STATE ENVIRONMENTAL POLICY ACT

State of Washington
Energy Facility Site Evaluation Council

DRAFT

Programmatic Environmental Impact Statement

High-Voltage Transmission Facilities in Washington

Olympia, Washington

MARCH 2025

STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL
PO Box 43172 • Olympia, Washington 98504-3172

March 31, 2025

Dear Interested Party:

The Energy Facility Site Evaluation Council (EFSEC) is **pleased to announce the release of the Draft Programmatic Environmental Impact Statement (EIS) for electrical transmission facilities** with a nominal voltage of 230 kilovolts (kV) or greater. This Programmatic EIS was prepared in accordance with the Washington State Environmental Policy Act (SEPA) under Chapter 43.21C.405 of the Revised Code of Washington (RCW) and Chapters 197-11 of the Washington Administrative Code (WAC).

EFSEC invites public review and comment on the Draft Programmatic EIS. A 30-day public comment period begins on March 31, 2025, ending on April 30, 2025, at 5:00 pm PDT.

EFSEC will hold a **public informational meeting on April 8, 2025**, featuring a presentation of the Draft Programmatic EIS materials. This meeting will provide an overview of the proposal, outline key findings, and offer an opportunity for the public to ask questions and learn more about the proposal before submitting formal comments. No comments will be taken at the public informational meeting, but **two public comment hearings will be held on April 22 and April 24, 2025**, during which comments will be taken. Furthermore, written comments can be submitted via the mail or online throughout April.

We welcome comments that are as specific as possible addressing the adequacy of the Programmatic EIS, impacts, methodologies, and identified mitigation measures. Following the public comment period, all comments received will be reviewed and considered in the preparation of the Final Programmatic EIS. The final document will include written responses to comments received.

PURPOSE OF THE PROGRAMMATIC EIS: Assessing the potential environmental impacts of high-voltage transmission facilities is the primary focus of this Programmatic EIS. It evaluates the construction, operation, maintenance, and modification of these facilities across Washington state. The Draft Programmatic EIS also identifies avoidance, minimization, and other mitigation measures to address probable significant adverse environmental impacts, as directed by the Washington State Legislature. It would serve as the first phase of SEPA-phased review for future high-voltage transmission facilities [WAC 197-11-060(5)]. Additional SEPA review would be required for any project-specific application.

HOW THE PROGRAMMATIC EIS WILL BE USED: The use of this Programmatic EIS for specific projects is unique. RCW 43.21C.408 mandates that a SEPA lead agency for a transmission facility covered by this Programmatic EIS must consider this document in its environmental review. Furthermore, when the recommendations (mitigation measures) identified in this Programmatic EIS are implemented for site-specific proposals, those proposals "are considered to have mitigated the probable significant adverse project-specific environmental impacts under this chapter for which recommendations were specifically developed."

DETAILS ABOUT HOW TO COMMENT AND PARTICIPATE IN THE PUBLIC MEETINGS

Public Informational Meeting:

- Tuesday, **April 8, 2025**, from 5:00 pm to 8:00 pm PDT
- Microsoft Teams: https://bit.ly/TransmissionPEIS-InfoMtg
- Phone: +1 (253) 372-2181
- Conference 365 313 874#

Comments may be submitted through the following methods:

- **Online:** https://comments.efsec.wa.gov/
- **By mail:** P.O. Box 43172 Olympia, WA 98503-3172
- **In-Person:** During the open virtual public comment hearings:

  Tuesday, **April 22, 2025,** from 5:00 pm to 8:00 pm PDT
  - Microsoft Teams: https://bit.ly/TransmissionPEIS-PubCmt1
  - Phone: +1 (253) 372-2181
  - Conference ID: 642 414 255#

  Thursday, **April 24, 2025,** from 5:00 pm to 8:00 pm PDT
  - Microsoft Teams: https://bit.ly/TransmissionPEIS-PubCmt2
  - Phone: +1 (253) 372-2181
  - Conference ID: 251 028 216#

For further details on the Draft Programmatic EIS and how to access it, please refer to the following information sources.

Information:	Contact:
Draft Programmatic EIS • Available on EFSEC's project website • Library locations for public review	https://www.efsec.wa. gov/energy-facilities/transmission-programmatic-eis
Questions about: • Public meetings/hearings • Accessing this Draft Programmatic EIS • Requesting a copy of the Draft Programmatic EIS o Printed or digital copies will be provided at the cost of production	Phone: (360)-664-1345 Email: efsec@efsec.wa.gov
Questions about the Draft Programmatic EIS Sean Greene Email: Sean.Greene@efsec.wa.gov Phone: (360)-485-1592	Patricia Betts Email: Patty.Betts@efsec.wa.gov Phone: (360)-974-9521

Your valuable input will enable EFSEC to produce a more complete and accurate Programmatic EIS.

Sincerely,

Sonia E. Bumpus
EFSEC Executive Director

FACT SHEET

State of Washington
Energy Facility
Site Evaluation Council

DRAFT

Programmatic Environmental Impact Statement

High-Voltage Transmission Facilities

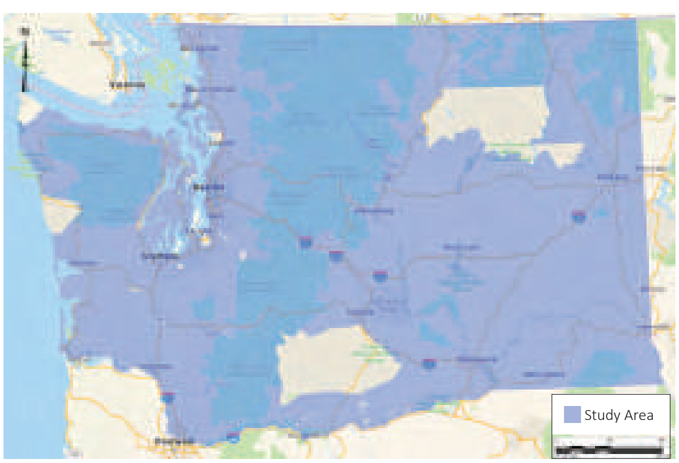
PURPOSE & NEED

As directed by the Washington State Legislature in RCW 43.21C.405, this Draft Programmatic EIS analyzes potential direct, indirect, and cumulative impacts of the construction, operation and maintenance, and upgrade or modification of transmission facilities in the State of Washington.

The Draft Programmatic EIS includes an analysis of potential impacts on the elements of the natural and built environment specified under RCW 43.21C.405(3), WAC 197-11-444, and WAC 463-60-535.

LOCATION

This EIS analyzes siting of these linear facilities in all geographic areas suitable for such facilities within in the State of Washington other than tribal lands and locations that would require undersea cables.



ALTERNATIVES

The Draft PEIS evaluates two alternatives:

- **ACTION ALTERNATIVE:** use of this Programmatic EIS to evaluate potential impacts associated with the development of high-voltage transmission facilities
- **NO ACTION ALTERNATIVE:** no use of this Programmatic EIS, with environmental review for project-level applications continuing in its current form

IMPLEMENTATION AND SUBSEQUENT ENVIRONMENTAL REVIEW

Once the Programmatic EIS is final, it will be used in accordance with RCW 43.21C.408 by applicants and lead agencies planning a transmission facility to:

- Avoid high impact areas,
- Incorporate identified mitigation, and
- Site and design a more environmentally-friendly proposal.

Project-specific applications would include a comprehensive review and analysis to identify the site-specific adverse impacts on resources to determine the suitability of this Draft Programmatic EIS. Environmental review may be phased by adopting or incorporating relevant information by reference from this Draft Programmatic EIS while evaluating site-specific adverse impacts of individual project applications. For more information on phased reviews, please refer to Chapter 1 of the EIS.

LICENSES, LAWS AND REGULATIONS

Because this is a programmatic EIS and the specific nature of projects that would be proposed is not yet known, it is not possible to present a complete list of permits, licenses, and approvals that could be required for project-specific applications. This Programmatic EIS includes a list of common regulatory, siting, and design considerations that projects would be expected to adhere to. Any project that would be subject to this Programmatic EIS would be required to receive all licenses and permits identified during the project-level environmental review.

CONTRIBUTORS

This document has been prepared under the direction of EFSEC. All chapters and appendices have been prepared for and approved by EFSEC. Key authors and principal contributors to the Draft Programmatic EIS analyses include:

STATE OF WASHINGTON
- Energy Facility Site Evaluation Council
- Department of Ecology
- Department of Fish and Wildlife
- Department of Natural Resources
- Department of Archaeology and Historic Preservation
- Department of Transportation
- Utilities and Transportation Commission

FEDERAL:
- U.S. Department of Defense

CONTRACTORS:
- WSP USA Inc
- WSP Canada
- Plateau CRM

Additional information on the authors and principal contributors is presented in Chapter 8 of the EIS.

RESPONSIBLE OFFICIAL CONTACT INFORMATION

WASHINGTON STATE ENERGY FACILITY SITE EVALUATION COUNCIL (EFSEC)
Sonia Bumpus, EFSEC Director

Date of Draft Programmatic EIS Issuance:

March 31, 2025

Date Comments are Due:

5:00 PM, April 30, 2025

CONTACT FOR QUESTIONS ABOUT THE EIS:

Sean Greene
EMAIL: Sean.Greene@efsec.wa.gov | **PHONE:** 360-485-1592

OR

Patricia Betts
EMAIL: Patty.Betts@efsec.wa.gov | **PHONE:** 360-974-9521

Planned Date of Final Programmatic EIS Issuance And Implementation:

June 30, 2025

Comments on the Draft Programmatic EIS received during the comment period will be addressed in the Final Programmatic EIS.

PUBLIC COMMENTS AND PUBLIC HEARINGS:

Submit comments by going to comments.efsec.wa.gov and selecting the campaign from the "open campaigns" section.

You may also send comments or questions about the public comment process to EFSEC by email at comments@efsec.wa.gov, phone at 360-664-1345, or by mail to this address:

EFSEC, re: Draft Programmatic EIS
PO Box 43172
Olympia, WA 98503-3172

Public Informational Meeting:

Tuesday, April 8, 2025,
5:00 PM – 8:00 PM PDT

MICROSOFT TEAMS:
bit.ly/PEIS_ScopingPubCmtMtg1

PHONE: 564-999-2000 | **CONFERENCE ID:** 335 336 413#

Public Comment Hearings:

Tuesday, April 22 and Thursday, April 24, 2025,
5:00 PM – 8:00 PM PDT

MICROSOFT TEAMS:
bit.ly/PEIS_ScopingPubCmtMtg1

PHONE: 564-999-2000 | **CONFERENCE ID:** 335 336 413#

REVIEWING THE DRAFT PROGRAMMATIC EIS

The Draft Programmatic EIS and associated resource reports developed specifically for this environmental review are available at no cost on EFSEC's Programmatic EIS website.

To obtain a printed copy, CD, or USB drive of the Draft Programmatic EIS (for the cost of production), please contact efsec@efsec.wa.gov or 360-664-1345.

efsec.wa.gov/energy-facilities/transmission-programmatic-eis

STATE ENVIRONMENTAL POLICY ACT

Draft Programmatic Environmental Impact Statement

High-Voltage Transmission Facilities in Washington

March 2025

This Page Intentionally Left Blank

Table of Contents

TABLES

FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
AASHTO	American Association of State Highway and Transportation Officials
ACS	American Community Survey
ACSR	aluminum conductor steel-reinforced
AI	artificial intelligence
APE	area of potential effect
APLIC	Avian Power Line Interaction Committee
APP	Avian Protection Plan
ASCE	American Society of Civil Engineers
B&O	business and occupation
BLM	Bureau of Land Management
BMP	best management practice
BPA	Bonneville Power Administration
CARA	Critical Aquifer Recharge Area
CCA	Climate Commitment Act
CEJST	Climate and Economic Justice Screening Tool
CEQ	Council on Environmental Quality
CETA	Clean Energy Transformation Act
CFR	Code of Federal Regulations
CH4	methane
CIE	Commission Internationale de l'Eclairage
cm	centimeters
CMP	Corridor Management Plan
CO	carbon monoxide
CO2	carbon dioxide
Covered Agencies	Washington State Departments of Ecology, Agriculture, Commerce, Health, Natural Resources, Transportation, and the Puget Sound Partnership
CSZ	Cascadia Subduction Zone
CWA	Clean Water Act
CZMA	Coastal Xone Management Act
DAHP	Washington State Department of Archaeology and Historic Preservation
dB	decibels
dBA	A-weighted decibels
dbh	diameter at breast height
DNR	Washington State Department of Natural Resources
DNS	Determination of Non-Significance
DOD	Department of Defense
DOE	U.S. Department of Energy
Ecology	Washington State Department of Ecology
EDNA	Environmental Designation for Noise Abatement
EFSEC	Washington Energy Facility Site Evaluation Council
EHD	Environmental Health Disparities
EIA	economic impact analysis
EIA	U.S. Energy Information Administration
EIS	Environmental Impact Statement
EJScreen	Environmental Justice Screen
ELF	extremely low frequency
ELF EMF	extremely low-frequency electromagnetic field
EMF	electromagnetic fields
EMI	electromagnetic interference
EPA	U.S. Environmental Protection Agency
ESA	Endangered species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FGTS	Freight and Goods Transportation System
FHWA	Federal Highway Administration
FLPMA	Federal Land Policy and Management Act
FPPA	Farmland Protection Policy Act
FSP	Freight System Plan
FTA	Federal Transit Administration
GDP	gross domestic product
GHG	greenhouse gas
GIS	geographic information system
GMA	Growth Management Act
GMP	Game Management Plan
GWMA	Groundwater Management Area
HDD	horizontal directional drilling
HEAL	Healthy Environment for All
HMP	habitat mitigation plan
HUC	hydrologic unit code
Hz	hertz
I	Interstate
IBA	Important Bird Area
IEEE	Institute of Electrical and Electronics Engineers
JSP	Job Skills Program
km	kilometers

km^2	square kilometers
KOP	key observation point
kV	kilovolt(s)
LANDFIRE	Landscape Fire and Resource Management Planning Tools
LEAD	Low-Income Energy Affordability Data
L_{eq}	equivalent continuous sound level
$L_{eq[8Hr]}$	equivalent noise level over 8 hours
LOS	level of service
LST	lattice steel tower
MDNS	mitigated determination of nonsignificance
mi2	square miles
MLRA	Major Land Resource Area
MTR	military training route
M_W	moment magnitude
MW	megawatts
NAAQS	National Ambient Air Quality Standards
NEMA	National Electrical Manufacturers Association
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NIETC	National Interest Electric Transmission Corridor
NO_2	nitrogen dioxide
NOTAM	Notice to Air Missions
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWPCC	Northwest Power and Conservation Council
NWSRS	National Wild and Scenic Rivers System
OFM	Office of Financial Management
OSHA	Occupational Safety and Health Administration
PAR	phase angle regulator
Parks Commission	Washington State Parks and Recreation Commission
PCB	polychlorinated biphenyls
PM	particulate matter
PM_{10}	particulate matter less than 10 microns
$PM_{2.5}$	particulate matter less than 2.5 microns
PSPS	public safety power shutoffs
PTBA	public transportation benefit area
PVC	polyvinyl chloride
RCO	Washington State Recreation and Conservation Office
RCW	Revised Code of Washington
RFA	reasonably foreseeable action
RFD	reasonably foreseeable development
RMP	Risk Management Plan
ROW	right-of-way
RSEI	Risk-Screening Environmental Indicators
RTA	regional transit authority
SB	Senate Bill
SEA-TAC	Seattle-Tacoma International Airport
SEPA	State Environmental Policy Act
SES	State Energy Strategy
SF_6	sulfur hexafluoride
SME	subject matter expert
SMP	Shoreline Master Program
SO_2	sulfur dioxide
SPA	special protection area
SR	State Route
SSA	Sole Source Aquifer
SWAP	State Wildlife Action Plan
SWPA	Surface Water Protection Area
TBM	tunnel boring machine
TCP	Traditional Cultural Place
TCWG	Transmission Corridors Work Group
TIA	Traffic Impact Assessment
TMDL	total maximum daily load
transmission facilities	high-voltage electric transmission facilities
TRI	Toxic Release Inventory
TSP	tubular steel pole
USC	United States Code
USDOT	U.S. Department of Transportation
USFS	U.S. Department of Agriculture, Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
UTC	Utilities and Transportation Commission
UV	ultraviolet
VMP	vegetation management plan

VOC	volatile organic compound
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WFWC	Washington Fish and Wildlife Commission
WHCWG	Washington Wildlife Habitat Connectivity Working Group
WHPA	well head protection area
WHR	Washington Heritage Register
WISAARD	Washington Information System for Architectural and Archaeological Records Data
WISC	Washington Invasive Species Council
WNHP	Washington Natural Heritage Program
WOTUS	Waters of the United States
WSDOT	Washington State Department of Transportation
WTSC	Washington Traffic Safety Commission
XLPE	cross-linked polyethylene
YFTB	Yakima fold and thrust belt

This Page Intentionally Left Blank

EXECUTIVE SUMMARY

The Washington Energy Facility Site Evaluation Council (EFSEC) is undertaking a broad evaluation of the potential environmental, cultural, and economic impacts of the construction, operation and maintenance, and upgrade or modification of electrical transmission facilities with a nominal voltage of 230 kilovolts (kV) or greater (transmission facilities) throughout the State of Washington. This analysis is being considered to improve and expand the planning of transmission facilities in response to Senate Bill (SB) 5165, codified in Washington as Revised Code of Washington (RCW) 43.21C.405 and signed by Governor Inslee on May 3, 2023, becoming effective July 23, 2023.

ES 1.0 INTRODUCTION

This Draft Programmatic Environmental Impact Statement (EIS) analyzes transmission facilities at a high level—not individual projects—to identify any common impacts, probable significant adverse environmental impacts, and measures to avoid, minimize, and mitigate probable significant adverse environmental impacts. “Impacts” are the effects or consequences of actions (Washington Administrative Code [WAC] 197-11-752) on the elements of the environment identified.

As directed by the Washington State Legislature in RCW 43.21C.405, this Draft Programmatic EIS analyzes potential direct, indirect, and cumulative impacts of the construction, operation and maintenance, and upgrade or modification of transmission facilities in the State of Washington. The Draft Programmatic EIS includes an analysis of potential impacts on the elements of the natural and built environment specified under WAC 197-11-444. It contains a comprehensive evaluation of impacts and identifies standard mitigation measures for the following topics:

- Earth Resources (including seismic hazards)
- Air Quality (including greenhouse gases)
- Water Resources
- Vegetation
- Habitat, Wildlife, and Fish
- Energy and Natural Resources
- Public Health and Safety
- Land and Shoreline Use (including military, agricultural, and ranching uses)
- Transportation
- Public Services and Utilities
- Visual Quality
- Noise and Vibration
- Recreation
- Historic and Cultural Resources (including Tribal rights, interests, and resources)
- Socioeconomics (including Environmental Justice and Overburdened Communities)[1]

[1] Although not listed among the elements of the environment in WAC 197-11-444, socioeconomics was added to the list of elements analyzed to reflect information on potential socioeconomic impacts provided in response to WAC 463-60-535.

In accordance with the Washington State Environmental Policy Act (SEPA), this Draft Programmatic EIS weighs the likelihood of occurrence of various impacts with the anticipated physical setting, magnitude, and duration of each impact (WAC 197-11-794) and considers several factors when analyzing potential impacts.

This Draft Programmatic EIS presents an analysis of impacts for three assumed project phases—construction, operation and maintenance, and upgrade or modification—and examines the Action Alternative and a No Action Alternative.

ES 1.1 Action Alternative

Under the Action Alternative, this Draft Programmatic EIS analyzes the potential impacts of transmission facilities and contributes to understanding the landscape-scale context of impacts from transmission facility development in Washington. The purpose of the Action Alternative is to identify common impacts and identify, analyze, and adopt, as appropriate, potential mitigation measures to be applied to transmission facilities so that project-specific reviews can focus on project impacts that could not be analyzed in this Programmatic EIS and that require additional analysis and review or coordination with other stakeholders.

This Draft Programmatic EIS would guide the development of project-specific applications for transmission facilities. The Action Alternative creates a phased strategy for the SEPA review process. It provides transmission developers with an opportunity to incorporate the mitigation identified in the Programmatic EIS into their projects during the planning stages and prior to submitting applications to SEPA Lead Agencies for review. Applicants' incorporation of this guidance would maximize the utility of the Programmatic EIS and would reduce the time needed for environmental review by SEPA Lead Agencies, as the Programmatic EIS would serve as the first phase of a phased SEPA review prior to the Lead Agencies' evaluation of individual project proposals.

ES 1.2 No Action Alternative

SEPA requires the analysis of a No Action Alternative. Under the No Action Alternative for this Draft Programmatic EIS, the SEPA Lead Agency for each proposed transmission project would continue the current process of review and management of transmission development under approved land use plans, SEPA, and regulations for transmission.

The impacts associated with the Action Alternative and the No Action Alternative are described quantitatively herein if sufficient data or information is available to do so. In cases where detailed information is not available, and such information is not essential to determining the level of adverse environmental impacts, impacts are described qualitatively. To determine potential impacts, this analysis considers existing laws and regulations, best management practices, and typical design considerations.

ES 1.3 Cumulative Impacts

The analysis of impacts from transmission facilities on the environment and resources may not be significant when considered alone, but when considered in combination with the impacts of reasonably foreseeable, past, and present actions, can result in a significant impact on the environment and resources of concern. SEPA requires that SEPA Lead Agencies address cumulative impacts.

Cumulative impacts are the combined result of incremental direct and indirect impacts on resources of concern from a project and past, present, and reasonably foreseeable actions. Reasonably foreseeable actions generally include actions that are currently underway, formally proposed or planned, or highly likely to occur based on available information. These actions, when combined with the impacts of a specific project, can lead to significant cumulative effects on the environment and resources of concern. The cumulative effects of past projects and actions are not individually identified but are addressed in the Affected Environment for each resource discussed in Chapter 3.

ES 2.0 BACKGROUND

The Washington State Legislature passed the Clean Energy Transformation Act (CETA) in 2019, which requires Washington's electric utilities to meet 100 percent of their retail electric load using non-emitting and renewable resources by January 1, 2045; eliminate coal-fired resources from their allocation of electricity by December 31, 2025; and make all retail sales of electricity greenhouse gas–neutral by January 1, 2030. The Legislature found that the electric power system serving Washington would require additional high-voltage transmission capacity to achieve the state's objectives and legal requirements. Consistent with Section 25 of CETA, EFSEC convened a Transmission Corridors Work Group.

The TCWG provided a Cover Letter and Final Report to Governor Inslee and the appropriate legislative committees on August 1, 2022 (EFSEC 2022a, 2022b). The Final Report identifies recommendations to guide transmission facility development in the state, while the Cover Letter summarizes the TCWG's work completed to date. The Cover Letter highlights the following key points that emerged from the work of the TCWG:

- Regional and interregional planning
- Staff resources in state agencies
- Enhanced resources for Tribes
- Pre-application planning and coordination

The Legislature anticipated the crucial role of additional transmission capacity in Washington and passed SB 5165 to align the needs of utility providers with CETA and enhance electric transmission planning. SB 5165 was codified into RCW 43.21C.405 and RCW 43.21C.408. EFSEC was also instructed to prepare nonproject environmental reviews, also known as Programmatic EISs, pursuant to RCW 43.21C.030. The purpose of the Programmatic EISs is to assess and disclose any probable significant adverse environmental impacts and identify related mitigation measures for transmission facilities in Washington. This Draft Programmatic EIS provides this requested analysis for two options (e.g., overhead and underground) and multiple phases of transmission facility development (e.g., construction, operation and maintenance, and upgrade or modification). Additional nonproject environmental reviews could be completed for areas identified as outside the scope of this Draft Programmatic EIS, if additional data becomes available.

ES 2.1 Purpose and Need

Washington State needs more transmission infrastructure for several reasons, including population growth, renewable energy integration, grid reliability and resilience, and economic growth. Expanded transmission capacity and modifications that make existing transmission capacity more effective would benefit electricity consumers in the state by making the electric power system more reliable and increasing access to more affordable sources of electricity in the state and across the western United States and Canada.

Existing constraints on transmission capacity within the state already present challenges in ensuring adequate and affordable supplies of clean electricity. Of particular concern is the capability of the transmission system to deliver clean electricity to and within the central Puget Sound area.

Transmission projects typically take at least a decade to develop and permit. This timing presents particular challenges for achieving the state's greenhouse gas emissions reduction mandates, which include ambitious benchmarks starting in 2030. There is a need to accelerate the timeline for transmission development while still protecting other Washington values, including land use, environmental protection, and Tribal rights.

Several factors contribute to the challenge of making timely and cost-effective expansions of high-voltage transmission systems. Transmission planning must reflect not just the requirements to connect individual generating resources to the grid but also the need to transfer electricity across the state and the West as a region. Transmission planning must incorporate state policies and laws in planning objectives.

The following principles recommended by the TCWG were considered in helping to expedite environmental review and permitting without compromising protections. These principles provide foundational, solution-oriented direction throughout transmission system development:

1. *Align and coordinate process, timing, and analysis methodologies within and across National Environmental Policy Act (NEPA) and other federal laws, and State Environmental Policy Act (SEPA) during project planning.*
2. *Use EFSEC for cross-jurisdictional long-range transmission projects.*
3. *Identify opportunities for federal and state programs to establish programmatic permitting agreements for transmission projects.*
4. *Identify specific geographic areas for siting transmission within corridors where additional transmission capacity is needed to meet the goals of CETA, as part of regional planning for grid-critical transmission investments/projects.*
5. *Approach expediting review and permitting with the primary goal of avoiding cultural resource impacts in transmission corridors.*
6. *Invest in proactive and meaningful Tribal consultation.*
7. *Invest in relationship-building between project developers and Tribes.*
8. *Look for a "win" for Tribes and cultural resources.*
9. *Leverage the expertise of the Department of Archaeological and Historic Preservation (DAHP).*
10. *Increase funding to Tribes and DAHP to reduce staffing constraints that impede and slow Tribal cultural resources review and completion of ethnographic studies.* (EFSEC 2022a)

This Draft Programmatic EIS serves several important purposes, including the following:

- **Provide a Broad Environmental Impact Assessment:** It presents a comprehensive evaluation of environmental impacts associated with transmission facility development at a broad level throughout Washington, rather than focusing on specific sites or corridors.

- **Facilitate Streamlined Planning:** It assesses common impacts and mitigation strategies early in the planning stage, which helps to streamline review and approval processes for individual transmission facility projects in the future. Streamlining the process can save time and resources for both developers and regulatory agencies.

- **Support Informed Decision-Making:** It provides information that can help developers understand impacts up front and make initial siting[2] and design[3] choices that could avoid or minimize impacts at earlier phases of project consideration, potentially expediting the permitting timeline for future transmission facility development.
- **Identify Mitigation Strategies:** It identifies effective avoidance, minimization, and mitigation measures[4] to address adverse environmental impacts, which can be applied to future transmission facility projects that fall within the scope of this Draft Programmatic EIS.
- **Initiate Public and Stakeholder Engagement:** It provides an up-front platform for public and stakeholder input, ensuring that community concerns and interests are considered early in the planning process.

Overall, this Draft Programmatic EIS helps facilitate the development and review of transmission infrastructure in an environmentally responsible and efficient manner.

ES 2.2 Decisions to Be Made

This Draft Programmatic EIS, when finalized, is designed to provide a broad environmental review for future project decisions. This Draft Programmatic EIS evaluates the potential environmental impacts of transmission facilities at a high level, rather than focusing on specific projects. Once finalized, a SEPA Lead Agency reviewing a project-specific application for an electrical transmission facility would decide to do one of the following:

- **Adopt** the Programmatic EIS, whereby an agency determines to use the Programmatic EIS unchanged, if the project-specific proposal would not cause probable significant adverse environmental impacts beyond those identified in this Programmatic EIS.
- **Prepare an addendum,** whereby an agency adopts the Programmatic EIS in full but adds minor analyses or information about a project-specific proposal that would not contribute any new or increased probable significant adverse environmental impacts to those identified in the Programmatic EIS.
- **Incorporate** the Programmatic EIS by reference, whereby an agency preparing an environmental document includes all or part of this Programmatic EIS by reference in their SEPA review.
- **Prepare a supplemental EIS,** whereby an agency adopts the Programmatic EIS in full but identifies and assesses substantial impacts or mitigation that have not been addressed in the Programmatic EIS.

SEPA allows for non-project reviews to provide a comprehensive analysis of potential environmental impacts for plans, policies, or programs. The SEPA Lead Agency is still required to conduct a project-specific environmental review even if a non-project environmental review has been conducted. This additional project-specific environmental review would particularly address any impacts or mitigation measures that were not adequately covered in the non-project review. This ensures that all significant environmental impacts are thoroughly evaluated and mitigated, providing a more detailed and focused analysis for individual projects.

---

[2] Siting involves identifying and evaluating potential routes for transmission facilities.

[3] Design involves the detailed planning of the transmission infrastructure.

[4] WAC 197-11-768 outlines the concept of mitigation in the context of environmental impact. Mitigation includes 1. Avoiding the impact, 2. Minimizing impacts, 3. Rectifying the Impact, 4. Reducing or eliminating the impact, 5. Compensating for the impact, and 6. Monitoring the impact.

ES 2.3 Scope of Analysis

EFSEC has determined that the *Planning Area* of this Draft Programmatic EIS will include the entire State of Washington. The *Study Area,* or geographic scope, includes all lands across Washington except for those covered by the exclusion criteria identified in Table 1.4-1 in Chapter 1, Introduction.

The scope of the Draft Programmatic EIS is limited to the probable, significant adverse environmental impacts in geographic areas suitable for the electrical transmission facilities with a nominal voltage of 230 kV or greater. As directed by the RCW 43.21C.405, the Draft Programmatic EIS is not required to evaluate geographic areas that lack the characteristics necessary to support electrical transmission facilities with a nominal voltage of 230 kV or greater.

The following areas will be excluded from the geographic scope of study for this Draft Programmatic EIS:

- Undersea or oceanic transmission[5]
- Tribal reservation lands[6]

Figure ES-1 shows the geographic scope, or Study Area, for this Draft Programmatic EIS. A full-sized figure representing the Study Area, Figure 1.5-1, is provided in Chapter 1, Introduction.

[5] Programmatic EIS documents address broad, overarching policies, plans, or programs rather than specific projects. Sea cables are considered to be too specific or detailed for the broad focus of this nonproject review. Additionally, sea cables, especially those that cross international water or state boundaries, may fall under different regulatory frameworks or jurisdictions, thus requiring separate, more specific environmental reviews. Lastly, the environmental impacts and technical considerations of sea cables can be significantly different from those of land-based transmission facilities. These differences might necessitate a distinct, focused EIS to adequately address the unique challenges and impacts.

[6] For the purposes of this scoping document, Tribal lands are not included in the Study Area. EFSEC will communicate with each Tribe that has reservation lands in the general scoping area, and if a Tribe chooses to include their lands, those lands will be added to the Study Area for the Final Programmatic EIS. Tribal lands are sovereign territories, and decisions regarding their use typically fall under the jurisdiction of the respective Tribal Government. Tribal lands often have their own regulatory processes and environmental review requirements, which may differ from state or federal processes. Federal agencies are required to engage in government-to-government consultation with Tribes. This process ensures that Tribal concerns and perspectives are adequately addressed.

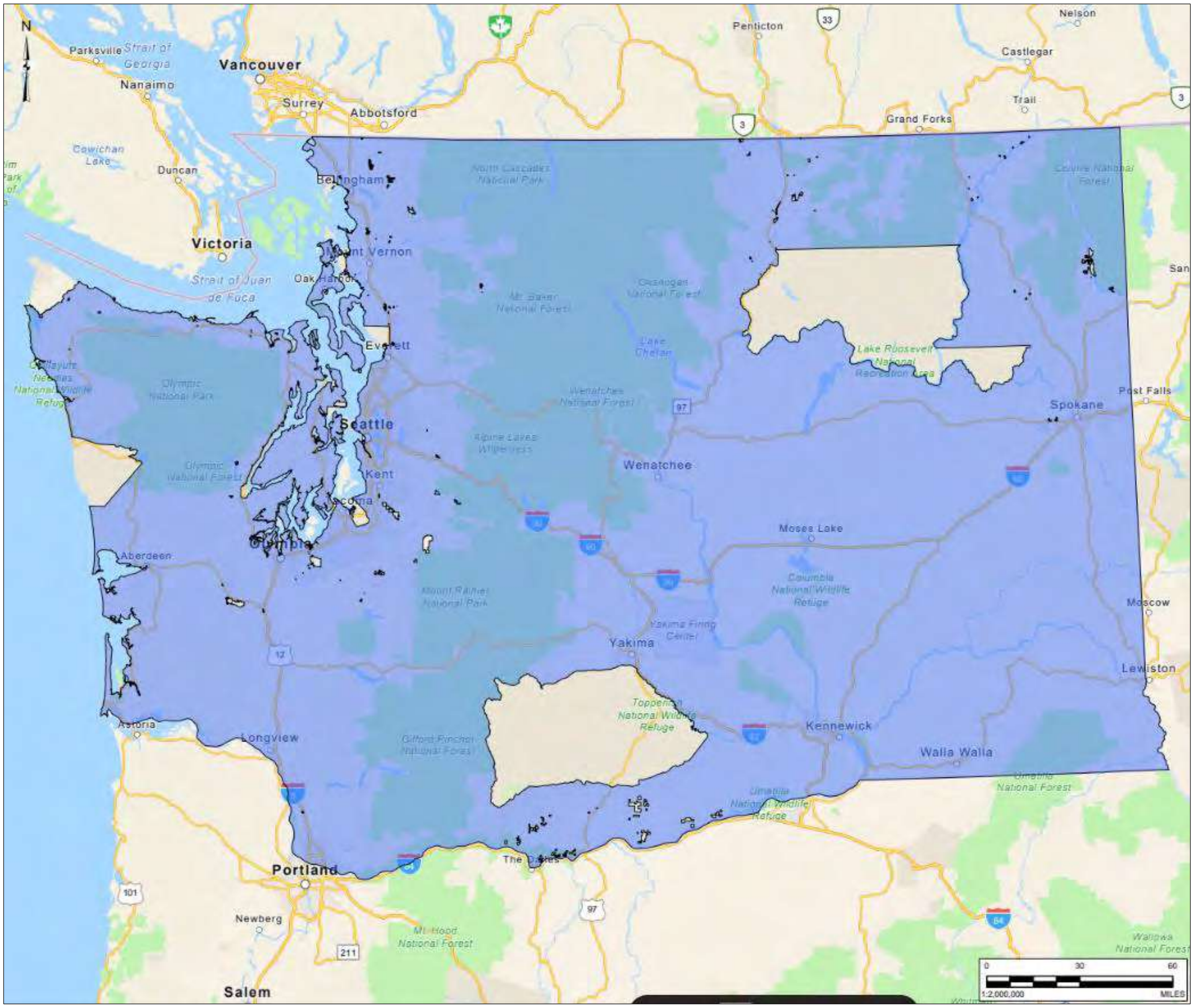


Figure ES-1: Study Area

ES 2.4 Decision Tree

Environmental reviews often involve complex decisions with multiple variables. A decision tree is a visual tool used to guide decision-making processes by outlining a series of questions and corresponding actions or outcomes. It helps users navigate complex regulations, policies, or procedures by breaking them down into manageable steps.

The decision tree is provided in **Figure ES-2** and discussed further in Chapter 1, Introduction. The decision tree breaks down into manageable steps how this Draft Programmatic EIS can be considered in project reviews. Because transmission facilities must connect two or more locations in a safe and reliable manner across the entire length of the project, agency authorizations can be streamlined so that environmental and regulatory considerations can also be simultaneously addressed over the entire length of the project. Within existing laws and regulations, it is possible to simplify the state authorization for transmission facilities.

RCW 43.21C.408 requires that the SEPA Lead Agency conducting a project-level environmental review of an electrical transmission facility with a nominal voltage of 230 kV or greater must consider the nonproject EIS completed pursuant to RCW 43.21C.405. This Draft Programmatic EIS, once finalized, represents the nonproject EIS. It is the intent of this Programmatic EIS to identify the SEPA steps for the SEPA lead agency to expedite the application process for transmission facility projects in Washington. To highlight the opportunities for efficiency gained by applicants, the SEPA review process anticipated by the SEPA Lead Agency has been identified in a decision tree.

In this Draft Programmatic EIS, general conditions and avoidance criteria were identified based on the affected environment and impact analysis. By incorporating these two assumptions into the baseline analysis, this Draft Programmatic EIS provides a framework for understanding and managing probable significant adverse environmental impacts of projects at a broader scale. This approach helps ensure that environmental protection measures are considered from the outset and are integrated into the planning and decision-making process while offering a consistent understanding of what impacts may require project-specific environmental review and mitigation outside the scope of this Draft Programmatic EIS.

Chapter 3 weighs the potential impacts on elements of the environment that would result from transmission facility development after considering the application of laws and regulations; siting and design considerations, including agency guidance and BMPs; general conditions, and avoidance criteria resulting in an impact determination. General conditions and avoidance criteria are designed to reduce the time and resources needed for subsequent project-specific environmental review, allowing developers and planners to better anticipate regulatory requirements. All general conditions, avoidance criteria, and mitigation measures are provided in Appendix 3.1-1.

STEP 1

Determine if the project-specific application fits the definition of a **transmission facility**[1] analyzed within the prescribed Study Area[2] of this Programmatic EIS.

NO

Follow applicable SEPA environmental review and permitting processes.

The SEPA Lead Agency would conduct an environmental review in accordance with Chapter 43.21C RCW and Chapter 197-11 WAC for the project-specific application and make a SEPA Threshold Determination.

Regarding this Programmatic EIS, the SEPA Lead Agency could **INCORPORATE BY REFERENCE.**

STEP 2

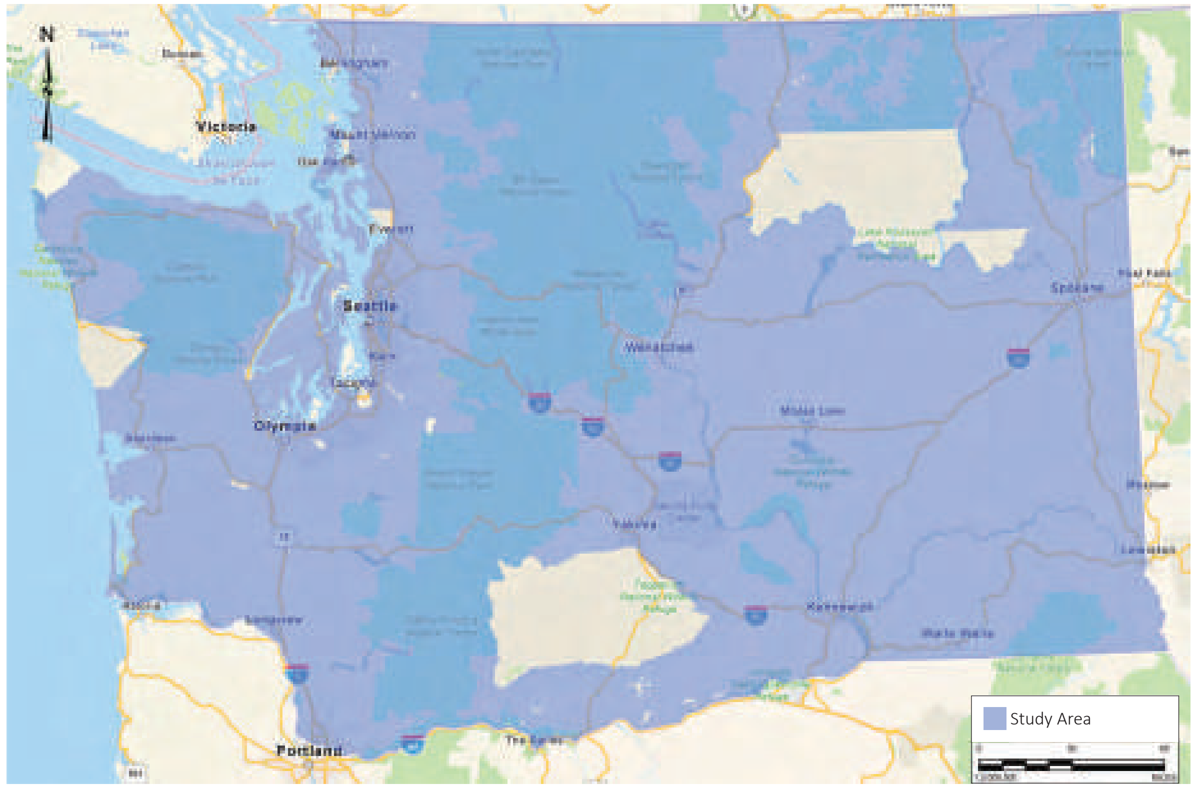
YES | Would the project-specific application have a federal nexus?

YES

Federal environmental review processes (e.g., NEPA) apply, which would include coordination with EFSEC for environmental review.

Regarding this Programmatic EIS, the SEPA Lead Agency could:

- Adopt the NEPA document as part of their SEPA environmental review process and documentation. **Proceed to Step 3**. *OR*
- Incorporate the NEPA document by reference and complete a separate SEPA analysis. **Proceed to Step 3**.



STEP 3

NO

STEP 3.1

Does the project comply with all state, federal, and local regulations[3]?

NO | This Programmatic EIS did not analyze this scenario.

THE FOLLOWING IS REQUIRED:

- **APP** Identify the regulations that cannot be followed and provide an explanation.
- ***SLA*** Complete additional environmental review and identify mitigation.[3, 7]

Proceed to Step 3.2.

YES

STEP 3.2

Are design considerations and BMPs[3] accounted for in the design of the project-specific application?

NO | This Programmatic EIS did not analyze this scenario.

THE FOLLOWING IS REQUIRED:

- **APP** Identify the design considerations and BMPs[3] that are not proposed as part of the project-specific application and provide an explanation.
- ***SLA*** Complete additional environmental review and identify mitigation.[3, 7]

Proceed to Step 3.3.

YES

STEP 3.3

Would the project comply with the identified **general conditions**[4] within this Programmatic EIS?

NO | This Programmatic EIS did not analyze this scenario.

THE FOLLOWING IS REQUIRED:

- **APP** Identify the general conditions that are not complied with and provide an explanation.
- ***SLA*** Complete additional environmental review and identify mitigation.[3, 7]

Proceed to Step 3.4.

YES

STEP 3.4

Does the project comply with the identified **avoidance criteria**[5] within this Programmatic EIS?

NO | This Programmatic EIS did not analyze this scenario.

THE FOLLOWING IS REQUIRED:

- **APP** Identify avoidance criteria that are not complied with and provide an explanation.
- ***SLA*** Complete additional environmental review and identify mitigation.[3, 7]

Proceed to Step 3.5.

YES

STEP 3.5

Are all probable significant adverse environmental impacts of the project identified and analyzed in this Programmatic EIS?

NO | This Programmatic EIS did not analyze this scenario.

THE FOLLOWING IS REQUIRED:

- ***SLA*** Identify and complete additional environmental review for probable significant adverse environmental impacts not analyzed in this Programmatic EIS and identify mitigation.[3, 7]

Proceed to Step 3.6.

YES

STEP 3.6[6]

Has the applicant committed to the **mitigation**[7] **measures**[3] identified within this Programmatic EIS associated with moderate or high impacts?

NO | This Programmatic EIS did not analyze this scenario.

THE FOLLOWING IS REQUIRED:

- **APP** Identify the mitigation[7] measures[3] that are not proposed as part of the project and provide an explanation.
- ***SLA*** Complete additional environmental review and identify mitigation.[3, 7]

Proceed to Step 4.

YES | **Proceed to Step 4**.

STEP 4[6]

The ***SLA*** has the responsibility to determine the appropriate level and type of environmental review for each project-specific application:

STEP 4.1

ADOPT the Programmatic EIS without the need for an addendum or supplemental analysis. This indicates that there are no additional project-specific details or analyses of impacts that should be recorded in the SEPA documentation.

OR

STEP 4.2

PREPARE AN ADDENDUM, in addition to adopting the Programmatic EIS, that adds analyses or information about the project but does not substantially change the analysis of significant impacts and alternatives addressed in this Programmatic EIS.

OR

STEP 4.3

PREPARE A SUPPLEMENTAL EIS, in addition to adopting the Programmatic EIS, that adds new analyses or information related to probable significant adverse environmental impacts of the project that have not been addressed in this Programmatic EIS. This may include project-specific impacts that were not identified in this Programmatic EIS or that were identified in this Programmatic EIS, but are determined by the SEPA Lead Agency through project-specific environmental review to have been insufficiently evaluated.

OR

STEP 4.4

INCORPORATE BY REFERENCE if the intent is for the SEPA Lead Agency to produce a full, distinct project-specific EIS.

REFERENCES

SLA	Responsibility of SEPA Lead Agency
APP	Responsibility of Applicant
BMP	Best Management Practice
EIS	Environmental Impact Statement
kV	Kilovolt
NEPA	National Environmental Policy Act
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
WAC	Washington Administrative Code

1 The construction, operation and maintenance, and upgrade or modification of electrical transmission facilities with a nominal voltage of 230kV or greater.

2 For the purposes of this Draft Programmatic EIS, Tribal lands and undersea cables are not included in the Study Area.

3 As applicable to project-specific applications.

4 As used in this Draft Programmatic EIS, a measure that provides a consistent baseline for evaluating the potential impacts of project-specific applications for transmission facility development.

5 Criteria that, when implemented, would narrow the scope of the project-specific environmental review. These broad mitigation measures would be anticipated to avoid otherwise significant impacts for project-specific applications.

6 If all environmental mitigation strategies from this Programmatic EIS have been implemented then mitigation would be deemed sufficient for all probable significant adverse environmental impacts addressed in this Programmatic EIS.

7 A specific step or action taken to address impacts of project development or action.

This Page Intentionally Left Blank

ES 3.0 RECOMMENDATIONS FROM THIS DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

Following the preparation of this Draft Programmatic EIS, the following key recommendations were identified to help streamline the process of siting, permitting, and addressing potential challenges for transmission facilities:

1) **Expand Use of the Programmatic EIS:** Agencies could increase the use of this Programmatic EIS for transmission facilities on federal and state land if a memorandum of agreement for coordinating and adopting documents between federal agencies and state agencies was considered and completed.

2) **Enhance Coordination:** Identify and complete the tools necessary to improve coordination between applicants, stakeholders, and agencies.

3) **Stakeholder and Partner Engagement:** Hold additional workshops with stakeholders and partners to increase engagement throughout the process to address concerns and gather input in an effort to help mitigate opposition and delays.

4) **Data and Evidence-Based Decisions:** Identify a mechanism and funding to utilize extensive data compilation and evidence-based recommendations to inform decision-making and overcome barriers to transmission facilities.

5) **Capacity Building:** Ensure that agencies have sufficient capacity and resources to handle the increasing number of projects proposed within the scope of this Programmatic EIS

6) **Environmental and Community Protection:** Balance the need for rapid deployment with the protection of environmental integrity and community interests.

7) **Update Guidance Information, as Appropriate:** As new data or scientific findings become available, the information in the appendices may need to be updated to reflect the most current information. Updates in environmental laws, regulations, or policies may also necessitate changes in guidance to ensure compliance. Feedback from public consultations or stakeholder engagements might highlight areas that require additional information or clarification.

8) **Formally Update the Programmatic EIS:** Periodically update the Programmatic EIS (Supplemental or Addendum) with new information and analyses that has been collected, including review of avoidance criteria to identify possible additional analysis.

9) **Prepare a Subsequent Programmatic EIS:** Prepare a Programmatic PEIS using multiple least-conflict corridors identified by other sources for future transmission development and examining corridor-specific impacts and mitigation.

ES 4.0 SUMMARY OF IMPACTS

This Draft Programmatic EIS comprehensively evaluates the potential environmental, social, and economic impacts of transmission facilities. By identifying adverse impacts, this Draft Programmatic EIS aims to inform decision-makers and stakeholders, ensuring that the implementation aligns with sustainable development goals and regulatory requirements. This analysis underscores the importance of avoidance criteria and mitigation measures to minimize negative consequences while maximizing positive outcomes for the environment and society. **Table ES-1** provides a summary, organized by element of the environment, of the impacts identified and analyzed.

Table ES-1: Summary of Impacts for all Elements of the Environment

Element of the Environment	Potential Impact Analyzed
Earth Resources (Section 3.2)	▪ Alteration of topography and drainage patterns ▪ Increased soil erosion and/or accretion ▪ Compaction of soil ▪ Damage from a geological event or geohazard
Air Quality (Section 3.3)	▪ Increased fugitive dust emissions ▪ Increased emissions from fuel-burning equipment ▪ Increased SF_6 emissions
Water Resources (Section 3.4)	▪ Impacts on water quality, including: - Changes in sedimentation - Changes in water chemistry ▪ Impacts on water quantity, including: - Increased water usage - Altered hydrology - Temporary water diversions - Groundwater extraction ▪ Damage to infrastructure
Vegetation (Section 3.5)	▪ Direct impacts and mortality, including: - Loss of habitat - Loss of species or populations - Loss of ecosystem functionality ▪ Indirect impacts, including: - Introduction or spread of invasive plants or noxious weeds - Surface runoff - Deposition of dust - Introduction of hazardous substances ▪ Fragmentation
Habitat, Wildlife, and Fish (Section 3.6)	▪ Direct habitat loss ▪ Indirect habitat loss ▪ Mortality of species ▪ Barriers to movement ▪ Fragmentation
Energy and Natural Resources (Section 3.7)	▪ Consumption of non-renewable resources ▪ Consumption of renewable resources ▪ Consumption of energy
Public Health and Safety (Section 3.8)	▪ Increase in accidents and injuries ▪ Exposure to hazardous materials ▪ Increased risk of wildfire ▪ Exposure to EMF ▪ Excess heat generation ▪ Inundation of vaults in floodplains

Element of the Environment	Potential Impact Analyzed
Land and Shoreline Use (Section 3.9)	▪ Incompatible land use ▪ Conflict with relevant goals and policies ▪ Loss of function and value of shorelines ▪ Loss of function and value of agricultural lands and rangelands ▪ Conflicts with military utilized airspace and civilian airfield operations
Transportation (Section 3.10)	▪ Impacts on vehicular transportation and infrastructure, including: - Closures and diversions - Increased traffic and increased collision risk - Impacts from access road construction - Impacts on road authority ▪ Impacts on waterborne vessels and infrastructure, including: - Closures and diversions - Increased collision risk - Impacts from infrastructure modification ▪ Impacts on rail transportation and infrastructure, including: - Closures and diversions - Increased collision risk - Impacts on rail stability - Impacts from infrastructure modification ▪ Impacts on air transportation and infrastructure[7], including: - Impacts from airspace restrictions - Increased collision risk - Decreased visibility
Public Services and Utilities (Section 3.11)	▪ Conflicts with existing utility infrastructure ▪ Increased solid waste production ▪ Increased water demand ▪ Increased demand for fire protection services, law enforcement, and emergency responders ▪ Increased emergency response times ▪ Increased risk of power outages at public service facilities
Visual Quality (Section 3.12)	▪ Degradation of scenic natural resources ▪ Degradation of aesthetics ▪ Degradation of night sky
Noise and Vibration (Section 3.13)	▪ Increased noise at sensitive receptors ▪ Increased ground-borne vibration at off-site structures ▪ Hearing loss
Recreation (Section 3.14)	▪ Temporary closure or restricted access ▪ Permanent closure ▪ Increase in use ▪ Change in integrity ▪ Increased risk of wildfire

[7] Section 3.09, Land and Shoreline Use, analyzes impacts on military utilized airspace and civilian airfield operations

Element of the Environment	Potential Impact Analyzed
Cultural and Historic Resources (Section 3.15)	▪ Physical impacts on historic and cultural resources ▪ Visual impacts on historic and cultural resources ▪ Physical impacts on TCPs and Tribal resources ▪ Visual impacts on TCPs and Tribal resources
Socioeconomics and Environmental Justice (Section 3.16)	▪ Degradation of the natural and built environment, including: - Noise and vibration - Air quality - Visual quality - Land and shoreline use, and recreation ▪ Changes in housing availability ▪ Changes in home values ▪ Changes in fiscal conditions and employment

1.0 CHAPTER 1 – INTRODUCTION

1.1 Programmatic Environmental Impact Statement Purpose and Overview

This Draft Programmatic Environmental Impact Statement (EIS)[1] evaluates potential future construction and operation of electrical transmission facilities with a nominal voltage[2] of 230 kilovolts (kV) or greater (referred to herein as “transmission facilities”) throughout the State of Washington. The Washington Energy Facility Site Evaluation Council (EFSEC) is fulfilling the directive of Revised Code of Washington (RCW) 43.21C.405 by completing this Draft Programmatic EIS for electric power system transmission planning.

This Draft Programmatic EIS generally evaluates adverse impacts associated with different types of transmission facility developments; it does not propose, evaluate, or approve a specific project. This nonproject environmental review[3] document is intended to be used for future planning and development of transmission facilities, which would require a subsequent environmental review of the project-specific application. That review would consist of evaluating the project’s consistency with the Programmatic EIS, including the applicability of the identified general conditions[4], avoidance criteria[5], and mitigation[6] measures, and analysis of additional impacts and mitigation, should any be identified. Overall, the Programmatic EIS is intended to:

- **Provide a Broad Environmental Impact Assessment:** It presents a comprehensive evaluation of environmental impacts associated with transmission facility development at a broad level throughout the State of Washington, rather than focusing on specific sites or corridors.
- **Facilitate Streamlined Planning:** It assesses common impacts and mitigation strategies early in the planning process, which helps to streamline review and approval processes for individual transmission facility projects in the future. Streamlining the process can save time and resources for both developers and regulatory agencies.
- **Support Informed Decision-Making:** It provides information that can help developers understand impacts up front and make initial siting[7] and design choices that could avoid or minimize impacts at earlier phases of project consideration, potentially expediting the permitting timeline for future transmission facility development.

---

[1] A type of EIS that evaluates the environmental impacts of broad policies, plans, or programs. This approach allows for a comprehensive analysis of potential impacts at a higher level, which can then be used to inform more specific, subsequent environmental reviews.

[2] The standard voltage level assigned to a transmission facility. The voltage level is used as a reference point for the design, operation, and regulation of the facility.

[3] Defined in WAC 197-11-70(b) as an environmental analysis of governmental actions that are not tied to a specific project. These actions typically involve decisions about policies, plans, or programs that set standards for controlling or modifying the environment, or that govern a series of connected actions.

[4] As used in this Draft Programmatic EIS, a measure that provides a consistent baseline for evaluating the potential impacts of project-specific applications for transmission facility development. This Draft Programmatic EIS assumes that applicants adhere to the general conditions specified in Section 3.1.

[5] Criteria that limit the scope of the environmental review and provide a consistent baseline for evaluating the potential impacts of project-specific applications. This Draft Programmatic EIS assumes that applicants would comply with the avoidance criteria specified in Section 3.1. When projects cannot meet the avoidance criteria, additional environmental review and mitigation measures would be required to address related project-specific impacts.

[6] WAC 197-11-768 outlines the concept of mitigation in the context of environmental impact. Mitigation includes 1. Avoiding the impact, 2. Minimizing impacts, 3. Rectifying the Impact, 4. Reducing or eliminating the impact, 5. Compensating for the impact, and 6. Monitoring the impact and taking the appropriate corrective measures.

[7] Identifying and evaluating potential routes for transmission facilities.

- **Identify Mitigation Strategies:** It identifies effective avoidance, minimization, and mitigation measures to address adverse environmental impacts, which can be applied to future transmission facility projects that fall within the scope[8] of the Programmatic EIS.
- **Initiate Public and Stakeholder Engagement:** It provides an up-front platform for public and stakeholder input, ensuring that community concerns and interests are considered early in the planning process.

Overall, the Programmatic EIS is intended to help facilitate project-specific applications for future transmission facilities in the State of Washington in an environmentally responsible and efficient manner.

1.2 Background

The Washington State Legislature passed the Clean Energy Transformation Act (CETA) in 2019, which requires Washington's electric utilities to meet 100 percent of their retail electric load[9] using non-emitting and renewable resources by January 1, 2045; eliminate coal-fired resources from their allocation of electricity by December 31, 2025; and make all retail sales of electricity greenhouse gas–neutral by January 1, 2030. The Legislature also found that the electric power system serving Washington requires additional high-voltage transmission capacity to achieve the state's objectives and legal requirements.

Consistent with Section 25 of CETA, the Transmission Corridors Work Group (TCWG) was formed in September 2021, and continued its efforts until June 2022. The TCWG's responsibilities included:

- *Reviewing the need for upgraded and new electricity transmission and distribution facilities to improve reliability, relieve congestion, and enhance the capability of the transmission and distribution facilities in the state to deliver electricity from electric generation, non-emitting electric generation, or renewable resources to retail electric load;*
- *Identifying areas where transmission and distribution facilities may need to be enhanced or constructed; and*
- *Identifying environmental review options that may be required to complete the designation of such corridors and recommend ways to expedite review of transmission projects without compromising required environmental and cultural protections.*

The TCWG provided a Cover Letter and Final Report to Governor Inslee and the appropriate legislative committees on August 1, 2022 (EFSEC 2022a, 2022b). The Final Report identifies recommendations to guide transmission facility development in the state, while the Cover Letter summarizes the TCWG's work completed to date. The Cover Letter highlights the following key points that emerged from the work of the TCWG:

- ***Regional and interregional planning.*** *Washington has long relied on out-of-state sources for its energy needs. Reliance on those sources is likely to increase in our clean energy future. It will be critical to have a strong state presence at the table for enhanced regional and interregional transmission planning. Timely engagement in clean energy transmission planning will ensure that the renewable energy Washington State needs can get to the homes and businesses that require it.*

---

[8] The range of proposed actions, alternatives, and impacts to be analyzed in an environmental document. For this Draft Programmatic EIS, the scope is high-voltage transmission facilities within the defined Study Area.

[9] The total amount of electricity consumed by end-use customers, such as residential, commercial, and industrial users, within a specific area or market.

- ***Staff resources in state agencies.*** *The state's critical role in transmission planning would be enhanced by the designation (and funding) of a team dedicated to coordinating state input to regional planning processes. We also need sufficient staff to perform the transmission siting work that will be required in the coming years, particularly in the realm of archeology and historic preservation.*
- ***Enhanced resources for Tribes.*** *The burden of paying for siting-related archeological and cultural review should not fall on the Tribes. It is critical that we identify mechanisms for funding Tribal governments to carry out this vital work.*
- ***Pre-application planning and coordination.*** *Key stakeholders believe the state currently lacks sufficient transmission infrastructure to meet CETA's 2030 targets for renewable energy. Given that it can take over 10 years to properly site a major transmission project, the needed planning work is already overdue and should begin as soon as possible.*

Subsequently, the Legislature passed Senate Bill (SB) 5165, which focuses on aligning the needs of utility providers with CETA and enhancing electric transmission planning; SB 5165 was codified into RCW 43.21C.405. RCW 43.21C.405 indicates that EFSEC shall prepare a nonproject environmental review (Programmatic EIS). The Programmatic EIS shall assess and disclose any probable significant[10] adverse environmental impacts, and identify related mitigation measures, for transmission facilities in Washington. This Draft Programmatic EIS presents this requested nonproject environmental review.

1.3 Need for Transmission Facilities

To meet the goals of CETA, the state needs more transmission facilities to integrate produced energy into the electricity grid. The Western Energy Coordination Council (WECC) released the Western Assessment of Resource Adequacy report (Western Assessment), which examines resource adequacy and reliability in the Western Interconnection[11] over the next 10 years (WECC 2024). The Western Assessment notes that current resource plans forecast staggering demand growth over the next decade. Annual demand for the Western Interconnection is forecasted to grow approximately 20 percent, from 942 terawatts per hour (TWh) in 2025, to 1,134 TWh in 2034. That growth rate is more than double the 9.6 percent growth forecast in resource plans filed in 2022, and over four times the historical growth rate of 4.5 percent between 2013 and 2022 (WECC 2024).

Transmission facility development would increase the capacity of the state's transmission system to achieve the following:

- Meet the electricity needs of the state's increasing population and growing economy.
- Enhance the reliability of the electric power system to ensure continuous delivery of electricity to consumers in the state.
- Address existing congestion and constraints on transmission capacity throughout the state, particularly in the central Puget Sound area, to meet end-user demands.

[10] A SEPA term defined in WAC 197-11-794 as "a reasonable likelihood of more than a moderate adverse impact on environmental quality."

[11] One of the five alternating current power grids or interconnections that make up the power grid in North America. The Western Interconnection stretches from western Canada south to Baja California Norte in Mexico, reaching eastward over the Rockies to the Great Plains.

- Increase access to more affordable sources of electricity within the state and across the western United States and Canada.
- Increase the state's capability to not only connect individual generating resources to the grid, but also transfer electricity across the state and the West as a region.

1.4 Overview of Alternatives

This Draft Programmatic EIS evaluates two alternatives: the Action Alternative and the No Action Alternative. The following discussion summarizes the two alternatives, while Chapter 2 describes them in greater detail.

1.4.1 Action Alternative

This Draft Programmatic EIS assesses the impacts of development of different types of transmission facilities. The Action Alternative evaluates the development of both overhead and underground transmission facilities. Three specific stages of the development of transmission facilities are evaluated herein: construction, operation and maintenance, and upgrade or modification.

1.4.1.1 Construction

In general, all transmission facility construction would include the following:

- **Site Characterization:** Site characterization involves conducting desktop analyses and feasibility and site studies. Feasibility studies could include conducting field surveys for data collection.
- **Site Preparation and Mobilization of Construction Crews:** Site preparation includes completing all planning, surveying, and permitting required to begin construction activities, which could take multiple years. Once the process is complete, vegetation clearing, grading, and construction of access roads can begin.
- **Site Construction:** Site construction includes the assembly, testing, and start-up of the transmission facility and involves many overlapping activities. Construction duration would vary based on the length of the transmission facility, type of transmission facility, and environmental setting of the proposed project-specific transmission corridor[12]. It is generally assumed that underground transmission facilities would take longer to construct, per mile, than overhead transmission facilities.
- **Post-Construction Restoration:** Once the transmission facility has been constructed, site restoration or reclamation activities would commence. These activities could include backfilling trenches, holes, and tunnels; restoring natural conditions to areas used for temporary access roads and laydown yards; and revegetating the right-of-way (ROW) with an appropriate seed mix to stabilize the soil and prevent erosion.

1.4.1.2 Operation and Maintenance

The activities related to the operation and maintenance of transmission facilities would vary based on type of facility, scale, and site characteristics. Generally, all operation and maintenance activities for transmission facilities would include the following:

- **Post-Construction Monitoring and Reporting:** Once all construction and post-construction reclamation activities are completed, any ongoing or long-term environmental measures that require monitoring and reporting would continue as necessary.

[12] A designated pathway or right-of-way where high-voltage transmission lines are constructed and maintained.

- **Routine Inspection:** Although it is not anticipated for transmission facilities to have staff on site daily, inspection and maintenance crews would be regularly deployed to ensure that the facility continues to meet safety and reliability requirements. Inspections can be conducted in a variety of ways, including the use of drones, helicopters, or conventional vehicles.
- **Maintenance and Repairs:** Maintenance of transmission facilities could include repairing old, degraded, obsolete, or inoperable components, conductors, or structures. Maintenance could also include replacing a component, conductor, or structure with a direct, "like-for-like"[13] component to support ongoing facility operation. It is anticipated that required maintenance and repairs would be addressed as soon as warranted, or within a 12-month period.
- **Right-of-Way Maintenance**: ROW would require ongoing maintenance to ensure adequate access to structures. Access roads may require regrading or repairs to water bars or culverts due to flooding or inadequate drainage.
- **Vegetation Management**: Vegetation within transmission facility ROWs and adjacent areas must be inspected and maintained on a regular basis to meet the minimum clearance requirements set forth by the North American Electric Reliability Corporation (NERC) (FAC-003-4). Vegetation management can include manual, mechanical, and/or chemical techniques.

1.4.1.3 Upgrade or Modification

The upgrade or modification of transmission facilities could include a variety of activities varying in size and scale. It is expected that ongoing operation and maintenance of an upgraded or modified transmission facility would be similar to that associated with newly constructed facilities. Generally, actions associated with upgrade or modification can include the following:

- **Replacement:** Upgrading or modifying an existing transmission facility can include replacing transmission towers, transformers, substations, switchyards, underground cabling, and ancillary equipment.[14] Actions associated with replacement can also include reconductoring[15] or upgrading components of a transmission facility to include advanced transmission technologies.
- **Modifying Facilities:** Modifying existing transmission facilities can include constructing additional transmission towers, transformers, substations, switchyards, underground cabling, and ancillary equipment. Construction associated with the proposed modification could increase or decrease the overall disturbance footprint of the facility.
- **Re-Locating Segments:** Modification to an existing transmission facility can include relocating a segment of the transmission facility within or outside of an existing ROW.
- **Converting Segments:** Upgrading or modifying an existing transmission facility can include the conversion of overhead transmission facilities to underground.

---

[13] "Like-for-like" in the context of a transmission facility generally refers to replacing components with ones that are of the same type, capacity, and function. This means that the new parts should not significantly alter the original design, capacity, or operational characteristics of the facility.

[14] Secondary systems and devices that support main transmission infrastructure.

[15] The replacement of cable or wire on an electric circuit, typically a high-voltage transmission line, to afford a greater electric-current-carrying capability.

1.4.2 No Action Alternative

Under the No Action Alternative, it is assumed that the State Environmental Policy Act[16] (SEPA) Lead Agency[17] would continue to review individual project applications for transmission facility development under existing state and local laws. The No Action Alternative would not use this Draft Programmatic EIS as a reference for SEPA compliance and would require individual environmental review.

1.5 Scope of Analysis

The scope of this Draft Programmatic EIS is limited to geographic areas in Washington that are suitable for siting transmission facilities. This Draft Programmatic EIS is not required to evaluate geographic areas that lack the characteristics necessary for siting transmission facilities.

The scope of this Draft Programmatic EIS, as defined in RCW 43.21C.405, considers, as appropriate, analysis of the following probable significant adverse environmental impacts, including direct, indirect, and cumulative impacts on:

(i) Historic and cultural resources;

(ii) Species designated for protection under RCW 77.12.020 or the federal Endangered Species Act;

(iii) Landscape scale habitat connectivity and wildlife migration corridors;

(iv) Environmental justice[18] and overburdened communities as defined in RCW 70A.02.010;

(v) Cultural resources and elements of the environment relevant to tribal rights, interests, and resources including tribal cultural resources, and fish, wildlife, and their habitat;

(vi) Land uses, including agricultural and ranching uses; and

(vii) Military installations and operations.

1.5.1 Geographic Scope

EFSEC has determined that the Planning Area[19] of this Draft Programmatic EIS includes the entirety of the State of Washington. The Study Area, or geographic scope[20], includes all lands in Washington except lands covered by the exclusion criteria identified in **Table 1.5-1**.

---

[16] A Washington law designed to ensure that environmental values are considered during decision-making by state and local agencies. SEPA requires these agencies to evaluate the environmental impacts of their actions, including issuing permits, adopting regulations and funding projects. The goal is to identify and mitigate potential environmental harm before decisions are made.

[17] A Lead Agency is defined as the agency with the main responsibility for complying with the procedural requirements of the Washington State Environmental Policy Act (SEPA).

[18] The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations and policies. This definition emphasizes addressing disproportionate environmental and health impacts on vulnerable populations and overburdened communities.

[19] For this Programmatic EIS, the entire State of Washington.

[20] For this Programmatic EIS, the entire State of Washington excluding the areas identified in Chapter 1.

Table 1.5-1: Exclusion Criteria

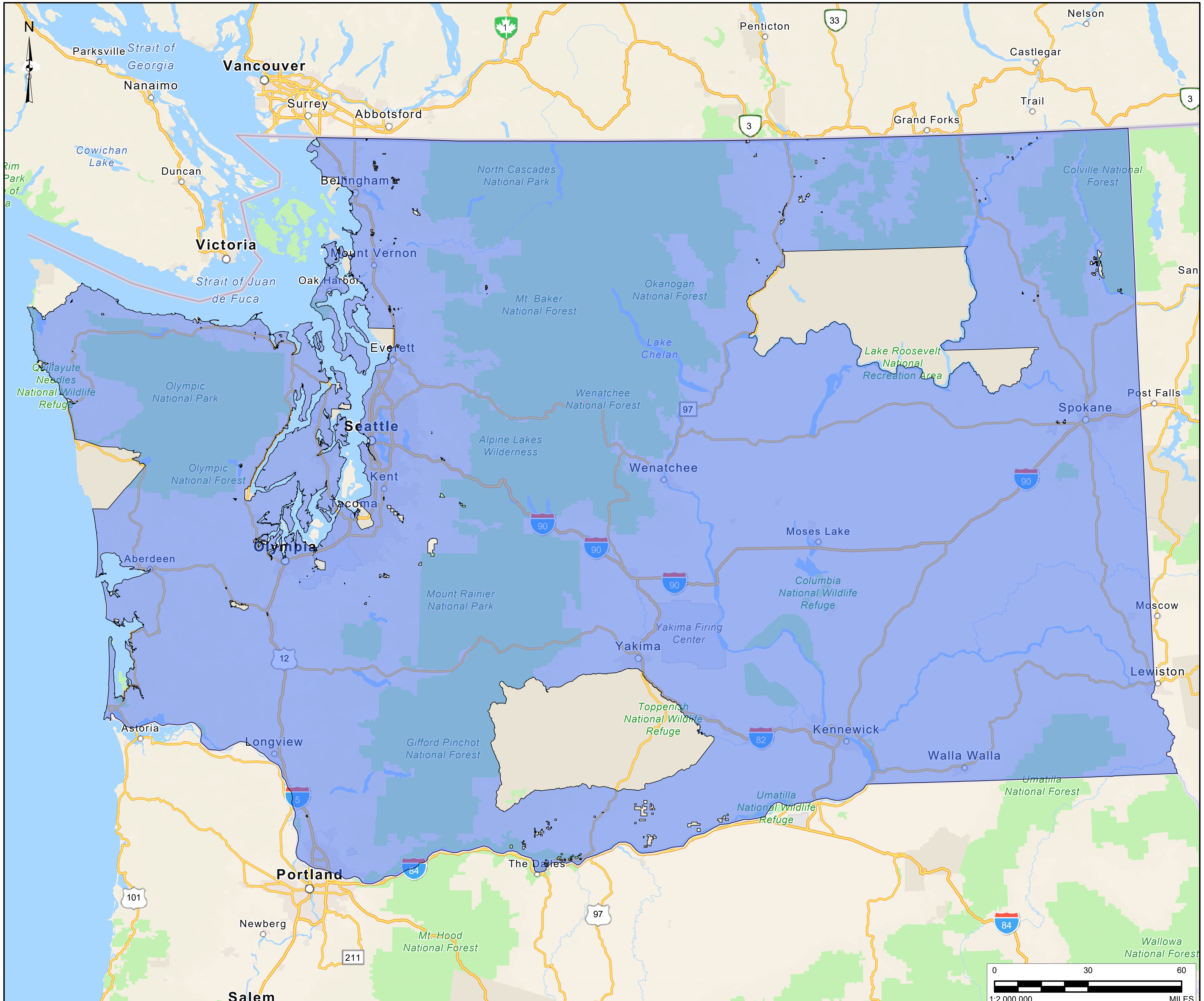
Exclusion No.	Exclusion Type	Description
1	**Tribal Lands**	For the purposes of this Draft Programmatic EIS, Tribal lands are not included in the Study Area. Tribal lands are sovereign territories, and decisions regarding their use typically fall under the jurisdiction of the respective Tribal government. Tribal lands often have their own regulatory processes and environmental review requirements, which may differ from state or federal processes. Federal agencies are required to engage in government-to-government consultation[21] with Tribes. This process ensures that Tribal concerns and perspectives are adequately addressed.
2	**Undersea or Oceanic**	Programmatic EIS documents address broad, overarching policies, plans, or programs rather than specific projects. Undersea cables for transmission facilities are considered to be too specific or detailed for the broad focus of this Draft Programmatic EIS. Additionally, undersea cables, especially those that cross international water or state boundaries, may fall under different regulatory frameworks or jurisdictions, requiring separate, more specific environmental reviews. Lastly, the environmental impacts and technical considerations of siting undersea cables for transmission facilities can be significantly different from those of land-based transmission facilities. These differences might necessitate a distinct, focused environmental review to adequately address the unique challenges and impacts. Islands with physical bridges to the mainland are included in the Study Area for the potential siting of transmission facilities along the bridges; undersea connections to these islands are beyond the scope of this Draft Programmatic EIS.

EIS = Environmental Impact Statement

The Study Area includes approximately 62,042 square miles and is identified in **Figure 1.5-1**. This Draft Programmatic EIS assesses and discloses the adverse environmental impacts associated with siting transmission facilities within the Study Area and identifies related avoidance criteria and mitigation measures to minimize probable significant adverse environmental impacts.

[21] The formal process of dialogue and negotiation between sovereign governments.

This Page Intentionally Left Blank



LEGEND

Study Area

EFSEC

Energy Facility Site Evaluation Council

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION FACILITIES

TITLE

STUDY AREA

YYYY-MM-DD 2024-10-10

CONSULTANT wsp

FIGURE
1.5-1

This Page Intentionally Left Blank

1.5.2 Temporal Scope

The temporal scope for this Draft Programmatic EIS covers a broad timeframe. This Draft Programmatic EIS provides a comprehensive analysis of environmental impacts, allowing for more efficient and streamlined reviews of subsequent, project-specific applications that fall under the broader program. While it is expected that project-specific SEPA Lead Agencies will make use of the best available science and existing regulations at their time of review, re-evaluation and/or supplementation of this Draft Programmatic EIS may be necessary when there are significant changes that could affect the scope or analysis provided in this document. The criteria that may require re-evaluation and/or supplementation of this Draft Programmatic EIS could include the following:

- **Regulatory Changes:** Updates or changes in environmental laws, regulations, or policies that affect the Study Area or transmission facility development.
- **New Information:** If new scientific data or environmental information becomes available that could significantly alter the impact analysis
- **Changes in the Study Area:** Significant modifications to the scope, scale, or nature of the Study Area that were not previously considered
- **New Technology:** New construction practices, technologies, or equipment that were not previously considered and have the potential for significant impacts

Any updated information to this Draft Programmatic EIS would be posted to EFSEC's website. Updates to documents referenced within this Draft Programmatic EIS would be available from their agencies of origin. Applicants would be responsible for ensuring they have checked the websites of EFSEC and other relevant agencies for the most current version of documents associated with this Draft Programmatic EIS. EFSEC is investigating other options to ensure applicants have easy access to updated information from EFSEC and other relevant agencies."

1.6 Governance Framework

This section describes the governance framework pertaining to transmission facility development.

1.6.1 State Environmental Policy Act Review Process

SEPA is intended to provide information to agencies, applicants, and the public to encourage the development of environmentally sound proposals. The environmental review process involves the identification and evaluation of probable adverse environmental impacts and the development of mitigation measures that would avoid, minimize, reduce, or otherwise address those environmental impacts. This environmental information, along with other considerations, is used by agency decision-makers to decide whether to approve a proposal, approve it with conditions, or deny it. SEPA applies to actions taken at all levels of government within Washington State.

As codified in Washington Administrative Code (WAC) 197-11-060(3) and WAC 197-11-784, SEPA environmental review is required for any state or local agency decision that meets the definition of an "action" and is not categorically exempt. Actions are divided into two categories, "project actions" and "nonproject actions." Project actions can include agency decisions to license, fund, or undertake a specific project. According to WAC 197-11-704, a nonproject action refers to governmental actions involving decisions on policies, plans, or programs that do not involve a specific project. This Draft Programmatic EIS is the first step of a phased review[22] for transmission facility development and broadly evaluates project-specific impacts; however, it is not a SEPA review for a specific project. It may be adopted[23] or otherwise used, as applicable, by the SEPA Lead Agency for meeting SEPA requirements for a specific project.

As previously described, this Draft Programmatic EIS provides a broad evaluation of environmental impacts and identifies relevant mitigation measures that can be generally applied to transmission facility development. This Draft Programmatic EIS does not evaluate any specific transmission facility project; therefore, the impacts associated with a specific project cannot fully be anticipated or addressed in this document. Impacts associated with project-specific applications could vary considerably based on location, size, scale, and timing. Although this Draft Programmatic EIS identifies potential project-specific impacts, project-specific applications would be required to undergo their own SEPA environmental review to ensure that project-specific impacts are adequately evaluated and addressed.

One of the first steps for an applicant to consider when initiating the SEPA environmental review process and preparing a proposal application is identifying the SEPA Lead Agency. The SEPA Lead Agency would review most new proposals and make sure that procedural reviews comply with SEPA, all environmental information is adequately gathered and assessed, threshold determinations[24] for impacts are made, and, if needed, EISs are prepared (Ecology 2024). SEPA Lead Agency status is determined according to WAC 197-11-922 through 948 and requires defining the total proposal and all necessary permits (Ecology 2018).

EFSEC is, or can be, the state authority for siting certain high-voltage electrical transmission facilities. EFSEC provides a single siting process, coordinates all evaluation and licensing steps, and specifies the conditions of construction and operation. RCW 80.50.060 and 80.50.045 outline the types of transmission facilities that either are required to apply, can elect to apply, or are prohibited from applying for site certification through the EFSEC process. These different types of transmission facilities are discussed below.

- **Required:** Facilities that must apply for site certification through EFSEC include transmission facilities that are:
  - At least 500 kV alternating current[25] or at least 300 kV direct current;[26] located in more than one county; and located in the Washington service area of more than one retail electric utility;
  - Located in a national interest electric transmission corridor[27]; or
  - Interstate lines[28]

[22] A SEPA term defined in WAC 197-11-776 as “the coverage of general matters in broader environmental documents, with subsequent narrower documents concentrating solely on the issues specific to the later analysis”.

[23] A SEPA term defined in WAC 197-11-708 as “an agency’s use of all or part of an existing environmental document to meet all or part of the agency’s responsibilities under SEPA to prepare an EIS or other environmental document.”

[24] A SEPA term defined in WAC 197-11-797 as “the decision by the responsible official of the lead agency whether or not an EIS is required for a proposal that is not categorically exempt”.

[25] An electric current that periodically reverses direction and changes its magnitude continuously with time.

[26] An electric current which flows in one direction.

[27] A geographic area designated by the U.S. Department of Energy where there is a significant need for new or upgraded transmission capacity to address electricity transmission limitations that adversely affect consumers.

[28] EFSEC is designated as the state authority for purposes of siting transmission facilities under Title 16 U.S.C. Sec. 824p, including interstate transmission facilities.

- **Optional:** Facilities that may choose to apply for site certification through EFSEC include transmission facilities that are:
  - At least 115 kV; and
  - Located in more than one jurisdiction that has promulgated land use plans[29] or zoning ordinances
- **Prohibited:** Facilities that are prohibited from applying for site certification through EFSEC include those that are:
  - Less than 115 kV;
  - Located in a single jurisdiction that has promulgated land use plans or zoning ordinances; or
  - Proposing normal maintenance and repairs that do not increase the capacity or dimensions.

Based on the criteria outlined above, transmission facility project applications within the scope of this Draft Programmatic EIS generally can or are required to follow one of two SEPA environmental review processes: 1) EFSEC's certification process or 2) local government processes.

1.6.1.1 Local Government SEPA Review Process

For project-specific applications where local governments would operate as the SEPA Lead Agency, the SEPA process involves several key steps to ensure that environmental considerations are integrated into decision-making. The Washington State Department of Ecology (Ecology) provides a comprehensive SEPA Handbook that offers detailed guidance on each step of the process. The SEPA Rules (WAC 197-11) outline the legal requirements and procedures for SEPA review. Additional resources and templates are available on Ecology's website to assist with SEPA compliance.

The SEPA rules recommend, but do not require, that SEPA Lead Agencies provide for a preapplication conference process that allows applicants to discuss a proposal with agency staff before submitting an application. In determining whether an environmental review is required under SEPA for a project-specific application, the SEPA Lead Agency must: 1) define the project in its entirety; 2) identify all agency actions required for the project; and 3) determine whether the project or agency action is categorically or otherwise exempt by statute or regulation.

If the application or agency action is not categorically exempt or otherwise exempt, then SEPA applies, and the SEPA Lead Agency must evaluate the application's likely environmental impacts by using an environmental checklist. The SEPA Lead Agency must then determine whether the adverse environmental impacts of the proposal would likely be significant and issue a threshold determination. The following threshold determinations can be made:

- **Determination of Non-Significance (DNS):** If the project is not likely to have a significant adverse environmental impact, the SEPA Lead Agency must issue a determination of nonsignificance.
- **Mitigated Determination of Non-Significance (MDNS):** If the project changes the proposal or includes mitigation measures that would reduce the identified significant adverse impacts to a nonsignificant level, then the SEPA Lead Agency must issue a "mitigated DNS" in lieu of a DNS and preparation of an EIS.

[29] A document that guides the land use decisions of a local government.

- **Determination of Significance (DS):** If the project is likely to have a significant adverse environmental impact, the SEPA Lead Agency must issue a determination of significance and begin preparing an EIS.

A SEPA Lead Agency conducting a project-specific environmental review for transmission facilities must begin with a review of this Draft Programmatic EIS. The review must consider and further evaluate any probable significant adverse environmental impacts associated with the project-specific application that were not analyzed in this Draft Programmatic EIS. If the review identifies additional probable significant adverse environmental impacts, the SEPA Lead Agency must identify specific mitigation measures to address the probable significant adverse environmental impacts.

1.6.1.2 SEPA Phased Review Process

Environmental review for project-specific applications may be phased under both the EFSEC certification and local government SEPA review processes. As defined in the WAC 197.11.060(5), "phased review" may allow the use of broader environmental documents followed by narrower documents. A phased review can result in a more effective environmental review by incorporating prior general discussion by reference and concentrating solely on site-specific information and effects.

Applicants would consider this Draft Programmatic EIS if the transmission facility is proposed within the prescribed Study Area. Applicants should especially focus on meeting the general conditions, avoidance criteria, and mitigation measures identified herein to the extent practicable. Applicants must also identify any probable significant adverse environmental impacts that were not analyzed in this Draft Programmatic EIS. When general conditions, avoidance criteria, or mitigation measures defined in this Draft Programmatic EIS cannot be met, additional mitigation may be necessary to address these probable significant adverse environmental impacts. Should the SEPA Lead Agency identify inconsistencies or probable significant adverse environmental impacts outside of this Draft Programmatic EIS, additional environmental review would be required.

As directed by RCW 43.21C.408, a SEPA Lead Agency reviewing project-specific applications for transmission facilities would use this Draft Programmatic EIS through one of the following methods:

- **Adopt** the Programmatic EIS without the need for an addendum or supplemental analysis. This indicates that there are no additional project-specific details or analyses of impacts that should be recorded in the SEPA documentation.
- **Prepare an Addendum[30],** in addition to adopting the Programmatic EIS, that adds analyses or information about the project but does not substantially change the analysis of significant impacts and alternatives addressed in this Programmatic EIS.
- **Prepare a Supplemental EIS[31]**, in addition to adopting the Programmatic EIS, that adds new analyses or information related to probable significant adverse environmental impacts of the project that have not been addressed in this Programmatic EIS. This may include project-specific impacts that were not identified in this

[30] A SEPA term defined in WAC 197-11-706 as "an environmental document used to provide additional information or analysis that does not substantially change the analysis of significant impacts and alternatives in the existing environmental document. The term does not include supplemental EISs."

[31] The supplemental EIS process is outline in Chapter 197-11 WAC, which specifies that a supplemental EIS is required if changes to the proposed action would result in significant environmental impacts not previously evaluated or new information or circumstances relevant to environmental concerns arise, leading to significant impacts not covered in the original EIS.

Programmatic EIS or that were identified in this Programmatic EIS, but are determined by the SEPA Lead Agency through project-specific environmental review to have been insufficiently evaluated.

- **Incorporate by Reference**[32], if the intent is for the SEPA Lead Agency to produce a full, distinct project-specific EIS.

Project-specific applications that follow all of the recommendations in this Draft Programmatic EIS are considered to have fully mitigated all probable significant adverse project-specific impacts addressed in this Draft Programmatic EIS.

1.6.1.3 Implementation of this Programmatic EIS

Applicants are required to provide detailed information as part of their project-specific application initiating a phased review in association with this Draft Programmatic EIS. An application would identify the general conditions, avoidance criteria[33], and design considerations[34] that were reviewed during initial site characterization, and the applicable mitigation measures, to ensure that adverse impacts result in a less than significant level rating. Project-specific applications using this Draft Programmatic EIS would focus on specific impacts and mitigation measures for the phased actions. To highlight the opportunities for efficiency gained by an applicant, the phased review process anticipated by the SEPA Lead Agency is outlined in a decision tree shown in **Figure 1.6-1.**

[32] A SEPA term defined in WAC 197-11-754 as “the inclusion of all or part of any existing document in an agency's environmental documentation by reference”.

[33] Within this Programmatic EIS, criteria that are expected to be met by project-specific applications during design and siting in order to be consistent with the analysis.

[34] May include guidance documents, manuals, and/or best management practices. Design considerations are typically standardized practices designed to prevent environmental impacts and are often included in regulatory compliance programs or implemented as routine practices.

This Page Intentionally Left Blank

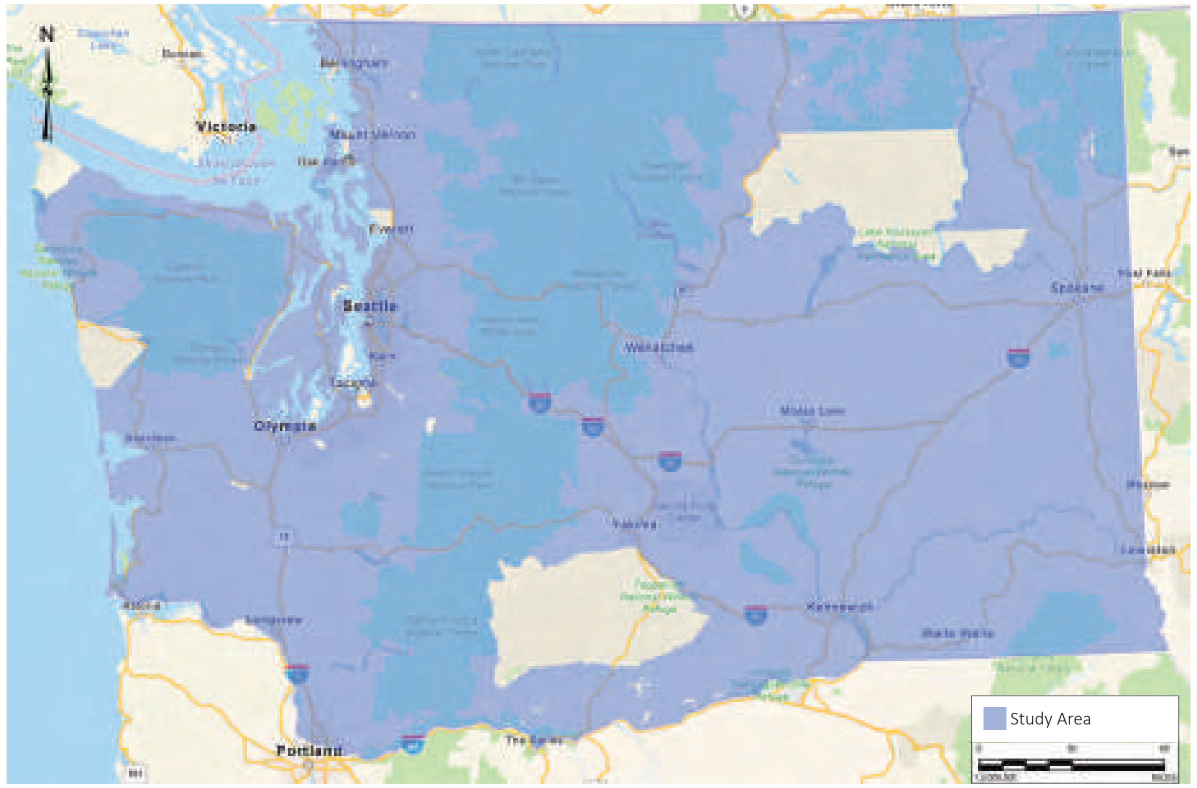
STEP 1

Determine if the project-specific application fits the definition of a **transmission facility**[1] analyzed within the prescribed Study Area[2] of this Programmatic EIS.

NO
Follow applicable SEPA environmental review and permitting processes.

The SEPA Lead Agency would conduct an environmental review in accordance with Chapter 43.21C RCW and Chapter 197-11 WAC for the project-specific application and make a SEPA Threshold Determination.

Regarding this Programmatic EIS, the SEPA Lead Agency could **INCORPORATE BY REFERENCE.**



STEP 2

YES | Would the project-specific application have a federal nexus?

YES
Federal environmental review processes (e.g., NEPA) apply, which would include coordination with EFSEC for environmental review.

Regarding this Programmatic EIS, the SEPA Lead Agency could:

- Adopt the NEPA document as part of their SEPA environmental review process and documentation. **Proceed to Step 3**. *OR*
- Incorporate the NEPA document by reference and complete a separate SEPA analysis. **Proceed to Step 3**.

STEP 3

NO
STEP 3.1
Does the project comply with all state, federal, and local regulations[3]?

NO | This Programmatic EIS did not analyze this scenario.
THE FOLLOWING IS REQUIRED:
- **APP** Identify the regulations that cannot be followed and provide an explanation.
- **SLA** Complete additional environmental review and identify mitigation.[3, 7]

Proceed to Step 3.2.

YES
STEP 3.2
Are design considerations and BMPs[3] accounted for in the design of the project-specific application?

NO | This Programmatic EIS did not analyze this scenario.
THE FOLLOWING IS REQUIRED:
- **APP** Identify the design considerations and BMPs[3] that are not proposed as part of the project-specific application and provide an explanation.
- **SLA** Complete additional environmental review and identify mitigation.[3, 7]

Proceed to Step 3.3.

YES
STEP 3.3
Would the project comply with the identified **general conditions**[4] within this Programmatic EIS?

NO | This Programmatic EIS did not analyze this scenario.
THE FOLLOWING IS REQUIRED:
- **APP** Identify the general conditions that are not complied with and provide an explanation.
- **SLA** Complete additional environmental review and identify mitigation.[3, 7]

Proceed to Step 3.4.

YES
STEP 3.4
Does the project comply with the identified **avoidance criteria**[5] within this Programmatic EIS?

NO | This Programmatic EIS did not analyze this scenario.
THE FOLLOWING IS REQUIRED:
- **APP** Identify avoidance criteria that are not complied with and provide an explanation.
- **SLA** Complete additional environmental review and identify mitigation.[3, 7]

Proceed to Step 3.5.

YES
STEP 3.5
Are all probable significant adverse environmental impacts of the project identified and analyzed in this Programmatic EIS?

NO | This Programmatic EIS did not analyze this scenario.
THE FOLLOWING IS REQUIRED:
- **SLA** Identify and complete additional environmental review for probable significant adverse environmental impacts not analyzed in this Programmatic EIS and identify mitigation.[3, 7]

Proceed to Step 3.6.

YES
STEP 3.6[6]
Has the applicant committed to the **mitigation**[7] **measures**[3] identified within this Programmatic EIS associated with moderate or high impacts?

NO | This Programmatic EIS did not analyze this scenario.
THE FOLLOWING IS REQUIRED:
- **APP** Identify the mitigation[7] measures[3] that are not proposed as part of the project and provide an explanation.
- **SLA** Complete additional environmental review and identify mitigation.[3, 7]

Proceed to Step 4.

YES | **Proceed to Step 4**.

STEP 4[6]

The **SLA** has the responsibility to determine the appropriate level and type of environmental review for each project-specific application:

STEP 4.1
ADOPT the Programmatic EIS without the need for an addendum or supplemental analysis. This indicates that there are no additional project-specific details or analyses of impacts that should be recorded in the SEPA documentation.

OR

STEP 4.2
PREPARE AN ADDENDUM, in addition to adopting the Programmatic EIS, that adds analyses or information about the project but does not substantially change the analysis of significant impacts and alternatives addressed in this Programmatic EIS.

OR

STEP 4.3
PREPARE A SUPPLEMENTAL EIS, in addition to adopting the Programmatic EIS, that adds new analyses or information related to probable significant adverse environmental impacts of the project that have not been addressed in this Programmatic EIS. This may include project-specific impacts that were not identified in this Programmatic EIS or that were identified in this Programmatic EIS, but are determined by the SEPA Lead Agency through project-specific environmental review to have been insufficiently evaluated.

OR

STEP 4.4
INCORPORATE BY REFERENCE if the intent is for the SEPA Lead Agency to produce a full, distinct project-specific EIS.

REFERENCES

SLA	Responsibility of SEPA Lead Agency
APP	Responsibility of Applicant
BMP	Best Management Practice
EIS	Environmental Impact Statement
kV	Kilovolt
NEPA	National Environmental Policy Act
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
WAC	Washington Administrative Code

1 The construction, operation and maintenance, and upgrade or modification of electrical transmission facilities with a nominal voltage of 230kV or greater.

2 For the purposes of this Draft Programmatic EIS, Tribal lands and undersea cables are not included in the Study Area.

3 As applicable to project-specific applications.

4 As used in this Draft Programmatic EIS, a measure that provides a consistent baseline for evaluating the potential impacts of project-specific applications for transmission facility development.

5 Criteria that, when implemented, would narrow the scope of the project-specific environmental review. These broad mitigation measures would be anticipated to avoid otherwise significant impacts for project-specific applications.

6 If all environmental mitigation strategies from this Programmatic EIS have been implemented then mitigation would be deemed sufficient for all probable significant adverse environmental impacts addressed in this Programmatic EIS.

7 A specific step or action taken to address impacts of project development or action.

This Page Intentionally Left Blank

1.6.1.4 EFSEC Certification Process

EFSEC's project siting review, or certification, is the state licensing process for siting, constructing, and operating energy projects, including transmission facilities. This process provides a centralized and streamlined approach for certifying large energy projects. Before initiating the certification process, applicants must go through a pre-application phase, as described in WAC 463-61. The pre-application process is intended to help applicants avoid unnecessary delays and expenditures by identifying information gaps early in the planning process. The preapplication process includes a meeting with EFSEC staff to discuss the proposed project, filing the preapplication request with EFSEC, and EFSEC hosting a public informational meeting. Once the pre-application phase is completed, the formal site certification application process can begin (EFSEC 2019). The formal application for site certification includes the following seven major steps:

1) Application submittal
2) Application review
3) Initial public meeting
4) Land use consistency hearing
5) Determination of Nonsignificance (DNS), Mitigated DNS, or Environmental Impact Statement (EIS)
6) Adjudicative proceedings and permits review
7) Recommendation to the Governor

EFSEC is responsible for coordinating activities to ensure that applications are compliant with SEPA, writing and/or coordinating the preparation of EISs, DNSs, and Mitigated DNSs, including scoping and issuing scoping notices, and working closely with other interested agencies. EFSEC also publishes and distributes its rules and amends them as necessary to stay current with regulatory changes and fulfills other general responsibilities, ensuring that environmental considerations are integrated into the decision-making process.

1.6.2 National Environmental Policy Act Review Process

Some project-specific applications may require approvals from federal agencies, thereby requiring compliance with both SEPA and the National Environmental Policy Act (NEPA). As described in the State Environmental Policy Handbook, SEPA's purpose and goals are almost identical to NEPA's, but federal agencies may have environmental review processes that vary slightly from SEPA's. The main areas of divergence typically relate to the scope of the review, types of impacts, and range of alternatives. SEPA provides an expressed substantive provision that authorizes agencies to deny or condition a proposal based on the impacts addressed in the environmental documents. This gives both agencies and the public an important purpose and need for SEPA review regardless of the extent of NEPA review established by the lead federal agency.

Furthermore, proposals that are covered under a specific NEPA exclusion but also involve "agency actions" by state or local agencies may require SEPA review. The environmental review requirements under SEPA are separate and independent from those required or exempted under NEPA. Both the process and criteria are different for establishing and applying exemptions under each statute and their implementing regulations (Ecology 2018).

For projects proposed or sited by a federal agency, the director[35] must coordinate state agency participation in the environmental review that is required under NEPA (RCW 80.50.045(5)). EFSEC, the SEPA Lead Agency (if different from EFSEC), and the federal lead agency would work collaboratively to review the proposed project against this Draft Programmatic EIS.

1.6.3 Overarching Regulations, Policies, and Guidance

Policies are principles or rules adopted by an organization or government to guide decisions and achieve rational outcomes. Policies can be formal or informal and are often used to ensure consistency in actions and decisions. A variety of regulations and policies have been identified throughout this Draft Programmatic EIS, including those listed below.

1.6.3.1 Federal Regulations and Policies

- **National Environmental Policy Act:** This act requires environmental analysis of federal agency actions to consider a project's impacts on urban[36] quality, historic and cultural resources, and the design of the built environment.
- **Federal Clean Air Act:** This comprehensive federal law regulates air emissions from stationary[37] and mobile sources[38]. Among other things, this law authorizes the U.S. Environmental Protection Agency to establish National Ambient Air Quality Standards to protect public health and public welfare and to regulate emissions of hazardous air pollutants.
- **Federal Land Policy and Management Act (FLPMA):** FLPMA is a comprehensive statute that governs the management of public lands administered by the Bureau of Land Management (BLM) under the U.S. Department of the Interior. FLPMA established that public lands should generally remain in federal ownership unless disposal serves the national interest. The act mandates that public lands be managed for multiple uses (e.g., recreation, grazing, timber, minerals) and sustained yield, ensuring that resources are available for future generations.
- **Federal Clean Water Act:** This act establishes regulations for discharging pollutants into Waters of the United States (WOTUS)[39] and regulates water quality standards for surface water. Under this act, it is unlawful to release pollutants into navigable waters unless a permit is obtained.
- **Federal Power Act:** The Federal Power Act, originally enacted in 1920 as the Federal Water Power Act, is a key piece of legislation governing the regulation of hydroelectric power and interstate electricity transmission in the United States. The act grants the Federal Energy Regulatory Commission (FERC) the authority to

[35] Per RCW 80.50.020, director means the director of the energy facility site evaluation council appointed by the chair of the council in accordance with RCW 80.50.360.

[36] The U.S. Census Bureau's urban areas represent densely developed territory, and encompass residential, commercial, and other non-residential urban land uses. An urban area must comprise a densely settled core of census blocks that meet minimum housing unit density and/or population density requirements. This includes adjacent territory containing non-residential urban land uses. To qualify as an urban area, the territory identified according to criteria must encompass at least 2,000 housing units or have a population of at least 5,000.

[37] A fixed site that emits air pollutants. Stationary sources include buildings, structures, facilities, or installations that release pollutants into the atmosphere.

[38] Vehicles, engines, and equipment that emit air pollutants and can move from one location to another.

[39] Defines the scope of waters that fall under federal jurisdiction for regulatory purposes. The definition of WOTUS has been subject to changes and legal interpretations. The most recent update, following the Supreme Court's decision in Sackett v. EPA, refined the criteria for what constitutes WOTUS, particularly focusing on wetlands directly connected to permanent waters.

issue licenses for non-federal hydroelectric projects on navigable waters and federal lands, ensuring that these projects serve the public interest.

- **Coastal Zone Management Act (CZMA):** The CZMA was enacted to protect the coastal environment from growing demands associated with residential, recreational, commercial, and industrial uses. The CZMA encourages coastal states to develop and implement coastal zone management programs to manage and balance competing uses of the coastal zone. The CZMA requires that federal actions that are reasonably likely to affect any land or water use or natural resource of the coastal zone be consistent with enforceable policies of a state's federally approved coastal management program.
- **14 Code of Federal Regulations (CFR) Part 77 – Safe, Efficient Use, and Preservation of the Navigable Airspace:** The Federal Aviation Administration has broad authority to regulate safe and efficient use of navigable airspace. This regulation outlines the regulations and standards for ensuring the safe and efficient use of the airspace.
- **36 CFR Part 254, Landownership Adjustments:** This regulation sets procedures for conducting exchanges of National Forest System lands and requires consideration of the public interest, including protection of fish and wildlife habitats, cultural resources, watersheds[40], and wilderness and aesthetic values, as well as enhancement of recreation opportunities and public access.
- **Public Law 94-588, National Forest Management Act, 36 CFR Part 219, Subpart A, National Forest System Land and Resource Management Planning:** This act governs the administration of national forests and removal of trees. It includes requirements for consideration, treatment, and protection of intangible resources such as scenery and aesthetics.

  If a project is located on a National Forest System unit, it must comply with the U.S. Forest Service's National Strategic Plan, National Forest System unit plans, and requirements for activity planning established in the U.S. Forest Service directive system.
- **National Wild and Scenic Rivers Act of 1968:** This act protects and enhances river values, including free-flow, water quality, and outstandingly remarkable values of 81 254 designated wild, and scenic, and recreational rivers totaling nearly 13,52,700 miles.
- **National Trails System Act of 1968:** This act designates national scenic trails to be continuous, extended routes of outdoor recreation within protected corridors. It promotes the enjoyment and appreciation of trails while encouraging greater public access. It establishes four classes of trails: national scenic trails, national historic trails, national recreation trails, and side and connecting trails.
- **Endangered Species Act of 1973:** This act establishes protection for fish, wildlife, and plants that are listed as threatened or endangered. Unless authorized by a permit from the U.S. Fish and Wildlife Service, the act prohibits activities that would impact species and their habitats protected under the act.

[40] A watershed is an area of land that drains all streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel.

1.6.3.2 State Regulations and Policies

- **Clean Energy Transformation Act:** This law commits Washington to an electricity supply free of greenhouse gas emissions by 2045. It includes provision for enhancing transmission infrastructure to support the integration of renewable energy.
- **Washington State Environmental Policy Act:** This act is a process that identifies and analyses environmental impacts that can be related to issuing permits. SEPA helps permit applicants and decision-makers understand how a proposed project would impact the environment.
- **Washington Coastal Zone Management Program:** Ecology administers Washington's Coastal Zone Management Program, which applies to the state's coastal zone, an area comprising 15 coastal counties with marine shorelines. The coastal zone includes all lands and waters within these coastal counties, as well as submerged lands seaward out to 3 nautical miles (about 3.5 miles). Projects within the coastal zone are required to comply with the State of Washington's Coastal Zone Management Program Enforceable Policies.
- **Shoreline Management Act:** The goal of this act is to prevent shoreline disturbance and restore degraded shoreline, including wetlands and riparian[41] and upland vegetation across the state's fresh and marine waters. Washington has a no-net loss goal for its shorelines. Counties are responsible for developing their own Shoreline Master Programs.
- **RCW Chapter 36.70A, Growth Management Act[42]:** This act requires cities and counties to plan for growth while conserving natural resources and protecting critical areas such as wetlands and forests. Under this act, counties are required to adopt comprehensive plans, including a comprehensive land use plan and development regulations. Relevant land management plans and land uses are summarized in Section 3.9, Land Use, and countywide comprehensive plan goals and policies are available in **Appendix 3.1-2**.
- **RCW Chapter 43.21C, State Environmental Policy:** This chapter outlines the legislative framework for SEPA and the requirements for environmental protection and review in Washington.
- **RCW Chapter 76.09:** This chapter establishes standards and regulations for managing the state's forests. Forestland is defined as all land that can produce merchantable timber[43], excluding agricultural land and residential land.
- **RCW Chapter 77.55 Construction Projects in State Waters:** Under the Hydraulics Act, a Hydraulic Project Approval from the Washington Department of Fish and Wildlife (WDFW) would be required when stormwater discharges related to a project would change the natural flow or bed of state waters.
- **RCW Chapter 80.50, Energy Facilities – Site Locations:** This chapter establishes EFSEC's role in siting, construction, and operation of major energy facilities in Washington. It provides the legal framework for EFSEC to streamline the permitting process and ensure compliance with state environmental and safety standards.

---

[41] Relating to a feature on the edge of a waterbody.

[42] A Washington State law that requires state and local governments to manage growth by identifying and protecting critical areas and natural resource lands, designating urban growth areas, and preparing and implementing comprehensive land use plans.

[43] Trees that have a commercial value and can be harvested or sold.

- **RCW Chapter 90.48 Water Pollution Control:** This policy aims to maintain the highest standard for Waters of the State[44] to preserve public health and recreation and to protect wildlife and aquatic species. It prohibits the discharge of pollution to state waters. Pollution is defined as any physical, chemical, or biological property that could impact the ecological function.
- **WAC 173-201A Water Quality Standards for Surface Waters of the State of Washington:** This code establishes surface water quality standards for surface waters in Washington that are consistent with public health standards, recreational use, and the protection of fish and wildlife. Surface waters include lakes, rivers, streams, ponds, wetlands, inland waters, and saltwater.
- **WAC 480-100 – Electric Companies:** This legislation establishes standards for the reliability and quality of electric service. This law requires that utilities meet certain performance criteria regarding the frequency and duration of outages.
- **State of Washington Priority Habitat[45] and Species List:** The WDFW maintains a catalogue of habitats and species that are prioritized for conservation and management. Priority habitats are unique habitats or features that support biodiversity. Priority species[46] require protection due to population trends, sensitivity to disturbance and habitat alteration, or importance to communities.

Guidance includes non-binding recommendations or interpretations issued by agencies to help understand and comply with laws and regulations. Guidance documents clarify expectations but do not have the force of law. Several guidance documents have been identified throughout this Draft Programmatic EIS, including the following:

1.6.3.3 Federal Guidance

- **Recommended Siting Practices for Electric Transmission Developers:** This document outlines best practices for siting electric transmission facilities (ACEG 2023). Recommended practices include:
  - Early, consistent, and transparent engagement
  - Treat communities and landowners respectfully
  - Compensate landowners fairly
  - Consult tribal governments, tribal communities, and environmental justice communities
- **Institute of Electrical and Electronics Engineers (IEEE) Standards:** The IEEE Standards Association is an operating unit within IEEE that develops global standards in a broad range of industries, including standards relevant to electrical transmission.
- **American Society of Civil Engineers (ASCE) Standards:** ASCE provides guidelines for the structural loading and design of transmission facilities, to ensure they can withstand environmental and operational stresses.

---

[44] All salt and fresh waters that are waterward of the ordinary high water line and within the territorial boundaries of the state. This includes lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the state's jurisdiction.

[45] Habitat that is given priority for conservation and management by the Washington Department of Fish and Wildlife; may refer to a unique vegetation association (e.g., shrubsteppe) or a particular habitat feature (e.g., cliffs).

[46] In Washington, species of concern for which special conservation actions may be required. These include, but are not, limited to, species that are state listed as endangered, threatened, sensitive, or candidate, or considered vulnerable.

- **Federal Energy Regulatory Commission Guidelines:** FERC provides guidelines for the siting of interstate electric transmission facilities, including environmental and community impact assessments.
- **North American Electric Reliability Corporation:** NERC develops reliability standards for the electric grid to ensure reliability and security of the North American bulk power system. NERC works with federal organizations like FERC for the review, approval, and enforcement of standards.
- **U.S. Department of Energy (DOE):** The DOE coordinates federal authorizations and environmental reviews for interstate transmission projects, aiming to streamline the permitting process while ensuring compliance with environmental and cultural protection laws.

1.6.3.4 State Guidance

- **Transmission Corridors Work Group:** Established under CETA, this group identified areas in Washington where transmission facilities may need to be enhanced or constructed. The group recommended ways to expedite project reviews without compromising environmental protection in the Final Report (EFSEC 2022b).
- **Ecology's Stormwater Management Manuals:** The stormwater manuals provide stormwater permit implementation and management guidance for eastern and western Washington (Ecology 2024). The manual for western Washington provides guidelines for managing stormwater in areas west of the Cascade Mountains crest to protect water quality and aquatic habitats. The manual for Eastern Washington provides guidelines for managing stormwater in areas east of the Cascade Mountains crest to protect water quality and aquatic habitats.
- **Riparian Ecosystems, Volume 2: Management Recommendations:** This publication provides updated riparian ecosystem management recommendations, including regulatory protections, delineation of riparian management zone, recommendations for restoring riparian ecosystems, and improving protection of riparian areas through adaptive management (WDFW 2020).
- **Best Management Practices Field Guide for ESA Habitat Protection:** This guide provides guidance for Washington State Department of Transportation (WSDOT) maintenance crews and regional maintenance environmental coordinators who work within sensitive priority areas. This guide was developed to train and alert staff as to when and where to apply and report implementation of the Regional Road Maintenance Endangered Species Act (ESA) Program Guidelines Best Management Practices (WSDOT 2018).
- **Regional Road Maintenance Best Management Practices:** This document includes checklists and guidance for minimizing impacts of soil movement during a project (WSDOT n.d.).
- **Wetland Mitigation in Washington State Part 1: Agency Policies and Guidance, and Part 2: Developing Mitigation Plans:** These publications provide an overview of the wetland regulatory process, approaches to compensatory mitigation, and technical guidance for developing compensatory mitigation (Ecology 2006a, 2006b).
- **WSDOT Manuals and Handbooks:** WSDOT manuals and guidelines provide comprehensive frameworks and standards for the planning, design, construction, and maintenance of transportation infrastructure in Washington. These documents cover a wide range of topics, including highway geometric design, materials specifications, ROW acquisition, rail safety oversight, and environmental considerations. They emphasize safety, efficiency, and best practices, ensuring that projects meet regulatory requirements and align with state and federal standards.

1.6.4 Executive and Secretarial Orders

Executive orders are directives issued by the President to manage operations of the federal government. Executive orders have the force of law and are used to direct the actions of government officials and agencies.

Secretarial orders are issued by heads of departments (e.g., the Secretary of the Interior). These orders provide direction on specific issues within the department's jurisdiction.

Several executive and secretarial orders have been issued to address transmission infrastructure and related energy policies, including the following:

- **Executive Order on Actions to Expedite Energy-Related Projects (May 18, 2001):** This order mandates that agencies act expediently and in a manner consistent with applicable laws to increase the "production and transmission of energy in a safe and environmentally sound manner."
- **Executive Order on Tackling the Climate Crisis at Home and Abroad (January 27, 2021):** This order directs federal agencies to accelerate clean energy generation and transmission projects. It emphasizes the need for a whole-of-government approach to the climate crisis, including the expansion of transmission infrastructure to support renewable energy.
- **Executive Order on America's Supply Chains (February 24, 2021):** While primarily focused on supply chains, this order includes provisions for strengthening the resilience of critical infrastructure, including the electric grid.
- **Executive Orders on Energy and Climate Technologies (January 2025)[47]:** These orders, issued by President Trump, focus on expediting environmental reviews and permitting for high-voltage interstate electricity transmission infrastructure. They aim to streamline the construction and maintenance of these facilities to support reliable, diversified, and affordable supply of energy.
- **Secretarial Order No. 3285 (February 22, 2010):** This order establishes the development of renewable energy as a priority for the U.S. Department of the Interior and establishes a Departmental Task Force on Energy and Climate Change.
- **Secretarial Order No. 3355 (August 31, 2017):** This order aims to streamline the NEPA review process for infrastructure projects, including transmission lines, to expedite their development.
- **Secretarial Order No. 3399 (April 16, 2021):** Issued by the Secretary of the Interior, this order prioritizes the development of renewable energy projects on public lands and waters, which includes the necessary transmission infrastructure to support these projects.

[47] At the time of completing this Draft Programmatic EIS, several of President Trump's executive orders from January 2025 are facing legal challenges. These orders, which include measures to expedite high-voltage transmission infrastructure and other policy changes, have prompted a series of lawsuits. The legal opposition is primarily focused on the environmental, regulatory, and administrative impacts of these orders. Despite facing legal challenges, these orders remain in effect unless they are overturned by a court or rescinded by a subsequent executive order.

1.6.5 Relevant Environmental Impact Statements

The following key EISs are related to transmission facilities or the need for transmission in Washington State.

- **Programmatic EISs for solar, wind, and green hydrogen[48] development in Washington.** These programmatic EISs, currently under development by Ecology, provide broad environmental assessments to guide future project decisions and are described below.
    - Utility-scale solar energy facilities: This draft programmatic EIS evaluates the following types of utility-scale solar energy facilities, as well as a No Action Alternative: utility-scale solar facilities, utility-scale solar facilities with battery energy storage systems, and utility-scale solar facilities that include agricultural uses. The final programmatic EIS is planned for release in June 2025.
    - Utility-scale onshore wind energy facilities: This draft programmatic EIS evaluates the following types of utility-scale onshore wind energy facilities, as well as a No Action Alternative: utility-scale onshore wind facilities, utility-scale onshore wind facilities with battery energy storage systems, and utility-scale onshore wind facilities that include agricultural uses. The final programmatic EIS is planned for release in June 2025.
    - Green electrolytic[49] and renewable hydrogen facilities: The draft programmatic EIS is planned for release in early January 2025. The scoping summary report identifies the study area, alternatives, and resources to be analyzed in the draft programmatic EIS. Three types of green hydrogen facilities are evaluated in the programmatic EIS: green hydrogen production facility, green hydrogen production facility with co-located battery energy storage system, and a green hydrogen storage facility (gas or liquid form).
- **Energize Eastside EIS:** Puget Sound Energy (PSE) proposed to construct and operate a major new transformer served by approximately 16 miles of new high-capacity electric transmission lines extending from Redmond to Renton, Washington. The purpose of the Energize Eastside project is to address a projected deficiency in transmission capacity resulting from growth in electrical demand, which could affect the future reliability of electrical service for the Eastside area in King County, Washington (City of Bellevue 2018). Project construction was completed in December 2024 and is fully operational (PSE n.d.).
- **Vantage to Pomona Heights 230 kV Transmission Line Project FEIS:** Pacific Power proposed to construct, operate and maintain a new 230 kV transmission line from Pacific Power’s Pomona Heights substation in Yakima County to the Bonneville Power Administration (BPA) Vantage Substation in Grant County, Washington. Pacific Power’s proposed project would eliminate the potential for redistributed loads and the overloading of the adjacent transmission system; would ensure continued reliable and efficient service to the Yakima Valley; and would address future reliability issues within the Mid-Columbia transmission system. In October of 2017, BPA decided to interconnect the Vantage to Pomona Heights transmission line into the Federal Columbia River Transmission System via the Vantage Substation (DOI 2016). The Vantage-Pomona Heights 230 kV line was completed in August 2020 (PacifiCorp 2023).
- **South of Tri-Cities Reinforcement Project:** BPA is proposing to construct a new 18-mile-long 115 kV transmission line between BPA’s existing Badger Canyon Substation in Benton County, Washington and

[48] Hydrogen produced through the electrolysis of water using renewable energy sources such as wind, solar, or hydropower.

[49] Refers to the process of producing substances, particularly hydrogen, through electrolysis powered by renewable energy sources.

BPA's existing Ashe-Marion 500 kV transmission line to the west. The primary goals of this project are to improve long-term electric reliability, improve short-term operational flexibility and address system maintenance needs. BPA has concluded scoping and the comment period closed on November 20, 2023. (BPA 2023). BPA is currently evaluating the project's potential environmental impacts and considering public input. The draft environmental assessment is anticipated to be released for public review in early 2025 (Tri-Cities Area Journal of Business 2024).

- **I-5 Corridor Reinforcement Project FEIS:** BPA proposed to build a 500 kV lattice-steel-tower transmission line that would have run from a new 500 kV substation near Castle Rock, Washington, to a new 500 kV substation near Troutdale, Oregon. On May 17, 2017, BPA announced their decision to not build the proposed transmission line (BPA 2017).
- **West-Wide Energy Corridor Final Programmatic EIS:** As directed by Section 368 of the Energy Policy Act of 2005 the Secretaries of Agriculture, Commerce, Defense, Energy, and the Interior designated energy corridors for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities on Federal land in the 11 contiguous western states. The Bureau of Land Management (BLM) and USDA Forest Service (Forest Service) prepared the West-wide Energy Corridor Programmatic EIS, and a record of decision (ROD) was signed in 2009. The ROD amended 92 BLM land use plans and designated approximately 5,000 miles of Section 368 energy corridors on BLM-administered lands. These designated corridors cross BLM-managed public lands in Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming (BLM n.d.).

  In November 2023, BLM announced that it will begin assessing targeted updates to energy corridors across the West, to help speed deployment of transmission infrastructure. The BLM published a Notice of Intent in the Federal Register on December 1, 2023, to prepare an EIS and resource management plan amendments (RMPAs) for 19 land use plans. This effort includes evaluating modifications to seven existing Section 368 energy corridors across seven western states. The next step is for the BLM to develop a Draft RMPA/EIS (BLM 2024).

1.7 Organization of this Programmatic Environmental Impact Statement

This Draft Programmatic EIS is organized into nine separate chapters and has multiple technical appendices. Chapter 3 is subdivided into 15 sections that address specific resource topics. **Table 1.7-1** presents additional details on the organization of the Draft Programmatic EIS chapters.

Table 1.7-1: Environmental Impact Statement Organizational Structure

Document Contents	Content Description
Front Matter	The front matter of this Draft Programmatic EIS includes publication and contact information, as well as a fact sheet with general information about this Draft Programmatic EIS.
Executive Summary	The executive summary introduces this Draft Programmatic EIS and provides background information. It also describes the purpose and need, Action and No Action Alternatives, and the ways this Draft Programmatic EIS can be used.
Chapter 1, Introduction	Chapter 1 provides greater detail on the Draft Programmatic EIS background, summarizes the alternatives considered, the need for transmission facilities, alternatives considered, and scope of analysis. This chapter also outlines the various steps and requirements for project-specific environmental analysis.

Document Contents	Content Description
Chapter 2, Overview of Transmission, Development Considerations, and Regulations	Chapter 2 describes the proposed alternatives and provides general assumptions used for environmental analysis. It discusses typical transmission systems and the activities related to the construction, operation and maintenance, and upgrade or modification of these transmission systems. This chapter also identifies laws, regulations, policies, processes, and other environmental analyses that are relevant to the development of transmission facilities.
Chapter 3, Affected Environment and Environmental Impact	Chapter 3 focuses on the pre-project environmental conditions within the Study Area and the impacts that may occur for environmental resources from the construction, operation and maintenance, and upgrade or modification of transmission facilities. This chapter is subdivided into separate sections that describe the existing environment and probable impacts for the 15 separate resources, as follows: ▪ Earth Resources ▪ Air Quality, including Greenhouse Gases[50] ▪ Water Resources ▪ Vegetation ▪ Habitat, Wildlife, and Fish ▪ Energy and Natural Resources ▪ Public Health and Safety ▪ Land and Shoreline Use ▪ Transportation ▪ Public Services and Utilities ▪ Visual Quality ▪ Noise[51] and Vibration[52] ▪ Recreation ▪ Historic and Cultural Resources, including Tribal Rights, Interests, and Resources ▪ Socioeconomics, Environmental Justice, and Overburdened Communities
Chapter 4, Cumulative Impacts	Chapter 4 describes cumulative impacts of the Action Alternative and No Action Alternative in combination with other past, present, and reasonably foreseeable developments.
Chapter 5, Consultation, Coordination, and Public Engagement	Chapter 5 details information related to public scoping[53]; government-to-government consultation; agency cooperation, consultation, and coordination; and cooperating agencies.
Chapter 6, References	Chapter 6 provides references to the literature cited throughout the Draft Programmatic EIS.
Chapter 7, Glossary	The glossary defines key terms used in the Draft Programmatic EIS.
Chapter 8, List of Preparers	The list of preparers identifies those who contributed to the preparation of the Draft Programmatic EIS.
Chapter 9, Distribution List	The distribution list identifies organizations and individuals that were sent electronic copies of the Draft Programmatic EIS.

[50] Gases in the Earth's atmosphere that trap heat, contributing to the raising of the Earth's average temperature over time.

[51] A sound that is "unwanted"—i.e., this term is based on human perception.

[52] The oscillating movement of a particle or object around its stationary reference position. Vibration can be caused by mechanical processes such as machinery operation, construction activities, or transportation systems.

[53] A process that gives the public an opportunity to provide input on issues.

2.0 CHAPTER 2 – OVERVIEW OF TRANSMISSION FACILITIES, DEVELOPMENT CONSIDERATIONS, AND REGULATIONS

This chapter provides an overview of typical types of transmission facilities and describes both the Action Alternative and No Action Alternative. It also describes activities related to the construction, operation and maintenance, and upgrade or modification of transmission facilities.

As detailed in Chapter 1, this Draft Programmatic Environmental Impact Statement (EIS) is fulfilling the directive of Revised Code of Washington (RCW) 43.21C.405 by evaluating potential future construction and operation of electrical transmission facilities with a nominal voltage of 230 kilovolts (kV) or greater (referred to herein as “transmission facilities”). This Draft Programmatic EIS does not evaluate the potential effects of electricity generation, storage, local distribution, or customer use.

2.1 Overview of Transmission Facilities

The electric systems of transmission facilities are generally divided into two categories for regulatory purposes—high voltage and low voltage. Consistent with the Federal Energy Regulatory Commission (FERC) National Reliability Standards, low-voltage transmission facilities are generally defined as those below 100 kV, while high-voltage transmission facilities typically operate above 200 kV and can sometimes include the 100 to 200 kV range as well (FERC 2023). Typical transmission voltages include 115 kV, 138 kV, 230 kV, 345 kV, 500 kV, and 765 kV (DOE 2023b).

Transmission facilities are broadly used to transfer electricity. As shown in **Figure 2.1-1**, electricity is generally produced at utility-scale power generation facilities. The electricity passes through a substation that increases the voltage level and transports the electricity long distances using high-voltage overhead—or, in some cases—underground transmission facilities. The electricity again passes through a substation to decrease the voltage level to a safer and more usable intensity. Local distribution systems that are made up of low-voltage transmission lines and transformers disseminate the electricity to individual customers, including houses, businesses, and industries (DOE 2023a). High-voltage transmission facilities can also be used to move large electrical loads from one substation to another to meet the National Energy Reliability Corporation (NERC) transmission system planning performance requirements and customer demands (NERC n.d.).

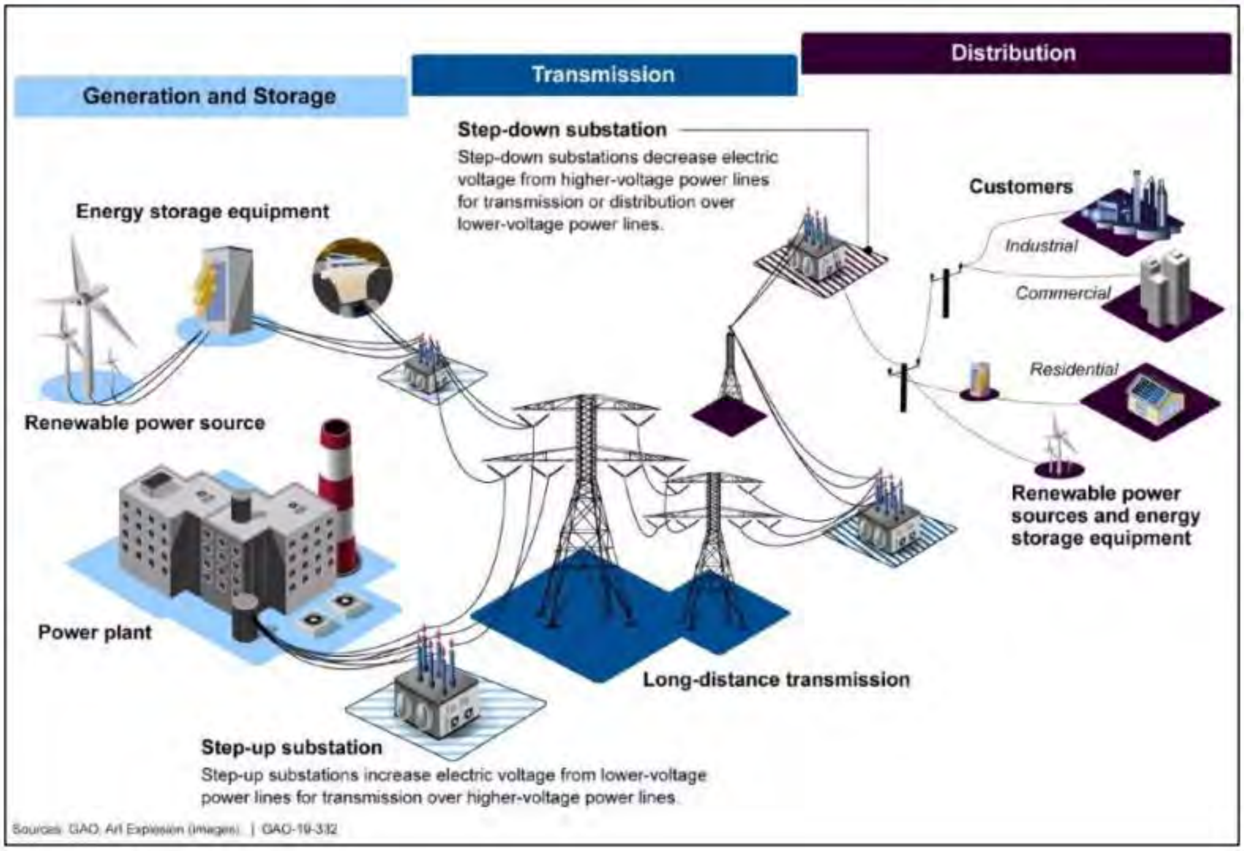


Figure 2.1-1: Transmission Facility Components
Source: GAO 2022

Electrical transmission facilities are essential for maintaining reliable and stable power supply, ensuring that there is minimal loss during transport and that electricity reaches consumers efficiently and safely. The development of transmission facilities also allows for effective incorporation of electricity produced by renewable energy facilities, such as wind and solar. The transmission facilities can facilitate the connection of remote generation sites with high renewable energy production potential but little demand with sites that have high renewable energy demand but little production potential. Increased development of transmission facilities also improves grid resilience by providing redundancy, backups, additional supply, and inter-grid connectivity[1] that can help to compensate for the impacts and struggles associated with outages or disruptions. A more comprehensive transmission grid has the further benefit of reducing electricity prices for consumers since it lowers the cost associated with power delivery (DOE 2023a).

2.1.1 Overhead Transmission

Overhead low- or high-voltage transmission facilities can vary in design, ranging from single wood poles situated along roadways to lattice towers with bundled conductors located in dedicated corridors.

[1] Refers to the linking of multiple electrical grids to allow the exchange of electricity between them. This connection helps balance supply and demand across different regions, enhancing the reliability and stability of the power supply.

Overhead high-voltage transmission towers are designed to keep conductors (transmission lines) separated from their surroundings and from each other. The National Electric Safety Code has specific requirements for different operating voltages; the higher the voltage, the greater the separation distance required between conductors.

A variety of overhead transmission structures are regularly used. These include single wood poles, wood H-frame, engineered wood, lattice steel towers (LSTs), and tubular steel poles (TSPs) (see **Figure 2.1-2**). Single wood poles are typically used for transmission facilities operating at 115 kV where the corridor width is restricted (e.g., within road rights-of-way [ROWs]). Wood H-frames can be used for cross country 115 kV facilities as they allow for greater average span distances. Wood H-frames can also be used for cross country 230 kV facilities where the topography allows. Guy wires are often used with these types of poles when the direction of the line changes or at termination poles. Engineered wood poles, also referred to as glue-laminated poles, can be used for 115 kV and 230 kV facilities when the ROW is restricted.

For 230 kV facilities and above, which are the focus of this Draft Programmatic EIS, both LST and TSP structures are most commonly used. LSTs consist of a steel framework with individual leg members and bracing systems. Bolted connections are used to assemble the lattice structure, ensuring stability and ease of maintenance. TSPs are hollow steel poles fabricated either as one piece or as several pieces fitted together (CPUC 2014a). However, it is assumed that the transmission facilities covered in this Draft Programmatic EIS would require transmission structures that are generally large enough that they arrive at the site in separate pieces and are assembled in sections from the ground up, with cranes or helicopters used to lift sections in place (CPUC 2014b). The choice of design between LST and TSP depends on factors such as voltage requirements and the surrounding environment.

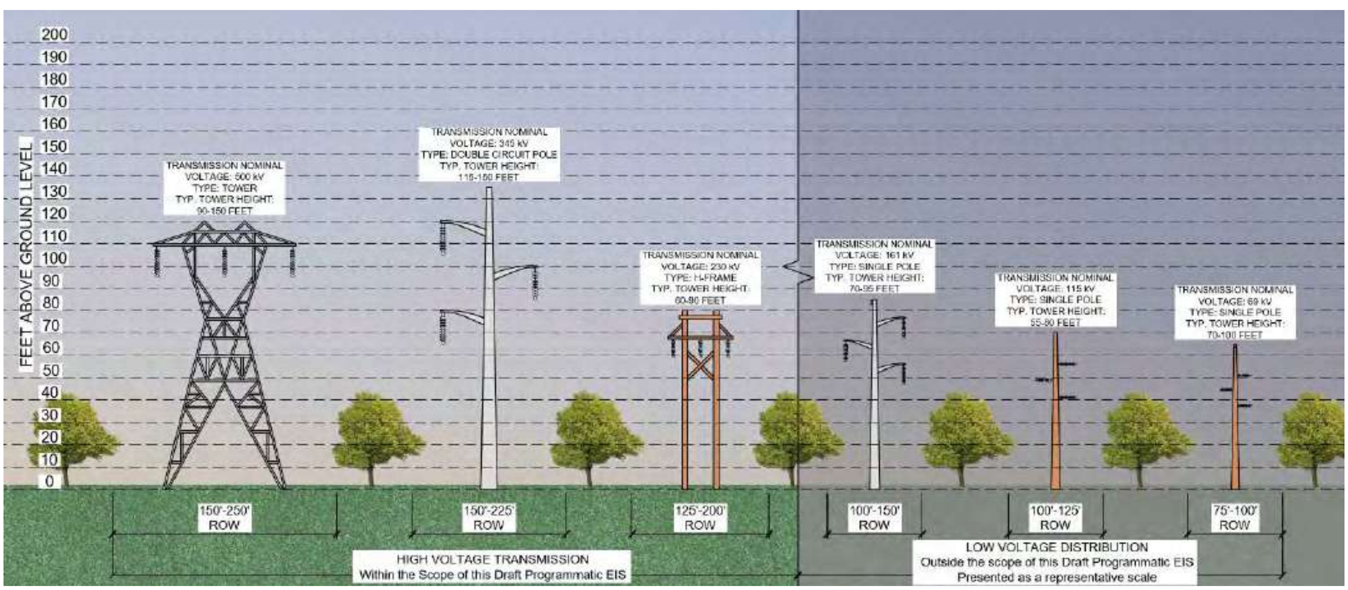


Figure 2.1-2: Overhead Transmission Structure Types

2.1.1.1 Substations and Transformers

The function of a substation is to transform electricity to a higher level of voltage, for efficient transmission over long distances, or a lower level of voltage, for easier and safer local distribution. Substations also provide controlled switching and protection functions. Switching and protection functions are used to balance electricity loads, isolate faults in the system to prevent damage, and support maintenance and repair activities (Prismecs 2024). Substations can vary greatly in size and complexity, depending on the amount of voltage being transferred and the number of connecting transmission lines (CPUC 2014a). Based on need and type of transmission facility, substations can be as small as 500 square feet or cover over 100 acres but are usually around 1 acre in size for local distribution systems and 10 to 20 acres for high voltage transmission facilities[2] (PSCW 2013; CPUC 2014a). **Figure 2.1-3** shows a few examples of substations, reflecting the variety of sizes that may be used.

Figure 2.1-3: Transmission Substations
Source: EFSEC 2024

Transformers are the primary component of substations, and they serve the substations' primary function of stepping up or stepping down the voltage of transmitted power. Given the amount of electricity passing through these transformers, it is vital to ensure that the components remain cool. Smaller transformers are typically self-cooling as their internal components are immersed in oil and are designed to allow the oil to cycle through the system and transfer heat to the external parts of the transformer. Larger transformers may need additional external cooling equipment like pumps to force the cycling of oil or fans to force air across heat exchange surfaces (USDA 2001). Other substation components could include breakers, switches, and capacitor banks. In addition, control equipment typically housed in a building, is required for the operation of the station.

2.1.1.2 Communication Systems

Communication systems help to provide safe and reliable electricity to the end user. The communication system shares real time information, such as the system's status, with power-generating facilities, electrical substations, and utility operation centers (AEP Transmission n.d.). Transmission facilities also have communications for control of the line and substations to detect problems and shut down line sections (CPUC 2014a).

2.1.1.3 Obstruction Lighting and Marking

Consistent with the Federal Aviation Administration's (FAA's) guidance, obstructions such as transmission lines may be marked or lighted to warn aircraft operators of their presence during both daytime and nighttime

[2] As defined in this Programmatic EIS, electrical transmission facilities with a nominal voltage of 230 kilovolts or greater.

conditions. Individual projects need to be reviewed to determine whether FAA marking and lighting requirements apply. They may be marked/lighted in any of the following combinations (FAA n.d.):

- **Aviation Red Obstruction Lights:** This option includes flashing aviation red beacons (20 to 40 flashes per minute) and steady-burning lights during nighttime operation. Orange and white paint is used for daytime markings.
- **Medium-Intensity Flashing White Obstruction Lights:** Medium-intensity flashing white obstruction lights may be used during daytime and twilight with automatically selected reduced intensity for nighttime operation. This system is not normally installed on structures less than 200 feet above ground level.
- **High-Intensity White Obstruction Lights:** Flashing high-intensity white lights may be used during daytime with reduced intensity for twilight and nighttime operation. In this type of system, the marking of structures with red obstruction lights and aviation orange and white paint may be omitted.
- **Dual Lighting:** A combination of flashing aviation red beacons and steady-burning aviation red lights for nighttime operation and flashing high-intensity white lights for daytime operation. Aviation orange and white paint may be omitted.
- **Catenary Lighting:** Lighted markers available for increased night conspicuity of high-voltage (69 kV or higher) transmission line catenary wires. Lighted markers provide conspicuity both day and night.
- **Omnidirectional lighting:** This option includes medium-intensity omnidirectional[3] flashing white lighting system that provides conspicuity both day and night on catenary support structures. The unique sequential/simultaneous flashing light system alerts pilots of the associated catenary wires.
- **High-Intensity Flashing Lights:** High-intensity flashing lights used to identify some supporting structures of overhead transmission lines located across rivers, chasms, gorges, etc. These lights flash in a middle, top, and lower light sequence at approximately 60 flashes per minute. The top light is normally installed near the top of the supporting structure, while the lower light indicates the approximate lower portion of the wire span. The lights are beamed toward the companion structure and identify the area of the wire span. High-intensity flashing white lights are also employed to identify tall structures, such as chimneys and towers, as obstructions to air navigation. The lights provide 360-degree coverage around the structure at 40 flashes per minute and consist of one to seven levels of lights, depending on the height of the structure. Where more than one level is used, the vertical banks flash simultaneously.

Another type of obstruction lighting is the audio-visual warning system (AVWS), which represents a newer technology. Under 47 CFR 87.483, AVWS is a radar-based obstacle avoidance system that activates obstruction lighting and audible warnings to alert pilots of potential collisions with land-based obstructions. This system can be used in transmission facilities instead of, or in combination with, traditional obstruction lighting, which is either continuously on or flashes. The AVWS may help to reduce the impacts associated with new or additional sources of light. Like with other warning systems, AVWS must be approved for use by the FAA.

In addition to lighting, brightly colored balls can be attached to the conductors to make them more visible to low-flying aircraft. Line markers can be attached to the ground wire of transmission lines and some lower voltage

[3] Refers to the capability of receiving or transmitting signals in all directions.

conductors depending on the marker type and local geographic conditions to prevent birds from perching or building nests on the wires (APLIC 2012).

2.1.2 Underground Transmission

Underground high-voltage transmission facilities may also be technically feasible and, depending on project-specific applications and site-specific considerations, may have the following benefits:

- **Improved Reliability and Resilience:** Underground transmission facilities are less vulnerable to external threats, such as high winds, falling branches, and wildfires. This reduces the risk of power outages and enhances the overall reliability and resiliency of the power grid. However, if issues do arise, repairs can take substantially longer than overhead facilities due to repair complexity, limited access, and technical skills required of transmission crews.
- **Lower Maintenance Costs:** While the initial installation costs are higher, underground transmission facilities often have lower long-term maintenance costs because they are less susceptible to damage from weather, vegetation, and other external factors.
- **Safety:** Although not completely excluded from safety risks altogether, underground transmission facilities reduce the risk of accidents and hazards associated with overhead transmission facilities, such as falling structures or wires.

While underground transmission has the benefit of increased resilience to severe weather conditions and reduced risks of power outages, it can cost 5 to 15 times more than overhead transmission facilities to install (EIA 2012; Xcel Energy 2024), require over 14 times as much soil excavation (DOE 2023a), and have approximately half as long of a life expectancy (PRPA 2024).

The installation of underground cables often requires significant excavation and disruption to the land. Excavation work is continuous along the corridor as opposed to specific structure locations required for overhead transmission facilities. Additionally, periodically along the corridor of the underground transmission facility, developers must construct large underground concrete boxes that measure approximately 8 to 10 feet wide by 24 to 30 feet long by 8 to 10 feet high (PSCW 2011; Xcel Energy 2024). These boxes, referred to as vaults, are used by utility crews to splice cables together during construction and during the operation of the transmission facility to perform maintenance and repairs (see **Figure 2.1-4**). Vaults must be placed every 900 to 3,500 feet, depending on the type of cable, topography, and voltage (PSCW 2011). Given the size of the vaults, areas where they must be placed would require substantially more excavation. Higher-voltage underground transmission facilities, such as those addressed in this Draft Programmatic EIS, may also require that vaults be constructed in adjacent pairs to handle redundant sets of cable during maintenance (PSCW 2011). The spacing of the conductors may also vary depending on the voltage to address heat dissipation from the conductors.

Developers typically construct overhead transmission facilities because underground facilities are more expensive and harder to maintain when required. Another typical consideration for developers is how the additional costs would be allocated. Some utility providers have tariffs in place that require the local jurisdiction or customer group requesting the underground transmission facility to pay the difference between the overhead and underground costs (PSE 2014). As of 2009, an estimated 0.5 percent of all transmission lines of at least 200 kV or higher in the United States were underground (EIA 2012). There are instances where 230 kV facilities or above have been placed underground, typically for very short segments or in specific urban areas where overhead transmission facilities are not feasible.

Figure 2.1-4: Underground Vaults
Source: Xcel Energy 2024; Oldcastle Infrastructure n.d.

2.2 Alternatives

2.2.1 Action Alternative

This Draft Programmatic EIS evaluates potential impacts associated with the development of electrical transmission facilities with a nominal voltage of 230 kV or greater in Washington. Electrical transmission facilities are defined in 80.50.020(12) as "electrical power lines and related equipment." Therefore, the Action Alternative in this Draft Programmatic EIS includes development of new overhead and underground transmission facilities, as well as the upgrade or modification of existing transmission facilities.

2.2.1.1 Overhead Transmission Facilities

This Draft Programmatic EIS evaluates new overhead transmission facilities, which include the following:

- Transmission structures (towers and poles)
- Conductors (wires)
- Ground wires
- Insulators
- Substations, including transformers and ancillary equipment, such as converter stations

After a project-specific environmental review and permitting are complete, it is expected that several years will be needed to construct a transmission facility, with the timeframe varying based on the length of the transmission facility, complexity of construction, and site-specific topography.

2.2.1.2 Underground Transmission Facilities

Although high-voltage transmission facilities are not typically constructed underground, this Draft Programmatic EIS includes underground construction as part of the Action Alternative. Constructing high-voltage transmission facilities underground could be beneficial to protect visual resources, avoid aviation and military operations, or improve electrical reliability in high-risk weather areas. Transmission facilities could also be placed underground to meet the needs of certain site constraints. Due to the extensive construction methods required for this option, it is assumed that, per mile, underground transmission would take longer to construct than overhead facilities.

This Draft Programmatic EIS evaluates new underground transmission facilities, which include the following:

- Insulated conductor cables
- Vaults
- Transition structures (risers)

2.2.1.3 Upgrade/Modification of Existing Transmission Facilities

Applicants could also pursue opportunities to modify or upgrade existing transmission facilities. Upgrades or modifications of existing transmission facilities are often considered to improve efficiency and reliability and are required to ensure compliance with updated regulations and standards. Upgrading or modifying an existing transmission facility can include replacing transmission towers, transformers, substations, switchyards, underground cabling, and ancillary equipment.[4] Such actions associated with modification can also include, or result from, reconductoring[5] or upgrading components of a transmission facility to include advanced transmission technologies. Upgrades and modifications do not include routine operation and maintenance activities, such as repairing or replacing components to maintain safe and reliable operation of the transmission facility. Details on routine operation and maintenance activities can be found in Section 2.3.3.

Construction associated with upgrade or modification could require expanding an existing transmission facility ROW. Construction of an upgraded or modified transmission facility would vary greatly depending on the proposed action. However, it is anticipated that actions such as installing advanced transmission technology could take several months, while rerouting or converting transmission facilities could take over a year. More information about the different actions considered as part of upgrading or modifying transmission facilities is provided below.

- **Reconductoring:** It is anticipated that as electric power demand increases, more or larger cables and conductors would be needed to increase the capacity and the interconnectivity of the grid to meet this fluctuation in demand. Historically, installation of new circuits has been the preferred solution to increase transmission capacity, but limited ROW and opposition from local communities can make “reconductoring” a practical alternative. Advances and innovations in materials can be applied to conductors, resulting in higher thermal rating and strength, which can reduce transmission and distribution losses, minimize safety hazards, and increase energy supply to end users (DOE 2015). It is anticipated that reconductoring transmission facilities to take approximately 6 to 18 months to complete (Grid Lab 2024).
- **Advanced Transmission Technologies:** Incorporating advanced technology into existing transmission facilities can help to improve the efficiency and effectiveness of electricity delivery and increase the overall reliability of the system. The technology can be applied to both grid software and grid hardware. Advanced

---

[4] Ancillary equipment refers to secondary systems and devices that support the main transmission infrastructure.

[5] Reconductoring is the replacement of cable or wire on an electric circuit, typically a high-voltage transmission line, to afford a greater electric-current-carrying capability (DOE 2015).

grid software technology can include solutions such as dynamic line rating[6] that focus on improvements in the control systems and decision-making processes. There are also physical asset and infrastructure solutions, such as power flow controllers and advanced conductors and cables that focus on carrying, converting, or controlling electricity. These different technologies can be implemented independently or in tandem to improve the overall efficiency and effectiveness of the transmission system (DOE 2020). It is anticipated that installing advanced transmission technology could take approximately 3 to 12 months (Grid Lab 2024).

- **Right-Size Replacement:** Right-size replacement[7] intends to provide opportunities to modify in-kind replacement of existing transmission facilities to increase their capabilities. Right-size replacements can extend a system’s useful life and reduce the need for new transmission facilities. This type of modification would be similar to constructing a new transmission facility in that it intends to address a long-term transmission need, increases the capacity of the existing transmission facility, and is located in the same general route as and/or expands the existing transmission facility ROWs (18 Code of Federal Regulations Part 35). For example, reconductoring may require the replacement of some or all of the existing transmission facility structures due to design load requirements imparted by the often larger and heavier conductor. It is anticipated that right-size replacement could take approximately 3 to 5 years to complete (Grid Lab 2024).
- **Modifying:** Modifying existing transmission facilities can include constructing additional transmission towers, transformers, substations, switchyards, underground cabling, and ancillary equipment. It is anticipated that modifying an existing transmission facility could take approximately the same amount of time as new construction.
- **Re-Routing:** Rerouting a portion of an existing transmission facility could be required in several scenarios. An existing transmission facility may need to be rerouted to connect a new power source to the transmission system. Rerouting could also be needed if proposed development overlaps or conflicts with the existing transmission facility. It is anticipated that rerouting an existing transmission facility could take approximately the same amount of time as new construction.
- **Converting:** A transmission facility could be converted from an overhead facility to an underground facility. This Draft Programmatic EIS does not evaluate this type of conversion. Converting a transmission facility may be needed in high fire-risk areas, severe weather event areas, or urban areas. It is anticipated that converting an existing transmission facility could take approximately the same amount of time as new construction of an underground transmission facility.

2.2.2 No Action Alternative

Under the No Action Alternative, it is assumed that the appropriate State Environmental Policy Act (SEPA) Lead Agency[8] would continue to review individual project-level applications for transmission facility development under

[6] A technology used in electric power transmission to optimize the capacity of transmission lines based on real-time conditions rather than static assumptions.

[7] Under FERC Order No. 1920, right-size replacement refers to modifying or upgrading an existing transmission facility to increase its capacity, thereby extending a system's useful life and reducing the need for new transmission facilities.

[8] According to Washington Administration Code 197-11-758, a SEPA Lead Agency is defined as the agency with the main responsibility for complying with the procedural requirements of the Washington State Environmental Policy Act.

existing state and local laws. The No Action Alternative would not use this Draft Programmatic EIS as reference for SEPA compliance, and individual projects would require separate environmental review.

2.3 Phases of Transmission Facility Development

Transmission facility development includes site characterization, environmental reviews and permit approvals, construction, operation and maintenance, and decommissioning[9] (see **Figure 2.3-1**). The phases of transmission facility development analyzed in this Draft Programmatic EIS include construction, operation and maintenance, and upgrade or modification.

The upgrade or modification to an existing transmission facility can occur after construction and during its operation and maintenance phase, but before decommissioning. Upgrades or modifications are often made to improve the efficiency, performance, or address evolving technological and regulatory requirements. The impacts from the upgrade or modification of an existing transmission facility may be similar to those described for construction. However, as described in each element of the environment throughout Chapter 3, there are often opportunities to minimize these adverse impacts. For example, adverse environmental impacts associated with the upgrade or modification of a transmission facility could be minimized by utilizing existing infrastructure and causing less disturbance.

Site Characterization	Environmental Review and Permit Approvals	Construction	Operation and Maintenance	Decommissioning*
• System Planning Studies • General Corridor, Route, and Site Identification • Desktop Analyses • Field Surveys • Site Studies • Feasibility Studies	• Pre-application Meeting • Application Submittal • Environmental Review • Environmental and Permit Approvals	• Site Preparation • Assembly, Testing, and Start-Up • Post-Construction Reclamation[10] • Post-Construction Monitoring and Reporting	• Operation • Maintenance and Inspection • Vegetation Management • Access Road Maintenance	• Environmental Studies and Environmental Reviews, if applicable • Dismantling and Removal • Recycling • Revegetation and Site Restoration

* As discussed in Section 2.3.4, decommissioning is not analyzed in this Draft Programmatic EIS.

Figure 2.3-1: Phases of Transmission Facility Development

2.3.1 Site Characterization

Initially, applicants identify the scale and scope of the proposed transmission facility project. The interconnection points determine the specific location for a new transmission facility or an upgrade or modification to an existing facility. Site characterization typically involves conducting desktop analyses, system planning studies, and, with agreement from the landowner(s), field surveys. Very little modification to the site is attributed to this phase, but impacts could still occur. For example, obtaining soil core samples could have unanticipated impacts on cultural,

[9] The steps taken to safely retire a facility from service. This process ensures that the site can be reused or returned to safe state.

[10] Refers to the process of restoring temporarily impacted land to its original or agreed-upon condition after construction activities are completed.

Tribal, and historical resources or could impact critical habitat. Therefore, for the purposes of the impact analysis completed for this Draft Programmatic EIS, site characterization is included as part of the construction phase.

Siting considerations typically include the transmission ROW width, identification of points of interconnection need, the geography of an area, and access to proposed or existing transmission infrastructure, such as substations. Considerations would also include zoning requirements and identification of critical areas.

The following activities could involve minimal or no site disturbance:

- Mapping and desktop assessment of surface hydrology and floodplains
- Mapping and desktop assessment of habitat, including wetland identification
- Mapping and assessment of water types, including identification of waters that contain fish and water crossings
- Mapping and identification of species (plants and wildlife)
- Completing desktop studies for Tribal, cultural, and historic resources
- Completing desktop slope evaluations and soil stability studies
- Completing desktop assessment of existing land use and ownership
- Completing due diligence assessments for lands with previous industrial uses
- Completing an evaluation of seismic stability and potential storm event runoff
- Completing a baseline air quality assessment, if requested by the SEPA Lead Agency

The following activities could include ground disturbance:

- Digging and Boring: Conducted for subsurface investigations and environmental surveys. These activities could help to understand soil and rock properties, soil conditions, subsurface environmental and/or cultural resources, soil or groundwater contamination, and geotechnical suitability.
- Auguring: Similar to drilling, but often used for shallower depths.
- Trenching: Used to install temporary utilities or to expose existing underground utilities.

2.3.2 Transmission Construction

Once an applicant has obtained all necessary environmental approvals and permits for a transmission facility (see Section 1.6 of Chapter 1, Introduction), the construction process begins. The duration of transmission facility construction can vary based on a variety of factors, including size, scale, type of facility (e.g., wood pole or LST; overhead or underground), whether it is a new transmission facility or an upgraded or modified facility, and site-specific characteristics. However, in general, all transmission facility construction includes the following stages, described in the sections that follow:

- Site Preparation
- Site Construction
- Post-Construction Reclamation

- Post-Construction Monitoring and Reporting

Construction activities, including oversight, administration, compliance, and monitoring, would be managed by the project-level applicant. The workforce is likely to consist of laborers, craftsmen, machine operators, supervisory personnel, and construction management personnel. The number of workers employed during the construction of transmission facilities would vary greatly depending on the size and scale of the proposed project. It is generally anticipated that construction of a transmission facility could require the following general roles and approximate counts:

- **Project Managers and Engineers:** Around 10 to 20 individuals, including civil, electrical, and environmental engineers
- **Construction Workers:** Ranges from 50 to 200 workers and includes linemen, equipment operators, and general laborers

It is assumed that underground transmission facility construction would require more construction workers than overhead transmission facilities. It also anticipated construction activities to occur sequentially, moving along the length of the transmission facility route. For example, a crew would begin preparing a site and once completed, they would move on to the next location while a second crew begins the assembly and start-up of the transmission facility at the first location. With this phased or sequenced approach, all employees would not be in one location at the same time.

2.3.2.1 Site Preparation

Site preparation begins with conducting all necessary preconstruction surveys, such as preconstruction wildlife surveys, for micro-siting and/or mitigation. Once surveys are finalized, the site preparation process can commence. The preparation of overhead and underground transmission facility construction sites could include establishment of applicable temporary erosion and sediment controls, clearing or grubbing of vegetation, tree removal, grading, constructing temporary staging and laydown areas, improving roads, and constructing new roads.

Projects in urban settings often face additional challenges in site preparation, such as limited space, higher traffic disruption, and stricter regulatory requirements. While rural[11] settings may not have these same challenges, they can face logistical challenges, such as difficult terrain and longer distances for material transport. Regardless of whether a setting is urban or rural, projects in environmentally sensitive areas may require special considerations to minimize environmental impact, including more stringent permitting processes and additional mitigation measures.

Construction Access

Construction access roads would likely be required for the movement of trucks, cranes, concrete trucks, bulldozers, and other equipment. Construction access would vary depending on the project scope, location and terrain, and environmental setting. Although existing roads would be used to the greatest extent feasible, roads may need to be improved or new access roads may need to be constructed. Road improvements could include laying rock or gravel where the soil is unstable, removing any overgrown vegetation, and widening the road and adjacent disturbance areas for safety clearances. New roads would require clearing, grading, and installing gravel or other suitable material. In areas with steep slopes or grades, drain drips or water bars could be required for

[11] Rural encompasses all population, housing, and territory not included within an urban area.

adequate drainage and to minimize soil erosion. In such areas, it is often required that terraces be created to ensure level work areas at the structure locations. In wetland or unstable soil areas, matting could be installed to allow heavy construction equipment access while minimizing impacts on soils, vegetation, and habitat. Furthermore, temporary bridges across waterways could be installed for access. Before constructing new roads, special consideration is given to the anticipated restoration required after construction is completed, including revegetation, rock cover, and other drainage and erosion control features (PacifiCorp 2021).

Access roads could also serve as the primary means of movement for maintenance crews through operation and maintenance. These roads could be used to access transmission lines, substations, and ancillary facilities for inspection, maintenance, and/or emergency repairs over the life of any project (PacifiCorp 2021).

Clearing and Grading

Clearing of existing shrubs, vegetation, asphalt, obstructions, and trees could be required for transmission facility ROWs, new and improved access roads, and staging and laydown areas, as well as future operational conditions. Site grading would entail establishing applicable temporary erosion and sediment control features, removing excess soils or soils that are unsuitable for construction from the site, and replacing them with load-bearing granular materials and aggregates to facilitate construction. The extent of site grading would depend on the proposed transmission facility and environmental setting. Construction in areas with steep slopes or unstable soils would require more earthmoving equipment to achieve appropriate elevations for site construction. Site grading activities could require the use of excavators, scrapers, dozers, paddle wheel scrapers, haul vehicles, and graders.

Staging and Laydown Areas

Staging areas are used to temporarily store materials, construction equipment, or vehicles and to assemble transmission facility components. The size and total number of staging areas vary depending on the size, scale, and type of transmission facility being proposed. In urban areas, parking lots or already developed areas can be used, while remote areas may require additional clearing and grading.

Helicopter Landing Zones

Helicopters can be used for a variety of construction activities where traditional ground equipment may not be allowed or is limited, such as in remote or sensitive areas. For example, helicopters can be used for the following activities (NWPPA n.d.):

- Conducting micro-siting surveys[12]
- Conducting alternative geotechnical analyses
- Transporting personnel, equipment, and/or materials
- Setting structures
- Stringing wires
- Post-construction monitoring or surveys

[12] Micro-siting surveys refer to the process of identifying the exact placement of a transmission facility structure.

As part of the site preparation phase, helicopter landing zones or pads may be needed for re-fueling and loading. The number and size of landing pads would depend on the helicopter model being used, length of the proposed transmission facility, and number of restricted construction sites. Helicopter landing pads would be constructed as close to the proposed construction site as practicable. The landing zone locations would also be prioritized in areas that require minimal site preparation and that are free of obstructions, such as open spaces, fields, or parking lots.

2.3.2.2 Site Construction (Assembly, Testing, and Start-Up)

The following sections describe the site construction process and activities associated with the assembly, testing, and start-up of overhead and underground transmission facilities.

Overhead Transmission

Overhead transmission line construction is typically completed in the following stages, but various construction activities may overlap, with multiple construction crews operating simultaneously:

- Installing structure foundations
- Assembling and erecting support structures
- Stringing conductors, ground wires, and fiber-optic lines

Foundations

Except for wood pole construction, most overhead transmission facilities have some form of concrete foundation. The size of the foundation typically depends on the type of structure and the terrain. Construction begins with the auguring of holes for structure footings. LSTs typically require four footings, each 3 to 4 feet wide and 15 to 30 feet deep. TSPs require one hole that is typically 8 to 12 feet wide and 40 to 60 feet deep. After the footing holes are excavated, they are reinforced with steel and then filled with concrete. It is anticipated that the foundations for both LSTs and TSPs would have a slight projection above the ground. Once the concrete has cured, crews can begin construction of the structure itself (CPUC 2014b).

Structure Installation

For wood pole construction, including engineered wood, once the insulators are attached to the wood poles, they are typically installed directly into the ground without a separate concrete foundation. Depending on the soil type, wood poles may require the use of casings. The structure installation process involves digging a hole, placing a pole in the hole, and then backfilling the hole with soils or other materials. The depth of the hole and the type of backfill material are carefully chosen to ensure stability and support for the pole. Guy wires are added at termination or turning wood structures and may be used to enhance stability of the system.

Steel overhead transmission facility structures are generally built from the ground up. Sections of LST structures are assembled near the installation site and lifted into place. Crews then bolt the sections together. TSPs can be assembled entirely near the site and erected in one piece or assembled in sections, depending on the terrain and available space. Structures can be lifted and set in place by a crane or helicopter, depending on accessibility for ground-based construction equipment (CPUC 2014b).

Structures and foundations would be designed to the requirements of the following applicable publications:

- American Society of Civil Engineers (ASCE) Standard 10, Design of Latticed Steel Transmission Structures
- ASCE Standard 48, Design of Steel Transmission Pole Structures

- ASCE Manual of Practice 113, Substation Structure Design Guide
- American Institute of Steel Construction 360 Specification for Structural Steel Buildings
- American Concrete Institute 318 Building Code Requirements for Structural Concrete and Commentary

Conductors, Ground Wires, and Fiber-Optic Lines

Construction of overhead transmission facilities includes the wire-stringing operation, during which conductors and ground wires are strung between structures. This operation can also include the installation of sheaves, vibration dampeners, weights, suspension, identification markers, and dead-end hardware assemblies for the entire length of the route (CPUC 2014b).

Conductors are the “wires” that are connected to the structures that relay the electric current. Conductors used in transmission lines are usually constructed from aluminum placed over a steel core for reinforcement. Conductors are generally not insulated, with air serving as the insulating material (Xcel Energy 2024). For voltages up to 200 kV, a single conductor per phase can be used, which includes a total of three wires. For voltages over 200 kV, bundled conductors are used to increase the capacity of the line and reduce power loss. Bundled conductors consist of two or more conductor cables per phase connected by non-conducting spaces (CPUC 2014a). Each alternating current circuit has three phases (e.g., lines), whereas each direct current circuit has two phases.

A lightweight sock line, or pilot line, is strung by bucket trucks, heavy equipment, and sometimes helicopters. The pilot line is threaded through wire rollers attached to the insulator of each structure. The pilot line is then attached to a conductor pulling cable, which is connected to a tensioning machine on a truck. The conductors are pulled from one structure to the next by a puller machine (CPUC 2014b). The puller and tensioner work together during the pulling operation to ensure that the conductor maintains the proper ground clearance at all times. Wire set-up sites or pulling stations, where the associated pulling machinery and equipment are staged, are located at intervals along the span (CPUC 2014b).

After a section of conductor is pulled through a series of structures, a tensioner is used to apply the proper tension. Applying proper tension is crucial as conductors can expand and contract with temperature changes, ensuring they will not sag too low when temperatures are high (CPUC 2014b). Guard poles or guard structures may be installed at transportation crossings, flood control areas, utility crossings, parks, and other sensitive locations to protect these underlying areas during wire-stringing operations. The guard structures intercept the wire in the event that it drops below a conventional stringing height, preventing damage to structures. These guard structures are temporary and are removed after conductor installation is complete (CPUC 2014a). At crossings of interstate and state highways, closures may be required during stringing operations to ensure public safety.

Once the conductors are pulled through the structures and have adequate tension, they are permanently connected (i.e., “clipped in”) to the insulator, which is attached to the structure. Insulators are made from non-conductive material and are used to prevent the unintended flow of electricity between conductors and supporting structures (CPUC 2014a). Insulators have historically been made of porcelain or toughened glass, which requires routine maintenance to avoid dust build-up leading to insulator flashover and noise. Newer insulators are made of polymer or silicon, which are lightweight and shatter-resistant (CPUC 2014a).

Ground wires are unpowered protective wires that are strung along the tops of towers to protect the system from lightning strikes. Ground wires sometimes include a fiber optic communication line to provide reliable control of the lines and substations (CPUC 2014a). Finally, vibration dampeners, weights, and spacers between the conductors of a bundled phase are installed (CPUC 2014b).

Fiber optic lines, or communication systems, help to provide safe and reliable electricity to the end user. The communication system shares real time information, such as the system's status, with power-generating facilities, electrical substations, and utility operation centers (AEP Transmission n.d.). A primary communication wire is typically installed as part of the transmission facility, and a secondary communication path can also be installed for redundancy. Communication systems can be installed both above and below ground. The communication line can be attached to transmission structures or installed in separate locations, such as nearby streets. The ground wire sometimes incorporates a fiber optic communications line (CPUC 2014a).

Substations and Transformers

Construction of a substation begins with site preparation, including clearing of vegetation, site grading, and installation of site drainage, ground grid, and concrete foundations (including spill prevention, control, and countermeasures for the transformer[s]). A non-conductive gravel pad is placed over the substation yard, and a security fence is installed surrounding the site for safety and security (PSCW 2013). In some instances, a communication tower may be required.

Underground Transmission

In this Draft Programmatic EIS, underground transmission facilities can include the following construction methods:

- Open trenching
- Trenchless crossings (including horizontal direction drilling [HDD], jack and bore, or tunneling)
- Underwater

Underground transmission facilities must be buried, which requires substantially more earthwork than overhead transmission facilities. There are two primary methods used for installing underground transmission lines: open trenching and trenchless crossings. Both are evaluated in this Draft Programmatic EIS as described below.

Open Trenching

The most common technique of underground transmission construction is open trenching. Open trenching is the most straightforward method and can be performed with basic construction skills and equipment. Open trenching involves the use of heavy machinery to dig an open trench at a depth typically of 6 to 8 feet but can be greater (PSCW 2011). This method allows precise control of the trench depth, making it suitable for projects with specific depth requirements. Traditional trenching equipment is generally less expensive to purchase and maintain in comparison to trenchless crossings that require drilling or tunneling. In the event of utility repairs or maintenance, traditional trenching offers relatively direct access to the utilities compared to trenchless. However, open trenching results in surface disruption, which can be problematic in urban or environmentally sensitive areas. Additionally, restoration of the surface after trenching can be time-consuming and costly.

Trenchless Crossings

The second method is trenchless crossings, used when open trenching is not practical due to the presence of structures or sensitive surface resources, shallow bedrock or groundwater levels, or because the soils will not bear the weight of heavy equipment (Hair 2015). Trenchless crossing techniques evaluated in this Draft Programmatic EIS include HDD, jack and bore, and tunneling.

Horizontal Directional Drilling

The HDD technique uses a surface-launched drilling rig to dig an underground tunnel with minimal surface disruption (Hair 2015). The process begins with crews digging sending and receiving pits. A drilling rig is used to cut a small pilot hole throughout the length of the route. Once it reaches the receiving end, it is pulled back through the pilot hole, creating a large tunnel while pulling the transmission line through. HDD is suitable for soft to hard clays and wet soils and involves drilling rather than extensive excavation (City of Portland n.d.). This method also provides flexibility in the drilling path, allowing the operator to maneuver around obstacles and along curves. HDD is anticipated to result in minimal impacts on natural habitats, is more suitable for environmentally sensitive areas, and can reduce post-construction site restoration costs (Hair 2015).

Jack and Bore

Jack and bore is another trenchless construction technique that uses a hydraulic auguring machine to create an underground tunnel. The jack and bore process requires moderate excavation at the entry and exit points for the jack and bore machine to be positioned. Typical boring pits are around 14 by 35 feet and deep enough to accommodate the boring equipment (PSCW 2011). A casing, which includes the transmission wires, is then jacked horizontally through the ground while a rotating auger simultaneously removes the soil. This technique is generally limited in maneuverability and steering; therefore, it is often used for short, straight segments (FDOT 2010).

Tunneling

Tunneling is generally used in urban areas where open trenching would not be a viable option and is typically located at depths greater than with HDD or jack and bore. In most cases, a tunnel boring machine (TBM) is used and can encompass the installation of tunnels by microtunneling, pipejacking, or conventional tunneling. The main difference between microtunneling/pipejacking and conventional tunneling is the method of lining the tunnel. Pre-formed pipes are used as the structural lining in pipejacking/microtunneling and in conventional tunneling, the lining is typically formed of precast concrete segments that are interlocked to line the tunnel bore as the TBM advances (National Grid 2023).

Construction would include forming work areas and entry and exit areas for the TBM to be used. The first phase of tunneling is to construct the launch and reception shafts. Following construction of the shafts, a base slab and tunnel headwall structure would be cast at the bottom of each shaft and a thrust wall installed within the launch shaft to allow the TBM to advance. The TBM would be lowered into the launch shaft and tunneling commenced between the launch and reception shafts. Once the tunnel is constructed and the transmission conductors have been installed, the shafts would either be capped using prefabricated beams/slabs then backfilled, or a tunnel head house constructed. The requirement for a tunnel headhouse would be determined depending on whether the required cable ratings could be achieved without mechanical ventilation within the tunnel (National Grid 2023).

Underwater

Underwater crossings of transmission lines along rivers or lakes involve laying cables directly on the waterbed. Before laying the cables, a detailed survey of the river or lakebed is conducted to identify the best route and avoid obstacles. Specialized barges or vessels are used to lay the cables on the waterbed. The cables are typically weighted or buried slightly to ensure they remain in place (Riverkeeper 2024). Measures are taken to minimize environmental impacts, such as avoiding sensitive habitats and ensuring proper sediment management. This method avoids the need for extensive excavation and surface disruption, making it suitable for some environmentally sensitive areas. Since the cables are underwater, they have no visual impact on the landscape.

Accessing and repairing underwater cables can be more challenging and costly than land-based cables. Examples of this construction method proposed in other transmission facility projects include:

- **Transbay Cable Project:** Approximately 53 miles of high-voltage direct-current cable connecting two substations to enhance the reliability of San Francisco’s electric grid (Babcock & Brown 2007).
- **Lake Champlain:** Nearly 97 miles of transmission cable proposed along the bottom of Lake Champlain (Adirondack Explorer 2024).
- **Hudson River:** Nearly 89 miles of transmission cable along the bottom of the Hudson River (Riverkeeper 2024).

Supporting Infrastructure for Underground Transmission Facilities

Additional infrastructure for underground transmission facilities would likely include underground vaults, transition structures, and lightning arrestors.

Underground Vaults

Once the trench or tunnel is prepared and the vaults are constructed, the underground cable can be placed. These cables consist of several components but can be described generally as a bundle of copper or aluminum conductor wires through which electricity passes, surrounded by an insulation layer composed of gas, fluid, polyethylene, or other non-conductive materials. Both the wire bundle and the insulation layer are then encased in an outer jacket that protects the wire from water infiltration and external damage (PSCW 2011).

Transition Structures

When underground transmission facilities need to connect to overhead lines, a transition structure or station is needed. For underground lines less than 345 kV, a 60- to 100-foot-tall transition structure similar in composition and construction to an overhead transmission support structure is installed. Transition structures are designed to keep conductors separated. The insulated overhead conductor is linked through a solid insulator device to the underground conductor. This insulator device keeps moisture out of the cables and ensures that the overhead line is appropriately distanced from the supporting structure (PSCW 2011).

For underground lines of 345 kV or greater, a transition station is needed. Depending on the length of the underground transmission facility, intermediate transition stations might be necessary. Transition stations are similar in composition to a small substation and typically cover 1 to 2 acres. These stations require grading, access roads, and stormwater management facilities (PSCW 2011).

Lightning Arrestors

Lightning arrestors are installed where the underground cable connects to the overhead lines to protect it from lightning strikes. Lightning arrestors are critical to the longevity of underground cables since the insulating material cannot be repaired if large voltage changes damage the cables (PSCW 2011).

2.3.2.3 Post-Construction Restoration

Backfilling of Trenches, Holes, and Tunnels

After the overhead support structures or cables and vaults have been installed, all trenches, holes, and/or tunnels are backfilled with the soils previously excavated from the site. In some instances, other backfill material is used in trenches around the cables to ensure sufficient heat transfer to the surrounding soils and groundwater (PSCW 2011).

Site Restoration and Revegetation

Reclamation and maintenance requirements for overhead and underground transmission ROW can vary depending on the specific regulations and guidelines set by different authorities. Although more extensive, typically site restoration for underground transmission facilities is similar to overhead transmission facilities. Once construction activities are completed and all excavated areas are backfilled, all roadways, landscaped areas, and undeveloped areas are restored to their pre-construction or agreed-upon conditions and topography (PSCW 2011). Infrastructure such as driveways, curbs, and private utilities impacted by transmission facility development would be restored to their pre-construction conditions.

Transmission facility development would also be required to vegetate disturbed areas to stabilize the soil and prevent erosion. This often involves an integrated vegetation management approach in which native species that are compatible with the local ecosystem are planted. This Draft Programmatic EIS outlines revegetation requirements, such as approving seed mixes by the SEPA Lead Agency in coordination with other stakeholders. Furthermore, tall trees would not be planted within the ROW of overhead transmission facilities to avoid interference with overhead lines, and deep-rooted shrubs or trees would not be planted within the ROW of underground transmission facilities to prevent interference with underground lines.

2.3.3 Transmission Operation and Maintenance

Activities for the operations phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Unlike other components associated with transmission facilities, substations may be staffed on a routine or daily basis during operations and typically have a permanent access road connecting the site to the nearest public road (PSCW 2013). This is particularly necessary and important should large equipment need replacing.

2.3.3.1 Post-Construction Monitoring and Reporting

Once initial post-construction restoration is completed, ongoing monitoring and reporting associated with mitigation measures identified in this Draft Programmatic EIS would be implemented. These efforts could include, but are not limited to, the following:

- Monitoring earth resources throughout operation and maintenance to avoid and/or minimize impacts related to soil compaction, soil erosion, and/or accretion13.
- Implementing a vegetation management plan to reduce direct and indirect impacts to sensitive vegetation.
- Implementing an invasive species management plan to reduce the spread of invasive species on the right-of-way, adjacent construction sites, and access roads.
- Implementing a revegetation plan to restore areas impacted by project construction. The revegetation plan would include a monitoring plan to determine the success of the restoration areas through operation and maintenance.
- Implementing a wildlife mitigation and monitoring plan, including avian protection and monitoring, throughout operation and maintenance to minimize impacts on the surrounding habitat and wildlife species.

[13] Refers to the process of growth or increase, typically by the gradual accumulation of additional layers of matter.

- Archaeological monitoring during maintenance activities to avoid and/or minimize impacts on cultural resources

Routine Inspections

Routine inspection and maintenance are vital to the longevity and efficiency of transmission facility operation. Recurring inspections would occur throughout the life of a transmission facility project and are required by federal regulations FAC-003-4 and FAC-501-WECC-4. Activities associated with routine inspections would vary depending on the type of transmission facility, scale, and location. Generally, routine inspections for transmission facilities would include an examination of the different components of the facility such as poles, anchors, hardware, fixtures, and conductors. Conductors and fixtures could be tested for corrosion, breaks, broken insulators, and correct tension. Substation structures would be inspected on a recurring basis for corrosion, equipment misalignment, operational parameters, or foundation problems.

Maintenance and Repairs

Maintenance of transmission facilities could include repairing old, degraded, obsolete, or inoperable components, conductors, or structures. Maintenance could also include replacing a component, conductor, or structure with a direct, “like-for-like” component to support ongoing facility operation. It is anticipated that required maintenance and repairs would be addressed as soon as warranted or within a 12-month period.

Right-of-Way Maintenance

ROW conditions would be examined during the routine inspections. The transmission facility ROW is likely to require ongoing maintenance to ensure adequate access to the structures. Access roads may require regrading or repairs to water bars or culverts due to flooding or inadequate drainage. Vegetation and debris along access roads and ROWs would be addressed and maintained as well.

Vegetation Maintenance

As discussed in Section 2.3.2.3, overhead transmission facility ROWs would be free of tall trees, while underground transmission facility ROWs would be free of any deep-rooted shrubs or trees. Vegetation within transmission facility ROWs and adjacent areas must be inspected and maintained on a regular basis to meet requirements set forth by NERC (FAC-003-4).

Vegetation maintenance would be required on a recurring basis to manage the growth of trees or vegetation within or encroaching upon transmission facility ROW. This can include mowing, trimming, tree removal, and the use of herbicides. Other new remote sensing technologies, such as Light Detection and Ranging (LiDAR) can be used for more effective vegetation management (DOE 2023b). In addition to routine vegetation management activities, there may be emergency situations where tree hazards require immediate response.

In some instances, helicopters can be used in remote areas to conduct scheduled vegetation maintenance. The use of helicopters can reduce ground disturbance, as well as the time needed to complete the required maintenance activities (BPA 2021). As discussed in Section 3.1, helicopters would be restricted from flying above sensitive wildlife habitats during noise-sensitive periods and would not conduct field landings or fly below 50 feet above ground level.

2.3.4 Transmission Decommissioning

Transmission facilities are decommissioned following the end of their useful lives, which generally range from 40 to 100 years. Underground transmission lines typically have a life expectancy closer to 40 years, while overhead transmission lines can approach 100 years (PRPA 2024). If a transmission facility is no longer needed at the end of its useful life, the applicant would be required to prepare a decommissioning plan and appropriate environmental analyses as identified by the SEPA Lead Agency when decommissioning is proposed (see general condition Gen-8 in Section 3.1). Furthermore, permitting agency(ies) may require financial security as part of a decommissioning plan.

When decommissioning is required, the decommissioning plan would provide a detailed outline of the following procedures:

- Complete decommissioning-phase environmental studies, as determined by the SEPA Lead Agency (at the time of project application or when decommissioning is proposed). These environmental studies could include socioeconomic studies and environmental assessments to better determine applicable mitigation measures.
- Remove project components, including conductors, insulators, hardware, structures, and foundations.
- Recycle, when appropriate, or disposal of project materials.
- Restore and revegetate all disturbed areas.

Since it is not possible to know whether a transmission facility would remain in operation or require decommissioning so far into the future, the environmental impacts associated with decommissioning a transmission facility are not analyzed in this Draft Programmatic EIS.

This Page Intentionally Left Blank

3.0 CHAPTER 3 – AFFECTED ENVIRONMENT, SIGNIFICANT IMPACTS, AND MITIGATION

The scope of this Draft Programmatic Environmental Impact Statement (EIS) analysis is limited to electrical transmission facilities with a nominal voltage of 230 kilovolts (kV) or greater (referred to herein as "transmission facilities") and considers environmental impacts over a broad geographic scope or Study Area, as identified in Chapter 1. Therefore, this Draft Programmatic EIS focuses on probable significant adverse impacts in a qualitative manner.

Washington Administrative Code (WAC) 197-11-444 lists elements of the environment to be evaluated by an EIS. This list of elements was combined with additional elements that were required to be evaluated by WAC 463-60-535 and Revised Code of Washington (RCW) 43.21C.405(3). Through the scoping process, the Washington Energy Facility Site Evaluation Council (EFSEC) determined that the construction, operation and maintenance, and upgrade or modification of transmission utilities would result in impacts on all elements. The Scoping Summary Memo is provided in Appendix 5-1.

Chapter 3 has been divided into separate sections for each element of the environment evaluated:

- Earth Resources (including seismic hazards)
- Air Quality (including greenhouse gases)
- Water Resources
- Vegetation
- Habitat, Wildlife, and Fish
- Energy and Natural Resources
- Public Health and Safety
- Land and Shoreline Use (including military, agricultural, and ranching uses)
- Transportation
- Public Services and Utilities
- Visual Quality
- Noise and Vibration
- Recreation
- Historic and Cultural Resources (including tribal rights, interests, and resources)
- Socioeconomics (including Environmental Justice and Overburdened Communities)

The information presented in this Draft Programmatic EIS is based primarily on public information available at the time of analysis. Pertinent sources used in this assessment are listed in Chapter 6, References.

3.1.1 Regulatory, Siting, and Design Considerations

For each element of the environment evaluated in this Draft Programmatic EIS, relevant regulatory, siting, and design considerations have been identified, including the types of permits and plans that may be required, and best management practices[1] (BMPs). Siting and design considerations are actions that could be taken by a developer in developing a facility design or considering a site. BMPs are activities, maintenance procedures,

[1] Activities, maintenance procedures, managerial practices, or structural features that prevent or reduce pollutants or other adverse impacts.

managerial practices, or structural features that prevent or reduce pollutants or other adverse impacts. These may be required in permits or plans by a regulatory agency.

In the early stages of siting and design, project applicants should coordinate with appropriate federal, state, and local agencies and potentially affected Tribes to identify impacts and take action to mitigate impacts to the greatest extent possible. Applicants should specify the actions they have taken to mitigate impacts through siting and design, as part of their project description.

3.1.2 Affected Environment

In the State Environmental Policy Act (SEPA) process, the “Affected Environment” section provides a detailed description of the existing environmental conditions that could be impacted by a project. To understand potential adverse impacts at a programmatic level, this Draft Programmatic EIS takes the following approach in analyzing elements of the environment:

1. **Broad Geographic Scope:** This Draft Programmatic EIS encompasses a larger geographic area and examines broader environmental trends compared to an individual project.
2. **Generalized Information:** It provides more generalized information about the environment, focusing on regional conditions rather than site-specific details.
3. **Framework for Future Projects:** It provides a foundation upon which future project-specific applications and environmental reviews can build from. This approach allows for a comprehensive understanding of potential adverse impacts at a larger scale, while specific details are addressed in more focused project-specific applications and subsequent environmental reviews.

Chapter 3, Affected Environment provides a detailed description of the existing environmental conditions that could be impacted by a project. The affected environment for a project-specific application typically includes information on the following:

1. **Physical Environment:** Details about land use, geology, soils, water resources, air quality, and climate
2. **Biological Environment:** Information on vegetation, wildlife, fish, and habitats
3. **Human Environment:** Data on population, noise and vibration, housing, transportation, recreation, public services, utilities, aesthetics, and cultural and historic resources
4. **Socioeconomic Environment:** Economic conditions, employment, and community services

The affected environment analysis helps understand the baseline conditions and assessment of the potential impacts of projects.

3.1.3 Baseline for Analysis

In this Draft Programmatic EIS, general conditions and avoidance criteria were identified based on the impact analysis.

1. **General Condition:** The analysis in this Draft Programmatic EIS assumes that applicants adhere to the specified general conditions.
2. **Avoidance Criteria:** The analysis in this Draft Programmatic EIS assumes that project-specific applications comply with the identified avoidance criteria.

By incorporating these two assumptions into the baseline analysis, this Draft Programmatic EIS provides a framework for understanding and managing probable significant adverse environmental impacts of projects at a broader scale. This approach helps ensure that environmental protection measures are considered from the outset and are integrated into the planning and decision-making process while offering a consistent understanding of what impacts may require project-specific environmental review and mitigation outside the scope of this Draft Programmatic EIS. All general conditions and avoidance criteria are outlined in the following sections and in **Appendix 3.1-1**.

3.1.3.1 General Conditions

The following general conditions provide a consistent baseline for evaluating the potential impacts of project-specific applications. The analysis provided in this Draft Programmatic EIS assumes that applicants adhere to the following specified general conditions:

Gen-1 – Review of this Programmatic EIS: Applicants planning and siting transmission facilities with a nominal voltage of 230 kilovolts or greater would consider this Programmatic Environmental Impact Statement (EIS), especially focusing on meeting the environmental management strategies identified herein to the extent practicable. When general conditions and avoidance criteria defined in this Programmatic EIS cannot be met by the applicant, additional environmental review and mitigation would be expected to address related impacts. This Programmatic EIS assumes that the applicant would commit to mitigation measures identified within this Programmatic EIS with an impact determination of moderate or high.

Rationale: Applicants reviewing the information in this Programmatic EIS, along with any future amendments, supplements, or replacement documents, will help ensure their specific project meets the requirements for using this Programmatic EIS during project-specific environmental reviews. This will enable the applicant to incorporate mitigation more efficiently and identify and mitigate project-specific probable significant adverse environmental impacts.

Gen-2 – Adhere to Laws and Regulations: This Programmatic Environmental Impact Statement (EIS) assumes that projects will adhere to relevant federal, state, and local laws and regulations. Applicants would provide information in the project-specific application to assist the State Environmental Policy Act (SEPA) Lead Agency in determining if the project adheres to all relevant laws and regulations. If a project cannot comply with a relevant law or regulation, then an explanation would be provided. Should the SEPA Lead Agency or agency with jurisdiction identify inconsistencies or probable significant adverse environmental impacts outside of this Programmatic EIS, additional environmental review would be required, and mitigation may be required.

Rationale: In Washington, SEPA mandates that all programmatic EISs comply with state environmental regulations (Revised Code of Washington 43.21C and Washington Administrative Code 197-11). Projects would be expected to comply with all relevant laws and regulations in order to use this Programmatic EIS as part of the phased environmental review process.

Gen-3 – Consistency with Policies and Ordinances: This Programmatic Environmental Impact Statement assumes that projects will be consistent with all applicable policies and ordinances. Applicants would provide information in the project-specific application that the State Environmental Policy Act (SEPA) Lead Agency and local jurisdictions can use to determine consistency. If a project is not consistent with a relevant policy or ordinance, the applicant would provide an explanation. If the applicant, SEPA Lead

Agency, or local jurisdiction identifies one or more policies or ordinances with which the project is inconsistent, additional environmental review would be required, and mitigation may be required.

Rationale: Additional policies and ordinances may be outlined by state, regional, county, or city agencies and jurisdictions. These may include, but are not limited to, the following:

- Comprehensive Plans
- Shoreline Master Programs
- Habitat Conservation Plans[2]
- Active Transportation Plans
- Local Ordinances (e.g., noise)

Gen-4 – Design Considerations: Applicants would document compliance with all applicable design considerations identified throughout Chapter 3. Applicants would identify the following in the project-specific application:

- Any instances where the project does not comply with applicable design considerations
- The rationale for not following the design considerations
- The planned approach

When applicable design considerations cannot be met, additional environmental review would be required by the State Environmental Policy Act Lead Agency.

Applicants must ensure that any updates to a design consideration or its associated documents are identified and used in the project-specific application.

Rationale: This Programmatic Environmental Impact Statement outlines design considerations at the beginning of each section throughout Chapter 3. Design considerations may include guidance documents, manuals, and/or best management practices. Design considerations are typically standardized practices designed to prevent environmental impacts and are often included in regulatory compliance programs or implemented as routine practices.

Gen-5 – Compliance with Avoidance Criteria: Project-specific applications would comply with the avoidance criteria identified in this Programmatic Environmental Impact Statement (EIS). If a project-specific application does not comply with the identified avoidance criteria, the State Environmental Policy Act Lead Agency would conduct additional environmental review of adverse impacts on the resource and identify project-specific mitigation strategies.[3]

Rationale: Several avoidance criteria throughout this Programmatic EIS are designed to avoid impacting an environmental resource altogether. If a project-specific application cannot comply with applicable

[2] A plan developed by applicants to conserve the habitat of a species at risk if their project is expected to cause incidental take of the species.

[3] Avoidance criteria are a form of mitigation that were developed for this Draft Programmatic EIS to allow for its application to a variety of project types and locations. Projects may not be able to fully implement all avoidance criteria. The project-specific impacts and mitigation, associated with the affected resource(s) and avoidance criteria, would be more appropriately addressed through project-specific SEPA environmental review.

avoidance criteria, additional environmental review would be required. Avoidance criteria aim to prevent probable significant adverse environmental impacts on sensitive environmental resources identified in this Programmatic EIS while providing project-specific applications opportunities to adequately evaluate and address site-specific impacts.

Gen-6 – Construction: Applicants would incorporate the following into the project-specific application, where applicable:

- No temporary staging, stockpiles of materials, temporary buildings, or equipment can remain on the project site during construction unless written approval is obtained from the parcel owner.
- Effort must be made to coordinate construction activities with other construction in the area.
- Appropriate property rights or access must be acquired before construction, operation, and/or maintenance activities can occur.
- All temporary construction areas disturbed during construction or other work associated with the project-specific application must be restored to pre-construction conditions once the work is complete.
- Excavations and drilling must meet federal, state, and local criteria; engineering standards; and Office of Safety and Occupational Health standards.
- The applicant is responsible for protecting the environment from damage by construction vehicles, equipment, construction activities, and storage of materials.

Rationale: These conditions collectively ensure that the project is conducted safely, legally, and responsibly, benefiting both the community and the environment.

Gen-7 – Cumulative Impact Assessment: Project-specific cumulative impact assessments would be completed to support the baseline cumulative impact analysis provided by this Programmatic Environmental Impact Statement (EIS). Applicants would prepare an updated reasonably foreseeable action[4] list based on the geographic setting associated with the project in coordination with the State Environmental Policy Act (SEPA) Lead Agency. The SEPA Lead Agency would analyze cumulative adverse impacts, identify appropriate mitigation measures, and determine significance based on any environmental resources of concern, using the information provided in this Programmatic EIS.

Rationale: The Washington Energy Facility Site Evaluation Council has determined that the appropriate scope and level of detail for this Programmatic EIS cumulative effects analysis (the Study Area) may not be sufficient for a project-specific cumulative effects analysis (Washington Administrative Code 197-11-060(5) Phased Review). This Programmatic EIS does analyze cumulative effects and recognizes that significant cumulative effects are possible for any environmental resource. However, the actual context for a specific project would vary with the physical setting and would therefore affect the analysis of

[4] Projects that are formally being proposed or planned, those about which a formal decision has been made, and developments currently under construction. RFAs that are formally being proposed or planned have readily available published planning documents or public notifications. RFAs for which a formal decision has been made include those that have undergone a federal, state, and/or local approval or application process(es), such as environmental clearance, application review, and/or permitting process(es).

cumulative effects for that specific project and make it more feasible to identify appropriate mitigation for any identified project-specific significant cumulative impacts.

Gen-8 – Decommissioning Analyses: The analysis of impacts during the decommissioning stage is outside the scope of this Programmatic Environmental Impact Statement. State Environmental Policy Act (SEPA) environmental review under Revised Code of Washington 43.21C would be required for the decommissioning stage. Project-specific applicants would consult with the SEPA Lead Agency to determine what decommissioning information they want, if any, at the time of project application.

Rationale: A transmission facility would be decommissioned following the end of its useful life, which generally ranges from 40 to 80 years. The SEPA Lead Agency reserves discretion to identify necessary environmental and socioeconomic studies pertinent to the decommissioning of transmission facilities.

Gen-9 – Preconstruction Surveys and Assessments: Project-specific applicants will complete preconstruction surveys and assessments as identified in the rationales of resource-specific mitigation measures throughout this Programmatic Environmental Impact Statement. Applicable preconstruction surveys and assessments are identified in the rationale of each mitigation measure with the following sentence:

"*This is a required component of project-specific applications necessary for SEPA Lead Agencies to evaluate baseline conditions.*"

Rationale: Surveys and assessments provide project-specific information that assist with the identification of project-level probable significant adverse environmental impacts. This includes the affected environment, potential constraints, and existing infrastructure that is essential for siting, design, and environmental review.

Gen-10 – Mitigation and Management Plans: Project-specific applicants will prepare and implement mitigation and management plans as identified in the rationales of resource-specific mitigation measures throughout this Programmatic Environmental Impact Statement. Applicable mitigation and management plans are identified in the rationale of each mitigation measure with the following sentence:

"*This is a required component of project-specific applications necessary to demonstrate regulatory compliance and risk management.*"

Rationale: Detailed mitigation and management plans demonstrate compliance with these regulatory requirements, facilitating efficient environmental review.

3.1.3.2 Avoidance Criteria

When the following avoidance criteria cannot be met, additional environmental review and mitigation measures would be required to address related project-specific impacts.

AVOID-1 – Hazardous Areas[5]: Avoid known hazardous areas, including but not limited to, contaminated soils, geologically hazardous areas, landfills, and cutbanks.

[5] Areas susceptible to erosion, sliding, earthquakes, or other geological events or areas that could pose a threat to health and safety when incompatible commercial, residential, or industrial development is sited in areas of significant hazard (e.g., landfills, underground mines, cutbanks, etc.).

Rationale: Avoiding hazardous areas provides safety for workers, the public, infrastructure, as well as environmental protection. Disturbing sites of known contamination or other hazards may require the development of remediation plans.

AVOID-2 – Wetland Disturbance: Avoid impacts within 300 feet of all wetlands.

Rationale: Protecting wetland vegetation would decrease the chances of wetland degradation during construction activities as these areas are important for sustained wetland function. Wetlands within the project footprint would be delineated following the U.S. Army Corps of Engineers wetland delineation methodology.

AVOID-3 – Sensitive Water Features: Avoid impacting areas sensitive to degradation, including adjusting the layout of new transmission facilities to steer clear of sensitive water features.

Rationale: Avoiding sensitive water features that are susceptible to degradation from construction activities including changes to the water features' physical characteristics (e.g., banks, bathymetry and substrate[6]), as well as chemical properties. Avoiding these areas helps preserve their structure and function..

AVOID-4 – Floodplains: Avoid having equipment or infrastructure within floodplains.

Rationale: This avoidance criterion would eliminate the potential for damage to infrastructure and electrical safety hazards because of inundation and would avoid some riparian ecosystems.

AVOID-5 – Areas of Rapid Channel Migration: Avoid having equipment or infrastructure in areas of rapid channel migration.

Rationale: This avoidance criterion would eliminate potential damage to infrastructure caused by erosion of soil or foundations for infrastructure, if a channel were to migrate.

AVOID-6 – Old-Growth and Mature Forests: Avoid old-growth forests, which include forests older than 200 years in western Washington and greater than 150 years in eastern Washington, and mature forests, which include forests greater than 80 years.

Rationale: This avoidance criterion would reduce direct loss of old-growth and mature forests, which have already lost the majority of their historical extent. Old-growth and mature forests are particularly susceptible to long-term impacts due to the time lag to reestablish current ecological functions if clearing occurs. In addition, linear features through old and mature forest stands increase the impacts from edge effects[7] such as the spread of invasive plants.

AVOID-7 – Rare, Endangered, or Threatened Plant Species and Sensitive Ecosystems: Avoid impacts on rare, endangered, or threatened plant species and sensitive ecosystems.

---

[6] A layer of material or surface where an organism could live.

[7] A phenomenon in which species composition changes near the boundary of a habitat. This term is typically used in the context of habitat degradation, where intact habitat contains less diversity near the point of contact with disturbed areas, such as clearcuts or agricultural land.

Rationale: Avoiding rare, endangered, or threatened plant species and sensitive ecosystems would reduce both direct and indirect impacts on, and fragmentation of, these communities.

AVOID-8 – Important Habitat: Avoid impacts on important and sensitive wildlife habitat, including:

- National wildlife refuges, parks, and other state or federally protected areas
- Washington State lands managed as wildlife areas, conservation easements, and other state-managed lands for conservation
- Important Bird Areas[8]
- Known stopover[9] locations for migratory species
- Mapped critical habitat for federally listed species and habitat identified in state or federal management plans for state listed species
- Mapped ungulate[10] winter and summer range
- Mapped habitat concentration areas[11]
- Wetlands, including a 300-foot buffer
- Known bat maternity colonies and hibernacula
- Known snake hibernacula
- Washington Shrubsteppe[12] Restoration and Resiliency Initiative greater sage-grouse core and corridor areas

Rationale: This avoidance criterion aims to reduce habitat loss and fragmentation that can be caused by linear features such as transmission facilities.

AVOID-9 – Movement Corridors: Avoid impacts on modeled movement corridors with medium to very high linkage as reported by the Washington Wildlife Habitat Connectivity Working Group unless the project is sited within or adjacent to an existing right-of-way or linear feature (e.g., a roadway).

Rationale: This avoidance criterion aims to reduce wildlife barriers to movement.

AVOID-10 – Buffer Setbacks for Wildlife and Wildlife Features: Avoid impacts within the setbacks for wildlife and wildlife features identified in Appendix 3.6-1. Applicants would verify and update as new buffers are recommended by Washington State (e.g., Washington Department of Fish and Wildlife [WDFW],

---

[8] A site that provides an essential service for bird populations during a part of their annual movement cycle.

[9] In reference to birds, an important resting or feeding area during migration.

[10] A mammal with hooves, including deer, moose, elk, and caribou.

[11] A model variable specific to the Washington Habitat Concentration Working Group's modeling of habitat connectivity. Habitat concentration areas are areas that are important or suspected to be important to a species of focus based on surveys or modeling data.

[12] An arid ecosystem that is dominated by grasses and shrubs in a landscape of rolling hills. In Washington, this is found in the southeast part of the state.

Washington State Department of Ecology). Buffers and setbacks would be reviewed with WDFW prior to the submittal of a project-specific application.

Rationale: This avoidance criterion reduces direct and indirect habitat loss and mortality of special status species[13].

AVOID-11 – Oil-Containing Conductor Cables: When installing underground transmission lines, avoid the use of oil-containing equipment for cooling. Cooling should be achieved through cross-linked polyethylene (XLPE) insulation material or other, best available technology.

Rationale: This avoidance criterion aims to eliminate the risk of insulation fluid leaks associated with oil-containing equipment underground.

AVOID-12 – Heat Sources: Avoid collocation with other heat sources like steam mains.

Rationale: This avoidance criterion aims to eliminate the risks associated with excess heat generation.

AVOID-13 – Land Use and Zoning Incompatibility and Conflicts: Avoid incompatible land uses and zoning. Demonstrate that there are no indirect or adjacent land use conflicts with private property owners or public land administrators.

Rationale: This avoidance criterion aims to avoid conflicts with land use and zoning. Avoiding land use and zoning conflicts will also help to reduce adverse impacts on property owners, agricultural landowners, noise, visual, and socioeconomics.

AVOID-14 – Civilian Airports and Military Installations: Avoid impacts on civilian airports, surrounding runway protection zones, and military installations, such as the Yakima Training Center, National Security Area, and Boardman Geographic Area of Concern.

Rationale: This avoidance criterion aims to avoid impacts on designated areas within which some forms of development could have an adverse impact on airport and military operations and/or readiness.

AVOID-15 – Non-Compliance with Utilities Accommodation Policy: Avoid planning, siting, and constructing transmission facilities that are not properly accommodated within highway rights-of-way (ROWs).

Rationale: Comprehensive analysis of impacts and mitigation strategies would be required by WSDOT when transmission facilities are planned or designed within ROWs. In cases where utility providers are noncompliant with the Utilities Accommodation Policy, the utility company must submit a detailed variance application to the applicable department for review. The variance application requires an environmental review and, if approved, additional mitigation measures may be required.

AVOID-16 – Decrease in LOS below Acceptable Levels: Avoid a decrease in level of service (LOS) below level C on roads used during construction and avoid additional LOS reductions during construction on roads already below level C.

---

[13] For this Programmatic EIS, special status fish and freshwater invertebrate species are defined as either listed under the federal Endangered Species Act or Bald and Golden Eagle Protection Act or listed by Washington State as endangered, threatened, sensitive, or candidate.

Rationale: This avoidance criterion aims to maintain LOS. LOS can be directly related to safety issues related to traffic density and flow. For example, higher traffic volumes and lower LOS can increase the risk of accidents.

AVOID-17 – Night Sky: Avoid impacts on areas managed for the protection of night sky.

Rationale: This avoidance criterion aims to protect designated night sky areas.

AVOID-18 – Exceptional Recreation Assets: Avoid impacts on, or within the viewshed[14] of, exceptional recreation assets as defined by the Washington State Recreation and Conservation Office (RCO).

Rationale: This avoidance criterion aims to protect exceptional recreational assets. These places provide a unique experience or activity that may not be available in all areas of the state. Coordination with the RCO early in the project planning process is a crucial step to adequately avoid these areas.

AVOID-19 – Wilderness Areas: Avoid impacts on, or within the viewshed of, designated wilderness areas.

Rationale: This avoidance criterion aims to protect the scenic integrity of wilderness areas. Wilderness areas are valued for their untouched natural beauty. The Wilderness Act of 1964 mandates the preservation of the natural conditions of designated wilderness areas.

AVOID-20 – Limit Closure of Recreation Resources: Consider closure and restrictions only after other mitigation strategies and alternatives have been explored. Avoid long-term closure and restriction of recreation resources lasting more than 24 months.

Rationale: This avoidance criterion establishes the definition of "long-term closure" in relation to impacts on recreation resources from the construction, operation and maintenance, and upgrade or modification of transmission facilities.

AVOID-21 – Physical Impacts on Historic and Cultural Resources: Avoid physical impacts on historic and cultural resources.

Rationale: This criterion aims to avoid adverse physical impacts on historic and cultural resources (identified through survey for the project-specific application within 5 years of the project). Physical impacts within the boundaries of cultural and historic properties (i.e. buildings, archaeological sites, etc.) may be considered an adverse effect if the feature impacted contributes to the significance of the property.

AVOID-22 – Visual Impacts on Historic and Cultural Resources: Avoid visual impacts on historic and cultural resources.

Rationale: Visual impacts may be considered an adverse effect if the integrity of the historic property's setting and feeling are important to its significance. This avoidance criterion aims to avoid adverse visual impacts on historic and cultural resources.

AVOID-23 – Physical Impacts on Tribal Resources and TCPs: Avoid physical impacts on Tribal resources, including first foods, and Tribal Cultural Properties (TCPs).

---

[14] The geographical area that is visible from a specific location.

Rationale: This avoidance criterion aims to avoid adverse physical impacts on Tribal resources and TCPs.

AVOID-24 – Visual Impacts on Tribal Resources and TCPs: Avoid visual impacts on Tribal resources and Tribal Cultural Properties (TCPs).

Rationale: This avoidance criterion aims to avoid adverse visual impacts on Tribal resources and TCPs.

AVOID-25 – Disproportionate Impacts on Environmental Justice Communities: Avoid disproportionate impacts on vulnerable populations or overburdened communities.

Rationale: This avoidance criterion aims to avoid a disproportionate impact on people of color populations, low-income populations, or overburdened communities.

AVOID-26 – Displacing Residents or Housing Units: Avoid land acquisitions that result in displacing residents of housing units.

Rationale: Long-term housing availability could be impacted if the construction of transmission facilities requires land acquisitions that results in displacing residents or housing units. Changes in housing availability could lead to adverse impacts on the economic environment, social conditions, and general welfare of communities, including vulnerable populations and overburdened communities. This avoidance criterion aims to avoid impacts on long-term housing availability.

3.1.3.3 Mitigation Measures

Mitigation measures to address adverse impacts on the environment are discussed in each subsequent section of Chapter 3. Measures can be implemented to avoid, minimize, and/or otherwise mitigate impacts associated with the construction, operation and maintenance, and upgrade or modification of transmission facilities. According to SEPA (WAC 197-11-768), “mitigation” is defined as:

(1) *Avoiding the impact altogether by not taking a certain action or parts of an action;*

(2) *Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;*

(3) *Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;*

(4) *Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;*

(5) *Compensating for the impact by replacing, enhancing, or providing substitute resources or environments;*

(6) *Monitoring the impact and taking appropriate corrective measures;*

After the incorporation of general conditions and avoidance criteria, applicants would select applicable resource-specific mitigation measures identified in this Draft Programmatic EIS to minimize the impacts of their project. It is assumed that all applicable mitigation measures for moderate or high impacts would be implemented to minimize probable significant adverse environmental impacts and to meet the requirements for the use of this Draft Programmatic EIS as the basis for their project-specific SEPA review. The SEPA Lead Agency is responsible for verifying that all applicable mitigation measures have been committed to by the applicant for impacts identified in this Draft Programmatic EIS. The SEPA Lead Agency will identify any omitted measures that should be required as a condition of the project. The SEPA Lead Agency is also responsible for identifying and analyzing any "project-level probable significant adverse environmental impacts not addressed in this Programmatic EIS" (RCW 43.21C.408(3)), and for making the SEPA Threshold Determination for the project-specific application.

When a SEPA Lead Agency reviews a project-specific application and identifies other probable significant adverse environmental impacts that were not accounted for in this Draft Programmatic EIS, additional environmental review and project-specific mitigation measures are required. These additional project-specific mitigation measures may be imposed by the SEPA Lead Agency, in coordination with any state or local agency with jurisdiction, as part of their approval through the use of their SEPA "substantive authority" (WAC 197-11-660). Additionally, should EFSEC be the SEPA Lead Agency, EFSEC has the specific authority to "develop and apply environmental and ecological guidelines" for projects they regulate under RCW 80.50.

The mitigation measures outlined in this Draft Programmatic EIS have been developed in consultation with other agencies and partners that have expertise in identifying probable significant adverse environmental impacts and ways to address those impacts. In addition, other agencies were asked to review specific sections, which provided them an opportunity to identify additional, published guidance or other manuals that may contain BMPs, design considerations, or other techniques that are appropriate for the siting of transmission facilities. **Appendix 3.1-1** provides a comprehensive list of the mitigation measures identified in this Programmatic EIS, along with additional guidance for implementation.

3.1.4 Impact Determination

This Draft Programmatic EIS describes the existing affected environment, method of analysis used for each element of the environment, types of impacts that could occur from transmission facilities, impact determination, potential mitigation measures, and whether the implementation of general conditions, avoidance criteria, and mitigation measures would minimize the impact to a less than significant level.

As described in Chapter 1, this Draft Programmatic EIS is a nonproject review document that would be used for the future planning and development of transmission facilities. As part of this Draft Programmatic EIS, adverse impacts associated with different types of transmission facility developments are described qualitatively. "Impacts" are the effects or consequences of actions (WAC 197-11-752) upon the evaluated elements of the environment.

There are three types of impacts considered in this Draft Programmatic EIS to evaluate the resulting effects or consequences of transmission facility development. The three types of impacts discussed in this chapter are:

- *Direct impacts*, which are the effects of an action on a resource that occurs at the same time and place as the action. An example of a direct impact would be increased noise levels experienced by residents living near a construction site.
- *Indirect impacts,* which are similar to direct impacts in that they are caused by the action; however, they occur later in time or occur farther from the activity causing the impact. An example of an indirect impact would be a decline in the numbers of a wildlife species due to fragmentation of that species' habitat by installation of fencing.
- *Cumulative impacts* are the combined result of incremental direct and indirect impacts on resources from a project or plan, past and present actions, and other reasonably foreseeable actions. Cumulative impacts are described in Chapter 4.

Chapter 3 evaluates direct and indirect impacts associated with the Action Alternative and the No Action Alternative. The No Action Alternative could result in increased impacts when compared to the Action Alternative for several reasons, such as the following:

- **Scope and Detail:** Environmental reviews of project-specific applications focus on evaluating site-specific project footprints and design details. Project-specific mitigation involves collaboration between the project applicant and the regulatory agency to balance the applicant's capabilities with agency requirements and to be applicable to the project-specific application. Avoidance is the most effective form of mitigation and the best opportunity to implement avoidance mitigation is prior to or during siting and design, which may take place before a project-specific application is submitted. As a result, mitigation identified after the project-specific planning process may not be as effective at mitigating impacts or as robust as the avoidance criteria and mitigation measures outlined in this Draft Programmatic EIS. This Draft Programmatic EIS is expected to be better suited for assessing broader environmental consequences of multiple related projects and their cumulative impacts and providing a framework for future project-specific planning and analyses that incorporates avoidance and identified mitigation during siting and design.
- **Regulatory Compliance:** In some cases, project-specific applications under the No Action Alternative may be unaware of certain regulatory requirements. By adhering to the detailed regulatory framework provided in this Draft Programmatic EIS, applicants are more likely to be in compliance at the time of application, avoiding the time and cost of reviewing or redesigning project elements to bring the application into compliance.
- **Comprehensive and Relevant Environmental Review:** This Draft Programmatic EIS establishes a baseline for analysis and provides a framework for projects that fit within its scope, which aims to facilitate the completion of comprehensive and relevant environmental reviews. This Draft Programmatic EIS was developed through an extensive literature review and in consultation with various subject matter experts. These resources may not be readily accessible or available to SEPA Lead Agencies under the No Action Alternative.

Chapter 3 weighs the potential impacts on elements of the environment that would result from transmission facility development after considering the application of laws and regulations; siting and design considerations, including agency guidance and BMPs; general conditions, and avoidance criteria resulting in an impact determination. **Table 3.1-1** summarizes the general descriptions anticipated for providing an impact determination.

Table 3.1-1: Impact Determination Scale

Nil	Negligible	Low	Moderate	High
Analysis confirmed that no foreseeable impacts are expected.	Minor, adverse environmental impacts would occur, but BMPs and design considerations are expected to be effective.	Adverse environmental impacts would occur even with the implementation of BMPs and design considerations. Impacts would be short term and nonsignificant.	Adverse environmental impacts would occur even with implementation of BMPs and design considerations. Moderate impacts may be long-term, occurring over one or more project phases. Moderate impacts have the potential to be significant.	Adverse environmental impacts would have significant and potentially severe effects even after implementation of BMPs and design considerations. High impacts may be permanent or continue for the duration of the project.

Note: Identification of environmental impacts and assignment of discipline-specific ratings is based on professional judgment and information available at the time of writing. A precautionary approach has been taken for the assessment where information is currently unknown or unavailable.

The impact determinations made throughout this Draft Programmatic EIS assume that the construction, operation and maintenance, and upgrade or modification of transmission facilities could impact the identified resource. A project could use "N/A" (Not Applicable) in their project-specific application SEPA Checklist. However, an explanation for why a particular impact does not apply to the project-specific application is required. Simply stating "N/A" without context is not acceptable. For example, if an impact regarding water usage does not apply because the project does not involve any water resources, an explanation should be provided. This ensures that the project-specific application is thorough and provides a clear understanding of the project's impacts.

3.1.5 Probable Significant Adverse Impact Determination

Under SEPA, environmental assessments weigh the likelihood of occurrence with the severity of an impact (WAC 197-11-794) and consider several factors when determining the significance of identified impacts (WAC 197-11-330). "Significant" under SEPA means a reasonable likelihood of more than a moderate adverse impact on environmental quality. An impact may also be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred.

Determining the significance of an impact involves context and intensity and does not lend itself to a formula or quantifiable test. The context may vary with the physical setting, and the intensity depends on the magnitude and duration of an impact (WAC 197-11-794). When evaluating the physical setting and intensity of impact, quantitative data are preferable; in some circumstances, qualitative information is sufficient and is used.

This Draft Programmatic EIS weighs the potential impacts on elements of the environment identified throughout Chapter 3 and cumulative impacts identified in Chapter 4 that could result from transmission facilities after considering the application of laws and regulations; siting and design considerations, including agency guidance and BMPs; and mitigation measures and makes a resulting determination of significance for each impact.

Identification of environmental impacts and assignment of significance ratings are based on professional judgment and information available at the time of writing. A precautionary approach has been taken for the assessment where information is currently unknown or unavailable.

3.1.6 Suitability Map

Project-specific applications would include a comprehensive review and analysis to identify the site-specific adverse impacts on resources to determine the suitability of this Draft Programmatic EIS. Environmental review may be phased by incorporating relevant information from this Draft Programmatic EIS by reference or adoption while evaluating site-specific adverse impacts of individual project applications. For more information on phased reviews, please refer to Chapter 1, Introduction.

Project-specific applications would include details about the precise location and site-specific conditions. For most elements of the environment, this Draft Programmatic EIS provides a suitability map that could be used by applicants and SEPA lead agencies during siting and design of a project-specific application to facilitate more informative and efficient environmental planning.

GoldSET is a comprehensive multicriteria analysis tool that facilitates transparent spatial analysis, ultimately aiding in corridor optimization. The GoldSET process involves five steps, as illustrated in **Figure 3.1-1**.

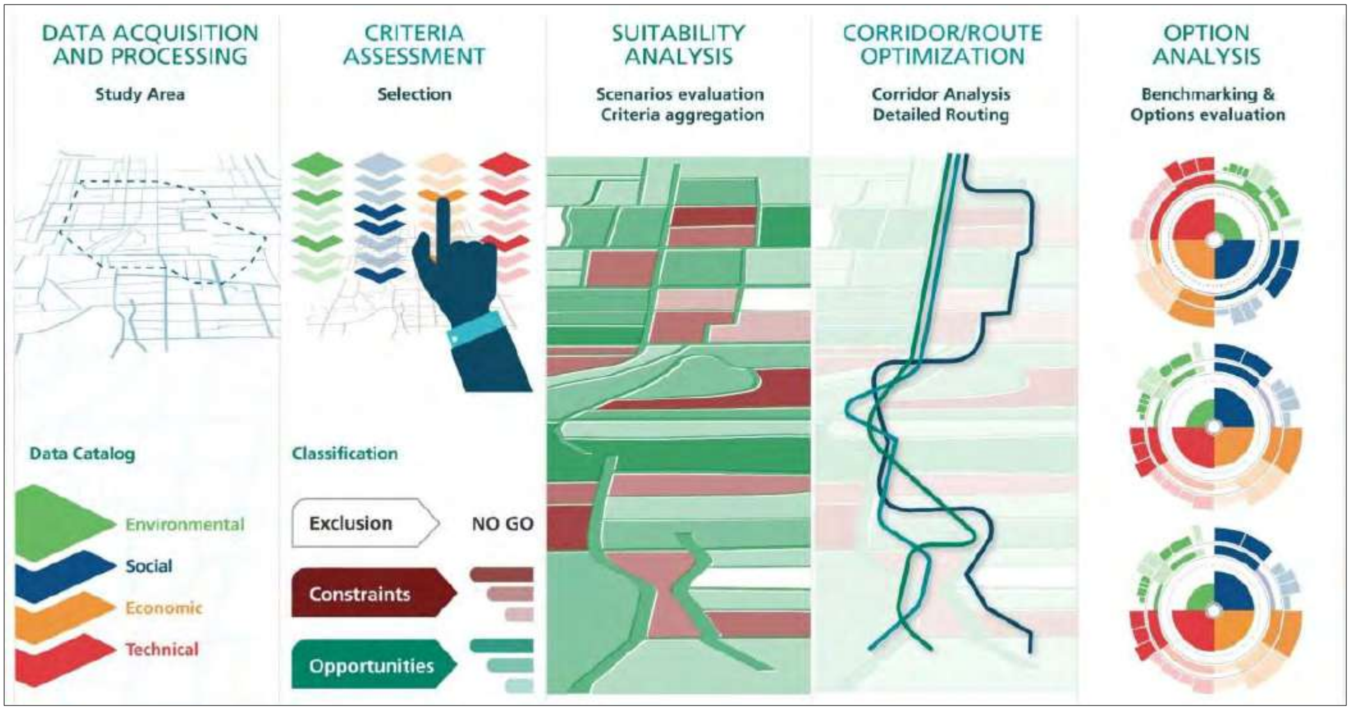


Figure 3.1-1: GoldSET Spatial Approach

The first step in the GoldSET process is defining the Study Area. Once defined, subject matter experts (SMEs) identify constraints or areas of conflict using available geospatial data and their resource knowledge. These constraints are evaluated and assigned a weight of low, medium, or high. This analysis results in the creation of GoldSET criteria cards, which are then compiled into a comprehensive suitability map.

Elements of the environment that do not have criteria cards or a suitability map include:

- Air Quality
- Energy and Natural Resources
- Public Health and Safety
- Public Services and Utilities
- Historic and Cultural Resources

These elements of the environment may not have readily available, public geospatial data or the SMEs did not find constraints pertinent to transmission facility development.

GoldSET was used to better understand and visually present data across environmental, social, economic, and technical dimensions. This process can help to identify low-conflict corridors, optimize corridor routing, and provide option analysis for project-specific applications.

This Draft Programmatic EIS does not conduct the final two steps of the GoldSET approach: Corridor/Route Optimization and Option Analysis. While corridor/route optimization is beneficial for both industry and agencies, it requires potential "points of connection." Since this Draft Programmatic EIS broadly evaluates the potential for transmission facility development across the state, it does not identify specific points of connection or corridors.

Applicants can choose whether to use the suitability analysis to further develop corridors between specific points of connection and analyze options or alternatives prior to submitting a project-specific application.

Figure 3.1-2 represents the exclusion criteria used for each GoldSET exercise and identifies the areas determined to be outside the scope of this Draft Programmatic EIS. These areas were excluded from analysis within GoldSET.

EXCLUSION CRITERIA

EXCLUSION CARD

Description

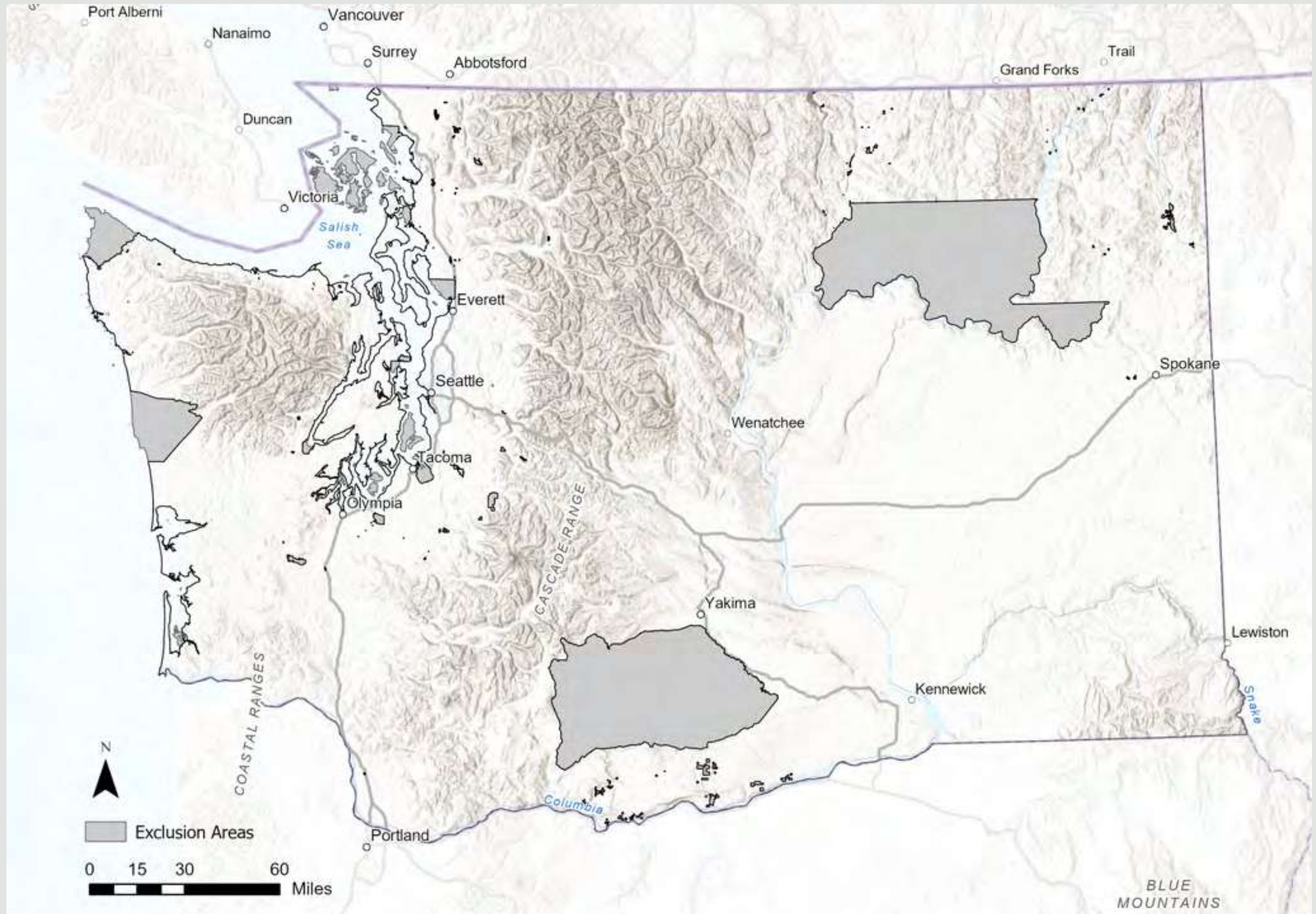
EFSEC has determined that the Planning Area of this Draft Programmatic EIS will include the entirety of Washington. The Study Area, or geographic scope, includes all lands across Washington except for lands covered by the exclusion criteria.

Programmatic EIS documents focus on broad policies. Sea cables are too specific for this review and may require separate reviews due to different regulatory frameworks. Their environmental impacts differ from land-based facilities, needing distinct EIS.

Tribal lands are excluded from the Study Area. Tribal lands have their own regulatory processes, and federal agencies must consult with Tribes to address their concerns.

Source

Washington State Dept. of Ecology, WA Dept. of Transportation



Indicator weight

EXCLUSION

HIGH

Exclusion Criteria

This Page Intentionally Left Blank

3.2 Earth Resources

This Draft Programmatic Environmental Impact Statement (EIS) considers impacts on earth resources resulting from the types of facilities described in Chapter 2. This section addresses the following topics related to the construction, operation and maintenance, and upgrade or modification of high-voltage electric transmission facilities (transmission facilities) in the State of Washington.

- Section 3.2.1 identifies regulatory, siting, and design considerations.
- Section 3.2.2 describes the affected environment.
- Section 3.2.3 describes impacts.
- Section 3.2.4 describes potential mitigation measures.
- Section 3.2.5 identifies probable significant adverse environmental impacts on earth resources.
- Section 3.2.6 provides a suitability map and scoring for the siting of transmission facilities as it relates to earth resources, based on the identified considerations, impacts, and mitigation measures.

3.2.1 Regulatory, Siting, and Design Considerations

This Draft Programmatic EIS establishes a broad framework for compliance, outlining general laws, regulations, best management practices (BMPs), and design considerations. It is assumed that project-specific applications will be developed within this pre-established regulatory context and are expected to comply with existing laws and regulations. If the project does not comply with applicable laws and regulations or fails to adhere to design considerations or BMPs, additional project-specific environmental review and mitigation would be required. The applicable federal, state, and local laws and regulations relevant to earth resources are summarized in **Table 3.2-1**.

Table 3.2-1: Laws and Regulations for Earth Resources

Applicable Legislation	Agency	Summary Information
43 USC Chapter 35 – FLPMA	Bureau of Land Management	FLPMA is a comprehensive statute that governs the management of public lands administered by the BLM under the U.S. DOI. FLPMA established that public lands should generally remain in federal ownership unless disposal serves the national interest. The act mandates that public lands be managed for multiple uses (e.g., recreation, grazing, timber, minerals) and sustained yield, ensuring that resources are available for future generations.
16 USC 1600-1614 – NFMA	U.S. Forest Service	NFMA provides the framework for managing national forests and grasslands, emphasizing sustainable management and conservation of forest resources.
RCW 36.70A, Growth Management – Planning by Selected Counties and Cities	Local governments with assistance from Washington State Department of Commerce[(a)]	RCW 36.70A requires all cities, towns, and counties in the state to identify critical areas and establish regulations to protect and limit development in those areas. Among the critical areas defined by the GMA are frequently flooded areas and geologically hazardous areas. As defined by WAC 365-190-120, geologically hazardous areas are areas susceptible to erosion, landslide, seismic activity, or other geological events such as mine hazards, volcanic hazards, mass wasting,[15] debris

[15] Refers to the movement of soil, rock, and debris down a slope due to the force of gravity.

Applicable Legislation	Agency	Summary Information
		flows,[16] rock falls, and differential settlement.[17] The GMA requires that local governments establish critical area protection programs that address the following: ▪ Protecting members of the public, public resources, and facilities from injury, loss of life, or property damage due to landslides and slope failures, erosion, seismic events, volcanic eruptions, or flooding ▪ Maintaining healthy, functioning ecosystems through the protection of unique, fragile, and valuable elements of the environment ▪ Directing activities not dependent on critical area resources to less ecologically sensitive sites, and mitigating unavoidable impacts on critical areas by regulating alterations in and adjacent to those areas Preventing cumulative adverse environmental impacts on frequently flooded areas
RCW 43.21C, State Environmental Policy	Washington State Department of Ecology[(a)]	This chapter outlines the legislative framework for SEPA and the requirements for environmental protection and review in Washington.
RCW 80.50, Energy Facilities – Site Locations	Energy Facility Site Evaluation Council	This chapter establishes EFSEC's role in siting, construction, and operation of major energy facilities in Washington. It provides the legal framework for EFSEC to streamline the permitting process and ensure compliance with state environmental and safety standards.
Chapter 197-11 WAC, SEPA Rules	Washington State Department of Ecology[(a)]	This chapter contains SEPA rules, detailing the procedures and requirements for environmental review under SEPA.
Chapter 365-190 WAC, Minimum Guidelines to Classify Agriculture, Forest, Mineral Land and Critical Areas	Washington State Department of Commerce[(a)]	This chapter provides the framework for counties and cities in Washington to classify and designate various types of lands, including critical areas such as wetlands, aquifer recharge areas, frequently flooded areas, and geologically hazardous areas. Specifically, Chapter 365-190-120 provides guidelines for classifying and designating areas that are susceptible to geological hazards such as erosion, landslides, earthquakes, and other geological events.
Washington State Building Code	Washington State Building Code Council[(a)]	The Washington State Building Code incorporates standards for construction in geologically hazardous areas to ensure safety and resilience.

[16] Fast-moving landslides composed of a mixture of water, soil, rock, and organic material that travel down slopes under the influence of gravity.

[17] Refers to the uneven settling of a structure's foundation, where different parts of the foundation settle at different rates.

Applicable Legislation	Agency	Summary Information
Washington State Environmental Policy Act	▪ Washington Energy Facility Site Evaluation Council ▪ Washington State Department of Ecology ▪ Local governments	This act is a process that identifies and analyzes environmental impacts that can be related to issuing permits. SEPA helps permit applicants and decision-makers understand how a proposed project would impact the environment.

Notes:

(a) The agency responsible for administering most permits or authorizations for the identified regulation. However, if EFSEC is determined to be the agency responsible for approving a proposal, EFSEC can administer several types of permits at the state and local level. EFSEC provides a streamlined process for siting and licensing major energy facilities, including transmission facilities in Washington State. EFSEC coordinates all evaluation and licensing steps, specifies the conditions for construction and operation, and issues a Site Certification Agreement, which assumes the responsibility for issuing individual state or local permits. By consolidating these permits into a single Site Certification Agreement, EFSEC can simplify the regulatory process for energy facility developers. While EFSEC itself does not directly administer federal permits, it works closely with federal agencies to ensure that all necessary federal requirements are met during the evaluation and licensing of energy facilities.

BLM = Bureau of Land Management; DOI = Department of the Interior; EFSEC = State of Washington Energy Site Evaluation Council; FLPMA = Federal Land Policy and Management Act; GMA = Growth Management Act; NFMA= National Forest Management Act; RCW = Revised Code of Washington; SEPA = Washington State Environmental Policy Act; USC = United States Code; WAC = Washington Administrative Code

The siting of transmission facilities is determined by engineering, technical, environmental, and socioeconomic factors. **Table 3.2-2** summarizes guidance documents and management plans that outline the design considerations and BMPs generally used to avoid or minimize impacts on earth resources.

Table 3.2-2: Siting and Design Considerations for Earth Resources

Siting and Design Consideration	Description
Recommended Siting Practices for Electric Transmission Developers (Americans for a Clean Energy Grid 2023)	This document outlines best practices for siting electric transmission facilities. Recommended practices include: ▪ Early and transparent engagement ▪ Respect and fair dealing ▪ Environmental considerations ▪ Interagency coordination ▪ Use of existing infrastructure
Best Management Practices for Regional Road Maintenance (WSDOT n.d.)	This document provides comprehensive guidelines for managing erosion and sedimentation[18] during road maintenance activities.
Guide for Transmission Line Foundations with Least Impact to the Environment (CEATI International n.d.)	This guide provides guidelines for selecting and designing transmission line foundations with minimal environmental impact.

[18] The process by which particles of soil, sand, and other materials are dislodged and transported by natural forces such as water, wind, or human activities like construction and deforestation.

Siting and Design Consideration	Description
IEEE Standards	Some IEEE standards address geotechnical aspects. For example, IEEE 81-2012 provides guidelines for measuring earth resistivity, ground impedance, and earth surface potentials of a grounding system. Additionally, IEEE standards related to geotechnical instrumentation include requirements for measuring thermal and thermomechanical responses, stress, strain, displacements, and pore pressure.
ASCE Standards	ASCE standards help ensure the safe and reliable design of transmission facilities by addressing various geotechnical factors such as soil stability, foundation design, and structural integrity.

ASCE = American Society of Civil Engineers; CEATI=Centre for Energy Advancement Through Technological Innovation; IEEE = Institute of Electrical and Electronics Engineers; WSDOT = Washington State Department

3.2.2 Affected Environment

This section describes the earth resources within the Study Area defined in Chapter 2, which include several key components:

- Geology
- Soils
- Topography
- Erosion and Accretion
- Geohazards

3.2.2.1 Geology

Washington is divided into several geologic provinces, as shown in **Figure 3.2-1**, each with unique characteristics, described below (DNR 2024a):

- **Columbia Basin**
  - **Composition:** Dominated by basalt flows from the Miocene epoch,[19] forming one of the largest plateaus in the world. The result of fissure eruptions that created the Columbia River Basalt Group.
  - **Features:** Formed by the accretion[20] of oceanic sediments and volcanic rocks, uplifted by tectonic forces.

[19] A specific period in time, often marked by notable events or developments.

[20] Refers to the process of growth or increase, typically by the gradual accumulation of additional layers of matter.

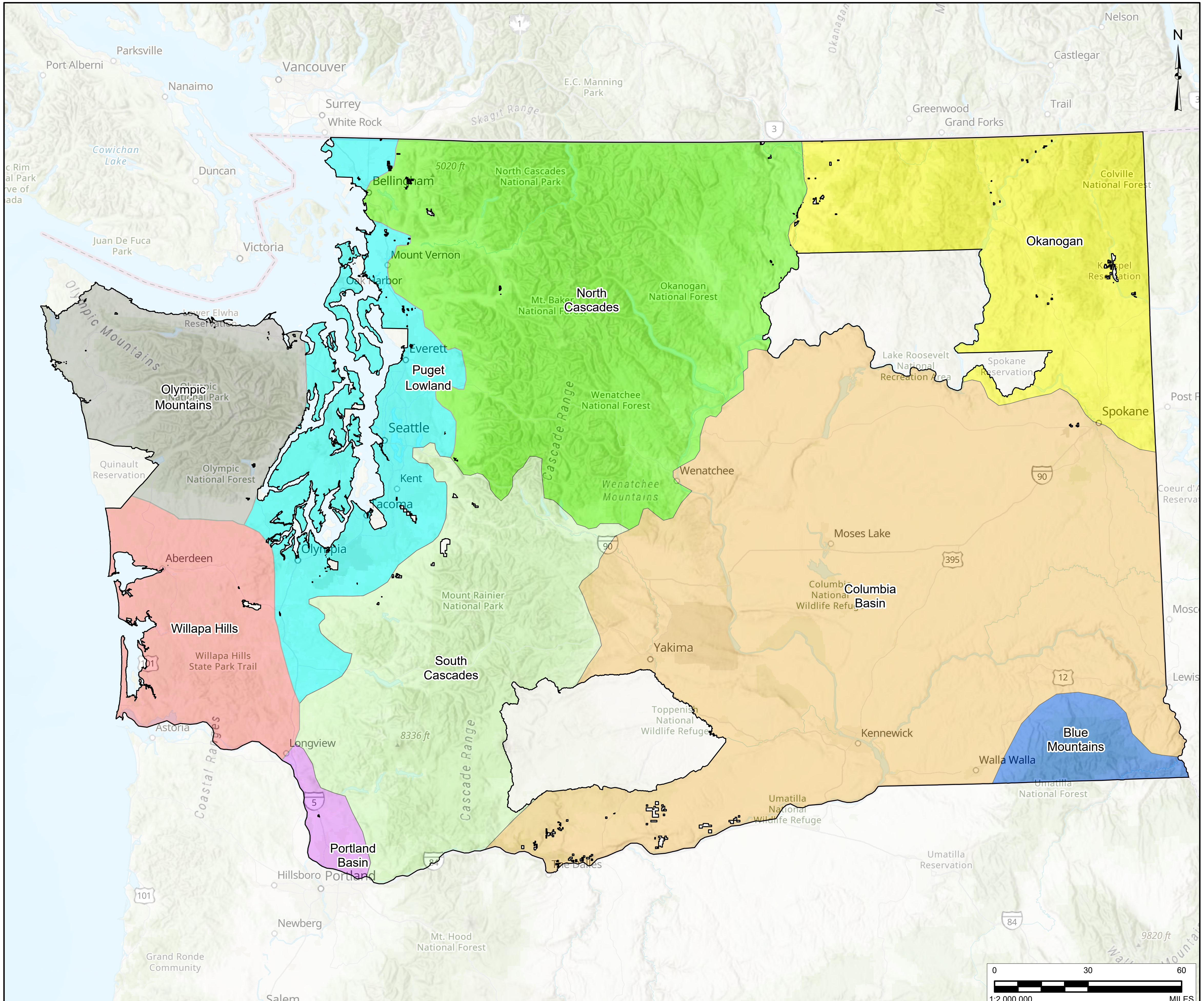
- **Puget Lowland**
  - **Composition:** A mix of glacial deposits, including till, outwash, and lacustrine sediments.[21] Shaped by repeated glaciations[22] during the Pleistocene epoch.
  - **Features:** Shaped by repeated glaciations, the lowland is a flat to gently rolling area with numerous lakes and wetlands.
- **Olympic Mountains**
  - **Composition:** Primarily composed of sedimentary rocks, including sandstone and shale. Created by the accretion of marine sediments and volcanic rocks.
  - **Features:** Rugged terrain with high peaks and deep valleys.
- **Blue Mountains**
  - **Composition:** A mix of volcanic and sedimentary rocks. Formed by volcanic activity and subsequent erosion.
  - **Features:** Rolling hills and dissected plateaus.[23]

[21] Deposits that form at the bottom of lakes. These sediments are typically composed of fine particles like silt, clay, and sometimes organic matter, which settle out of the water due to the low-energy environment of a lake.

[22] Periods in Earth's history when large ice sheets covered portions of the continents.

[23] A type of landform that has been eroded by rivers and streams, resulting in a landscape with sharp relief and deep valleys.

This Page Intentionally Left Blank



LEGEND

Study Area

Geologic Provinces of Washington (WaDNR, 2024)

- Blue Mountains
- Columbia Basin
- North Cascades
- Okanogan
- Olympic Mountains
- Portland Basin
- Puget Lowland
- South Cascades
- Willapa Hills

EFSEC
Energy Facility Site
Evaluation Council

REFERENCES AND NOTES
1. SERVICE LAYER CREDITS: SOURCES: ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY, ESRI, USGS
2. GEOLOGIC PROVINCES: WADNR, 2024

PROJECT
DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE
GEOLOGIC PROVINCES OF WASHINGTON

YYYY-MM-DD 2025-03-18
CONSULTANT wsp

FIGURE
3.2-1

This Page Intentionally Left Blank

- **Willapa Hills**
  - **Composition:** Predominantly underlain by Crescent Formation basalts; includes sedimentary rocks and basalt flows from the Columbia River Basalt Group.
  - **Features:** Characterized by hills that are rounded due to extensive weathering.
- **Okanogan**
  - **Composition:** Composed of Precambrian, Paleozoic, and Mesozoic rocks, as well as formations from the Eocene Epoch.
  - **Features:** Metamorphic core complexes, Precambrian rocks, thrust faults[24] and terrane boundaries,[25] plutonic intrusions,[26] glacial features, and Eocene extensional[27] features highlight the complex and dynamic geological history.
- **South Cascades**
  - **Composition:** Characterized by volcanic activity and complex geological history shaped by the subduction[28] of the oceanic plate beneath the North American plate.
  - **Features:** Part of the Cascades Volcanic Arc,[29] formed by subduction. This process has created a series of volcanic peaks over millions of years. Geological history also involves accretion of oceanic sediments and volcanic islands.
- **North Cascades**
  - **Composition:** Similar to the South Cascades, a complex mix of metamorphic and igneous rocks, including schist, gneiss, and granite. Result of complex tectonic processes, including subduction and terrane accretion.
  - **Features:** Known for steep, glaciated peaks and alpine scenery.
- **Portland Basin**
  - **Composition:** Contains up to 1,800 feet of late Miocene and younger sediments, as well as volcanic deposits, including the Columbia River Basalt Group and the Boring Volcanic Field.

---

[24] A type of reverse fault where the fault plane has a low dip angle (which it is the angle at which the fault dips), typically less than 45 degrees. In a thrust fault, the hanging wall (the block of rock above the fault plane) moves up and over the footwall (the block below the fault plane) due to compressional forces.

[25] Typically marked by faults or complex fault zones, these boundaries form where a terrane, which is a fragment of crust with a distinct geological history, has been accreted or attached to a larger continental mass.

[26] Bodies of igneous rock that form when magma cools and solidifies beneath the Earth's surface.

[27] Refers to processes and structures associated with the stretching and thinning of the Earth's crust or lithosphere. This typically occurs in regions where tectonic forces pull the crust apart, leading to the formation of features such as normal faults, rift valleys, and mid-ocean ridges.

[28] A geological process where one tectonic plate moves under another and sinks into the Earth's mantle.

[29] A major volcanic region in western North America, extending from southwestern British Columbia through Washington and Oregon to Northern California.

- **Features:** Part of the Puget-Willamette forearc trough of the Cascadia subduction system. It is characterized by a faulted, asymmetric syncline structure. The Columbia River has played an important role in shaping the basin, carving channels, and depositing sediments.

The Puget Lowland was heavily influenced by glaciation during the last Ice Age. Glaciers advanced and retreated multiple times over the past 2 million years, depositing thick layers of glacial till and outwash. These sediments created the region's characteristic rolling hills, valleys, and numerous lakes, such as Lakes Union, Washington, and Sammamish. The glacial activity also formed the many islands in the Strait of Juan de Fuca and Puget Sound.

The Olympic Mountains, located on the Olympic Peninsula, are primarily composed of marine sedimentary rocks and basalt that were accreted onto the continent over millions of years. These mountains support dense coniferous forests and temperate rainforests, such as the Hoh Rainforest, which are among the few temperate rainforests in the continental United States.

The geological history of the Pacific Northwest reflects the evolution of plate tectonic forces. Between about 17 and 12 million years ago, large volumes of lava erupted from deep crustal fissures[30] above a "mantle hotspot."[31] These basalt flows make up the Columbia River Basalt Group, the most common type of exposed rock in the region. The convergence of the North American, Juan de Fuca, and Pacific plates has had a profound impact on the geology of the Pacific Northwest, as described below (Swanson et al. 1989):

- **North American**
  - **Description:** The North American plate is one of the largest tectonic plates, covering most of North America, parts of the Atlantic Ocean, Greenland, and parts of Siberia.
  - **Movement:** This plate moves roughly westward at a rate of about 0.9 inches per year. In Washington, the western boundary is defined by the Cascadia Subduction Zone (CSZ), where it interacts with the Juan de Fuca plate.
- **Juan de Fuca**
  - **Description:** The Juan de Fuca plate is a small oceanic plate off the coast of the Pacific Northwest. It is a remnant of the larger Farallon plate.
  - **Movement:** This plate is subducting beneath the North American plate at the CSZ. The subduction process leads to geological activity, including the formation of the Cascade Range and frequent seismic events. The rate of the Juan de Fuca plate's eastward movement is about 2 inches per year.
- **Pacific**
  - **Description:** The Pacific plate is the largest tectonic plate, covering much of the Pacific Ocean basin.

[30] Fractures or cracks in the Earth's crust that can vary in size from a few meters to sever kilometers. These fissures can form due to various geological processes, including tectonic activity, volcanic activity, and the cooling and contraction of lava.

[31] A location in the Earth's mantle where hot, buoyant material rises towards the surface, creating volcanic activity.

- **Movement:** This plate moves northwestward at a rate of 2.0 to 3.9 inches per year. It interacts with the North American plate along the San Andreas Fault to the south and the Aleutian Trench to the north. Its interaction with the Juan de Fuca plate occurs at the Juan de Fuca Ridge.

a) The geological processes in western Washington are shaped by the region's dynamic tectonic activity and glacial history. Western Washington is affected by the ongoing tectonic activity associated with the CSZ. The CSZ is where the Juan de Fuca and North American plates interact. The Juan de Fuca plate, entirely oceanic, is slowly sinking and moving eastward beneath the western edge of the North American plate, a process known as subduction. The Pacific plate lies beneath the Pacific Ocean and adjoins the Juan de Fuca plate. The separation of the Pacific and Juan de Fuca plates causes the Juan de Fuca plate to move eastward beneath the North American plate. As the Juan de Fuca plate moves away from the Pacific plate, molten rock fills the gap between the plates, forming "spreading centers" with many hot springs and undersea eruptions. This slow movement drives most of the active geological processes in the Pacific Northwest, including the generation of earthquakes, formation and eruption of volcanoes, and uplift and folding of the earth's surface.

The relative motions of tectonic plates alter the structure of rocks in the overlying North American plate. Continuous plate movements along the plate's western edge have fragmented it into smaller crustal blocks, such as the Oregon Coastal Range, Canadian Coastal Mountains, and Sierra Nevada blocks. The northward movement of the Oregon Coastal Range block has pushed western Washington against the stationary Canadian Coast Mountains. This interaction has caused most of Oregon and southwest Washington to rotate clockwise relative to North America at a rate of 0.4 to 1.0 degrees per million years (Wells and Heller 1988; Wells and Simpson 2001; Brocher et al. 2017). These rotations and block movements result in north-south-directed compression and the folding of the earth's crust in Washington.

The north-south-directed compression and folding in the shallow crust of eastern Washington have created the Yakima fold and thrust belt (YFTB). This region features a series of alternating ridges and valleys, known as anticlines (ridges) and synclines (valleys). An anticline is the elevated part of a geological unit folded by geological forces, while a syncline is a geological trough, representing the lower part of a folded unit. The young ridge-and-valley topography of the YFTB includes narrow anticlinal ridges up to 2,000 feet high, separated by broad synclinal valleys that are 1 to 10 miles wide, covering approximately 5,500 square miles in eastern Washington (Reidel et al. 2003).

Geological Processes – "Ice Ages"

Another major geological impact on the state was the advance and retreat of continent-wide glaciers over the last million years. During the most recent glaciation, from about 15,000 to 10,000 years ago, glaciers formed an ice dam on the Clark Fork River in northern Idaho, creating Lake Missoula. As the ice melted, the lake grew until it overwhelmed the ice dam, causing massive recurring flood events across eastern Washington and the Columbia River. These floods carved deep channels into the basalt bedrock, forming the "channeled scabland" landscape.

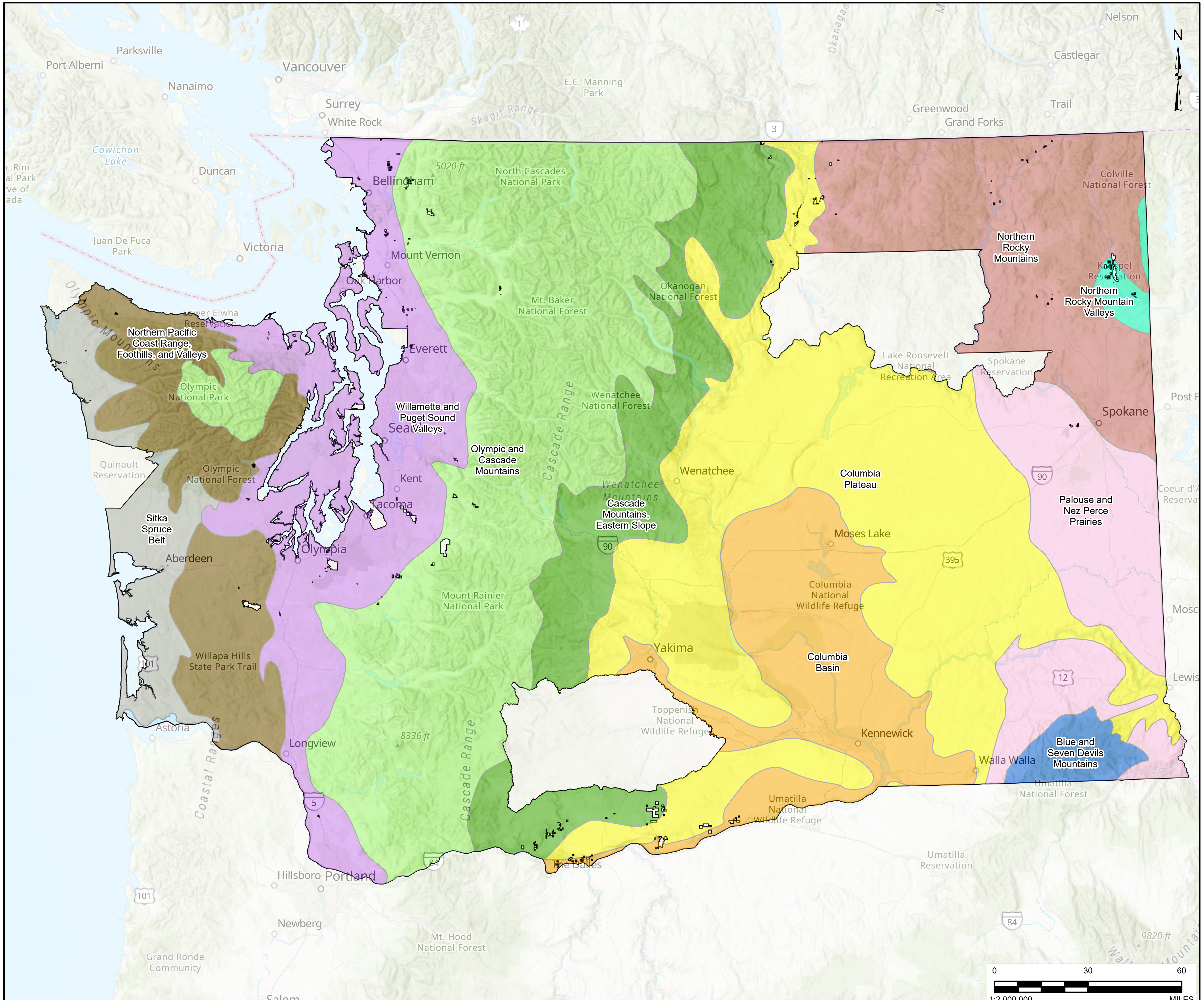
Evidence of these floods is visible at Wallula Gap and Grand Coulee, which form a two-stage canyon 50 miles long and up to 900 feet deep. Each flood discharged an estimated 350,000,000 cubic feet per second, stripping topsoil and glacial deposits in eastern Washington and northern Oregon. Older glacial sediments were deposited in western Washington and the Pacific Ocean, later blown back into the Columbia Basin by southwesterly winds as eolian loess (Sweeny et al. 2017).

Geologists agree that the Puget Sound area experienced six or more major glacial events. Ice from the Coast Range and Rocky Mountains of British Columbia advanced southward into the Puget Lowland, depositing new sediments and partially eroding previous ones. During ice-free periods, streams, waves, weathering, bioturbation[32], and landslides reworked these sediments. The most recent glaciation, the Fraser Glaciation (18,000 to 13,000 years ago), covered the central Puget Lowland with ice about 3,000 feet thick, compacting the soils beneath (Thorson 1989; Porter and Swanson 1998). As the ice retreated, meltwater streams deposited sand, gravel, cobbles, and boulders, while post-glacial lacustrine and organic deposits formed in depressions and low-flowing water areas. These glacial recessional soils are not glacially consolidated.

3.2.2.2 Soils

Major Land Resource Areas (MLRAs) are used for understanding and managing soils in Washington. MLRAs help in statewide agricultural planning, provide a framework for managing natural resources, guide research and education efforts, assess and mitigate environmental impacts, and inform policymakers and land managers about land use and conservation. Washington's MLRAs are shown in **Figure 3.2-2**.

[32] Refers to the reworking of soils and sediments by living organisms, such as animals and plants.



LEGEND

- Study Area

Major Land Resource Areas (USDA, 2022)

- Blue and Seven Devils Mountains
- Cascade Mountains, Eastern Slope
- Columbia Basin
- Columbia Plateau
- Northern Pacific Coast Range, Foothills, and Valleys
- Northern Rocky Mountain Valleys
- Northern Rocky Mountains
- Olympic and Cascade Mountains
- Palouse and Nez Perce Prairies
- Sitka Spruce Belt
- Willamette and Puget Sound Valleys

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES
1. SERVICE LAYER CREDITS: SOURCES: ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY, ESRI, USGS
2. MAJOR LAND RESOURCE AREAS: USDA, 2022

PROJECT
DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE
MAJOR LAND RESOURCE AREAS OF WASHINGTON

YYYY-MM-DD 2025-03-18
CONSULTANT wsp

FIGURE
3.2-2

This Page Intentionally Left Blank

Washington's soils are diverse and influenced by various factors, including parent material,[33] climate, topography, biological activity, and time, as described below (Hipple n.d.):

- **Parent Material:** Soils in Washington are derived from a variety of parent materials, including volcanic ash, glacial till, alluvium, and loess. These materials contribute to the soils' physical and chemical properties.
- **Climate:** The state's climate varies from west to east, affecting soil moisture and temperature regimes. Western Washington's soils are influenced by high precipitation and mild temperatures, while eastern Washington's soils experience lower precipitation and more extreme temperatures.
- **Topography:** The diverse topography, from coastal plains to mountainous regions, influences soil drainage, erosion, and deposition patterns.
- **Biological Activity:** Vegetation, microorganisms, and fauna contribute to soil formation through organic matter decomposition and nutrient cycling.
- **Time:** Soil development varies with age, with older soils typically exhibiting more developed horizons[34] and greater nutrient leaching.

Washington has soils from 10 of the 12 different soil orders[35] recognized by the U.S. Department of Agriculture's soil classification system. This diversity is due to the state's varied climate, vegetation, and geological history. The 10 soil orders found in Washington are described below:

- **Andisols:** Found primarily in areas with volcanic activity, such as the Cascade Range, these soils are rich in volcanic ash and have high water-holding capacity. They are highly valued for their fertility and water-holding capacity.
- **Mollisols:** Predominantly found in the Palouse region, these soils are fertile and rich in organic matter, making them ideal for agriculture. They are highly prized for agricultural use.
- **Alfisols:** Common in forested areas, particularly in the foothills of the Cascades and the Olympic Mountains, these soils have a clay-enriched subsoil and are moderately fertile.
- **Entisols:** These soils are young, with little horizon development, and are found in areas with recent geological activity like river valleys and coastal regions.
- **Inceptisols:** These soils are widespread across the state and are characterized by minimal horizon development.
- **Ultisols:** Found in the wetter, forested regions of the state, these soils tend to be weathered and acidic but can still support forestry and some types of agriculture.
- **Histosols:** Present in wetland areas, these organic-rich soils are formed from decomposed plant material. They are often protected due to their ecological significance and role in water filtration.

---

[33] A distinct layer of soil or sediment that has unique characteristics compared to the layers above and below it.

[34] A distinct layer of soil or sediment that has unique characteristics compared to the layers above and below it.

[35] In soil science, a soil order is the highest level of classification in the USDA Soil Taxonomy system. There are twelve soil orders, each defined by specific characteristics and processes that influence soil formation.

- **Aridisols:** These soils are found in the drier, eastern parts of the state.
- **Spodosols:** Typically found in cooler, forested areas with high rainfall, these soils are often protected to maintain diversity of ecosystems.
- **Vertisols:** These soils are characterized by high clay content and the expansion and contraction with moisture changes.

Soil orders are important for several reasons, particularly in the fields of agriculture, environmental science, and land management. Soil orders provide a systematic way to classify and organize soils based on their properties and formation processes. This helps scientists and land managers understand and communicate about different soil types more effectively. Knowing the soil order of a given area can inform best practices for soil management, including irrigation, fertilization, and crop selection. Different soil orders have distinct characteristics that affect their suitability for various uses. Some orders are more prone to erosion or nutrient leaching, which can also influence management decisions. Recognizing soil orders can aid in conservation efforts by identifying areas that need protection and restoration. In Washington, several soil types are protected due to their unique characteristics and ecological importance. These include:

- **Prime Farmland Soils:** These highly productive soils are essential for agriculture. Prime farmland is typically associated with several soil orders that have the best combination of physical and chemical characteristics for agricultural productivity. This soil type can include Mollisols, Alfisols, and Inceptisols (USDA NRCS n.d.).
- **Wetland Soils:** These soils support wetland ecosystems and are protected under various environmental regulations. Wetland soils can be found across all 12 soil orders in the USDA Soil Taxonomy system; however, certain soil orders are more commonly associated with wetlands due to their specific characteristics. These orders include Histosols, Inceptisols, Entisols, Mollisols, and Spodosols (National Academies Press 2024).
- **Forest Soils:** Found in forested areas, these soils are crucial for maintaining forest health and biodiversity. Forest soils can be found in several soil orders, each with unique characteristics that support forest ecosystems. Soil orders include Alfisols, Andisols, Entisols, Inceptisols, Mollisols, Spodosols, and Ultisols (USDA NRCS n.d.).
- **Erosion-prone Soils:** Soils susceptible to erosion are protected to prevent land degradation and maintain water quality. Some of the most erosion-prone soil orders include Entisols, Inceptisols, Alfisols, Ultisols, and Aridisols (USDA NRCS n.d.).

Due to their ecological importance and unique characteristics, Histosols, Andisols, Alfisols, and Mollisols are protected through various conservation practices and regulations, including the following:

- **Conservation Programs:** Programs like the Natural Resources Conservation Service (NRCS) promote soil health through practices such as no-till farming,[36] cover crops,[37] and conservation buffers.

---

[36] Also known as zero tillage or direct drilling, no-till farming is an agricultural technique where crops are grown without disturbing the soil through tillage. Instead of plowing, farmers used specialized equipment to plant seeds directly into the soil, leaving crop residues on the surface.

[37] Plants grown primarily to cover and protect the soil rather than for harvest.

- **Soil Surveys:** The NRCS conducts soil surveys to map and assess soil resources, providing data for sustainable management.
- **Regulatory Frameworks:** Wetland soils (Histosols) and other critical soils are protected under environmental regulations to preserve their ecological functions.
- **Erosion Control:** Measures are implemented to prevent soil erosion, protecting soils like Alfisols and Mollisols.

Soil Properties

Washington's soils exhibit a wide range of physical and chemical properties. Physically, they vary from sandy to clayey textures, influencing water retention, drainage, and root penetration. Soil structures in the state range from granular to blocky or prismatic, affecting aeration and water movement. Depth varies, with some areas having shallow soils over bedrock and others having deep profiles. Bulk density impacts root growth and water movement, with higher-density soils being more compact.

Chemically, soil pH[38] ranges from acidic in wetter, forested areas to neutral or slightly alkaline in drier regions, affecting nutrient availability and microbial activity. Organic matter content, particularly high in Mollisols and Histosols, influences fertility, structure, and water-holding capacity. Nutrient levels vary widely, with fertile soils like Mollisols having high levels of essential nutrients. Biological properties, such as organic matter content and microbial activity, are higher in regions with dense vegetation and organic inputs.

Soil compaction can become an issue in construction projects, ultimately changing the properties of the soil. Compacted soil has fewer air spaces, which reduces its ability to absorb water. This can lead to increased surface runoff and standing water, potentially causing erosion and waterlogging. Poor drainage can also affect the stability of structures and lead to foundation problems. Without adequate pore spaces, compacted soil is more susceptible to erosion by wind and water. Erosion can undermine the foundations of structures and lead to sedimentation in nearby waterbodies, affecting water quality (see Section 3.4, Water Resources).

Compacted soil makes it difficult for plant roots to penetrate, which can inhibit vegetation growth (see Section 3.5, Vegetation). This can lead to poor landscaping outcomes and reduced soil stability, as plants play a crucial role in preventing erosion.

3.2.2.3 Topography

Washington's topography is highly diverse, ranging from sea level at the Pacific Ocean to the towering peak of Mount Rainier at 14,411 feet above mean sea level. The state's landscape includes the rugged Cascade Range and Olympic Mountains, which feature steep slopes exceeding 30 degrees, and the more moderate slopes of the Blue Mountains. In contrast, the Columbia Plateau and Puget Lowlands have gentler slopes, generally less than 10 degrees, making these areas more suitable for agriculture and urban development.

This variation in elevation and slope gradients influences land use, climate, and ecological diversity across Washington. The steep, forested mountains support dense vegetation and unique ecosystems, while the fertile, gently sloping plains of the Columbia Plateau are ideal for farming.

[38] A measurement of the acidity and alkalinity of water; stands for "potential of hydrogen."

3.2.2.4 Unique Physical Features

In geography, unique physical features can include landforms like mountains, valleys, and rivers, as well as other natural elements such as climate, soil, vegetation, and wildlife. These areas are often safeguarded through national and state park designations, natural area preserves, and other conservation efforts to maintain their natural beauty and ecological integrity. Unique physical features contribute to Washington's rich natural heritage and play a crucial role in its ecology, economy, and cultural identity. Examples of unique physical features in the state include:

- **Mount Rainier:** Protected within Mount Rainier National Park
- **Hoh Rainforest:** Located in Olympic National Park
- **Palouse Falls:** Located in Palouse Falls State Park
- **Mima Mounds**: Protected within the Mima Mounds Natural Area Preserve
- **Mount St. Helens:** Part of the Mount St. Helens National Volcanic Monument
- **Beacon Rock:** Located in the Columbia River Gorge
- **North Cascades National Park:** Known for its rugged mountain landscapes and glaciers

3.2.2.5 Erosion/Accretion

Erosion and accretion are natural processes that shape landscapes, especially along coastlines. Erosion is the process by which natural forces like wind, water, and ice wear away rocks and soil, transporting them from one location to another. It can lead to the loss of land and changes in landscape features. Accretion is the deposition of materials like sand, silt, and gravel, which build up landforms. Accretion can create new land or add to existing land masses. These processes are essential for maintaining the dynamic balance of coastal and riverine environments.

Coastal erosion is a major concern in Washington, especially along the Pacific Northwest coastline. It can lead to the loss of valuable land, damage to infrastructure, and changes in coastal ecosystems. Factors like wave action, sea-level rise, and human activities (e.g., construction of jetties) can intensify erosion.

Accretion can counteract erosion to some extent, creating new habitats and stabilizing shorelines. This process helps build up beaches and landforms by depositing sediments. Coastal structures like jetties and seawalls can disrupt natural sediment transport, leading to increased erosion in some areas and accretion in others.

3.2.2.6 Geologically Hazardous Areas

Washington Administrative Code (WAC) 365-190-120 specifically mentions that geologically hazardous areas include areas prone to erosion, sliding, earthquakes, or other geological events. These areas pose a threat to transmission facilities that occur in these areas.

Landslide Hazards

The U.S. Geological Survey (USGS) defines a landslide as the movement of a mass of rock, debris, or earth down a slope under the direct influence of gravity (USGS n.d. [a]). While landslide-caused disasters are rare in Washington, when they do occur, they can impact transportation systems, communities, and natural resources, leading to severe property damage and loss of life. Landslides can occur on nearly any ground if the right conditions of soil, moisture content, and slope angle are present. Triggers for landslides include heavy rain, rapid snowmelt, flooding, earthquakes, vibrations, and other natural or human-induced events.

Vegetation plays a crucial role in maintaining slope stability, and its removal can exacerbate landslide hazards. Plant roots help bind soil particles together, providing mechanical stability to slopes. When vegetation is removed, this root reinforcement is lost, making the soil more prone to erosion and landslides. Vegetation also intercepts rainfall and facilitates evapotranspiration[39], reducing the amount of water that reaches the soil. Without vegetation, more water infiltrates the soil, increasing pore water pressure and reducing soil strength, which can trigger landslides (see Section 3.5, Vegetation, for more information).

There are two main types of landslides, as described below:

- **Shallow Rapid Landslides:** These are fast-moving landslides that typically involve the upper layers of soil and rock. They are often triggered by heavy rainfall or rapid snowmelt.
- **Deep-Seated Landslides:** These involve deeper layers of soil and rock and can move more slowly. They are often triggered by prolonged periods of wet weather or seismic activity.

Washington is divided into several landslide provinces, each characterized by specific geological and environmental conditions that influence landslide activity, as described below:

- **Olympic Mountains:** This region experiences frequent landslides due to its rugged topography and high rainfall.
- **Southwest Washington:** This region is characterized by its high susceptibility to landslides due to its geological and climatic conditions.
- **Puget Lowland:** This area is prone to both shallow and deep-seated landslides due to its glacially derived soils and steep slopes. Urban development and heavy rainfall contribute to landslide risk in this area.
- **Cascades Range:** The steep, mountainous terrain of the Cascades is susceptible to landslides, particularly in areas with volcanic activity and heavy precipitation.
- **Columbia Plateau:** Although generally less prone to landslides, this area can experience landslides along river valleys and steep slopes, especially during periods of heavy rain or rapid snowmelt.
- **Okanogan Highlands:** The province is susceptible to various types of landslides due to its steep slopes, geological composition, and climatic conditions. Landslides in this region can be triggered by heavy rainfall, rapid snowmelt, and seismic activity.

Landslides encompass rockfalls, slides, slumps, and debris flows. While gravity is the primary force driving landslides, they can also be triggered by water, wind, or large-scale disturbances such as earthquakes or volcanic activity. Steep and unstable slopes are most at risk for landslides. Other factors influencing the likelihood of a slide include soil type and thickness, geological structure, vegetative cover, soil conditions and saturation, and the amount, rate, and duration of precipitation. Landslide hazard areas are typically defined as regions where a

[39] Combined process of water movement from the Earth's surface to the atmosphere through evaporation and transpiration.

combination of slope inclination, soil type, geological structure, and water presence makes them susceptible to failure and subsequent downhill movement.

Earthquake Hazards

Earthquakes present numerous hazards to both built and natural environments. Earthquakes in Washington can cause strong ground shaking that can be felt locally, throughout the state, and even across the broader Pacific Northwest. The severity and reach of this shaking are primarily determined by the earthquake's magnitude, which measures the energy released at the source.

Earthquake magnitude is measured by analyzing records from regionally deployed seismometers[40] and accelerometers.[41] The most common magnitude scale now used by seismologists is the moment magnitude, expressed as M_W or **M**. The M_W scale measures the energy released at the earthquake source. The M_W and most other earthquake magnitude scales are logarithmic, meaning that an earthquake of M_W 6 releases about 30 times more energy at its source than an M_W 5 earthquake. Most people do not feel earthquakes smaller than about M_W 3 unless they are within approximately 5 miles of the epicenter and the earthquake is less than about 10 miles deep.

The main hazards associated with earthquakes in the Pacific Northwest and Washington are:

- Strong ground shaking
- Soil liquefaction
- Earthquake-triggered landslides
- Surface fault rupture
- Tsunami and seiche

Earthquake hazards in the Pacific Northwest are primarily related to the ongoing activity of the CSZ as the North American and Juan de Fuca tectonic plates converge toward each other. The major types of earthquakes that occur in the Pacific Northwest region are described below:

- **Megathrust CSZ Earthquakes:** Also referred to as a subduction interface earthquake, this earthquake type results from rupture at the shallow section (less than 30 miles from the surface) of interface or boundary between the Juan de Fuca plate and the overriding North American plate.
- **Deep CSZ Earthquakes:** Also referred to as a subduction in-slab earthquake, this earthquake type results from the release of stresses within the subducting Juan de Fuca plate beneath the plate interface during its slow eastward descent beneath the Pacific Northwest area.
- **Shallow Crustal Earthquakes:** Shallow crustal earthquakes are those that occur in the upper 18 miles of the earth's crust. Some shallow crustal earthquakes originate along known and mapped crustal fault zones; these are referred to as background earthquakes or crustal fault earthquakes. There are also shallow crustal

[40] An instrument that measures the motion of the ground, especially those caused by earthquakes, volcanic eruptions, and explosions.

[41] A device that measures the acceleration of ground motion caused by seismic waves during events like earthquakes

earthquakes that are not associated with mapped faults and occur within the region between the mapped faults (DNR 2024b).

Megathrust CSZ earthquakes occur when there are sudden ruptures along the brittle upper part of the Juan de Fuca-North American plate boundary. Although subduction interface earthquakes are rare, they can reach magnitudes greater than M_W 9 when they do happen. No such earthquakes have been recorded in the Pacific Northwest's written history, but geological evidence from Northern California to British Columbia shows that multiple CSZ subduction interface earthquakes of M_W 8+ to M_W 9 have occurred over the last 10,000 years (e.g., Atwater et al. 1995; Clague et al. 2000; Atwater et al. 2005; Kelsey et al. 2005; Nelson et al. 2006). The most recent subduction interface earthquake in the Pacific Northwest happened in January 1700, with an estimated magnitude of M_W 8.7 to 9.2 (Cascadia Department of Bioregion n.d.). Geological evidence suggests that earthquakes of M_W 9.0 or greater have occurred at least seven times in the Pacific Northwest over the past 3,500 years, indicating an average recurrence interval of 400 to 600 years (PNSN n.d.).

As the Juan de Fuca plate subducts beneath the North American plate, the resulting increase in rock and bending stresses can cause subduction in-slab earthquakes. These earthquakes tend to have lower maximum magnitudes and occur at greater depths than megathrust subduction interface earthquakes. Most CSZ in-slab earthquakes have been recorded beneath the Puget Sound region. Notable historical in-slab earthquakes include the 1949 M_W 6.9 Olympia, the 1965 M_W 6.7 Seattle-Tacoma, and the 2001 M_W 6.8 Nisqually earthquakes. The recurrence interval for in-slab earthquakes is approximately every 30 to 50 years (EERI and WMDEMD 2005). The subduction of the Juan de Fuca plate compresses and deforms the western edge of the North American plate, creating crustal faults and folds. Crustal fault earthquakes occur when shallow faults, extending up to 15 miles deep, rupture. Additionally, background earthquakes are generated by unmapped and deeper faults within the shallow crust, away from known and mapped faults.

In addition to the major types of earthquakes that occur in the Pacific Northwest as a result of plate tectonics, the region's active volcanoes can also trigger earthquakes. Unlike tectonic earthquakes, volcanic earthquakes are caused by the upward movement of molten rock (magma) beneath and within the Cascade Range volcanoes. These earthquakes are typically localized to the volcanic centers and are usually not felt beyond the immediate vicinity. However, during large volcanic eruptions, such as the 1980 eruption of Mount St. Helens, volcanic earthquakes can cause strong shaking several miles from the volcano.

Surface Fault Rupture

The initial displacement along a fault, known as a fault rupture, releases energy that propagates as seismic waves.[42] In larger earthquakes, with a moment magnitude of 6 or higher, the fault can rupture all the way to the ground surface. This surface fault rupture can cause ground displacements, sometimes up to 30 feet. Such ruptures can lead to severe structural damage to buildings, bridges, and other infrastructure situated across the fault line.

[42] Energy waves generated by earthquakes, volcanic eruptions, or explosions.

Strong Ground Shaking

Strong ground shaking from earthquakes is the most widespread hazard in the Pacific Northwest. This shaking can cause damage to engineered structures. The extent of earthquake damage at a specific location depends on the following factors:

- The structure of the earth between the earthquake source and the site (i.e., travel path)
- The properties of the near-surface soil and rock beneath the site
- The type, design, and construction of the structures subjected to the shaking

The intensity of earthquake ground motion is measured by several parameters, with horizontal peak ground acceleration being the greatest acceleration experienced by the ground at a given location during an earthquake. The USGS has developed the Unified Hazard Tool, which can estimate peak ground acceleration and provide other crucial information for engineers designing facilities to withstand earthquake shaking.

Soil Liquefaction

Soil liquefaction is a temporary transformation of sandy soil from a solid state to a more liquid-like state. This phenomenon typically occurs during strong ground shaking, especially in loose sandy or silty sand soils that are saturated and have poor drainage. Soils most prone to liquefaction are non-cohesive and frequently saturated near the ground surface, typically less than 80 feet below ground surface. Loose to medium-dense sands and soft to medium-stiff, low plasticity silts[43] are particularly susceptible because earthquake shaking can increase pore pressures in these saturated soils.

The potential for liquefaction increases with prolonged ground shaking. For instance, megathrust subduction interface earthquakes, which can have over a minute of strong shaking, are more likely to induce liquefaction in susceptible soils. Liquefaction can lead to ground settlement and lateral spreading,[44] especially along riverbanks or stream channels. This settlement can reduce the bearing capacity of both shallow and deep foundations, adversely affecting structures. Categories help in assessing the risk and planning for mitigation measures to earthquake-prone regions. The common categories of liquefaction susceptibility include (USGS n.d. [b]):

- **Very High:** Areas where the soil is highly prone to liquefaction during an earthquake. These zones typically have loose, saturated sands and silts, often found in regions with man-made fill or young, unconsolidated sediments.
- **High:** Zones with a significant risk of liquefaction, though not as extreme as the "Very High" category. These areas still contain loose, water-saturated soils that can liquefy under seismic shaking.
- **Moderate:** Areas with a moderate risk of liquefaction. The soils in these zones may liquefy under strong earthquake shaking, but the conditions are less favorable for liquefaction compared to the "High" and "Very High" categories.

[43] Fine-grained soils that exhibit low plasticity, meaning they have limited ability to deform without cracking or breaking when wet.

[44] A type of ground deformation that occurs when saturated soil layers lose their strength and move laterally due to seismic activity, such as an earthquake.

- **Low:** Zones where the risk of liquefaction is relatively low. The soils here are less likely to liquefy during an earthquake, often due to being denser or less saturated.
- **Very Low:** Areas with minimal risk of liquefaction. The soils in these zones are typically dense, well-drained, and not prone to liquefaction even during strong seismic events.

Tsunamis and Seiches

Tsunamis are long-duration ocean waves, typically lasting more than 20 minutes, generated by offshore earthquakes, landslides, and volcanic eruptions that displace the seafloor. These waves can range from a few feet to tens of feet in height, inundating coastal and low-lying inland areas. The risk of tsunamis is highest near ocean shorelines and river mouths. Landslides that enter waterbodies with sufficient force can also create localized tsunami waves, affecting rivers, lakes, or ocean shorelines.

Seiches are oscillating water waves that occur in enclosed or partially enclosed waterbodies like lakes and rivers. They can be triggered by earthquakes, volcanic activity, landslides, or extreme wind and weather events. Seiches become hazardous when their vertical waves approach shallow water or shorelines.

Volcanic Hazards

Cascade Range volcanoes have produced more than 100 eruptions in the past few thousand years. Cascade volcanoes have the potential to cause widespread disasters. The Pacific Northwest is extensively monitored by the USGS and the Cascades Volcano Observatory with an advanced seismic network. As Cascade volcanoes erupt, they can produce the following adverse conditions:

- **Ashfall:** This effect results when ash is forcibly ejected by a volcanic explosion and becomes airborne. Volcanic ash can become suspended in the air and travel great distances from the volcanic vent, entrained by the wind, before falling to the ground.
- **Lahars:** This component of a volcanic eruption occurs when volcanic ash and other debris mix with a water source to form volcanic mudflows. Lahars are typically generated during and after eruptions, when large volumes of loose volcanic ash are present along the flanks of a volcano. Lahars may continue to mobilize loose debris for years after the event that caused them. Lahars are very fast-moving and can destroy bridges, roads, and other infrastructure along drainage paths.
- **Debris flows:** Like lahars, debris flows contain a higher concentration of volcanic debris, but with lower water content. Debris flows are not easily mobilized and are extremely dense, capable of causing damage.
- **Lava flows:** Lava flows are streams of molten rock that pour or ooze from an erupting vent. Lava erupts during either nonexplosive activity or explosive lava fountains.
- **Pyroclastic flows:** These flows are chaotic blasts of volcanic ash, hot gases, and rock debris, usually generated from the collapse of an eruption column. Pyroclastic flows can spread out in any direction from a volcanic vent at very high speeds and are not restricted to drainage channels, unlike lahars, debris flows, and lava flows.
- **Other Effects:** Massive landslides can occur if portions of a volcano collapse during an eruption, as seen in the Mount St. Helens eruption in May 1980. Another hazard is the seismicity associated with volcanic activity, which may trigger earthquake events. Significant volcanic activity is generally preceded by weeks to months of increased seismicity.

Underground Mines

Washington contains more than 3,800 inactive and/or abandoned metal mines located on private, state, federal, and tribal lands (Huntting 1956; U.S. Bureau of Mines 1995) and approximately 230 inactive and abandoned coal mines (Schasse et al. 1994). Most of these mines became inactive prior to the enactment of environmental laws requiring reclamation (Norman 2000). Conditions at these sites are largely undocumented. Depending on the depth of the mine and the material above the mine, subsidence can occur over a large area (regional subsidence) that extends beyond the limits of the mine workings. This can cause foundation settlement, damage to utility lines (water, sewer, gas), or other problems. Where mine workings are relatively shallow, subsidence can be very localized and can result in localized depressions. Mine openings, waste dumps, and mine gases can pose other risks if they are present.

3.2.3 Impacts

An assessment of impacts was completed for the construction, operation and maintenance, and upgrade or modification of transmission facilities within the Study Area.

3.2.3.1 Method of Analysis

The Study Area for a project-specific application would typically encompass several key regions and features, such as the following:

- **Project Site and Immediate Vicinity:** Specific location of the project and the surrounding area that might be directly affected by construction, operation and maintenance, and upgrade or modification activities.
- **Soil and Geology:** Types of soils and geological formations present in the area. This helps in understanding the potential for erosion, landslides, and other geotechnical issues. Unique geologic formations should be identified that are within the viewshed of the project.
- **Seismic Hazards:** Risk of earthquakes and their impact on the stability of the proposed transmission facility.
- **Previous Earthworks:** Previous earthworks, such as landfills or underground mines, help understand whether uneven settlement or subsidence is a concern. Additionally, disturbing these sites could release contaminants, posing environmental and health risks.

This Draft Programmatic EIS analyzes the affected environment and impacts on earth resources within the Study Area defined in Chapter 2. Three project phases for each transmission facility type were considered: construction, operation and maintenance, and upgrade or modification.

This evaluation considers overhead transmission facilities and underground transmission facilities for each phase. Overhead transmission facilities consist of transmission lines and substations and similar ancillary infrastructure. Overhead transmission facilities also incorporate aboveground infrastructure that may be associated with underground transmission facilities. Underground transmission facilities consist of underground transmission lines, underground access vaults, and other below-ground infrastructure. The construction of underground transmission facilities includes open trench, trenchless, and underwater construction methods.

Impact Determination

The discussion of impacts is qualitative given the high-level nature of a Programmatic EIS; quantification would require project-specific details to analyze. **Table 3.2-3** describes the criteria used to evaluate impacts from the

Action Alternative and No Action Alternative. Information reviewed to identify impacts on earth resources in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping.

Table 3.2-3: Criteria for Assessing the Impact Determination on Earth Resources

Impact Determination	Description
Nil	No foreseeable impacts are expected. A transmission facility would not adversely affect the soil, geology, or other related earth resources during any phase (e.g., construction, operation and maintenance, or upgrade or modification). A project would not cause soil erosion, compaction, or instability.
Negligible	Changes would either be non-detectable or, if detected, would have only slight effects. A project would cause only minor soil disturbance, with little erosion or compaction. There would be no noticeable changes to geological formations or the stability of the area. A project would not be adversely affected by existing seismic conditions. Best management practices and design considerations are expected to be effective.
Low	A project is expected to have minor but noticeable effects on earth resources, even with the implementation of best management practices and design considerations. A project would cause some soil disturbance, but it would be limited in extent and duration. Erosion control measures would be implemented to minimize impacts. There could be minor changes to geological formations, but these would not affect the stability of the area. Minor adjustments could be needed to account for existing geohazards. Impacts would be short-term and nonsignificant.
Moderate	Adverse impacts are likely to occur even with the implementation of best management practices and design considerations. A project would cause noticeable soil disturbance, including erosion and compaction, but these impacts could be managed with appropriate mitigation measures. There could be moderate changes to geological formations, which could affect the stability of the area. These changes would require careful monitoring and management. A project could be moderately affected by existing geohazards, necessitating specific design considerations. Moderate impacts may be long-term, occurring over one or more project phases. Moderate impacts have the potential to be significant.
High	A project is expected to have significant and potentially severe effects on earth resources. A project would cause extensive soil disturbance, including substantial erosion, compaction, and potential loss of soil fertility. These impacts could be difficult to fully mitigate. There would be substantial changes to geological formations, which could affect the stability of the area. This might include increased risk of landslides or other geotechnical issues. A project is highly vulnerable to existing geohazards, requiring extensive design and construction measures to address these risks. Impacts may be permanent or continue for the duration of the project.

To clearly understand the potential severity of impacts without any interventions, the following impact determinations exclude the use of avoidance criteria and mitigation measures. The ratings assume compliance with all federal, state, and local laws and regulations, as well as standardized BMPs and design considerations. Assessing impacts without avoidance criteria or mitigation measures offers a baseline understanding of potential environmental effects, helping to identify the true extent of these impacts. Environmental laws often require that initial impact assessments be conducted without considering mitigation to maintain the integrity of the environmental review process..

3.2.3.2 Action Alternative

Construction

Overhead Transmission Facilities

Activities for the construction phase of overhead transmission facilities would vary and depend on the scale of the facility and site characteristics. Construction could include a site preparation phase of relatively short duration (e.g., a few months), followed by a longer construction and start-up phase. It is assumed that the construction phase of overhead transmission, per mile, would have a shorter duration than underground construction.

Overhead transmission facilities infrastructure could have the following impacts during the construction phase:

- Alteration of Topography and Drainage Patterns
- Soil Erosion and/or Accretion
- Compaction of Soil
- Damage from a Geological Event or Geohazard

Alteration of Topography and Drainage Patterns

The construction of transmission facilities often involves alterations to the landscape. Changes to topography or drainage patterns can occur during clearing and grading, the construction of access roads, and foundation excavation.

The first step in constructing transmission facilities is often clearing vegetation and grading the land to create a stable foundation for structures. This process can alter the natural topography by leveling hills, filling valleys, and removing trees and other vegetation. The construction of access roads for construction vehicles and maintenance crews can also change the natural drainage patterns and topography. Roads often require cutting into slopes and installing culverts to make certain areas of construction more accessible. Excavating for the foundations of transmission towers and substations can disturb the soil and rock layers, leading to changes in the natural drainage patterns.

Impact Determination: Depending on the scale of the facility and site characteristics the impacts on alteration of topography and drainage patterns from the construction of overhead transmission facilities, without mitigation measures incorporated, is anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Soil Erosion and/or Accretion

Construction activities can lead to increased soil erosion and accretion. Soil erosion occurs when soil particles are detached and transported by wind, water, or other natural forces. Eroded soil can be carried into nearby waterbodies, leading to sedimentation that affects aquatic habitats and water quality. The following factors can contribute to soil erosion during construction:

- **Vegetation Removal:** Clearing of land for transmission facilities removes the protective cover of vegetation, exposing soil to erosion (see Section 3.5, Vegetation).
- **Excavation and Grading:** These activities disturb the soil structure, increasing the risk of erosion by water runoff.

- **Stormwater Runoff:** Heavy rainfall can lead to increased runoff, which can carry away loose soil particles (see Section 3.4, Water Resources).

During construction, soil accretion can occur in areas where eroded soil is transported and settles. This can lead to the formation of new landforms or the alteration of existing ones. The following factors can influence soil accretion:

- **Sediment Transport:** Eroded soil particles are carried by water or wind and deposited in lower-lying areas.
- **Construction Activities:** Movement of soil during construction can lead to the unintentional buildup of soil in certain areas.

Soil erosion can lead to the loss of fertile topsoil, which is essential for crop growth. This can result in reduced agricultural yields and increased costs for farmers who need to replace lost nutrients. Eroded soil can be carried into rivers and streams, leading to sedimentation (see Section 3.4, Water Resources). Sedimentation can affect water quality, harm aquatic habitats, and increase the risk of flooding by clogging waterways. Coastal erosion can lead to the loss of land and damage to infrastructure. Coastal erosion is particularly concerning in areas with a lot of human development, such as residential and commercial properties.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on soil erosion and/or accretion from the construction of overhead transmission facilities, without mitigation measures incorporated, are anticipated to vary and could be negligible to low.

Compaction of Soil

Heavy construction equipment compresses the soil, reducing the size and number of air-filled pores. This limits the oxygen available to plant roots and soil microorganisms, which can negatively affect plant growth and soil health (see Section 3.5, Vegetation). Compacted soil has fewer and smaller pores, which reduces its ability to absorb water and can lead to increased surface runoff, erosion, and reduced groundwater recharge. Persistent soil compaction can lead to long-term degradation of soil structure and fertility, making it difficult to restore the land to its original condition. To minimize adverse impacts, standard BMPs such as wide-track vehicles, matting, and deep tillage are often employed during and after construction.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on compaction of soil from the construction of overhead transmission facilities, without mitigation measures incorporated, is anticipated to vary and could be nil to low.

Damage from a Geological Event or Geohazard

Geohazards refers to the susceptibility of an area to geological hazards such as landslides, earthquakes, soil liquefaction, and other ground movements.

- **Soil Composition:** Certain soil types, such as clay or loose, unconsolidated materials, are more prone to instability. These soils can shift or collapse under the weight of construction. Heavy machinery used during construction can compact the soil, reducing its permeability and affecting plant growth and water infiltration.
- **Water Infiltration:** Excessive water from rainfall or construction activities can weaken soil and rock structures, leading to increased risk of landslides and erosion.
- **Subsidence:** Heavy construction equipment and the weight of the structures can compact the soil, leading to subsidence. This is especially common in areas with loose or unconsolidated soils. Excavating for

foundations and then backfilling can disturb the natural soil structure. If the backfill is not properly compacted, it can settle over time, causing subsidence. If the construction site is above old mine workings, natural caverns, or other underground voids, the additional load from the construction can cause the ground to collapse into these voids, leading to subsidence.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on damage from a geological event or geohazard from the construction of overhead transmission facilities, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission

Activities for the construction phase of underground transmission facilities, including open trench, trenchless (including directional drilling), or underwater construction methods, would vary depending on the scale of the facility and site characteristics. Similar to overhead transmission facilities, underground construction could include a site preparation phase of relatively short duration, followed by a longer construction and start-up phase. It is assumed that the construction phase for underground transmission facilities, per mile, would have a longer duration than overhead projects. Underground transmission could have the following adverse impacts during the construction phase:

- Alteration of Topography and Drainage Patterns
- Soil Erosion and/or Accretion
- Compaction of Soil
- Damage from a Geological Event or Geohazard

Alteration of Topography and Drainage Patterns

The construction of underground transmission facilities often involves alterations to the landscape. Changes to topography or drainage patterns can occur during clearing and grading, the construction of access roads, and excavation.

Installing underground cables typically requires extensive excavation unless trenchless construction methods are used. Excavation disturbs the natural soil structure, leading to changes in the landscape such as the creation of trenches and pits. The process of digging and backfilling trenches can alter the natural topography. For example, the removal of soil and rock can create depressions, while the addition of backfill can create raised areas.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on alteration of topography and drainage patterns from the construction of underground transmission facilities, without mitigation measures incorporated, are anticipated to vary and could be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Soil Erosion and/or Accretion

Impacts on soil erosion and/or accretion are generally greater for underground transmission facilities than for overhead facilities due to extensive excavation, trenching, and vegetation disruption. Underground transmission facilities require more excavation to bury transducer cables. This process disturbs a large amount of soil, increasing the risk of erosion, especially during heavy rainfall. The removal of vegetation and topsoil exposes the soil to erosion. The amount of ground disturbance varies with the method of underground transmission construction.

In contrast, overhead transmission facilities involve minimal ground disturbance, primarily limited to areas around tower foundations. The construction of underground transmission facilities often involves digging long trenches, which can disrupt the natural soil structure and drainage patterns. This can lead to increased erosion, especially if the trenches are not properly stabilized.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on soil erosion and/or accretion from the construction of underground transmission faciliites, without mitigation measures incorporated, are anticipated to vary and could be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Compaction of Soil

Soil compaction during the construction of underground transmission facilities would be similar to overhead transmission facilities and have a low to moderate impact determination. Persistent soil compaction can lead to long-term degradation of soil structure and fertility, making it difficult to restore the land to its original condition.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on compaction of soil from the construction of underground transmission facilities, without mitigation measures incorporated, is anticipated to vary and could be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Damage from a Geological Event or Geohazard

Geological instability can cause ground movement (e.g., landslides) and settling (e.g., subsidence). This can lead to misalignment or damage to underground transmission facilities. Unstable geological conditions can lead to increased water ingress into the construction site, which can complicate excavation and installation processes, increase the risk of flooding, and necessitate extensive dewatering[45] efforts. In areas with unstable rock or soil, there is a higher risk of collapses or cave-ins during excavation. This can pose safety hazards to construction workers and infrastructure.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on damage from a geological event or geohazard from the construction of underground transmission facilities, without mitigation measures incorporated, are anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Operation and Maintenance

Overhead Transmission Facilities

Activities for the operation and maintenance phase of overhead transmission facilities would vary and depend on the scale of the facility and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance

[45] The process of removing groundwater or surface water from a construction site. Dewatering is typically done to create a dry and stable environment for excavation, foundation work, or other construction activities.

for equipment and rights-of-way, similar to any other linear industrial facility. Overhead transmission facilities could have the following identified adverse impacts during the operation and maintenance phase:

- Soil Erosion and/or Accretion

Soil Erosion and/or Accretion

Maintenance activities, such as vegetation management and access road upkeep, can disturb soil, leading to erosion and possibly accretion. This is particularly a concern in areas with steep slopes or loose soil.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on soil erosion and/or accretion from the operation and maintenance of overhead transmission facilities, without mitigation measures incorporated, are anticipated to vary and could be nil to low.

Underground Transmission Facilities

Similar to overhead transmission facilities, activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and rights-of-way, similar to any other linear industrial facility. Underground transmission could have the following adverse impacts during the operation and maintenance phase:

- Soil Erosion and/or Accretion
- Compaction of Soil

Soil Erosion and/or Accretion

Maintenance activities, such as vegetation management and access road upkeep, can disturb soil, leading to erosion and, possibly, accretion. This is particularly a concern in areas with steep slopes or loose soil. Erosion can undermine the foundations of transmission towers and other structures, leading to instability and potential failure.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on soil erosion and/or accretion from the operation and maintenance of underground transmission facilities, without mitigation measures incorporated, are anticipated to vary and could be nil to low.

Compaction of Soil

Maintenance activities, such as the movement of heavy machinery, can compact soil, reducing its permeability and affecting plant growth. Maintenance activities for underground transmission facilities often require more equipment than overhead transmission facilities, especially for excavation, leading to ongoing compaction issues.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on compaction of soil from the operation and maintenance of underground transmission facilities, without mitigation measures incorporated, are anticipated to vary and could be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Upgrade or Modification

Overhead Transmission Facilities

Upgrading or modifying overhead transmission facilities would involve several steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Overhead transmission could have the following adverse impacts during the upgrade or modification phase:

- Alteration of Topography and Drainage Patterns
- Soil Erosion and/or Accretion
- Compaction of Soil

While adverse impacts would be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing structures and footprints, which minimizes the disturbance to surrounding land and ecosystems. New construction often requires clearing land, which can disrupt existing land uses and have a larger impact on resources.
- **Infrastructure Utilization:** Existing infrastructure can be reused or enhanced, reducing the need for extensive new development.

Underground Transmission Facilities

Upgrading or modifying underground transmission facilities would involve several steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Underground transmission could have the following identified adverse impacts during the upgrade or modification phase:

- Alteration of Topography and Drainage Patterns
- Soil Erosion and/or Accretion
- Compaction of Soil

While adverse impacts would be similar to construction, adverse impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing structures and footprints, which minimizes the disturbance to surrounding land and ecosystems. New construction often requires clearing land, which can disrupt existing land uses and have a larger impact on resources.
- **Infrastructure Utilization:** Existing infrastructure can be reused or enhanced, reducing the need for extensive new development.

3.2.3.3 No Action Alternative

The No Action Alternative represents the scenario in which this Draft Programmatic EIS is not used and current management practices for siting and planning transmission facilities continue unchanged. Under this alternative, each project would continue to be evaluated on a case-by-case basis and reviewed for compliance with existing regulations, codes, and standard practices. While impact determinations would likely be similar to those outlined in this Draft Programmatic EIS, projects would not benefit from the impact reductions associated with the avoidance criteria developed and analyzed in this Draft Programmatic EIS. These criteria are anticipated to provide additional mitigation that further reduces potential environmental impacts.

3.2.4 Potential Mitigation Measures

This section describes measures that would eliminate, reduce the intensity of, or compensate for adverse impacts from construction, operation and maintenance, and upgrade or modification of transmission facilities. All general conditions adopted for this Draft Programmatic EIS, identified in Section 3.1, are relevant to this resource section. Applicants would be responsible for providing information within their application materials documenting the implementation of the general conditions.

Avoidance criteria adopted for this Draft Programmatic EIS are identified in Section 3.1. Avoidance criteria that are relevant to this resource section are described below:

AVOID-1 – Hazardous Areas: Avoid known hazardous areas, including but not limited to, contaminated soils, geologically hazardous areas, landfills, and cutbanks.

Rationale: Avoiding hazardous areas provides safety for workers, the public, and infrastructure, as well as environmental protection. Disturbing sites of known contamination or other hazards may require the development of remediation plans.

AVOID-2 – Wetland Disturbance: Avoid impacts within 300 feet of all wetlands.

Rationale: Protecting wetland vegetation would decrease the chances of wetland degradation during construction activities as these areas are important for sustained wetland function. Wetlands within the project footprint would be delineated following the U.S. Army Corps of Engineers wetland delineation methodology.

Applicants would be responsible for providing information within their application materials documenting the project’s compliance with the above avoidance criteria.

Potential mitigation measures have been identified to minimize adverse impacts from transmission facility projects. These measures are intended to be broad so that they can be applied to most projects that would be covered under this Draft Programmatic EIS. However, project-specific plans would be needed to adapt the measures for project-specific applications.

When impact determinations are identified as moderate or high, the applicant would either adopt applicable mitigation measures from this Draft Programmatic EIS or the SEPA Lead Agency may require applicable mitigation measures to be implemented to reduce project-specific impacts. When impact determinations are low, applicable mitigation measures should still be considered by the applicant and the SEPA Lead Agency as these measures would help to further reduce project-specific impacts, including the project’s contribution to cumulative impacts. These measures would be implemented in addition to compliance with laws, regulations, environmental permits, plans, and design considerations required for transmission facilities.

The following mitigation measures could be adopted to mitigate adverse impacts:

Geo-1 – Minimize Soil Disturbance: Minimize soil disturbance, including footprints related to access roads and permanent structures, to the greatest extent practicable. Minimize the use of construction techniques that would be harmful to topsoil composition, where feasible.

Rationale: Minimizing the footprint of access roads and permanent transmission facilities would reduce direct and indirect impacts on vegetation, including vegetation clearing, spread of invasive plant species or dust, and required ongoing vegetation maintenance.

Minimizing soil disturbance helps maintain the natural structure of the soil, which is essential for water infiltration, root growth, restoration activities, and the habitat of soil organisms.

Geo-2 – Geotechnical Surveys: Conduct thorough geotechnical investigations to assess soil and rock conditions before construction begins.

Rationale: This is a required component of project-specific applications necessary for SEPA Lead Agencies to evaluate baseline conditions.

Geotechnical surveys provide critical data about the soil, rock, and groundwater conditions at a site. By identifying potential geotechnical hazards such as landslides, sinkholes, or soil liquefaction, strategies can be developed to mitigate risks, ensuring the safety and stability of the construction project.

Geo-3 – Slope Stabilization: Use retaining walls, terracing, and vegetation to stabilize slopes and prevent landslides when appropriate to do so.

Rationale: Slope stabilization ensures safety and protects infrastructure, property, and natural resources. Unstable slopes can lead to landslides, which pose risks to human life, property, and infrastructure.

Geo-4 – Seismic Design: Design structures to withstand seismic forces, including flexible foundations and reinforcement.

Rationale: This mitigation measure aims to ensure that structures can withstand the forces generated by earthquakes, thereby protecting lives, reducing property damage, and maintaining functionality. Seismic design is guided by various building codes and standards, which are regularly updated based on the latest research and technological advancements.

Geo-5 – Drainage Control: Implement effective drainage systems and manage water runoff to reduce soil saturation.

Rationale: This mitigation measure aims to manage water effectively to prevent a range of environmental and structural issues.

Geo-6 – Monitoring and Maintenance Plan: Implement a comprehensive monitoring and maintenance plan for new construction.

Rationale: A comprehensive monitoring and maintenance plan would support the protection and sustainable management of earth resources during and after construction activities.

Geo-7 – Environmental Assessments: Perform detailed environmental assessments to identify potential contamination.

Rationale: This is a required component of project-specific applications necessary for SEPA Lead Agencies to evaluate baseline conditions.

Previous earthworks such as underground mines or landfills could cause structural instability and environmental concerns. Disturbing sites of previous earthworks or dumping could release contaminants, posing environmental and health risks. Detailed environmental assessments help identify and mitigate potential project-specific risk, reducing the likelihood of encountering unexpected contamination.

Geo-8 – Minimize Impacts on Sensitive Soils: Design projects to minimize adverse impacts on high erodibility zones and areas sensitive to degradation.

Rationale: Minimizing impacts on high-erodibility zones and sensitive soils offers environmental protection, stability, and safety. Sensitive soils, such as those with high organic content or unique properties, are more susceptible to degradation from construction activities. Minimizing impacts on these areas helps preserve their structure and function.

In addition to the above mitigation measures, the following mitigation measures[46] developed for other resources may be applicable:

W-2 – Clear Spanning or Trenchless Methods for Water Crossings: When feasible, use clear spanning for overhead transmission or trenchless construction for underground transmission to minimize disturbance to riparian areas, wetlands and wetland buffers, and surface waters.

W-3 – Phased Construction: Sequence and schedule construction, maintenance, and upgrade/replacement activities when near surface waterbodies to minimize erosion and sediment transport.

W-5 – Implement Erosion and Sediment Control Measures: Implement effective and appropriate erosion control measures in construction and operation to mitigate runoff into streams.

W-6 – Minimize Hydrology Changes: Minimize water diversions or changes to natural hydrology, to the extent possible. Natural hydrology would be restored to the site following construction.

Veg-1 – Desktop Assessment for Plant Priority Species and Sensitive Ecosystems: During the design and siting of transmission facilities, perform a desktop assessment with publicly available spatial data for plant priority species and sensitive ecosystems. Identify areas where priority species and sensitive ecosystems have potential to occur.

Veg-2 – Pre-disturbance Surveys for Plant Priority Species and Sensitive Ecosystems: Conduct pre-disturbance surveys for plant priority species and sensitive ecosystems prior to construction in permanent and temporary footprint areas where suitable habitat occurs.

Veg-3 – Site Transmission Facilities in Existing ROW or Disturbed Areas: Site transmission facilities in existing right-of-way (ROW) or disturbed areas, to the greatest extent practicable.

Veg-4 – Vegetation Management Plan: Create and implement vegetation management plans (VMPs) that are specific to the habitat(s) where project work is occurring for construction, operation and maintenance, upgrade or modification, and decommissioning.

Veg-6 – Revegetation Plan: Prepare a revegetation plan for areas of temporary disturbance from construction of the transmission facility.

[46] The rationales for the identified mitigation measures are provided in their respective resource sections.

Hab-4 – Decommission Nonpermanent Roads: Decommission and restore any access roads not required for operation and maintenance.

Hab-9 – Retain Wildlife Trees where Practicable: Wildlife trees are trees with features that are especially beneficial to wildlife. These typically include living and dead trees that are decaying and those that have cavities or good conditions for cavity creation, sloughing bark that can provide roost sites for bats, branches for perching, basal cavities for denning, and foraging opportunities for woodpeckers and other wildlife. Wildlife trees will be retained where safe to do so.

Fish-13 – Reduce Number of Stream Crossings: Design transmission facilities to reduce the number of stream crossings. Access roads and utilities would share common rights-of-way.

Fish-14 – Use Bioengineering: Design stabilization structures to incorporate bioengineering[47] principles; for example, use of living and nonliving plant materials in combination with natural and synthetic support material for slope stabilization, erosion reduction, and vegetation establishment.

Fish-15 – Removal of Riparian Vegetation: Minimize disturbance to low-growing shrubs and grass species in riparian areas, or tree removal in steep gulches.

3.2.5 Probable Significant Adverse Environmental Impacts

Determining the significance of an impact involves context and intensity, which, in turn, depend on the magnitude and duration of the impact. “Significant” in the Washington State Environmental Policy Act means a reasonable likelihood of more than a moderate adverse impact on environmental quality. An impact may also be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred (WAC 197-11-794).

Identification of environmental impacts and assignment of discipline-specific ratings is based on professional judgment and information available at the time of writing. A precautionary approach has been taken for the assessment where information is currently unknown or unavailable.

This Draft Programmatic EIS weighs the impacts on earth resources that would result from transmission facilities after considering the application of laws and regulations; siting and design considerations, including agency guidance and BMPs; and mitigation and makes a resulting determination of significance for each impact. **Table 3.2-4** summarizes the impacts anticipated for the construction, operation and maintenance, and upgrade or modification of transmission facilities.

[47] The incorporation of biological materials and structures in engineering design.

This Page Intentionally Left Blank

Table 3.2-4: Summary of Impacts, Mitigation Measures, and Significance Rating for Earth Resources

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Earth – Alteration of Topography and Drainage Patterns	Construction	Alteration of topography and drainage patterns is likely to occur during the construction of new overhead and underground transmission facilities during grading, excavation, vegetation removal, trenching/boring, and soil management. Many of the changes to topography and drainage are considered temporary and can generally be restored after construction is completed.	**Overhead:** negligible to moderate **Underground:** low to moderate	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-3:** Wetland Disturbance ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Geo-2:** Geotechnical Surveys ▪ **Geo-3:** Slope Stabilization ▪ **Geo-4:** Seismic Design ▪ **Geo-5:** Drainage Control ▪ **Geo-6:** Monitoring and Maintenance Plan ▪ **Geo-7**: Environmental Assessments ▪ **Geo-8:** Minimize Impacts on Sensitive Soils ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **W-3:** Phased Construction ▪ **W-5:** Implement Erosion and Sediment Control Measures ▪ **W-6:** Minimize Hydrology Changes ▪ **Veg-1:** Desktop Assessment for Plant Priority Species and Sensitive Ecosystems ▪ **Veg-2:** Pre-disturbance Surveys for Plant Priority Species and Sensitive Ecosystems ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas	Less than Significant	Required regulatory plans and permits generally prevent and/or minimize impacts from alteration of topography and drainage patterns. Several BMPs can also be implemented to minimize impacts. By carefully planning and implementing BMPs and mitigation measures, the environmental impacts of altering topography and drainage patterns can be reduced.
	Operation and Maintenance	This impact is not anticipated to occur during the operation and maintenance of overhead or underground transmission facilities.	**Overhead:** N/A **Underground:** N/A			
	Upgrade or Modification	An upgrade or modification to transmission facilities can involve grading or leveling of land, which can alter the natural topography. These changes might not be as extensive as those from new construction but can still affect topography and local drainage patterns. Upgrades or modifications may also include the addition of impervious surfaces, such as access roads or equipment pads. These surfaces can increase surface runoff, reducing the amount of water that infiltrates into the soil.	**Overhead:** negligible to moderate **Underground:** low to moderate			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Earth – Soil Erosion and/or Accretion	Construction	Construction activities often involve clearing vegetation and disturbing the soil, which can increase the vulnerability of the land to erosion. In some cases, construction can lead to increased sediment deposition downstream or in other areas. This can happen when construction activities increase the amount of sediment carried by water, which then settles in new locations. Effective design considerations and BMPs such as erosion control and sediment management can reduce the impact.	**Overhead:** negligible to low **Underground:** low to moderate	▪ **AVOID-3:** Wetland Disturbance ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Geo-2:** Geotechnical Surveys ▪ **Geo-3:** Slope Stabilization ▪ **Geo-5:** Drainage Control ▪ **Geo-6:** Monitoring and Maintenance Plan ▪ **Geo-7**: Environmental Assessments ▪ **Geo-8:** Minimize Impacts on Sensitive Soils ▪ **W-5:** Implement Erosion and Sediment Control Measures ▪ **Veg-1:** Desktop Assessment for Plant Priority Species and Sensitive Ecosystems ▪ **Veg-2:** Pre-disturbance Surveys for Plant Priority Species and Sensitive Ecosystems ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas ▪ **Veg-4:** Vegetation Management Plan ▪ **Veg-6:** Revegetation Plan ▪ **Hab-4:** Decommission Nonpermanent Roads ▪ **Hab-9:** Retain Wildlife Trees where Practicable ▪ **Fish-13:** Reduce Number of Stream Crossings ▪ **Fish-14:** Use Bioengineering ▪ **Fish-15:** Removal of Riparian Vegetation	Less than Significant	Required regulatory plans and permits generally prevent and/or minimize erosion and accretion from project-related activities.
	Operation and Maintenance	Regular maintenance often involves clearing vegetation to keep transmission corridors clear. This can disturb soil and increase erosion. The movement of heavy machinery during maintenance can disturb soil and exacerbate erosion.	**Overhead:** nil to low **Underground:** nil to low			
	Upgrade or Modification	The upgrading or modification of both overhead and underground transmission facilities could have various impacts. Clearing vegetation to access and upgrade or modify transducer cables can lead to increased erosion. Excavation for underground transducer cables can also disturb soil structure and local ecosystems.	**Overhead:** negligible to low **Underground:** low to moderate			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Earth – Compaction of Soil	Construction	The use of heavy machinery to install both overhead and underground transmission facilities can increase bulk density and reduce porosity[48] of soils. Construction also often requires temporary access roads, which can compact the soil. Excavation for underground transducer cables often involves digging trenches, which can compact the soil along the trench lines and adjacent areas.	**Overhead:** nil to low **Underground:** low to moderate	▪ **AVOID-3:** Wetland Disturbance ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Geo-2:** Geotechnical Surveys ▪ **Geo-3:** Slope Stabilization ▪ **Geo-4:** Seismic Design ▪ **Geo-5:** Drainage Control ▪ **Geo-6:** Monitoring and Maintenance Plan ▪ **Geo-7:** Environmental Assessments ▪ **Geo-8:** Minimize Impacts on Sensitive Soils ▪ **Veg-1:** Desktop Assessment for Plant Priority Species and Sensitive Ecosystems ▪ **Veg-2:** Pre-disturbance Surveys for Plant Priority Species and Sensitive Ecosystems ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas ▪ **Veg-6:** Revegetation Plan	Less than Significant	The compaction process is usually temporary and primarily occurs during the construction phase. During construction, soil compaction is carefully controlled and monitored to ensure it meets specific engineering standards. Additionally construction projects often utilize best management practices to address potential negative impacts of soil compactions including soil aeration, the use of geotextiles, and proper drainage systems to maintain soil health and prevent erosion. Once the infrastructure is in place, the need for further compaction is minimal, reducing long-term impacts.
	Operation and Maintenance	Soil compaction is less of a concern during the operation and maintenance of overhead transmission facilities than during to the construction phase. During operation and maintenance, the use of heavy machinery is reduced. Most maintenance tasks can be performed with lighter equipment or by personnel on foot. Soil compaction remains a concern during the operation and maintenance of underground transmission facilities because maintenance of underground transmission facilities often requires the use of heavy machinery to access and repair the transducer cables. This equipment can compact the soil, especially if maintenance is frequent or extensive. Accessing underground transducer cables typically involves re-excavating trenches, which can lead to repeated soil compaction.	**Overhead:** N/A **Underground:** low to moderate			
	Upgrade or Modification	Soil compaction during the upgrade of transmission facilities can occur due to heavy machinery, construction activities, or material storage.	**Overhead:** nil to low **Underground:** low to moderate			

[48] Refers to the volume of pore spaces or voids within the soil.

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[a]	Significance after Applying Mitigation	Rationale for Significance Rating
Earth – Damage from a Geological Event or Geohazard	Construction	Geological instability during site selection and construction can impact foundation stability, slope stability, and cause construction challenges and long-term maintenance.	**Overhead:** low to high **Underground:** low to high	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-3:** Wetland Disturbance ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Geo-2:** Geotechnical Surveys ▪ **Geo-3:** Slope Stabilization ▪ **Geo-4:** Seismic Design ▪ **Geo-5:** Drainage Control ▪ **Geo-6:** Monitoring and Maintenance Plan ▪ **Geo-7**: Environmental Assessments ▪ **Geo-8:** Minimize Impacts on Sensitive Soils ▪ **W-6:** Minimize Hydrology Changes ▪ **Veg-1:** Desktop Assessment for Plant Priority Species and Sensitive Ecosystems ▪ **Veg-2:** Pre-disturbance Surveys for Plant Priority Species and Sensitive Ecosystems ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas	Less than Significant	The application of BMPs, engineering design considerations, and mitigation measures reduces these risks. BMPs often include techniques like slope reinforcement, retaining walls, and soil nailing, which enhance the stability of slopes and prevent landslides. Each transmission facility site is unique, and BMPs are tailored to address the specific geological and hydrological conditions of the area. This customized approach ensures that the most effective measures are implemented to maintain stability.
	Operation and Maintenance	Ongoing geological instability, such as soil erosion or landslides, can compromise the integrity of existing transmission tower foundations leading to structural failures. However, this impact is not anticipated to occur during the operation and maintenance of overhead or underground transmission facilities with proper siting and engineering.	**Overhead:** N/A **Underground:** N/A			
	Upgrade or Modification	This impact is not expected to occur during the upgrade or modification of overhead or underground transmission facilities if proper siting and engineering of existing facilities are followed. Upgrades or modifications may be necessary to address existing geological instability, which would be unlikely to lead to an adverse impact.	**Overhead:** N/A **Underground:** N/A			

Notes:
[a] Appendix 3.9-1 provides a detailed listing of each general condition, avoidance criteria, and mitigation measure. Having these details in an appendix serves as a comprehensive reference section that can be consulted independently of the main text. This is particularly useful for detailed guidance and technical specifications that may be referred to multiple times. Additionally, including this information in an appendix allows for easier updates and revisions. If mitigation measures or guidelines change, the appendix can be updated without altering the main content.

BMP = best management practice; EIS = environmental impact statement; N/A = not applicable

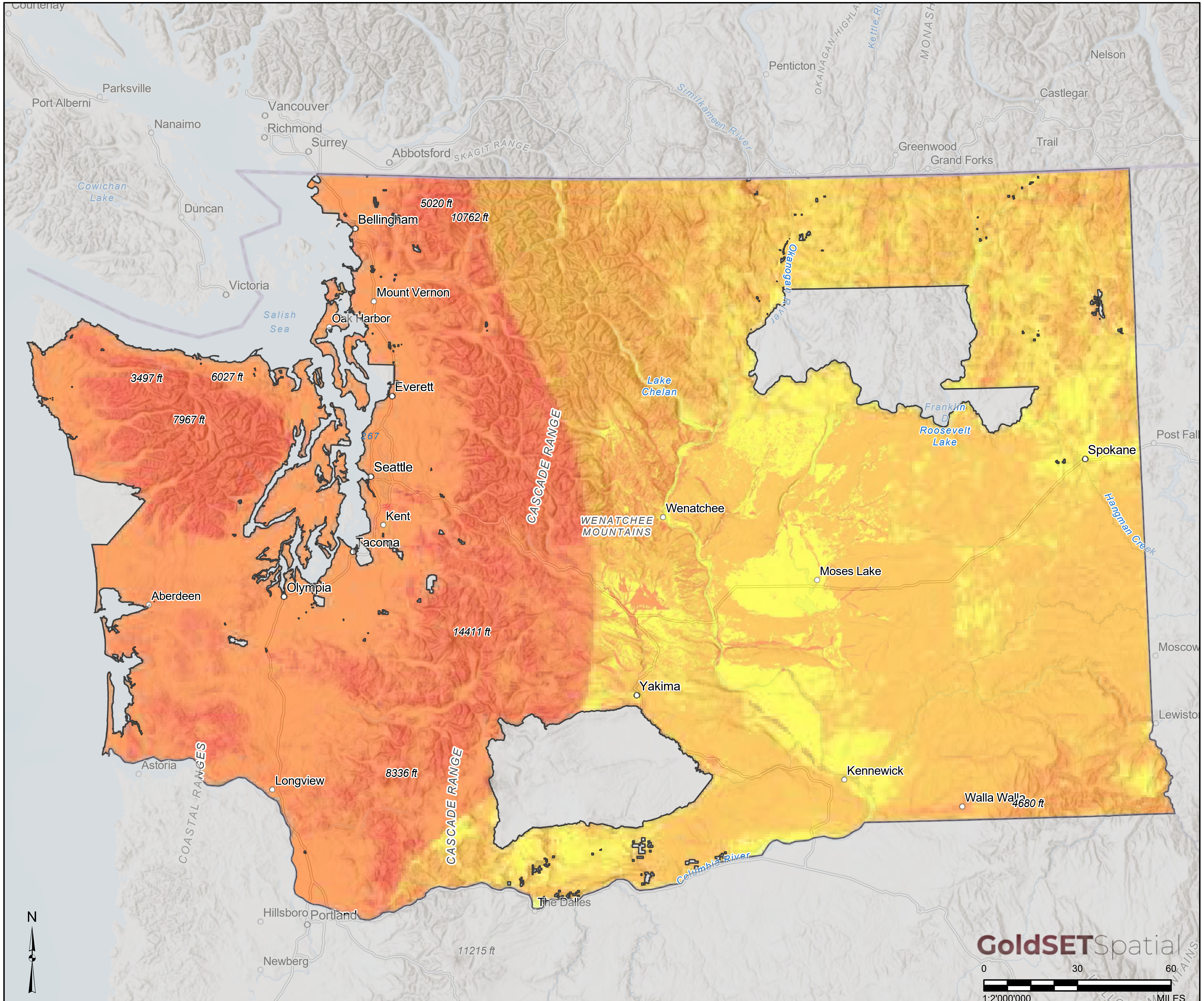
3.2.6 Suitability Map

Project-specific reviews would include a comprehensive review and analysis to identify the site-specific adverse impacts on resources to determine the suitability of this Draft Programmatic EIS. Environmental review may be phased by incorporating relevant information from this Draft Programmatic EIS by reference while evaluating site-specific adverse impacts of the individual project applications. For more information on phased reviews, please refer to Chapter 1, Introduction.

Project-specific applications would include details about the precise location and site-specific conditions. This Draft Programmatic EIS provides a suitability map that, when incorporated with project-specific applications, could be used to facilitate more informative and efficient environmental planning.

Figure 3.2-3 represents the suitability map for earth resources and identifies the appropriateness of areas using applicable laws and regulations, criteria specific to the siting of transmission facilities, and knowledge from subject matter experts.

This Page Intentionally Left Blank



LEGEND

Study Area

Conflict Indicator Key

- Neutral
- Low
- Low-Medium
- Medium
- Medium-High
- High
- Very High

THE SEAL OF THE STATE OF WASHINGTON 1889

EFSEC
Energy Facility Site
Evaluation Council

REFERENCES AND NOTES

1. ESRI, CGIAR, USGS; WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS
2. THE CONFLICT INDICATOR KEY CAN BE USED TO IDENTIFY AND HIGHLIGHT AREAS WHERE DIFFERENT PROJECT CONSTRAINTS MAY OVERLAP, POTENTIALLY LEADING TO CONFLICTS. THE KEY USES DIFFERENT COLORS TO REPRESENT THE INTENSITY OR LIKELIHOOD OF CONFLICT.

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

Suitability Map – Earth Resources

YYYY-MM-DD 2024-12-18 CONSULTANT wsp FIGURE 3.2-3

This Page Intentionally Left Blank

3.2.6.1 Suitability Map Methodology

The suitability map evaluates various criteria and assigns a suitability score to different areas based on how well those areas meet the desired conditions.

A number of individual siting decision criteria, referred to as indicators in GoldSET, were identified by subject matter experts for inclusion in this resource's suitability map. Subject matter experts assigned a weighting based on the degree of constraint (i.e., high, medium or low), or potential difficulty for a transmission facility to traverse an area. Each of the GoldSET Indicator cards describing the criteria chosen and the source of the data layers used are provided in **Appendix 3.2-1.**

A summary of the criteria used to produce each GoldSET card is provided below.

Earth Resources GoldSET Card – Low Conflict – Volcanic Hazards

Low conflict volcanic hazards include the spatial extent of volcanic hazards and lahar deposition zones. While volcanic events are rare, any volcanic activity would be impactful to transmission facility construction, operation and maintenance, and upgrade or modification.

Earth Resources GoldSET Card – Low Conflict – Earthquake Hazards

Low conflict earthquake hazards include inactive faults with slip rates less than 0.2 mm/year, areas with peak ground accelerations less than 0.4 g, and low to moderate liquefaction hazard zones. These earthquake hazards would be impactful to transmission facility construction, operation and maintenance, and upgrade or modification.

Earth Resources GoldSET Card – Low Conflict – Geologic Hazards

Low conflict geologic hazards include existing mapped landslides classified as low to medium threats, slopes between 15-40 percent-rise and greater than 1,000 square meters, and high erodibility zones. These hazards would be impactful to transmission facility construction, operation and maintenance, and upgrade or modification.

Earth Resources GoldSET Card – Medium Conflict – Earthquake Hazards

Medium conflict earthquake hazards include active (Holocene faults with slip rates greater than 0.2 mm/year) faults with peak ground accelerations greater than 0.4 g, high to very high liquefaction hazard zones, and coastal tsunami zones. These earthquake hazards would be impactful to transmission facility construction, operation and maintenance, and upgrade or modification.

Note that a 250 ft buffer on either side of active faults were provided in the datasets.

Earth Resources GoldSET Card – Medium Conflict – Geologic Hazards

Medium conflict geologic hazards include existing mapped landslides classified as high threat, slopes above 40 percent-rise and greater than 1,000 square meters, and areas of underground mining. These hazards would be impactful to transmission facility construction, operation and maintenance, and upgrade or modification.

Note that a 1-mile buffer around inactive and abandoned metal/non-metal mines, both surface and underground, as well as a 0.5- mile buffer around coal mines were provided in the datasets.

This Page Intentionally Left Blank

3.3 Air Quality

This Draft Programmatic Environmental Impact Statement (EIS) considers impacts on air quality resulting from the types of facilities described in Chapter 2. This section addresses the following topics related to the construction, operation and maintenance, and upgrade or modification of high-voltage electric transmission facilities (transmission facilities) in the State of Washington:

- Section 3.3.1 identifies regulatory, siting, and design considerations.
- Section 3.3.2 describes the affected environment.
- Section 3.3.3 describes impacts.
- Section 3.3.4 describes potential mitigation measures.
- Section 3.3.5 identifies probable significant adverse environmental impacts on air quality.

3.3.1 Regulatory, Siting, and Design Considerations

This Draft Programmatic EIS establishes a broad framework for compliance, outlining general laws, regulations, best management practices (BMPs), and design considerations. It is assumed that project-specific applications will be developed within this pre-established regulatory context and are expected to comply with existing laws and regulations. If the project does not comply with applicable laws and regulations or fails to adhere to design considerations or BMPs, additional project-specific environmental review and mitigation would be required. The applicable federal, state, and local laws and regulations relevant to air quality resources are summarized in **Table 3.3-1**.

The Clean Air Act, regulated by the U.S. Environmental Protection Agency (EPA), is the primary federal statute governing air quality. In the State of Washington, the Washington State Department of Ecology (Ecology), and, in some specific areas, local clean air agencies, regulate air quality. Washington State has established regulations for permitting new sources in both attainment[49] and nonattainment[50] areas of the state, and additional requirements may be imposed by local authorities. Tribal governments also regulate air quality within their reservations, with technical assistance from the EPA, though Tribal lands are beyond the scope of this Programmatic EIS. Additionally, the Washington Energy Facility Site Evaluation Council (EFSEC) has superseding authority for state and local air quality permitting and compliance for transmission facilities that go through its siting process.

Table 3.3-1: Laws and Regulations for Air Quality

Applicable Legislation	Agency	Summary Information
CFR Title 40, Part 86 – Mobile Source Emission Standards	U.S. Environmental Protection Agency	Mobile source regulations generally apply to mobile source equipment manufacturers prior to sale, who must certify that their equipment complies with applicable standards.

[49] A geographic region that meets or exceeds the National Ambient Air Quality Standards (NAAQS) set by the EPA.

[50] Regions that do not meet the National Ambient Air Quality Standards (NAAQS) set by the Environmental Protection Agency (EPA) for certain pollutants.

Applicable Legislation	Agency	Summary Information
42 USC §7401 – Clean Air Act	U.S. Environmental Protection Agency	Air quality is measured relative to the NAAQS[51] area designations: ▪ Attainment area (in compliance) ▪ Nonattainment area (failure to comply) "Criteria" pollutants are defined as air pollutants that can harm the environment and public health. These pollutants include the following: ▪ NAAQS to regulate emissions from six criteria pollutants: CO, NO_2, PM (PM_{10} and $PM_{2.5}$), O_3, SO_2, and Pb
Clean Energy Transformation Act	Washington State Department of Commerce	This law commits Washington to an electricity supply free of greenhouse gas[52] emissions by 2045. It includes provision for enhancing transmission infrastructure to support the integration of renewable energy.
Washington State Environmental Policy Act	Washington Energy Facility Site Evaluation Council Washington State Department of Ecology Local governments	This act is a process that identifies and analyzes environmental impacts that can be related to issuing permits. SEPA helps permit applicants and decision-makers understand how a proposed project will impact the environment. Certain projects, as defined in the SEPA Rules (WAC 197-11-704) and that are not exempt, are required to go through the SEPA process.
WAC 173-400, General Regulations for Air Pollution Sources	Washington State Department of Ecology[(a)]	This chapter establishes standards and rules to control and prevent pollution from air contaminant sources in Washington. This chapter provides emission standards, permit requirements, and monitoring and reporting requirements and describes compliance and enforcement.
WAC 173-423-081, Medium- and Heavy-Duty Engine Standards	Washington State Department of Ecology[(a)]	These standards establish criteria and procedures for the manufacture, testing, distribution, and sale of new on-highway[53] medium-duty[54] and heavy-duty[55] trucks and engines.

51 National Ambient Air Quality Standards: Regulations established by the EPA under the Clean Air Act. These standards are designed to protect public health and the environment by setting limits on the concentration of specific air pollutants.

52 Gases in the Earth's atmosphere that trap heat, contributing to the greenhouse effect.

53 Long-haul trucks, dump trucks, and other large commercial vehicles with a gross vehicle weight rating over 26,000 pounds.

54 Typically include delivery trucks, utility trucks, and some vocational trucks. These vehicles have a gross vehicle weight rating (GVWR) between 10,001 and 26,000 pounds.

55 Include long-haul trucks, dump trucks, and other large commercial vehicles with a GVWR over 26,000 pounds.

Applicable Legislation	Agency	Summary Information
WAC 173-441, Reporting of Emissions of Greenhouse Gas	Washington State Department of Ecology[(a)]	This code establishes an inventory of GHG emissions through a mandatory GHG reporting rule for certain operations that emit at least 10,000 metric tons of CO_2 equivalent per year.[56]
WAC 173-460, Controls for New Sources of Toxic Air Pollutants	Washington State Department of Ecology[(a)]	WAC 173-460 establishes regulations for managing emissions from new or modified sources of toxic air pollutants in Washington.
WAC 173-476, Ambient Air Quality[57] Standards[58]	Washington State Department of Ecology[(a)]	WAC 173-476 establishes the maximum acceptable levels of various pollutants in the ambient air to protect public health and the environment. This chapter sets standards for Washington's six criteria pollutants: CO, NO_2, PM (PM_{10} and $PM_{2.5}$), O_3, SO_2, and Pb. Local air quality is measured relative to these standards.
Prohibitory rules (e.g., emission limits) for specific categories of stationary sources of air pollution	Local agencies[(a)]	Local rules and regulations for potential sources of air pollution are included under Ecology and EFSEC review for energy facilities and addressed under an NOC[59] review.[(b)]
County dust emission limits	Local agencies[(a)]	Counties often provide guidelines for dust suppression or outline methods to minimize dust emissions and compliance is enforced by local air quality agencies.

Notes:

(a) The agency responsible for administering most permits or authorizations for the identified regulation. However, if EFSEC is determined to be the agency responsible for approving a proposal, EFSEC can administer several types of permits at the state and local level. EFSEC provides a streamlined process for siting and licensing major energy facilities, including transmission facilities in Washington State. EFSEC coordinates all evaluation and licensing steps, specifies the conditions for construction and operation, and issues a Site Certification Agreement, which assumes the responsibility for issuing individual state or local permits. By consolidating these permits into a single Site Certification Agreement, EFSEC can simplify the regulatory process for energy facility developers. While EFSEC itself does not directly administer federal permits, it works closely with federal agencies to ensure that all necessary federal requirements are met during the evaluation and licensing of energy facilities.

(b) Construction and operation activities of transmission facilities typically do not involve major new or modified sources of air pollution that would trigger PSD regulations. Consequently, PSD regulations are generally not applicable to transmission facilities.

---

56 A metric used to compare the emissions of various greenhouse gases based on their global warming potential.

57 Refers to the quality of the air in the outdoor environment. It is determined by the concentration of pollutants in the atmosphere, which can affect human health and the environment.

58 Regulatory limits set to protect public health and the environment from harmful levels of air pollutants. These standards define the maximum allowable concentrations of specific pollutants in the outdoor air over a given period.

59 A formal document used to inform relevant parties and regulatory bodies about the commencement, progress, or completion of a construction project.

Table 3.3-1 Notes Continued:
CFR = Code of Federal Regulations; CO = carbon monoxide;[60] Ecology = Washington State Department of Ecology; EFSEC = Washington Energy Facility Site Evaluation Council; GHG = greenhouse gases; NAAQS = National Ambient Air Quality Standards; NO_2 = nitrogen dioxide; NOC = notice of construction; O_3 = ozone; Pb = lead; PM = particulate matter; PM_{10} = particulate matter less than 10 microns in diameter; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PSD = Prevention of Significant Deterioration[61]; SEPA = State Environmental Policy Act; SO_2 = sulfur dioxide;[62] USC = United States Code; WAC = Washington Administrative Code

The siting of transmission facilities is determined by engineering, technical, environmental, and socioeconomic factors. **Table 3.3-2** summarizes guidance documents and management plans that outline the design considerations and BMPs generally used to avoid or minimize impacts on air quality.

Table 3.3-2: Siting and Design Considerations for Air Quality

Siting and Design Consideration[a]	Description
Methods for Dust Control (Ecology 2016)	This publication provides guidelines and techniques for controlling dust emissions from various activities.
Guide to Handling Fugitive Dust from Construction Projects (AGC and Fugitive Dust Task Force 1997)	This guide provides comprehensive guidelines for managing and mitigating fugitive dust[63] emissions from construction activities.
State Implementation Plan (Ecology n.d.[a])	The Washington SIP[64] is a comprehensive plan that outlines how Washington meets and maintains national air quality standards. It includes sections on attainment plans,[65] maintenance plans, and infrastructure plans.
Air Quality, Greenhouse Gas, and Energy Guidance (WSDOT 2022)	This document provides guidelines for evaluating air quality, greenhouse gas emissions, and energy impacts in project documentation to meet NEPA, SEPA, and Clean Air Act requirements.
WSDOT Environmental Guidance – Air Quality, Energy and Greenhouse Gas Emissions (WSDOT 2025)	This guidance helps determine the type of analysis and documentation required for projects, ensuring compliance with air quality, energy, and greenhouse gas emissions standards[66].
Fugitive Dust Control Measures and Best Practices (EPA 2022)	This resource provides guidelines for controlling fugitive dust emissions from various sources and emphasizes best practices to minimize dust generation and protect air quality.

---

[60] Carbon monoxide is a pollutant gas, which is predominantly produced by incomplete combustion of carbon-containing materials.

[61] A key component of the Clean Air Act, designed to protect air quality in areas that meet or exceed the National Ambient Air Quality Standards.

[62] A pollutant gas that is emitted when fuels that contain sulfur are combusted.

[63] Refers to tiny particles that become airborne due to various activities, rather than being emitted through a confined flow stream like a chimney or exhaust pipe.

[64] State Implementation Plan: A comprehensive plan developed by the Washington State Department of Ecology to ensure that the state meets the National Ambient Air Quality Standards (NAAQS) set by the Environmental Protection Agency (EPA).

[65] A detailed strategy developed to bring a specific geographic area into compliance with the NAAQS set by the EPA.

[66] Regulatory limits set by governments that specify the maximum allowable levels of pollutants that can be released into the atmosphere from various sources.

Siting and Design Consideration[a]	Description
Clean Air Act Permit Modeling Guidance (EPA 2024)	This guide provides recommendations on modeling techniques and guidance for estimating pollutant concentrations to assess control strategies and determine emission limits.
Air Quality Analysis Checklist (EPA 2024)	This checklist highlights important aspects of an air quality analysis with appropriate references to existing EPA policy and guidance to assist in the development and review of the compliance demonstration modeling as part of an overall air quality assessment.
Recommended Siting Practices for Electric Transmission Developers (Americans for a Clean Energy Grid 2023)	This document outlines best practices for siting electric transmission facilities, including: ▪ Early and transparent engagement ▪ Respect and fair dealing ▪ Environmental considerations ▪ Interagency coordination ▪ Use of existing infrastructure

Ecology = Washington State Department of Ecology; EPA = U.S. Environmental Protection Agency; NEPA = National Environmental Policy Act; SEPA = State Environmental Policy Act; SIP = State Implementation Plan; WSDOT = Washington State Department of Transportation

3.3.2 Affected Environment

This section describes air quality within the Study Area defined in Chapter 2, which includes several key components:

- Climate
- Ambient Air Quality
- Greenhouse Gas Emissions
- Odor

Air quality contributes to the health and wellness of people, as well as the environment. Air quality is affected by natural factors such as geography, topography, and wind speed and direction, as well as by human sources, including stationary sources (e.g., industrial development) and mobile sources (e.g., passenger vehicles, heavy duty trucks). Emissions from these sources could potentially expose nearby sensitive receptors[67] to pollutant concentrations.

3.3.2.1 Climate

Atmospheric conditions such as wind speed, wind direction, atmospheric stability, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants,[68] which affects ambient air quality. For example, higher winds could contribute to the windblown of fugitive dust.

[67] Sensitive receptors are people who are considered to be more sensitive than others to air pollutants.

[68] Refers to the process by which air pollutants spread from their source into the surrounding atmosphere. This process is crucial for understanding and predicting air quality impacts.

Fugitive dust is particulate matter (PM) that is suspended in the air by wind or human activities, such as construction (AGC and the Fugitive Dust Task Force 1997).

The climate in Washington varies across the state's geography and is influenced by elevation, latitude, topographic features, vegetative cover, proximity to large waterbodies, and ocean currents. Washington has seven distinct physiographic[69] regions, which include the Pacific coastline, the Cascade Range, and the fields of the Columbia Basin, among others. The Cascade Range divides the state into two parts: western Washington and eastern Washington. Western Washington is the most densely populated; approximately 60 percent of the state's residents live west of the mountains. Many of Washington's more populous cities such as Seattle, Tacoma, Olympia, Vancouver, and Bellingham are located on the western side of the state (Commerce n.d.).

Western Washington, often identified as the area west of the Cascade Mountains, is known for its damp and temperate climate, receiving more precipitation than eastern Washington due to the rain shadow effect[70] of the Cascades. The weather in western Washington may be summarized as follows:

- **Snowfall:** Snow is infrequent, but winter nighttime temperatures can easily drop to between 20 and 30 degrees Fahrenheit (°F).
- **Sunshine:** The percent of possible sunshine received each month ranges from approximately 25 percent in winter to 60 percent in summer (WRCC n.d.).
- **Rainfall:** The greater Seattle area receives about 37 inches of rain annually. July and August are the driest months, while January and February are the wettest (Commerce n.d.).
- **Seasonal Weather:** Summer temperatures rarely exceed 79°F, and winter daytime temperatures seldom fall below 45°F.
- **Temperature:** The average maximum temperature in July is near 70°F along the coast and 75°F in the foothills. Minimum temperatures are around 50°F. In winter, the warmer areas are near the coast. In January, maximum temperatures range from 43°F to 48°F and minimum temperatures from 32°F to 38°F (WRCC n.d.).

As mentioned, the Cascades capture most of the rain from the atmosphere moving eastward across the state, which affects weather and climate in that area. The climate in eastern Washington may be characterized as follows:

- **Snowfall:** The mountains can receive up to 200 inches of snowfall annually.
- **Sunshine:** Cities like Wenatchee, Ellensburg, and the Tri-Cities get up to 300 days of sunshine a year, with minimal rainfall.

---

69 Physiography is defined as the study of physical features of the Earth's surface. Physiographic regions are defined by their distinct geology and topography, such as hills, valleys, and flat areas.

70 A phenomenon that occurs when a mountain range blocks the passage of rain-producing weather systems, casting a "shadow" of dryness behind it.

- **Rainfall:** Annual precipitation ranges from seven to nine inches near the confluence of the Snake and Columbia Rivers, 15 to 30 inches along the eastern border, and 75 to 90 inches near the summit of the Cascade Mountains (WRCC n.d.).
- **Seasonal Weather:** In the central part of the state, summers are hot and mostly clear, while winters are cold and partly cloudy. Annual rainfall is about 7 to 9 inches, whereas Spokane, on the eastern edge of the state, receives between 15 to 30 inches per year.
- **Temperature:** Average summer highs range from the upper 80s°F to mid-90s°F, and winter daytime temperatures can vary from the upper 30s°F to just above 0°F (Commerce n.d.).

3.3.2.2 Ambient Air Quality

The EPA has set the National Ambient Air Quality Standards (NAAQS) for six common air pollutants: PM, lead, sulfur dioxide, nitrogen oxides,[71] ozone, and carbon monoxide. These standards are designed to protect public health with an adequate margin of safety. NAAQS are expressed in concentration levels in ambient air, averaged over a specific time interval. The State of Washington has adopted the same standards as the federal level. State and local clean air agencies monitor and track emissions to make sure that levels of outdoor air pollutants meet federal and state air quality standards. State and local agencies currently operate 56 air quality monitoring stations throughout their respective jurisdictional areas, located as follows:

- Twenty-two stations are located in urban areas (the Puget Sound region, the Tri-Cities, and Vancouver, Spokane, and Yakima Counties).
- Nineteen stations are located in small communities outside of urban areas that have local sources of particulate matter less than 2.5 microns in diameter ($PM_{2.5}$).
- Seven are located in agricultural areas.
- Seven are located on Tribal reservations.
- One is in a natural rural location (Olympic Peninsula) (Ecology n.d.[b]).

Areas that comply with the NAAQS are designated “attainment areas,” and areas that do not meet the NAAQS are designated as “nonattainment” areas.

The collection of regional emissions data is a key and necessary component of air quality planning by the federal, state, and regional agencies responsible for attaining and maintaining ambient air quality standards. The EPA collects air quality data from outdoor monitors across the United States and publishes the Air Quality Statistics Report (EPA 2025b). This report shows yearly summaries of air pollution values for six criteria air pollutants, per city, county, and state. It shows the highest values reported during the year by all monitors in the state and highlights values that exceed NAAQS.

Table 3.3-3 shows exceedances in $PM_{2.5}$ in 24-hour and annual standards in Okanogan County and annual standards in Stevens and Yakima Counties during 2023. Additionally, exceedances of the 24-hour standard for particulate matter less than 10 microns in diameter (PM_{10}) were recorded in Benton, Spokane, Stevens, Walla

[71] Nitrogen oxides are a group of gases that include nitric oxide (NO) and nitrogen dioxide (NO_2) which are predominantly produced by combustion of fossil fuels.

Walla, and Yakima Counties. In recent years, Washington experienced extended smoke events from regional wildfires in the Pacific Northwest (Ecology n.d.[c]). These events have caused repeated exceedances of the PM standards and are generally considered exceptional events that are excluded from attainment determinations.

Table 3.3-3: 2023 Annual Ambient Air Quality Monitors Data per County in Washington State

County	Criteria Air Pollutants and Area's Maximum Air Quality Statistics[a]													
	CO 1-hour	CO 8-hour	NO_2 1-hour	NO_2 1-hour	Ozone 1-hour	Ozone 8-hour	SO_2 1-hour	SO_2 24-hour	SO_2 1-hour	$PM_{2.5}$ 24-hour	$PM_{2.5}$ annual	PM_{10} 24-hour	PM_{10} annual[d]	Lead 3-Month Average
Benton	-[b]	-	-	-	0.08	0.067	-	-	-	-	-	185[c]	19	-
Clallam	0.4	0.4	-	-	0.06	0.05	-	-	-	-	-	-	-	-
Clark	-	-	-	-	0.08	0.062	-	-	-	25	6.4	-	-	-
Columbia	-	-	-	-	0.06	0.057	-	-	-	-	-	-	-	-
King	1.3	1	50	15	0.09	0.068	3	2	1	24	7.9	-	-	-
Kitsap	-	-	-	-	-	-	-	-	-	19	4.9	-	-	-
Kittitas	-	-	-	-	-	-	-	-	-	18	6.5	-	-	-
Okanogan	-	-	-	-	-	-	-	-	-	51[c]	11.8[c]	-	-	-
Pierce	-	-	37	13	0.07	0.057	-	-	-	29	7.3	-	-	-
Skagit	-	-	-	-	0.06	0.046	4	1	0	12	5.3	-	-	-
Snohomish	-	-	-	-	.	.	-	-	-	26	8.5	-	-	-
Spokane	-	-	-	-	0.07	0.062	-	-	-	25	7.7	189[c]	16	-
Stevens	-	-	-	-	.	.	-	-	-	31	10.1[c]	167[c]	24	-
Thurston	-	-	-	-	0.07	0.055	-	-	-	-	-	-	-	-
Walla Walla	-	-	-	-	.	.	-	-	-	-	-	201[c]	22	-
Whatcom	-	-	-	-	0.07	0.055	4	1	0	12	5	-	-	-
Yakima	-	-	-	-	-	-	-	-	-	26	9.5[c]	168[c]	20	-

Source: EPA 2025b

Note:

[a] EPA Air Quality Standards are listed as follows: carbon monoxide: 35 ppm (1-hour), 9 ppm (8-hour); nitrogen dioxide: 100 ppb (1-hour), 53 ppb (annual); ozone: 0.12 ppm (1-hour), 0.070 ppm (8-hour); sulfur dioxide: 75 ppb (1-hour), 140 ppb (24-hour), 30 ppb (annual); $PM_{2.5}$: 35 μg/m^3 (24-hour), 9.0 μg/m^3 (annual); PM_{10}: 150 μg/m^3 (24-hour), lead: 0.15 μg/m^3 (3-month average)

[b] No data reported or monitored at this location.

[c] Exceeds NAAQS

[d] The EPA does not have an annual PM_{10} standard. The EPA's NAAQS for PM_{10} include only a 24-hour standard. This standard should not be exceed more than once per year on average over three years.

μg/m^3 = micrograms per cubic meter; CO = carbon monoxide; EPA = U.S. Environmental Protection Agency; NAAQS = National Ambient Air Quality Standards; NO_2 = nitrogen dioxide; ppb = particles per billion; ppm = particles per million; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PM_{10} = particulate matter; SO_2 = sulfur dioxide

This Page Intentionally Left Blank

In addition to collecting ambient air quality data, Ecology regularly tabulates and reports emission sources in an emissions inventory for Washington, which contains data for five of the six criteria air pollutants (except lead) in 24 source categories that include both natural and manufactured sources. The latest published emissions inventory in 2020 for the state indicates that fugitive dust from construction activities represents 18.36 and 4.81 percent of statewide emissions of PM_{10} and $PM_{2.5}$, respectively. Sources of fugitive dust (i.e., agricultural operations, construction activity, and roadways) contribute to a large amount of the PM_{10} and $PM_{2.5}$ emissions in the state—about 63 and 24 percent, respectively (Ecology 2024). Besides fugitive dust, the development of transmission facilities could generate emissions from mobile sources, such as nitrogen oxides[72] (NO_X), carbon monoxide[73] (CO), sulfur dioxide (SO_2), and volatile organic compounds[74] (VOCs), which are pollutants that result primarily from combustion. Mobile sources such as on- and off-road vehicles, boats, aircraft, and locomotives account for about 58, 43, and 3 percent of all NO_X, CO, and SO_2 state emissions, respectively and for about 5 percent of VOC emissions statewide (Ecology 2024).

Emissions typically vary in location, emission rate, and emission release patterns over time. To understand the impact, expected emissions are calculated and compared to existing, background, and regional (i.e., countywide) data. The most current regional emissions inventory, as well as national and state standards (i.e., NAAQS) are used to determine the baseline conditions. Wind and dry conditions can exacerbate dust generation and dispersion.

3.3.2.3 Greenhouse Gas Emissions

Greenhouse gases (GHGs) absorb infrared radiation in the atmosphere. The infrared radiation is selectively absorbed or “trapped” by GHGs, and heat is then reradiated[75] back toward the earth’s surface, warming the lower atmosphere and the earth’s surface (EPA 2025c). Atmospheric concentrations of GHGs have risen dramatically since the Industrial Revolution (EPA 2025a).[76] This has resulted in gradually increasing global temperature, thereby increasing the potential for indirect effects such as:

- Decrease in precipitation as snow
- Gradual melting of polar ice caps
- Increase in severe weather
- Changes to plant and animal species and habitat
- Rise in sea level

Climate impacts are not attributable to any single action but are exacerbated by diverse individual sources of emissions that each make relatively small additions to GHG concentrations. Both natural processes and human

[72] Nitrogen oxides are a group of gases that include nitric oxide (NO) and nitrogen dioxide (NO_2) which are predominantly produced by combustion of fossil fuels.

[73] Carbon monoxide is a pollutant gas, which is predominantly produced by incomplete combustion of carbon-containing materials.

[74] Volatile organic compounds are emitted as gases from certain solids or liquids, some of which may have short- and long-term adverse health effects.

[75] Refers to the process by which absorbed energy is emitted again, typically in the form of radiation.

[76] A transformative period from the late 18th to the early 19th century, marked by a shift from agrarian and handicraft economies to industrial and machine manufacturing economies.

activities emit GHGs. Human activities known to emit GHGs include industrial manufacturing, utilities, transportation, residential activities, and agricultural activities. The GHGs that enter the atmosphere because of human activities are carbon dioxide (CO_2), methane (CH_4), NO_X, and fluorinated carbons (hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) (EPA 2025c).

Washington's GHG emissions inventory requirements are focused on the state's largest emitting sources and industries. Construction, operation and maintenance, and upgrade or modification of transmission facilities are not anticipated to involve the use of major sources of GHGs that would be subject to these requirements.

The GHGs CO_2, CH_4, and NO_X are emitted during the combustion of fuels in mobile sources. Construction of transmission facilities would result in temporary generation of GHG emissions related to mobile sources like on-road vehicle operations and off-road equipment.

Emissions of CO_2, and small amounts of CH_4 and NO_X, can be also attributed to the generation of electricity in the power sector, whereas sulfur hexafluoride (SF_6) can be linked to electricity transmission and distribution equipment (EPA 2025e). SF_6 is a GHG that serves as an electric insulator and interrupter in equipment that transmits and distributes electricity, such circuit breakers and switches in substations. Less than 1 percent of GHG emissions from the U.S. power sector come from SF_6 (EPA 2025d). The EPA is working with the electric power industry to reduce emissions through the SF_6 Emission Reduction Partnership for Electric Power Systems. National and state practices to reduce SF_6 emissions include annual reporting, as well as application of BMPs such as leak detection and repair, use of recycling equipment, and consideration of alternative technologies that do not use SF_6 (EPA 2025e).

3.3.2.4 Odor

Cities and towns with dense populations are more sensitive to odor emissions, due to proximity to residential, commercial, and industrial activities. Odors from traffic, industrial processes and waste management facilities can impact air quality and public health. In rural areas, agricultural activities such as livestock farming and crop production can be sources of orders, odors in rural areas. Ecology and local air quality agencies monitor and regulate odor emissions to ensure that they do not exceed acceptable levels and cause nuisance or health issues.

Minor odors may be generated from the exhaust of diesel-fueled vehicles and equipment. These odors are expected to be temporary and confined to the immediate vicinity of the construction sites.

3.3.3 Impacts

An assessment of impacts was completed for the construction, operation and maintenance, and upgrade or modification of transmission facilities within the Study Area.

3.3.3.1 Method of Analysis

The Study Area for a project-specific application would typically encompass several key regions and features, such as the following:

- **Project Site and Immediate Vicinity:** This includes the specific location of the project and the surrounding area that might be directly affected by construction, operation and maintenance, and upgrade or modification activities.

- **Air Basin:**[77] Depending on the project components identified for the development of a transmission facility, a specific analysis of the meteorology and regional area would be required. Reported ambient monitoring data of three years should be analyzed.

This Draft Programmatic EIS analyzes the affected environment and impacts on air quality within the Study Area defined in Chapter 2. Three project phases for each transmission facility type were considered: construction, operation and maintenance, and upgrade or modification.

This evaluation considers overhead transmission facilities and underground transmission facilities for each phase. Overhead transmission facilities consist of transmission lines and similar aboveground, ancillary infrastructure. Overhead transmission facilities also incorporate above-ground infrastructure, like substations, that may be associated with underground transmission facilities (e.g., clearing footprint required for launch and retrieval shafts for trenchless construction). Underground transmission facilities consist of underground transmission lines, underground access vaults, and other below-ground infrastructure. The construction of underground transmission facilities includes open trench, trenchless (including directional drilling), and underwater construction methods.

Impact Determination

The discussion of impacts is qualitative given the high-level nature of a Programmatic EIS; quantification would require project-specific details to analyze. **Table 3.3-4** describes the criteria used to evaluate impacts from the Action Alternative and No Action Alternative. Information reviewed to identify impacts on air quality in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping.

Table 3.3-4: Criteria for Assessing the Impact Determination on Air Quality

Impact Determination	Description
Nil	A project would have no foreseeable impacts on air quality during any phase (i.e., construction, operation and maintenance, or upgrade or modification). A project would not produce sources of air pollutants or emissions from construction equipment.
Negligible	Minor, adverse impacts on air quality would occur. A project would produce some emissions, such as dust or exhaust from construction equipment; however, best management practices and design considerations are expected to be effective.
Low	Adverse impacts on air quality would occur, even with the implementation of best management practices and design considerations. A project would produce some emissions, such as dust or exhaust from construction equipment, but these are limited and controlled. Adverse impacts on air quality would be short term and nonsignificant.
Moderate	Adverse impacts are likely to occur even with the implementation of best management practices and design considerations. A project would result in an increase in emissions, such as dust, vehicle exhaust, and emissions from construction equipment. Adverse impacts on air quality would be localized and primarily occur during the construction phase. Moderate impacts may be long-term, occurring over one or more project phases. Moderate impacts have the potential to be significant.
High	Adverse impacts would have significant and potentially severe effects on air quality even after implementation of best management practices and design considerations. A project would produce considerable emissions of pollutants, such as dust, vehicle exhaust, and emissions from construction equipment. There is the potential to exceed relevant air quality standards and regulations. Adverse impacts on air quality may affect a larger area, not just localized to the construction site. High impacts may be permanent or continue for the duration of the project.

EIS = Environmental Impact Statement

[77] A geographic area characterized by similar meteorological and geographic conditions throughout. These areas are often defined by natural boundaries such as mountains, which can trap air and pollutants within the basin, leading to unique air quality challenges.

To clearly understand the potential severity of impacts without any interventions, the following impact determinations exclude the use of avoidance criteria and mitigation measures. The ratings assume compliance with all federal, state, and local laws and regulations, as well as standardized BMPs and design considerations. Assessing impacts without avoidance criteria or mitigation measures offers a baseline understanding of potential environmental effects, helping to identify the true extent of these impacts. Environmental laws often require that initial impact assessments be conducted without considering mitigation to maintain the integrity of the environmental review process.

3.3.3.2 Action Alternative

Construction

Overhead Transmission Facilities

Activities for the construction phase of overhead transmission facilities would vary and depend on the scale of the facility and site characteristics. Construction could include a site preparation phase of relatively short duration (e.g., a few months), followed by a longer construction and start-up phase. It is assumed that the construction phase of overhead transmission, per mile, would have a shorter duration than underground construction. Overhead transmission facilities infrastructure could have the following identified impacts during the construction phase:

- Increased Fugitive Dust Emissions
- Increased Emissions from Fuel-Burning Equipment
- Increased SF_6 Emissions

The primary type of air pollution during construction would be PM, including $PM_{2.5}$ and PM_{10}, including fugitive dust and combustion pollutants from stationary and mobile equipment exhaust.

Increased Fugitive Dust Emissions

Construction activities and material handling may generate considerable fugitive dust during the construction phase. Based on the size of the PM, fugitive dust emissions could affect visibility and have health effects related to respiratory issues. Construction activities that could create fugitive dust include road building and grading, on-site travel on unpaved surfaces, work area clearing and preparation for tower removal or construction, and blasting[78] for tower footings. The movement of heavy construction equipment and vehicles over unpaved surfaces may contribute substantially to fugitive dust emissions. Any disruption of soils susceptible to erosion could also create fugitive dust, as well as vegetation removal and debris disposal.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on emissions from fugitive dust, without mitigation measures incorporated, are anticipated to vary and could be low to moderate impact. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

[78] Controlled use of explosives to break, excavate, or shape rock, concrete, or other materials.

Increased Emissions from Fuel-Burning Equipment

Portable generators and other mobile sources, such as concrete batch plants, may be used during construction. The temporary use of these equipment are anticipated to be permitted separately from projects by the owners/operators of the equipment. Construction activities are considered to be temporary sources and are exempt from permitting review. No air quality permits are expected to be required for the construction or operation of any of the transmission facilities.

Mobile sources with diesel internal combustion engines, including heavy equipment, would emit pollutants such as CO, CO_2, $PM_{2.5}$, NO_X, SO_X, VOC, and others. The Clean Air Act requires all mobile equipment to meet national and state regulations. Factors like localization and duration of the construction phase could be analyzed to estimate the magnitude of impacts. Construction of transmission facilities typically lasts from 12 months to as much as 24 months. Construction would be localized to a specific corridor area and would not involve major sources of air pollutants.

Construction emissions associated with exhaust from heavy equipment, delivery, and haul trucks could be calculated and compared to existing background air quality levels to determine whether estimated pollutant emissions would exceed NAAQS.

Minor odors may be generated from the exhaust of diesel-fueled vehicles and equipment. These odors are expected to be temporary and confined to the immediate vicinity of the construction sites.

Impact Determination: Depending on the scale of the transmission facility and site characteristics, the impacts on emissions from fuel-burning equipment, without mitigation measures incorporated, are anticipated to vary and could be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Increased SF_6 Emissions

During the construction of transmission facilities, SF_6 emissions could occur primarily from the installation and handling of gas-insulated switchgear and other electrical equipment that use SF_6 as an insulating and arc-quenching[79] medium. SF_6 could be released during the initial filling of gas-insulated equipment. Proper handling and filling procedures are crucial to minimize emissions.

Impact Determination: Depending on the scale of the transmission facility and site characteristics, impacts on emissions from SF_6, without mitigation measures incorporated, are anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Activities for the construction phase of underground transmission facilities, including open trench, trenchless (including directional drilling), or underwater construction methods, would vary depending on the scale of the facility and site characteristics. Similar to overhead transmission facilities, underground construction could include a site preparation phase for relatively short duration, followed by a longer construction and start-up phase. It is assumed that the construction phase for underground transmission facilities, per mile, would have a longer

[79] The process of extinguishing an electrical arc that forms when current-carrying contacts in a circuit breaker or switchgear separate. This arc is a highly ionized, conductive path that can cause significant damage if not properly managed. Effective arc-quenching is crucial for ensuring the safe and efficient interruption of electrical currents.

duration than overhead projects. Underground transmission could have the following identified impacts during the construction phase:

- Increased Fugitive Dust Emissions
- Increased Emissions from Fuel-Burning Equipment

Increased Fugitive Dust Emissions

The trenching, excavation, and construction of underground transmission facilities could generate more fugitive dust than what would be expected for an overhead transmission facility.

Expected emissions from these sources could be calculated and compared to existing, background, regional (i.e., countywide) emissions using the most current regional emissions inventory, as well as national and state standards (i.e., NAAQS).

Impact Determination: Depending on the scale of the transmission facility and site characteristics, the impacts on emissions from fugitive dust, without mitigation measures incorporated, are anticipated to vary and could be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Increased Emissions from Fuel-Burning Equipment

Construction activities for underground transmission facilities often involve the use of heavy machinery and vehicles that burn fossil fuels, leading to the emission of pollutants. The trenching, excavation, and construction of underground transmission facilities could generate more emissions than what would be expected for an overhead transmission facility. Expected emissions from these sources could be calculated and compared to existing, background, regional (i.e., countywide) emissions using the most current regional emissions inventory, as well as national and state standards (i.e., NAAQS).

Minor odors may be generated from the exhaust of diesel-fueled vehicles and equipment. These odors are expected to be temporary and confined to the immediate vicinity of the construction sites.

Impact Determination: Depending on the scale of the transmission facility and site characteristics, the impacts on emissions from fuel-burning equipment, without mitigation measures incorporated, are anticipated to vary and be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Operation and Maintenance

Overhead Transmission Facilities

Activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and rights-of-way (ROWs). Overhead transmission facilities could have the following identified impacts during the operation and maintenance phase:

- Increased Fugitive Dust Emissions
- Increased Emissions from Fuel-Burning Equipment
- Increased SF_6 Emissions

Increased Fugitive Dust Emissions

During the operation and maintenance phase, routine maintenance and inspections of transmission facilities, including emergency repairs and vegetation management, would take place. These activities would necessitate the use of maintenance vehicles traveling on both paved and unpaved access roads. As a result, there would be temporary fugitive dust emissions, similar to what occurs during construction activities, though at a reduced frequency.

Impact Determination: Depending on the scale of the transmission facility and site characteristics, the impacts on emissions from fugitive dust, without mitigation measures incorporated, are anticipated to vary and could be negligible to low.

Increased Emissions from Fuel-Burning Equipment

During the operation and maintenance phase, routine maintenance and inspections of transmission facilities, including emergency repairs and vegetation management, would take place. These activities would necessitate the use of maintenance vehicles, heavy equipment, and possibly portable generators. The use of equipment would result in temporary emissions and minor odors from fuel-burning equipment, similar to what occurs during construction activities, though at a reduced frequency.

Impact Determination: Depending on the scale of the transmission facility and site characteristics, the impacts on emissions from fuel-burning equipment, without mitigation measures incorporated, are anticipated to vary and could be negligible to low.

Increased SF_6 Emissions

Fugitive emissions of SF_6 could occur from seals and joints in the equipment, especially if not properly installed or maintained. During maintenance activities, such as opening equipment for repairs or inspections, SF_6 could escape if not properly managed.

Impact Determination: Depending on the scale of the transmission facility and site characteristics, impacts on emissions from SF_6, without mitigation measures incorporated, are anticipated to vary and could be negligible to low.

Underground Transmission Facilities

Similar to overhead transmission facilities, activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs, similar to any other linear industrial facility. Underground transmission could have the following identified impacts during the operation and maintenance phase:

- Increased Fugitive Dust Emissions
- Increased Emissions from Fuel-Burning Equipment

Increased Fugitive Dust Emissions

Maintenance crews would conduct routine maintenance and inspections of transmission facilities, perform emergency repairs, access substations as needed, and manage vegetation along ROWs. These activities would necessitate the use of maintenance vehicles traveling on both paved and unpaved access roads, resulting in temporary fugitive emissions of dust.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on emissions from fugitive dust, without mitigation measures incorporated, are anticipated to vary and could be negligible to low impact.

Increased Emissions from Fuel-Burning Equipment

Maintenance crews would conduct routine maintenance and inspections of transmission facilities, perform emergency repairs, access substations as needed, and manage vegetation along ROWs. These activities would necessitate the use of maintenance vehicles, heavy equipment, and possibly portable generators. The use of equipment would result in temporary emissions and minor odors from fuel-burning equipment, similar to what occurs during construction activities, though at a reduced frequency.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on emissions from fuel-burning equipment, without mitigation measures incorporated, are anticipated to vary and could be negligible to low.

Upgrade or Modification

Overhead Transmission Facilities

Upgrading or modifying overhead transmission facilities would involve several key steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Overhead transmission could have the following identified impacts during the upgrade or modification phase:

- Increased Fugitive Dust Emissions
- Increased Emissions from Fuel-Burning Equipment
- Increased SF_6 Emissions

While adverse impacts would be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing structures and footprints, which minimizes the disturbance to surrounding land and ecosystems. New construction often requires clearing land, which could disrupt existing land uses and have a larger impact on resources.
- **Infrastructure Utilization:** Existing infrastructure could be reused or enhanced, reducing the need for extensive new development.

Underground Transmission Facilities

Upgrading or modifying underground transmission facilities would involve several steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Underground transmission could have the following identified adverse impacts during the upgrade or modification phase:

- Increased Fugitive Dust Emissions
- Increased Emissions from Fuel-Burning Equipment

While adverse impacts would be similar to construction, adverse impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing structures and footprints, which minimizes the disturbance to surrounding land and ecosystems. New construction often requires clearing land, which could disrupt existing land uses and have a larger impact on resources.
- **Infrastructure Utilization:** Existing infrastructure could be reused or enhanced, reducing the need for extensive new development.

3.3.3.3 No Action Alternative

The No Action Alternative represents the scenario in which this Draft Programmatic EIS is not used and current management practices for siting and planning transmission facilities continue unchanged. Under this alternative, each project would continue to be evaluated on a case-by-case basis and reviewed for compliance with existing regulations, codes, and standard practices. While impact determinations would likely be similar to those outlined in this Draft Programmatic EIS, projects would not benefit from the impact reductions associated with the avoidance criteria developed and analyzed in this Draft Programmatic EIS. These criteria are anticipated to provide additional mitigation that further reduces potential environmental impacts.

3.3.4 Potential Mitigation Measures

This section describes measures that would eliminate, reduce the intensity of, or compensate for adverse impacts from construction, operation and maintenance, and upgrade or modification of transmission facilities.

All general conditions adopted for this Draft Programmatic EIS, identified in Section 3.1, are relevant to this resource section. Applicants would be responsible for providing information within their application materials documenting their implementation of the general conditions.

Avoidance criteria adopted for this Draft Programmatic EIS are identified in Section 3.1. Avoidance criteria that are relevant to this resource section are described below:

AVOID-1 – Hazardous Areas: Avoid known hazardous areas, including but not limited to, contaminated soils, geologically hazardous areas, landfills, and cutbanks.

Rationale: Avoiding hazardous areas provides safety for workers, the public, infrastructure, as well as environmental protection. Disturbing sites of known contamination or other hazards may require the development of remediation plans.

Applicants would be responsible for providing information within their application materials documenting the project’s compliance with the above avoidance criteria.

Potential mitigation measures have been identified to minimize adverse impacts from transmission facility projects. These measures are intended to be broad so that they can be applied to most projects that would be covered under this Programmatic EIS. However, project-specific plans would be needed to adapt the measures for project-specific applications.

When impact determinations are identified as moderate or high, the applicant would either adopt applicable mitigation measures from this Programmatic EIS or the SEPA Lead Agency may require applicable mitigation measures to be implemented to reduce project-specific impacts. When impact determinations are low, applicable mitigation measures should still be considered by the applicant and the SEPA Lead Agency as these measures would help to further reduce project-specific impacts, including the project's contribution to cumulative impacts. These measures would be implemented in addition to compliance with laws, regulations, environmental permits, plans, and design considerations required for transmission facilities.

The following mitigation measures could be adopted to mitigate adverse impacts:

Air-1 – Traffic Speeds: Restrict traffic speeds to under 15 miles per hour on unpaved areas that do not have designated speed limits.

Rationale: Limiting traffic speeds on unpaved roads is a key strategy to reduce dust emissions. Access-road-related fugitive dust from vehicle traffic on unpaved roads is a large source of PM_{10} and $PM_{2.5}$ emissions. Road-related fugitive dust emissions increase with increasing vehicle speed on unpaved roads. Limiting the speed on unpaved roads would reduce dust generation, improve air quality, and provide better visibility and safety.

Air-2 – Use Low-Emission Construction Equipment and Vehicles: Use low-emission construction equipment and vehicles, such as those meeting the latest emission standards.

Rationale: This mitigation measure aims to reduce exhaust emissions.

Air-3 – SF_6 Emission Reduction Partnership: Participate in the SF_6 Emission Reduction Partnership for Electric Power Systems.

Rationale: This mitigation measure aims to reduce emissions of SF_6. Participants in the program benefit from shared best practices, technical guidance, and support from the Environmental Protection Agency to enhance their emission reduction efforts.

Air-4 – Counties with Exceedances: Minimize emissions in counties with air quality exceedances during the construction and upgrade or modification of transmission facilities.

Rationale: Minimizing emissions in counties with air quality exceedances during the construction and upgrade or modification of transmission facilities is crucial for public health, regulatory compliance, environmental protection, and to minimize contributing factors to climate change.

In addition to the above mitigation measures, the following mitigation measures[80] developed for other resources may be applicable:

Geo-1 – Minimize Soil Disturbance: Minimize soil disturbance, including footprints related to access roads and permanent structures, to the greatest extent practicable. Minimize the use of construction techniques that would be harmful to topsoil composition, where feasible.

Geo-8 – Minimize Impacts to Sensitive Soils: Design projects to minimize adverse impacts on high erodibility zones and areas sensitive to degradation.

Veg-3 – Site Transmission Facilities in Existing ROW or Disturbed Areas: Site transmission facilities in existing right-of-way (ROW) or disturbed areas, to the greatest extent practicable.

---

[80] The rationales for the identified mitigation measures are provided in their respective resource sections.

Hab-7 – Vehicle and Equipment Use and Maintenance: Prohibit vehicles and other equipment from idling when not in use during construction. Vehicles and other equipment would be inspected daily for leaks and would be kept in good condition. Vehicles and equipment would only be stored with proper spill protection measures in place and in areas where contaminants would not enter the environment, watercourses, or riparian areas if spills were to occur.

TR-5 – Carpool Program: Create a carpool program that connects workers commuting from similar areas.

SE-1 – Communication Plan: Prepare a communication plan that includes a mechanism for handling complaints.

3.3.5 Probable Significant Adverse Environmental Impacts

Determining the significance of an impact involves consideration of context and intensity, which, in turn, depend on the magnitude and duration of the impact. “Significant” in the Washington State Environmental Policy Act means a reasonable likelihood of more than a moderate adverse impact on environmental quality. An impact may also be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred (Washington Administrative Code 197-11-794).

Identification of environmental impacts and assignment of discipline-specific ratings is based on professional judgment information available at the time of writing. A precautionary approach has been taken for the assessment where information is currently unknown or unavailable.

This Draft Programmatic EIS weighs the impacts on air quality resources that would result from transmission facilities after considering the application of laws and regulations; siting and design considerations, including agency guidance and BMPs; and mitigation and makes a resulting determination of significance for each impact. **Table 3.3-5** summarizes the impacts anticipated for the construction, operation and maintenance, and upgrade or modification of transmission facilities.

This Page Intentionally Left Blank

Table 3.3-5: Summary of Impacts, Mitigation Measures, and Significance Rating for Air Quality

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Air Quality – Increased Fugitive Dust Emissions	Construction	Construction activities that could create fugitive dust include disruption of soils from vegetation clearing, grading, and debris removal, Fugitive dust could also occur from constructing roads, traveling on unpaved surfaces, preparing for tower removal or construction, trenching, and blasting for tower footings.	**Overhead:** low to moderate **Underground:** low to moderate	▪ **AVOID-1:** Hazardous Areas ▪ **Air-1:** Traffic Speeds ▪ **Air-2:** Use Low-Emission Construction Equipment and Vehicles ▪ **Air-4:** Counties with Exceedances ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Geo-8:** Minimize Impacts to Sensitive Soils ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas ▪ **Hab-7:** Vehicle and Equipment Use and Maintenance ▪ **TR-5:** Carpool Program ▪ **SE-1:** Communication Plan	Less than Significant	Mitigation measures generally prevent and/or minimize fugitive dust emissions generated from project-related activities.
	Operation and Maintenance	Routine inspection and maintenance of transmission facilities would require vehicles to access the transmission facility via paved and/or unpaved roads. Fugitive dust emissions would be temporary and at a reduced frequency compared to construction.	**Overhead:** negligible to low **Underground:** negligible to low			
	Upgrade or Modification	Upgrade or modification of transmission facilities would result in fugitive dust emissions similar to what was described for construction. However, impacts are generally anticipated to be lower than those for new transmission facilities due to minimized disturbance areas, utilizing existing infrastructure, and compliance with regulatory and environmental regulations and standards.	**Overhead:** low to moderate **Underground:** low to moderate			
Air Quality – Increased Emissions from Fuel-burning Equipment	Construction	During construction, mobile sources of fuel-burning equipment, such as portable generators, heavy machinery or equipment, concrete batch plants, and vehicles could be used. The use of such equipment would emit pollutants such as CO, CO_2, SO_X, $PM_{2.5}$, NO_X, and VOCs.	**Overhead:** low to moderate **Underground:** low to moderate	▪ **AVOID-1:** Hazardous Areas ▪ **Air-1:** Traffic Speeds ▪ **Air-2:** Use Low-Emission Construction Equipment and Vehicles ▪ **Air-4:** Counties with Exceedances ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Geo-8:** Minimize Impacts to Sensitive Soils ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas ▪ **Hab-7:** Vehicle and Equipment Use and Maintenance ▪ **SE-1:** Communication Plan	Less than Significant	Construction projects must comply with stringent state and federal air quality regulations. These regulations include the use of cleaner, low-emission equipment and fuels, which significantly reduce overall emissions. During construction, projects may implement various mitigation measures to minimize emissions. Also, the emissions from construction activities are typically temporary and localized.
	Operation and Maintenance	Inspections, maintenance, and repairs of transmission facilities throughout operation would require the use of machinery and vehicles. The use of fuel-burning equipment through operation and maintenance of transmission facilities would result in short-term impacts on air quality.	**Overhead:** negligible to low **Underground:** negligible to low			
	Upgrade or Modification	Upgrade or modification of transmission facilities would result in emissions from fuel-burning equipment similar to what was described for construction. However, impacts are generally anticipated to be lower than those for new transmission facilities due to minimized disturbance areas, utilizing existing infrastructure, and compliance with regulatory and environmental regulations and standards.	**Overhead:** low to moderate **Underground:** low to moderate			
Air Quality – Increased SF_6 Emissions	Construction	During the construction of overhead transmission facilities, fugitive emissions of SF_6 could occur from the installation and handling of gas-insulated switchgear and other electrical equipment that use SF_6 as an insulating and arc-quenching medium. SF_6 could also be released during the initial filling of gas-insulated equipment.	**Overhead:** negligible to moderate **Underground:** N/A	▪ **Air-3:** SF_6 Emission Reduction Partnership	Less than Significant	Compliance with evolving industry leak rate minimization standards is expected to reduce SF_6 emissions.
	Operation and Maintenance	Fugitive emissions of SF_6 could occur from seals and joints in the equipment associated with overhead transmission facilities. During maintenance activities, such as opening equipment for repairs or inspections, SF_6 could escape.	**Overhead:** negligible to low **Underground:** N/A			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[a]	Significance after Applying Mitigation	Rationale for Significance Rating
	Upgrade or Modification	Upgrade or modification of overhead transmission facilities could result in similar impacts on air quality as a result of SF_6 emissions as described for construction. However, impacts are anticipated to be lower than those for new transmission facilities due to minimized disturbance areas, utilizing existing infrastructure, and compliance with regulatory and environmental regulations and standards.	**Overhead:** negligible to moderate **Underground:** N/A			

Notes:

[a] Appendix 3.9-1 provides a detailed listing of each general condition, avoidance criteria, and mitigation measure. Having these details in an appendix serves as a comprehensive reference section that can be consulted independently of the main text. This is particularly useful for detailed guidance and technical specifications that may be referred to multiple times. Additionally, including this information in an appendix allows for easier updates and revisions. If mitigation measures or guidelines change, the appendix can be updated without altering the main content.

BMP = best management practice; CO = carbon monoxide; CO_2 = carbon dioxide; N/A = not applicable; No_x = nitrogen oxide; $PM_{2.5}$ = particulate matter less than 2.5 microns; PM_{10} = particulate matter less than 10 microns; SO_X = sulfur oxide; SF_6 = sulfur hexafluoride; VOC = volatile organic compound

3.3.6 Suitability Map

Project-specific reviews would include a comprehensive review and analysis to identify the site-specific adverse impacts on resources to determine the suitability of this Draft Programmatic EIS. Environmental review may be phased by incorporating relevant information from this Draft Programmatic EIS by reference while evaluating site-specific adverse impacts of the individual project applications. For more information on phased reviews, please refer to Chapter 1, Introduction.

Project-specific applications would include details about the precise location and site-specific conditions. Generally, this Draft Programmatic EIS provides a suitability map for each element of the environment, that, when incorporated with project-specific applications, could be used to facilitate more informative and efficient environmental planning.

A suitability map was not completed for air quality. Air quality can vary significantly over time and space due to factors like weather, emissions, and topography. More detailed, site-specific analysis is required to determine suitability of a project-specific application in any area. This variability can make it difficult to create a static suitability map that accurately reflects current conditions while accounting for impacts of transmission facilities on air quality.

This Page Intentionally Left Blank

3.4 Water Resources

This Draft Programmatic Environmental Impact Statement (EIS) considers impacts on water resources resulting from the types of facilities described in Chapter 2. This section addresses the following topics related to the construction, operation and maintenance, and upgrade or modification of high-voltage electric transmission facilities (transmission facilities) in the State of Washington:

- Section 3.4.1 identifies regulatory, siting, and design considerations.
- Section 3.4.2 describes the affected environment.
- Section 3.4.3 describes impacts.
- Section 3.4.4 describes potential mitigation measures.
- Section 3.4.5 identifies probable significant adverse environmental impacts on water resources.
- Section 3.4.6 provides a suitability map and scoring for the siting of transmission facilities as it relates to water resources, based on the identified considerations, impacts, and mitigation measures.

3.4.1 Regulatory, Siting, and Design Considerations

This Draft Programmatic EIS establishes a broad framework for compliance, outlining general laws, regulations, best management practices (BMPs), and design considerations. It is assumed that project-specific applications will be developed within this pre-established regulatory context and are expected to comply with existing laws and regulations. If a project does not comply with applicable laws and regulations or fails to adhere to design considerations or BMPs, additional project-specific environmental review and mitigation would be required. The applicable federal, state, and local laws and regulations relevant to water resources are summarized in **Table 3.4-1**.

Table 3.4-1: Laws and Regulations for Water Resources

Applicable Legislation	Agency	Summary Information
16 USC §791a et seq. – Federal Power Act	Federal Energy Regulatory Commission	The Federal Power Act, originally enacted in 1920 as the Federal Water Power Act, is a key piece of legislation governing the regulation of hydroelectric power and interstate electricity transmission in the United States. The act grants FERC the authority to issue licenses for non-federal hydroelectric projects on navigable waters and federal lands, ensuring that these projects serve the public interest.
16 USC § 1451 et seq. – Coastal Zone Management Act ()	National Oceanic and Atmospheric Administration[b]	The federal consistency provisions of the CZMA require that federal actions, including the issuance of federal licenses and permits, be consistent with the enforceable policies of the Washington Coastal Zone Management Program. This applies to federal actions within and outside of Washington's 15 coastal counties that could have reasonably foreseeable impacts on state coastal resources and uses. The CZMA was enacted to protect the coastal environment from growing demands associated with residential, recreational, commercial, and industrial uses. The CZMA encourages coastal states to develop and implement coastal zone management programs to manage and balance competing

Applicable Legislation	Agency	Summary Information
		uses of the coastal zone.[81] Washington's program is discussed in the Washington Coastal Zone Management Program section of this table.
33 U.S.C. §401 et seq. – Rivers and Harbors Act	U.S. Army Corps of Engineers	Refers to a series of laws passed by the United States Congress to regulate and improve the nation's waterways.
33 USC §1251 et seq. – Clean Water Act	Environmental Protection Agency (a)(b)	This act establishes regulations for discharging pollutants into WOTUS[82] and regulates water quality standards for surface water. Under the CWA, it is unlawful to release pollutants into navigable waters unless a permit is obtained. The CWA also includes regulated state specific water quality standards.
42 USC §300(f) et seq. – Safe Drinking Water Act	Environmental Protection Agency (b)	This act establishes regulations intended to preserve groundwater as a source of drinking water. It manages underground injection of liquid wastes and designates some aquifers as irreplaceable sources of drinking water.
Executive Order 11990, Protection of Wetlands	Federal Agencies	The order aims to minimize the destruction, loss, or degradation of wetlands and to enhance their natural and beneficial values.
Washington Coastal Zone Management Program	Washington State Department of Ecology(c)	Ecology administers Washington's Coastal Zone Management Program, which applies to the state's coastal zone, an area comprising the 15 coastal counties with marine shorelines. The coastal zone includes all lands and waters within these coastal counties, as well as submerged lands seaward out to 3 nautical miles (about 3.5 miles).(b) Projects within a coastal zone are required to comply with the State of Washington's Coastal Zone Management Program Enforceable Policies. The Washington Coastal Zone Management Program's enforceable policies are found in the following laws, regulations, and plans: ▪ Shoreline Management Act ▪ Water Pollution Control Act ▪ Washington Clean Air Act ▪ Ocean Resources Management Act ▪ The Marine Spatial Plan for Washington's Pacific Coast
RCW 77.55 Construction Projects in State Waters	Washington Department of Fish and Wildlife(c)	Under the Hydraulics Act, a Hydraulic Project Approval from WDFW would be required when stormwater discharges related to a project would change natural flow or bed of state waters.
RCW 79.105.030, Aquatic lands—Management guidelines	Washington State Department of Natural Resources(c)	This code establishes that management of state-owned aquatic lands shall be in conformance with constitutional and statutory requirements.

[81] Coastal Zone refers to the area where coastal waters and adjacent shorelands interact closely, including various ecosystems such as islands, wetlands, salt marshes, and beaches. It extends to the international boundary in the Great Lakes and to the outer limits of state ownership in other areas. The zone encompasses land necessary to manage shorelands that significantly impact coastal waters and areas vulnerable to sea level rise and excludes lands under federal control.

[82] Defines the scope of waters that fall under federal jurisdiction for regulatory purposes. The definition of WOTUS has been subject to changes and legal interpretations. The most recent update, following the Supreme Court's decision in Sackett v. EPA, refined the criteria for what constitutes Waters of the United States, particularly focusing on wetlands directly connected to permanent waters (EPA 2025).

Applicable Legislation	Agency	Summary Information
RCW 79.105.210, Aquatic lands—Preservation and enhancement of water-dependent uses—Leasing authority	Washington State Department of Natural Resources(c)	This code outlines the leasing authority of state-owned aquatic lands by the DNR.
RCW 79.110.020, Certain aquatic lands subject to easements for removal of valuable materials— Private easements subject to common use in removal of valuable materials	Washington State Department of Natural Resources(c)	This code establishes that every right-of-way for an easement over and across any state-owned aquatic tidelands or shorelands “shall be subject to joint and common use in accordance with provisions of RCW 79.36.380.”
RCW 90.03, Water Code	Washington State Department of Ecology(c)	This code establishes the framework for water rights[83] and water resource management in Washington State.
RCW 90.48 Water Pollution Control	Washington State Department of Ecology(c)	This policy aims to maintain the highest standard for Waters of the State[84] to preserve public health and recreation and to protect wildlife and aquatic species. It prohibits the discharge of pollution to state waters. Pollution is defined as any physical, chemical, or biological property that could impact the ecological function.
WAC 173, Ecology, Department of	Washington State Department of Ecology(c)	This code encompasses a wide range of environmental regulations managed by Ecology. This title includes chapters on various topics, including water quality standards.
WAC 220-660 Hydraulic Code Rules	Washington Department of Fish and Wildlife	Establishes requirements to obtain approval for hydraulic project, that are projects that will divert, obstruct, or change the natural flow of marine or freshwater.
WAC 463-76, Regulations for Compliance with NPDES Permit Program	State of Washington Energy Facility Site Evaluation Council	This chapter requires compliance with several other regulations, including: ▪ WAC 173-200: Water Quality Standards for Groundwaters of the State of Washington ▪ WAC 173-201A: Water Quality Standards for Surface Waters of the State of Washington ▪ WAC 173-204: Sediment Management Standards ▪ 40 CFR 131.36: Toxics criteria for states not complying with Clean Water Act section 303(c)(2)(B)
WAC 508-12 Administration of Surface and Groundwater Code	Washington State Department of Ecology	Provides procedures and regulation for Ecology’s administration of waters including diversions and appropriation.

83 A legal entitlement that allows a person or entity to use water from a specific source, such as a river, stream, lake, or groundwater, for a particular purpose like irrigation, industrial use, or domestic consumption.

84 All salt and fresh waters that are waterward of the ordinary high water line and within the territorial boundaries of the state. This includes lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the state's jurisdiction.

Applicable Legislation	Agency	Summary Information
Washington State Environmental Policy Act	■ Washington Energy Facility Site Evaluation Council ■ Washington State Department of Ecology ■ Local governments	This act is a process that identifies and analyzes environmental impacts that can be related to issuing permits. SEPA helps permit applicants and decision-makers understand how a proposed project will impact the environment. Certain projects, as defined in the SEPA Rules (WAC 197-11-704) and that are not exempt, are required to go through the SEPA process.
Growth Management Act[85]	Washington State Department of Commerce[(c)]	Protection of CARAs is required under the GMA. CARAs are defined by WAC 365-190-100 as "areas with a critical recharging effect on aquifers used for potable water." CARAs are established to protect drinking water supply by preventing pollution from entering groundwater and maintaining access to groundwater supply. The GMA also identifies frequently flooded areas, geological hazardous areas, wetlands, and fish and wildlife habitat, such as stream corridors, as critical areas.

Notes:

(a) Section 404 permits are issued by the U.S. Army Corps of Engineers.

(b) The EPA and NOAA set national standards and oversee the implementation of the Act, but states have the authority to issue permits and enforce regulations through their own programs. This system, known as cooperative federalism, allows states to tailor their programs to local conditions while maintaining consistency with federal standards.

(c) The agency responsible for administering most permits or authorizations for the identified regulation. However, if EFSEC is determined to be the agency responsible for approving a proposal, EFSEC can administer several types of permits at the state and local levels. EFSEC provides a streamlined process for siting and licensing major energy facilities, including transmission facilities in Washington State. EFSEC coordinates all evaluation and licensing steps, specifies the conditions for construction and operation, and issues a Site Certification Agreement, which assumes the responsibility for issuing individual state or local permits. By consolidating these permits into a single Site Certification Agreement, EFSEC can simplify the regulatory process for energy facility developers. While EFSEC itself does not directly administer federal permits, it works closely with federal agencies to ensure that all necessary federal requirements are met during the evaluation and licensing of energy facilities.

CARA = Critical Aquifer Recharge Area; CFR = Code of Federal Regulation; CWA = Clean Water Act; CZMA = Coastal Zone Management Act; DNR = Washington State Department of Natural Resources; Ecology = Washingto n State Department of Ecology; EFSEC = Washington Energy Facility Site Evaluation Council; EPA = U.S. Environmental Protection Agency; FERC = Federal Energy Regulatory Commission; GMA = Growth Management Act; NPDES = National Pollutant Discharge Elimination System; RCW = Revised Code of Washington; SEPA = State Environmental Policy Act; USC = United States Code; WAC = Washington Administrative Code; WOTUS= Waters of the United States; WDFW = Washington Department of Fish and Wildlife

The siting of transmission facilities is determined by engineering, technical, environmental, and socioeconomic factors. **Table 3.4-2** summarizes guidance documents and management plans that outline the design considerations and BMPs generally used to avoid or minimize impacts on water resources, including water quality and water quantity.

85 A Washington State law that requires state and local governments to manage growth by identifying and protecting critical areas and natural resource lands, designating urban growth areas, and preparing and implementing comprehensive land use plans (RCW Chapter 36.70A).

Table 3.4-2: Siting and Design Considerations for Water Resources

Siting and Design Consideration	Description
Stormwater Management Manual for Western Washington	This manual provides guidelines for managing stormwater in areas west of the Cascade Mountains crest to protect water quality and aquatic habitats.
Stormwater Management Manual for Eastern Washington	This manual provides guidelines for managing stormwater in areas east of the Cascade Mountains crest to protect water quality and aquatic habitats.
Federal Energy Regulatory Commission Guidelines	FERC provides guidelines for the siting of interstate electric transmission facilities, including environmental and community impact assessments.
Recommended Siting Practices for Electric Transmission Developers (Americans for a Clean Energy Grid 2023)	This document outlines best practices for siting electric transmission facilities. Recommended practices include: ▪ Early and transparent engagement ▪ Respect and fair dealing ▪ Environmental considerations ▪ Interagency coordination ▪ Use of existing infrastructure

Notes:
BMP = best management practice; FERC = Federal Energy Regulatory Commission

3.4.2 Affected Environment

Washington State has diverse and vital water resources that are essential for its ecosystems, communities, and economy. This section describes the water resources within the Study Area defined in Chapter 2.

3.4.2.1 Regulatory Definitions

Many waters in Washington are classified as either Waters of the United States (WOTUS) or Waters of the State. Both WOTUS and Waters of the State are subject to regulations aimed at protecting water quality and managing water resources.

Waters of the United States

WOTUS are defined in 40 Code of Federal Regulations (CFR) part 120.2 and are subject to regulation under federal laws, such as the Clean Water Act. The U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency (EPA) are responsible for determining which waters are classified as WOTUS. This includes issuing permits for activities that may impact these waters. WOTUS generally consist of:

- **Navigable waters:** Traditional navigable waters like large rivers and lakes
- **Tidal waters:** Waters that are subject to the ebb and flow of the tide
- **Territorial seas:** Coastal waters up to 3 nautical miles offshore
- **Interstate waters:** Waters that cross state boundaries, including rivers, lakes, and ponds
- **Impoundments:** Reservoirs and other impounded waterbodies that are connected to navigable waters, tributaries, or adjacent wetlands
- **Tributaries:** Streams and rivers that flow into navigable or interstate waters

- **Adjacent wetlands:** Wetlands that are directly connected to other WOTUS

The classification of WOTUS ensures that these waterbodies are protected and regulated to maintain their water quality and ecological health.

Waters of the State of Washington

Waters of the State are defined by Washington Administrative Code (WAC) 173-226-30 and Revised Code of Washington (RCW) 90.48.020. Waters of the State generally consist of all surface waters and watercourses within the jurisdiction of the state, including:

- Lakes
- Rivers
- Ponds
- Streams
- Inland waters
- Underground waters
- Salt waters

In contrast to WOTUS, Waters of the State include groundwater, are not limited to navigable waterways, and are not limited to waterbodies that have a continuous surface connection to other waterbodies. Waters of the State are subject to regulation under state law even though they may not be subject to federal regulation. In Washington, the Washington State Department of Ecology (Ecology) is primarily responsible for managing the state's water resources. They oversee water quality, water supply, and shoreline management to ensure that the state's waters meet environmental standards and support both human and ecological needs. Additionally, the Washington State Department of Natural Resources manages state-owned aquatic lands, including navigable lakes, rivers, streams, and marine waters.

Water Rights

As defined in RCW 90.03.010, a water right is a legal authorization to use a specific amount of water for a beneficial purpose, such as irrigation, domestic water supply, or industrial use. Water rights in Washington are defined and managed by Ecology (Ecology 2013). All waters in Washington are publicly owned. Individuals or entities can obtain the right to use water, but they do not own the water itself.

There are three types of water rights:

- **Claims:** These are assertions of water use that pre-date the state's water permitting system (1917 for surface water, 1945 for groundwater). The validity of a claim can only be confirmed through judicial processes (Ecology 2013).
- **Permits:** These allow the development of a water right. A permit is not a final water right but grants permission to construct a water system and start using water according to the permit's terms.
- **Certificates:** These are issued after confirming that all permit conditions are met; a certificate is the legal record of a water right and is attached to the land where the water is used.

To obtain a water right, applicants must follow a detailed process that includes submitting an application, public notice, and environmental review. Washington follows the "first in time, first in right" principle, meaning that older water rights have priority over newer ones during shortages. Water rights must be used beneficially and continuously. Rights can be lost through non-use, a process known as relinquishment. Ecology monitors water use, ensures compliance with water rights, handles disputes, and enforces regulations.

Water availability varies across the state, and new water rights can be challenging to obtain in some areas due to limited supply. An executed agreement for water is often necessary during the construction of a project in Washington for several reasons, including the following:

- **Legal Compliance:** Ensuring that the project complies with state and local water use regulations. This includes obtaining the necessary permits and adhering to water rights laws.
- **Water Supply Assurance:** Securing a reliable water supply for construction activities, such as dust control, concrete mixing, and other needs. An executed agreement guarantees that the water source is legally available and sufficient for the project's duration.
- **Environmental Protection:** Protecting local water resources by ensuring that water use during construction does not negatively impact nearby waterbodies or ecosystems. This includes managing stormwater runoff and preventing contamination.
- **Dispute Avoidance:** Preventing potential disputes with other water users by clearly defining the terms of water use, including the amount, source, and duration of water withdrawal.
- **Project Planning and Budgeting:** Facilitating accurate project planning and budgeting by securing water resources in advance. This helps avoid delays and additional costs associated with water shortages or legal issues.

Water Use and Importance

Washington is committed to sustainable water management practices to ensure that water remains available for future generations. Effective management of water resources is crucial for addressing the challenges posed by climate change, such as increased frequency and severity of droughts. The waters of Washington State are extremely important for several reasons, including the following:

- **Agriculture:** Washington's waters support a multi-billion-dollar agricultural industry, providing essential irrigation for crops. Section 3.9, Land and Shoreline Use, describes the affected environment and analyzes impacts from the construction and operation and maintenance of transmission facilities on land use, including agriculture.
- **Fishing Industry:** The state's waters sustain one of the nation's most prominent commercial fishing industries, crucial for both the economy and local communities. Section 3.6, Habitat, Wildlife, and Fish, describes the affected environment and analyzes impacts from the construction and operation and maintenance of transmission facilities on wildlife, including fish.
- **Biodiversity:** The waters of Washington, from rivers to lakes and wetlands, support diverse ecosystems. They provide critical habitats for species. Section 3.6, Habitat, Wildlife, and Fish, describes the affected environment and analyzes impacts from the construction and operation and maintenance of transmission facilities on wildlife.
- **Ecosystem Health:** Healthy waters are essential for maintaining the natural processes that sustain the environment, including nutrient cycling and habitat formation. Section 3.6, Habitat, Wildlife, and Fish, describes the affected environment and analyzes impacts from the construction and operation and maintenance of transmission facilities on habitat.

- **Hydroelectric Power:** Washington generates about one-third of the nation's hydroelectric power, thanks to its abundant rivers and water resources. Section 3.7, Energy and Natural Resources, describes the affected environment and analyzes impacts from the construction and operation and maintenance of transmission facilities on energy and natural resources, including hydroelectric power.
- **Recreation:** Washington's waters offer numerous recreational opportunities, such as fishing, boating, and swimming, which are vital for the quality of life and tourism. Section 3.14, Recreation, describes the affected environment and analyzes impacts from the construction and operation and maintenance of transmission facilities on recreation.
- **Cultural Heritage:** Many of Washington's waters hold cultural and historical value, especially for Indigenous communities who have relied on these resources for time immemorial[86]. Section 3.15, Historic and Cultural Resources, describes the affected environment and analyzes impacts from the construction and operation and maintenance of transmission facilities on historic and cultural resources, including Tribal rights, interests, and resources.

3.4.2.2 Watershed Management

A watershed is as an area of land that drains all streams and rainfall to a common outlet, such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel (USGS n.d.). Watershed boundaries outline these areas and provide a logical framework for managing water resources. By focusing on the natural hydrology, it is easier to understand and address the conditions and stressors affecting water quality and availability.

The Watershed Boundary Dataset is a geographical information system (GIS)-based dataset delineating drainage boundaries across the United States. Developed by the Natural Resources Conservation Service and other agencies, it provides detailed information on watershed boundaries, which is crucial for various environmental and planning purposes.

The drainages are described using a hierarchal system consisting of hydrographic regions, subregions, basins, subbasins, watersheds, and subwatersheds.[87] There are 21 regions across the United States, including Hawaii, Alaska, and Puerto Rico/U.S. Virgin Islands (USGS 2021). Each subsequent level is divided into smaller drainages that nest within the higher level. At each level, beginning with the region, the drainages are described with a two-digit hydrologic unit code (HUC). Hydrographic regions are identified by a two-digit HUC, sub-regions are four digits (HUC4), basins are six digits (HUC6), subbasins are eight digits (HUC8), watersheds are 10 digits (HUC10), and subwatersheds are 12 digits (HUC12).

The eight sub-regional levels (HUC4) help in managing and studying the water resources within the state. A subregion includes the area drained by a river system, a reach of a river and its tributaries in that reach, a closed basin(s), or a group of streams forming a coastal drainage area. Washington State has 16 HUC4 sub-regions. The HUC4 sub-regional levels within the State of Washington are summarized in **Table 3.4-3**.

---

[86] A period so long ago that it extends beyond the reach of memory, record, or tradition.

[87] A smaller division within a larger watershed. It represents a specific area of land where all the water drains to a particular point within the larger watershed.

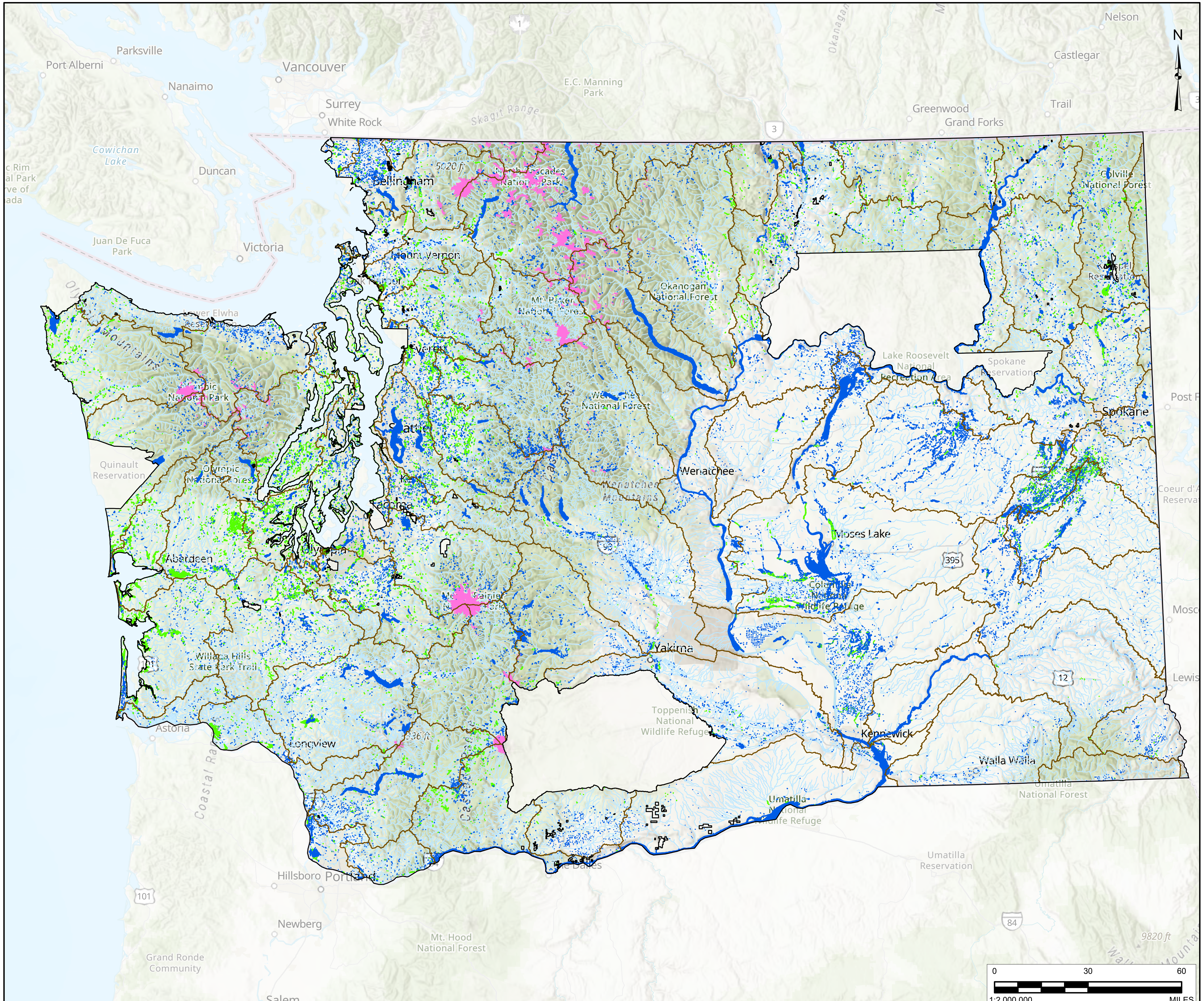
Table 3.4-3: Hydrographic Regions and Basins

Hydrographic Region	Sub-Regions
Pacific Northwest	Puget Sound
	Lower Columbia
	Middle Columbia-Hood
	Middle Columbia-Lake Wallula
	Middle Columbia-Snake
	Upper Columbia
	Yakima
	Snake River
	Upper Snake
	Lower Snake
	Clearwater
	Salmon
	Hells Canyon
	Grande Ronde
	Walla Walla
	Umatilla

Source: USGS 2021

Major surface waterbodies in and adjacent to Washington, and hydrologic unit boundaries, are shown in **Figure 3.4-1.**

This Page Intentionally Left Blank



LEGEND

- Study Area
- Watershed Boundary Dataset 8-Digit Hydrologic Unit (USGS, 2024)
- Surface Water Flowline (USGS, 2024)

Surface Waterbody (USGS, 2024)

- Lake/Pond/Reservoir
- Estuary/Swamp/Marsh
- Ice Mass

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES

1. SERVICE LAYER CREDITS: SOURCES: ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY, ESRI, USGS
2. SURFACE WATER FLOWLINE, SURFACE WATERBODY, WATERSHED BOUNDARY DATASET: USGS, 2024

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

MAJOR SURFACE WATER BODIES

YYYY-MM-DD 2025-03-18 CONSULTANT wsp

FIGURE 3.4-1

This Page Intentionally Left Blank

Surface Water

The term *surface water* refers to bodies of water at the ground surface (DNR 2025). These include oceans, rivers, streams, lakes, ponds, reservoirs, springs, and wetlands. Approximately 75 percent of Washington’s total water supply comes from surface water sources (DNR 2025).

Washington’s coastal waters support a wide range of ecosystems. The coastal waters of Puget Sound and the Pacific Ocean are included in the WOTUS definition. Puget Sound is one of the largest estuaries in the United States. It plays a crucial role in the region’s ecology, providing habitat for many marine species and supporting commercial and recreational activities.

Washington is home to several major rivers, including the Columbia River, Snake River, and their tributaries, which are considered WOTUS. These rivers play a crucial role in the state’s ecosystem and economy. The Columbia River is the largest river in Washington, with an average discharge of about 265,000 cubic feet per second at its mouth. The Snake River, a major tributary, has an average discharge of about 56,900 cubic feet per second (USGS 2025a).

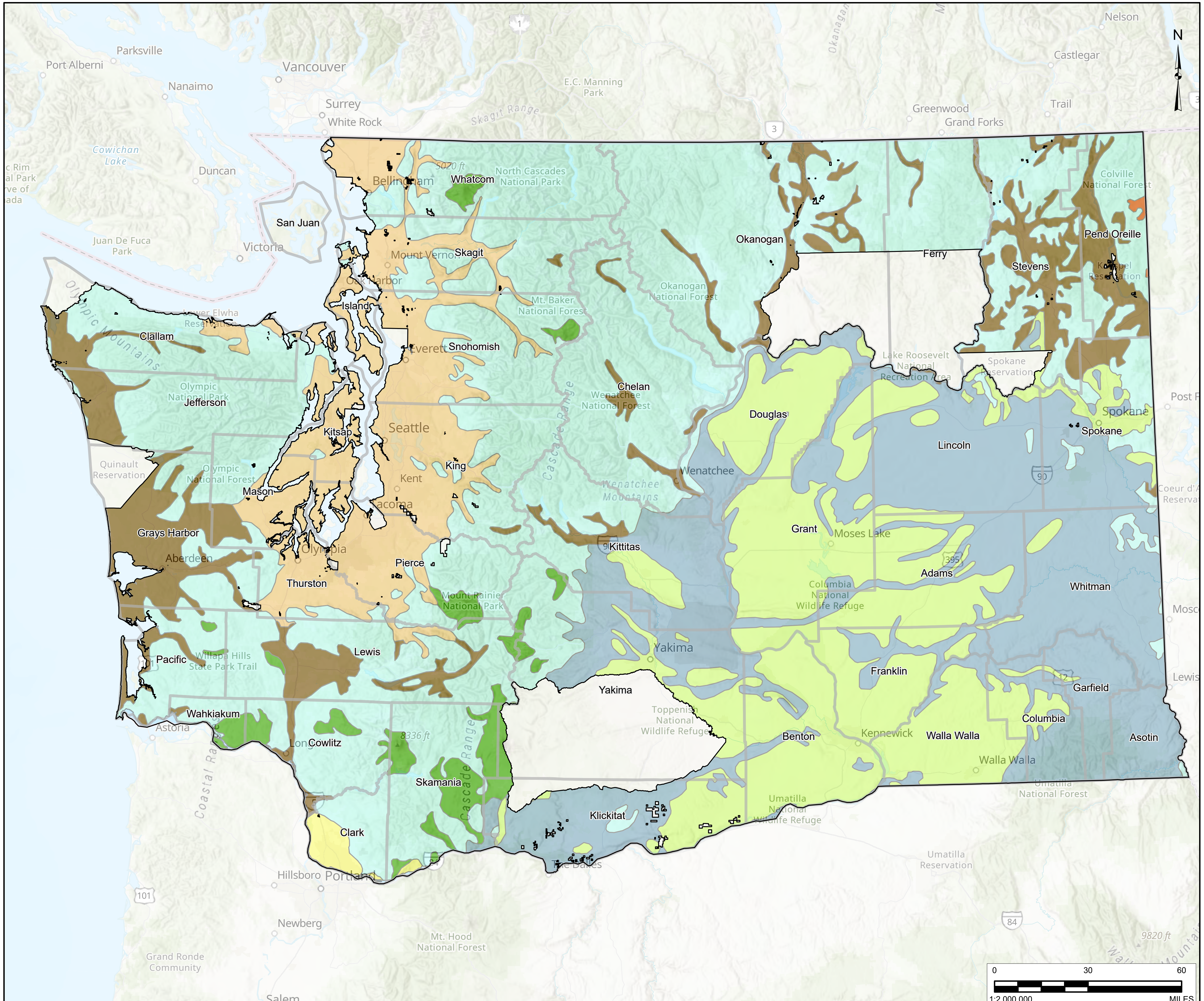
Washington has more than 8,000 lakes and reservoirs, and while all of them are considered Waters of the State, many are also considered WOTUS (DNR 2025). Lakes such as Lake Washington and Lake Chelan, as well as their numerous wetlands, are classified as WOTUS.

Groundwater

Groundwater provides about 25 percent of the state’s total water supply and over 60 percent of its drinking water (DNR 2025). An aquifer is a water-bearing geologic unit from which useful amounts of groundwater can be extracted. The underground location where the water collects is called a saturated zone. When there is enough water in the saturated zone to be pumped from a well, it is called an aquifer. Aquifers have the capacity to both store and transmit water. Both unconsolidated (i.e., soil) and consolidated (i.e., rock) units can yield sufficient water to be classified as an aquifer. Washington has seven principal aquifers,[88] as defined by the U.S. Geological Survey Ground Water Atlas of the United States (USGS 2025b). Principal aquifers in Washington are shown in **Figure 3.4-2.**

[88] A principal aquifer is a regional, extensive aquifer system with the potential to be used as a source of drinking water.

This Page Intentionally Left Blank



LEGEND

- Study Area
- County Boundary

Principal Aquifers (USGS, 2023)

- Columbia Plateau basaltic-rock aquifers
- Columbia Plateau basin-fill aquifers
- Northern Rocky Mountains Intermontane Basins aquifer system
- Pacific Northwest basaltic-rock aquifers
- Pacific Northwest basin-fill aquifers
- Puget Sound aquifer system
- Willamette Lowland basin-fill aquifers
- Other rocks

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES

1. SERVICE LAYER CREDITS: SOURCES: ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY, ESRI, USGS
2. PRINCIPAL AQUIFERS: USGS, 2023

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

PRINCIPAL AQUIFERS

YYYY-MM-DD 2025-03-18 CONSULTANT wsp FIGURE 3.4-2

This Page Intentionally Left Blank

There are several designations aimed at protecting groundwater resources, all serving slightly different purposes and managed through different frameworks, including the following:

- Critical Aquifer Recharge Areas (CARAs)
  - **Purpose:** To protect areas that are crucial for recharging aquifers used for drinking water.
  - **Designation:** Identified by local governments, such as cities and counites, based on factors like soil type, geology, and potential contamination sources. Ecology provides guidance and technical assistance to local governments to help identify and protect CARAs.
  - **Management:** Local regulations and BMPs are implemented to prevent contamination and ensure sustainable groundwater recharge.
- Sole Source Aquifers (SSAs)
  - **Purpose:** To protect aquifers that supply at least 50 percent of the drinking water for an area with no viable alternative sources.
  - **Designation:** Requires a formal petition to the EPA and a determination that the aquifer is the sole or principal source of drinking water.
  - **Management:** Federal review of projects that could potentially contaminate the aquifer, ensuring that federal funds are not used for projects that pose a risk. SSAs in Washington are listed in **Table 3.4-4** (FHWA, EPA, and WSDOT 2014).
- Groundwater Management Areas (GWMAs)
  - **Purpose:** To manage and protect groundwater resources in areas identified as vulnerable or overused.
  - **Designation:** Established under Chapter 173-100 WAC, designated by Ecology based on factors like groundwater quality, quantity, and usage.
  - **Management:** Development of groundwater management programs that include monitoring, regulation, and public education to ensure sustainable use. GWMAs have been designated in Yakima County and King County.

CARAs, SSAs, and GWMAs often overlap geographically, as they all aim to protect critical groundwater resources. For example, an SSA might be designated a CARA and fall within a GWMA.

Table 3.4-4: Sole Source Aquifers in Washington

Aquifer Name	Location
Bainbridge Island	Kitsap County
Camano Island	Island County
Cedar Valley	City of Renton King County
Central Pierce County	City of Tacoma Pierce County
Cross Valley	Snohomish County King County
Guemes Island	Skagit County

Aquifer Name	Location
Lewiston Basin	Asotin County Garfield County
Marrowstone Island	Jefferson County
Newberg Area	Snohomish County
Spokane Valley - Rathdrum Prairie	Spokane County
Troutdale	City of Vancouver Clark County
Vashon-Maury Island	King County
Whidbey Island	Island County

Source: EPA n.d.

Stormwater

Stormwater, which originates from precipitation like rain or snow, interacts with both surface water and groundwater. Washington's precipitation varies widely, from over 150 inches annually in the Olympic Peninsula to less than 10 inches in the Columbia Basin (NOAA 2022).

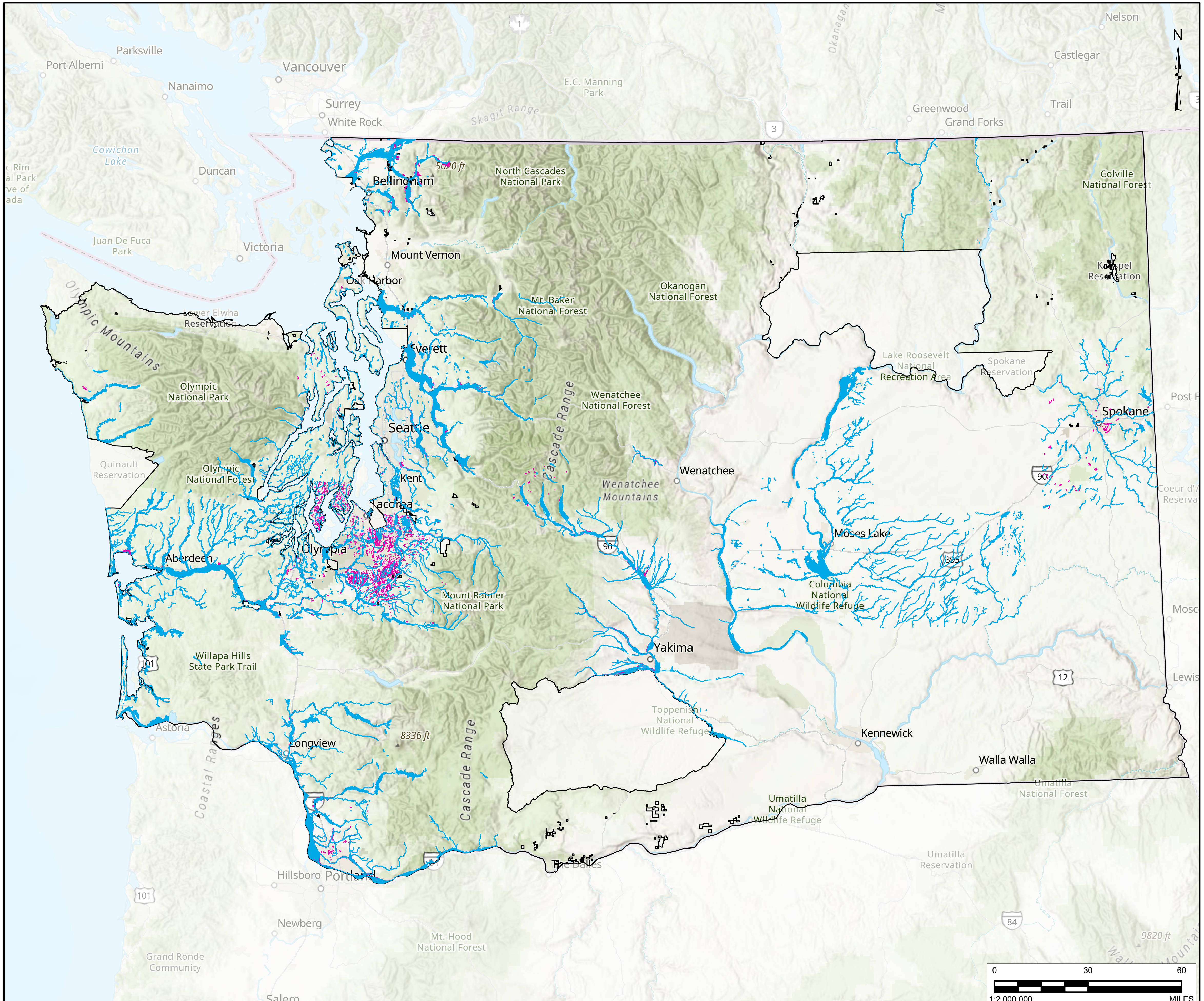
National Pollutant Discharge Elimination System (NPDES) permits for discharging stormwater are required for specific categories of facilities or activities (40 CFR § 122.26(a)). Facilities that use steam to generate electric power, including coal-handling sites, require industrial stormwater permit coverage (40 CFR § 122.26 (b)(14)(vii)); electric power transmission facilities generally do not.[89] Construction activities with ground disturbance require stormwater permit coverage if the disturbed area exceeds 1 acre. In Washington, construction stormwater permits are generally managed by Ecology. However, EFSEC can issue these permits if applicable. Construction stormwater permits and the associated control measures are intended to control discharge of pollutants to surface water and to control erosion, sediment transport, and discharge of suspended sediment to surface waters. Additionally, measures for controlling discharge of other pollutants are included in construction stormwater permit requirements.

Flooding

Flood Insurance Rate Maps issued by the Federal Emergency Management Agency (FEMA) delineate zones based on the probability of flood inundation. These maps typically depict zones with 1 percent and 0.2 percent chance annually of being flooded—i.e., the zones with 100-year and 500-year recurrence intervals, which are also known as the 100-year and 500-year floodplains. Additionally, flood maps typically depict floodways, which are the areas adjacent to stream channels that cannot be obstructed without causing upstream flood elevations to increase. The area between the floodway and the flood zone edge is the flood fringe.

Flood zones have been identified by FEMA adjacent to major streams and rivers in many populated areas throughout the state, as shown in **Figure 3.4-3.** Channel migration zones are areas where stream channels move over time. Channel migration is a natural process. Meandering streams are a common example of channels that migrate. A migrating channel can damage infrastructure by undermining foundations or eroding soil adjacent to underground transmission facilities.

[89] The Washington State Department of Ecology has the authority to require facilities to obtain coverage under the Industrial Stormwater General Permit or an individual stormwater permit if the facility is a significant contributor of pollutants to waters of the state or is reasonably expected to cause violations of any water quality standard.



LEGEND

- Study Area
- 100-Year Floodzone
- 500-Year Floodzone

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES
1. SERVICE LAYER CREDITS: SOURCES: ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY, ESRI, USGS
2. FLOODZONES: FEMA, 2024

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

FLOODZONES IDENTIFIED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY

YYYY-MM-DD 2025-03-18

CONSULTANT wsp

FIGURE
3.4-3

This Page Intentionally Left Blank

Water Quality

There are multiple approaches to water quality management in Washington, including the following:

- Clean Water Act (CWA) Section 303: Water Quality Standards
- CWA Section 404: Dredge and Fill Permits
- Source Water Protection Areas (SWPAs)
- Special Protection Areas (SPAs)
- Wellhead Protection Areas (WHPAs)

CWA Section 303: Water Quality Standards

Section 303 of the CWA requires that states assess surface water quality biannually and identify waterbodies that do not meet water quality criteria. Management of surface water quality under the CWA has been delegated to Ecology, though the EPA retains responsibility for NPDES permits for federally owned facilities and on Tribal lands within the state.

The list of waterbodies with impaired water quality is known as the 303(d) list. Ecology maintains an online database and a mapping tool called the Water Quality Atlas, where individuals can view the most current assessment results. The 303(d) list is part of the CWA requirements and helps prioritize waterbodies for restoration and protection efforts. Waterbodies are commonly listed for failing to meet water quality criteria, including:

- **Suspended Solids:** Particles that cloud the water and can harm aquatic life
- **Nutrients:** Excessive levels of nutrients like nitrogen and phosphorus (i.e., eutrophication), which can lead to algal blooms and other water quality issues
- **Microorganisms:** Pathogens, such as bacteria and viruses, that can pose health risks to humans and animals
- **Temperature:** Elevated water temperatures that can affect the health of fish and other aquatic organisms

For each waterbody on the 303(d) list, the state is required to identify the total maximum daily load (TMDL), which is the maximum amount of a pollutant that a waterbody can receive and attain water quality standards (EPA 2024). Typically, a TMDL is allocated between point sources such as wastewater treatment facilities, and non-point sources that essentially apply to an entire watershed except for point sources.

Permits are often required for activities that may impact 303(d) listed waterbodies in Washington. Activities that discharge pollutants into these waterbodies typically require an NPDES permit. These permits must comply with the TMDL requirements to ensure that pollutant levels do not exceed the established limits. Erosion and sediment control measures typically implemented at disturbed ground sites can be effective in controlling pollutant discharge to surface waters. Projects that include ground disturbance near 303(d) listed waterbodies may be subject to more stringent water quality control measures than typical to meet TMDL requirements.

CWA Section 404: Dredge and Fill Permits

Section 404 of the CWA regulates the discharge of dredged or fill material into WOTUS, including wetlands. Permits are required for such activities to ensure they do not harm water quality or aquatic ecosystems. All discharges that affect the bottom elevation of a waterbody must obtain a CWA Section 404 permit from the U.S. Army Corps of Engineers. Wetlands are present adjacent to many waterbodies and would be identified on a project-specific basis.

Source Water Protection Areas

SWPAs, as defined in the Safe Drinking Water Act, are areas designated to limit potential contamination of surface water sources of drinking water. These are analogous to WHPAs, described below) for groundwater sources of drinking water. The Washington State Department of Health oversees the SWPA program, which includes the following:

- **Sanitary Control Areas:** These are zones immediately surrounding drinking water sources, with specific regulations to prevent contamination. For wells, the radius is typically 100 feet, and for springs or surface water intakes, it is 200 feet (Washington State Department of Health 2012).
- **Watershed Control Programs:** These programs involve detailed inventories of potential contamination sources within a watershed and implement measures to control and monitor activities that could affect water quality (Washington State Department of Health n.d.).

Projects within SWPAs must comply with stringent regulations to prevent contamination of water sources. This often involves obtaining permits and adhering to specific construction practices designed to protect water quality. The Source Water Assessment Program provides a GIS mapping tool that visually represents drinking water source protection areas. This tool helps utilities, regulatory agencies, and the public understand and manage risks to water quality.

Special Protection Areas

SPAs, as defined by WAC 173-200-090, are designated to provide increased protection to certain groundwater sources due to their unique characteristics, such as the following:

- **Beneficial Use or Ecological Systems:** Groundwaters that support a beneficial use or an ecological system requiring more stringent criteria than drinking water standards.
- **Vulnerability to Pollution:** Groundwaters, including recharge areas and WHPAs, that are particularly vulnerable to pollution due to their hydrogeologic characteristics.
- **Sole Source Aquifer Status:** Groundwaters that have been designated as SSAs by federal authorities.

Wellhead Protection Areas

WHPAs, as defined by WAC 246-290-135, are crucial for safeguarding drinking water sources. WHPAs are divided into zones based on the time it takes for water to travel to the well or spring. These zones are typically set at six months, one year, five years, and 10 years. Responsibilities of local government authorities include:

- **Inventorying Contamination Sources:** Local authorities must identify and inventory potential sources of groundwater contamination within the WHPA.
- **Notification:** Local authorities are responsible for notifying owners and operators of contaminant sources about the WHPA boundaries and the results of the inventory.
- **Documentation:** Authorities must document these notifications and report them to regulatory agencies and local governments.

- **Contingency Planning:** It is essential to develop plans to address temporary or permanent loss of the water source due to contamination. This includes coordinating with emergency responders in case of a contaminant release.
- **Imposing Restrictions:** Local governments may impose restrictions and requirements on activities within WHPAs to minimize risks to the drinking water source.

3.4.3 Impacts

An assessment of impacts was completed for the construction, operation and maintenance, and upgrade or modification of transmission facilities within the Study Area.

3.4.3.1 Method of Analysis

The study area for a project-specific application would typically encompass several key regions and features, such as the following:

- **Project Site and Immediate Vicinity:** This includes the specific location of the project and the surrounding area that might be directly affected by construction and operation and maintenance activities.
- **Watershed and River Basins:** The study area would be large enough to determine if there were any impacts on watershed or river basins.
- **Wetlands and Floodplains:** The study area would be large enough to determine if there were any impacts on wetlands and floodplains.
- **Groundwater Aquifers:** Groundwater aquifers in the vicinity of the project would be included within the study area to evaluate impacts on groundwater resources.

This Draft Programmatic EIS analyzes the affected environment and impacts on water resources within the Study Area defined in Chapter 2. Three project phases for each transmission facility type were considered: construction, operation and maintenance, and upgrade or modification. This evaluation considers overhead transmission facilities and underground transmission facilities for each phase. Overhead transmission facilities consist of transmission lines and substations and similar ancillary infrastructure. Overhead transmission facilities also incorporate above-ground infrastructure that may be associated with underground transmission facilities (e.g., clearing footprint required for launch and retrieval shafts for trenchless construction). Underground transmission facilities consist of underground transmission lines, underground access vaults, and other below-ground infrastructure. The construction of underground transmission facilities includes open trench, trenchless, and underwater construction methods.

Impact Determination

The discussion of impacts is qualitative given the high-level nature of a Programmatic EIS; quantification would require project-specific details to analyze. **Table 3.4-5** describes the criteria used to evaluate impacts from the Action Alternative and No Action Alternative. Information reviewed to identify impacts on water resources in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping.

Table 3.4-5: Criteria for Assessing the Impact Determination on Water Resources

Impact Determination	Description
Nil	No foreseeable impacts are expected. The transmission facility would not adversely affect the watershed or river basins, wetlands and floodplains, or groundwater aquifers during any phase (e.g., construction, operation and maintenance, or update and modification). A project would not cause water quality degradation, water access reduction, redirection, or wetland destruction.
Negligible	Changes would either be non-detectable or, if detected, would have only slight effects. A project would cause only minor water disturbance, with no water quality degradation, water access reduction, redirection, or wetland destruction. There would be no noticeable changes to watershed or river basins, wetlands and floodplains, or groundwater aquifers of the area. A project would not be adversely affected by existing hydrological conditions. Best management practices and design considerations are expected to be effective.
Low	A project is expected to have minor but noticeable effects on water resources, even with the implementation of best management practices and design considerations. A project would cause some water quality and access disturbance, but it would be limited in extent and duration. There may be minor changes to watershed or river basins, wetlands and floodplains, or groundwater aquifers, but these would not affect the water resources of the area. Minor adjustments may be needed to account for existing hydrological conditions. Impacts would be short term and nonsignificant.
Moderate	Adverse impacts are likely to occur even with the implementation of best management practices and design considerations. A project would cause noticeable water quality degradation, water access reduction or redirection, or wetland destruction. There may be moderate changes to watershed or river basins, wetlands and floodplains, or groundwater aquifers, which could affect the water resources of the area. These changes would require careful monitoring and management. A project may be moderately affected by existing hydrological conditions, necessitating specific design considerations. Moderate impacts may be long-term, occurring over one or more project phases. Moderate impacts have the potential to be significant.
High	A project is expected to have significant and potentially severe effects on water resources. A project would cause extensive water quality and access disturbance, including significant water quality degradation, water access reduction, redirection, or wetland destruction and potential loss of hydrological formations. These impacts could be difficult to fully mitigate. There would be substantial changes to watershed or river basins, wetlands and floodplains, or groundwater aquifers, which could affect the water resources of the area. This might include increased risk of drought, flood, or other water issues. A project is highly vulnerable to existing hydrological conditions, requiring extensive design and construction measures to address these risks. High impacts may be permanent or continue for the duration of the project.

To clearly understand the potential severity of impacts without any interventions, the following impact determinations exclude the use of avoidance criteria and mitigation measures. The ratings assume compliance with all federal, state, and local laws and regulations, as well as standardized BMPs and design considerations. Assessing impacts without avoidance criteria or mitigation measures offers a baseline understanding of potential environmental effects, helping to identify the true extent of these impacts. Environmental laws often require that initial impact assessments be conducted without considering mitigation to maintain the integrity of the environmental review process.

The following categories of effects were considered: surface water quality, surface water quantity, groundwater quality, groundwater quantity, damage by water, and adverse effects of infrastructure on upstream flooding.

3.4.3.2 Action Alternative

Construction

Overhead Transmission Facilities

Activities for the construction phase of overhead transmission facilities would vary and depend on the scale of the facility and site characteristics. Construction could include a site preparation phase of relatively short duration (e.g., a few months), followed by a longer construction and start-up phase. It is assumed that the construction phase of overhead transmission, per mile, would have a shorter duration than underground construction. Overhead transmission facilities infrastructure could have the following identified impacts during the construction phase:

- Impacts on Water Quality
- Impacts on Water Quantity
- Damage to Infrastructure

Impacts on Water Quality

Impacts to water quality during the construction of an overhead transmission facility could include changes in sedimentation and water chemistry. The construction of overhead transmission facilities typically includes ground disturbance, which can result in increased soil erosion and sediment transport that, if not controlled, increases suspended solids concentrations and sedimentation in surface waterbodies. Sources of erodible materials can include excavations for footings, blasting locations, and soil stockpiles.

Spills that occur near waterbodies can also change water quality through the introduction of deleterious substances such as lubricants, oils, and fuel. Typical sources of spills during the construction phase include construction equipment (handheld and machinery) operating near watercourses. Spills to land can also impact groundwater quality if spilt material is allowed to seep into the ground.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Impacts on Water Quantity

The construction of transmission facilities can have several impacts on water quantity, including:

- **Increased Water Usage:** Construction activities often require water for dust control, concrete mixing, and other processes, which can strain local water resources.
- **Altered Hydrology:** The clearing of vegetation and soil compaction can change the natural flow of water, potentially leading to reduced infiltration and increased surface runoff.
- **Temporary Water Diversions:** Construction may involve temporary diversions of waterbodies to facilitate the building process, which can affect the availability of water downstream.
- **Groundwater Extraction:** In some cases, groundwater may be extracted for construction needs, which can lower the water table and affect nearby wells and ecosystems. Groundwater extraction and management can also be required at excavations and trenches to keep these sites dry.

The implementation of established best management practices (BMPs) from the resources identified in **Table 3.4-2**, would minimize impacts on surface water quality and surface water or groundwater quantity. Additional mitigation measures to protect water resources are identified in Section 3.4.4.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Damage to Infrastructure

During the construction of transmission facilities, there is potential for flood water and storm surge events to inundate construction sites. During flooding or storm surge events, construction sites can become inundated with water, resulting in potential damage to equipment and materials, increased risk of delays in construction timelines, and heightened safety hazards for workers on site. Damage to infrastructure could also occur if weather events cause watercourse scour or debris deposition in floodways near construction sites.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Activities for the construction phase of underground transmission facilities, including open trench, trenchless (including horizontal directional drilling), or underwater construction methods, would vary depending on the scale of the facility and site characteristics. Similar to overhead transmission facilities, construction underground could include a site preparation phase of relatively short duration, followed by a longer construction and start-up phase. It is assumed that the construction phase for underground transmission facilities, per mile, would have a longer duration than overhead projects. Underground transmission could have the following identified impacts during the construction phase:

- Impacts on Water Quality
- Impacts on Water Quantity
- Damage to Infrastructure

Impacts on Water Quality

Impacts during the construction of underground transmission facilities would be similar to impacts during the construction phase of overhead transmission facilities. However, construction of underground facilities poses an increased risk of sedimentation in waterbodies during installation of underwater transmission facilities that may disturb sediments at the bottom of a waterbody.

Installation of underwater facilities could also resuspend contaminated sediments into the water column. Contaminated sediments that may accumulate and become buried in a waterbody include heavy metals, polychlorinated biphenyls (PCBs), and toxic substances. These substances can originate from various sources, such as mine waste, industrial runoff, or agricultural chemicals.

The construction of underground transmission facilities that disturbs the bottom of a waterbody would likely require a CWA Section 404 Permit. In addition to activities within navigable waters, construction or maintenance activities that involve excavation (dredging) or placing fill in wetlands require a permit.

Similar to construction of overhead transmission facilities, spills and leaks from machinery and other equipment used near waterbodies could result in input of deleterious substances into these systems. Spills to the ground can also result in impacts on groundwater quality.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Impacts on Water Quantity

The construction of underground transmission facilities would have impacts on water quantity similar to those for overhead construction; however, increased ground disturbance associated with trenching may increase impacts on water quantity, including the following:

- **Increased Water Usage:** Underground construction activities often require large amounts of water for dust control, concrete mixing, and other processes, which can strain local water resources.
- **Altered Hydrology:** The clearing of vegetation, soil excavation, and compaction can change the natural flow of water, potentially leading to reduced infiltration and increased surface runoff.
- **Temporary Water Diversions:** Underground construction may involve temporary diversions of waterbodies to facilitate the building process, which can affect the availability of water downstream.
- **Groundwater Extraction:** In some cases, groundwater may be extracted for construction needs and to maintain dry trenches, which can lower the water table and affect nearby wells and ecosystems.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Damage to Infrastructure

During construction of underground facilities, there is potential for damage to infrastructure from flooding if facilities are located within floodplains or coastal flood hazard areas. During flooding or storm surge events, underground construction sites can become inundated with water, resulting in compromised structural integrity, potential damage to equipment and materials, increased risk of delays in construction timelines, and heightened safety hazards for workers on site.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Operation and Maintenance

Overhead Transmission Facilities

Activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and rights-of-way (ROWs), similar to any other linear industrial facility. Overhead transmission facilities could have the following identified impacts during the operation and maintenance phase:

- Impacts on Water Quality

- Damage to Infrastructure

Impacts on Water Quality

During the operation and maintenance of transmission facilities, there is the potential for surface water and groundwater quality degradation if petroleum liquids are leaked or spilled during use of vehicles or other maintenance equipment. Other sources of deleterious substances that could impact surface water and groundwater quality include spills of concentrated herbicides, pesticides, and liquids used in electrical equipment, as well as improper disposal of these materials.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be negligible to low.

Damage to Infrastructure

Electrical equipment could be damaged during the operation and maintenance of transmission facilities due to inundation during a flood event or storm surge. Damage to infrastructure in floodways could occur if scour patterns destabilize waterbody banks. Damage to infrastructure could occur if channel migration resulted in soil erosion that undermined facilities or damaged foundations. Further, debris migrating downstream can collide and collect around water infrastructure or be deposited against infrastructure during flood events, resulting in damage to these features.

The implementation of established BMPs from the resources identified in **Table 3.4-2** would minimize the identified impacts on water resources.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Similar to overhead transmission facilities, activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs, similar to any other linear industrial facility. Underground transmission could have the following identified impacts during the operation and maintenance phase:

- Impacts on Water Quality
- Damage to Infrastructure

Impacts on Water Quality

Spills and leaks of petroleum, herbicides, pesticides, and liquids used in electrical equipment could occur during the operation and maintenance of underground transmission facilities. Spills and leaks could impact surface water and groundwater quality.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be negligible to low.

Damage to Infrastructure

Impacts during the operation and maintenance of underground transmission facilities would be similar to impacts during the operation and maintenance of overhead transmission facilities; however, underground systems would be more vulnerable to damage by flooding.

Underground transmission facilities that are located within floodplains or coastal flood hazard areas may be vulnerable to water damage during flooding or storm surge events. Water inundation of vaults and substations can result in damaged equipment, compromised functionality, and safety hazards. In coastal regions, saltwater infiltration can accelerate corrosion of metal materials and further damage underground facility components.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Upgrade or Modification

Overhead Transmission Facilities

Upgrading or modifying overhead transmission facilities would involve several key steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Similar to the construction phase, overhead transmission could have the following identified impacts during the upgrade or modification phase:

- Impacts on Water Quality
- Impacts on Water Quantity
- Damage to Infrastructure

While adverse impacts would be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Reduced Land and Water Disturbance:** Upgrading or modifying existing infrastructure typically involves less disturbance to land and waterbodies than building new facilities, which often require new ROWs and can impact previously undisturbed areas.
- **Minimized Erosion and Sedimentation:** Modifications usually result in less soil disturbance, thereby reducing the risk of erosion and sedimentation in nearby waterbodies.
- **Lower Risk of Water Contamination:** Upgrading existing infrastructure often involves less extensive ground disturbance and construction activity, so there is less risk of spills and leaks occurring and contaminating water resources during construction.
- **Efficient Use of Existing Infrastructure:** Utilizing existing infrastructure can minimize the need for new water crossings and other activities that could affect water quality.

Underground Transmission Facilities

Upgrading or modifying underground transmission facilities could involve several key steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Similar to the construction phase, underground transmission could have the following identified impacts during the upgrade or modification phase:

- Impacts on Water Quality
- Impacts on Water Quantity
- Damage to Infrastructure

While adverse impacts would be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Reduced Land and Water Disturbance:** Upgrading or modifying existing infrastructure typically involves less disturbance to land and waterbodies than building new facilities, which often require new ROWs and can impact previously undisturbed areas.
- **Minimized Erosion and Sedimentation:** Modifications usually result in less soil disturbance, thereby reducing the risk of erosion and sedimentation in nearby waterbodies.
- **Lower Risk of Water Contamination:** Upgrading existing infrastructure often involves less extensive ground disturbance and construction activity, so there less risk of spills and leaks occurring and contaminating water resources during construction.
- **Efficient Use of Existing Infrastructure:** Utilizing existing infrastructure can minimize the need for new water crossings and other activities that could affect water quality.

3.4.3.3 No Action Alternative

The No Action Alternative represents the scenario in which this Draft Programmatic EIS is not used and current management practices for siting and planning transmission facilities continue unchanged. Under this alternative, each project would continue to be evaluated on a case-by-case basis and reviewed for compliance with existing regulations, codes, and standard practices. While impact determinations would likely be similar to those outlined in this Draft Programmatic EIS, projects would not benefit from the impact reductions associated with the avoidance criteria developed and analyzed in this Draft Programmatic EIS. These criteria are anticipated to provide additional mitigation that further reduces potential environmental impacts.

3.4.4 Potential Mitigation Measures

This section describes measures that would eliminate, reduce the intensity of, or compensate for adverse impacts from construction, operation and maintenance, and upgrade or modification of transmission facilities. All general conditions adopted for this Draft Programmatic EIS, identified in Section 3.1, are relevant to this resource section. Applicants would be responsible for providing information within their application materials documenting the implementation of the general conditions.

Avoidance criteria adopted for this Draft Programmatic EIS are identified in Section 3.1. Avoidance criteria that are relevant to this resource section are described below:

AVOID-1 – Hazardous Areas: Avoid known hazardous areas, including but not limited to, contaminated soils, geologically hazardous areas, landfills, and cutbanks.

Rationale: Avoiding hazardous areas provides safety for workers, the public, infrastructure, as well as environmental protection. Disturbing sites of known contamination or other hazards may require the development of remediation plans.

AVOID-2 – Wetland Disturbance: Avoid impacts within 300 feet of all wetlands.

Rationale: Protecting wetland vegetation would decrease the chances of wetland degradation during construction activities as these areas are important for sustained wetland function. Wetlands within the project footprint would be delineated following the U.S. Army Corps of Engineers wetland delineation methodology.

AVOID-3 – **Sensitive Water Features:** Avoid impacting areas sensitive to degradation, including adjusting the layout of new transmission facilities to steer clear of sensitive water features.

Rationale: Avoiding sensitive water features that are susceptible to degradation from construction activities including changes to the water features' physical characteristics (e.g., banks, bathymetry and substrate), as well as chemical properties. Avoiding these areas helps preserve their structure and function.

AVOID-4 – Floodplains: Avoid having equipment or infrastructure within floodplains.

Rationale: This avoidance criterion would eliminate the potential for damage to infrastructure and electrical safety hazards because of inundation and would avoid some riparian ecosystems.

AVOID-5 – Areas of Rapid Channel Migration: Avoid having equipment or infrastructure in areas of rapid channel migration.

Rationale: This avoidance criterion would eliminate potential damage to infrastructure caused by erosion of soil or foundations for infrastructure, if a channel were to migrate.

Applicants would be responsible for providing information within their application materials documenting the project's compliance with the above avoidance criteria.

Potential mitigation measures have been identified to minimize adverse impacts from transmission facility projects. These measures are intended to be broad so that they can be applied to most projects that would be covered under this Programmatic EIS. However, project-specific plans would be needed to adapt the measures for project-specific applications.

When impact determinations are identified as moderate or high, the applicant would either adopt applicable mitigation measures from this Programmatic EIS or the SEPA Lead Agency may require applicable mitigation measures to be implemented to reduce project-specific impacts. When impact determinations are low, applicable mitigation measures should still be considered by the applicant and the SEPA Lead Agency as these measures would help to further reduce project-specific impacts, including the project's contribution to cumulative impacts. These measures would be implemented in addition to compliance with laws, regulations, environmental permits, plans, and design considerations required for transmission facilities.

The following mitigation measures could be adopted to mitigate adverse impacts:

W-1 – Minimize Water Use: Minimize water use, to the greatest extent practicable.

Rationale: Minimizing water use during construction and operation and maintenance of transmission facilities in Washington is essential for both environmental sustainability and cost efficiency.

W-2 – Clear Spanning or Trenchless Methods for Water Crossings: When feasible, use clear spanning for overhead transmission or trenchless construction for underground transmission to minimize disturbance to riparian areas, wetlands and wetland buffers, and surface waters.

Rationale: By clear spanning with overhead transmission lines, water resources and associated vegetation would remain intact and continue to provide ecological functions and habitat for wildlife.

Trenchless construction methods significantly reduce surface disruption compared to traditional trenching methods and help prevent soil erosion and sedimentation in waterbodies.

Maintaining intact vegetation also helps mitigate soil erosion and sedimentation and provides bank stability. The closed nature of trenchless methods reduces the risk of contaminants entering waterbodies and mitigates impacts on the surrounding environment, including vegetation and wildlife habitats.

W-3 – Phased Construction: Sequence and schedule construction, maintenance, and upgrade/replacement activities when near surface waterbodies to minimize erosion and sediment transport.

Rationale: Construction sequencing, in which activities are planned and executed in phases, helps limit the amount of exposed soil at any given time. This approach reduces the risk of erosion and sediment transport by allowing disturbed areas to be stabilized before moving to new sections. The scheduling of activities during seasonal dry periods would mitigate impacts associated with high water, as well as adverse effects on the environment related to working in wet conditions or in water.

W-4 – Store Chemicals, Operate Equipment, and Conduct Maintenance away from Water: Store fuel, oils, and lubricants away from watercourses. Maintain, repair, and/or service vehicles and equipment away from watercourses and at designated repair facilities whenever possible. Operate equipment and machinery from the top of the bank and outside of riparian areas, wetlands and wetland buffers, and surface waters.

Rationale: This mitigation measure aims to reduce impacts on water quality (contaminants, sediment), fish, and aquatic habitat.

W-5 – Implement Erosion and Sediment Control Measures: Implement effective and appropriate erosion control measures in construction and operation to mitigate runoff into streams.

Rationale: This mitigation measure aims to reduce sediment loading[90] into stream reaches and maintain water quality and fish habitat quality.

W-6 – Minimize Hydrology Changes: Minimize water diversions or changes to natural hydrology, to the extent possible. Natural hydrology would be restored to the site following construction.

Rationale: Minimizing changes in hydrology would reduce the effects of transmission line development on plant communities within and adjacent to the ROW. Vegetation communities can be sensitive to

[90] The amount of sediment in a waterbody.

changes in the amount of water they receive—in particular, ecosystems like wetlands that rely on intact hydrology for persistence.

W-7 – SWPAs, SPAs, and WHPAs: Locate substations, underground vaults, and any facility where materials that could degrade groundwater quality are used or stored, outside of surface water protection areas, special protected areas, and wellhead protection areas to the greatest extent possible.

Rationale: This mitigation measure aims to minimize potential for groundwater contamination that could result in a water supply well being removed from service temporarily or permanently.

In addition to the above mitigation measures, the following mitigation measures[91] developed for other resources may be applicable:

Geo-1 – Minimize Soil Disturbance: Minimize soil disturbance, including footprints related to access roads and permanent structures, to the greatest extent practicable. Minimize the use of construction techniques that would be harmful to topsoil composition, where feasible.

Geo-3 – **Slope Stabilization:** Use retaining walls, terracing, and vegetation to stabilize slopes and prevent landslides when appropriate to do so.

Geo-5 – **Drainage Control:** Implement effective drainage systems and manage water runoff to reduce soil saturation.

Geo-7– Environmental Assessments: Perform detailed environmental assessments to identify potential contamination.

Geo-8 – Minimize Impacts on Sensitive Soils: Design projects to minimize impacts on high erodibility zones and areas sensitive to degradation.

Veg-3 – Site Transmission Facilities in Existing ROW or Disturbed Areas: Site transmission facilities in existing right-of-way (ROW) or disturbed areas, to the greatest extent practicable.

Veg-6 – Revegetation Plan: Prepare a revegetation plan for areas of temporary disturbance from construction of the transmission facility.

Hab-1 – Use of Pesticides, Herbicides, and Fungicides: Minimize using harmful chemicals, including pesticides, herbicides, and fungicides, during the construction and operation and maintenance phases of transmission facility projects.

Hab-3 – Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines: Minimize transmission line crossings of canyons and draws, along ridge lines, parallel to rivers, and within riparian habitat.

Hab-7 – Vehicle and Equipment Use and Maintenance: Prohibit vehicles and other equipment from idling when not in use during construction. Vehicles and other equipment would be inspected daily for leaks and would be kept in good condition. Vehicles and equipment would only be stored with proper spill protection

[91] The rationales for the identified mitigation measures are provided in their respective resource sections.

measures in place and in areas where contaminants would not enter the environment, watercourses, or riparian areas if spills were to occur.

Hab-8 – Worker Education Program: Develop a worker education program for implementation during project construction and operation. The program would train workers on operating near sensitive wildlife habitat and features, sensitive wildlife periods, working around watercourses and riparian features, management of wildlife attractants, management of special status species, wildlife reporting, and wildlife mortality reporting.

Fish-2 – Design Perpendicular Approaches: Construct transmission facility access road approaches and crossings perpendicular to streams or rivers and maintain the existing channel form and dimensions.

Fish-4 – Fords: Minimize low-water crossings (fords) by selecting the use of temporary bridges if temporary access is needed to cross waterways.

Fish-5 – Delineate Riparian Management Zones: Delineate riparian management zones or buffers where certain activities (vegetation clearing or herbicide treatment) may be restricted.

Fish-7 – Work in Dry Conditions: Plan and schedule work in streams during dry conditions or when flows are anticipated to be at their lowest, when possible.

Fish-11 – Regular Maintenance of Infrastructure: Regularly inspect and maintain infrastructure during operation to prevent leaks and spills into aquatic habitat.

Fish-13 – Reduce Number of Stream Crossings: Design transmission facilities to reduce the number of stream crossings. Access roads and utilities would share common rights-of-way.

Fish-14 – Use Bioengineering: Design stabilization structures to incorporate bioengineering principles; for example, use of living and nonliving plant materials in combination with natural and synthetic support material for slope stabilization, erosion reduction, and vegetation establishment.

Fish-16 – In-stream Sediment Disruption: If transmission facility construction requires open-cut trenching or would generate in-stream sedimentation, then establish a dilution zone suitable to the location and flow where sediment impacts are minimized.

H&S-3 – Hazardous Material Management Plan: Develop and implement a project-specific Hazardous Material Management Plan that outlines procedures for air contaminants, contaminated soil, or groundwater encountered incidentally during construction, including emergency notification and suspension of construction activities in the suspected area until the type and extent of contamination are determined.

3.4.5 Probable Significant Adverse Environmental Impacts

Determining the significance of an impact involves context and intensity, which, in turn, depend on the magnitude and duration of the impact. “Significant” in the Washington State Environmental Policy Act means a reasonable likelihood of more than a moderate adverse impact on environmental quality. An impact may also be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred (WAC 197-11-794).

Identification of environmental impacts and assignment of discipline-specific ratings is based on professional judgment and information available at the time of writing. A precautionary approach has been taken for the assessment where information is currently unknown or unavailable.

This Draft Programmatic EIS weighs the impacts on water resources that could result from transmission facilities after considering the application of laws and regulations; siting and design considerations, including agency guidance and BMPs; and mitigation and makes a resulting determination of significance for each impact. **Table 3.4-6** summarizes the impacts anticipated for the construction, operation and maintenance, and upgrade or modification of transmission facilities.

This Page Intentionally Left Blank

Table 3.4-6: Summary of Impacts, Mitigation Measures, and Significance Rating for Water Resources

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Water – Impacts on Water Quality	Construction	Water quality could be impacted during the construction phase from increased suspended solids and sedimentation, and changes in physical and chemical water quality parameters. Ground disturbance, stockpiling, and construction in and around surface water features can result in erosion and sediment transport leading to increased turbidity. Loss of vegetation cover, spills, leaks, and improper storage of materials can result in changes to physical (e.g., temperature, pH) and chemical (e.g., metal) water quality characteristics.	**Overhead:** low to high **Underground:** low to high	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-3:** Sensitive Water Features ▪ **AVOID-4:** Floodplains ▪ **AVOID-5:** Areas of Rapid Channel Migration ▪ **W-1:** Minimize Water Use ▪ **W-2:** Clear Spanning or Trenchless Methods for Water ▪ **W-3:** Phased Construction ▪ **W-4:** Store Chemicals, Operate Equipment, and Conduct Maintenance away from Water ▪ **W-5:** Implement Erosion and Sediment Control Measures ▪ **W-6:** Minimize Hydrology Changes ▪ **W-7:** SWPAs, SPAs, and WHPAs ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Geo-3:** Slope Stabilization ▪ **Geo-5:** Drainage Control ▪ **Geo-7:** Environmental Assessments ▪ **Geo-8:** Minimize Impacts on Sensitive Soils ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas ▪ **Veg-6:** Revegetation Plan ▪ **Hab-1:** Use of Pesticides, Herbicides, and Fungicides ▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-7:** Vehicle and Equipment Use and Maintenance ▪ **Hab-8:** Worker Education Program ▪ **Fish-2:** Design Perpendicular Approaches ▪ **Fish-4:** Fords	Less than Significant	Adverse impacts to water quality associated with the construction, operation, and upgrade or modification of overhead and underground transmission facilities can be managed through the application of regulatory requirements, standard BMPs, avoidance criteria, and mitigation measures. With the application of these measures, it is expected that impacts to water quality would be less than significant.
	Operation and Maintenance	Maintenance activities can lead to soil erosion, increasing sediment in nearby water bodies. Excavation for underground cables during maintenance can disrupt soil structure, leading to sedimentation in water bodies. In both instances, sedimentation would lead to impacts on water quality. Accidental spills of chemicals or fuels used in maintenance of overhead and underground transmission facilities can contaminate surface water and groundwater resulting in impacts on water quality.	**Overhead:** negligible to low **Underground:** negligible to low			
	Upgrade or Modification	Water quality could be impacted during the upgrade or modification phase from increased suspended solids and sedimentation, and changes in physical and chemical water quality parameters. Ground disturbance, stockpiling, and construction in and around surface water features can result in erosion and sediment transport leading to increased turbidity. Loss of vegetation cover, spills, leaks, and improper storage of materials can result in changes to physical (e.g., temperature, pH) and chemical (e.g., metal) water quality characteristics.	**Overhead:** low to high **Underground:** low to high			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
				▪ **Fish-5:** Delineate Riparian Management Zones ▪ **Fish-7:** Work in Dry Conditions ▪ **Fish-11:** Regular Maintenance of Infrastructure ▪ **Fish-13:** Reduce Number of Stream Crossings ▪ **Fish-14:** Use Bioengineering ▪ **Fish-16:** In-stream Sediment Disruption ▪ **H&S-3:** Hazardous Material Management Plan		
Water – Impacts on Water Quantity	Construction	The construction of transmission facilities can impact water quantity in various ways, including increasing surface water runoff, water diversion, groundwater disruption, and dewatering.[92]	**Overhead:** negligible to high **Underground:** low to high	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-3:** Sensitive Water Features ▪ **AVOID-4:** Floodplains ▪ **AVOID-5:** Areas of Rapid Channel Migration ▪ **W-1:** Minimize Water Use ▪ **W-2:** Clear Spanning or Trenchless Methods for Water ▪ **W-3:** Phased Construction ▪ **W-6:** Minimize Hydrology Changes ▪ **W-7:** SWPAs, SPAs, and WHPAs ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Geo-3:** Slope Stabilization ▪ **Geo-5:** Drainage Control ▪ **Geo-7:** Environmental Assessments ▪ **Geo-8:** Minimize Impacts on Sensitive Soils ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas ▪ **Veg-6:** Revegetation Plan ▪ **Hab-1:** Use of Pesticides, Herbicides, and Fungicides ▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and	Less than Significant	Adverse impacts can be avoided or minimized by using alternate water sources (e.g., trucking in water) and reducing water consumption requirements. With the application of avoidance and mitigation measures impacts to water quantity during construction and upgrade or modification of overhead and underground transmission facilities are expected to be less than significant.
	Operation and Maintenance	This impact is not anticipated to occur during the operation and maintenance of overhead or underground transmission facilities.	**Overhead:** N/A **Underground:** N/A			
	Upgrade or Modification	The upgrade and modification of transmission facilities can impact water quantity in various ways, including increasing surface water runoff, water diversion, groundwater disruption, and dewatering.	**Overhead:** negligible to high **Underground:** low to high			

[92] The process of removing groundwater or surface water from a construction site. This is typically done to create a dry and stable environment for excavation, foundation work, or other construction activities.

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
				Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-7:** Vehicle and Equipment Use and Maintenance ▪ **Hab-8:** Worker Education Program ▪ **Fish-2:** Design Perpendicular Approaches ▪ **Fish-4**: Fords ▪ **Fish-5:** Delineate Riparian Management Zones ▪ **Fish-7:** Work in Dry Conditions ▪ **Fish-11:** Regular Maintenance of Infrastructure ▪ **Fish-13:** Reduce Number of Stream Crossings ▪ **Fish-14:** Use Bioengineering ▪ **Fish-16:** In-stream Sediment Disruption ▪ **H&S-3:** Hazardous Material Management Plan		
Water – Damage to Infrastructure	Construction	Flooding or storm surge events that occur during construction of a transmission facility could result in damage to equipment and materials, schedule delays, and worker hazards.	**Overhead:** negligible to high **Underground:** low to high	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-3:** Sensitive Water Features ▪ **AVOID-4:** Floodplains ▪ **AVOID-5:** Areas of Rapid Channel Migration ▪ **W-2:** Clear Spanning or Trenchless Methods for Water ▪ **W-3:** Phased Construction ▪ **W-7:** Minimize Hydrology Changes ▪ **W-8:** SWPAs, SPAs, and WHPAs ▪ **Geo-3:** Slope Stabilization ▪ **Geo-5:** Drainage Control ▪ **Geo-7:** Environmental Assessments ▪ **Geo-8:** Minimize Impacts on Sensitive Soils ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas ▪ **Veg-6:** Revegetation Plan ▪ **Fish-4:** Fords	Less than Significant	Adverse impacts to infrastructure from flooding, storm surges, stream migration, and erosion and back destabilization can be mitigated with the application of avoidance and mitigation criteria such that adverse effects are expected to be less than significant.
	Operation and Maintenance	Flooding and storm surge events during operation and maintenance could result in damage to equipment, and electrical equipment (substations and similar). Channel migration during the operation period could result in soil erosion and scour leading to damage to foundations of infrastructure. Similarly, flooding or debris migration at towers located in floodways could result in damage to fill or foundations of ancillary infrastructure.	**Overhead:** low to high **Underground:** low to high			
	Upgrade or Modification	Flooding or storm surge events that occur during construction of a transmission facility could result in damage to equipment and materials, schedule delays, and worker hazards.	**Overhead:** negligible to high **Underground:** low to high			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[a]	Significance after Applying Mitigation	Rationale for Significance Rating
				▪ **Fish-5:** Delineate Riparian Management Zones ▪ **Fish-7:** Work in Dry Conditions ▪ **Fish-13:** Reduce Number of Stream Crossings ▪ **Fish-14:** Use Bioengineering ▪ **Fish-16:** In-stream Sediment Disruption ▪ **H&S-3:** Hazardous Material Management Plan		

Notes:

(a) Appendix 3.9-1 provides a detailed listing of each general condition, avoidance criteria, and mitigation measure. Having these details in an appendix serves as a comprehensive reference section that can be consulted independently of the main text. This is particularly useful for detailed guidance and technical specifications that may be referred to multiple times. Additionally, including this information in an appendix allows for easier updates and revisions. If mitigation measures or guidelines change, the appendix can be updated without altering the main content.

BMP = best management practice; N/A = not applicable; ROW = right-of-way; SPA = special protection area; SWPA = surface water protection area; WHPA = wellhead protection area

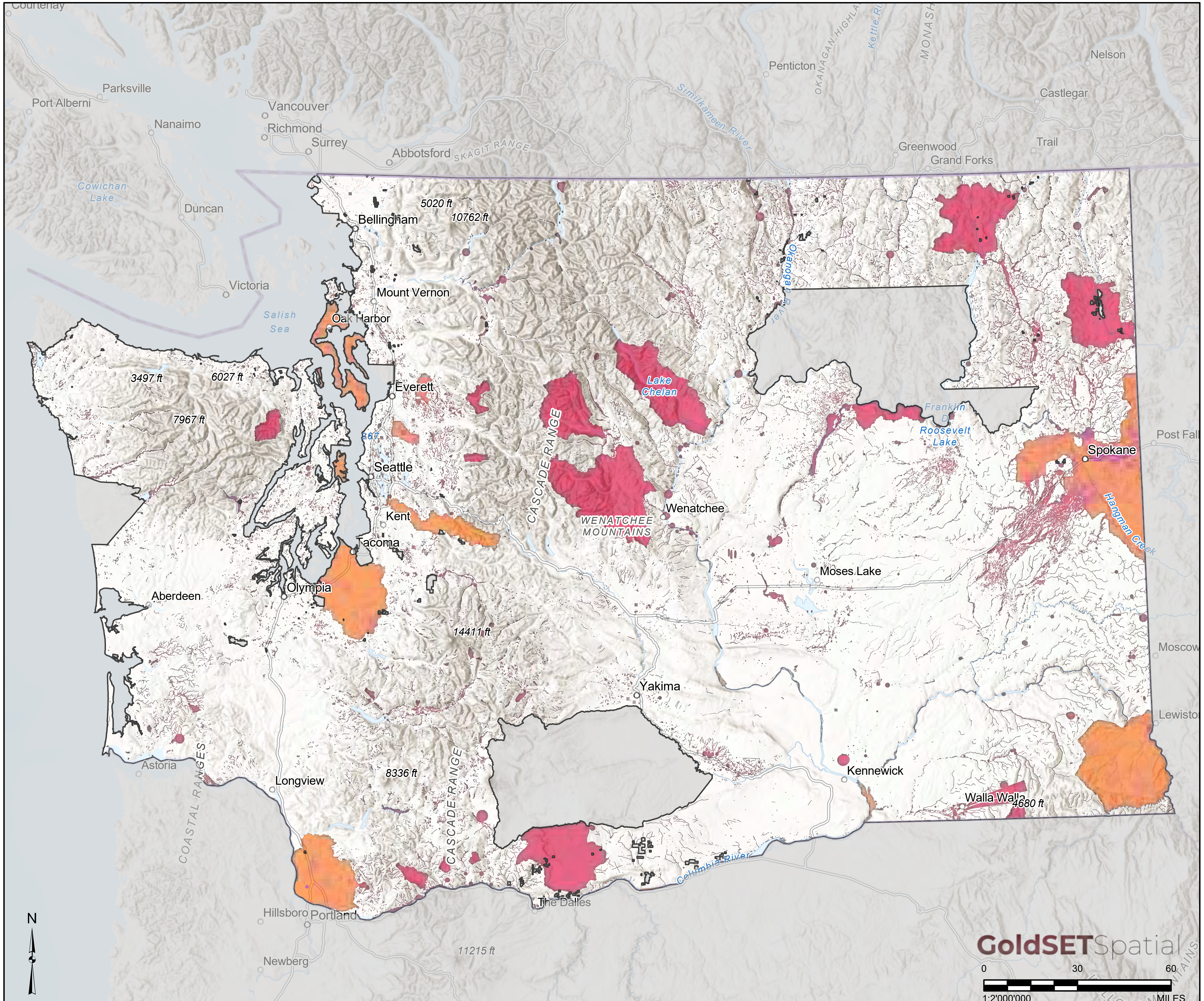
3.4.6 Suitability Map

Project-specific reviews would include a comprehensive review and analysis to identify the site-specific adverse impacts on resources to determine the suitability of this Draft Programmatic EIS. Environmental review may be phased by incorporating relevant information from this Draft Programmatic EIS by reference while evaluating site-specific adverse impacts of the individual project applications. For more information on phased reviews, please refer to Chapter 1, Introduction.

Project-specific applications would include details about the precise location and site-specific conditions. This Draft Programmatic EIS provides a suitability map that, when incorporated with project-specific applications, could be used to facilitate more informative and efficient environmental planning.

Figure 3.4-4 represents the suitability map for water resources and identifies the appropriateness of areas using applicable laws and regulations, criteria specific to the siting of transmission facilities, and knowledge from subject matter experts.

This Page Intentionally Left Blank



LEGEND

Study Area

Conflict Indicator Key

- Neutral
- Low
- Low-Medium
- Medium
- Medium-High
- High
- Very High

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES

1. ESRI, CGIAR, USGS; WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS
2. THE CONFLICT INDICATOR KEY CAN BE USED TO IDENTIFY AND HIGHLIGHT AREAS WHERE DIFFERENT PROJECT CONSTRAINTS MAY OVERLAP, POTENTIALLY LEADING TO CONFLICTS. THE KEY USES DIFFERENT COLORS TO REPRESENT THE INTENSITY OR LIKELIHOOD OF CONFLICT.

PROJECT

DRAFT PROGRAMMATIC EIS HIGH-VOLTAGE TRANSMISSION

TITLE

SUITABILITY MAP FOR WATER RESOURCES

YYYY-MM-DD 2024-12-18 CONSULTANT wsp

FIGURE 3.4-4

This Page Intentionally Left Blank

3.4.6.1 Suitability Map Methodology

The suitability map evaluates various criteria and assigns a suitability score to different areas based on how well those areas meet the desired conditions.

A number of individual siting decision criteria, referred to as indicators in GoldSET, were identified by subject matter experts for inclusion in this resource's suitability map. Subject matter experts assigned a weighting based on the degree of constraint (i.e., high, medium, or low) or potential difficulty for a transmission facility to traverse an area. Each of the GoldSET Indicator cards describing the criteria chosen and the source of the data layers used is provided in **Appendix 3.4-1.**

A summary of the criteria used to produce each GoldSET card is provided below.

Water GoldSET Card – Medium Conflict - Water Quality

This GoldSET card includes areas identified as source aquifers and impaired water bodies. Sole source aquifers provide over 50% of drinking water with no alternatives, requiring special permits for construction. Impaired water bodies are those listed under Section 303(d) of the Clean Water Act and are prioritized for cleanup to meet water quality standards and TMDLs.

Note that no setbacks were included.

Water GoldSET Card – High Conflict - Water Quality

Areas at high risk of water quality degradation include water protection areas, wetlands, estuaries, seeps, and springs. Water protection areas are intended to prevent contaminants like chemicals, fuels, and waste from reaching water resources.

Chanel migration zones are areas where rivers and streams shift, causing erosion and property damage. Floodplains (100- and 500-year, as defined by FEMA) and floodways are vulnerable to flooding, and development in these areas can increase the risk of flood-related damage.

Note that a 200-foot setback around known seeps and springs and a 300-foot setback around known wetlands were provided in the dataset. No setbacks were provided for channel migration zones, floodplains, or floodways.

This Page Intentionally Left Blank

3.5 Vegetation

This Draft Programmatic Environmental Impact Statement (EIS) considers impacts on vegetation resources resulting from the types of facilities described in Chapter 2. This section addresses the following topics related to the construction, operation and maintenance, and upgrade or modification of high-voltage electric transmission facilities (transmission facilities) in the State of Washington:

- Section 3.5.1 identifies regulatory, siting, and design considerations.
- Section 3.5.2 describes the affected environment.
- Section 3.5.3 describes impacts.
- Section 3.5.4 describes potential mitigation measures.
- Section 3.5.5 identifies probable significant adverse environmental impacts on vegetation.
- Section 3.5.6 provides a suitability map and scoring for the siting of transmission facilities as it relates to vegetation, based on the identified considerations, impacts, and mitigation measures.

3.5.1 Regulatory, Siting, and Design Considerations

This Draft Programmatic EIS establishes a broad framework for compliance, outlining general laws, regulations, best management practices (BMPs), and design considerations. It is assumed that project-specific applications will be developed within this pre-established regulatory context and are expected to comply with existing laws and regulations. If the project does not comply with applicable laws and regulations or fails to adhere to design considerations or BMPs, additional project-specific environmental review and mitigation would be required. The applicable federal and state laws and regulations relevant to vegetation are summarized in **Table 3.5-1**.

Table 3.5-1: Laws and Regulations for Vegetation

Applicable Legislation	Agency	Summary Information
Federal		
16 USC Chapter 35 - Endangered Species Act	U.S. Fish and Wildlife Service	This act establishes protection for fish, wildlife, and plants that are listed as threatened or endangered. Unless authorized by a permit from the USFWS, the act prohibits activities that would impact species and their habitats protected under the act (USFWS 2024a). Incidental take permits may be applied for by a non-federal entity whose activities may result in the take of endangered or threatened animal species. A habitat conservation plan must accompany an application for an incidental take permit (USFWS 2024a).
33 USC §1344 - Clean Water Act (Section 404)	Washington State Department of Ecology	This act aims to protect and manage wetlands and their resources through minimizing, avoiding, or compensating for wetland impacts. Their goal is to have No Net Loss of aquatic resources, including wetlands (EPA 2024). Permits are required if development will have discharge of dredged or fill material in waters or wetlands and there is no other practical alternative (EPA 2024).

Applicable Legislation	Agency	Summary Information
State		
Washington State Environmental Policy Act	State of Washington Energy Facility Site Evaluation Council Washington State Department of Ecology Local governments	This act is a process that identifies and analyzes environmental impacts that can be related to issuing permits. SEPA helps permit applicants and decision-makers understand how a proposed project will impact the environment. Certain projects, as defined in the SEPA Rules (WAC 197-11-704) and that are not exempt, are required to go through the SEPA process.
State of Washington Priority Habitat and Species List (WDFW 2023)	Washington Department of Fish and Wildlife[(a)]	The WDFW maintains a catalog of habitats and species that are prioritized for conservation and management. Priority habitats[93] are unique habitats or features that support biodiversity. Priority species[94] require protection due to population trends, sensitivity to disturbance and habitat alteration, or importance to communities.
RCW 17.10, Noxious Weeds—Control Boards	Washington State Noxious Weed Control Board[(a)]	This laws aims to limit economic loss and adverse effects to Washington's agricultural, natural, and human resources due to the presence and spread of noxious weeds on all terrestrial and aquatic areas in the state. WAC 16-750 lists and classifies noxious weeds into three classes of distribution across the state. They describe when noxious weeds should be removed, and by whom. They outline procedures for how to remove weeds and what to replace them with. Some herbicides used to control noxious weeds must be applied by a licensed pesticide applicator (NWCB 2024a).
RCW 36.70A, Growth Management – Planning by Selected Counties and Cities	Washington State Department of Commerce[(a)]	The goals of the Growth Management Act are to maintain and enhance natural-resource-based industries, retain open space, enhance recreational opportunities, protect the environment, and enhance the state's high quality of life. It provides guidance on classifying and designating forest resource lands and identifying the steps to preserve them. Local governments are responsible for creating their own regulations for development within and around wetlands under the Growth Management Act. This act requires counties to adopt development regulations for conservation of agricultural, forest, and mineral resource lands. Wetlands under development regulations must be delineated (RCW 36.70A.175).

93 Habitat that is given priority for conservation and management by the Washington Department of Fish and Wildlife; may refer to a unique vegetation association (e.g., shrubsteppe) or a particular habitat feature (e.g., cliffs).

94 In the State of Washington, a species of concern is a species where special conservation actions may be required. These include, but are not, limited to, species that are either state-listed as endangered, threatened, sensitive, or candidate species, or considered vulnerable.

Applicable Legislation	Agency	Summary Information
RCW 76.04, Forest Protection	Washington Department of Natural Resources	Electric utilities are required to have a wildfire mitigation plan. The wildfire mitigation plan is recommended to include vegetation management along the transmission and distribution lines, infrastructure maintenance and repair, and preventative programs.
RCW 76.09, Forest Practices	Washington State Department of Natural Resources[(a)]	These codes provide standards and regulations for managing the state's forests. As defined in WAC 222, forest land is defined as all land that can produce merchantable timber,[95] excluding agriculture land and residential land. Several permits may be applicable, including the following: ▪ Notice of Conversion to non-forestry use if an area of forest land is to not be generated to forest. ▪ Construction of forest roads ▪ Construction in wetlands for the purpose of forest roads or landings[96]
RCW 90.84, Wetlands Mitigation Banking	Washington State Department of Ecology[(a)]	Under this act, it is the policy of Washington State to support wetland mitigation banking.[97] WAC 173-700 provides a framework for certifying and operating a wetland banking system (ORIA 2019). A certification is required for participating in wetland banking. Wetland mitigation banks may include sites where wetlands are restored, created, enhanced, or preserved. Other permits may be required (ORIA 2019).
WAC 173-26-221, General master program provisions	Washington State Department of Ecology[(a)]	The goal of the Shoreline Management Act is to prevent shoreline disturbance and restore degraded shoreline, including wetlands, and riparian[98] and upland vegetation, across the state's fresh and marine waters. The state has a no-net loss goal for its shorelines. Counties are responsible for developing their own Shoreline Master Programs. A permit may be required based on a county's specific Shoreline Management Plan.
WAC 222-38, Forest Chemicals	Forest Practices Board	This code provides the policy for the storage, handling, and application of pesticides, fertilizers, and other forest chemicals in forest management.

95 Refers to trees that have a commercial value and can be harvested or sold.

96 Designated areas where logs are collected, processed, and loaded onto trucks for transportation to mills or other destinations.

97 A system designed to compensate for unavoidable impacts to wetlands. A wetland mitigation bank is a site where wetlands are restored, created, enhanced, or, in exceptional cases, preserved.

98 Relating to a feature on the edge of a waterbody.

Table 3.6-1 Notes:

[a] The agency responsible for administering most permits or authorizations for the identified regulation. However, if EFSEC is determined to be the agency responsible for approving a proposal, EFSEC can administer several types of permits at the state and local levels. EFSEC provides a streamlined process for siting and licensing major energy facilities, including transmission facilities in Washington State. EFSEC coordinates all evaluation and licensing steps, specifies the conditions for construction and operation, and issues a Site Certification Agreement, which assumes the responsibility for issuing individual state or local permits. By consolidating these permits into a single Site Certification Agreement, EFSEC can simplify the regulatory process for energy facility developers. While EFSEC itself does not directly administer federal permits, it works closely with federal agencies to ensure that all necessary federal requirements are met during the evaluation and licensing of energy facilities.

EFSEC = State of Washington Energy Site Evaluation Council; RCW = Revised Code of Washington; SEPA = Washington State Environmental Policy Act; USFWS = U.S. Fish and Wildlife Service; WAC = Washington Administrative Code; WDFW = Washington Department of Fish and Wildlife

The siting of transmission facilities is determined by engineering, technical, environmental, and socioeconomic factors. **Table 3.5-2** summarizes guidance documents and management plans that outline the design considerations and BMPs generally used to avoid or minimize impacts on vegetation.

Table 3.5-2: Siting and Design Considerations for Vegetation

Siting and Design Consideration[a]	Description
Biodiversity Areas and Corridor Creation and Conservation (Azerrad et al. 2023)	This publication provides a priority habitat and species biodiversity areas and corridors map that allows for flagging regions of high-quality habitats that can be turned into corridors. Creating biodiversity areas and corridors is important for creating large, connected landscapes and creating movement for species.
BMPs for invasive plants	The Washington State Noxious Weed Control Board provides BMPs for controlling and disposing of noxious weeds. The board provides an integrated weed management approach to determine how best to control noxious weeds to reach land-use goals. It also provides information on the best control methods and timing of control (NWCB 2024a). The board has different BMPs for disposing of different types of noxious weeds, including flowering plants, woody materials, toxic plants, and more (NWCB 2024b).
Washington Utilities and Transportation Commission (UTC) – Wildfire Mitigation Plan	The mission of the UTC is to ensure investor-owned utility and transportation routes are safe, equitable, reliable, and fairly priced. The UTC requires that electric utilities submit annual wildfire plans, which would include all the tools a utility could use to prevent and respond to wildfires, including vegetation management, improving electrical line resilience against extreme weather, and methods for depowering lines (UTC 2025).
Management Recommendations for Washington's Priority Habitats and Species (Rodrick and Milner 1991; revised 2018)	Includes management recommendations for 60 species of fish and wildlife, some of which have been replaced by newer guidelines listed in this table.

Siting and Design Consideration[(a)]	Description
Management Recommendations for Washington State's Shrubsteppe[99] Priority Habitat (WDFW 2020a)	Management recommendations for shrubsteppe ecosystems include long-term planning and current planning activities. Long-range management practices include identifying and mapping ecosystems, creating habitat connectivity between shrubsteppe habitats, adopting policies and regulations to protect shrubsteppe, and including shrubsteppe in the Growth Management Act. Current activities include site-specific management, avoidance, and minimization mitigation.
BMPs for Washington State Oregon White Oak Woodlands (WDFW 2024a)	This document outlines the following BMPs for mitigating disturbance of Oregon white oak (*Quercus garryana*) woodlands: ▪ Avoidance - Avoid disturbance in and around Oregon white oak ecosystems. ▪ Minimization - When all alternatives for avoidance have been considered but are not possible, minimize disturbance by avoiding removal of high-functioning individual trees and retain as much habitat as possible. ▪ Compensation - When ecosystem function is lost due to habitat removal, implement compensatory mitigation on site or as close to the site as possible. A compensatory plan should address both the physical loss of habitat and temporal loss[100] of functions.
Conservation Strategy for Washington State Inland Sand Dune (DNR 2007)	This strategy provides information on inland sand dune systems in Washington and identifies management strategies for conserving these ecosystems. Inland sand dunes provide habitat to multiple plant and animal species at risk, as well as being a priority habitat. Eight sand dune ecosystems have been identified as having significant conservation value and should be avoided by transmission projects: Hanford Central Dunes, Juniper Dunes Wilderness, Delight Dunes, Wanapum and Wanapum North Dunes, Wahluke Dunes, Handford Black Sand Dunes, Sentinel Butte Dunes, and Wakefield Dunes.
Riparian Ecosystems, Volume 2: Management Recommendations (WDFW 2020b)	This publication provides updated riparian ecosystem management recommendations, including regulatory protections, delineation of riparian management zone, recommendations for restoring riparian ecosystems, and improving protection of riparian areas through adaptive management.
Landscape Planning for Washington's Wildlife: Managing for Biodiversity in Developing Areas (WDFW 2009a)	Provides guidelines and management strategies to reduce impacts on biodiversity in Washington State.

99 An arid ecosystem which is dominated by grasses and shrubs in a landscape of rolling hills. In Washington, this is found in the southeast.

100 Refers to the delay between the loss of a habitat or resource and the time it takes for mitigation efforts to fully compensate for that loss.

Siting and Design Consideration[a]	Description
Design Stormwater Management following Washington State Department of Ecology's Stormwater Management Manuals	Ecology provides guidance on stormwater management with manuals specific to western and eastern Washington. Implementation of stormwater management can protect surrounding vegetation from impacts such as sedimentation and flash floods. The following best management practices are recommended for minimizing impacts on vegetation resources (Ecology 2024a, 2024b): ▪ BMP T5.40: Preserving Native Vegetation ▪ BMP T5.41: Better Site Design ▪ Biofiltration BMPs ▪ BMP F6.62: Tree Retention and Tree Planting
Institute for Electrical and Electronics Engineers (IEEE) Standards Association Guide for Maintenance Methods on Energized Power Lines	Provides general recommendations for performing maintenance work along energized power lines, which includes ensuring proper care and maintenance of tools and equipment, and work methods for vegetation management.
Recommended Siting Practices for Electric Transmission Developers (Americans for a Clean Energy Grid 2023)	This document outlines best practices for siting electric transmission facilities. Recommended practices include: ▪ Early and transparent engagement ▪ Respect and fair dealing ▪ Environmental considerations ▪ Interagency coordination ▪ Use of existing infrastructure
Shoreline Master Programs Handbook, Chapter 11, Vegetation Conservation, Buffers, and Setbacks (Ecology 2017)	The Shoreline Master Program Handbook provides BMPs and guidelines for protecting shorelines and aquatic life. Buffers and setbacks help preserve native vegetation (mainly riparian) that occurs along shorelines, which has multiple benefits related to protecting both aquatic and terrestrial resources.
Update on Wetland Buffers: The State of Science Final Report (Ecology 2013)	This publication provides an update on the state of science regarding the use of buffers in protecting wetland functions.
Wetland Mitigation in Washington State Part 1: Agency Policies and Guidance and Part 2: Developing Mitigation Plans (Ecology et al. 2006, 2021)	These publications provide basic principles of wetland mitigation and technical guidance for developing compensatory mitigation.
Arid Lands Initiative – Shared Priorities for Conservation at a Landscape Scale (Arid Lands Initiative 2014)	Designates priority areas of shrubsteppe habitats for conservation in Washington
Site Specific Management: How to Avoid and Minimize Impacts of Development to Shrubsteppe (Azzerad et al. 2011)	Provides recommendations for shrubsteppe management in land development projects, including roads and utility corridors.
Shrub-Steppe and Grassland Restoration Manual for the Columbia River Basin (Benson et al. 2011)	Provides information on shrubsteppe and grassland restoration which can be important for proponents to consider when disturbing land in these habitats.
PHS Local Government User Guide: Shrubsteppe and Eastside Steppe Map (Folkerts et al. 2023)	Contains information on shrubsteppe classification and provides mapping tools that can help the development and siting of long-term projects such as transmission facilities in the Columbia Plateau.
Washington Shrubsteppe Restoration and Resiliency Initiative: Long-Term Strategy 2024 – 2054 (WDFW 2024b)	Identifies priority areas for conservation in shrubsteppe habitat in the Columbia Basin. Contains a mapping tool that identifies core areas for conservation, species distributions, migration corridors, shrubsteppe cover, and other important information.

Siting and Design Consideration[a]	Description
Federal Energy Regulatory Commission (FERC) Reliability Standards	These standards ensure the reliable operation of the bulk power system, addressing aspects such as resource adequacy, system performance, and operational security.
North American Electric Reliability Corporation Transmission Vegetation Management standards (NERC 2016)	This document provides five requirements to follow for vegetation management within transmission right-of-way: ▪ Maintain vegetation to prevent spread into the minimum vegetation clearance distance. ▪ Document management strategies and processes to prevent spread of vegetation in the minimum vegetation clearance distance. ▪ Complete timely notification of the appropriate control center regarding vegetation conditions. ▪ Implement corrective actions to ensure that flashover spread[101] will not be violated (e.g., through vegetation management). ▪ Perform annual inspections of vegetation conditions.
Interim Guidelines for Wetland Protection and Conservation in British Columbia; Chapter Nine: Road and Utility Corridors (Wetland Stewardship Partnership 2009)	This publication provides BMPs for road and construction in wetlands. Related recommended practices include the following: ▪ Design crossings for minimal impacts. ▪ Incorporate runoff treatment structures (detention ponds, grassed swales etc.) into road designs to serve as filters for contaminants entering the wetlands. ▪ Decommission unused roads and re-establish wetland functions.

BMP = best management practice

3.5.2 Affected Environment

This section describes the vegetation resources that occur within the Study Area described in Chapter 2. It divides the Study Area into ecologically relevant sections based on Washington's ecoregions, and groups vegetation in the Study Area using the following sources:

- Vegetation groups available from Landscape Fire and Resource Management Planning Tools (LANDFIRE) (2016a) within the Study Area
- Sensitive ecosystems, which include vegetation associations of conservation concern (ranked as S1, S2, S3, SX, and SH by NatureServe) and terrestrial priority habitats and features based on the Washington Department of Fish and Wildlife (WDFW) (2005)
- Wetlands, utilizing the National Wetlands Inventory (NWI) wetlands mapper (USFWS 2024b)
- Priority plant species in Washington

While the Programmatic EIS was developed based on guidance documents available at the time of writing, including priority habitats, listed vegetation communities, and priority plant species, vegetation resources and

[101] Flash-over spread occurs when high voltage electricity jumps over an insulator or between conductors in an electrical discharge.

those considered most sensitive to transmission facility development may change over time. The most recent guidance and data layers available should be used and consulted by applicants on a project-by-project basis to determine and avoid potential interactions with vegetation resources.

3.5.2.1 Vegetation

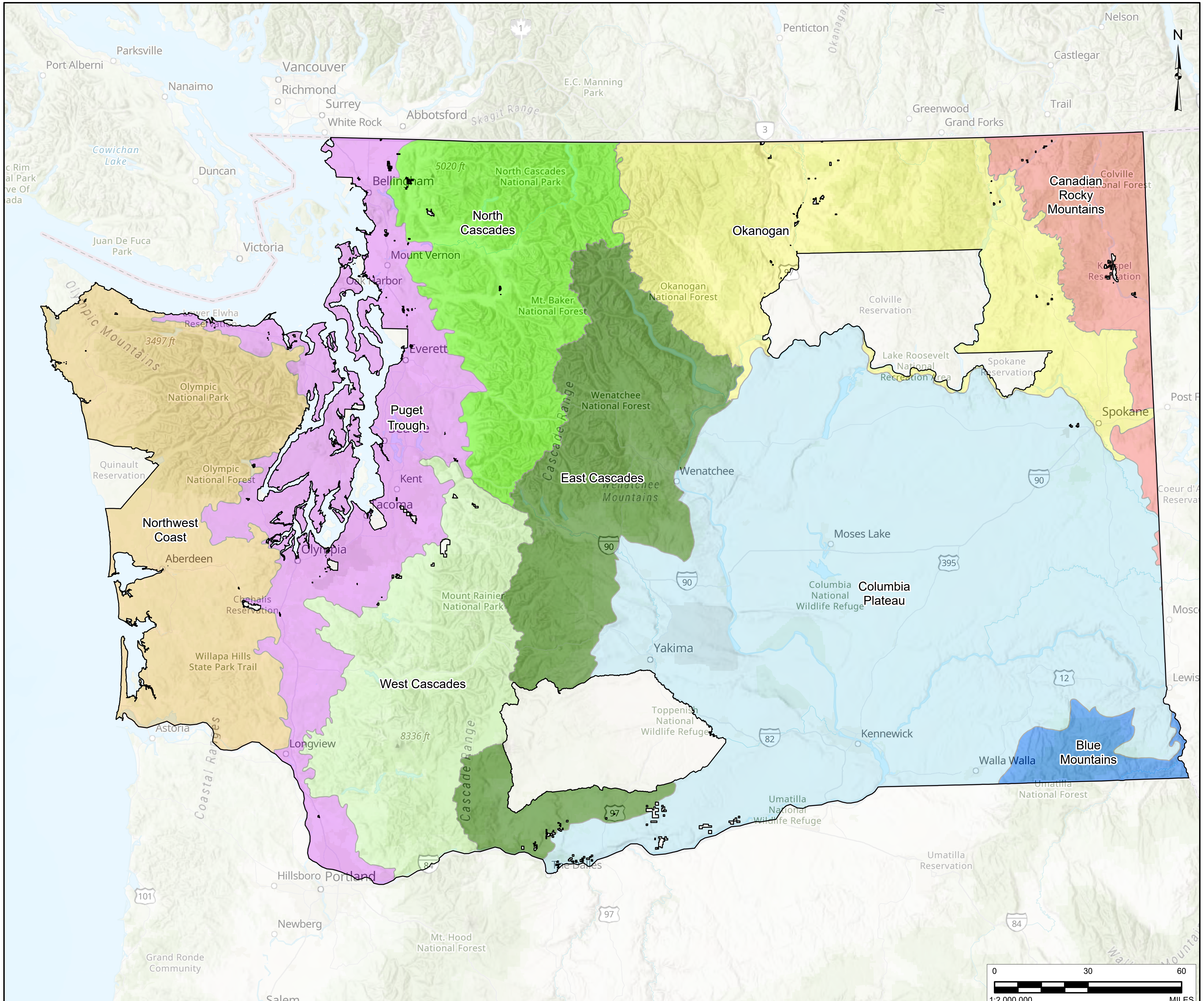
Ecoregions of Washington

Washington is divided into nine level III ecoregions (**Figure 3.5-1**) (DNR 2022). These ecoregions were developed as a spatial framework to group similar ecosystems within the state based on geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology. Due to the similarity of ecosystems in each ecoregion, these areas were chosen as subdivisions for the State of Washington for analysis in the Programmatic EIS. Because they form ecologically relevant divisions, they are likely to have similar challenges and constraints associated with transmission facility infrastructure. Each ecoregion is described below. The descriptions focus on the portions of the ecoregions that are within Washington, as some ecoregions extend beyond the state boundaries into adjoining states and Canada. A summary of the total acres within the Study Area of each of Washington's ecoregions is provided in **Table 3.5-3**Error! Reference source not found..

Table 3.5-3: Total Area of Washington's Ecoregions (Level III) within the Study Area

Ecoregion of Washington	Total Area (acres)	Percentage of the Study Area[(a)]
Blue Mountains	566,513	1.4%
Canadian Rocky Mountains	1,663,598	4.2%
Columbia Plateau	13,143,500	33.1%
East Cascades	4,169,496	10.5%
North Cascades	3,328,979	8.4%
Northwest Coast	4,411,035	11.1%
Okanogan	4,832,328	12.2%
Puget Trough	4,121,571	10.4%
West Cascades	3,470,182	8.7%
Total	**39,707,201**	**100%**

Source: Summary calculated using data from DNR (2022).
[(a)]Total may not sum due to rounding.



LEGEND

- Study Area

Ecoregions (WaDNR, 2022)

- Blue Mountains
- Canadian Rocky Mountains
- Columbia Plateau
- East Cascades
- North Cascades
- Northwest Coast
- Okanogan
- Puget Trough
- West Cascades

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES

1. SERVICE LAYER CREDITS: WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS, ESRI, USGS
2. ECOREGIONS: DNR, 2022

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

ECOREGIONS OF WASHINGTON

YYYY-MM-DD 2025-03-24

CONSULTANT wsp

FIGURE
3.5-1

This Page Intentionally Left Blank

Northwest Coast

The Northwest Coast ecoregion occupies 4,411,035 acres of the Study Area (approximately 11.1 percent of the Study Area) and covers the Olympic Peninsula and the coast mountain range, including the Willapa Hills (WDFW 2005). The climate of the region is characterized by high precipitation, ranging from 60 to 240 inches annually, which mostly falls between November and April (WDFW 2005). The northeastern Olympic Mountains receive the least amount of rain due to the rain shadow effect. Summers are typically cool (WDFW 2005).

The Olympic Mountains are characterized by jagged peaks that extend up to 8,000 feet above sea level and were formed as an individual uplift event separate from the coastal mountain chain. Areas of alpine and subalpine[102] terrain occur on this range, including alpine meadows, exposed rock, and glacial ice. The Willapa Hills have a more rounded topography due to erosion (WDFW 2005).

Forests in this ecoregion are highly productive and consist predominantly of coniferous trees (WDFW 2005). The climate produces large trees with an abundant understory of mosses, lichens, ferns, and herbs. Dominant tree species of the ecoregion include Douglas-fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), and western redcedar (*Thuja plicata*) (WDFW 2005). Forests extend from sea level to 2,200–3,200 feet above sea level in the Coast Range and Olympic Mountains. A narrow area of forests dominated by Sitka spruce (*Picea sitchensis*) occurs along the coast, where cool, wet conditions and salt spray favor this species, in this ecoregion (WDFW 2005).

Open subalpine parkland occurs at higher elevations, above the timberline (WDFW 2005). Parkland is characterized by well-spaced trees intermixed with shrub or herbaceous vegetation. Alpine environments persist at the highest elevations where climatic extremes limit tree growth. Other prominent ecosystems in this ecoregion include broadleaf riparian forests, native grasslands, sand dunes and coastal strand communities, western redcedar and red alder (*Alnus rubra*) swamps, and rush meadows and marshes (WDFW 2005). Glaciers occur on the mountain peaks of the Olympic Mountains, including one prominent glacier approximately 10 square miles on Mount Olympus (WDFW 2005). Numerous rare plants occur in the Olympic Mountains due to their relative isolation and diversity of ecosystems (WDFW 2005).

Fifty-five percent of this ecoregion is privately owned land and is predominantly used for commercial forestry. Thirty-one percent is managed by six federal agencies (U.S. Forest Service [USFS], National Park Service, U.S. Fish and Wildlife Service [USFWS], U.S. Department of Defense, and U.S. Army Corps of Engineers), and 12 percent is in public trust land managed by the Washington Department of Natural Resources (DNR) (WDFW 2005). The Olympic National Forest, managed by the USFS, is a protected area that occurs in this ecoregion and is surrounded by Olympic National Park (WDFW 2005). Other dominant land uses include sport fishing, recreational activities, and hunting (WDFW 2005). Most communities in this ecoregion are small and located along the coast, with one major metropolitan area, Aberdeen-Hoquiam (WDFW 2005).

Puget Trough

The Puget Trough is located east of the Northwest Coast ecoregion and is the most populous of the ecoregions in Washington. The Puget Trough covers 4,121,571 acres in the Study Area (10.4 percent of the Study Area). The climate in this ecoregion is characterized as maritime with warm, relatively dry summers, and mild, wet winters (WDFW 2005). Annual precipitation ranges from 25 to 60 inches. The Olympic Mountains produce a rain shadow

[102] A region on a mountain just below the tree line. This is typically the transition zone between montane forest and treeline.

effect that reduces the amount of rainfall this region receives (WDFW 2005). Meltwater from glaciers in the adjacent Olympic Mountains and North Cascades provides fresh, cold water to the streams and rivers located in the Puget Trough (WDFW 2005).

The Puget Trough comprises broad lowland valleys and inland seas. It is bordered in the west by the Olympic Mountains and the east by the Cascade Range, creating unique climate, soils, and geology (WDFW 2005). The lowlands have an average height of 445 feet. The Puget Trough includes three natural basins that formed 150 million years ago from colliding tectonic plates. The area was covered by thick glaciers approximately 15,000 years ago, followed by erosion during the melting of the last major glaciation, which formed the lowlands that exist today (WDFW 2005).

Ecosystems in the Puget Trough are diverse, ranging from coniferous forest to prairie grasslands, oak savannahs, and estuarine[103] environments. Dominant tree species of coniferous forests include Douglas-fir, western hemlock, and western redcedar (WDFW 2005). Characteristic deciduous[104] trees include Oregon white oak (*Quercus garryana*), Pacific madrone (*Arbutus menziesii*), bigleaf maple (*Acer macrophyllum*), and red alder. Grasslands intermix with open oak woodlands, creating Oregon white oak (*Quercus garryana*) ecosystems, which were historically maintained by fires set by Native Americans of the region (WDFW 2005).

West Cascades

The West Cascades ecoregion is located west of the Cascade crest and south of Snoqualmie Pass and is the least developed ecoregion in Washington. The West Cascades ecoregion covers 3,470,182 acres in the Study Area (8.7 percent of the Study Area). The climate in this ecoregion is characterized as wet and mild (WDFW 2005). Annual precipitation ranges from 55 to 140 inches, mostly falling from October through April. Higher elevations have fluctuating snowpack, with lower elevations accumulating little snow (WDFW 2005).

The West Cascades ecoregion is composed of highlands shaped by montane[105] glaciers and riverine valleys. Elevation ranges from 1,000 to 7,000 feet above sea level, with peaks exceeding 14,000 feet on Mount Rainier (WDFW 2005). Isolated volcanic peaks and high plateaus also occur in this region, including Mount St. Helens. Natural lakes frequently occur, created by glacial processes and resulting landslides (WDFW 2005).

Ecosystems in the West Cascades are dominated by conifer forests, including Douglas-fir and western hemlock forests at low to middle elevations (WDFW 2005). At higher elevations on volcanic peaks, alpine meadows, and cushion plant communities are supported (WDFW 2005). Historically, this region was extensively used for timber harvest, but it remains biologically diverse and somewhat intact botanically (WDFW 2005).

North Cascades

The North Cascades ecoregion occupies 3,328,979 acres of the Study Area (approximately 8.4 percent of the Study Area), includes the Cascade Range north of Snoqualmie Pass and west of the crest, and extends northward to British Columbia, Canada (WDFW 2005). The climate of the ecoregion is characterized by high precipitation, ranging from 60 to 160 inches annually, which mostly falls between October and April (WDFW

[103] Unique and dynamic ecosystems where rivers meet the sea, creating a mix of fresh and saltwater known as brackish water.

[104] A type of tree that sheds its leaves annually.

[105] An area with lots of mountains, or on a mountain.

2005). High elevations maintain significant snowpack through much of the year, while middle to low elevations have fluctuating or transient snowpacks (WDFW 2005).

The North Cascades ecoregion is composed of glaciated mountain terrain ranging from 1,000 to 7,000 feet above sea level, with the highest peaks (volcanoes) reaching more than 10,000 feet. Glacially carved valleys and cirques[106] are prominent, in addition to natural lakes created by glacial processes (WDFW 2005).

Forests in this ecoregion consist of western hemlock, Douglas-fir, and redcedar at low elevations. At middle elevations, forests consist predominantly of either Pacific silver fir (*Abies amabilis*) or western hemlock, and forests at higher elevations are a mosaic of both species. Above timberline, alpine heaths, meadows, and fellfields (cushion plant communities) occur (WDFW 2005). Other habitats include riparian areas dominated by broadleaf trees, avalanche chutes with Sitka alder (*Alnus alnobetula*) and vine maple (*Acer circinatum*), and wetlands.

The majority of land in this region is owned by the National Park Service, USFS (through the Mount Baker-Snoqualmie National Forest), or DNR. Private land is under legacy ownership, and other state, city, and county land makes up the remainder of the region (WDFW 2005).

East Cascades

The East Cascades ecoregion is located east of the Cascade crest and extends from the Sawtooth Ridge south to the Columbia Gorge. The East Cascades covers 4,169,496 acres in the Study Area (10.5 percent of the Study Area). The climate in this ecoregion varies from west to east, with western areas having colder temperatures and high precipitation and eastern areas being hot and dry (WDFW 2005). Annual precipitation ranges from 20 to 120 inches, mostly falling from November through April (WDFW 2005).

The East Cascades were formed by alpine glaciers and landslides, creating rugged topography. Broad valleys extend in the lowlands between mountain ridges (WDFW 2005). Isolated volcanic cones appear in this region, though only Mount Adams (12,276 feet) is as high as those in the Western Cascades. Most of the region ranges in elevation from 2,000 to 7,000 feet (WDFW 2005).

Ecosystems in the East Cascades are dominated by coniferous forests. Dominant species include grand fir (*Abies grandis*), Douglas-fir, and ponderosa pine (*Pinus ponderosa*) (WDFW 2005). Oregon white oak woodlands occur at lower elevations in the southern half of the ecoregion, and shrublands occur along the foothills and south-facing slopes (WDFW 2005). Fire has historically been an important factor in this ecoregion, with fire intervals ranging from 10 to 150 years. The historic fire regime impacted the forest stand patterns, resulting in a mosaic of forest stand ages and densities; however, fire suppression has resulted in large areas of dense forests (WDFW 2005).

Okanogan

The Okanogan ecoregion is located east of the Cascade crest and west of the Selkirk Mountains. This ecoregion covers 4,832,328 acres in the Study Area (12.2 percent). The climate in this ecoregion is the coldest in the state (WDFW 2005). Annual precipitation in this area ranges from 14 to 24 inches, with up to 90 inches in the Cascades. The Cascade Mountains produce a rain shadow effect over this ecoregion, resulting in less rainfall (WDFW 2005).

[106] A bowl-shaped, amphitheater-like valley formed by glacial erosion.

The Okanogan ecoregion is a transitional region that includes the Methow and Okanogan Valleys, the Okanogan Highlands, and the Colville and Spokane Valleys (WDFW 2005). The highest elevation is in the northern part of this region, with peaks surpassing 8,900 feet above sea level. Low valleys are located around 750 feet above sea level (WDFW 2005).

Ecosystems in the Okanogan ecoregion are diverse, ranging from coniferous forests in the mountain ridges and hills and shrubsteppe and native grasslands in the low valleys (WDFW 2005). High elevations are dominated by subalpine fir (*Abies lasiocarpa*) and Engelmann spruce (*Picea engelmannii*), while Douglas-fir, western larch (*Larix occidentalis*), western white pine (*Pinus monticola*), and quaking aspen (*Populus tremuloides*) are more common at middle elevations (WDFW 2005). This area has remained somewhat intact and contains many rare plant species that are important for wildlife (WDFW 2005).

Columbia Plateau

The Columbia Plateau is in the eastern part of Washington; it is bounded by the Cascade, Okanogan, Blue, and Rocky Mountains ecoregions and covers approximately one-third of the state. The Columbia Plateau covers 13,143,500 acres in the Study Area (33.1 percent of the Study Area). The climate in this ecoregion is the hottest and driest of any region in the state (WDFW 2005). Annual precipitation ranges from 8 to 14 inches due to a rain shadow effect produced by the Cascade Mountains (WDFW 2005). Drought and natural fires are common in this region (WDFW 2005).

The Columbia Plateau is composed of basalt canyons and coulees carved by ice age floods. Elevations are lowest near the Columbia River (160 feet above sea level) and rise to nearly 4,000 feet above sea level in the Badger and Tekoa Mountains (WDFW 2005).

The dominant ecosystem in the Columbia Plateau is generally characterized as drought-tolerant shrubsteppe. Most of the region is dominated by sagebrush; other steppe communities, such as salt desert scrub, desert playa, and grasslands, are also present (WDFW 2005). The remaining native vegetation of the region occurs on canyon sides and in shallow basalt soils in the scablands (WDFW 2005). Douglas-fir and ponderosa pine forests occur in the foothills of the surrounding mountains (WDFW 2005). Other special habitats include sand dunes, gravelly areas, basalt cliffs, steep canyons, alkali lakes, and vernal pools[107] (WDFW 2005).

Canadian Rocky Mountains

The Canadian Rocky Mountains ecoregion is located east of the Okanogan Ecoregion. The Canadian Rocky Mountains ecoregion covers 1,663,598 acres in the Study Area (4.2 percent of the Study Area). The climate in this ecoregion varies, but the majority of the region is characterized as a maritime climate with warm, relatively dry summers, and mild, wet winters (WDFW 2005). Annual precipitation ranges from 24 to 34 inches.

The Canadian Rocky Mountains ecoregion was historically nearly completely glaciated. This has resulted in U-shaped moraine valleys[108] and isolated mountain peaks (WDFW 2005). Elevations range from 1,300 feet above sea level along the Columbia River up to 7,000 feet in the Salmo-Priest Wilderness area (WDFW 2005).

Ecosystems in the Canadian Rocky Mountains are dominated by coniferous forest, though forest composition varies with climate and elevation (WDFW 2005). At lower elevations, Douglas-fir and ponderosa pine are

[107] Seasonal pools of water that provide habitat for plants and animals.

[108] A type of valley formed by the accumulation of glacial debris, known as moraines.

dominant, while grand fir, western hemlock, and western redcedar forests are more common in mid-montane elevations in the region (WDFW 2005). Subalpine fir and Engelmann spruce forests can be found at higher elevations, along with whitebark pine (*Pinus albicaulis*), lodgepole pine (*Pinus contorta*), and subalpine larch (*Larix lyallii*) (WDFW 2005). Along riparian areas, willows (*Salix* spp.) and cottonwoods (*Populus* sp.) can be found in addition to native grasslands on south-facing slopes and along the foothills (WDFW 2005).

Blue Mountains

The Blue Mountains ecoregion extends from Idaho and Oregon into the southeast corner of Washington. The Blue Mountains cover 566,513 acres in the Study Area (1.4 percent of the Study Area). The climate in this ecoregion is characterized by wet winters, with floods in the spring and autumn being common (WDFW 2005). Annual precipitation ranges from 14 to 24 inches (WDFW 2005).

The Blue Mountains were formed by the uplifting of the Columbia River basalt flows. The Grande Ronde and Snake Rivers cut deep canyons, creating the topography that typifies this region (WDFW 2005). Elevation ranges from 2,000 to 4,000 feet above sea level, with the highest point being Mount Misery (6,387 feet) and the lowest point occurring along the Snake River (750 feet) (WDFW 2005). Windblown silt and volcanic ash cover the majority of the plateau, creating a rich soil base.

Ecosystems in the Blue Mountains have remained relatively intact and consist largely of natural or semi-natural vegetation. Most of the region is dominated by coniferous forest consisting of Douglas-fir and ponderosa pine at lower elevations, which are replaced by subalpine fir and Engelmann spruce at higher elevations (WDFW 2005). Canyon grasslands and dense shrublands also occur, due to the varying topography of the region (WDFW 2005).

The majority of this ecoregion is public land managed by federal and state departments such as the USFS, USFWS, and DNR. There is some private land in the valley bottoms of the region and a few mining claims in the mountains.

Ecosystems

While ecoregions are geographically and climatically similar sections of Washington, ecosystems are more discrete units used to describe vegetation communities that arise from combinations of soil, climate, topography, and physiography. Multiple ecosystems occur within each ecoregion of Washington, and similar ecosystems may be found across ecoregions.

Ecosystem classification often follows a hierarchical approach, with plant associations as the fundamental unit by which ecosystem status and rank are assessed. The classification system identifies a group of plant community types, termed an “association,” that tend to co-occur across the landscape due to the combination of ecological processes, substrates,[109] and environmental gradients (LANDFIRE 2016b). Plant associations are typically named after the climax species that characterize the ecosystem, meaning the species expected to occur in an ecosystem that is in an unmodified state (e.g. not impacted by fire, flooding, or human intervention). The Washington Natural Heritage Program (WNHP) identifies plant associations that occur in Washington and assesses each plant association status to determine which are priorities for conservation. The WNHP assesses the rarity or extirpation[110] risk of plant associations using NatureServe’s Conservation Status Ranking Methodology, which ranks ecosystems on a five-point scale from critically imperiled (1) to secure (5) (NatureServe

[109] A layer of material or surface where an organism could live.

[110] The state of a species or population becoming locally extinct in a specific geographic area while still existing elsewhere.

2024a). A summary of the definitions of ranks is included in **Table 3.5-4**. The rank provided uses the subnational (S) status category for Washington. Species conservation rankings follow the same convention. Plant associations of conservation concern for the purpose of assessing the affected environment include those that are ranked as S1, S2, or S3, as well as those that are considered extirpated (SX and SH).

Table 3.5-4: Conservation Status Ranking and Definition for Ecosystems and Vegetation Based on NatureServe

Rank	Definition
SX	Presumed Extirpated – species or plant association that is believed to be extirpated from the jurisdiction.
SH	Possibly Extirpated – species or plant association known only from historical records without sufficient evidence to definitively determine whether the occurrence is extirpated from the jurisdiction.
S1	Critically Imperiled – species or plant association at a very high risk of extirpation in the jurisdiction due to very restricted range,[111] few populations or occurrences, very steep population decline, severe threats, or other factors.
S2	Imperiled – species or plant association at a high risk of extirpation due to restricted range, few populations or occurrences, steep population decline, severe threats, or other factors.
S3	Vulnerable – species or plant association at moderate risk of extirpation due to fairly restricted range, relatively few populations or occurrences, recent or widespread declines in population, threats, or other factors.
S4	Apparently Secure – species or plant association at a fairly low risk of extirpation due to extensive range or many populations or occurrences, but with possible cause for some concern due to local recent declines, threats, or other factors.
S5	Secure – species or plant association at very low risk of extirpation in the jurisdiction due to very extensive range or abundant populations or occurrences, with little to no concern from declines or threats.
SU	Unrankable – unable to assign rank due to insufficient data or conflicting information.
SNR	Unranked – status is not yet assessed for the jurisdiction.
SNA	Not Applicable – the species or plant association is not a suitable target for conservation for the jurisdiction (e.g., non-native species).

NatureServe (2024b)

Plant associations are often too detailed for broad scale ecosystem mapping. As such, plant associations are typically grouped together into broader groups for ecosystem mapping purposes. This is achieved by grouping plant associations that have similar dominant species and provide similar structure and function. Habitat mapping for the State of Washington was obtained from LANDFIRE (2016a). The LANDFIRE database is a multi-agency program managed by the USFS and the U.S. Department of the Interior. The tool provides landscape geospatial tools to assist with planning, management, and operations (LANDFIRE 2016c). The most detailed scale of habitat mapping from LANDFIRE, which covers the entire state of Washington, is at the level of vegetation group. The ecosystem classification for vegetation type in LANDFIRE follows the ecosystem classification developed by

[111] Species with ranges that are restricted by some factor which could be biological, physical, or behavioral.

NatureServe for the western hemisphere. A summary of vegetation groups by ecoregion in the Study Area is provided in **Table 3.5-5.**

Developed land within the Study Area is estimated to be 2,323,596 acres, with 47.4 percent of the developed land mapped in the Puget Trough (**Table 3.5-5**). Developed land includes areas of all intensities of development, including developed (high, medium, low); developed – roads; and industry development (i.e., quarries, strip mines, gravel pits, wells, and wind pads). Urban greenspaces total 893,026 acres in the Study Area, which includes urban forests, urban herbaceous area, and urban shrubland, the majority of which occurs in the Puget Trough (**Table 3.5-5**). Agricultural areas, including crops, fallow fields, orchards, berries, pasture, vineyards, and wheat, total 7,354,164 acres in the Study Area, of which 84.3 percent occurs in the Columbia Plateau. The remaining areas all fall into natural vegetation groups or vegetated areas dominated by introduced species (e.g., Great Basin & Intermountain Introduced Annual and Biennial Forbland). Ecosystems in the Study Area are shown in **Figure 3.5-2.**

This Page Intentionally Left Blank

Table 3.5-5: Area of Vegetation Groups by Ecoregion in the Study Area

Vegetation Group	Blue Mountains Ecoregion (Acres)	Canadian Rocky Mountains Ecoregion (Acres)	Columbia Plateau Ecoregion (Acres)	East Cascades Ecoregion (Acres)	North Cascades Ecoregion (Acres)	Northwest Coast Ecoregion (Acres)	Okanogan Ecoregion (Acres)	Puget Trough Ecoregion (Acres)	West Cascades Ecoregion (Acres)	Total Area in the Study Area (Acres)
Agriculture-Cultivated Crops and Irrigated Agriculture	0	<1	0	0	<1	0	96	76	0	173
Columbia Basin Foothill and Canyon Dry Grassland	78,195	79	602,191	23,859	16	0	51,090	0	0	755,430
Columbia Basin Foothill Riparian Herbaceous	49	2	25,176	126	0	0	1,562	0	0	26,915
Columbia Basin Foothill Riparian Shrubland	168	42	13,287	354	0	0	1,231	0	0	15,081
Columbia Basin Foothill Riparian Woodland	2,120	711	63,714	1,392	0	0	6,549	0	0	74,486
Columbia Basin Palouse Prairie	216	5	22,090	0	0	0	0	0	0	22,310
Columbia Plateau Low Sagebrush Steppe	194	0	68	0	0	0	0	0	0	262
Columbia Plateau Scabland Shrubland	2,324	3	383,928	30,550	0	0	5,510	0	0	422,315
Columbia Plateau Steppe and Grassland	4,368	36	1,359,727	53,999	0	0	113,781	0	0	1,531,911
Developed-High Intensity	2	199	18,005	1,872	542	2,493	6,955	78,011	866	108,945
Developed-Low Intensity	440	5,148	82,363	26,255	12,275	25,318	42,534	306,458	26,893	527,683
Developed-Medium Intensity	32	1,275	58,257	6,408	2,123	6,763	21,792	161,147	3,210	261,008
Developed-Roads	10,696	25,216	422,842	127,708	29,254	103,260	148,495	487,896	66,469	1,421,836
East Cascades Mesic Montane Mixed-Conifer Forest and Woodland	0	0	882	914,814	71	0	28,847	0	398	945,012
East Cascades Oak Forest and Woodland	0	0	1,114	1,812	0	0	0	0	0	2,927
East Cascades Oak-Ponderosa Pine Forest and Woodland	0	0	106	2,193	0	0	0	0	0	2,299
East Cascades Ponderosa Pine Forest and Woodland	0	0	10,192	96,801	0	0	0	0	0	106,992
Great Basin & Intermountain Introduced Annual Grassland	3,551	41	330,059	20,551	0	0	18,112	0	0	372,314
Great Basin & Intermountain Introduced Perennial Grassland and Forbland	5,781	121	168,824	6,286	0	0	23,051	0	0	204,063
Great Basin & Intermountain Ruderal Shrubland	13,165	2	123,952	6,594	0	0	19,161	0	0	162,874
Interior West Ruderal Riparian Forest	0	0	6,980	35	0	0	0	0	0	7,014
Interior Western North American Temperate Ruderal Grassland	5,014	11,315	287,764	27,367	0	0	56,697	0	0	388,156
Interior Western North American Temperate Ruderal Shrubland	1,668	2,544	268,177	6,768	0	0	3,998	0	0	283,156
Inter-Mountain Basins Active and Stabilized Dune	0	0	11,949	19	0	0	22	0	0	11,989
Inter-Mountain Basins Alkaline Closed Depression	2	<1	51,940	137	0	0	1,602	0	0	53,681

Vegetation Group	Blue Mountains Ecoregion (Acres)	Canadian Rocky Mountains Ecoregion (Acres)	Columbia Plateau Ecoregion (Acres)	East Cascades Ecoregion (Acres)	North Cascades Ecoregion (Acres)	Northwest Coast Ecoregion (Acres)	Okanogan Ecoregion (Acres)	Puget Trough Ecoregion (Acres)	West Cascades Ecoregion (Acres)	Total Area in the Study Area (Acres)
Inter-Mountain Basins Big Sagebrush Shrubland	4,771	186	1,107,599	49,947	0	0	105,216	0	0	1,267,719
Inter-Mountain Basins Big Sagebrush Steppe	7,283	104	589,409	83,271	0	0	104,748	0	0	784,815
Inter-Mountain Basins Cliff and Canyon	6,605	13	104,441	15,275	0	0	20,505	0	0	146,841
Inter-Mountain Basins Curl-leaf Mountain Mahogany Shrubland	1,523	0	17	0	0	0	0	0	0	1,540
Inter-Mountain Basins Curl-leaf Mountain Mahogany Woodland	245	0	2	0	0	0	0	0	0	247
Inter-Mountain Basins Greasewood Flat	<1	0	0	0	0	0	0	0	0	<1
Inter-Mountain Basins Montane Sagebrush Steppe	3,689	3	131	36,373	0	0	52,880	0	0	93,076
Inter-Mountain Basins Semi-Desert Shrubsteppe	14	0	30,880	31	0	0	262	0	0	31,187
North American Arid West Emergent Marsh	83	2,903	11,698	6,143	0	0	7,538	0	0	28,365
North American Glacier and Ice Field	0	0	0	11,839	50,873	35,159	54	0	31,065	128,990
North Pacific Active Volcanic Rock and Cinder Land	0	0	0	0	0	0	0	0	12,493	12,493
North Pacific Alpine and Subalpine Bedrock and Scree[112]	0	0	0	106,839	178,509	39,679	53,062	0	26,060	404,149
North Pacific Alpine and Subalpine Dry Grassland	0	0	<1	116,159	48,722	10,816	82,419	5	12,673	270,794
North Pacific Avalanche Chute Shrubland	0	0	0	7,390	9,410	1,408	4,550	0	3,427	26,185
North Pacific Broadleaf Landslide Forest	0	0	0	23	63,194	593,131	0	581,465	348,933	1,586,747
North Pacific Dry and Mesic Alpine Dwarf-Shrubland	0	0	0	19,969	27,210	2,778	27,948	0	2,426	80,331
North Pacific Dry and Mesic Alpine Fell-field or Meadow	0	0	0	977	3,807	1,714	2,371	0	55	8,924
North Pacific Dry Douglas-fir-(Madrone) Forest and Woodland	0	0	0	410	2	4,769	0	29,329	8,834	43,344
North Pacific Dry-Mesic Silver Fir-Western Hemlock-Douglas-fir Forest	0	0	0	199,329	276,857	28,260	4,128	604	486,485	995,664
North Pacific Hardwood-Conifer Swamp	0	0	0	357	2,063	12,746	0	3,400	1,735	20,301
North Pacific Herbaceous Bald and Bluff	0	0	0	64	54	284	0	212	98	712
North Pacific Hypermaritime Herbaceous Headland	0	0	0	0	0	711	0	83	0	794
North Pacific Hypermaritime Shrub Headland	0	0	0	0	0	48	0	24	0	71

[112] Loose rocky debris on a hill or cliff.

Vegetation Group	Blue Mountains Ecoregion (Acres)	Canadian Rocky Mountains Ecoregion (Acres)	Columbia Plateau Ecoregion (Acres)	East Cascades Ecoregion (Acres)	North Cascades Ecoregion (Acres)	Northwest Coast Ecoregion (Acres)	Okanogan Ecoregion (Acres)	Puget Trough Ecoregion (Acres)	West Cascades Ecoregion (Acres)	Total Area in the Study Area (Acres)
North Pacific Hypermaritime Western Red-cedar-Western Hemlock Forest	0	0	0	0	134,059	61,354	0	43,394	15,718	254,525
North Pacific Lowland Mixed Hardwood-Conifer Forest	0	0	0	135	127,640	14,130	0	70,520	12,751	225,176
North Pacific Lowland Riparian Forest	0	0	393	44,369	70,619	239,811	7,056	320,483	85,382	768,113
North Pacific Lowland Riparian Shrubland	0	0	129	1,139	750	3,611	330	6,275	675	12,909
North Pacific Maritime Coastal Sand Dune and Strand	0	0	0	0	0	3,133	0	2,518	0	5,651
North Pacific Maritime Coastal Sand Dune Ruderal Herb Vegetation	0	0	0	0	0	101	0	126	0	227
North Pacific Maritime Coastal Sand Dune Ruderal Scrub	0	0	0	0	0	91	0	57	0	148
North Pacific Maritime Dry-Mesic Douglas-fir-Western Hemlock Forest	0	0	0	12,284	44,977	708,180	0	433,647	767,105	1,966,192
North Pacific Maritime Mesic Subalpine Parkland	0	0	0	31,115	85,963	24,351	0	0	2,917	144,347
North Pacific Maritime Mesic-Wet Douglas-fir-Western Hemlock Forest	0	0	0	3,759	25,362	345,558	0	289,144	324,579	988,403
North Pacific Mesic Western Hemlock-Silver Fir Forest	0	0	0	240,596	1,330,802	647,622	7,442	2,822	677,807	2,907,091
North Pacific Montane Massive Bedrock-Cliff and Talus[113]	0	0	0	118,427	81,277	22,142	39,133	7,466	23,992	292,437
North Pacific Montane Riparian Shrubland	0	0	4	1,475	1,027	91	2,339	169	1,030	6,134
North Pacific Montane Riparian Woodland	0	0	0	33,612	13,144	10,966	9,727	855	19,601	87,905
North Pacific Montane Shrubland	0	0	84	210,570	62,081	73,504	132,694	3,666	38,201	520,802
North Pacific Mountain Hemlock Forest	0	0	0	154,507	297,551	70,618	9,561	<1	52,265	584,502
North Pacific Oak Woodland	0	0	0	37	0	382	0	5,350	20,052	25,821
North Pacific Seasonal Sitka Spruce Forest	0	0	0	0	72,411	799,806	0	33,371	2,730	908,318
North Pacific Shrub Swamp	0	0	0	86	24	113	0	414	801	1,438
North Pacific Wooded Volcanic Flowage	0	0	0	11,324	0	0	0	0	4,265	15,589
Northern Rocky Mountain Avalanche Chute Shrubland	0	798	0	0	0	0	23	0	0	821
Northern Rocky Mountain Conifer Swamp	0	99	0	0	0	0	2	0	0	101
Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest	182,509	362,427	72,604	437,962	64	0	1,408,308	0	0	2,463,874
Northern Rocky Mountain Foothill Conifer Wooded Steppe	2,838	828	8,294	3,211	0	0	14,949	0	0	30,120

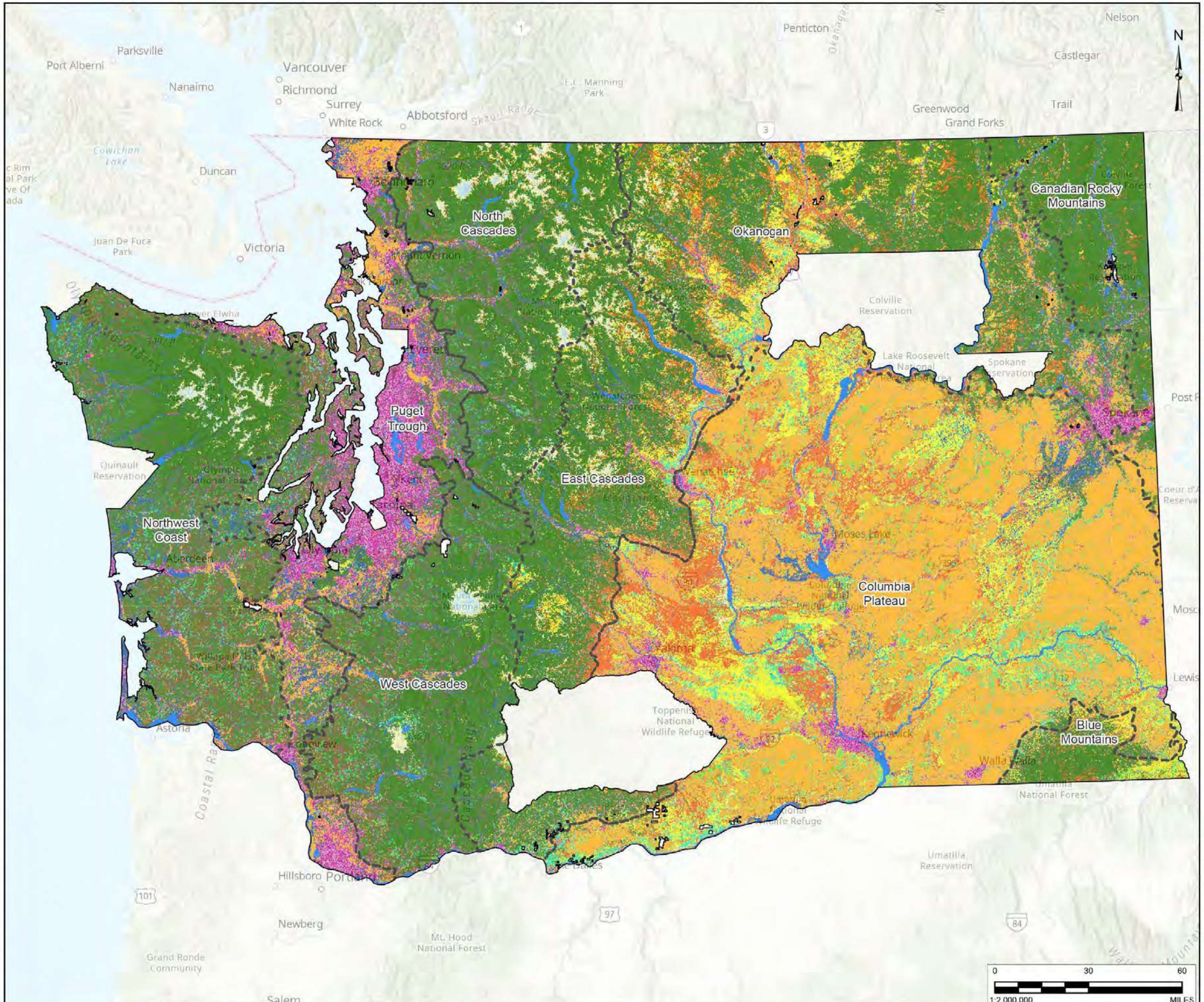
[113] A deposition of rocks which have fell from a slope or cliff and collected near the base.

Vegetation Group	Blue Mountains Ecoregion (Acres)	Canadian Rocky Mountains Ecoregion (Acres)	Columbia Plateau Ecoregion (Acres)	East Cascades Ecoregion (Acres)	North Cascades Ecoregion (Acres)	Northwest Coast Ecoregion (Acres)	Okanogan Ecoregion (Acres)	Puget Trough Ecoregion (Acres)	West Cascades Ecoregion (Acres)	Total Area in the Study Area (Acres)
Northern Rocky Mountain Lower Montane Riparian Shrubland	32	602	7	0	0	0	1,030	0	0	1,671
Northern Rocky Mountain Lower Montane Riparian Woodland	1,532	34,694	609	0	0	0	38,809	0	0	75,644
Northern Rocky Mountain Lower Montane-Foothill-Valley Grassland	16,123	15,559	9,754	92,665	115	0	287,924	0	0	422,141
Northern Rocky Mountain Mesic Montane Mixed Conifer Forest	67,715	767,272	3,532	0	0	0	114,635	0	0	953,154
Northern Rocky Mountain Montane-Foothill Deciduous Shrubland	55,389	69,592	39,494	39,738	155	0	337,303	0	0	541,670
Northern Rocky Mountain Ponderosa Pine Woodland and Savanna	47,076	102,115	175,509	185,281	1	0	428,634	0	<1	938,616
Northern Rocky Mountain Subalpine Deciduous Shrubland	829	17,607	288	0	0	0	14,141	0	0	32,864
Northern Rocky Mountain Subalpine Woodland and Parkland	0	4,509	0	43,141	6,251	0	117,919	0	0	171,821
Northern Rocky Mountain Subalpine-Upper Montane Grassland	1,538	2,170	244	0	0	0	4,980	0	0	8,931
Northern Rocky Mountain Western Larch Savanna	75	4,965	33	785	0	0	31,318	0	0	37,176
Open Water	2,918	23,386	249,209	78,904	45,093	78,182	82,835	116,163	57,057	733,746
Quarries-Strip Mines-Gravel Pits-Well and Wind Pads		661	959	190	167	37	358	1,695	151	4,218
Rocky Mountain Alpine-Montane Wet Meadow	23	579	9	0	0	0	4,400	0	0	5,010
Rocky Mountain Aspen Forest and Woodland	4,572	375	517	390	0	0	2,412	0	0	8,266
Rocky Mountain Cliff Canyon and Massive Bedrock	812	2,285	24	0	0	0	21,901	0	0	25,022
Rocky Mountain Lodgepole Pine Forest	2,167	14,436	86	20,832	22	0	160,794	0	0	198,337
Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	2,367	17,566	1	70,631	16,377	0	69,105	0	3,813	179,859
Rocky Mountain Subalpine Mesic-Wet Spruce-Fir Forest and Woodland	7,396	49,234	8	174,746	74,865	46,283	118,876	0	27,038	498,446
Rocky Mountain Subalpine-Montane Mesic Meadow	713	1,983	57	0	0	0	9,879	0	0	12,633
Rocky Mountain Subalpine-Montane Riparian Shrubland	54	17	14	0	0	0	30	0	0	115
Rocky Mountain Subalpine-Montane Riparian Woodland	207	522	21	3,093	910	0	16,150	0	0	20,903
Southern Vancouverian Lowland Ruderal Grassland	0	0	0	6,290	49,200	120,891	164	64,152	85,116	325,813
Southern Vancouverian Lowland Ruderal Shrubland	0	0	0	2,626	882	23,731	<1	39,139	54,119	120,496
Temperate Pacific Freshwater Emergent Marsh	0	0	<1	734	6,636	14,125	88	47,545	9,736	78,863

Vegetation Group	Blue Mountains Ecoregion (Acres)	Canadian Rocky Mountains Ecoregion (Acres)	Columbia Plateau Ecoregion (Acres)	East Cascades Ecoregion (Acres)	North Cascades Ecoregion (Acres)	Northwest Coast Ecoregion (Acres)	Okanogan Ecoregion (Acres)	Puget Trough Ecoregion (Acres)	West Cascades Ecoregion (Acres)	Total Area in the Study Area (Acres)
Temperate Pacific Subalpine-Montane Wet Meadow	0	0	0	3,360	1,469	479	3,211	0	2,337	10,856
Temperate Pacific Tidal Salt and Brackish Marsh	0	0	0	0	0	18,692	0	14,320	0	33,012
Western Cool Temperate Bush Fruit and Berries	<1	9	8,073	7	1,004	2,939	65	20,550	336	32,983
Western Cool Temperate Close Grown Crop	1,193	17,339	508,239	9,343	55	94	87,271	7,751	117	631,403
Western Cool Temperate Developed Deciduous Forest	1	1	2	24	1,003	2,624	18	61,287	1,943	66,902
Western Cool Temperate Developed Evergreen Forest	109	2,119	6,769	2,627	916	2,579	7,839	30,280	2,154	55,392
Western Cool Temperate Developed Herbaceous	87	988	35,561	3,055	1,033	3,998	8,173	42,647	1,477	97,018
Western Cool Temperate Developed Mixed Forest	32	340	2,512	612	752	2,791	846	29,960	708	38,553
Western Cool Temperate Developed Shrubland	57	1,244	10,528	1,223	144	468	5,716	4,464	209	24,052
Western Cool Temperate Fallow/Idle Cropland	1,409	2,701	1,555,390	7,480	45	101	16,862	3,977	2	1,587,968
Western Cool Temperate Orchard	18	186	281,128	30,227	435	3,272	33,414	16,991	3,167	368,838
Western Cool Temperate Pasture and Hayland	4,326	24,019	321,839	28,455	21,950	76,726	50,102	456,913	32,492	1,016,822
Western Cool Temperate Row Crop	744	8,293	772,865	256	1,150	2,365	5,635	71,532	94	862,933
Western Cool Temperate Row Crop - Close Grown Crop	1,052	9,009	203,979	1,327	10	236	11,150	6,286	36	233,085
Western Cool Temperate Urban Deciduous Forest	124	601	13,311	2,069	8,122	29,390	3,820	86,437	17,828	161,702
Western Cool Temperate Urban Evergreen Forest	959	3,735	12,868	25,689	30,098	67,546	9,464	55,941	75,433	281,732
Western Cool Temperate Urban Herbaceous	76	442	13,544	1,438	1,224	6,335	5,103	30,022	3,373	61,557
Western Cool Temperate Urban Mixed Forest	233	364	2,381	1,857	5,722	9,391	1,074	28,819	7,785	57,625
Western Cool Temperate Urban Shrubland	72	1,008	25,209	1,848	406	2,828	7,795	7,648	1,604	48,418
Western Cool Temperate Vineyard	8	15	106,251	1,203	11	1	398	295	66	108,249
Western Cool Temperate Wheat	6,720	33,086	2,436,858	4,185	24	25	27,955	2,518	2	2,511,372
Western North American Ruderal Wet Meadow & Marsh	46	10,609	16,338	82	0	0	21,123	0	0	48,198
Western North American Ruderal Wet Shrubland	111	3,262	72,844	161	0	0	6,341	0	0	82,719
Willamette Valley Upland Prairie	0	0	0	0	0	0	0	5,254	0	5,254
Total	**566,513**	**1,663,598**	**13,143,500**	**4,169,496**	**3,328,979**	**4,411,035**	**4,832,328**	**4,121,571**	**3,470,182**	**39,707,201**

Source: LANDFIRE 2016

This Page Intentionally Left Blank



LEGEND

- Study Area
- Ecoregions (WaDNR, 2022)

Vegetation Cover (Landfire, 2023)

- Agricultural
- Conifer
- Conifer-Hardwood
- Developed
- Developed-High Intensity
- Developed-Low Intensity
- Developed-Medium Intensity
- Developed-Roads
- Exotic Herbaceous
- Exotic Tree-Shrub
- Grassland
- Hardwood
- NA
- Open Water
- Quarries-Strip Mines-Gravel Pits-Well and Wind Pads
- Riparian
- Shrubland
- Snow-Ice
- Sparsely Vegetated

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES
1. SERVICE LAYER CREDITS: WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS, ESRI, USGS
2. ECOREGIONS: DNR, 2022; VEGETATION: LANDFIRE, 2016a

PROJECT
DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE
ECOSYSTEMS IN THE STUDY AREA
BASED ON LANDFIRE VEGETATION GROUP MAPPING

YYYY-MM-DD 2025-03-24
CONSULTANT wsp
FIGURE
3.5-2

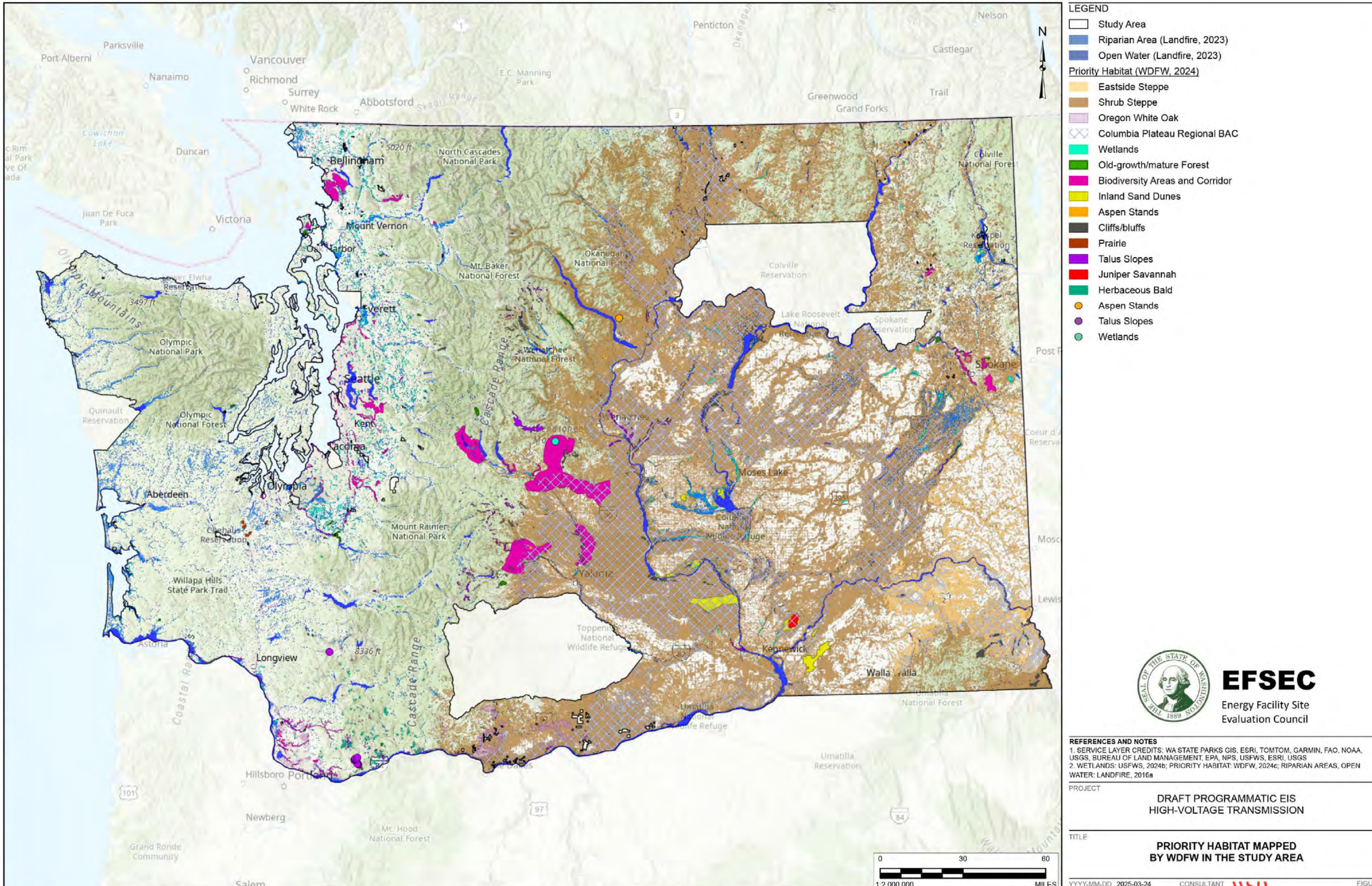
This Page Intentionally Left Blank

Priority Habitats

The WDFW also maintains information on at-risk ecosystems in Washington. The WDFW has identified 16 priority habitats and four priority habitat features in Washington for which conservation measures should be taken. Priority habitats and features are a habitat type or unique feature on the landscape that provide significant value to multiple wildlife species (WDFW 2023). Due to the importance of priority habitats to multiple species, the need to conserve these spaces, and the threat imposed by development on these vegetation resources, priority habitats were identified as a constraint in this Draft Programmatic EIS.

Of the 16 identified priority habitats, 11 are terrestrial systems and are summarized below. Aquatic habitats, are discussed under Section 3.6, Habitat, Wildlife, and Fish. Wetlands are described below under their own subsection. In addition to ecosystems, the WDFW has identified four priority habitat features included under priority habitat. Three have been identified as ecosystem-related components (cliffs, caves, and talus slopes) and are described below. The fourth habitat feature, logs and snags, is widespread and was not available for summary. Priority habitat mapped in the Study Area is provided in **Figure 3.5-3.** A summary of the area of terrestrial priority habitats in the Study Area for each ecoregion is provided in **Table 3.5-6.** Due to variations in climate, topography, soils, physiography, and ecosystem-forming processes, some priority habitats are tied to specific ecoregions, while others are more well-distributed across the state.

This Page Intentionally Left Blank



EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES
1. SERVICE LAYER CREDITS: WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS, ESRI, USGS
2. WETLANDS: USFWS, 2024b; PRIORITY HABITAT: WDFW, 2024c; RIPARIAN AREAS, OPEN WATER: LANDFIRE, 2016a

PROJECT
DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE
PRIORITY HABITAT MAPPED BY WDFW IN THE STUDY AREA

YYYY-MM-DD 2025-03-24 CONSULTANT wsp

FIGURE 3.5-3

This Page Intentionally Left Blank

Table 3.5-6: Area of Priority Habitat by Ecoregion in the Study Area[(a)]

Terrestrial Priority Habitat or Feature[(b)]	Blue Mountains Ecoregion (Acres)	Canadian Rocky Mountains Ecoregion (Acres)	Columbia Plateau Ecoregion (Acres)	East Cascades Ecoregion (Acres)	North Cascades Ecoregion (Acres)	Northwest Coast Ecoregion (Acres)	Okanogan Ecoregion (Acres)	Puget Trough Ecoregion (Acres)	West Cascades Ecoregion (Acres)	Total Area (Acres)
Aspen Stands	0	22	48	1,186	0	0	69	0	0	1,324
Biodiversity Areas and Corridors	77,911	10,721	4,982,241	455,754	5,037	3,656	516,706	93,442	10,040	6,155,508
Caves	0	0	0	325	0	9	0	121	259	715
Cliffs	14,855	42	66,074	22,263	2,031	1,676	9,934	1,706	2,268	120,848
Eastside Steppe	25,298	2,271	297,981	0	0	0	31	0	0	325,581
Herbaceous Balds	0	0	0	95	0	13	0	19	2,664	2,790
Inland Dunes	0	0	104,740	435	0	0	1,378	0	0	106,553
Juniper Savannah	0	0	7,606	0	0	0	0	0	0	7,606
Old Growth – Mature Forests	0	16	61	3,617	420	160	1,565	2,020	1,153	9,012
Oregon White Oak Woodlands	0	0	16,357	33,657	0	51	0	3,249	99	53,414
Riparian[(c)]	4,161	36,590	254,480	106,687	86,450	85,560	327,782	84,812	103,354	1,089,876
Shrubsteppe	108,970	29,558	5,162,268	419,998	0	0	797,167	0	0	6,517,961
Talus Slopes	0	0	12,628	26,495	165	0	260	66	6,782	46,396
Westside Prairie	0	0	0	0	0	0	0	1,957	0	1,957
Wetlands[(d)]	0	7,526	50,895	40,40	11,685	9,383	5,732	91,595	3,544	184,401
Total	**231,195**	**86,747**	**10,955,379**	**1,074,552**	**105,787**	**100,508**	**1,660,624**	**278,987**	**130,162**	**14,623,941**

(a) Priority habitat summaries are based on the Priority Habitat and Species database received from WDFW (2024b) received August 21, 2024. For priority habitats that are recorded using point features in the database, a 300-foot radius was applied to the data point to provide an approximated area. All areas are rounded to the nearest acre.
(b) Four habitat features are recognized by WDFW (2023): caves, cliffs, logs and snags, and talus slopes. All were included in the analysis except logs and snags. Data for logs and snags were not available from WDFW (2024b), and these features are too widespread to estimate.
(c) One data point was available in the WDFW (2024b) database for riparian areas, which was located in the North Cascades ecoregion, though more occur within the State of Washington. For this reason, riparian areas were summarized using LANDFIRE (2016a) and included all groups that contained the word “riparian.”
(d) The wetland summary provided is from the Priority Habitat and Species database (WDFW 2024c). The Priority Habitat and Species database does not differentiate between freshwater wetlands and freshwater deepwater; however, based on review of the identified areas, these areas mainly represent freshwater wetlands. An additional summary is provided under the Wetlands section for wetlands from the National Wetlands Inventory.

This Page Intentionally Left Blank

Aspen Stands

Aspen stands are defined as areas dominated by quaking aspen trees either as a homogeneous stand or mixed with other species. Areas of aspen stands must be greater than 1 acre to qualify as a priority habitat (WDFW 2023). Aspen stands are distributed throughout eastern Washington, in the Cascade Mountains, and the southern part of the Coastal and Olympic Mountains.

Caves

Caves are underground cavities that can be located in soil, rock, ice, or other geological formations. Caves are defined as a cavity that is large enough to contain a human. Human-made cavities, including mine shafts, can mimic natural caves and are considered in this feature group if they contain actual or suspected occurrences of priority species (WDFW 2023). Caves serve important functions for wildlife, such as providing maternal roosting areas for species of bats.

Cliffs

Cliffs include areas of steep topography, with vertical or nearly vertical angles. To be considered a priority habitat, cliffs must be greater than 25 feet high and occur below 5,000 feet elevation (WDFW 2023).

Eastside Steppe

The eastside steppe is located primarily east of the Cascade Mountains. The eastside steppe is characterized by perennial bunchgrasses and forbs.[114] The vegetation community is dominated by bluebunch wheatgrass (*Pseudoroegneria spicata*) with Idaho fescue (*Festuca idahoensis*), Sandberg bluegrass (*Poa secunda*), rough fescue (*F. campestris*), or needlegrass (*Achnatherum* sp.). The cover of grass and forbs is typically low in drier sites and increases in areas that receive greater precipitation or are located on soils with greater moisture-holding capacity. The shrub layer is typically sparse and includes sagebrush (*Artemisia* sp.), rabbitbrush (*Chrysothamnus* sp.), bitterbrush (*Purshia tridentata*), common snowberry (*Symphoricarpos albus*), and rose (*Rosa* sp.) (WDFW 2023).

Herbaceous Balds

Herbaceous balds occur in mountainous terrain in the western part of the state. Herbaceous balds are characterized as patches of low-growing grasses and forbs located on shallow soils over bedrock. The plant species that persist are capable of surviving at climatic extremes, including seasonally dry conditions and steep slopes with shallow soils. Some scattered trees may survive in these conditions. Herbaceous balds range in size from small patches of 12 acres to larger areas of 250 acres (WDFW 2023).

Inland Dunes

Inland dunes were formed through the initial deposition of sand from flood events followed by wind reworking the deposits to form sand fields. The formation of dunes requires transport by wind; therefore, the material of inland dunes is characterized by well-sorted fine- to medium-grained sand. In general, dunes accumulate sand during strong winds and lose sand during gentle winds until a critical size is reached. At critical size, sand is maintained and deposited on the leeward side (WDFW 2023).

Three functional stages of dunes are recognized: 1) open/migrating, 2) anchored, and 3) stabilized. An open/migrating dune has active surface sand that migrates with the effective wind direction. Unstable slip faces (lee

[114] A broad-leaved, non-woody flowering plant that is not a grass.

slopes) form, on which vegetation cover is minimal. Anchored dunes have active surface sands, but the movement of sand is inhibited by vegetation. This stage of a dune is often located on the trailing arms of migrating parabolic dunes and on vegetated sand sheets. Stabilized dunes lack active sands due to the presence of vegetation, cryptobiotic crusts, or volcanic ash that has sealed off the sand (WDFW 2023).

Plant communities on inland dunes vary but often resemble communities found in shrubsteppe ecosystems such as bitterbrush, rabbitbrush, and snow buckwheat (*Eriogonum niveum*). Some species of plants are restricted to sand dune ecosystems, including Indian ricegrass (*Achnatherum hymenoides*), lemon scurfpea (*Psoralidium lanceolatum*), veiny dock (*Rumex venosus*), and gray cryptantha (*Cryptantha leucophaea*). Vegetation cover varies with precipitation and evapotranspiration[115] (WDFW 2023). Several listed plant associations, plant priority species, and animal species at risk occur in inland sand dunes (DNR 2007).

Inland dunes exist in a state of flux. The mobility of sand is influenced by wind strength, while vegetation stabilizes sand and is influenced by precipitation. In periods of extended precipitation, vegetation persists, resulting in litter accumulation and soil development processes. Periods of drought lead to unfavorable conditions for vegetation persistence that can result in mobility of sand again (WDFW 2023).

An estimated 76 percent of inland sand dunes in Washington have been lost since the 1970s (DNR 2007). Major threats identified include invasive species (in particular, cheatgrass [*Bromus tectorum*]); conversion to agricultural land; off-road vehicles; intentional stabilization; residential development; livestock grazing; and mining (DNR 2007).

Juniper Savannah

Juniper savannah priority habitat includes juniper woodlands (WDFW 2023). Juniper savannahs occur on the drier edges of juniper woodlands where western juniper (*Juniperus occidentalis*) mixes with grasslands and consists of shrub/tree mix with 0 to 20 percent tree cover (NatureServe 2024c). Junipers are widely spaced and commonly have dead portions in their upper branches, making the canopies open and irregular (NatureServe 2024b). Juniper woodlands occur in areas with 20 to 40 percent canopy cover (NatureServe 2024c). Juniper savannahs are often found along the northern and western edges of the Great Basin and within the Columbia Plateau (NatureServe 2024c). The dominant species are western juniper and big sagebrush (*Artemisia tridentata*). Common shrubs include bitterbrush, rubber rabbitbrush (*Ericameria nauseosa*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), wax current (*Ribes cereum*), and horsebrush species (*Tetradymia* ssp.) (NatureServe 2024c). Common grasses include thread-leaf sedge (*Carex filifolia*), Idaho fescue, Sandberg bluegrass, and bluebunch wheatgrass (NatureServe 2024c). Juniper is usually the only tree species, but ponderosa pine and Jeffrey’s pine (*Pinus jeffreyi*) occur occasionally (NatureServe 2024c).

Old Growth – Mature Forests

The definition of old-growth forest differs based on location due to changes in growing conditions such as climate and soils, and disturbance regimes (e.g., fire). The main characteristics of old-growth forests west of the Cascade crest are large-diameter or old trees, multi-structured canopy, tree gaps, standing dead trees, and downed wood.

115 Combined process of water movement from the Earth's surface to the atmosphere through evaporation and transpiration.

To be considered an old-growth forest west of the Cascade crest, a forest stand must meet all of the following criteria (WDFW 2023):

- The stand is greater than 7.5 acres.
- The stand contains at least two tree species.
- The stand forms a multi-layered canopy with occasional small openings.
- The density is at minimum eight trees per acre that have a diameter at breast height (dbh) greater than 32 inches or are more than 200 years old.
- The density is at minimum four snags per acre with dbh of greater than 20 inches and minimum of 15 feet in height.
- The density of downed wood is at minimum four logs per acre that measure greater than 24 inches in diameter and are greater than 50 feet in length.

Elevation impacts tree growth and size. For forest stands above 2,500 feet the above criteria apply with all of the following amendments (WDFW 2023):

- The trees in the stand have a dbh greater than 30 inches.
- The density of snags is 1.5 per acre.
- The density of large downed logs is at minimum two logs per acre, which are greater than 24 inches in diameter and greater than 50 feet in length.

Forest stands east of the Cascade crest vary greatly in tree species composition and structural complexity due to the influence of fire, climate, and soils. The density of downed logs is expected to vary or be absent, and tree canopies may be multi-storied or single-storied. East of the Cascade crest, all of the following criteria must be met to identify old-growth forest (WDFW 2023):

- The forest stand is older than 150 years.
- The density of trees is at minimum 10 trees per acre with dbh greater than 21 inches.
- The density of snags is at minimum one to three snags per acre with dbh greater than 12 to 14 inches.

Mature forest stands are important not only as habitat for multiple species, but also as an important component in regenerating old-growth forests. Snags and large downed wood are also important components in mature forest, but there is typically a lower density in mature forest than in old-growth forest (WDFW 2023). Both of the following criteria are used to identify mature forest (WDFW 2023):

- The average dbh of the stand is greater than 21 inches;
- The age of trees in the stand is 80 to 200 years for forests west of the Cascade crest and 80 to 160 years for areas east of the Cascade crest. Due to the overlap in these definitions, stands greater than 150 years east of the Cascade crest were assumed to be old-growth for purposes of this Draft Programmatic EIS.

Oregon White Oak Woodlands

Oregon white oak woodlands are restricted to the western half of Washington. These areas are characterized by stands with 25 percent oak-dominated canopy coverage or with canopy coverage less than 25 percent but where oak accounts for at least 50 percent, which is often referred to as an oak savannah (WDFW 2023). The understory of oak woodlands typically contains plants indicative of prairie grasslands (see Westside Prairie, below). To be considered priority habitat, oak woodlands west of the Cascade Mountains in non-urbanized areas must be greater than 1.0 acre; east of the Cascade Mountains, they must be greater than 5 acres; and in urban or urbanizing areas, single oaks or stands less than 1.0 acre may be considered priority habitat (WDFW 2023).

Riparian

Riparian areas are located adjacent to freshwater aquatic systems and include the area from the ordinary high-water mark to the extent of land that is influenced by the aquatic system (WDFW 2023). Riparian habitat also includes the entire floodplain and other riparian areas that are connected to streams and freshwater (WDFW 2023). Perennial[116] and intermittent[117] water influences the soil, vegetation, water tables, microclimate,[118] and wildlife in riparian systems, and riparian vegetation influences the aquatic systems and the soil as well (WDFW 2023).

Shrubsteppe

Shrubsteppe is a non-forested ecosystem that consists of one or more layers of perennial bunchgrass and an overstory of conspicuous shrub species patterned on the landscape(WDFW 2023). The most dominant shrub species is big sagebrush, but other co-dominant shrubs include bitterbrush, threetip sagebrush (*Artemisia tripartita*), scabland sagebrush (*Artemisia rigida*), and dwarf sagebrush (*Artemisia arbuscula*) (WDFW 2023). Commonly found grasses include Idaho fescue, bluebunch wheatgrass, Sandberg bluegrass, Thurber’s needlegrass (*Achnatherum thurberianum*), and needle-and-thread (*Hesperostipa comata*), and some sites have layers of lichens, mosses, and algae (WDFW 2023). Areas with higher precipitation or greater capacity for soils to hold moisture can support a dense layer of forbs (WDFW 2023). Shrubsteppe has diverse habitat features, including various levels of topography and can occur in canyons or riparian ecosystems (WDFW 2023). Shrubsteppe ecosystems vary in quality and are influenced by soil properties and erosion or disturbance (WDFW 2023). More disturbed sites have more non-native species that co-dominate (WDFW 2023).

Snags and Logs

Snags are defined as dead or dying trees that exhibit decay characteristics, which enable cavity excavation or use by wildlife. Snags and logs are associated with habitat types that are dominated by trees (WDFW 2023). Priority snags and logs are determined based on dbh and height or length. Priority snags include snags with a dbh greater than 20 inches in western Washington or greater than 12 inches in eastern Washington, and greater than 6.5 feet in height. Priority logs include logs that are greater than 12 inches in dbh and greater than 20 feet long (WDFW 2023).

Snags and logs were not identified in the priority habitat and species database provided by WDFW and analyzed in **Table 3.5-6**. These habitat features are associated with tree dominated ecosystems and are assumed to be

---

[116] Refers to bodies of water that maintain continuous flow or presence throughout the year under normal conditions.

[117] Refers to bodies of water that flow only during certain times of the year, typically after rainfall or snowmelt.

[118] A local climate at a small scale

available primarily in forested habitat. However, snags and logs may also include solitary snags near waterbodies, remnant snags in developed or urban areas, and areas with relatively high densities of snags (WDFW 2023). Therefore, they may occur in any ecosystem type.

Talus Slopes

Talus slopes are dominated by rock and form naturally from rockslides. The WDFW defines these as areas of rock rubble ranging in average size from 0.5 to 6.5 feet composed of basalt, andesite, and/or sedimentary rock (WDFW 2023). Anthropogenic talus slopes, such as mine tailings, can also be included in this category. Talus slopes form unique features that are important for wildlife habitat.

Westside Prairie

Westside prairie is a non-forested, herbaceous habitat with less than 60 percent cover (WDFW 2023). Two types of westside prairie occur, dry prairie and wet prairie (WDFW 2023). If a soil surface is impervious, it is not considered to be dry or wet prairie. Dry prairie occurs on many soils that are commonly associated with prairies and where soils are well-drained (WDFW 2023). Diagnostic grasses, sedges, and forbs dominate, with mosses, lichen, and bare ground found in between the forbs and grasses (WDFW 2023). The presence of at least three of 24 identified diagnostic grasses, sedges, or forbs species is required to establish an area as a dry prairie (WDFW 2023). Wet prairie can be found in the lower Columbia-Willamette region of southwest Washington and occurs on rich clay soils that are saturated in the early part of the growing season and then dry out throughout the summer (WDFW 2023). Wet prairies are also found in the Puget Trough ecoregion on glacial outwash soils that are limited to swales and low-gradient riparian areas (WDFW 2023). Similar to the dry prairie, three diagnostic grasses, sedges, or forbs species are needed to establish an area as wet prairie (WDFW 2023).

Biodiversity Areas and Corridors

Biodiversity areas and corridors occur across Washington. Biodiversity areas and corridors are grouped together as one priority habitat but include two distinct features. Biodiversity areas are defined using one of two criteria (WDFW 2023):

a) An area that has been identified as biologically diverse through scientific-based assessments conducted at a landscape scale (e.g., an ecoregion, county-level); or
b) An area within a city or urban growth area that contains valuable habitat for fish or wildlife and features predominantly native vegetation. The area has relatively high vertical or horizontal diversity (due to canopy layers, snags, downed wood, and diverse native vegetation) compared to the surrounding urban environment, or it should support a diverse community of species as identified by a qualified biologist.

Corridors are areas of relatively undisturbed vegetation that connect habitat conservation areas, priority habitats, biodiverse areas, or other habitat valuable to fish and wildlife within a city or urban growth area (WDFW 2023).

Wetlands

Wetlands are areas that are inundated with water at a frequency and duration sufficient to support vegetation typically adapted for survival in saturated soil conditions (USACE and EPA 2024). Wetlands also have hydric soils that produce anaerobic conditions and hydrophytic plants that can tolerate the anaerobic conditions of the soils (Ecology 2024c). Wetlands provide various critical ecosystem functions; they help stabilize shorelines, maintain water quality, recharge aquifers, and provide habitat for fish, wildlife, and plants (Michaud 2001). Wetlands have economic benefits too, including flood and erosion protection that would otherwise damage infrastructure (Michaud 2001). Washington wetlands cover approximately 938,000 acres, or about 2 percent of the state

(Ecology 2024c). The types of wetlands in Washington are bogs, aquatic beds, coastal salt marshes, freshwater flats, fens, freshwater tidal wetlands, interdunal wetlands, interior alkaline wetlands, marshes and wet meadows, riparian areas, seeps and springs, swamps, vernal pools, and wet rock. Wetlands occur across the entirety of the state but are more abundant, proportionally, in western Washington than eastern Washington. Estuarine and marine wetlands are concentrated on the west coast of Washington. Wetlands are important for healthy watersheds and are becoming scarce in Washington.

In addition to the Priority Habitat and Species database information provided in **Table 3.5-6**, the NWI database was summarized to determine the area of wetlands in the Study Area by ecoregion. The NWI includes areas of freshwater ecosystems (i.e., lake and freshwater pond) and marine environments (i.e., estuarine and marine), which were excluded from the summary. Lakes and freshwater are discussed in Section 3.04, Water Resources. Marine environments are not included in the Study Area. With the excluded marine habitats, the NWI has 1,324,7511 acres of wetlands mapped in Washington, with the greatest area of wetlands mapped in the Columbia Plateau ecoregion. Wetlands in Washington are summarized in **Table 3.5-7** and shown in **Figure 3.5-4.**

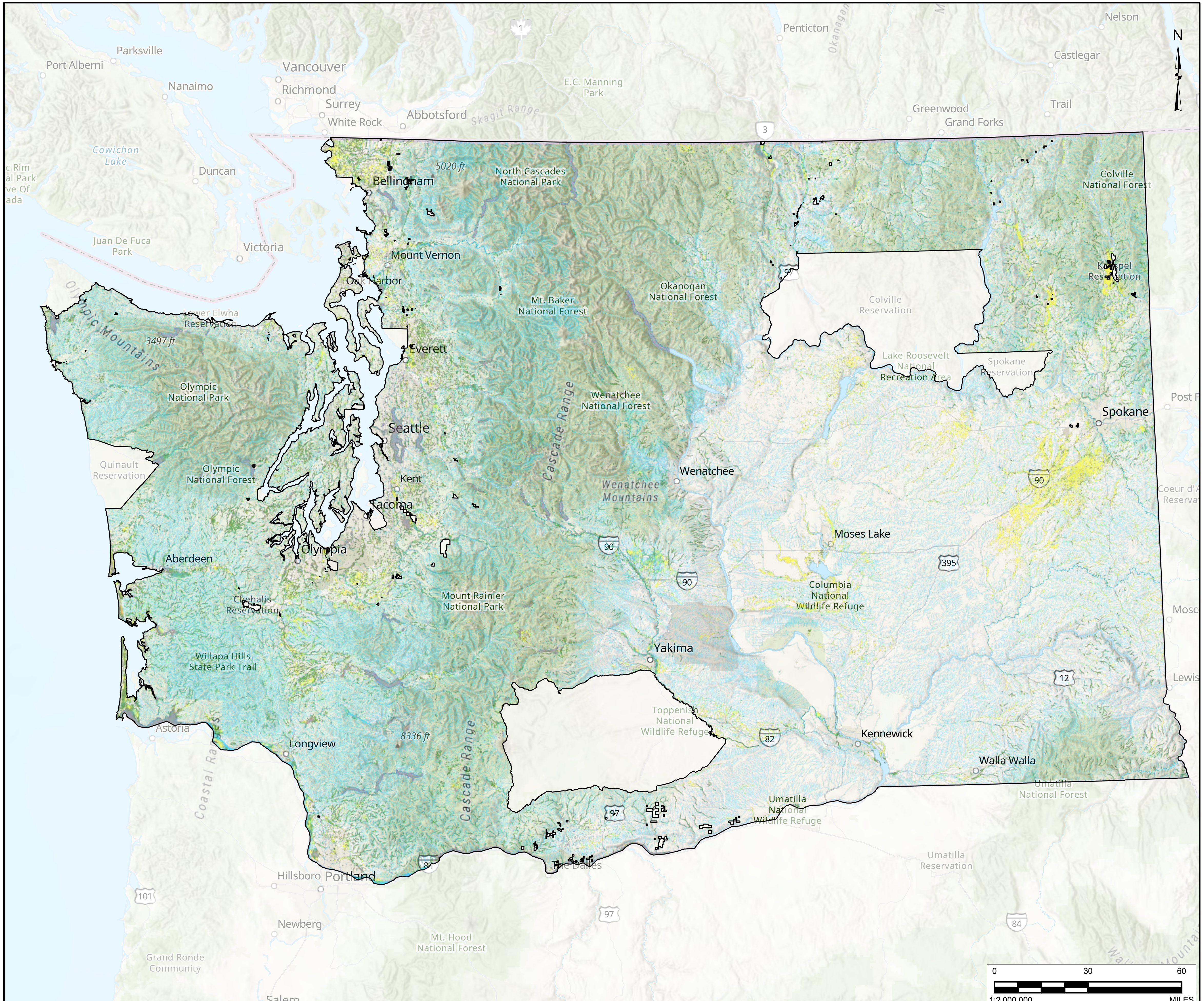
Table 3.5-7: Area Wetlands in the Study Area by Ecoregion

Wetland Type	Blue Mountains Ecoregion (Acres)	Canadian Rocky Mountains Ecoregion (Acres)	Columbia Plateau Ecoregion (Acres)	East Cascades Ecoregion (Acres)	North Cascades Ecoregion (Acres)	Northwest Coast Ecoregion (Acres)	Okanogan Ecoregion (Acres)	Puget Trough Ecoregion (Acres)	West Cascades Ecoregion (Acres)	Total Area (Acres)
Estuarine and Marine Wetland	0	0	0	0	0	20,129	0	17,260	0	**37,389**
Freshwater Emergent Wetland	108	26,542	108,486	7,662	3,305	28,936	53,175	87,287	10,675	**326,176**
Freshwater Forested/Shrub Wetland	704	11,550	19,508	25,398	16,896	68,440	29,380	113,763	32,713	**318,352**
Other	0	0	53	0	0	754	0	31	9	**847**
Riverine	8,414	20,714	107,369	54,299	77,449	128,592	59,069	70,411	93,905	**620,222**
Total Acres	**9,227**	**58,807**	**235,416**	**87,359**	**97,650**	**246,850**	**141,624**	**288,752**	**137,303**	**1,302,988**

Source: USFWS 2024b

Note: Freshwater ponds, lakes, and estuarine and marine deepwater are included in the National Wetland Inventory database but were not included in the data summary as these are generally considered surface waters, not wetlands.

This Page Intentionally Left Blank



LEGEND

- Study Area
- Mapped Wetland (FWS, 2024)
  - Freshwater Emergent Wetland
  - Freshwater Forested/Shrub Wetland
  - Riverine
  - Other

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES
1. SERVICE LAYER CREDITS: WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS, ESRI, USGS
2. WETLANDS: USFWS, 2024b

PROJECT
DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE
WETLANDS MAPPED IN THE STUDY AREA

YYYY-MM-DD 2025-03-24 CONSULTANT wsp FIGURE 3.5-4

This Page Intentionally Left Blank

Plant Priority Species

The WNHP maintains a list of plant priority species, which includes all plant species in Washington that are species of concern (Miller et al. 2024). Within this list, the WHNP uses a ranking system to assess the global, federal, and state level of concern for each species. There are three levels of priority:

- Priority 1, the highest priority, includes species that are at high risk of extinction across their entire range, including their range in Washington. The species will have a small population, and their habitats are generally degraded or reduced (DNR 2018).
- Priority 2 includes species that are predicted to become endangered across their entire range or within Washington within the foreseeable future (DNR 2018).
- Priority 3 species are vulnerable, and their population is declining in Washington. Species in this level are likely to become threatened without active management practices (DNR 2018).

In addition to the priority rankings, the WNHP includes the state status of each species and the ecoregions where it may be found (Miller et al. 2024), as follows:

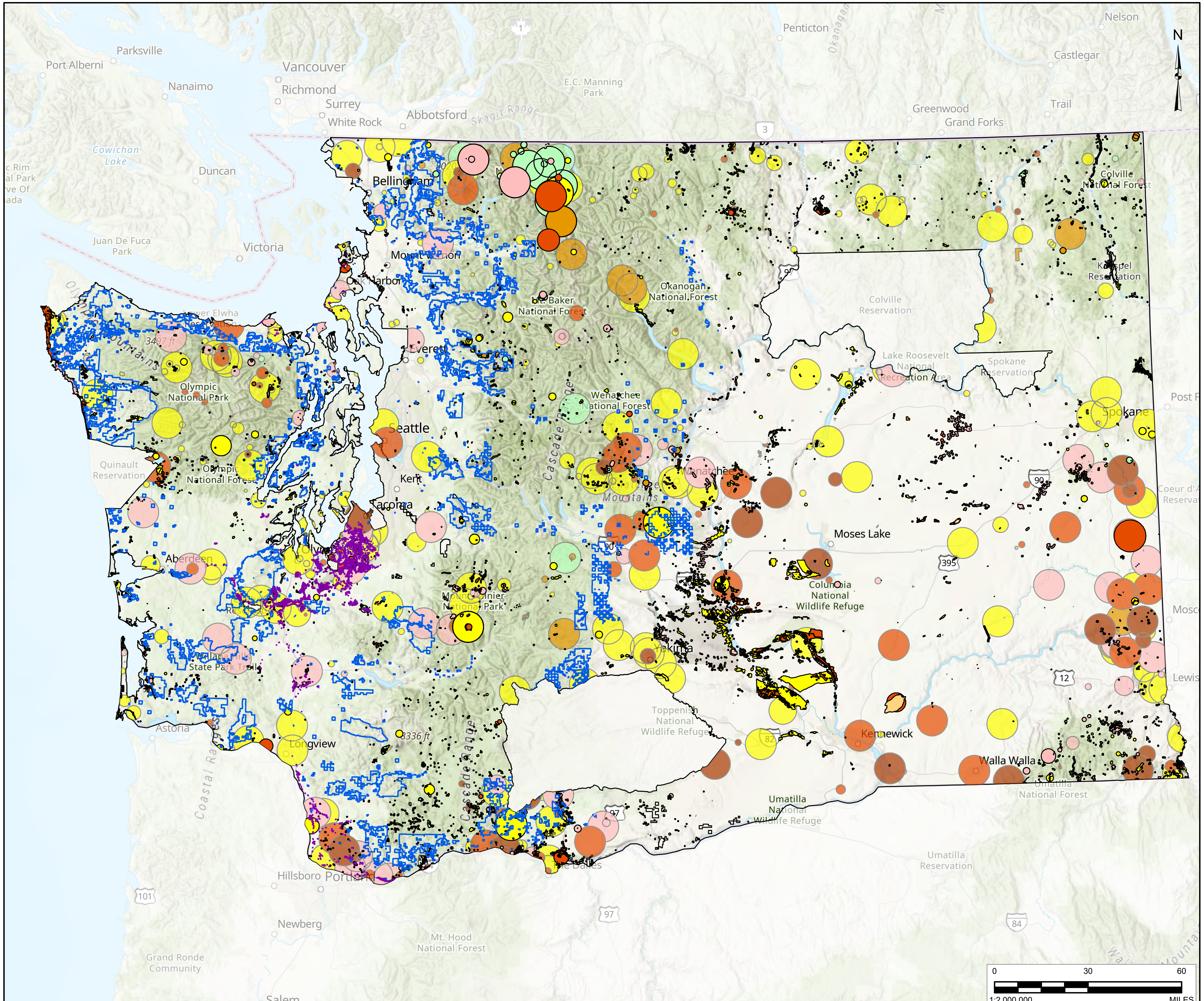
- Endang: Endangered, at risk of becoming extirpated in Washington, or extinct
- Threat: Threatened, likely to become endangered in Washington
- Sens: Sensitive or population in decline in Washington, could become threatened or endangered without management
- Extirp: Extirpated in Washington, or possibly extinct

The WNHP also includes the federal status of the species as listed (Miller et al. 2024):

- Endang: Endangered, a species is at risk of extinction in a major portion or all of its range.
- Threat: Threatened, a species is likely to become endangered in the near future.
- Prop: Proposed, a species has been proposed to be listed as endangered or threatened.
- Cand: Candidate, a species is being evaluated by the USFWS to be listed as endangered or threatened but no proposal has been made.
- B-Sens: Bureau of Land Management (BLM) sensitive, the species has been found in at least one BLM-managed area in Washington.
- F-Sens: USFS sensitive, the species has been found on at least one USFS-managed area in Washington.

A summary of priority vascular plant species in Washington State is provided in **Appendix 3.5-1** along with a description of habitat requirements and a summary of ecoregion species that are known to occur. Known occurrences of plant priority species are provided in **Figure 3.5-5**.

This Page Intentionally Left Blank



LEGEND

- Study Area
- Oaks and Grasslands of the Puget Trough Ecoregion (DNR, 2022a)
- Habitat Conservation Plan Lands (DNR, 2021)

Washington Natural Heritage Program Element Occurrences

Current State Status (DNR, 2023)

- ENDANGERED
- REVIEW 1 LIST
- REVIEW 2 LIST
- WATCH LIST
- SENSITIVE
- THREATENED
- NO CONCERN
- NOT LISTED

Historical State Status (DNR, 2022c)

- ENDANGERED
- POSSIBLY EXTIRPATED
- REVIEW 1 LIST
- REVIEW 2 LIST
- SENSITIVE
- THREATENED
- NO CONCERN

EFSEC Energy Facility Site Evaluation Council

REFERENCES AND NOTES

1. SERVICE LAYER CREDITS: WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS, ESRI, USGS
2. OAKS AND GRASSLANDS: WADNR, 2022a; HABITAT CONSERVATION PLAN LANDS: WADNR 2021; WASHINGTON NATURAL HERITAGE PROGRAM: WADNR, 2022c, 2023

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

PRIORITY PLANT SPECIES ELEMENT OCCURRENCES FROM WASHINGTON NATURAL HERITAGE PROGRAM

YYYY-MM-DD 2025-03-24

CONSULTANT wsp

FIGURE 3.5-5

This Page Intentionally Left Blank

3.5.3 Impacts

Transmission facilities are known to have impacts on vegetation resources. This section summarizes the impacts of transmission facilities on vegetation, biological factors that contribute to impacts, and transmission facility features that contribute to impacts.

Impacts on vegetation from transmission facilities can be broadly grouped into three general categories: direct impacts and mortality (e.g., loss of a population or loss of a patch of sensitive ecosystems from vegetation clearing); indirect impacts (e.g., spread of invasive plants); and fragmentation. Regardless of the type of transmission facility under consideration, vegetation clearing and grubbing is required for access roads and rights-of-way (ROWs) and the construction, and upgrade or modification of a transmission facility. Throughout operation and maintenance, vegetation clearing is required for ROWs, which can prevent restoring ROWs to certain ecosystems until decommissioning.

3.5.3.1 Method of Analysis

The study area for a project-specific application would typically encompass several key regions and features, such as the following:

- **Project site and immediate vicinity:** This includes the specific location of the project and the surrounding area that might be directly affected by construction, operation and maintenance, and upgrade or modification activities.
- **A local study area surrounding the project site:** This includes areas beyond the project site and immediate vicinity to help understand the landscape-level context of the project and impacts on vegetation.

This Draft Programmatic EIS analyzes the affected environment and impacts on vegetation resources within the Study Area defined in Chapter 2. Three project phases for each transmission facility type were considered: construction, operation and maintenance, and upgrade or modification.

This evaluation considers overhead transmission facilities and underground transmission facilities separately for each phase. Overhead transmission facilities consist of transmission lines and substations and similar ancillary infrastructure. Overhead transmission facilities also incorporate aboveground infrastructure that may be associated with underground transmission facilities (e.g., clearing footprint required for launch and retrieval shafts for trenchless construction). Underground transmission facilities consist of underground transmission lines, underground access vaults, and other belowground infrastructure. The construction of underground transmission facilities includes open-trench, trenchless, and underwater construction methods.

Impact Determination

The discussion of impacts is qualitative given the high-level nature of a Programmatic EIS; quantification would require project-specific details to analyze. **Table 3.5-8** describes the criteria used to evaluate impacts from the Action Alternative and No Action Alternative. Information reviewed to identify impacts on vegetation resources in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping.

Table 3.5-8: Criteria for Assessing the Impact Determination on Vegetation

Impact Determination	Description
Nil	A project would have no foreseeable impact on vegetation, including native plant species and ecosystems. A project would be sited entirely within existing anthropogenic disturbance (e.g., on developed, agricultural, or crop land) and would not result in the direct loss of native plants or ecosystems. Buffers are maintained around areas with native vegetation.
Negligible	A project would have a minor, adverse impact on vegetation, including native plant species and ecosystems. However, best management practices and design considerations are expected to be effective. A project would be sited outside buffers around known occurrences of plant priority species, priority habitats, plant associations of conservation concern, and wetlands for all phases. There would be no measurable change to vegetation community composition of adjacent native ecosystems or plant populations.
Low	A project would have adverse impacts on vegetation, even with the implementation of best management practices and design considerations. A project would result in the direct loss of natural ecosystems, but the change would be within the natural population variability and resiliency of a species or population and therefore not expected to impact the viability of the species or population for a longer period of time. Impacts to natural vegetation would occur, including loss or change in composition, but the structure and function of naturally vegetated areas would remain unchanged from pre-disturbance conditions. Impacts would be short term and nonsignificant.
Moderate	A project would have adverse impacts on vegetation, even with the implementation of best management practices and design considerations. A project would result in an incremental change that could cause changes to a plant population or native ecosystem over shorter or longer periods of time. The level of impact would exceed the resiliency and adaptability[119] of a species or population. Population levels may stabilize at a lower abundance than before the impact occurred. Impacts to natural ecosystems would impact the function, structure, or ecosystem services provided by the ecosystem, resulting in reduced functionality, but functionality would not be entirely lost. Naturally vegetated areas may become more isolated or have measurable changes in the ratio of edge to core habitat. Moderate impacts may be long-term, occurring over one or more project phases. Moderate impacts have the potential to be significant.
High	A project would have significant and potentially severe impacts on vegetation, even with the implementation of best management practices and design considerations. A project would result in an incremental change that it is expected to exceed the resiliency and adaptability of the species or populations thereby impacting the viability of the species or populations. Populations would be at risk of extirpation. Impacts to natural ecosystems would impact the functionality and ecosystem services provided by the ecosystem, rendering the ecosystem non-functional. High impacts may be permanent or continue for the duration of the project.

To clearly understand the potential severity of impacts without any interventions, the following impact determinations exclude the use of avoidance criteria and mitigation measures. The ratings assume compliance with all federal, state, and local laws and regulations, as well as standardized BMPs and design considerations. Assessing impacts without avoidance criteria or mitigation measures offers a baseline understanding of potential environmental effects, helping to identify the true extent of these impacts. Environmental laws often require that initial impact assessments be conducted without considering mitigation to maintain the integrity of the environmental review process.

Three project phases for each transmission facility type were considered: construction, operation and maintenance, and upgrade or modification. Potential interactions between a transmission facility (both overhead

[119] In biology, a species' ability to continue functioning after a disturbance.

and underground) and vegetation during construction, operation and maintenance, and upgrade or modification were identified based on information obtained from a review of literature and published information. The discussion of impacts is qualitative given the high-level nature of a Programmatic EIS; quantification, particularly as it relates to quantifying acres of disturbance, would require specific project details to analyze. Information reviewed to identify impacts on vegetation in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping. The analysis of impacts and characterization of significant adverse impacts are organized under construction, operation and maintenance, and upgrade or modification by impact category as follows:

- **Direct impacts (permanent and temporary), including plant mortality:** Includes direct disturbance or loss of ecosystems and populations of plant priority species within a project footprint.
- **Indirect impacts:** May occur due to project-related habitat quality. Indirect habitat loss does not result in the direct removal of a vegetation resource (i.e., direct impact), but rather in changes to the quality of an ecosystem or habitat for plant priority species that may ultimately lead to its loss (e.g., spread of invasive plant species, release of a deleterious substance).
- **Fragmentation:** Occurs when a linear feature results in division of an otherwise continuous tract of ecosystem or plant priority species population into smaller, more isolated patches.

The analysis of impacts is based on best available science at the time of writing. It is limited by the availability of data from public sources. Understanding the impacts of anthropogenic disturbances on biodiversity, including vegetation resources, is an evolving science, and few studies have collected long-term data or addressed confounding effects. Scientific understanding may change over time, and applicants should rely on the best available science at the time of application, which may differ from the impacts identified here.

3.5.3.2 Action Alternative

Construction

Overhead Transmission Facilities

Activities for the construction phase of overhead transmission facilities would vary and depend on the scale of the facility and site characteristics. Construction could include a site preparation phase of relatively short duration (e.g., a few months), followed by a longer construction and start-up phase. It is assumed that the construction phase of overhead transmission, per mile, would have a shorter duration than underground construction. Overhead transmission infrastructure could have the following impacts on vegetation resources during the construction phase:

- Direct Impacts
- Indirect Impacts
- Fragmentation

Direct Impacts

Vegetation clearing and grubbing is one of the main impacts on vegetation resources. Construction of overhead transmission facilities would require clearing vegetation for structure placement, access roads, and substations, which would have adverse impacts on ecosystems and plant priority species. In some cases, the entire ROW may require vegetation clearing. The impacts from vegetation clearing typically occur near the onset of the construction phase and often persist through operation and maintenance until the project is decommissioned and ecological communities can be restored.

A typical ROW width is 130 to 260 feet but may vary depending on transmission facility voltage and the adjacent landscape. For transmission facility ROWs that run hundreds of miles, this can equate to thousands of acres of direct disturbance to vegetation. Tall vegetation, such as tall shrubs and trees, is typically cleared from the width of the ROW or within strike distance of the transmission line. However, complete clearing may not be required for all ecosystem types, such as those dominated by low-growing vegetation.

Permanent direct impacts from transmission facilities include those that persist from the construction phase through the operation and maintenance phase and are not restored within the life of the project (WDFW 2009b). These would include the individual footprint of structure foundations for overhead transmission facility poles, permanent access roads to allow workers to maintain the transmission facility. These areas are assumed to remain non-vegetated through the life of the transmission facility and would constitute permanent losses of vegetation resources.

Temporary direct impacts from transmission facilities include those that are required for the construction phase but are restored and revegetated following construction (WDFW 2009b). These would include construction laydown areas and temporary access roads. Following construction, these areas would be restored to native vegetation similar to pre-disturbance conditions. However, vegetation under overhead transmission lines must be maintained to avoid electrification. For this reason, restoration of the area underneath overhead transmission lines may have differential impacts on different ecosystems.

Ecosystems dominated by low-growing vegetation such as grasslands, shrubsteppe, some wetlands, or sparsely vegetated ecosystems, such as talus slopes or rock outcrops, are compatible with overhead transmission facilities. The vegetation naturally does not reach the height of overhead wires, and, while some clearing and loss would be associated with the areas of permanent direct impacts, the entire ROW would not require clearing. On the other hand, forested ecosystems, which are dominated by trees, experience greater impacts than other ecosystems because all trees within the ROW or within strike distance are required to be cleared. Following construction, many of these areas cannot be restored to the forested pre-construction condition due to safety concerns of trees interacting with overhead transmission lines. Therefore, forested areas in the ROW are permanently lost for the life of the project. These areas may become “modified habitat” within the ROW, where some native vegetation is restored but the same structure and functions as the previous forested habitat are not available. Forested ecosystems are more dominant in the western portion of Washington in the Northwest Coast, Puget Trough, North Cascades, West Cascades, and East Cascades ecoregions.

The impacts of transmission facilities are exacerbated in old and mature forests. Old and mature forests are defined based on the age of trees and the presence of multi-storied structures within the forest, which requires time to develop. Further, in addition to the time lag between vegetation clearing and restoration, mature and old forests require time to achieve the climactic or near-climactic state. In other words, it takes mature and old forests decades or even centuries to develop the age and characteristics that define these systems. Old and mature forests predominantly occur in the East Cascades, Okanogan, Puget Trough, and West Cascades based on the Priority Habitat and Species Database (**Table 3.5-5**) (WDFW 2024c). Old and mature forest is also known to occur in the Canadian Rocky Mountains, Columbia Plateau, North Cascades, and Northwest Coast ecoregions, but less than 500 acres are currently mapped (**Table 3.5-5**) (WDFW 2024c). These areas may be of particular importance given the limited amount of old and mature forests remaining in these ecoregions.

Clear spanning is a method of transmission facility construction that could be used to avoid disturbing some ecosystem patches that support low-growing vegetation communities such as wetlands, shrubsteppe, or some riparian areas. In this method, all access is maintained outside the avoidance areas and the poles are erected on either side, which limits direct disturbance to what is required to run the cables over of the vegetation. The following sections discuss the direct impacts of constructing overhead transmission facilities in relation to broad ecosystem groups.

Alpine Ecosystems

Alpine ecosystems occur above the tree line. These areas are typically characterized by harsh climatic extremes. Alpine ecosystems are typically characterized by low-growing plant communities such as heathlands, alpine meadows, or alpine grasslands or sparsely vegetated communities such as late-snowbeds, glaciers, and alpine fell-fields. Due to the harsh environments, including strong winds, and difficult access, it is unlikely that many of these ecosystems would be suitable for overhead transmission; however, given the predominantly low-growing vegetation, clearing of the entire ROW is not anticipated to be required in these areas.

Forests and Woodlands

As described above, overhead transmission facility impacts would be greatest for forests and woodlands where the ecosystem is defined by tall woody species. It is expected that clearing of the width of the ROW (130 to 260 feet) would be required for all portions of overhead transmission facility that are routed through forests and woodlands, and that trees would continue to be excluded during operation and maintenance.

Riparian

Riparian areas include areas near waterbodies such as streams, lakes, ponds, and rivers. These areas may range from deciduous and mixed forests to shrub-dominated areas or herbaceous communities. The use of clear spanning to cross waterbodies is common practice within riparian areas for overhead transmission facilities. This method would minimize the disturbance to riparian areas from the transmission facility footprint and any required ROW or access road for each direction. The impact would vary depending on the dominant vegetation in the riparian area.

Steppe and Prairie

Steppe and prairie ecosystems include areas dominated by low-growing shrubs (e.g., big sagebrush), graminoids (i.e., grasses, rushes, and sedges), and forbs. While direct impacts would be associated with the access roads and transmission tower footprints, clearing of the entire ROW is not anticipated to be required in these ecosystems because the low-growing vegetation does not pose a threat to overhead transmission facility safety.

Sparsely Vegetated Ecosystems (Talus Slopes, Cliff, Bluffs, Inland Dunes)

Sparsely vegetated ecosystems include a broad range of ecosystems such as talus slopes, cliffs/bluffs, and inland dunes, that are characterized by a low percentage of the area being covered by vascular plants. When considering overhead transmission facilities, direct impacts on these ecosystems are anticipated to be limited to areas needed for temporary construction and permanent features. Because there is limited vegetation cover, clearing the entire ROW width is not anticipated in these areas.

Wetlands

Wetland ecosystems can range from low-growing graminoid-dominated ecosystems (e.g., marshes and fens) to tall woody shrubs and coniferous trees (e.g., treed swamps). For wetlands that are dominated by tall shrubs and trees, it would be necessary to clear the entire ROW width. In addition, wetlands may range from small, isolated depressions to large wetland complexes. In some cases, overhead transmission facilities may clear span wetlands, with limited disturbance to the wetland or wetland buffer. In other instances, where wetlands are large complexes, the fill required to create roads and platforms for transmission facility towers can have not just footprint-related impacts, but also alterations to the function of the ecosystem by changing hydrological regimes. Transmission pole structures and roads in wetlands would likely require infilling and could alter water flow through wetlands. Heavy machinery can degrade soil quality, causing compaction (PSCW n.d.), which may limit the ability to restore temporary and permanent areas needed for construction.

Plant Priority Species

Plant priority species are federally and state-listed species that have been assessed and are at some risk of extinction. Loss of habitat from anthropogenic development is one of the leading threats to species at risk (Government of Canada 2014). Direct disturbance could result in loss of habitat for priority plant species, direct loss of a population, or even localized extirpation. At-risk plant species may undergo varying degrees of population loss, depending on the vulnerability of the species, the ability of surrounding populations to “rescue” the population, and the resilience of the species to mitigation measures such as transplanting and propagation. The rescue effect hypothesizes that less isolated populations are less likely to go extinct due to the ability of nearby populations to recolonize[120] suitable habitat and due to increased genetic diversity through occasional migration among nearby populations (Lehtinen 2023).

Impact Determination: Depending on the scale of the facility and site characteristics, the direct impacts on vegetation, without mitigation measures incorporated, are anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Indirect Impacts

Indirect impacts on vegetation from overhead transmission are impacts that could occur outside of the direct disturbance areas due to construction of the overhead transmission facility and include the following:

- Introduction or Spread of Invasive Plants or Noxious Weeds
- Surface Runoff
- Deposition of Dust
- Introduction of Hazardous Substances

Introduction or Spread of Invasive Plants or Noxious Weeds

Linear infrastructure can facilitate the spread of invasive species to adjacent ecosystems (Dubé et al. 2011). Project construction could introduce or spread invasive plants or noxious weeds. Construction resulting in vegetation removal and soil disturbance creates opportunities for invasive plant establishment, and linear construction along a transmission facility creates a corridor for invasive plants to travel. Invasive plants typically have characteristics that facilitate their spread, such as being pioneering species that are quick to establish in available sites and are competitive with native vegetation. The competitive nature of successful invasive plants can aid in competitively excluding other, desirable native plants from establishing. The primary vectors that could introduce or spread invasive plants and noxious weeds are vehicles, equipment, and material (in particular, soil and seed) brought to site. Invasive species have the potential to alter the chemical and physical properties of soil,

[120] The reestablishment of a species into an area after it was extirpated.

as well as change nutrient cycling regimes, which can alter the structure and composition of native vegetation (Weidenhamer and Callaway 2010).

All ecosystem types are susceptible to the spread of invasive plants; however, some factors may increase the risk of invasive plant establishment and spread. In general, invasive plants along transmission facility corridors are correlated with biophysical attributes, including soil productivity and abundant light, and are correlated with distance to human development and recent disturbance (Lampinen et al. 2015). Construction of transmission facilities could result in new disturbances that create available space and opportunity for invasive plant establishment. Furthermore, transmission facilities developed near existing human development are more likely to have invasive plants already established. Transmission facilities in areas of relatively low human disturbance then provide significant opportunity to spread invasive plants to areas with current low establishment. The impacts of the spread of invasive plants on ecosystems that have limited human development and invasive plant establishment would likely be greater than impacts on ecosystems that have already undergone large-scale human disturbance.

Surface Runoff

Surface runoff from a construction site could mobilize sediments from exposed surfaces during clearing and infrastructure installation and redistribute these soils outside of the project footprint or in sensitive ecosystems. Movement and deposition of sediment could impact soil quality and vegetation in the surrounding area. Sedimentation impacts may vary depending on ecosystem type. Floodplain ecosystems and wetlands may be adapted to some sedimentation and require sediment to accumulate to maintain equilibrium; however, a large release of sediment could still have impacts on vegetation. Sediments can inundate vegetation, causing mortality or reduced growth (BC Ministry of Transportation and Infrastructure 2022). Sedimentation could alter hydrology by blocking flow channels, which could impact ecosystems that depend on hydrological connections, such as wetlands.

Deposition of Dust

Project construction could increase ambient dust from site preparation and clearing activities, excavation, and concrete works. In addition, vehicles and equipment moving along temporary and permanent access roads could increase dust as these roads are typically unpaved. Vehicle movements on unpaved roads generally produce more dust than paved roads, with dust deposition occurring up to 0.6 miles from the road (Kameswaran et al. 2019). As dust can move a long distance from a construction site, deposition can impact the surrounding vegetation, which would not otherwise have been disturbed. Dust deposition can impact the quality and quantity of vegetation adjacent to construction areas by adversely affecting plant growth. This occurs when dust settles on plants and blocks stomata, reducing photosynthesis and chlorophyll content, and ultimately impacting plant vigor and leaf growth (Farmer 1993; Kameswaran et al. 2019).

Introduction of Hazardous Materials

Accidental spills can result in the introduction of hazardous substances to the environment. Hazardous substances that may be stored or used during construction of a project include synthetic lubricating oils, glycol-water mix, hydraulic fluid, and diesel fuel. Activities that could result in accidental spill include refueling vehicles and equipment (e.g., oil, diesel fuel), vehicle and equipment maintenance (e.g., oil leak), concrete-mixing for foundations or pads, and installation of project features that are filled with liquid, such as transistors. Hazardous substances could cause direct mortality of vegetation or plant priority species, loss of vigor, and increased susceptibility to pathogens. Similar to dust, when substances like oil come into contact with leaves and other surfaces, stomata may be blocked, resulting in impacts on photosynthesis, thermal stress, and oxidative stress (da Silva Correa et al. 2022). Some hazardous substances persist in soil for prolonged periods and may impact soil chemistry. Oil-contaminated soil results in reduced availability of oxygen, water, and nutrients (da Silva Correa et al. 2022). In addition, oil-contaminated soil impacts plant growth, including changes to root and leaf growth and development, and change in plant biomass (da Silva Correa et al. 2022). Accidental spills may occur regardless of the ecosystem and the impacts would be similar to all ecosystem types. The following sections discuss the indirect impacts of constructing overhead transmission facilities in relation to broad ecosystem groups.

Alpine Ecosystems

Most alpine ecosystems occur in remote areas and have limited existing human disturbance. Plant species that persist in alpine areas are highly adapted to the harsh conditions. As human development is typically low and biophysical conditions are marginal, alpine ecosystems typically have low invasive plant abundance. New disturbance from transmission facility development could have significant impacts on these areas by facilitating invasive plant spread; however, the harsh environmental conditions may preclude the establishment of some invasive plants.

Surface runoff and dust from transmission facilities could impact adjacent areas. Soils in alpine areas are typically early in development due to recent deglaciation; however, soil depth may vary depending on the steepness of slopes, deposition patterns, and weatherability of parent material (Poulenard and Podwojewski 2004). Alpine soils may be susceptible to erosion, particularly where there are steep slopes with limited vegetation cover. Alpine environments also have potential for wind erosion due to high winds and exposure of soils (Poulenard and Podwojewski 2004). Most vegetation in this ecosystem is low to the ground, and sedimentation or deposition of dust may cover vegetation impacting growth and survival.

Forests and Woodlands

Forests are a commercial resource in Washington, and many forests have been impacted by logging. This has resulted in invasive plant establishment in many areas. Forests may restrict some invasive plant spread where canopies are dense, thereby restricting light availability. Areas of relatively undisturbed forests, including existing old and mature forests, likely have limited invasive plant establishment in comparison to second-generation or commercial forests.

Surface runoff and dust from transmission facilities could impact adjacent areas and would mostly impact understory vegetation. Overall ecosystem structure is expected to be maintained (i.e., trees would have limited impacts from sedimentation and dust).

Riparian

Riparian ecosystems provide many services, including flood and erosion protection, stormwater management, and water filtration (Ecology 2024d). Impacts of invasive plants on riparian ecosystems can result in changes to the structure and function of the ecosystem. Streams and other flowing waterbodies can act as dispersal corridors, similar to roads and transmission facilities. Introduction or spread of invasive plants to riparian ecosystems may result in a much broader area of spread due to the connection of land and water. In addition, invasive plants that create monocultures along streambanks can change the aquatic ecosystem by altering nutrient cycling, destabilizing banks, affecting water quality, and altering stream temperature (Urgenson et al. 2009; Greenwood and Kuhn 2014).

Riparian ecosystems occur along streams and other waterbodies and are typically adapted to various flooding regimes. Flood events result in natural deposition and removal of sediments over time. Sedimentation from anthropogenic sources could still impact riparian areas, but these ecosystems are expected to be resilient to sedimentation that could result from construction of a transmission facility. However, riparian ecosystems play a role in protecting aquatic ecosystems. If riparian areas are lost, there is limited vegetation to protect aquatic ecosystems from surface runoff.

Steppe and Prairie

Steppe and prairie ecosystems are most commonly found in eastern Washington, where agriculture and livestock grazing is abundant. Grasslands and shrublands (synonymous with prairie and steppe) typically have productive soil and high light availability, creating conditions suitable for invasive plants (Dhakal et al. 2023; Lampinen et al. 2015). Biodiversity of invasive plants in grasslands is higher than forested environments and may be attributed in part to disturbance agents like fire and grazing, as well as proximity to human disturbance (Dhakal et al. 2023). Fire is an important disturbance agent in these ecosystems, but it can also provide opportunities to create available space and release nutrients for use in invasive plant establishment and spread.

Cheatgrass is an invasive plant that has not only established over much of eastern Washington but has resulted in ecosystem level changes. Cheatgrass is a common invader of shrubsteppe, grasslands, and agricultural fields. The characteristics of cheatgrass result in increases in fire frequency, whereby lands with high cover of cheatgrass (15 percent or more) are twice as likely to burn and result in fire seasons starting earlier in the year (Bradley et al. 2017). Invasive plants that interact and alter ecological conditions that maintain ecosystems are particularly detrimental to the persistence of natural ecosystems.

Steppe and prairie ecosystems occur predominantly in arid eastern Washington. Dust is more typical in these environments, and therefore, the impacts from dust may be greater than in other ecosystems more common in western Washington. Similarly, dry conditions can result in reduced infiltration of rain into the soil, resulting in risk for overland flow.

Sparsely Vegetated Ecosystems (Talus Slopes, Cliff, Bluffs, Inland Dunes)

Sparsely vegetated ecosystems are characterized by a low cover of plant species. This may be in part due to marginal conditions in the substrate. For example, talus slopes and cliffs typically have limited soil development and plants are restricted to pockets of soil developed on and between rocks. Similarly, inland dunes are characterized by sandy substrate, which has limited moisture holding capacity. While space is available for colonization by invasive plants, conditions may be unsuitable for many invasive plants. However, stabilization of inland dune ecosystems by invasive plants is one of the leading threats to this ecosystem, particularly cheatgrass, which can establish and achieve densities that prevent sand movement (DNR 2007).

Sparsely vegetated ecosystems occur across the state. Impacts of surface runoff to rock-dominated ecosystems are likely to be limited, due to limited soil resources in rock-dominated ecosystems. Similarly, talus slopes and cliffs have limited soil material, and dust impacts are anticipated to be low. Conversely, a fundamental characteristic of inland dunes is mobile substrates. Stabilizers used in dust suppression may have adverse impacts on inland dunes, similar to stabilization from invasive plants.

Wetlands

Wetlands are particularly susceptible to invasive plants. Wetland invasive plants are prolific and often result in monocultures, which can alter wetland structure, biodiversity, and, ultimately, food webs (Zedler and Kercher 2004). Wetlands with nutrient-rich, and productive soils may be particularly at risk of invasion as many invasive plants can out-compete native plants (Zedler and Kercher 2004). Indirect impacts from invasive plants on wetlands from overhead transmission facility construction could result in loss of wetland functions (PSCW n.d.).

Wetlands function as natural filtration systems for water; however, major releases of sediment can impact wetlands. Wetlands typically occur in lower slope positions and depressional areas, which naturally receive water from the surrounding landscape. Accidental release of sediment to wetlands can impact vegetation by burying plants and potentially impacting water quality. Similarly, dust can result in similar impacts if it deposits in the wetland. Large sedimentation events could result in infilling of portions of wetlands, resulting in cumulative loss of wetland area. In addition, linear infrastructure can change water flow and flow rates into wetlands, which madoy also impact the wetland quality.

Plant Priority Species

Indirect impacts may further degrade habitat for plant priority species or cause further mortality. Indirect impacts for vegetation are more severe the closer the transmission facility infrastructure is to known populations of plant priority species. For example, dust from access roads may coat the leaves of some plants, which can result in smothering effects on vegetation and ultimately plant mortality (Farmer 1993; Kameswaran et al. 2019). Similarly, invasive plant spread may alter the physical and chemical properties of soil, which can reduce the quality of habitat for other native species, including plant priority species (Weidenhamer and Callaway 2010). Plant priority species are species that are already considered at some degree a threat for extinction, and indirect impacts may result in additional population loss.

Impact Determination: Depending on the scale of the facility and site characteristics, the indirect impact of on vegetation, without mitigation measures incorporated, are anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fragmentation

Fragmentation occurs when multiple anthropogenic disturbances reduce the patch size[121] of residual ecosystems, creating a mosaic of residual patches interspersed within a matrix of anthropogenic disturbance (Haddad et al. 2015). Creating isolated patches of ecosystems can alter ecosystem function; for example, isolated patches may experience reduced gene flow between communities.

Linear features such as roads and transmission facility ROWs traverse long distances across landscapes. Linear features bisect multiple ecosystems and can lead to ecosystem fragmentation. Linear features have a high edge-to-interior ratio and increase the edges along natural ecosystems. It is estimated that 70 percent of the world's remaining forests are located within 1 km (0.6 miles) of an edge (Haddad et al. 2015). Edges can lead to ecosystem degradation over time by altering microclimates, changing community composition, altering nutrient cycling, and impacting biodiversity (Haddad et al. 2015).

Fragmentation can lead to ecosystem loss—in particular, as patch sizes become increasingly small and/or isolated from other patches. Fragmentation reduces species richness for both plants and animals and leads to change in community composition, resulting in localized extirpation (Haddad et al. 2015). Plant community composition is used to classify plant associations. Ecosystems are lost when a change to plant communities results in indicator and dominant species being no longer present. This is particularly a concern for priority habitats and plant associations listed at the state level, which have already been identified as under some degree of threat and typically occur as patches of residual intact ecosystems on the landscape. The impacts from fragmentation may increase over time if fragmentation persists (Haddad et al. 2015).

[121] The size of a continuous or connected ecosystem type.

The same concept of fragmentation can be applied to populations of plant priority species. Studies of habitat fragmentation show that plant biodiversity declines over time with decreased patch size and increased patch isolation,[122] indicating that local extirpations occur (Haddad et al. 2015). Small populations of plant priority species are vulnerable to extirpation as unanticipated events may wipe out the population. Fragmentation can lead to multiple impacts on plant priority species. First, fragmentation may reduce a population size by directly impacting a portion of the population. Populations can recover if there are populations of plant priority species that can migrate to the area. However, fragmentation may further isolate a population from adjacent populations if a species cannot cross the anthropogenic disturbance. Immigration lag, by which small and isolated patches are slower to experience migration of species, is observed in fragmented habitat (Haddad et al. 2015), and therefore recovery of a lost population, if possible, is expected to be slower due to fragmentation.

Edge effects[123] from fragmentation may vary depending on the ecosystem type. It is estimated that impacts on microclimate and from invasive plants along edges may extend 25 to 775 feet into adjacent areas (Bentrup 2008). Edge effects can impact community composition and should be considered for linear infrastructure. While individual plant priority species were not specifically investigated for this Draft Programmatic EIS, this concept can be applied in ecosystem-level impact assessments. If the habitat on which a plant priority species depends is substantially altered, localized extirpation may occur.

Overhead transmission facilities are anticipated to have fragmentation-related impacts on vegetation. The severity of the impact is a function of the degree of existing isolation of the ecosystem patches, the distance between ecosystem patches (i.e., width of the direct disturbance area), ability of species to disperse, and the length of time before decommissioning (i.e., the impact is removed). The following sections discuss the fragmentation-related impacts of constructing overhead transmission facilities in relation to broad ecosystem groups.

Alpine Ecosystems

Most alpine ecosystems are remote and have undergone limited anthropogenic disturbance relative to other ecosystems. Alpine ecosystems occur as a mosaic responding to variations in soil availability, solar radiation, and extreme climatic conditions. At the landscape scale, alpine ecosystems are isolated fragments from one another as they occur above the tree line at high elevations. Because of the isolation, alpine ecosystems may be quite distinct from one another, with unique sets of species and plant priority species restricted to small ranges. Fragmentation impacts from transmission facilities are relatively uncommon in alpine ecosystems but could result in further isolation of populations.

Forests and Woodlands

Impacts on forests and woodlands from fragmentation can vary. In portions of western Washington, forests dominate the landscape up to tree line. Construction of transmission facilities could lead to distinct boundaries along the forest edge, but it is not anticipated to result in ecosystem loss. However, other tree-dominated ecosystems such as Oregon Oak woodlands, which occur already as fragmented patches, would be highly susceptible to loss from further fragmentation.

[122] The extent a habitat patch is isolated from other similar habitats.

[123] A phenomenon where species composition changes towards the boundary of a habitat. Typically used in the context of habitat degradation, where intact habitat contains less diversity near where it contacts disturbed areas, such as clearcuts or agricultural land.

Riparian

Impacts of fragmentation from construction of transmission facilities on riparian ecosystems are expected to vary. In urban areas, riparian areas have been highly modified, fragmented, and lost. Further fragmentation is likely to exacerbate the impact and could result in ecosystem loss. Where riparian areas are relatively intact, the impact of fragmentation may be less. Low-growing riparian vegetation can persist under overhead transmission facilities, so the distance between intact patches is estimated to be the width of a road. Where riparian ecosystems are dominated by tall shrubs or trees, the distance between patches is expected to be greater due to the need to clear the full ROW width. Clear span construction of overhead transmission facilities is expected to minimize fragmentation of riparian areas.

Steppe and Prairie

Steppe and prairie ecosystems have been highly modified due to agricultural development in Washington. Patches of intact steppe and prairie remain; however, further fragmentation from construction of transmission facilities could impact the persistence of small, isolated patches. Fragmentation may lead to increased indirect impacts (e.g., invasive plants), resulting in degradation of the ecosystem. For larger patches, ecosystems may experience increased indirect impacts, but large patches of steppe and prairie are anticipated to persist. Steppe and prairie ecosystems are expected to be maintained in overhead transmission facility ROWs, and only areas needed for construction are expected to be cleared. This means the distance between patches of steppe and prairie can likely be overcome by dispersal.

Sparsely Vegetated Ecosystems (Talus Slopes, Cliff, Bluffs, Inland Dunes)

Sparsely vegetated ecosystems occur as isolated patches on the landscape. Similar to alpine ecosystems, species that occur in these ecosystems may already experience some isolation. The resilience of species in these ecosystems is a product of the species' dispersal ability and the ability to survive conditions with limited nutrients. Clearing of the entire ROW is not expected to be required in sparsely vegetated areas, so the distance between patches would be reduced to the width of access roads and pole footings.

Wetlands

Fragmentation of wetlands from construction of overhead transmission could cause impacts on ecological function. This can alter water flow within a wetland and result in isolated patches of wetland that were once continuous, which can alter ecosystem function. In addition, linear features such as roads that bisect a wetland may result in loss of hydrological connections among connected wetlands, which can change wetland hydrology from impoundment. Small, isolated patches may be at increased risk of ecosystem loss. Clear span methods are anticipated to minimize impacts of construction on wetlands, particularly small wetlands that be entirely avoided; however, for larger wetland complexes, this may not be feasible.

Plant Priority Species

As described above, fragmentation can result in additional losses of populations of plant priority species as patch size decreases and patch isolation increases. Ultimately this may lead to local extirpation if there is reduced migration among populations (Haddad et al. 2015). Small populations of plant priority species are vulnerable to extirpation as unanticipated events may wipe out the population.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on fragmentation, without mitigation measures incorporated, are anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Activities for the construction phase of underground transmission facilities, including open trench, trenchless (including horizontal directional drilling), or underwater construction methods, would vary depending on the scale of the facility and site characteristics. Similar to overhead transmission facilities, construction underground could include a relatively short site preparation phase, followed by a longer construction and start-up phase. It is assumed that the construction phase for underground transmission facilities, per mile, would have a longer duration than overhead projects. Underground transmission infrastructure could have the following impacts on vegetation resources during the construction phase:

- Direct Impacts
- Indirect Impacts
- Fragmentation

<u>*Direct Impacts*</u>

In general, the direct impacts described for construction of overhead transmission would be similar for underground transmission. Vegetation clearing of the ROW would be required prior to construction of underground transmission facilities, resulting in the loss of natural ecosystems. Unlike overhead structures, installation of underground transmission facilities would require additional grubbing and excavation to facilitate construction. As such, construction of underground transmission facilities may result in greater impacts on soil and seedbanks, depending on the time required to complete construction, which would impact the ability to restore ecosystems following construction. In addition, excavation could result in impacts on plant root systems, particularly tree species, where root systems can be as extensive as the aboveground branching. Significant damage to root systems can lead to the death of a tree. Additional excavation would be required every 900 to 3,500 feet along the underground transmission ROW to accommodate vaults.

While it is expected that some natural ecosystems can be retained during construction under overhead transmission, this is not the case for underground transmission. As a result, the extent of direct loss of vegetation is expected to be greater than overhead transmission. The exception would be ecosystems that are traversed using trenchless construction methods such as horizontal directional drilling (HDD). HDD is a method of tunneling under a feature, which would minimize aboveground disturbance. This method can be used to avoid impacts on features such as large waterbodies or sensitive features (e.g., wetlands). Disturbance related to HDD includes a launch pad footprint and a retrieval pad footprint on either side of the tunnel alignment; however, the area between the launch and retrieval pads is left intact and the transmission line is pulled through an underground tunnel.

Following construction, some ecosystems may be compatible with restoration objectives of the underground transmission facilities, such as grasslands. These direct impacts may be considered temporary if restoration can occur following construction. However, deep-rooted or woody species, such as tall shrubs and trees, would be incompatible with underground transmission. Therefore, the duration of direct impacts on different ecosystems would not be equivalent. The direct impacts from underground transmission on forested ecosystems—in particular, old and mature forests—would be considered permanent as these systems would be lost throughout construction, operation, and decommissioning and would not be restored within the life of the project. Forests and similar ecosystems could start to be reestablished post-decommissioning; however, this could take decades or centuries to achieve their pre-construction state, particularly for old and mature forests.

The following sections discuss the direct impacts of constructing underground transmission facilities in relation to ecosystem groups and plant priority species.

Alpine Ecosystems

Construction of underground transmission is expected to have limited impacts on alpine environments. Many ecosystems have thin soils or are dominated by rock substrate, making them unsuitable for cut and cover trenching techniques. Alpine ecosystems occur at high elevations, which are not typically the preferred alignment for linear transmission as this would increase path distance and associated costs for construction.

Forests and Woodlands

Underground transmission facilities are anticipated to have direct impacts on forests and woodlands, similar to overhead transmission facilities, where the ecosystem is defined by tall woody species. It is expected that clearing of the width of the ROW would be required for all portions of underground transmission facility that are routed through forests and woodlands, and that trees would continue to be excluded during operations as deep-rooted species could impact the underground transmission facility. Trenchless construction could be used on small segments to limit impacts on sensitive features like old and mature forest and Oregon Oak woodlands.

Riparian

The use of trenchless construction is common practice for utilities to cross streams and riparian areas. Trenchless construction would minimize disturbance to the transmission facility footprint and any required ROW or access road for each direction. However, additional costs are anticipated to be incurred using trenchless construction, and there are few existing transmission facilities in Washington that are currently underground. Underground transmission facilities through riparian areas are anticipated to have direct impacts on vegetation if trenchless construction is not used. It would be necessary to clear the width of the ROW, as well as excavate and stockpile soil. This presents opportunities for sediment to be released into streams. In addition, many riparian areas are dominated by tall shrubs and deciduous or coniferous trees. This vegetation would not be suitable for planting above the transmission facility ROW during operation. Alteration of vegetation structure in riparian areas could impact riparian function, including the ability to trap sediments and filter overland flow before water reaches adjacent waterbodies.

Steppe and Prairie

Direct impacts could be associated with the ROW and access roads, as all vegetation could be impacted by trenching techniques. Disturbance to soil in arid areas, such as where shrubsteppe typically occurs, disturbs biological soil crusts. These soil crusts are important for soil stability, erosion prevention, and increased water infiltration (McIntosh et al. 2007). Disturbance to soil from underground transmission facility could disrupt the ecological functions biocrust provide to shrubsteppe and grasslands. Trenchless construction could be used for traversing high-quality steppe and prairie ecosystems, which could minimize impacts to launch and retrieval areas.

Sparsely Vegetated Ecosystems (Talus Slopes, Cliff, Bluffs, Inland Dunes)

When considering underground transmission facilities, direct impacts on these ecosystems are anticipated to be limited as traditional trenching techniques would not be feasible in areas dominated by rock or sand. Given the typically small size of these areas, trenchless techniques may be considered, which could limit direct impacts to launch and retrieval shafts.

Wetlands

For wetlands that are dominated by tall shrubs and trees, the entire ROW width required for trenching is anticipated to be cleared. Trenchless construction could be used to cross under wetlands, thereby minimizing the direct disturbance footprint. Trenching techniques would have major impacts on wetlands if used. Trenching and heavy machinery could result in soil compaction and alterations to hydrology (Olson and Doherty 2012). Studies of pipeline crossing in wetlands indicate that species diversity is reduced in areas impacted by pipelines ROWs compared to adjacent natural areas (Olson and Doherty 2012). Impacts from underground transmission facility are expected to be similar to pipelines given similar construction techniques. In addition, heavy machinery can degrade soil quality, causing compaction (PSCW n.d.), which could limit the ability to restore temporary and permanent areas needed for construction.

Plant Priority Species

Like overhead transmission facilities, the direct loss of plant priority species and their habitat from underground transmission facilities could occur if a project were sited over habitat that supports rare plant populations. The magnitude of the loss of a population of plant priority species would vary depending on the vulnerability of the species, the ability of surrounding populations to “rescue” the population, and the resilience of the species to mitigation measures such as transplanting and propagation.

Impact Determination: Depending on the scale of the facility and site characteristics, the direct impacts on vegetation, without mitigation measures incorporated, is anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Indirect Impacts

Indirect impacts from underground transmission facilities would be similar to overhead during the construction phase. Construction of underground transmission facilities requires ground disturbance along long linear features, which facilitate the introduction and spread of invasive plants. Due to the need for excavation in underground transmission construction, the amount of exposed soil and soil stockpiles is expected to be greater. This presents greater opportunities for invasive plants to establish and an increased risk of surface water runoff and sedimentation from the construction site. Construction activities have the potential to create dust—in particular, from exposed or stockpiled material associated with excavating a trench for underground transmission—which has negative impacts on vegetation growth, as described above for indirect impacts from overhead transmission construction. Due to the amount of material that may require stockpiling, the risk of sedimentation and dust is greater for underground transmission facilities relative to overhead transmission facilities. The following sections discuss the indirect impacts of constructing underground transmission facilities in relation to broad ecosystem groups.

Alpine Ecosystems

New disturbance from underground transmission facility construction could have significant impacts on these areas by facilitating invasive plant spread; however, the harsh environmental conditions may preclude the establishment of invasive plants. Surface runoff and dust from transmission facilities could impact adjacent areas. Some alpine ecosystems have limited soil available and therefore would be unsuitable for underground transmission facilities unless trenchless methods are used, which would minimize indirect impacts. Alpine soils may be susceptible to erosion—in particular, where there are steep slopes with limited vegetation cover. Alpine environments also have potential for wind erosion due to high winds and exposure of soils (Poulenard and Podwojewski 2004). Most vegetation is low to the ground, and sedimentation or deposition of dust could cover vegetation, impacting growth and survival.

Forests and Woodlands

Surface runoff and dust from the construction of underground transmission facilities could impact adjacent forested areas and would mostly impact understory vegetation. Overall ecosystem structure is expected to be maintained (i.e., trees would undergo limited impacts from sedimentation and dust).

Riparian

Introduction or spread of invasive plants to riparian ecosystems could result in a much broader area of spread due to the connection of land and water. In addition, invasive plants that create monocultures along streambanks can result in changes to the aquatic ecosystem by altering nutrient cycling, destabilizing banks, changing water quality, and altering stream temperature (Urgenson et al. 2009; Greenwood and Kuhn 2014).

Sedimentation from anthropogenic sources could still impact riparian areas, but these ecosystems are expected to be resilient to sedimentation that may result from construction of an underground transmission facility. If riparian areas are lost from direct disturbance, there is limited vegetation to protect aquatic ecosystems from surface runoff. If trenching is used and riparian areas are directly impacted, the risk of indirect impacts are greater than if trenchless construction methods or an overhead transmission facility is used. Underground transmission facilities require excavation along the ROW that disturbs a larger area than overhead transmission facilities; in particular, larger volumes of soil are disturbed. This increases the risk of sediment release to adjacent aquatic ecosystems due to the proximity of waterbodies in riparian areas.

Steppe and Prairie

Steppe and prairie ecosystems occur predominantly in arid eastern Washington. Dust is more typical in these environments, and therefore, the impacts from dust may be greater than in other ecosystems more common in western Washington. Similarly, dry conditions can result in reduced infiltration of rain, resulting in risk for overland flow.

Sparsely Vegetated Ecosystems (Talus Slopes, Cliff, Bluffs, Inland Dunes)

Sparsely vegetated ecosystems occur across the state. Impacts of surface runoff to rock-dominated ecosystems are likely limited, due to limited soil resources in the areas. Similarly, talus slopes and cliffs have limited soil material, and dust impacts are anticipated to be low. Conversely, a fundamental characteristic of inland dunes is mobile substrates. Stabilizers used in dust suppression may have adverse impacts on inland dunes, similar to stabilization from invasive plants.

Wetlands

Wetlands are particularly susceptible to invasive plants. Wetland invasive plants are prolific and often result in monocultures, which can alter wetland structure, biodiversity, and, ultimately, food webs (Zedler and Kercher 2004). Wetlands with nutrient-rich and productive soils may be particularly at risk of invasion, as many invasive plants are capable of out-competing native plants. Indirect impacts from invasive plants in a wetland from the construction of an underground transmission facility could result in loss of wetland functions.

Wetlands function as natural filtration systems for water; however, major releases of sediment can impact wetlands. Wetlands typically occur in lower slope and depressional areas, which naturally receive water from the surrounding landscape. Accidental release of sediment to wetlands can impact vegetation by burying plants and potentially impacting water quality. Similarly, dust can result in similar impacts if it deposits in the wetland. Large sedimentation events could result in infilling of portions of wetlands, resulting in cumulative loss. In addition, linear infrastructure can change water flow and flow rates into wetlands, which may also impact wetland quality.

Plant Priority Species

Similar to overhead transmission facilities, indirect impacts may further degrade habitat for plant priority species or cause further mortality. Due to the increased soil disturbance from underground transmission facilities, the risk of indirect impacts from dust, sedimentation, and invasive plants are greater for underground relative to overhead. Plant priority species are species that are already considered at some degree a threat for extinction, and indirect impacts could result in additional population loss.

Impact Determination: Depending on the scale of the facility and site characteristics, the indirect impacts on vegetation, without mitigation measures incorporated, are anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fragmentation

Impacts from underground transmission facilities due to fragmentation would be similar to those described above for the construction phase of overhead transmission facilities. Clearing and grubbing would be required for the entire underground transmission ROW, which could lead to fragmentation of ecosystems and populations of plant priority species. Underground transmission facilities create similar ROWs to those used for overhead, potentially wider where underground vaults exist, resulting in long linear features that bisect ecosystems and create disturbed edges adjacent to intact ecosystems. Planting certain plant species would be restricted within an underground transmission facility ROW, as deep-rooted species like shrubs and trees present a safety hazard for the utility from physical damage or from becoming electrified, so fragmentation is anticipated to persist beyond the construction phase.

Similar to overhead transmission facilities, underground transmission facilities are anticipated to have fragmentation impacts on vegetation. The severity of the impact is a function of the degree of existing isolation of the ecosystem patches, the distance between ecosystem patches (i.e., width of the direct disturbance area), ability of species to disperse, and the length of time before decommissioning (i.e., the impact is removed). The following sections discuss the fragmentation-related impacts of constructing underground transmission facilities in relation to broad ecosystem groups.

Alpine Ecosystems

Fragmentation impacts from underground transmission facilities, similar to overhead transmission facilities, are relatively uncommon in alpine ecosystems but could result in further isolation of populations of plants and vegetation communities.

Forests and Woodlands

Fragmentation impacts on forests and woodlands from underground transmission facilities can vary, similar to those from overhead transmission facilities. In portions of western Washington, forests dominate the landscape up to the tree line. Construction of underground transmission facilities could lead to distinct boundaries along the forest edge, but it is not anticipated to result in ecosystem loss. However, other tree-dominated ecosystems such as Oregon Oak woodlands, which occur already as fragmented patches, would be highly susceptible to loss from further fragmentation.

Riparian

Impacts of fragmentation from construction of underground transmission facilities on riparian ecosystems are expected to vary. In urban areas, riparian areas have been highly modified, fragmented, and lost. Further fragmentation is likely to exacerbate the impact and could result in ecosystem loss. Where riparian areas are relatively intact, the impact of fragmentation may be less. Low-growing, shallow rooted riparian vegetation can persist above underground transmission facilities, so the distance between intact patches is estimated to be the width of the ROW. Where riparian ecosystems are dominated by tall shrubs or trees, the distance between patches is expected to be greater due to the need to clear the full ROW width. Trenchless construction of underground transmission facilities is expected to minimize fragmentation of riparian areas.

Steppe and Prairie

Steppe and prairie ecosystems have been highly modified due to agricultural development in Washington. Patches of intact steppe and prairie remain; however, further fragmentation from construction of underground transmission facilities could impact the persistence of small, isolated patches. Fragmentation may lead to increased indirect impacts (e.g., invasive plants), resulting in degradation of the ecosystem. For larger patches, ecosystems may experience increased indirect impacts, but large patches of steppe and prairie are anticipated to persist. Steppe and prairie ecosystems may be restored following ground disturbance for underground trenching in temporary disturbance areas, but soil impacts, loss of biocrust, and loss of some species may occur.

Sparsely Vegetated Ecosystems (Talus Slopes, Cliff, Bluffs, Inland Dunes)

Underground transmission facilities in rock-dominated ecosystems would likely be restricted to trenchless construction, so clearing of the entire ROW is not expected to be required in sparsely vegetated areas, and the distance between patches would be minimized.

Wetlands

Fragmentation of wetlands from the construction of underground transmission facilities could cause impacts on ecological function. This can alter water flow within a wetland and result in isolated patches of wetland that were once continuous, which can alter ecosystem function. Small, isolated patches may be at increased risk of ecosystem loss. Where trenchless construction methods are used, it is anticipated that the impacts of construction on wetlands would be minimized, particularly for small wetlands that can be entirely avoided; however, for larger wetland complexes, this may not be feasible.

Plant Priority Species

Similar to overhead transmission facilities, fragmentation can result in additional losses of populations of plant priority species as patch size decreases and patch isoloation increases. Ultimately this could lead to local extirpation if there is reduced migration among populations (Haddad et al. 2015). Small populations of plant priority species are vulnerable to extirpation as unanticipated events may wipe out the population.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on fragmentation, without mitigation measures incorporated, are anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Operation and Maintenance

Overhead Transmission Facilities

Activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs, similar to other linear industrial facilities. Overhead transmission infrastructure could have the following impacts on vegetation resources during the operation and maintenance phase:

- Direct Impacts

- Indirect Impacts
- Fragmentation

During the operation and maintenance phase, the following would be expected to occur:

- Maintenance of vegetation along the transmission ROW, including cutting or trimming back vegetation, mowing, or other means of physical disturbance to vegetation
- Spraying of vegetation with herbicide
- Removal of potentially hazardous vegetation within or adjacent to the ROW that has potential to interact with the facility, such as cutting large, dead snags
- Maintenance of transmission facility infrastructure that may require heavy equipment and some temporary disturbance to vegetation to facilitate access and work areas

Direct Impacts

Direct impacts on vegetation resources are mostly realized during the construction phase. During operation and maintenance, vegetation under the transmission facility ROW would require maintenance to prevent it from interacting with the overhead lines. As described under the construction phase, ecosystems are impacted differentially by overhead transmission facilities. Some ecosystems would be compatible with restoration under overhead transmission facilities and may require minimal maintenance, but forest ecosystems are typically not restored. Maintenance would be required to remove pioneering trees[124] under a transmission line; therefore, forest ecosystems—in particular, mature and old forests—would not be restored until decommissioning and removal of infrastructure.

In some cases, impacts on adjacent areas may be required to maintain the safety of the transmission line. Dead trees in adjacent areas may require removal if they are within strike distance of the transmission line to prevent them from falling onto transmission infrastructure and access routes. This would result in additional direct loss of vegetation. Snags provide structural diversity to ecosystems such as forests and wildlife habitat, and natural decaying wood provides nutrient inputs to ecosystems.

The following sections discuss the direct impacts of operating and maintaining overhead transmission facilities in relation to broad ecosystem groups.

Alpine Ecosystems

Further direct impacts on alpine ecosystems during operation are anticipated to be minimal. Low-growing vegetation characteristic of these ecosystems is likely to require minimal ongoing maintenance.

Forests and Woodlands

Forests and woodlands are expected to require maintenance during operation. Forests are typically not re-established under overhead transmission due to safety concerns and ongoing maintenance required to trim back branches or top trees. Therefore, impacts from construction are anticipated to persist through operation.

[124] The first trees to colonize disturbed or damaged ecosystems.

Riparian

Some vegetation maintenance may be required in riparian areas where tall vegetation and trees occur, similar to forest and woodlands.

Steppe and Prairie

Further direct impacts on steppe and prairie ecosystems during operation are anticipated to be minimal. Low-growing vegetation characteristic of these ecosystems are not likely to require ongoing maintenance.

Sparsely Vegetated Ecosystems (Talus Slopes, Cliff, Bluffs, Inland Dunes)

Further direct impacts on sparsely vegetated ecosystems during operation are anticipated to be minimal. Low-growing vegetation characteristic of these ecosystems is not likely to require ongoing maintenance.

Wetlands

Some vegetation maintenance may be required in wetlands where tall shrubs and trees require maintenance, similar to forest and woodlands.

Plant Priority Species

Further direct impacts to plant priority species are anticipated to be limited during operation and maintenance as most direct loss is anticipated during the construction of the overhead transmission facility. Vegetation maintenance activities may result in additional loss, if species growth characteristics are not compatible with height requirements or limits of approach within the overhead transmission facility ROW. Accidental trampling may also result from maintenance workers accessing the overhead transmission facility. Maintenance activities would not likely affect large areas; however, populations of plant priority species may be small and at risk of local loss.

Impact Determination: Depending on the scale of the facility and site characteristics, the direct impacts on vegetation, without mitigation measures incorporated, are anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Indirect Impacts

The indirect impacts discussed under the construction of overhead transmission facilities would be relevant to impacts associated with operation and maintenance. Vehicle and equipment access along roads would continue to present opportunities for the introduction and spread of invasive plants, create dust, and could result in surface runoff. Maintenance activities could result in accidental release of hazardous materials. Furthermore, roads and ROWs could provide access for the public, which could also facilitate indirect impacts such as trampling, recreational use, and accidents including fire. Indirect impacts are anticipated to continue through for the duration of the overhead transmission facility.

During operation and maintenance, the use of herbicides may cause indirect impacts on non-target plants both within and adjacent to the ROW. Herbicides may be employed during operation and maintenance to manage invasive plants specifically and/or to more broadly control plant growth in the ROW. The application method and type of herbicide used would change the magnitude of the impact on non-target plants. For example, broad-cast spraying and aerial spraying are non-selective methods for treating invasive plants and noxious weeds that can result in herbicide application to non-target species. Some herbicides are non-selective, meaning that they can impact most species within broad functional groups. Non-target spraying may impact populations of plant priority species located within or near the ROW. Herbicides are designed to impact the growth and survival of plants and could cause these same impacts on native vegetation in restored areas or adjacent areas not previously impacted by direct disturbance. Herbicide drift from both aerial and broadcast spraying has been documented, with downwind drift from aerial spraying 5.0 to 8.6 times further than ground application methods and reaching 492 to 1,640 feet from the intended application site due to factors such as wind speed and humidity (Butts et al. 2022).

Indirect impacts are expected to persist for all ecosystem types. Differences discussed above in terms of impacts from invasive plants, sedimentation, and dust on different ecosystems and priority plant species are expected to persist through operations; however, there would be minimal soil disturbance during operation and maintenance relative to new construction and impacts are anticipated to be less than construction.

Impact Determination: Depending on the scale of the facility and site characteristics, the indirect impacts on vegetation, without mitigation measures incorporated, are anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fragmentation

Fragmentation of vegetation resources mostly occurs during the construction phase; however, the impacts from construction could persist in most ecosystems through the operation and maintenance phase. As discussed under the construction phase for overhead transmission facilities, the impacts from fragmentation are not a one-time occurrence, but can continue to increase as time passes (Haddad et al. 2015). For example, the longer ecosystems remain fragmented, the greater number of native species that may experience localized extirpation. In addition, during operation and maintenance, some maintenance activities may require additional new disturbance, which could result in further fragmentation of residual ecosystems adjacent to the transmission facility. For example, replacing transmission poles may be required from damage due to natural events and temporary disturbance of vegetation may be required for work areas.

Fragmentation during operation and maintenance is anticipated to persist for all areas of permanent direct disturbance. For forested and woodland ecosystems, treed and tall shrub riparian ecosystems, and treed and tall shrub wetlands, fragmentation impacts are anticipated to be the greatest because the entire ROW for overhead transmission facility is expected to be maintained in an altered state from construction to decommissioning. In addition, where roads and transmission facility structures are established in wetlands, fragmentation impacts during operation and maintenance are expected to continue and potentially worsen if hydrological connection is disrupted. Impacts of fragmentation to ecosystems with low-growing vegetation are anticipated to be less, and for operations, the width of fragmentation is reduced to the width of permanent access roads and transmission pole footprints.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on fragmentation, without mitigation measures incorporated, are anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Similar to overhead transmission facilities, activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs, similar to other linear industrial facilities. Underground transmission infrastructure could have the following impacts on vegetation resources during the operation and maintenance phase:

- Direct impacts
- Indirect impacts

- Fragmentation

The following are expected to occur during the operation and maintenance of underground transmission facilities:

- Maintenance of vegetation along the transmission ROW, including cutting or trimming back vegetation, mowing, or other means of physical disturbance to vegetation
- Spraying of vegetation with herbicide
- Removal of potentially hazardous vegetation adjacent to the ROW that has potential to interact with the facility, such as cutting large, dead snags or trees with root systems that encroach on the underground line
- Maintenance of transmission facility infrastructure that may require heavy equipment and some vegetation clearing to facilitate access and work areas

Direct Impacts

Similar to overhead transmission, most of the direct impacts for underground transmission facilities are realized during construction. However, additional direct impacts may occur during operation to facilitate maintenance of infrastructure and vegetation along the ROW. In addition, restrictions to the types of plant species that can be planted in the ROW may limit the types of ecosystems that can be restored during operations and maintenance. As such, most direct ecosystem loss could continue from construction through operation and maintenance. The following sections discuss the direct impacts of constructing underground transmission facilities in relation to broad ecosystem groups.

Alpine Ecosystems

Further direct impacts on alpine ecosystems during operation and maintenance are anticipated to be minimal. Low-growing vegetation characteristic of these ecosystems is not likely to require ongoing maintenance.

Forests and Woodlands

Forests and woodlands are expected to require maintenance during the operation and maintenance phase. Forests are typically not re-established over underground transmission due to safety concerns of deep-rooted species. Therefore, impacts from construction are expected to persist through operation.

Riparian

Some vegetation maintenance may be required in riparian areas, where tall vegetation and trees occur, similar to forest and woodlands.

Steppe and Prairie

Further direct impacts on steppe and prairie ecosystems during operation are anticipated to be minimal. Low-growing vegetation characteristic of these ecosystems is not likely to require ongoing maintenance.

Sparsely Vegetated Ecosystems (Talus Slopes, Cliff, Bluffs, Inland Dunes)

Further direct impacts on sparsely vegetated ecosystems during operation are anticipated to be minimal. Low-growing vegetation characteristic of these ecosystems is not likely to require ongoing maintenance.

Wetlands

Some vegetation maintenance may be required in wetlands where tall shrubs and trees require maintenance, similar to forest and woodlands.

Plant Priority Species

Like overhead transmission facility operation and maintenance, further direct impacts to plant priority species are anticipated to be limited during operation and maintenance as most direct loss is anticipated during the construction of the overhead transmission facility. Vegetation maintenance activities may result in additional loss, if species growth characteristics are not compatible with underground transmission facilities. Accidental trampling may also result from maintenance workers accessing the underground transmission facility. Maintenance activities may not affect large areas; however, populations of plant priority species may be small and at risk of local loss.

Impact Determination: Depending on the scale of the facility and site characteristics, the direct impacts on vegetation, without mitigation measures incorporated, are anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Indirect Impacts

Indirect impacts from the operation and maintenance phase of underground transmission facilities on vegetation resources are similar to those during the construction phase. Ecosystems adjacent to the ROW may be impacted through introduction and spread of invasive plants and noxious weeds, generation of dust and surface water runoff, and introduction of hazardous substances. The risk of indirect impacts from dust, surface water runoff, and introduction of hazardous substances is anticipated to be less during the operation and maintenance phase than in the construction phase, as there would be fewer roads and temporary laydowns than construction, fewer sources of exposed soil, and fewer people and equipment on site.

Similar to overhead transmission facilities, herbicide use may cause indirect impacts on non-target species in restored or adjacent ecosystems. These non-target impacts could result in additional loss of native plants. Furthermore, roads and ROWs could provide access to the public, which can also facilitate indirect impacts such as trampling, recreation use, and accidents including fire. Non-target spraying may impact populations of plant priority species located within or near the ROW.

Indirect impacts are expected to persist for all ecosystem types. Differences discussed above in terms of impacts from invasive plants, sedimentation, and dust to different ecosystems are expected to persist through operations and maintenance; however, as there would be minimal soil disturbance during operation relative to new construction.

Impact Determination: Depending on the scale of the facility and site characteristics, the indirect impacts on vegetation, without mitigation measures incorporated, are anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fragmentation

Fragmentation to vegetation resources mostly occurs during the construction phase; however, fragmentation where permanent impacts occur would persist during the operation and maintenance phase. The impacts from fragmentation are not a one-time occurrence but continue to increase as time increases (Haddad et al. 2015). For example, the longer ecosystems remain fragmented, the greater the number of native species that may experience localized extirpation. Therefore, fragmentation is anticipated to persist through the operation of underground transmission facilities similar to overhead. In addition, some maintenance activities may require additional new disturbance, which could result in further fragmentation of residual ecosystems adjacent to the transmission facility.

Fragmentation during operation and maintenance is anticipated to persist in all ecosystems for areas of permanent direct disturbance. For forested and woodland ecosystems, treed and tall shrub riparian ecosystems, and treed and tall shrub wetlands, fragmentation impacts are anticipated to be the greatest because the entire ROW for underground transmission facility is expected to be maintained in an altered state from construction to decommissioning. In addition, where roads are established in wetlands, fragmentation impacts during operation and maintenance are expected to continue and potentially worsen if hydrological connection is disrupted. Impacts of fragmentation on ecosystems with low-growing vegetation are anticipated to be less, and for operations, the width of fragmentation is reduced to the width of permanent access roads.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on fragmentation, without mitigation measures incorporated, are anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Upgrade or Modification

Overhead Transmission Facilities

Upgrading or modifying overhead transmission facilities would involve several steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Overhead transmission could have the following adverse impacts to vegetation resources during the upgrade or modification phase:

- Direct impacts
- Indirect impacts
- Fragmentation

While adverse impacts would be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be less than those for constructing new transmission facilities due to several factors, including those described below:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing structures and footprints, which minimizes the new disturbance to surrounding land and ecosystems. New construction often requires clearing land, which can disrupt existing land uses and have a larger impact on resources.
- **Infrastructure Utilization:** Existing infrastructure can be reused or enhanced, reducing the need for extensive new development.
- **Resiliency of Existing Vegetation:** For native plants and ecosystems persisting along an existing ROW may be resilient to the type of disturbance associated with constructing and operating a transmission facility. Similarly, populations of plant priority species outside of new disturbance areas that have persisted along the ROW may have increased resilience.

Underground Transmission Facilities

Upgrading or modifying underground transmission facilities would involve several steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Underground transmission could have the following identified adverse impacts during the upgrade or modification phase:

- Direct impacts
- Indirect impacts
- Fragmentation

While adverse impacts would be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be less than those for constructing new transmission facilities due to several factors, including those described below:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing structures and footprints, which minimizes the new disturbance to surrounding land and ecosystems. New construction often requires clearing land, which can disrupt existing land uses and have a larger impact on resources.
- **Infrastructure Utilization:** Existing infrastructure can be reused or enhanced, reducing the need for extensive new development.
- **Resiliency of Existing Vegetation:** For native plants and ecosystems persisting along an existing ROW may be resilient to the type of disturbance associated with constructing and operating a transmission facility. Similarly, populations of plant priority species outside of new disturbance areas that have persisted along the ROW may have increased resilience.

While adverse impacts would be similar to construction, adverse impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing structures and footprints, which minimizes the disturbance to surrounding land and ecosystems. New construction often requires clearing land, which can disrupt existing land uses and have a larger impact on resources.
- **Infrastructure Utilization:** Existing infrastructure can be reused or enhanced, reducing the need for extensive new development.

3.5.3.3 No Action Alternative

The No Action Alternative represents the scenario in which this Draft Programmatic EIS is not used and current management practices for siting and planning transmission facilities continue unchanged. Under this alternative, each project would continue to be evaluated on a case-by-case basis and reviewed for compliance with existing regulations, codes, and standard practices. While impact determinations would likely be similar to those outlined in this Draft Programmatic EIS, projects would not benefit from the impact reductions associated with the avoidance criteria developed and analyzed in this Draft Programmatic EIS. These criteria are anticipated to provide additional mitigation that further reduces potential environmental impacts.

3.5.4 Potential Mitigation Measures

This section describes measures that would eliminate, reduce the intensity of, or compensate for adverse impacts from construction, operation and maintenance, and upgrade or modification of transmission facilities. All general conditions adopted for this Draft Programmatic EIS, identified in Section 3.1, are relevant to this resource section.

Applicants would be responsible for providing information within their application materials documenting the implementation of the general conditions.

Avoidance criteria adopted for this Draft Programmatic EIS are identified in Section 3.1. Avoidance criteria that are relevant to this resource section are described below:

AVOID-2 – Wetland Disturbance: Avoid impacts within 300 feet of all wetlands.

Rationale: Protecting wetland vegetation would decrease the chances of wetland degradation during construction activities as these areas are important for sustained wetland function. Wetlands within the project footprint would be delineated following the U.S. Army Corps of Engineers wetland delineation methodology.

AVOID-4 – Floodplains: Avoid having equipment or infrastructure within floodplains.

Rationale: This avoidance criterion would eliminate the potential for damage to infrastructure and electrical safety hazards because of inundation and would avoid some riparian ecosystems.

AVOID-6 – Old-Growth and Mature Forests: Avoid old-growth forests, which include forests older than 200 years in western Washington and greater than 150 years in eastern Washington, and mature forests, which include forests greater than 80 years.

Rationale: This avoidance criterion would reduce direct loss of old-growth and mature forests, which have already lost the majority of their historical extent. Old-growth and mature forests are particularly susceptible to long-term impacts due to the time lag to reestablish current ecological functions if clearing occurs. In addition, linear features through old and mature forest stands increase the impacts from edge effects such as the spread of invasive plants.

AVOID-7 – Rare, Endangered, or Threatened Plant Species and Sensitive Ecosystems: Avoid impacts on rare, endangered, or threatened plant species and sensitive ecosystems.

Rationale: Avoiding rare, endangered, or threatened plant species and sensitive ecosystems would reduce both direct and indirect impacts on, and fragmentation of, these communities.

AVOID-8 – Important Habitat: Avoid impacts on important and sensitive wildlife habitat, including:

- National wildlife refuges, parks, and other state or federally protected areas
- Washington State lands managed as wildlife areas, conservation easements, and other state-managed lands for conservation
- Important Bird Areas
- Known stopover locations for migratory species
- Mapped critical habitat for federally listed species and habitat identified in state or federal management plans for state listed species
- Mapped ungulate winter range
- Mapped habitat concentration areas
- Wetlands, including a 300-foot buffer

- Known bat maternity colonies and hibernacula
- Known snake hibernacula
- Washington Shrubsteppe Restoration and Resiliency Initiative greater sage-grouse core and corridor areas

Rationale: This avoidance criterion aims to reduce habitat loss and fragmentation that can be caused by linear features, such as transmission facilities.

AVOID-19 – Wilderness Areas: Avoid impacts on, or within the viewshed of, designated wilderness areas.

Rationale: This avoidance criterion aims to protect wilderness areas. Wilderness areas are valued for their untouched natural beauty. The Wilderness Act of 1964 mandates the preservation of the natural conditions of designated wilderness areas.

Applicants would be responsible for providing information within their application materials documenting the project's compliance with the above avoidance criteria.

Potential mitigation measures have been identified to minimize adverse impacts from transmission facility projects. These measures are intended to be broad so that they can be applied to most projects that would be covered under this Programmatic EIS. However, project-specific plans would be needed to adapt the measures for project-specific applications.

When impact determinations are identified as moderate or high, the applicant would either adopt applicable mitigation measures from this Programmatic EIS or the SEPA Lead Agency may require applicable mitigation measures to be implemented to reduce project-specific impacts. When impact determinations are low, applicable mitigation measures should still be considered by the applicant and the SEPA Lead Agency as these measures would help to further reduce project-specific impacts, including the project's contribution to cumulative impacts. These measures would be implemented in addition to compliance with laws, regulations, environmental permits, plans, and design considerations required for transmission facilities.

The following mitigation measures could be adopted to mitigate adverse impacts:

Veg-1 – Desktop Assessment for Plant Priority Species and Sensitive Ecosystems: During the design and siting of transmission facilities, perform a desktop assessment with publicly available spatial data for plant priority species and sensitive ecosystems. Identify areas where priority species and sensitive ecosystems have potential to occur.

Rationale: This initial assessment aims to reduce the likelihood of direct or indirect loss of plant priority species.

Veg-2 – Pre-disturbance Surveys for Plant Priority Species and Sensitive Ecosystems: Conduct pre-disturbance surveys for plant priority species and sensitive ecosystems prior to construction in permanent and temporary footprint areas where suitable habitat occurs.

Rationale: This mitigation measure aims to reduce the likelihood of plant priority species being directly lost during construction activities.

Veg-3 – Site Transmission Facilities in Existing ROW or Disturbed Areas: Site transmission facilities in existing right-of-way (ROW) or disturbed areas, to the greatest extent practicable.

Rationale: Using existing ROW or disturbed areas would minimize the loss of vegetation and habitat and reduce fragmentation that can be caused by linear features, such as transmission facilities. This mitigation measure also mitigates physical and visual impacts on historic and cultural properties.

Veg-4 – Vegetation Management Plan: Create and implement vegetation management plans (VMPs) that are specific to the habitat(s) where project work is occurring during construction, operation and maintenance, upgrade or modification, and decommissioning.

Rationale: This is a required component of project-specific applications necessary to demonstrate regulatory compliance and risk management.

VMPs would help identify and manage sensitive vegetation on and adjacent to work sites, reducing direct and indirect loss. The operation VMP would also outline the methods to be used by the applicant to manage vegetation within the ROW.

Veg-5 – Invasive Species Management Plan: Create and implement an invasive species management plan.

Rationale: This is a required component of project-specific applications necessary to demonstrate regulatory compliance and risk management.

An invasive species management plan would inform contractors' procedures for managing invasive species and reduce their spread on the right-of-way, adjacent construction sites, and access roads.

Veg-6 – Revegetation Plan: Prepare a revegetation plan for areas of temporary disturbance from construction of the transmission facility.

Rationale: This is a required component of project-specific applications necessary to demonstrate regulatory compliance and risk management.

This mitigation measure aims to reduce direct and indirect loss of vegetation by revegetating disturbed construction areas with native species. Native plants provide important ecosystem services and would impede or slow the propagation of invasive plant species.

Veg-7 – Habitat Mitigation Plan: Develop a habitat mitigation plan (HMP) that would quantify impacts of the project on sensitive ecosystems and offsetting requirements.

Rationale: Direct loss of habitat from a project would require offset to avoid net loss of sensitive ecosystems and wildlife habitat. An HMP would provide the required offset quantity and a framework for how the applicant would meet offset obligations.

In addition to the above mitigation measures, the following mitigation measures[125] developed for other resources may be applicable:

Geo-1 – Minimize Soil Disturbance: Minimize soil disturbance, including footprints related to access roads and permanent structures, to the greatest extent practicable. Minimize the use of construction techniques that would be harmful to topsoil composition, where feasible.

Geo-5 – Drainage Control: Implement effective drainage systems and manage water runoff to reduce soil saturation.

Geo-7 – Environmental Assessments: Perform detailed environmental assessments to identify potential contamination

Geo-8 – Minimize Impacts on Sensitive Soils: Design projects to minimize adverse impacts on high erodibility zones and areas sensitive to degradation.

W-2 – Clear Spanning or Trenchless Methods for Water Crossings: When feasible, use clear spanning for overhead transmission or trenchless construction for underground transmission to minimize disturbance to riparian areas, wetlands and wetland buffers, and surface waters.

W-4 – Store Chemicals, Operate Equipment, and Conduct Maintenance away from Water: Store fuel, oils, and lubricants away from watercourses. Maintain, repair, and/or service vehicles and equipment away from watercourses and at designated repair facilities whenever possible. Operate equipment and machinery from the top of the bank and outside of riparian areas, wetlands and wetland buffers, and surface waters.

W-5 – Implement Erosion and Sediment Control Measures: Implement effective and appropriate erosion control measures in construction and operation to mitigate runoff into streams.

W-6 – Minimize Hydrology Changes: Minimize water diversions or changes to natural hydrology, to the extent possible. Natural hydrology would be restored to the site following construction.

Hab-1 – Use of Pesticides, Herbicides, and Fungicides: Minimize using harmful chemicals, including pesticides, herbicides, and fungicides, during the construction and operation and maintenance phases of transmission facility projects.

Hab-4 – Decommission the Nonpermanent Roads: Decommission and restore any access roads not required for operation and maintenance.

Hab-6 – Woody Debris Salvage and Restoration: Salvage and retain large, coarse, woody debris during construction and in-stream works. The post-construction revegetation and restoration plan would include planting native shrubs and replacing woody debris unless prohibited by a state authority due to fire risk. Post-construction revegetation and restoration plans would be provided to the Washington Department of Fish and Wildlife for review prior to approval by the State Environmental Policy Act Lead Agency.

Hab-8 – Worker Education Program: Develop a worker education program for implementation during project construction and operation. The program would train workers on operating near sensitive wildlife habitat

[125] The rationales for the identified mitigation measures are provided in their respective resource sections.

and features, sensitive wildlife periods, working around watercourses and riparian features, management of wildlife attractants, management of special status species, wildlife reporting, and wildlife mortality reporting.

Hab-9 – Retain Wildlife Trees where Practicable: Wildlife trees are trees with features that are especially beneficial to wildlife. These typically include living and dead trees that are decaying and those that have cavities or good conditions for cavity creation, sloughing bark that can provide roost sites for bats, branches for perching, basal cavities for denning, and foraging opportunities for woodpeckers and other wildlife. Wildlife trees will be retained where safe to do so.

Wild-14 – Access Management Plan: Develop an access management plan to manage human and predator access on the right-of-way (ROW).

Fish-5 – Delineate Riparian Management Zones: Delineate riparian management zones or buffers where certain activities (vegetation clearing or herbicide treatment) may be restricted.

Fish-7 – Work in Dry Conditions: Plan and schedule work in streams during dry conditions or when flows are anticipated to be at their lowest, when possible.

Fish-9 – Decontaminate All Gear: Control the spread of invasive species and diseases by minimizing work in areas known to support invasive plant species, and use decontamination procedures on all equipment and gear as specified for the species or disease.

Fish-14 – Use Bioengineering: Design stabilization structures to incorporate bioengineering principles; for example, use of living and nonliving plant materials in combination with natural and synthetic support material for slope stabilization, erosion reduction and vegetation establishment.

Fish-15 – Removal of Riparian Vegetation: Minimize disturbance to low-growing shrubs and grass species in riparian areas, or tree removal in steep gulches.

H&S-1 – Fire Mitigation Plan: Develop a fire mitigation plan that includes both preventative and remedial measures for potential ignition source operations[126].

3.5.5 Probable Significant Adverse Environmental Impacts

Determining the significance of an impact involves context and intensity, which, in turn, depend on the magnitude and duration of the impact. “Significant” in the Washington State Environmental Policy Act means a reasonable likelihood of more than a moderate adverse impact on environmental quality. An impact may also be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred (Washington Administrative Code 197-11-794).

Identification of environmental impacts and assignment of discipline-specific ratings is based on professional judgment and information available at the time of writing. A precautionary approach has been taken for the assessment where information is currently unknown or unavailable.

[126] Activities or use of equipment that can produce sparks, flames, or heat, potentially igniting flammable materials. These activities may not necessarily be part of a hot-work process (i.e., electrical equipment).

This Draft Programmatic EIS weighs the potential impacts on vegetation resources that could result from transmission facilities after considering the application of laws and regulations; siting and design considerations, including agency guidance and best management practices; and mitigation and makes a resulting determination of significance for each impact. **Table 3.5-9** summarizes the impacts anticipated for the construction, operation and maintenance, and upgrade or modification of transmission facilities.

This Page Intentionally Left Blank

Table 3.5-9: Summary of Impacts, Mitigation Measures, and Significance Rating for Vegetation Resources

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Vegetation – Direct Impacts	Construction	Permanent or temporary loss of vegetation from clearing and grubbing for structure placement, access roads, ROW, and substations.	**Overhead:** nil to high **Underground:** nil to high	▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-4:** Floodplains ▪ **AVOID-6:** Old-Growth and Mature Forests ▪ **AVOID-7:** Rare, Endangered, or Threatened Plant Species and Sensitive Ecosystems ▪ **AVOID-8:** Important Habitat ▪ **AVOID-19:** Wilderness Areas ▪ **Veg-1:** Desktop Assessment for Plant Priority Species and Sensitive Ecosystems ▪ **Veg-2:** Pre-disturbance Surveys for Plant Priority Species and Sensitive Ecosystems ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas ▪ **Veg-4:** Vegetation Management Plan ▪ **Veg-5:** Invasive Species Management Plan ▪ **Veg-6:** Revegetation Plan ▪ **Veg-7:** Habitat Mitigation Plan ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Geo-5:** Drainage Control ▪ **Geo-7:** Environmental Assessments ▪ **Geo-8:** Minimize Impacts on Sensitive Soils ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **W-4:** Store Chemicals, Operate Equipment, and Conduct Maintenance Away from Water ▪ **W-5:** Implement Erosion and Sediment Control Measures ▪ **W-6:** Minimize Hydrology Changes ▪ **Hab-1:** Use of Pesticides, Herbicides, and Fungicides ▪ **Hab-4:** Decommission the Nonpermanent Roads ▪ **Hab-6:** Woody Debris Salvage and Restoration ▪ **Hab-8:** Worker Education Program	Less than Significant	Construction of a new transmission facility would result in the loss of vegetation, particularly forested and tall shrub-dominated ecosystems that cannot be maintained on the ROW, whether overhead or underground. Most direct impacts on vegetation occur during construction, whether from new construction or upgrades or modifications. Many ecosystems characterized by low-growing vegetation may be compatible with revegetation in the ROW of underground or overhead transmission facilities, except forested and tall shrub-dominated ecosystems. However, overhead transmission facilities may be able to avoid disturbance to some low-growing vegetation, while underground transmission facilities would still require initial disturbance from excavation. Areas of vegetation lost in permanent infrastructure footprints for the transmission facility (e.g., permanent access roads) would be lost for the duration of the project. For forested and tall shrub-dominated ecosystems, the entire width of the ROW is anticipated to be lost. Operation and maintenance may require some disturbance to vegetation for maintenance work. In addition, vegetation would be managed in the ROW for the life of the project. Maintenance may include mechanical removal, herbicide spraying, or other means to limit vegetation encroachment on the transmission line. Upgrade or modification would require some additional footprint; however, the extent of vegetation loss is reduced by reusing an existing ROW. Mitigation measures applied to reach less than significant rating focus on avoidance and minimization of direct impacts to native vegetation. These two steps in the mitigation hierarchy are most important for plants and ecological communities. While restoration can restore some ecosystems, they may not be able to restore all
	Operation and Maintenance	Permanent loss of vegetation from transmission facility construction and ROW maintenance.	**Overhead:** nil to moderate **Underground:** nil to moderate			
	Upgrade or Modification	Permanent or temporary loss of vegetation from clearing and grubbing for ROW expansion, structure placement, access roads, and substations.	**Overhead:** nil to high **Underground:** nil to high			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
				▪ **Hab-9:** Retain Wildlife Trees where Practicable ▪ **Wild-14:** Access Management Plan ▪ **Fish-5:** Delineate Riparian Management Zones ▪ **Fish-7:** Work in Dry Conditions ▪ **Fish-9:** Decontaminate All Gear ▪ **Fish-14:** Use Bioengineering ▪ **Fish-15:** Removal of Riparian Vegetation ▪ **H&S-1:** Fire Mitigation Plan		ecosystem functions provided by the natural ecological community. Some native plants are challenging to propagate and use in restoration, and for at-risk species, loss of individuals could be irreversible.
Vegetation – Indirect Impacts	Construction	Indirect impacts, including spread of invasive plants, sedimentation, dust, accidental spill of hazardous material, and use of herbicides.	**Overhead:** nil to high **Underground:** nil to high	▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-4:** Floodplains ▪ **AVOID-6:** Old-Growth and Mature Forests ▪ **AVOID-7:** Rare, Endangered, or Threatened Plant Species and Sensitive Ecosystems ▪ **AVOID-8:** Important Habitat ▪ **AVOID-19:** Wilderness Areas ▪ **Veg-1:** Desktop Assessment for Plant Priority Species and Sensitive Ecosystems ▪ **Veg-2:** Pre-disturbance surveys for Plant Priority Species and Sensitive Ecosystems ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas ▪ **Veg-4:** Vegetation Management Plan ▪ **Veg-5:** Invasive Species Management Plan ▪ **Veg-6:** Revegetation Plan ▪ **Veg-7:** Habitat Mitigation Plan ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Geo-5:** Drainage Control ▪ **Geo-7:** Environmental Assessments ▪ **Geo-8:** Minimize Impacts on Sensitive Soils ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings	Less than Significant	Construction activities would involve heavy machinery, excavating soil, and maintaining equipment. These activities have the potential to result in the following indirect impacts: invasive plant introduction or spread, surface runoff, dust, spill of hazardous material, or use of herbicides to treat invasive plants. These impacts could spread from the active construction site to adjacent areas, resulting in degradation of adjacent ecosystems. Operation activities would involve use of vehicles to access portions of the transmission facility, permanent roads, vegetation maintenance, and maintaining the transmission facility. These activities have the potential to result in the following indirect impacts: invasive plant introduction or spread, surface runoff, dust, spill of hazardous material, or use of herbicides to treat invasive plants. These impacts could spread from the active construction site to adjacent areas, resulting in degradation of adjacent ecosystems. An upgrade or modification of an existing transmission facility would result in indirect impacts to adjacent ecosystems; however, previous disturbance in the original construction of the ROW is expected to have already contributed indirect impacts (such as invasive plants), and adjacent areas may already be in a degraded state relative to new construction.
	Operation and Maintenance	Indirect impacts, including spread of invasive plants, sedimentation, dust, accidental spill of hazardous material, and use of herbicides.	**Overhead:** nil to moderate **Underground:** nil to moderate			
	Upgrade or Modification	Indirect impacts, including spread of invasive plants, sedimentation, dust, accidental spill of hazardous material, and use of herbicides.	**Overhead:** nil to high **Underground:** nil to high			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
				▪ **W-4:** Store Chemicals, Operate Equipment, and Conduct Maintenance Away from Water ▪ **W-5:** Implement Erosion and Sediment Control Measures ▪ **W-6:** Minimize Hydrology Changes ▪ **Hab-1:** Use of Pesticides, Herbicides, and Fungicides ▪ **Hab-4:** Decommission the Nonpermanent Roads ▪ **Hab-6:** Woody Debris Salvage and Restoration ▪ **Hab-8:** Worker Education Program ▪ **Hab-9:** Retain Wildlife Trees where Practicable ▪ **Wild-14:** Access Management Plan ▪ **Fish-5:** Delineate Riparian Management Zones ▪ **Fish-7:** Work in Dry Conditions ▪ **Fish-9:** Decontaminate All Gear ▪ **Fish-14:** Use Bioengineering ▪ **Fish-15:** Removal of Riparian Vegetation ▪ **H&S-1:** Fire Mitigation Plan		Mitigation measures applied to reach a less than significant rating focus on avoidance and minimization of direct impacts on native vegetation. These two steps in the mitigation hierarchy are most important for plants and ecological communities. When direct impacts are avoided and/or minimized, the potential for indirect impacts is also minimized.
Vegetation – Fragmentation	Construction	Change in ecosystem quality and persistence due to isolation from fragmentation, resulting in increased edge effects.	**Overhead:** nil to high **Underground:** nil to high	▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-4:** Floodplains ▪ **AVOID-6:** Old-Growth and Mature Forests ▪ **AVOID-7:** Rare, Endangered, or Threatened Plant Species and Sensitive Ecosystems ▪ **AVOID-8:** Important Habitat ▪ **AVOID-19:** Wilderness Areas ▪ **Veg-1:** Desktop Assessment for Plant Priority Species and Sensitive Ecosystems ▪ **Veg-2:** Pre-disturbance surveys for Plant Priority Species and Sensitive Ecosystems ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas ▪ **Veg-4:** Vegetation Management Plan	Less than Significant	New construction of a transmission facility is anticipated to create new fragmentation on the landscape, increasing edge effects where previously intact ecosystems occurred. Creation of new transmission ROW through natural ecosystems, particularly in tree- and shrub-dominated habitat is expected to result in long term changes to those ecosystems by creating smaller patches. Fragmentation of priority habitats such as shrubsteppe has been identified as a major threat. Fragmentation initiated during construction would continue through operation and maintenance. Creation of new transmission facility ROW through natural ecosystems, particularly in tree- and shrub-dominated habitat is expected to result in long-term changes to those systems by creating smaller patches. Fragmentation to priority habitats such as
	Operation and Maintenance	Change in ecosystem quality and persistence due to isolation from fragmentation, resulting in increased edge effects.	**Overhead:** nil to moderate **Underground:** nil to moderate			
	Upgrade or Modification	Change in ecosystem quality and persistence due to isolation from fragmentation, resulting in increased edge effects.	**Overhead:** nil to high **Underground:** nil to high			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
				▪ **Veg-5:** Invasive Species Management Plan ▪ **Veg-6:** Revegetation Plan ▪ **Veg-7:** Habitat Mitigation Plan ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Geo-5:** Drainage Control ▪ **Geo-7:** Environmental Assessments ▪ **Geo-8:** Minimize Impacts on Sensitive Soils ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **W-4:** Store Chemicals, Operate Equipment, and Conduct Maintenance Away from Water ▪ **W-5:** Implement Erosion and Sediment Control Measures ▪ **W-6:** Minimize Hydrology Changes ▪ **Hab-1:** Use of Pesticides, Herbicides, and Fungicides ▪ **Hab-4:** Decommission the Nonpermanent Roads ▪ **Hab-6:** Woody Debris Salvage and Restoration ▪ **Hab-8:** Worker Education Program ▪ **Hab-9:** Retain Wildlife Trees where Practicable ▪ **Wild-14:** Access Management Plan ▪ **Fish-5:** Delineate Riparian Management Zones ▪ **Fish-7:** Work in Dry Conditions ▪ **Fish-9:** Decontaminate All Gear ▪ **Fish-14:** Use Bioengineering ▪ **Fish-15:** Removal of Riparian Vegetation ▪ **H&S-1:** Fire Mitigation Plan		shrubsteppe have been identified as a major threat. An upgrade or modification to an existing transmission facility makes use of an area where fragmentation has already occurred. It is anticipated that the width of the disturbance may increase (potentially increasing dispersal distance) and patch size may be reduced; however, edge effects are anticipated to already be impacting the adjacent ecosystems due to the existing transmission facility. Mitigation measures applied to reach less a than significant rating focus on avoidance and minimization of direct impacts on native vegetation. These two steps in the mitigation hierarchy are most important for plants and ecological communities. When direct impacts are avoided or minimized, fragmentation is avoided or minimized.

Notes:
(a) Appendix 3.9-1 provides a detailed listing of each general condition, avoidance criteria, and mitigation measure. Having these details in an appendix serves as a comprehensive reference section that can be consulted independently of the main text. This is particularly useful for detailed guidance and technical specifications that may be referred to multiple times. Additionally, including this information in an appendix allows for easier updates and revisions. If mitigation measures or guidelines change, the appendix can be updated without altering the main content.
BMP = best management practice; ROW = right-of-way

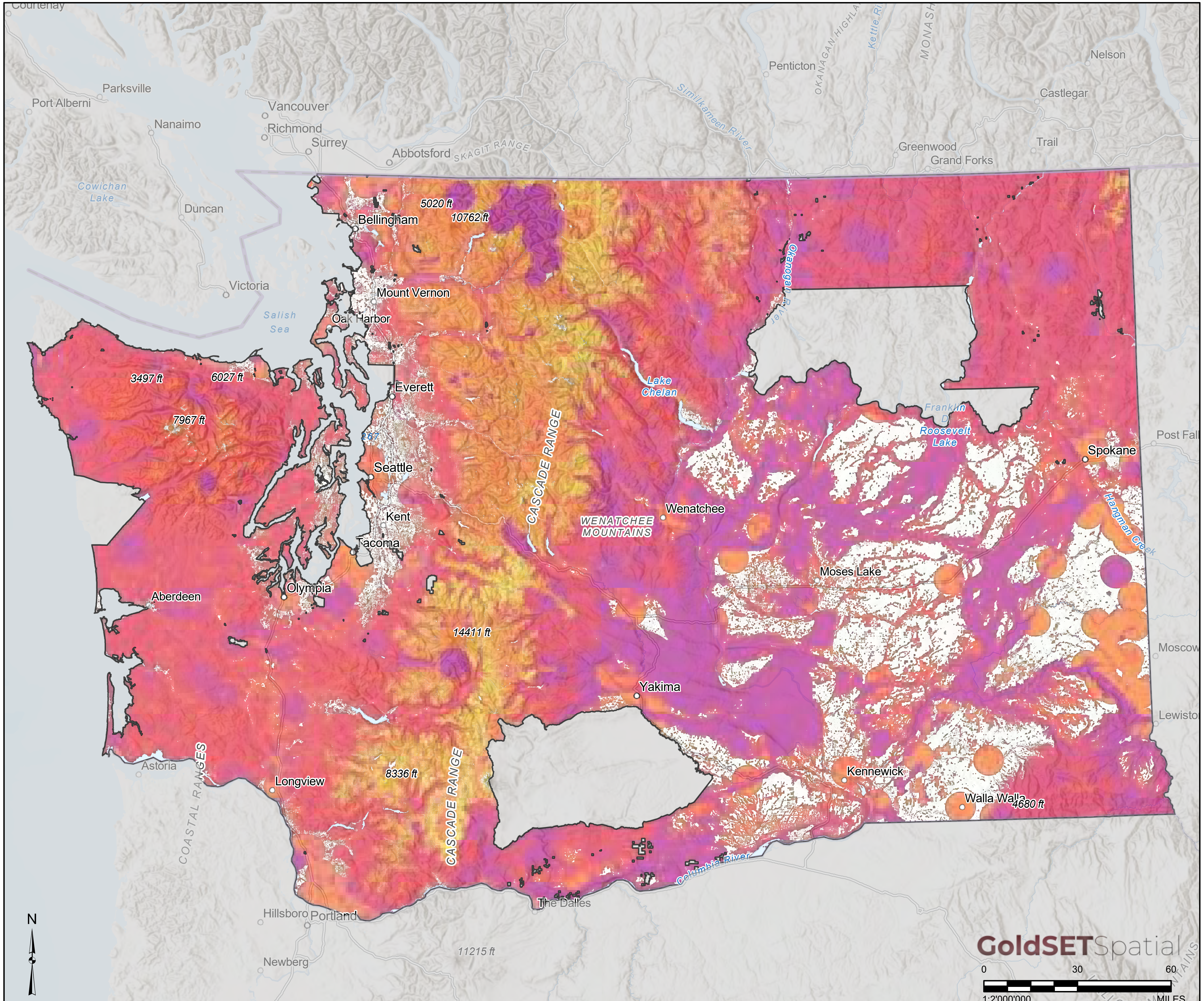
3.5.1 Suitability Map

Project-specific reviews would include a comprehensive review and analysis to identify the site-specific adverse impacts on resources to determine the suitability of this Draft Programmatic EIS. Environmental review may be phased by incorporating relevant information from this Draft Programmatic EIS by reference while evaluating site-specific adverse impacts of the individual project applications. For more information on phased reviews, please refer to Chapter 1, Introduction.

Project-specific applications would include details about the precise location and site-specific conditions. This Draft Programmatic EIS provides a suitability map that, when incorporated with project-specific applications, could be used to facilitate more informative and efficient environmental planning.

Figure 3.5-6 represents a suitability map for vegetation and identifies the appropriateness of areas using applicable laws and regulations, criteria specific to the siting of transmission facilities, and knowledge from subject matter experts.

This Page Intentionally Left Blank



LEGEND

Study Area

Conflict Indicator Key

- Neutral
- Low
- Low-Medium
- Medium
- Medium-High
- High
- Very High

EFSEC
Energy Facility Site Evaluation Council

THE SEAL OF THE STATE OF WASHINGTON 1889

REFERENCES AND NOTES

1. WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS; ESRI, USGS
2. THE CONFLICT INDICATOR KEY CAN BE USED TO IDENTIFY AND HIGHLIGHT AREAS WHERE DIFFERENT PROJECT CONSTRAINTS MAY OVERLAP, POTENTIALLY LEADING TO CONFLICTS. THE KEY USES DIFFERENT COLORS TO REPRESENT THE INTENSITY OR LIKELIHOOD OF CONFLICT.

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

SUITABILITY MAP FOR VEGETATION

YYYY-MM-DD 2025-02-07 CONSULTANT wsp

FIGURE 3.5-6

This Page Intentionally Left Blank

3.5.1.1 Suitability Map Methodology

The suitability map evaluates various criteria and assigns a suitability score to different areas based on how well those areas meet the defined criteria.

A number of individual siting decision criteria, referred to as indicators in GoldSET, were identified by subject matter experts for inclusion in this resource's suitability map. Subject matter experts assigned a weighting based on the degree of constraint (i.e., high, medium, or low), or potential difficulty for a transmission facility to traverse an area. Each of the GoldSET Indicator cards describing the criteria chosen and the source of the data layers used are provided in **Appendix 3.5-2.**

Each of the spatial data layers were digitally combined by GoldSET to produce the multi-criteria map of transmission facility suitability across the Study Area.

A summary of the criteria used to produce each GoldSET card is provided below.

Vegetation GoldSET Card – Low Conflict - Sensitive Ecosystems and Species at Risk

This criterion includes natural vegetated areas that are not currently considered at risk. Ecosystems include vegetation groups from the LANDFIRE database where the majority of vegetation communities are ranked as S4 or S5 that do not fall into the above GoldSet cards. Natural vegetation areas are important habitat for wildlife and plant species. Preserving intact natural areas is important to conserve species and to minimize risk of these ecosystem types becoming at-risk.

In addition, this dataset includes buffers established around ecosystems and species identified in Vegetation GoldSET Card - Medium Conflict - Sensitive Ecosystems and Species at Risk. Edge effects from the anthropogenic disturbance can extend from 25 to 775 feet and can result in changes to microclimatic conditions such as soil moisture and can facilitate the spread of invasive plants (Bentrup 2008).

Note that a 775-foot buffer around Medium Conflict - Sensitive Ecosystems and Species at Risk was provided in the dataset.

Vegetation GoldSET Card – Medium Conflict - Sensitive Ecosystems and Species at Risk

WDFW Priority Habitat and Species (PHS) database included in this category are westside prairie, shrubsteppe, juniper savannah, herbaceous balds, and eastside steppe. This criterion also includes vegetation areas of medium sensitivity from the LANDFIRE database which include vegetation communities that are at a reduced risk of extinction or uncertainties regarding status and ecosystems that do not have a significant time lag to be restored and can be restored within transmission rights-of-way. Low growing vegetation can be compatible or restored along the right-of-way.

Vegetation groups from the LANDFIRE database used in this GoldSET Card include groups ranked as NatureServe S3, SU, SH, SNR, or SX. These rankings have a reduced threat of extinction, unknown status, or have already been identified as extinct and are unlikely to occur. This GoldSET Card also includes all extinct or historical occurrences of plant species at risk from the Washington Natural Heritage Program (WNHP) database.

Vegetation GoldSET Card – Medium Conflict - Fragmentation of High Sensitivity Areas

This criterion includes a 775-foot buffer around High Conflict - Sensitive Ecosystems and Species at Risk. Maintaining buffers around sensitive ecosystems and species minimizes the risk of indirect impacts and fragmentation. In addition, intact buffers provide corridors for species between existing habitat patches[127]. Edge effects from the anthropogenic disturbance can extend from 25 to 775 feet and can result in changes to microclimatic conditions such as soil moisture and can facilitate the spread of invasive plants (Bentrup 2008).

Vegetation GoldSET Card – High Conflict - Sensitive Ecosystems and Species at Risk

WDFW PHS in this category include old and mature forest, inland sand dunes, biodiversity areas and corridors, riparian areas, aspen forest, Oregon white oak woodlands, and wetlands. This category also includes highly sensitive vegetation areas from the LANDFIRE database which includes ecosystems and species at threat of extinction and incompatible with transmission facilities, those that would be challenging or impossible to restore, those that would have a long time lag before the ecosystem is restored to its previous condition, and those ecosystems that protect areas of high biodiversity. Extant plant priority species available from Washington Natural Heritage Program are also included with pre-defined setbacks.

This GoldSET Card includes the following data:

- Wetlands include wetlands from the PHS database and the National Water Inventory (NWI) database, excluding marine and estuarine wetlands;
- Vegetation groups from the LANDFIRE database, where most of the vegetation associations within the group are ranked as S1 or S2 by NatureServe; and
- All known extent occurrences of plant species at risk from the Washington Natural Heritage Program (WNHP) database.

Note that a 300-foot buffer around wetland areas and a 100-foot buffer around PHS cave points were provided in the dataset.

[127] Small areas of habitat. This term is typically used in the context of habitat loss, where only habitat patches remain.

3.6 Habitat, Wildlife, and Fish

This Draft Programmatic Environmental Impact Statement (EIS) considers impacts on habitat, wildlife, and fish resulting from the types of facilities described in Chapter 2. This section addresses the following topics related to the construction, operation and maintenance, and upgrade or modification of high-voltage electric transmission facilities (transmission facilities) in the State of Washington:

- Section 3.6.1 identifies regulatory, siting, and design considerations.
- Section 3.6.2 describes the affected environment.
- Section 3.6.3 describes impacts.
- Section 3.6.4 describes potential mitigation measures.
- Section 3.6.5 identifies probable significant adverse environmental impacts on habitat, wildlife, and fish.
- Section 3.6.6 provides a suitability map and scoring for the siting of transmission facilities as it relates to habitat, wildlife, and fish, based on the identified considerations, impacts, and mitigation measures.

3.6.1 Regulatory, Siting, and Design Considerations

This Draft Programmatic EIS establishes a broad framework for compliance, outlining general laws, regulations, best management practices (BMPs), and design considerations. It is assumed that project-specific applications will be developed within this pre-established regulatory context and are expected to comply with existing laws and regulations. If the project does not comply with applicable laws and regulations or fails to adhere to design considerations or BMPs, additional project-specific environmental review and mitigation would be required. The applicable federal, state, and local laws and regulations relevant to habitat, wildlife, and fish are summarized in **Table 3.6-1**.

Table 3.6-1: Laws and Regulations for Habitat, Wildlife, and Fish

Applicable Legislation	Agency	Summary Information
16 USC §668 - Bald and Golden Eagle Protection Act	U.S. Fish and Wildlife Service	This act prohibits the take[128] of bald or golden eagles and their feathers, nests, eggs, or other parts, without a permit. See CFR 50 § 22.260 for information on eagle take permits.[129]
CFR 50 §22.260 – Permits for incidental take[130] of eagles by power lines	U.S. Fish and Wildlife Service	Transmission line developers that have taken the required steps to reduce eagle mortalities with transmission lines can apply for a permit to allow incidental eagle take. Application documents are specified under § 22.260 and must be submitted to the USFWS and include total number of miles of transmission line, the state and county, and the length or number of poles to be placed in areas with high risk of eagle collisions. Applicants must also include a collision response

[128] To harass, hunt, capture, kill an animal.

[129] A permit which can be applied for by proponents who have projects that may result in the incidental injury or killing of bald and golden eagles. This permit is issued to proponents who prove they meet the best practices for reducing eagle mortality, and who have created a Collision Response Strategy, A Proactive Retrofit Strategy, a Reactive Retrofit Strategy, and a Shooting Response Strategy.

[130] An unintentional, but not unexpected, take of a protected species.

Applicable Legislation	Agency	Summary Information
		strategy,[131] a proactive retrofit strategy,[132] a shooting response strategy,[133] and a reactive retrofit strategy.[134]
16 USC §§1531–1544 - The Endangered Species Act	U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration - National Marine Fisheries Services	This act provides for the conservation of endangered and threatened species (including subspecies, varieties, and subpopulations) listed under the act and protects the habitats they rely on. Incidental take permits[135] may be applied for by a non-federal entity whose activities may result in the take of endangered or threatened animal species. A habitat conservation plan[136] must accompany an application for an incidental take permit.
16 USC §§703-712 - Migratory Bird Treaty Act	U.S. Fish and Wildlife Service	This act prohibits taking (killing, capturing, selling, trading, and transporting) migratory bird species. Permits under the Migratory Bird Treaty Act are described under Part 21 of the act. This part describes the conditions under which the USFWS may consider permits.
33 USC Chapter 26 - Clean Water Act	U.S. Environmental Protection Agency	This act establishes regulations for discharging pollutants into waters of the United States and regulates water quality standards for surface water. Under the CWA, it is unlawful to release pollutants into navigable waters unless a permit is obtained. The following sections of the CWA may apply to projects covered under this Draft Programmatic EIS: ▪ Section 404 of the CWA requires authorization for the discharge of dredge or fill material into waters of the United States, including some wetlands. ▪ Section 401 of the CWA provides states and Tribes the authority to issue water quality certifications, which are required for federal discharge permits[137] into waters of the United States. ▪ Section 402 of the CWA regulates point sources of discharge for pollutants to waters of the United States. A NPDES permit is required for a facility to discharge a

[131] Describes how the permittee will identify eagle collision occurrences, identify factors that could have led to the collision, and implement risk-reduction measures.

[132] This plan developed by proponents will identify infrastructure which is not avian safe and include a timeline and strategy on how to retrofit it in an avian safe manner. More information can be found here: https://www.ecfr.gov/current/title-50/chapter-I/subchapter-B/part-22/subpart-E/section-22.260

[133] A plan developed by proponents to monitor eagle mortality and identify if shooting is the suspected cause, and if so to identify reduction measures and inform law enforcement. More information can be found here: https://www.ecfr.gov/current/title-50/chapter-I/subchapter-B/part-22/subpart-E/section-22.260

[134] This plan developed by proponents will identify measures that the proponent will take to identify and detect eagles that have been electrocuted. If an eagle is found, the pole that caused its mortality must be retrofitted unless it is already avian safe. More information can be found here: https://www.ecfr.gov/current/title-50/chapter-I/subchapter-B/part-22/subpart-E/section-22.260

[135] A permit that allows the accidental mortality or injury of a protected animal species if the permittee is taking the required steps to mitigate risk of such an occurrence.

[136] A plan developed by proponents to conserve the habitat of a species at risk if their project is expected to cause incidental take of the species.

[137] A legal document issued by regulatory agencies that authorizes the release of pollutants into waterbodies under specific conditions. These permits are designed to ensure that the discharge meets environmental standards to protect water quality and public health.

Applicable Legislation	Agency	Summary Information
		specified amount of pollutant into receiving waters under certain conditions. The Joint Aquatic Resource Permit Application (JARPA) is used by the Washington State Departments of Fish and Wildlife, Ecology, Natural Resources (for state-owned aquatic land), and Transportation; U.S. Environmental Protection Agency; U.S. Army Corps of Engineers; U.S. Coast Guard; and local governments (for shorelines). The JARPA provides a consolidated permit application process for federal, state, and local permits for construction and development activities near aquatic environments, including the local Shoreline Permit, State 401 Water Quality Certification, State Hydraulic Project Approval, State Aquatic Use Authorization, State Mooring Buoy Applications, Federal Section 404 and Section 10, Federal Private Aids to Navigation, and Federal 401 Water Quality Protection Agency.
State Environmental Policy Act	State of Washington Energy Facility Site Evaluation Council Washington State Department of Ecology Local governments	This act is a process that identifies and analyzes environmental impacts that can be related to issuing permits. SEPA helps permit applicants and decision-makers understand how a proposed project will impact the environment. Certain projects, as defined in the SEPA Rules (WAC 197-11-704) and that are not exempt, are required to go through the SEPA process.
State of Washington Priority Habitat and Species List (WDFW 2008)	Washington Department of Fish and Wildlife [(a)]	Priority habitats are unique habitats or features that support biodiversity. WDFW maintains a catalogue of priority habitats and species that are a priority for conservation and management. Priority species require protection due to population trends, sensitivity to disturbance and habitat alteration, or importance to communities.
RCW 77 Fish and Wildlife	Washington Department of Fish and Wildlife [(a)]	This chapter provides the revised and reorganized game code of Washington State as of 1980 and clarifies and improves the administration of the state’s game laws.
RCW 77.55 Construction Projects in State Waters	Washington Department of Fish and Wildlife [(a)]	Under state law, a Hydraulic Project Approval permit submitted to WDFW would be required when stormwater discharges related to a project would change the natural floor or bed of state waters. Proponents must obtain a permit before work can conducted near protected state waters and fish habitat.
RCW 77.65.420 Wild Salmonid Policy	Washington Department of Fish and Wildlife [(a)]	This policy regulates protection, management, and production of wild salmonids[138] in Washington.
RCW 90.48 Water Pollution Control	Washington State Department of Ecology [(a)]	This policy aims to maintain the highest standard for waters of the state to preserve public health and recreation and to protect wildlife and aquatic species. It prohibits the discharge of pollution to state waters. Pollution is defined as any physical, chemical, or biological property that could impact the ecological function.

[138] Belonging to the family Salmonidae such as salmon or trout.

Applicable Legislation	Agency	Summary Information
RCW 90.58 Shoreline Management Act	Washington State Department of Ecology [(a)]	This act guides the planning around accessing, using, and protecting the state's freshwater and coastal shorelines. It requires all counties and most towns and cities with shorelines to develop and implement Shoreline Master Programs.
WAC 173-201A Water Quality Standards for Surface Waters of the State of Washington	Washington State Department of Ecology [(a)]	This chapter establishes surface water quality standards for State of Washington surface waters that are consistent with public health standards, recreational use, and the protection of fish and wildlife. Surface waters include lakes, rivers, streams, ponds, wetlands, inland waters, and saltwater.
WAC 220-610 State and Protected Species	Washington Department of Fish and Wildlife [(a)]	This regulation provides protection to state-listed species. It provides special protection for bald eagles only when they are listed as threatened or endangered in the state.
WAC 220-660 Hydraulic Code Rules	Washington Department of Fish and Wildlife [(a)]	A hydraulic project is the construction or performance of work that will use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh waters of the state. A Hydraulics Project Approval is required in order to ensure that construction or performance of work is done in a manner that protects fish life.
Applicable local legislation	Local governments	Different towns, cities, counties, and other local governments may have specific legislation relevant to wildlife, habitat, trees, riparian setbacks, or vegetation protection. Proper permits and authorizations are obtained in each local jurisdiction.

Note:
[(a)] The agency responsible for administering most permits or authorizations for the identified regulation. However, if EFSEC is determined to be the lead agency, EFSEC can administer several types of permits at the state and local level. EFSEC provides a streamlined process for siting and licensing major energy facilities, including transmission facilities in Washington State. EFSEC coordinates all evaluation and licensing steps, specifies the conditions for construction and operation, and issues a Site Certification Agreement, which assumes the responsibility for issuing individual state or local permits. By consolidating these permits into a single Site Certification Agreement, EFSEC can simplify the regulatory process for energy facility developers. While EFSEC itself does not directly administer federal permits, it works closely with federal agencies to ensure that all necessary federal requirements are met during the evaluation and licensing of energy facilities.
CFR = Code of Federal Regulations; CWA = Clean Water Act; EFSEC = Energy Facility Site Evaluation Commission; EIS = Environmental Impact Statement; NPDES = National Pollutant Discharge Elimination System; RCW = Revised Code of Washington; SEPA = State Environmental Policy Act; USC = United States Code; USFWS = U.S. Fish and Wildlife Service; WAC = Washington Administrative Code; WDFW = Washington Department of Fish and Wildlife

The siting of transmission facilities is determined by engineering, technical, environmental, and socioeconomic factors. **Table 3.6-2** summarizes guidance documents and management plans that outline the design considerations and BMPs generally used to avoid or minimize impacts on habitat, wildlife, and fish.

Table 3.6-2: Siting and Design Considerations for Habitat, Wildlife and Fish

Siting and Design Consideration[(a)]	Description
Management Recommendations for Washington's Priority Species (MRWPS): Ferruginous Hawk (Watson and Azerrad 2024)	Provides management recommendations for ferruginous hawks in Washington.
MRWPS: Western Gray Squirrel (Linders et al. 2010)	Provides management recommendations for western gray squirrels in Washington.
MRWPS: Great Blue Heron (Azerrad 2012)	Provides management recommendations for great blue herons in Washington.

Siting and Design Consideration[(a)]	Description
MRWPS Volume I: Invertebrates (Larsen et al. 1995)	Provides management recommendations for Priority invertebrate species in Washington.
MRWPS Volume III: Amphibians and Reptiles (Larsen 1997)	Provides management recommendations for Priority amphibian and reptile species in Washington.
MRWPS Volume IV: Birds (Larsen et al. 2004; revised 2012)	Provides management recommendations for Priority bird species in Washington.
MRWPS, Volume V: Mammals (Interim) (WDFW 2010)	Provides management recommendations for Priority mammal species in Washington.
Priority Habitats and Species Management Recommendations: Mazama Pocket Gopher (WDFW 2011; revised 2016)	Provides management recommendations for Mazama pocket gophers in Washington.
Management Recommendations for Washington's Priority Habitats and Species (Rodrick and Milner 1991; revised 2018)	Includes management recommendations for 60 species of fish and wildlife, some of which have been replaced by newer guidelines listed in this table.
Management Recommendations for Washington's Priority Habitats and Species: Riparian Pollinators (Martin and Azerrad 2023a)	Provides mitigation, management recommendations, and BMPs intended to guide project-specific management plans regarding riparian areas and pollinators.
Management Recommendations for Washington's Priority Habitats and Species: Western Bumble Bee (Martin and Azerrad 2023b)	Provides management recommendations for protecting western bumble bee habitat, mitigating harmful activities, and other information important to the conservation of this species
Landscape Planning for Washington's Wildlife: Managing for Biodiversity in Developing Areas (WDFW 2009)	Provides guidelines and management strategies to reduce impacts on biodiversity in Washington State.
Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 (APLIC 2006)	Summarizes BMPs, biological factors that lead to collisions, engineering specifications for safe transmission lines, and other relevant information.
Reducing Avian Collisions with Power Lines: The State of the Art in 2012 (APLIC 2012)	Provides utility companies and wildlife agencies with current information and guidance on reducing avian collisions. This document is still a draft.
Best Management Practices for Electric Utilities in Sage-Grouse Habitat (APLIC 2015)	Contains BMPs to address siting and maintenance within sage-grouse habitat. Developed by the Avian Power Line Interaction Committee, along with federal and local government, utility companies, and state agency partners.
Wildlife and Powerlines (Martín Martín et al. 2022)	Contains global information on the impacts of transmission lines on wildlife, including case studies. Contains BMPs and recommendations for creating wildlife safe transmission lines.
Recommended Standard Best Management Practices (USFWS n.d.)	Provides BMPs identified by USFWS to manage impacts on aquatic ecosystems.
Water Crossing Design Guidelines (Barnard et al. 2013)	Provides guidance on design of culverts, bridges, tide gates, temporary crossings, culvert abandonment, and project plans.
Stream Habitat Restoration Guidelines (Cramer 2012)	Provides guidelines for stream habitat restoration, including site, reach, and watershed assessment; problem identification; and general approaches to restoring stream and riparian habitat and restoration techniques.

Siting and Design Consideration[a]	Description
Integrated Streambank Protection Guidelines (WDFW 2002)	Provides guidelines for evaluating and selecting the correct streambank treatments and techniques.
Management Practices Field Guide for ESA 4 (d) Habitat Protection (WSDOT 2018)	Provides guidance for WSDOT maintenance crews and regional maintenance environmental coordinators who work within sensitive priority areas.
Applicable sections in Stormwater Management Manual for Western Washington Volume IV Source Control BMPs (Ecology 2012a), including: ▪ S407 BMPs for Dust Control at Disturbed Land Areas and Unpaved Roadways and parking lots ▪ S414 BMPs for Maintenance and Repair of Vehicles and Equipment ▪ S415 BMPs for Maintenance of Public and Private Utility Corridors and Facilities ▪ S416 BMPs for Maintenance of Roadside Ditches ▪ S411 BMPs for Landscaping and Lawn/Vegetation Management ▪ S419 BMPs for Mobile Fueling of Vehicles and Heavy Equipment ▪ S426 BMPs for Spills of Oil and Hazardous Substances ▪ S429 BMPs for Storage or Transfer (Outside) of Solid Raw Materials, Byproducts or Finished Products	Provides stormwater BMPs that include schedules of activities; prohibitions of practices; maintenance procedures; and other physical, structural, and/or managerial practices that prevent or reduce the release of pollutants and other adverse impacts on waters of Washington State in areas west of the Cascade Mountains crest. BMPs can be used singularly or in combination.
Stormwater Management Manual for Eastern Washington Volume IV Source Control BMPs (Ecology 2024)	Provides stormwater BMPs that include schedules of activities; prohibitions of practices; maintenance procedures; and other physical, structural, and/or managerial practices that prevent or reduce the release of pollutants and other adverse impacts on waters of Washington State in areas east of the Cascade Mountains crest. BMPs can be used singularly or in combination.
Vehicle and Equipment Washwater Discharges. Best Management Practices Manual (Ecology 2012b)	This guidance manual discusses the environmental concerns over discharges from washing the exterior surfaces of vehicles and equipment such as cars and/or trucks, and light or heavy equipment.
State of Washington Alternative Mitigation Policy Guidance for Aquatic Permitting Requirements (WDFW 2019a)	Provides policy guidance on requiring or recommending mitigation to achieve no net loss of habitat functions by offsetting losses at the impact site through gains of mitigation.
Pend Oreille River in the Box Canyon Reservoir Riverbank Stabilization Guidelines (Mainstream Restoration Inc. 2007)	Provides guidelines for the five bank stabilization techniques supported by WDFW for this area.
Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (*Entosphenus tridentatus*) (USFWS 2010)	Provides information on BMPs for Pacific lamprey that can be incorporated into any stream-disturbing activity (e.g., aquatic habitat restoration, prescribed fire, recreational development, grazing, gravel extraction/mining, water diversions, etc.) on lands managed by the U.S. Forest Service and Bureau of Land Management throughout the range of Pacific lamprey.

Siting and Design Consideration[(a)]	Description
Fish Exclusion – Protocol and Standards (WSDOT 2023)	Guidance for work proposed in fish-bearing[139] waters to reduce the risk of potential injury to fish during construction.
Freshwater Avoidance Times (WDFW 2018)	Indicates times when spawning or incubating salmonids are least likely to be present in Washington State freshwater
Riparian Ecosystems, Volume 2: Management Recommendations (Rentz et al. 2020)	Provides guidance to protect and restore healthy, intact, and fully functioning riparian ecosystems.
Wetland Mitigation in Washington State Part 1: Agency Policies and Guidance and Part 2: Developing Mitigation Plans (Ecology, U.S. Army Corps of Engineers Seattle District, and U.S. Environmental Protection Agency 2006, 2021)	Provides basic principles of wetland mitigation and technical guidance for developing compensatory mitigation.
Recommended Siting Practices for Electric Transmission Developers (Americans for a Clean Energy Grid 2023)	Outlines best practices for siting electric transmission facilities. Recommended practices include: ▪ Early and transparent engagement ▪ Respect and fair dealing ▪ Environmental considerations ▪ Interagency coordination ▪ Use of existing infrastructure
The Arid Lands Initiative – Shared Priorities for Conservation at a Landscape Scale (Arid Lands Initiative 2014)	Designates priority areas of shrub steppe habitats for conservation in Washington
Ungulate Migrations of the Western United States, Volume 4 (Kauffman et al. 2024)	Provides information on ungulate movement routes for species in the western United States, which can help transmission line developers avoid key areas.
Energy Development Guidelines for Mule Deer (Lutz et al. 2011)	Provides general guidelines for siting transmission lines to reduce impacts on mule and black-tailed deer.
IPaC: Information for Planning and Consultation (USFWS 2024b)	Tool created by the USFWS to streamline the process for environmental review and permitting. Mapping tools can help proponents review federally listed species and critical habitat, as well as other protected environmental features such as wetlands, that overlap with their project area.
Site Specific Management: How to Avoid and Minimize Impacts of Development to Shrub-steppe (Azerrad et al. 2011)	Provides recommendations for shrubsteppe management in land development projects, including roads and utility corridors.
PHS Local Government User Guide: Shrub Steppe and Eastside Steppe Map (Folkerts et al. 2023)	Contains information on shrubsteppe classification and provides mapping tools that can help the development and siting of long-term projects such as transmission lines in the Columbia Plateau.
Shrub-Steppe and Grassland Restoration Manual for the Columbia River Basin (Benson et al. 2011)	Provides information on shrubsteppe and grassland restoration which can be important for proponents to consider when disturbing land in these habitats.

[139] Streams, rivers, or other bodies of water that support fish populations at any time of the year. Fish-bearing watercourses provide essential habitats for various fish species, including spawning, rearing, and feeding areas.

Siting and Design Consideration[a]	Description
Managing for Monarchs in the West: Best Management Practices for Conserving the Monarch Butterfly and its Habitat (Xerces Society 2018)	Provides guidance on how to manage monarch breeding and migratory habitat.
Washington Shrub steppe Restoration and Resiliency Initiative: Long-Term Strategy 2024 – 2054 (WDFW 2024a)	Identifies priority areas for conservation in shrub steppe habitat in the Columbia Basin. Contains a mapping tool that identifies core areas for conservation, species distributions, migration corridors, shrub steppe cover and other important information.
Biological Assessment Preparation Manual Chapter 7.0 Construction Noise Impact Assessment (WSDOT 2020)	Identifies noise reduction strategies (Section 7.2.3.3) for in-stream pile driving.

Notes:
[a] Additional BMPs, policies, and guidelines listed under other sections (e.g. Vegetation) are applicable to Biological Resources.
BMP = best management practice; ESA = Endangered Species Act; MRWPS = Management Recommendations for Washington's Priority Species; USFWS = U.S. Fish and Wildlife Service; WDFW = Washington Department of Fish and Wildlife; WSDOT = Washington State Department of Transportation.

3.6.2 Affected Environment

This section describes the biological resources within the Study Area defined in Chapter 2, which include several key components:

- Wildlife
- Fish
- Migration Routes and Corridors

3.6.2.1 Wildlife

Habitat

Washington's landscape and climate is diverse across the state and provides a variety of habitats for wildlife. Ecoregions are broadly defined areas that share similar characteristics, such as climate, geology, soils, and other environmental conditions. Ecoregions depict general areas with similar ecosystem types and wildlife communities. The Washington State Department of Natural Resources (DNR) divides Washington into nine ecoregions; west to east, these are: Northwest Coast, Puget Trough, West Cascades, North Cascades, East Cascades, Okanogan, Columbia Plateau, Canadian Rocky Mountains, and Blue Mountains (DNR 2022).

Northwest Coast Ecoregion

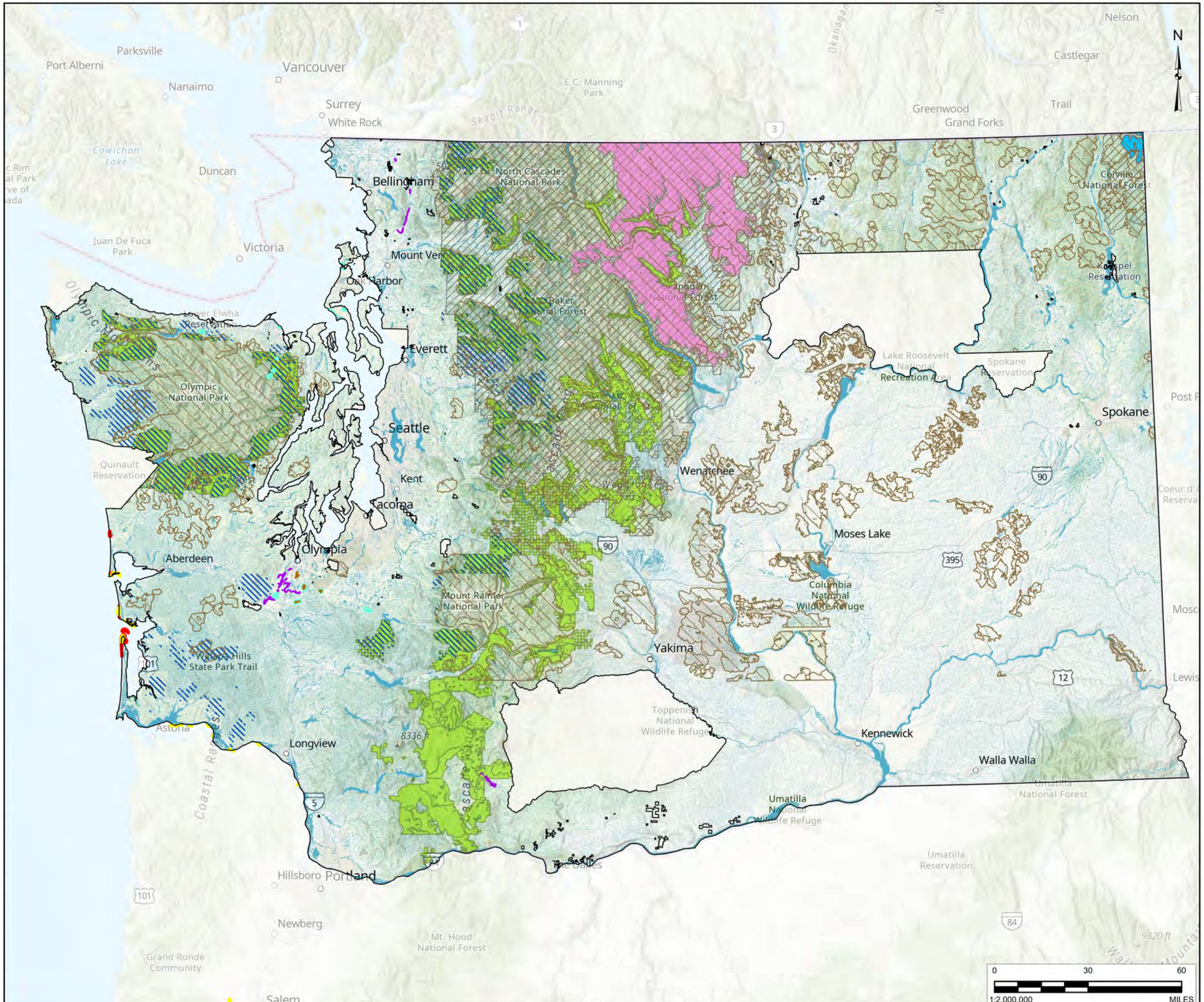
The Northwest Coast ecoregion includes most of the Olympic Peninsula, the coastal mountains of western Washington, and the lowlands along the west coast. This ecoregion experiences warm, relatively dry summers and mild, very wet winters. Elevations range from sea level to over 1,200 meters (3,940 feet) above sea level (CEC 2011). Coastal estuaries, such as Grays Harbor and Willapa Bay, support large seasonal congregations of shorebirds and waterfowl (BirdWeb 2005). Uplands are predominantly coniferous forest, which provides nesting habitat for a variety of bird species such as band-tailed pigeon (*Patagioenas fasciata*), red-breasted sapsucker (*Sphyrapicus ruber*), Hutton's vireo (*Vireo huttoni*), chestnut-backed chickadee (*Poecile rufescens*), and purple finch (*Haemorhous purpureus*) (BirdWeb 2005). Old growth forests in this ecoregion provide nesting habitat for marbled murrelet (*Brachyramphus marmoratus*), which is listed as threatened under the federal Endangered Species Act (ESA), endangered by the Washington Fish and Wildlife Commission (WFWC), and has critical habitat throughout the region (**Figure 3.6-1**) (WDFW 2024m). The Northwest Coast ecoregion contains 10 state priority Important Bird Areas (IBAs),[140] four of which are off the coast of the Olympic Peninsula and not visible in **Figure 3.6-2**; one Oregon State priority IBA that overlaps with Washington; and five global priority IBAs interspersed throughout the region (**Figure 3.6-2**) (Audubon 2024).

Mammals in the Northwest Coast ecoregion include black-tailed deer (*Odocoileus hemionus columbianus*), Roosevelt elk (*Cervus canadensis roosevelti*), black bear *(Ursus americanus),* cougar (*Puma concolor*)*,* coyote (*Canis latrans*), bobcat *(Lynx rufus*)*,* beaver (*Castor canadensis*)*,* and Townsend's vole (*Microtus townsendii*) (CEC 2011). Amphibians and reptiles include northwestern pond turtle (*Actinemys marmorata*), listed as endangered by the WFWC; western toad (*Anaxyrus boreas*), listed as a candidate species[141] by the WFWC; and northwestern salamander (*Ambystoma gracile*) (WDFW 2024b).

140 A site that provides an essential service for bird populations during a part of their annual movement cycle.

141 A species that is currently under review to determine if it should be listed under the Endangered Species Act. This category is also used by state agencies such as the Washington State Department of Fish and Wildlife.

This Page Intentionally Left Blank



LEGEND

- Study Area
- Mapped Wetland (FWS, 2024)
- Important Bird Area (Audubon, 2024)
- Habitat Concentration Area (WHCWG, 2016)

Critical Habitat (USFWS, 2024)

- Mazama Pocket Gopher
- Streaked Horned Lark
- Western Snowy Plover
- Taylors Checkerspot
- Woodland Caribou
- Oregon Spotted Frog
- Canada Lynx
- Marbled Murrelet
- Spotted Owl
- Grizzly Bear

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES

1. SERVICE LAYER CREDITS: SOURCES: ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY, ESRI, USGS
2. WETLANDS: FWS, 2024; IMPORTANT BIRD AREAS: AUDUBON, 2024; HABITAT CONCENTRATION AREAS: WHCWG, 2016; CRITICAL HABITAT: USFWS, 2024

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

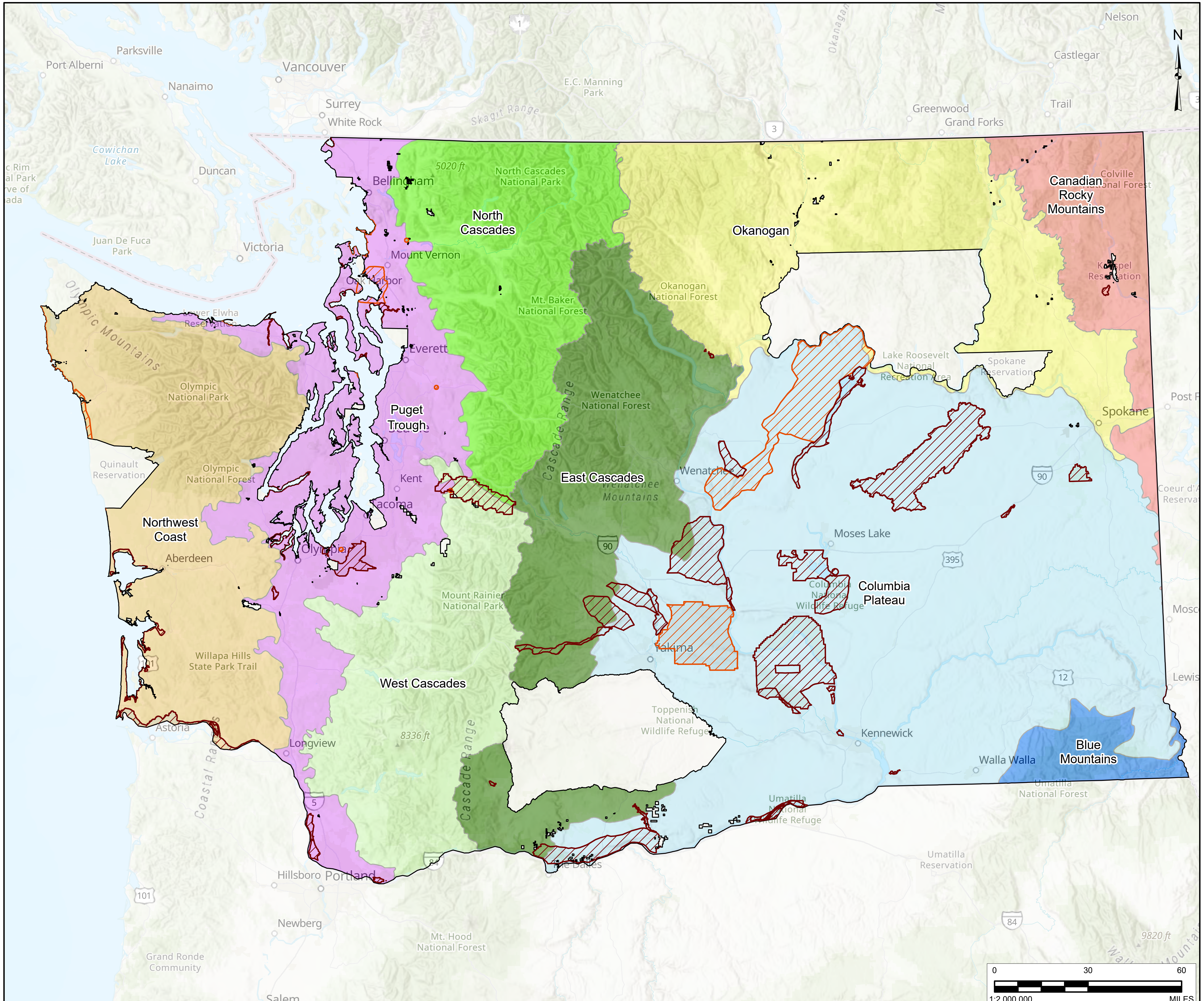
IMPORTANT WILDLIFE HABITATS IN WASHINGTON STATE

YYYY-MM-DD 2025-03-18

CONSULTANT wsp

FIGURE 3.6-1

This Page Intentionally Left Blank



LEGEND

- Study Area

Important Bird Areas (Audubon, 2025)

- Global Priority
- State Priority

Ecoregions (WaDNR, 2022)

- Blue Mountains
- Canadian Rocky Mountains
- Columbia Plateau
- East Cascades
- North Cascades
- Northwest Coast
- Okanogan
- Puget Trough
- West Cascades

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES
1. SERVICE LAYER CREDITS: SOURCES: ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY, ESRI, USGS
2. ECOREGIONS: WADNR, 2024; IMPORTANT BIRD AREAS: AUDUBON, 2025

PROJECT
DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE
IMPORTANT BIRD AREAS OF WASHINGTON STATE

YYYY-MM-DD 2025-03-18
CONSULTANT wsp
FIGURE
3.6-2

This Page Intentionally Left Blank

Puget Trough Ecoregion

The Puget Trough ecoregion occupies the lowland and marine waters between the Cascades and Olympic Mountain ranges. This ecoregion experiences warm, dry summers and mild, wet winters. Elevations range from sea level to 310 meters (1000 feet) above sea level (BirdWeb 2005; CEC 2011). Coastal bays, estuaries, and marshes along Puget Sound support large seasonal congregations of shorebirds and waterfowl (BirdWeb 2005). Most of the ecoregion comprises broad rolling lowlands, consisting mostly of even-aged conifer-dominated tree stands and some prairie habitat to the south, which provide nesting habitat for a variety of bird species such as pileated woodpecker (*Dryocopus pileatus*), great horned owl (*Bubo virginianus*), marsh wren (*Cistothorus palustris*), evening grosbeak (*Hesperiphona vespertina*), and streaked horned lark *(Eremophila alpestris strigata),* which is listed as threatened under the ESA and endangered by the WFWC. The Puget Trough ecoregion contains 23 state-recognized IBAs, one of which is at the intersection of, and overlaps with, the North Cascades, West Cascades, and the East Cascades, and seven globally recognized IBAs interspersed throughout the region (**Figure 3.6-2**) (Audubon 2024).

Mammals in the Puget Trough include black-tailed deer, elk (*Cervus canadensis*), black bear, red fox *(Vulpes vulpes*)*,* beaver*,* and river otter (*Lontra canadensis*). Amphibians in the Puget Trough include western toad and long-toed salamander (*Ambysftoma macrodactylum*)*.* Oregon spotted frog (*Rana pretiosa*)*,* which is listed as threatened under the ESA and endangered by the WFWC, occurs in this ecoregion. Critical habitat for this species has been identified in the southern section of this ecoregion near Olympia **Figure 3.6-1** (WDFW 2024b). The Puget Trough is a highly fragmented habitat that is host to over 70 percent of Washington's human population. Human development, forestry, and agriculture have eliminated much of the original vegetation and habitat (BirdWeb 2005).

West Cascades Ecoregion

The West Cascades ecoregion includes west-central Washington between the Puget Trough and the East Cascades. This ecoregion experiences mostly dry, warm summers and mild to cool, very wet winters. Elevations range from 20 to over 4,270 meters (50 to 14,000 feet) above sea level (WDFW 2000). The steep ridges, extensive coniferous forests, and river valleys that characterize this ecoregion support a variety of bird species such as pileated woodpecker; mountain quail (*Oreortyx pictus*); mountain chickadee (*Poecile gambeli*); northern goshawk (*Accipiter gentilis*), listed as a candidate species by the WFWC; and northern spotted owl (*Strix occidentalis caurina*), listed as threatened under the ESA, listed as endangered by the WFWC, and has critical habitat throughout this ecoregion **(Figure 3.6-1**) (BirdWeb 2005; WDFW 2015). The West Cascades ecoregion contains one state-recognized IBA, located at the intersection of the North Cascades, Puget Trough, and East Cascades ecoregions, and one globally recognized IBA that is shared with the Puget Trough ecoregion (**Figure 3.6-2**) (Audubon 2024).

Mammals in the West Cascades include black bear; Townsend's big-eared bat (*Corynorhinus townsendii*), listed as a candidate species by the WFWC; western gray squirrel (*Sciurus griseus*), listed as endangered by the WFWC; and wolverine (*Gulo gulo*), listed as threatened under the ESA and a candidate species by the WFWC*.* Five of the 11 endemic wildlife species in this region are amphibians, including Cascade torrent salamander (*Rhyacotriton cascadae*), listed as a candidate species by the WFWC; coastal giant salamander (*Dicamptodon tenebrosus*); larch mountain salamander (*Plethodon larselli*), listed as a sensitive species by the WFWC; Van Dyke's salamander (*P. vandykei*), listed as a candidate species by the WFWC; and the Cascades frog (*Rana cascadae*) (WDFW 2000).

North Cascades Ecoregion

The North Cascades ecoregion includes the northern extent of the Cascade Range in northwest Washington and an area encompassing the high Olympic mountains west of the Puget Trough. This ecoregion experiences dry, warm summers and mild to cold, wet winters. Elevation in this area ranges from 150 to over 3,050meters (500 to 10,000 feet) above sea level (CEC 2011; BirdWeb 2005). The rugged, glaciated, mountains and U-shaped valleys support a variety of birds such as mountain chickadee, pileated woodpecker, grouse (*Tetraoninae sp*.), and osprey (*Pandion haliaetus*) (BirdWeb 2005; CEC 2011). Over 96 percent of the North Cascades ecoregion is uninhabited by humans, creating large, unfragmented critical habitat for species such as Canada lynx (*Lynx canadensis*), marbled murrelet, and northern spotted owl that are designated as threatened under the ESA, listed as endangered by the WFWC, and have critical habitat throughout this ecoregion (**Figure 3.6-1**) (BirdWeb 2005; WDFW 2024m). The North Cascades ecoregion contains a portion of one state-recognized IBA where the North Cascades and Columbia Plateau ecoregions meet and a portion of one globally recognized IBA shared with the Puget Trough (**Figure 3.6-2**) (Audubon 2024).

Mammals in the North Cascades include black bear, bighorn sheep (*Ovis canadensis*), mountain goat, black-tailed deer, mule deer (*Odocoileus hemionus*), cougar, coyote, bobcat, beaver, and fisher (*Pekania pennanti*), which is listed as endangered by the WFWC (CEC 2011; WDFW 2024c). Reptiles and amphibians in the North Cascades include northern alligator lizard (*Elgaria coerulea*), western toad, and terrestrial garter snake (*Thamnophis elegans*) (WDFW 2024b).

East Cascades Ecoregion

The East Cascades ecoregion is in central Washington in the rain shadow of the West Cascades ecoregion. This ecoregion experiences warm, dry summers and cold winters. Elevation ranges from 300 to over 2,500 meters (980 to 8,200 feet) above sea level (CEC 2011). Most of the terrain in this region comprises sloping mountains with open ponderosa pine (*Pinus ponderosa*) forests and high plateaus that support sagebrush and steppe vegetation and provide nesting habitat to a variety of bird species such as Cooper's hawk (*Accipiter cooperii*), osprey, sooty grouse (*Dendragapus fuliginosus*), and downy woodpecker (*Dryobates pubescens*) (BirdWeb 2005). The East Cascades ecoregion contains nine state-recognized IBAs throughout the region—three of which overlap with the Columbia Plateau ecoregion and one that overlaps with the North Cascades, West Cascades, and Puget Trough—and no globally recognized IBAs (**Figure 3.6-2**) (Audubon 2024).

Mammals in this ecoregion include black bear, black-tailed deer, mule deer, cougar, wolverine, coyote, and yellow-bellied marmot (*Marmota flaviventris*) (CEC 2011). Reptiles in the region include common sharp-tailed snake (*Contia tenuis*) and California mountain kingsnake (*Lampropeltis zonata*), which is listed as a candidate species by the WFWC and only found in this ecoregion of Washington. Oregon spotted frog, which is listed as threatened under the ESA and endangered by the WFWC, has critical habitat in the southern portion of this ecoregion (**Figure 3.6-1**) (WDFW 2024b).

Okanogan Ecoregion

The Okanogan ecoregion covers north-central Washington and lies between the North Cascades to the west, the Columbia Plateau to the south, and the Northern Rockies to the east. This region experiences hot, dry summers, and cool winters. Elevation ranges from about 210 to 2,740 meters (700 to 9,000 feet) above sea level (BirdWeb 2005). Rolling plateaus, wide valleys, and large glacial lakes characterize this ecoregion (BirdWeb 2024). The extensive forests comprising ponderosa pine, Douglas-fir, western larch, and quaking aspen provide nesting habitat for many birds, including Williamson's sapsucker (*Sphyrapicus thyroideus*), pine siskin (*Spinus pinus*), and yellow-rumped warbler (*Setophaga coronata*) (Dawson 2020; Hunt and Flaspohler 2020; Gyug et al. 2023). The

Okanogan ecoregion contains one state-recognized IBA along the southern border shared with the Columbia Plateau ecoregion and one globally recognized IBA along the southwestern border shared with the East Cascades ecoregion (**Figure 3.6-2**) (Audubon 2024).

Mammals in this ecoregion include white-tailed deer (*Odocoileus virginianus*), black bear, bobcat, and coyote (CEC 2011). Reptiles and amphibians found in this ecoregion include western rattlesnake (*Crotalus oreganus*), long-toed salamander, and western toad (WDFW 2024b). Less than 10 percent of the Washington portion of this ecoregion has been converted to agricultural or urban use, leaving large swaths of unfragmented habitat (BirdWeb 2024).

Columbia Plateau Ecoregion

The Columbia Plateau ecoregion covers most of central and southeastern Washington and is found between the Cascade Range to the west, the Rocky Mountains to the northeast, and Idaho to the east. This region experiences hot, dry summers and cold winters. Elevation ranges from 30 to 1,280 meters (100 to 4,200 feet) above sea level (BirdWeb 2005). Undulating hills and plateaus[142] divided by steep-sided canyons characterize this ecoregion. The sagebrush steppe and grassland provide nesting habitat for a variety of birds, including western meadowlark (*Sturnella neglecta*), sage thrasher (*Oreoscoptes montanus*), savannah sparrow (*Passerculus sandwichensis*), and ferruginous hawk (*Buteo regalis*), which is listed as endangered by the WFWC (WDFW 2024m, BirdWeb 2005). The Columbia Plateau ecoregion contains 24 state- recognized IBAs, two of which overlap with the East Cascades, one Oregon state priority IBA that straddles the Washington-Oregon border, and two globally recognized IBAs interspersed throughout the region (**Figure 3.6-2**) (Audubon 2024;).

Mammals in the Columbia Plateau include mule deer, pronghorn antelope (*Antilocapra americana*), coyote, and black-tailed jackrabbit (*Lepus californicus*), which is listed as a candidate species by the WFWC. Reptiles and amphibians include western diamondback rattlesnake (*Crotalus atrox*), Columbia spotted frog (*Rana luteiventris*), which is listed as a candidate species by the WFWC, northern sagebrush lizard (*Sceloporus graciosus*), which is listed as a candidate species by the WFWC, northern leopard frog (*Lithobates pipiens*), which is listed as endangered by the WFWC (WDFW 2024b).

Canadian Rocky Mountains Ecoregion

The Canadian Rocky Mountains ecoregion includes the Northern Rocky Mountains in eastern Washington. This region experiences dry, warm summers and cold, snowy winters (CEC 2011). Elevation ranges from about 400 to 2,230 meters (1,300 to 7,300 feet) above sea level (BirdWeb 2005). This region is dominated by mountains supporting spruce and pine forests at higher elevations, Douglas-fir (*Pseudotsuga menziesii*) and ponderosa pine at lower elevations, wet valleys of western hemlock (*Tsuga heterophylla*) and western red cedar (*Thuja plicata*) forests, and deep canyons (CEC 2011). These features provide habitat for a variety of bird species, including mountain bluebird (*Sialia currucoides*), osprey, common raven (*Corvus corax*), and red-tailed hawk (*Buteo jamaicensis*) (BirdWeb 2005). The Canadian Rocky Mountains ecoregion contains one state-recognized IBA and no globally recognized IBAs (**Figure 3.6-2**) (Audubon 2024).

Mammals in the Canadian Rocky Mountains include elk, bighorn sheep, mule deer, moose (*Alces alces*), gray wolf (*Canis lupus*) which are listed as endangered by the ESA and the WFWC, grizzly bear (*Ursus arctos horribilis),* which is listed as threatened by the ESA and endangered by the WFWC, and black bear, mountain

---

[142] A topography which was many hills, depressions, and plateaus.

goat, cougar, American marten (*Martes americana*), Canada lynx, bobcat, wolverine, white-tailed deer, snowshoe hare (*Lepus americanus*), and caribou (*Rangifer tarandus*), which is listed as endangered under the federal ESA and by the WFWC and has critical habitat throughout this ecoregion (**Figure 3.6-1**) (CEC 2011; WDFW 2024d). Reptiles and amphibians include western toad, northern alligator lizard, and Columbia spotted frog (WDFW 2024b).

Blue Mountains Ecoregion

The Blue Mountains ecoregion includes the southeastern corner of Washington. This region experiences warm, dry summers and cold winters. Elevation ranges from 305 to over 3,000 meters (1000 to 9,840 feet) above sea level (CEC 2011). Diverse landscapes from open mountain ranges supporting ponderosa pine and Douglas-fir forests to sagebrush steppe and juniper woodland provide habitat for a variety of birds, including pileated woodpecker, sage thrasher, western bluebird (*Sialia mexicana*), mountain bluebird, and chestnut-backed chickadee (BirdWeb 2005). The Blue Mountains ecoregion contains no state-recognized and no globally recognized IBAs (**Figure 3.6-2**) (Audubon 2024).

Mammals in the Blue Mountains ecoregion include Rocky Mountain elk (*Cervus canadensis nelsoni*), mule deer, black-tailed deer, black bear, bighorn sheep, cougar, bobcat, coyote, and beaver (CEC 2011). Reptiles and amphibians include Rocky Mountain tailed frog (*Ascaphus montanus*), which is listed as a candidate species by the WFWC, western toad, and long-toed salamander (WDFW 2024b).

Critical Habitat

Federally designated critical habitat is a parcel of land essential to the conservation of a species identified by the ESA to be endangered or threatened (USFWS 2017a). Designated critical habitat is located across the state, but most of the parcels are in central and western Washington. Critical habitat parcels are selected based on landscape features that threatened and endangered species require for survival. These polygons[143] may be identified based on models and may not be field verified; they may be not occupied at the time of assigning, but the designation is intended to manage landscape capacity for species recovery. The features may not be found anywhere else, and the species may have specialized habitat (i.e., breeding, foraging, wintering) requirements that can only be met by specific habitat features that are at risk of destruction, as in the case of old growth forests being cut for logging and agriculture. Critical habitat selection aims to protect important physical and biological characteristics of an area necessary for species conservation (USFWS 2017b). Destruction or modification of critical habitat requires approval by the U.S. Fish and Wildlife Service (USFWS) if the proposed development involves a federal nexus (e.g., permit, license, or funding). In Washington, critical habitat parcels have been identified for 13 species, 12 of which are relevant to transmission facility development (WDFW 2024d).

Important Bird Areas

An IBA is an area that is globally important for the conservation of bird populations (BirdLife International 2021). IBAs are identified based on a standard set of four criteria that protect habitat for globally threatened and endangered birds, birds restricted by range or habitat, and large congregations of birds (Bird Studies Canada 2024). The National Audubon Society, in partnership with BirdLife International, identifies IBAs in the United States, and each IBA is given one of three designations: global significance, continental significance, or state significance. There are 73 IBAs in Washington State, of which 59 are state priority IBAs, 14 are global priority IBAs, and none are continental priority (**Figure 3.6-2**). Additionally, two Oregon State priority IBAs that overlap the

[143] An identified area on a map that corresponds to an area of land.

Washington-Oregon border have been included in the IBA tabulation for the Northwest Coast and Columbia Plateau ecoregions (**Figure 3.6-2**) (Audubon 2024). IBAs are found throughout the state, but the highest concentration of IBAs is in central Washington, mainly in the Columbia Plateau ecoregion, along inlets and coastline in the west, and on the Oregon border in the south. IBA parcels can be on federal land, state land, and privately owned land as the decision about where IBAs are located is ultimately determined by bird use.

General Wildlife Species

Mammals

Washington has 132 native mammal species subdivided into 90 terrestrial, 27 marine, and 15 bat species (Burke Museum 2013). The nine ecoregions in Washington support a diverse population of wildlife, from aquatic mammals, such as otters, that live in the state's many rivers and estuaries, to terrestrial mammals such as yellow-bellied marmots, that thrive in the alpine meadows, to animals that inhabit desert climates, such as black-tailed jackrabbits. Precipitation varies widely across the state. The coast range ecoregion receives an average 214.9 centimeters (cm) (84.6 inches) of precipitation annually, while the Columbia Plateau receives an average 33.4 cm (13.2 inches) of precipitation annually (CEC 2011). Mammals in each ecoregion rely on the resources provided by the landscape to survive. Most terrestrial mammals in Washington spend their entire lives within the state, meaning they require habitat in all four seasons for activities such as overwintering or hibernation, breeding, and raising young, and enough space for their offspring to maintain a territory. For example, the Coast Range ecoregion provides large tracts of unfragmented land for mammals like cougars, which require a complex territory of up to 50 square kilometers (km^2) (19.3 square miles [mi^2]) for foraging, breeding, and overwintering (NCC 2024). The Rocky Mountains and Cascade ecoregions also provide expansive unfragmented habitat for animals, like mountain goats, that live on steep rocky mountainsides in alpine regions (WDFW 2024e).

Wolverines, which occur throughout Washington's Cascade Mountain range and high ranges and plateaus of northeastern Washington, maintain a territory ranging from 100 to over 1,990 km^2 (38.6 to 768.3 mi^2) through alpine and subalpine habitats (WDFW 2024f). A smaller mammal, Washington ground squirrel, a state and federal candidate species, lives in the Columbia Basin of eastern Washington in steppe and shrubsteppe habitats. This species' population has declined, due in part to habitat loss and fragmentation[144] related to development and agriculture (WDFW 2024g). Mule deer are found throughout most of Washington. Due to food availability, predator distribution, and winter weather, this species moves between separate summer and winter ranges and will migrate up to 51 kilometers (km) (31.7 miles) between ranges. Residential and agricultural development, increasing wildfire frequency, and human recreation are the greatest factors affecting corridor connectivity between ranges and range quality (WDFW 2016; Kauffman et al. 2024).

T*wo mammal species have been identified as priority invasive species by the Washington Invasive Species Council: nutria (*Myocastor coypus*) and feral pigs (*Sus scrofa*), with the latter not currently known to exist in the* state *(WISC 2025). Nutria are aquatic rodents that consume the roots and stems of wetland plants in a destructive manner that can impact riparian areas (WISC 2025). They also can populate quickly*; they *have spread throughout western Washington and are beginning to be found in the interior (WISC 2025). Feral pigs are not known to have populations in Washington, but they are* present *in Oregon and California. The potential*

[144] The process by which habitat is divided into smaller pieces by a disturbance, typically an anthropogenic disturbance. For example, the construction of a road through a forest would lead to habitat fragmentation.

economic, ecological, and health threats that feral pigs can pose *for livestock and people have led to them being* classified *as a priority invasive species.*

Birds

More than 500 species of birds occur in Washington at various times throughout the year due to the state's diverse habitats such as alpine meadows, rainforests, shrubsteppe, old growth forests, and wetlands (WDFW 2024h). Washington's old growth forests provide important habitat for at-risk species like northern goshawk and marbled murrelet. In the east, shrubsteppe and grassland provide habitat for state-listed endangered species like ferruginous hawk, greater sage-grouse (*Centrocercus urophasianus*), and Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*). In the lowlands, wetland habitat supports birds like sandhill crane, and Clark's grebe (*Aechmophorus clarkii*) (WDFW 2024i). While birds occur across the state, some key locations for birds are the Skagit Wildlife Management Area, Dungeness National Wildlife Refuge, Olympic National Park, and Grays Harbor National Wildlife Refuge on the west coast; Mount Rainier National Park in the Cascade mountains; and Leahy Junction – Moses Coulee, Yakima Training Center, and Columbia National Wildlife Refuge in central/ eastern Washington (Audubon Washington n.d.).

Habitat selection for birds varies across species. Some birds that spend the entire year in Washington will nest in one location that provides quality nesting habitat, sufficient food, and shelter, then move to a different location for winter that has enough food and shelter to survive. Many bird species migrate large distances in the spring and fall between their breeding and wintering grounds, respectively. Birds that migrate long distances require stopover[145] or staging grounds to rest and refuel before continuing their journey. They may use the same staging grounds every year, with thousands of other birds, or they may select a new location annually or semiannually (Warnock 2010). Examples of long-distance migrants are shorebird species like sanderling (*Calidris alba*), western sandpipers (*Calidris mauri*), and dunlins (*Calidris alpina*), which make use of the large sandy beaches on the west coast as stopover sites (Audubon Washington n.d.).

Some birds, like song sparrows (*Melospiza melodia*), may nest in the same general area but build a new nest each year (Arcese et al. 2020), while others, like great blue herons and American white pelicans (*Pelecanus erythrorhynchos*), nest in large colonies. For example, the heron colony in Reed Island State Park has approximately 180 nests that the herons reuse each year (Cullinan 2001). American white pelicans are also an example of a species that only occupies the state in the summer for breeding, along with several warbler species, which migrate south in the fall (Audubon Washington n.d.). In the winter, many species of waterfowl use Washington as an overwintering area between breeding seasons (Audubon Washington n.d.). Some birds, like American robins (*Turdus migratorius*) and American crows (*Corvus brachyrhynchos*), are generalists[146] that have adapted alongside humans and will nest in a variety of locations and structures, while others, like marbled murrelets and northern spotted owls, have highly specific nesting habitat requirements that are sensitive to change and human development (Nelson 2020; Vanderhoff et al. 2020; Gutiérrez et al. 2020; and Verbeek et al. 2024).

---

[145] In the context of birds, a stopover site is an important resting or feeding areas during migration.

[146] A species that has a high level of tolerance for different environmental conditions.

Amphibians and Reptiles

There are an estimated 25 species of amphibians and 28 species of reptiles in Washington (WDFW 2024j). Amphibians and reptiles inhabit a variety of ecosystems and can occur in most habitats across Washington, depending on life requisites.

Amphibians can be grouped into aquatic and terrestrial breeding obligates.[147] Terrestrial breeding obligates are the lungless salamanders in the family Plethodontidae. Aquatic breeding obligates consist of frogs, toads, newts, and mole salamanders in the family Ambystomatidae. Aquatic breeding obligates in Washington breed predominantly in slow-moving freshwater aquatic habitat, such as wetlands, beaver impoundments, ponds, ditches, and sloughs (Corkran and Thoms 1996). A few species, such as Rocky Mountain tailed frog and coastal giant salamander, breed in fast-flowing streams. Terrestrial breeding obligates breed in moist, sheltered terrestrial habitat such as decaying logs, burrows, and rock piles (Corkran and Thoms 1996). Adults of both aquatic and terrestrial breeding amphibians spend variable amounts of time in terrestrial habitat outside of the breeding season (Corkran and Thoms 1996). Suitable terrestrial habitat for adult amphibians varies with species and seasonal use, but generally consists of forested habitat, open clear cuts, riparian habitat, and meadows (Corkran and Thoms 1996; COSEWIC 2012). However, some species, such as Larch Mountain salamanders, are adapted to unique environments, which occur in talus and scree slopes. Upland habitats are typically moist and provide shelter and thermoregulatory[148] microhabitat[149] features such as decaying logs, shrub cover, moist hollows, and debris or rock piles (Matsuda et al. 2006). Adult amphibians also require access to hibernation sites such as talus slopes, debris piles, burrows and holes, and wetland or pond habitats.

Reptiles inhabit a variety of ecosystems, from wetlands to shrubsteppe. Reptiles in Washington include turtles, snakes, and lizards. Turtles, like the northwestern pond turtle, which is state-listed as endangered, are primarily aquatic, living in ponds or lakes with plenty of basking locations and grasslands or open woodland nearby for nesting (WDFW 2024k). In general, regionally occurring snake and lizard species have a patchy distribution and are associated with shrubland, grassland, and canyons with access to suitable hibernacula (winter shelter used for hibernation) or hibernation habitat (e.g., loose soils for burrowing). Reptiles like the northern sagebrush lizard and striped whipsnake, which are both listed as candidate species in the state, require vegetated sand dunes with minimal disturbance and no grazing livestock (WDFW 2024l).

There are two invasive amphibian species in Washington that have been identified as priority species by the Washington Invasive Species Council (WISC): American bullfrog (*Lithobates catesbeianus*) and African clawed frog (*Xenopus laevis*) (WISC 2025). American bullfrogs are found in a variety of freshwater habitats across the state, such as marshes, streams, ponds, reservoirs, wetlands, and ditches. They will eat many different types of native species consisting of amphibians, turtles, birds, fish, and young snakes (WISC 2025). They are expected to have contributed to amphibian declines across North America (WISC 2025). Both species can inhabit many different types of freshwater aquatic habitats and will eat any native species they can catch, including mammals, fish, birds, frogs, reptiles, and snails (WISC 2025). Africa clawed frogs also carry pathogens that can harm native amphibian and fish species (WISC 2025).

---

[147] A species that must live in a specific condition or environment to survive.

[148] Refers to the process of maintaining a certain temperature regardless of external temperature pressure.

[149] Small habitat features which typically provide special functions to a plant or animal in a certain landscape.

Invertebrates

Invertebrates are animals without a backbone. These include arthropods (i.e., arachnids, insects, crustaceans, centipedes, and millipedes), mollusks (i.e., snails and slugs), and annelids (i.e., segmented worms). Little is known about many invertebrate species, even though they make up 99 percent of animal species globally (WDFW 2015). Invertebrates are important for many ecological processes, such as soil nutrient cycling, soil creation, pollination, biocontrol, seed dispersal,[150] water filtration; are critical components of all food webs; and are critical to global ecosystems and economies (WDFW 2015; Schowalter et al. 2018). There is much less information about invertebrates than about other taxonomic groups (Harvey et al. 2023). Many invertebrate species are highly specialized, which allows them to partition resource use in ecosystems, but this can make them very sensitive to changes such as habitat loss, changes in host plant[151] phenology and abundance, climactic changes such as temperature and weather patterns, competition from invasive species, and pollutants (Harvey et al. 2023).

According to the citizen science platform iNaturalist, 3,728 species of native arthropods, 335 species of native mollusks, and 89 species of native annelids have been observed in Washington (iNaturalist Community 2024a, 2024b, 2024c). However, these estimates are likely lower than the actual number of species in each of these taxonomic groups in Washington, as, except for certain well-understood groups such as butterflies (Papilionidae), many invertebrate species are difficult to detect and classify taxonomically. Further, this group does not receive much attention from scientists relative to its diversity (van Klink et al. 2022). Some invertebrate groups in North America have been severely affected by humans—most notably, freshwater bivalves[152]—which are more species-rich in North America than anywhere else on earth, but a high number are imperiled or extinct. For example, 37 species in the United States alone are presumed extinct (WDFW 2015).

Washington's State Wildlife Action Plan (SWAP) lists animals of greatest conservation need and includes 37 species of invertebrate from orders such as Coleoptera (beetles), Hymenoptera (ants, bees, and wasps), Lepidoptera (butterflies and moths), Orthoptera (grasshoppers), Odonata (dragonflies and damselflies), Trichoptera (caddisflies), Plecoptera (stoneflies), and Ephemeroptera (mayflies) (WDFW 2015). Other invertebrate groups in the SWAP include mollusks, slugs, freshwater bivalves, marine bivalves, marine gastropods,[153] and one earthworm species. Many of the invertebrates listed in the SWAP are of concern due to habitat loss and fragmentation; critically low population sizes that can be geographically isolated;[154] restricted ranges; habitat degradation, including pollution; and loss of host plants. Four species or subspecies of terrestrial invertebrates are listed as endangered either federally or in Washington, all of them butterflies (WDFW 2024m). These are the Mardon skipper (*Polites mardon*, state-listed as endangered, not federally listed), island marble (*Euchloe ausonides insulana*, state-listed as candidate, federally listed as endangered), Taylor's checkerspot (*Euphydryas editha taylori*, state-listed as endangered, federally listed as endangered), and Oregon silverspot (*Speyeria zerene hippolyta,* state-listed as endangered, federally listed as threatened). More information about these species can be found in **Table 3.6-3**.

[150] To disperse from one area to another.

[151] A plant which is required by a species, typically an arthropod, for feeding, egg laying, or some other part of their lifecycle.

[152] An animal in the phylum Mollusca. These are soft-bodied invertebrates which typically contain a calcium carbonate shell around their body.

[153] An animal in the class Gastropoda. These include snails and slugs.

[154] A population that is geographically separated from other populations of the same species.

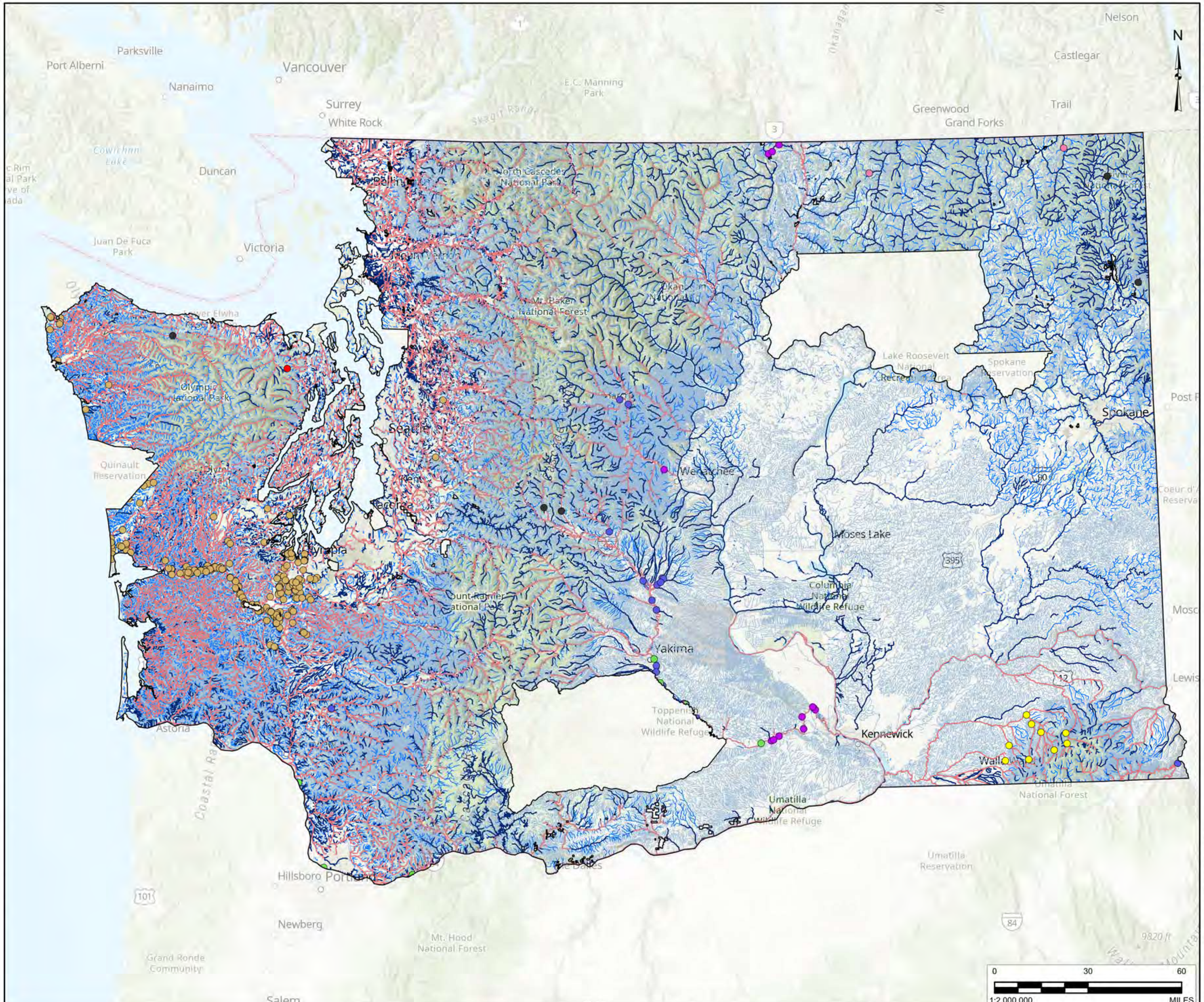
In Washington, there are 22 priority invasive invertebrate taxa identified by WISC, consisting of 13 invasive insect species and nine non-insect taxa, which are all aquatic and discussed under Section 3.6.2.3. Eight of these species have been found or have become established in the state, and the other five have a potential to become introduced and would have substantial impacts if they were to become established (WISC 2025). Some of the invasive species found in the state are agricultural pests, such as the apple maggot *(Rhagoletis pomonella*) and spotted wing drosophila (*Drosophila suzukii*), while others can be forest pests such spongy moth (*Lymantria dispar*), or threats to honeybees, such as northern giant hornet (*Vespa mandarinia*). Other species of invasive insects occur in the state, but these are not identified as high priority by WISC.

General Fish Species

There is no consensus on the number of fish species in Washington. The Washington Biodiversity Council (2007) indicates that Washington provides a home to 470 freshwater and marine fishes, whereas the WDFW (2024i) lists 190 species of marine and freshwater fish. Wydoski and Whitney (2003) reported 91 fishes that are represented by 22 families composed of 49 genera and 87 species; 50 are native fishes and 41 are introduced fishes. These 91 fishes include subspecies; for example, cutthroat trout has three subspecies—coastal cutthroat trout (*Oncorhynchus clarkii clarkii)*, westslope cutthroat trout (*Oncorhynchus clarkii lewisi*), and Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*). They also include hybrid sport fish, such as tiger muskellunge (*E. Lucius x E. masquinongy*), which is a hybrid between northern pike (*Esox lucius*) and muskellunge (*Esox masquinongy*). The Olympic mudminnow (*Novumbra hubbsi*), which is a state-listed sensitive species, is the only fish species endemic to Washington and is found primarily in the lowland of the Olympic Mountains and Willapa Hills, including the Olympic Peninsula, the Chehalis River basin, south Puget Sound, and a few sites in Snohomish and King Counties (Wydoski and Whitney 2003; WDFW 2012a). Steelhead (*Oncorhynchus mykiss*) is the designated state fish of Washington (Wydoski and Whitney 2003). Fish distribution and known salmon/steelhead streams are identified in **Figure 3.6-3**.

There are 28 different invasive fish species in Washington, of which 19 are classified as prohibited and nine are regulated. Prohibited invasive species include those that are considered by the WFWC to have a high risk of becoming an invasive species and may not be possessed, imported, purchased, sold, propagated, transported, or released into state waters except as provided in Revised Code of Washington (RCW) 77.15.253 (WDFW 2024p). Regulated fish are considered by the WFWC to have some beneficial use, along with a moderate but manageable risk of becoming an invasive species, and may not be released into state waters except as provided in RCW 77.15.523 (WDFW 2024p). Invasive fish species of greatest concern in Washington with known distribution include the northern pike, which is classified as prohibited (WDFW 2024q). They occur in the Pend Oreille River watershed, including Boundary Reservoir and Box Canyon Reservoir. Other prohibited fish species include alligator gar (*Atractosteus spatula),* bighead carp (*Hypophthalmichthys nobilis*), black carp (*Mylopharyngodon piceus*), black piranha (*Serrasalmus rhombeus*), blackskin catfish (*Clarias meladerma*), bowfin (*Amia calva*), fathead minnow (*Pimephales promelas*), golden orfe (*Leuciscus idus – golden*), grass carp (*Ctenopharyngodon idella)*, longnose gar (*Lepisosteus osseus*), northern snakehead (*Channa argus*), red piranha (*Rooseveltiella nattereri),* red-bellied piranha (*Pygocentrus nattereri*), round goby (*Neogobius melanostomus*), rudd (*Scardinius erythropthalmus*), silver carp (*Hypophthalmichthys molitrix*), silver orfe (*Leuciscus idus – silver),* and walking catfish (*Clarias batrachus)* (WDFW 2024p).

This Page Intentionally Left Blank



LEGEND

- Study Area
- Statewide Integrated Fish Distribution (WSFW, 2024)
- Salmon/Steelhead Stream (WSFW, 2024)

Watercourse (WaDNR, 2021)

- Fish
- Non-fish/Unknown

Priority Fish Observation (WSFW, 2024)

- Lake Chub
- Leopard dace
- Margined sculpin
- Mountain Sucker
- Olympic mudminnow
- Pygmy Whitefish
- Umatilla dace
- Westslope Cutthroat Trout

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES

1. SERVICE LAYER CREDITS: SOURCES: ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY, ESRI, USGS
2. PRIORITY FISH OBSERVATIONS, SALMON/STEELHEAD STREAM, STATEWIDE INTEGRATED FISH DISTRIBUTION: WSFW, 2024; WATERCOURSE: WADNR, 2021

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

FISH PRIORITY SPECIES AND HABITAT DISTRIBUTION IN WASHINGTON STATE

YYYY-MM-DD 2025-03-18 CONSULTANT wsp FIGURE 3.6-3

This Page Intentionally Left Blank

Wildlife Priority Species

For the purpose of this Draft Programmatic EIS, special status wildlife species are defined as one or more of the following:

- Listed under the federal ESA
- Listed by Washington State as endangered, threatened, sensitive, or candidate species
- Protected under the Bald and Golden Eagle Protection Act (USFWS 2016)

There are 58 terrestrial[155] vertebrate special status wildlife species in Washington, comprising of 18 mammals, 26 birds, nine amphibians, and five reptiles. In addition, 26 terrestrial invertebrate species, including insects and mollusks, that occur in Washington are either state- or federally listed, or state candidate species (**Table 3.6-3**).

[155] Excludes marine mammals and marine birds such as short-tailed albatross.

This Page Intentionally Left Blank

Table 3.6-3: Federally or State-Listed Endangered, Threatened, or Sensitive Wildlife Species or State Candidate Species in Washington.

Species[a]	Federal / State Listing[a]	Ecoregions[b,c]	Habitat[b]	Total Abundance	Abundance in Washington	Short-Term Trends	Long-Term Trends	Threats[b]
Gray Wolf *Canis lupus*	FE / SE	▪ Okanogan ▪ Canadian Rocky Mountains ▪ Blue Mountains ▪ East Cascades ▪ West Cascades	Generalist	10,000 to > 1,000,000[d]	260 (2023)[e]	Increase[e]	Decline[e]	▪ Illegal killing of wolves ▪ Wolf-livestock conflicts
Grizzly Bear *Ursus arctos horribilis*	FT / SE	▪ North Cascades ▪ East Cascades ▪ Okanogan ▪ Canadian Rocky Mountains	Generalist	~27,800 (In Canada and Continental United States)[f]	70 to 80 (Selkirk Mountain Recovery Zone – northeastern Washington and northern Idaho; 2017)[f]	Increase[f]	Decline[f]	▪ Habitat loss ▪ Habitat degradation ▪ Public education ▪ Habitat fragmentation ▪ Lack of information
Wolverine *Gulo gulo*	FT / SC	▪ North Cascades ▪ West Cascades ▪ East Cascades ▪ Okanogan ▪ Canadian Rocky Mountains ▪ Blue Mountains	Boreal,[156] tundra, and taiga[157] ecosystems. In alpine and subalpine areas in Washington.	10,000 to >1,000,000[d]	Unknown	Decline to relatively stable[d]	Decline[d]	▪ Lack of information ▪ Habitat loss ▪ Habitat fragmentation ▪ Climate changes
Lynx *Lynx canadensis*	FT/ SE	▪ North Cascades ▪ East Cascades ▪ Canadian Rocky Mountains	Subalpine and boreal forest. High elevation conifer forests in Washington.	10,000 to > 1,000,000[d]	87 (early 2000s)[b]	Decline[b]	Decline[b]	▪ Wildfire ▪ Small population size ▪ Reduced habitat connectivity
Fisher *Pekania pennanti*	NA / SE	▪ Pacific Northwest Coast ▪ Puget Trough ▪ Canadian Rocky Mountains	Conifer and mixed conifer deciduous.	10,000 to >1,000,000[d]	90 (released from 2008 to 2010, thought to be increasing)[b]	Unknown, potential increase[b]	Decline[b]	▪ Incidental trapping[158] ▪ Highway collisions
Western Gray Squirrel *Sciurus griseus*	NA / SE	▪ Puget Trough ▪ West Cascades ▪ North Cascades ▪ East Cascades ▪ Okanogan	Transitional areas where conifer-dominated areas merge with open areas with oak and other deciduous trees.	18,000,000 (California in 2003)[g]	937 (1995 to 2005 survey efforts)[h]	Likely Increase (due to translocations)[h]	Decline[h]	▪ Habitat Loss ▪ Road collisions ▪ Disease ▪ Competition with non-native squirrels ▪ Loss of genetic diversity[b]
Cascade Red Fox *Vulpes vulpes cascadensis*	NA / SE	▪ West Cascades ▪ East Cascades ▪ Okanogan	Subalpine meadows and open forests in Cascade Range.	Endemic to Washington[b]	No population estimates. 51 individuals identified in southern Washington in genetic study.[i]	Decline[b]	Decline[b]	▪ Habituation[159] to people ▪ Lacking information ▪ Climate change

156 A type of climatic zone related to northern forests which are dominated by conifers.

157 A climatic zone typically with sparse conifers mixed with rocks and shrubs. Generally, taigas are more northern than boreal areas and closer to the tree line and tundra.

158 Inadvertently catching an animal in a trap or a structure designed for another purpose (e.g., open construction trench).

159 The process of becoming accustomed to something; often used in wildlife biology to refer to a species becoming accustomed to people.

Species[(a)]	Federal / State Listing[(a)]	Ecoregions[(b,c)]	Habitat[(b)]	Total Abundance	Abundance in Washington	Short-Term Trends	Long-Term Trends	Threats[(b)]
Woodland Caribou (South Selkirk Population) *Rangifer tarandus caribou*	FE / SE	▪ Canadian Rocky Mountains	Old growth conifer forests above 1,220 meters (4,002.63 feet) with abundant arboreal[160] lichen.	18 (2014 South Selkirk Woodland Caribou population, mostly in British Columbia, Canada)[(b)]	18 (2014 South Selkirk Woodland Caribou population, mostly in BC, Canada)[(d)]	Decline[(b)]	Decline[(b)]	▪ Small population size ▪ Predation ▪ Highway collisions ▪ Snowmobile disturbance and other human activities ▪ Habitat loss
Columbian White-tailed Deer *Odocoileus virginianus leucurus*	FT / ST	▪ Puget Trough ▪ Pacific Northwest Coast	Riparian habitat within the Columbia River floodplain.	2,500 to 10,000 (2016)[(d)]	1,000 (2016)[(d)]	Increase[(d)]	Decline[(d)]	▪ Habitat loss ▪ Habitat degradation ▪ Water management ▪ Predation pressure ▪ Invasive plant species ▪ Inadequate recovery goals
Pygmy Rabbit (Columbia Basin population) *Brachylagus idahoensis*	FE / SE	▪ Columbia Plateau	Sagebrush stands in loose soil for burrowing.	Endemic to Washington[(b)]	>125 individuals[(j)]	Increase (after some decrease from 2017 to 2020)[(j)]	Decline[(j)]	▪ Habitat loss ▪ Lack of information ▪ Livestock habitat depreciation ▪ Insufficient reserve lands
Mazama Pocket Gopher *Thomomys mazama*	FT / ST	▪ Puget Trough ▪ Pacific Northwest Coast	Grasslands, prairies, and subalpine meadows with well-drained soil for burrowing.	100,000 to >1,000,000[(d)]	2,000 to >5,000 (2007)[(d)]	Unknown[(d)]	Decline[(d)]	▪ Habitat loss ▪ Habitat degradation ▪ Trapping and overharvesting ▪ Lack of information
Townsend's big-eared Bat *Corynorhinus townsendii*	NA / SC	▪ Whole state	Lowland conifer and deciduous forests, montane conifer forests, shrubsteppe, open areas.	10,000 to 1,000,000[(d)]	Unknown [(k)]	Stable/ Decline[(c,k)]	Decline[(k)]	▪ Roost disturbance ▪ Pesticides ▪ Agricultural and silvicultural[161] practices
Keen's Myotis *Myotis keenii*	NA / SC	▪ Coast Range ▪ Puget Trough ▪ West Cascades	Moist, mature, low elevation forests during warmer months, mid-elevation caves for hibernation.	10,000 to 100,000[(d)]	Unknown, presumed rare[(b,k)]	Unknown[(b,k)]	Decline[(k)]	▪ Lack of information ▪ Pesticides ▪ Habitat Loss
White-tailed Jackrabbit *Lepus townsendii*	NA / SC	▪ Columbia Plateau ▪ Okanogan	In summer, hilly sites with bunchgrass. In winter, sagebrush flats in valley bottoms.	10,000 to >1,000,000[(d)]	Unknown (low)[(d)]	Decline[(b,d)]	Decline[(b,d)]	▪ Habitat loss ▪ Low population size ▪ Disease ▪ Overharvesting
Black-tailed Jackrabbit *Lepus californicus*	NA / SC	▪ Columbia Plateau	Inhabits shrubsteppe areas with sagebrush and rabbitbrush. Feeds in grassy areas at night.	Unknown[(d)]	Unknown[(d)]	Relatively stable[(d)]	Decline[(d)]	▪ Habitat Loss ▪ Habitat Degradation ▪ Small population size ▪ Disease ▪ Overharvesting ▪ Lack of data

160 An organism which is adapted to living in trees

161 Describes the practice of managing the growth, composition, health, and quality of forests to meet diverse needs and values, such as timber production, wildlife habitat, water resources, and recreation.

Species[a]	Federal / State Listing[a]	Ecoregions[b,c]	Habitat[b]	Total Abundance	Abundance in Washington	Short-Term Trends	Long-Term Trends	Threats[b]
Washington Ground Squirrel *Urocitellus washingtoni*	NA / SC	▪ Columbia Plateau	Prefers shrubsteppe or grasslands with silty loam soil for burrowing. May inhabit disturbed sites when food is abundant.	Unknown,[l] 2,500 to 100,000[d]	Unknown[l]	Decline[b,c]	Decline[b,d]	▪ Habitat loss ▪ Habitat fragmentation ▪ Invasive plant species ▪ Overharvesting ▪ Lack of information
Townsend's Ground Squirrel) (South of the Yakima River) *Urocitellus townsendii*	NA / SC	▪ Columbia Plateau	Historically inhabited shrubsteppe, grassland, sagebrush habitat, now also found in agricultural areas and pastures.	Endemic to Washington State[b]	Unknown[m]	Decline[m,b,d]	Decline[m,b,d]	▪ Lack of information ▪ Habitat loss ▪ Fragmentation ▪ Invasive plant species ▪ Overharvesting
Olympic Marmot *Marmota olympus*	NA / SC	▪ Northwest Coast	Alpine and subalpine meadows in the Olympic Mountains. Typically prefers south facing slopes.	Endemic to Washington State[b]	2,000 to 4,000[n]	Relatively stable[b,d]	Decline[b,d]	▪ Predation by invasive species ▪ Fire control ▪ Reduced snowpack ▪ Public education
Sandhill Crane *Grus canadensis*	NA / SE	▪ East Cascades ▪ Columbia Plateau	Flooded meadows, marshes, and wetlands.	8,000 (Central Valley population; 1993)[o]	60 (30 breeding pairs; 2015)[b]	Stable or increasing[b]	Declines and increases across range[d]	▪ Habitat loss ▪ Lack of information ▪ Agricultural effects such as changing water levels
Western Snowy Plover *Charadrius nivosus nivosus*	FT / SE	▪ Pacific Northwest Coast	Coastal beaches, sandspits, and dunes. Breeds on dry mudflats[162] or beaches above hightide line.	10,000 to 100,000[c]	<50 (2014)[b]	Stable/ Increase[b]	Decline[d]	▪ Human disturbance ▪ Nest predation ▪ Degradation of habitat ▪ Resource information needs
Upland Sandpiper *Bartramia longicauda*	NA / SE	▪ None - Extirpated[b]	Prefers tall grass and wet meadows for nesting.	100,000 to >1,000,000 individuals[d]	0 – Extirpated[b]	Decline[d]	Decline[d]	▪ Lack of information ▪ Protection of historical breeding areas
Marbled Murrelet *Brachyramphus marmoratus*	FT / SE	▪ Pacific Northwest Coast ▪ Puget Trough	Marine species which breeds in coastal old growth forests.	300,000 (1995)[o]	7,494 (2015)[p]	Decline[p]	Decline[p]	▪ Breeding habitat loss ▪ Low juvenile recruitment ▪ Environmental contamination ▪ Recreation activities near breeding sites
Columbian Sharp-Tailed Grouse *Tympanuchus phasianellus columbianus*	NA / SE	▪ East Cascades ▪ Okanogan ▪ Columbia Plateau	Grassland and steppe habitat	56,000 to 62,000 (2000)[q]	902 (2011)[q]	Decline[b]	Decline[b]	▪ Habitat fragmentation ▪ Small populations ▪ Habitat loss
Greater Sage-grouse *Centrocercus urophasianus*	NA / SE	▪ Columbia Plateau ▪ Okanogan	Shrubsteppe with dominant sagebrush.	142,000 (1998)[o]	<1000 (2014)[b]	Stable[b]	Decline[d]	▪ Habitat loss ▪ Wildfires ▪ Small populations ▪ Habitat fragmentation

162 A type of habitat consisting of a wet muddy area, typically near the ocean, which becomes muddy at low tide and is covered by water at high tide.

Species[a]	Federal / State Listing[a]	Ecoregions[b,c]	Habitat[b]	Total Abundance	Abundance in Washington	Short-Term Trends	Long-Term Trends	Threats[b]
Ferruginous Hawk *Buteo regalis*	NA / SE	▪ Columbia Plateau	Shrubsteppe and arid grasslands.	110,000 (2005 to 2014 Canada and U.S., estimated using BBS data)[o]	Unknown	Decline[r]	Decline[r]	▪ Habitat loss ▪ Habitat fragmentation ▪ Human disturbance at nest sites ▪ Poisoning of prey
Yellow-billed Cuckoo *Coccyzus americanus*	FT / SE	▪ None - Extirpated	Riparian areas, including willows and cottonwoods.	10,000 to >1,000,000[d]	0 – Extirpated[b]	Decline[d]	Decline[d]	▪ Habitat loss and degradation ▪ Lack of information
Northern Spotted Owl *Strix occidentalis caurina*	FT / SE	▪ Pacific Northwest Coast ▪ Puget Trough ▪ North Cascades ▪ West Cascades ▪ East Cascades	Coniferous forests with complex canopy and downed wood. Typically mid- and late-seral stage.	<15,000 (2016)[s]	671 Pairs (1987-1992 Surveys)[o]	Decline[d]	Decline[d]	▪ Habitat loss – old growth ▪ Barred owl predation
Streaked Horned Lark *Eremophila alpestris strigata*	FT / SE	▪ Pacific Northwest Coast ▪ Puget Trough	Grasslands, coastal beaches, sparsely vegetated shorelines.	1170 to 1610 (2013)[b]	245 pairs (2013)[b]	Decline[d]	Decline[d]	▪ Lack of information ▪ Dredged material deposition ▪ Aircraft collisions ▪ Habitat loss ▪ Loss of genetic diversity
Oregon Vesper Sparrow *Pooecetes gramineus affinis*	90D / SE	▪ Puget Trough	Large prairie sites and pastures with scattered shrubs and grass.	3000 (2021)[t]	300 (2021)[t]	Decline[t]	Decline[t]	▪ Habitat loss ▪ Invasive plant species ▪ Military training exercises ▪ Increased predation pressure ▪ Herbicide and pesticides
Common Loon *Gavia immer*	NA / SS	▪ Pacific Northwest Coast ▪ Puget Trough ▪ North Cascades ▪ East Cascades ▪ Okanogan ▪ Canadian Rocky Mountains ▪ Columbia Plateau	Requires clear lakes for breeding with small islands or marshy shallow vegetation for nest sites.	100,000 to 1,000,000 (2014)[d]	Unknown	Relatively stable[d]	Decline[d]	▪ Habitat loss ▪ Habitat degradation ▪ Human disturbance at breeding areas ▪ Landowner engagement ▪ Public outreach requirements (lead fishing gear, gear entanglement, commercial bycatch)
American White Pelican *Pelecanus erythrorhynchos*	NA / SS	▪ Pacific Northwest Coast ▪ Puget Trough ▪ Columbia Plateau	Require isolated freshwater islands for nesting.	100,000 to 1,000,000 (2005)[d]	~2,000 adults (2012)[q]	Increase[d]	Decline[d]	▪ Nest and roost sites affected by dredging ▪ Lack of information on prey
Western Grebe *Aechmophorus occidentalis*	NA / SC	▪ Columbia Plateau ▪ Okanogan	Uses large lakes, reservoirs, and marshes for breeding, and protected marine areas during winter.	80,000-90,000 adults [u]	1,000 to 2,000 adults (2015) [b]	Relatively stable [u]	Decline [b, c]	▪ Reduced water in reservoirs affect breeding ▪ Boat wakes damage nests ▪ Bycatch in gill nets ▪ Prey declines ▪ Oil spills
Clark's Grebe *Aechmophorus clarkii*	NA / SC	▪ Columbia Plateau	Uses large lakes, reservoirs, and marshes for breeding, and protected marine areas during winter.	71,737 birds [v]	75 to 150[b]	Decline [b, c]	Decline [b, c]	▪ Reduced water in reservoirs affect breeding ▪ Boat wakes damage nests

Species[a]	Federal / State Listing[a]	Ecoregions[b,c]	Habitat[b]	Total Abundance	Abundance in Washington	Short-Term Trends	Long-Term Trends	Threats[b]
Northern Goshawk *Accipiter gentilis*	NA / SC	▪ Northwest Coast ▪ Puget Trough ▪ North Cascades ▪ West Cascades ▪ East Cascades ▪ Okanogan ▪ Canadian Rockies ▪ Blue Mountains [w]	Nests in stands of large conifers that contain structural complexity.[w]	1,000,000 to 2,499,999[u]	Unknown ([w])	Unknown[w]	Unknown [u,w]	▪ Habitat loss ▪ Pesticides and herbicides[u]
Golden Eagle *Aquila chrysaetos*	NA / SC (Bald and Golden Eagle Protection Act)	▪ All ecoregions	Shrubsteppe, dry open areas, canyonlands. Nests on cliffs, rocky ledges, trees, and human-made structure.	57,000 (North America)[s]	300 breeding territories (occupancy of these are not well understood)[b]	Relatively Stable to Increase[s]	Unknown[b,c]	▪ Habitat loss ▪ Fragmentation ▪ Prey declines ▪ Collisions with wind turbines
Flammulated Owl *Otus flammeolus*	NA / SC	▪ East Cascades ▪ Okanogan ▪ Blue Mountains ▪ Canadian Rockies	Associated with mature ponderosa pine forests with snags, cavities, and a relatively open canopy.	11,000 (Canada and U.S.)[s]	Unknown[b]	Decline [u]	Unknown[b,c]	▪ Fire suppression practices ▪ Habitat loss
Burrowing Owl *Athene cunicularia*	NA / SC	▪ Columbia Plateau ▪ Okanogan	Shrubsteppe and open areas, including plains, and grasslands, and prairies.	1,100,000 (Canada and U.S.)[s]	Unknown [b]	Decline [d]	Decline[d]	▪ Habitat loss ▪ Pesticides and poisoning ▪ Lack of information
White-headed Woodpecker *Picoides albolarvatus*	NA / SC	▪ East Cascades ▪ Okanogan ▪ Canadian Rocky Mountains ▪ Blue Mountains	Associated with ponderosa pine and Douglas-fir forests with open canopies and large snags.	200,000 (Canada and U.S.)[s]	Unknown [b]	Stable[c,u]	Unknown[b]	▪ Fire suppression practices ▪ Habitat loss ▪ Lack of information
Black-backed Woodpecker *Picoides arcticus*	NA / SC	▪ East Cascades ▪ Okanogan ▪ Canadian Rocky Mountains ▪ Blue Mountains [m]	Mid-high elevation conifer forests, specialists of recently burned standing dead forests.[m]	1,800,000 (Canada and U.S.)[s]	Unknown[b]	Stable to increase[s,u]	Relatively stable[d]	▪ Fire suppression practices ▪ Habitat loss[m]
Loggerhead Shrike *Lanius ludovicianus*	NA / SC	▪ Columbia Plateau ▪ Okanogan	Inhabits open areas, including shrubsteppe and grasslands with scattered perches and shrubs for nesting.	4,200,000 (Canada and U.S.)[s]	Unknown[b]	Decline[d]	Decline[d]	▪ Habitat loss ▪ Loss of sagebrush ▪ Lack of information
Slender-billed White-breasted Nuthatch *Sitta carolinensis aculeata*	NA / SC	▪ Puget Trough	Requires oak and oak conifer woodlands, with specific trees being Oregon white ash, Oregon ash, and black cottonwood. Inhabits the Puget Trough ecoregion.	Unknown [d]	<50 birds [b]	Decline[x]	Unknown	▪ Habitat loss ▪ Small population size ▪ Lack of information
Sage Thrasher *Oreoscoptes montanus*	NA / SC	▪ Columbia Plateau ▪ Okanogan	Sagebrush is required for breeding, either in areas with expansive coverage or sometimes in small patches of sagebrush in agricultural fields.	6,600,000 [s]	Unknown [b]	Relatively stable in Washington[b] or Decline[d]	Decline[b,d]	▪ Habitat loss ▪ Fragmentation ▪ Overgrazing by livestock ▪ Invasive plant species ▪ Lack of information

Species[a]	Federal / State Listing[a]	Ecoregions[b,c]	Habitat[b]	Total Abundance	Abundance in Washington	Short-Term Trends	Long-Term Trends	Threats[b]
Sagebrush Sparrow *Artemisiospiza nevadensis*	NA / SC	▪ Columbia Plateau ▪ Okanogan	Areas containing large expanses of big sagebrush	4,700,000[s]	Unknown[b]	Relatively stable[u]	Unknown	▪ Habitat loss ▪ Fragmentation ▪ Overgrazing by livestock ▪ Invasive plant species ▪ Lack of information
Bald Eagle *Haliaeetus leucocephalus*	NA / NA (Bald and Golden Eagle Protection Act)	▪ All ecoregions	Typically breeds near large waterbodies such as oceans, lakes, rivers, and reservoirs. Requires large trees for nest construction.	200,000 mature individuals[s]	3,000 breeding birds (2005)[b]	Increase[b,c]	Decline[d]	▪ Habitat loss
Oregon Spotted Frog *Rana pretiosa*	FT / SE	▪ Puget Trough ▪ West Cascades ▪ Eastern Cascades and Foothills	Shallow wetlands associated with flowing water. Breeds in flooded wetland margins.	10,000 to 100,000 (2012)[d]	7368 adults (2012)[z]	Decline[d]	Decline[d,c]	▪ Lack of information ▪ Invasive plant species ▪ Invasive fish species ▪ Drying of wetlands
Northern Leopard Frog *Lithobates pipiens*	NA / SE	▪ Columbia Plateau ▪ Canadian Rocky Mountains	Requires specific habitat type. Needs shallow lentic areas for breeding, forages on moist areas on land, over winters in deep water that doesn't freeze.	100,000 to 1,000,000[c]	Unknown	Decline[d]	Decline[d]	▪ Invasive American bullfrogs ▪ Water management practices ▪ Agricultural practices ▪ Lack of information for disease effects ▪ Invasive aquatic plant species
Larch Mountain Salamander *Plethodon larselli*	NA / SS	▪ West Cascades ▪ East Cascades	Steep areas of scree, talus, and other rocky soils in various types of forested and non-forested habitats. Typically, north facing.	Unknown	Unknown	Relatively stable[d]	Decline[d]	▪ Lack of information ▪ Habitat loss and degradation ▪ Mining of rocks ▪ Climate change
Dunn's Salamander *Plethodon dunni*	NA / SC	▪ Northwest Coast	Habitat includes rocky areas and talus adjacent to streams in humid forests. They do not prefer flowing water, but areas that are constantly moist.	10,000 to 100,000 [d]	Unknown	Decline to Stable[d]	Unknown[d]	▪ Lack of information ▪ Habitat loss
Van Dyke's Salamander *Plethodon vandykei*	NA / SC	▪ Northwest Coast ▪ West Cascades	Found in moist areas with cool temperatures, and is typically associated with streams, seepages, and rock outcrops.	2,500 to 100,000 [d]	Unknown	Unknown[d]	Decline [d]	▪ Lack of information ▪ Habitat loss ▪ Fragmentation
Cascade Torrent Salamander *Rhyacotriton cascadae*	90d / SC	▪ West Cascades ▪ Puget Trough	Found in streams, seepages, and waterfall splash zones that are cold and have a thick canopy cover.	Unknown[d]	Unknown	Unknown[b,c]	Unknown [cd]	▪ Lack of information ▪ Habitat degradation ▪ Climate Change ▪ Habitat loss
Western Toad *Anaxyrus boreas*	NA / SC	▪ Northwest Coast ▪ Puget Trough ▪ West Cascades ▪ North Cascades ▪ East Cascades ▪ Okanogan ▪ Canadian Rocky Mountains ▪ Blue Mountains	Occurs in a wide range of habitat, including forests, prairies, canyons, Oregon oak, and ponderosa pine habitat. Breeds in a wide variety of water features.	100,000 to 1,000,000[d]	Unknown	Decline to Relatively stable[d]	Decline[d]	▪ Vehicle collision ▪ Habitat loss ▪ Habitat degradation ▪ Lack of information Chytrid fungus and other diseases

Species[a]	Federal / State Listing[a]	Ecoregions[b,c]	Habitat[b]	Total Abundance	Abundance in Washington	Short-Term Trends	Long-Term Trends	Threats[b]
Columbia Spotted Frog *Rana luteiventris*	NA / SC	▪ East Cascades ▪ Okanogan ▪ Columbia Plateau ▪ North Cascades ▪ Blue Mountains	Inhabits a variety of still and slow-moving waterbodies like streams and creeks, or pools on the edge of moving watercourses.	100,000 to 1,000,000[d]	Unknown	Decline[d,u]	Decline[d]	▪ Introduced American bullfrog ▪ Lack of information ▪ Habitat loss
Rocky Mountain Tailed Frog *Ascaphus montanus*	NA / SC	▪ Blue Mountains	Inhabits fast-flowing streams in matures forests with rocky substrates and cold, clear water. Can occasionally persist in streams that have been modified by disturbances, including burns.	2,500 to 100,000[d]	229 observations on WDFW database (1997 to 2010)[b]	Decline to relatively stable[d]	Decline to relatively stable[d]	▪ Lack of information ▪ Habitat loss ▪ Habitat degradation
Northwestern Pond Turtle *Actinemys marmorata*	90D / SE	▪ Puget Trough ▪ West Cascades	In Washington, they inhabit lakes and ponds but leave water to lay eggs in surrounding habitat.	2,500 to 100,000 (2021)[d]	800-1000 (2015)[y]	Decline[y]	Decline[y]	▪ Habitat loss ▪ Invasive American bullfrogs ▪ Invasive plant species ▪ Lack of population information
Sagebrush Lizard *Sceloporus graciosus*	NA / SC	▪ Columbia Plateau ▪ Okanogan	Associated with sand dunes and sandy habitats that have bare ground and shrubs for cover.	>100,000[d]	Unknown[b]	Relatively stable[c,u]	Decline[d]	▪ Lack of information ▪ Habitat loss ▪ Invasive plant species
Common Sharp-tailed Snake *Contia tenuis*	NA / SC	▪ Puget Trough ▪ East Cascades ▪ Columbia Plateau	Found in Garry oak forests, riparian areas with deciduous trees, and shrubsteppe uplands with deciduous trees. Associated with rocks and rotting logs.	10,000 to 1,000,000[d]	Unknown [b]	Relatively stable[c,u]	Decline [d]	▪ Lack of information ▪ Habitat loss
California Mountain Kingsnake *Lampropeltis zonata*	NA / SC	▪ East Cascades	Inhabits Oregon white oak and ponderosa pine forests, occurring in moist habits with rocks and woody debris.[163]	10,000 to 1,000,000 [d]	Unknown but likely small [b]	Relatively stable [d]	Decline [d]	▪ Lack of information ▪ Habitat loss ▪ Fragmentation ▪ Overharvesting for pet trade
Striped Whipsnake *Coluber taeniatus*	NA / SC	▪ Columbia Plateau	Obligates of shrubsteppe, typically occurring in very dry areas of the Columbia Basin in habitats with basalt outcrops.	100,000 to 1,000,000 [d]	Unknown [b]	Relatively stable[d]	Decline[d]	▪ Lack of information ▪ Habitat loss ▪ Fragmentation ▪ Habitat degradation ▪ Invasive plant species ▪ Overgrazing by livestock
Columbia Oregonian *Cryptomastix hendersoni* (snail)	NA / SC	▪ Columbia Plateau	Inhabits seeps and streams in the Columbia Basin, associated with logs, leaf litter, and other moist habitat features.	Unknown	Unknown	Decline[b]	Decline[d]	▪ Habitat degradation ▪ Habitat loss

[163] Debris which can consist of downed trees, branches, rotting logs, or other woody materials.

Species[a]	Federal / State Listing[a]	Ecoregions[b,c]	Habitat[b]	Total Abundance	Abundance in Washington	Short-Term Trends	Long-Term Trends	Threats[b]
Poplar Oregonian *Cryptomastix populi* (snail)	NA / SC	▪ Columbia Plateau	Found in canyons in with surrounding sage scrub vegetation. Inhabits cool talus slopes and shrubby draws.[164]	Unknown	Unknown	Decline[b,d]	Decline[d]	▪ Lack of information ▪ Habitat loss ▪ Overgrazing by livestock
Dalles Sideband *Monadenia fidelis minor* (snail)	NA / SC	▪ West Cascades	Known from talus around seeps and springs that provide moist habitat and in forested upland areas.	Unknown	Unknown	Unknown[d]	Decline[d]	▪ Habitat loss
Blue-gray Taildropper *Prophysaon coeruleum* (slug)	NA / SC	▪ Puget Trough	Inhabits moist forests of either conifer or mixed-wood composition with an abundant layer of course woody debris and leaf litter.	Unknown[d]	Unknown[b]	Decline[b]	Unknown[d]	▪ Habitat loss
Oregon Silverspot *Speyeria zerene hippolyta*	FT / SE	▪ None - Extirpated	Coastal grasslands and coastal meadows.[aa]	823 (2018)[bb]	0 – Extirpated[bb]	Decline[d]	Decline[d]	▪ Invasive plant species ▪ Loss of host plants ▪ Habitat loss and degradation
Taylor's Checkerspot *Euphydryas editha taylori*	FE / SE	▪ Puget Lowlands ▪ Coast Range	Lowland prairies and meadows, coastal and alpine meadows, dunes, forest clearings in old growth.	Unknown to >30,000[aa]	>30,000[aa] (Based on estimates from three sites in Washington; 2019)	Increase[aa]	Decline[b,cc]	▪ Invasive plant species ▪ Loss of host plants ▪ Habitat loss ▪ Habitat degradation
Island Marble *Euchloe ausonides insulana*	FE / SC	▪ Puget Trough	Coastal dunes, meadows, open disturbed areas, grasslands.	Endemic to Washington[b]	50 to 100 (2015)[b]	Decline[b]	Decline[b]	▪ Increased herbivore browsing ▪ Agricultural practices
Mardon Skipper *Polites mardon*	NA / SE	▪ Puget Trough ▪ East Cascades	Alpine meadows, glacial outwash prairies, grass dominated sites.	Unknown to >35000[dd]	>35000[dd] (Based on abundance counts at the two highest population sites in Washington; 2022)	Increase[dd]	Decline[dd]	▪ Invasive plant species ▪ Lack of knowledge ▪ Habitat loss ▪ Habitat degradation ▪ Climate change ▪ Habitat fragmentation
Monarch Butterfly *Danaus plexippus*	FC / SC	▪ Columbia Plateau ▪ Blue Mountains ▪ Okanogan ▪ East Cascades	Typically occur in field margins where milkweeds grow, also near wetlands and riparian areas.	44,300,000 (including introduced populations)[u]	Unknown	Decline[d]	Decline[d]	▪ Lack of information ▪ Education needs ▪ Habitat loss

[164] Also known as a re-entrant, a draw is a terrain feature characterized by two parallel ridges with low ground in between them. The low ground area itself is the draw. Draws are similar to valleys but on a smaller scale. While valleys run parallel to a ridgeline, draws are perpendicular to the ridge and rise with the surrounding ground, often disappearing upslope.

Species[a]	Federal / State Listing[a]	Ecoregions[b,c]	Habitat[b]	Total Abundance	Abundance in Washington	Short-Term Trends	Long-Term Trends	Threats[b]
Western Bumble Bee *Bombus occidentalis*	90d / SC	▪ Puget Trough ▪ West Cascades ▪ North Cascades ▪ East Cascades ▪ Columbia Plateau ▪ Canadian Rocky Mountains	A generalist that is typically associated with meadows, grasslands, and forests.	Unknown	Unknown	Decline[d]	Decline[d]	▪ Lack of information ▪ Agriculture practices
Beller's Ground Beetle *Agonum belleri*	NA / SC	▪ Puget Trough	Only inhabits sphagnum bogs at mid-low elevation in the Puget lowlands.	20 to 30 populations[b]	Unknown	Unknown[b]	Unknown[b]	▪ Habitat degradation ▪ Lack of information
Mann's Mollusk-eating Ground Beetle *Scaphinotus mannii*	NA / SC	▪ Columbia Plateau	Inhabits shrub-dominated springs and damp areas in canyons amongst the Snake River drainage.	<10 populations[b]	Unknown	Unknown[b]	Unknown[b]	▪ Habitat loss (from reservoirs) ▪ Agricultural practices ▪ Lack of information
Columbia River Tiger Beetle *Cicindela columbica*	NA / SC	▪ Columbia Plateau	Uses sandbars in the Columbia and Snake River systems that are not affected by high water levels.	Unknown[b]	Unknown [b]	Unknown[b]	Unknown[b]	▪ Habitat loss (from reservoirs) ▪ Lack of information
Hatch's Click Beetle *Eanus hatchii*	NA / SC	▪ Puget Trough	Obligate of small sphagnum bogs found in small watersheds.	Unknown (only known from four bogs)[b]	Unknown[b]	Decline[b,c]	Decline[d]	▪ Habitat degradation
Columbia Clubtail *Gomphurus lynnae* (dragonfly)	NA / SC	▪ Columbia Plateau	Inhabits slow moving rivers with muddy or sandy banks, and gravelly rapids. Only one known population in Washington	Unknown[d]	Unknown - one known population[b]	Relatively Stable[d]	Unknown[d]	▪ Habitat degradation ▪ Small population size ▪ Habitat loss
Pacific Clubtail *Phanogomphus kurilis* (dragonfly)	NA / SC	▪ West Cascades ▪ Puget Trough	In Washington, inhabits lakes and large ponds with sandy to muddy substrates.	Unknown[d]	Unknown – two to three populations[b]	Decline[b]	Unknown[d]	▪ Habitat degradation ▪ Small population size ▪ Habitat loss
Sand-verbena Moth *Copablepharon fuscum*	NA / SC	▪ Puget Trough	Requires coastal dune sites that are non-stabilized, and support sand verbena, its host plant.	Unknown[d]	Unknown – five populations[b]	Decline to Relatively Stable[d]	Decline[d]	▪ Habitat loss ▪ Small population size ▪ Habitat degradation
Yuma Skipper *Ochlodes yuma*	NA / SC	▪ Columbia Plateau	Inhabits marshes in the Columbia Basin that support its hostplant, native common reed.	Unknown[d]	Unknown – three to five populations[b]	Decline[b]	Unknown[d]	▪ Lack of information ▪ Habitat loss ▪ Invasive species
Makah Copper *Tharsalea mariposa makah*	NA / SC	▪ Northwest Coast	Requires coastal *Sphagnum* bogs that support bog cranberry, its hostplant.	Unknown	Unknown - 10 to 15 populations[b]	Decline[b]	Unknown	▪ Habitat loss ▪ Habitat degradation ▪ Climate change ▪ Lack of information
Chinquapin Hairstreak *Habrodais grunus herri*	NA / SC	▪ West Cascades	Requires its host plant, golden chinquapin. Spends most of its life in its canopy.	Unknown	Unknown – one to two populations[b]	Decline[b]	Unknown	▪ Lack of information ▪ Habitat loss ▪ Small population size
Johnson's Hairstreak *Callophrys johnsoni*	NA / SC	▪ Puget Trough ▪ Northwest Coast	Mature forests that support its host plant, dwarf mistletoe, which grows on western hemlock.	Unknown	Unknown – five to 10 populations[b]	Relatively Stable[d]	Decline[d]	▪ Habitat loss ▪ Lack of information

Species[a]	Federal / State Listing[a]	Ecoregions[b,c]	Habitat[b]	Total Abundance	Abundance in Washington	Short-Term Trends	Long-Term Trends	Threats[b]
Juniper Hairstreak *Callophrys gryneus* (Columbia Basin segregate)	NA / SC	▪ Columbia Plateau	In Washington, inhabits shrubsteppe in the Columbia Basin where its host plant western juniper occurs.	Unknown	Unknown – five to 10 populations[b]	Unknown	Unknown	▪ Lack of information ▪ Habitat loss
Puget Blue *Icaricia icarioides blackmorei*	NA / SC	▪ Northwest Coast ▪ Puget Trough	Inhabits low-elevation grasslands and sub-alpine meadows, host plants are sickle-keeled and broadleaf lupine.	Unknown	Unknown – seven to 10 populations[b]	Decline[b]	Unknown	▪ Lack of information ▪ Invasive plant species ▪ Habitat loss
Valley Silverspot *Speyeria zerene bremnerii*	NA / SC	▪ Puget Trough ▪ Northwest Coast	Restricted to meadows and grasslands in western Washington Olympic Mountains and Puget Sound area. Larval hostplant is early blue violet (*Viola adunca*)	Unknown	Unknown - 10 to 15 populations[b]	Decline[b]	Unknown	▪ Invasive plant species ▪ Lack of information ▪ Habitat degradation
Silver-bordered Fritillary *Boloria selene atrocostalis*	NA / SC	▪ Columbia Plateau ▪ Okanogan	Restricted to *Sphagnum* bogs and fens in the Columbia Basin. Larval hostplant is a species of violet.	Unknown	Unknown - 15 to 20 populations[b]	Decline[b]	Unknown	▪ Overgrazing by livestock ▪ Invasive plant species ▪ Habitat loss ▪ Habitat degradation
Great Arctic *Oeneis nevadensis gigas*	NA / SC	▪ Puget Trough	Inhabits open forest edges, meadow edges, and rocky slopes. Host plant is an unknown grass.	Unknown	Unknown – one population[b]	Unknown	Unknown	▪ Lack of information ▪ Small population size ▪ Habitat loss

Notes:

(a) WDFW 2024m
(b) WDFW 2015
(c) BirdWeb 2005
(d) NatureServe 2024
(e) Smith et al. 2024
(f) Lewis 2019
(g) USFWS 2003
(h) Wiles et al. 2023
(i) Akins 2016
(j) Hayes and Gallie 2024
(k) Hayes and Wiles 2013
(l) USFWS 2011
(m) WDFW 2013
(n) Cassola 2016
(o) Cornell Lab 2024
(p) Desimone 2016
(q) Stinson and Schroeder 2012
(r) Watson and Azerrad 2024
(s) Rosenberg et al. 2016
(t) Altman et al. 2020
(u) IUCN 2024
(v) Rosenberg et al. 2019
(w) Larsen et al. 2004
(x) OWI n.d.
(y) Hallock et al. 2017
(z) WDFW 2012b
(aa) Linders et al. 2020
(bb) Hays and Stinson 2019
(cc) Potter 2016
(dd) Combs et al. 2023

90D = USFWS has made a 90-day finding that listing may be warranted; BBS = breeding bird survey; FC = federally listed candidate; FE = federally listed endangered; FT = federally listed threatened; NA = not applicable SC = state candidate for listing; SE = state-listed endangered; SS = state sensitive species; ST = state-listed threatened; 90d = USFWS has made a 90-day finding that listing may be warranted

3.6.2.2 Fish

Habitat

Washington supports diverse fish habitat that includes marine waters, estuaries, wetlands, rivers, lakes, and streams. There are approximately 8,000 lakes, 113,361 km (70,439 miles) of river and nearly 4,828 km (3,000 miles) of saltwater shoreline (Wydoski and Whitney 2003; NWSRS n.d.). The number of fish species is generally lower in headland streams at higher elevations and increases downstream, with larger streams and rivers having more diverse habitats (Wydoski and Whitney 2003).

Freshwater

Major Subregions

The United States is divided and sub-divided into hydrological units. At each level, beginning with the region, the drainages are described with a two-digit hydrologic unit code (HUC). Hydrographic regions are identified by a two-digit HUC, subregions are four digits (HUC4), basins are six digits (HUC6), subbasins are eight digits (HUC8), watersheds are 10 digits (HUC10), and subwatersheds are 12 digits (HUC12). The 16 subregions (HUC4) in Washington help in managing and studying the water resources in the state. See Section 3.4, Water Resources, subsection 3.4.2 for more details.

Washington has 10 ecological drainage units that provide a means of characterizing and assessing ecological components within defined hydrological systems: Lower Fraser, Puget Sound, Olympic-Chehalis, Lower Columbia, Yakima-Palouse, Okanogan, Great Lakes/Columbia Mountains, Clark Fork, John Day-Umatilla, and Grande Ronde (Washington Biodiversity Council 2007). There are also eight salmon recovery regions in the state that aid in recovery planning and implementation: Hood Canal, Puget Sound, Washington Coast, Lower Columbia River, Middle Columbia River, Upper Columbia River, Northeast Washington, and Snake River.

Lakes and Rivers

Washington has approximately 113,361 km (70,439 miles) of river, of which 399.4 km (248.2 miles) are designated as wild, scenic, and/or recreation including Illabot Creek, Klickitat River, Middle Fork Snoqualmie River, Pratt River, Skagit River, and White Salmon River.

The Columbia River is the principal river in the U.S. Pacific Northwest. The Columbia River estuary has a tidal zone that extends 233 km (146 miles) upstream, and the saltwater influence extends 48 km (30 miles) (WDFW 2024n). Major tributaries to the Columbia River include the Klickitat River, Yakima River, Palouse River, Lower Crab Creek, Wenatchee River, Entiat River, Methow River, Okanogan River, Sanpoil River, Spokane River, and Pend Oreille River. There are also rivers that flow into Puget Sound, including the Nisqually, Puyallup, Skykomish, and Skagit Rivers. Other rivers that flow into the Pacific Ocean include the Nooksack River, which flows into the Strait of Georgia, and the Quinault and Chehalis Rivers, which flow directly into the Pacific Ocean (Wydoski and Whitney 2003).

Large lakes and reservoirs in Washington include Ozette Lake, Lake Crescent, Lake Chelan, Banks Lake, Potholes Reservoir, Lake Sacajawea, Lake Washington, Lake Quinault, Lake Wenatchee, Ross Lake, Lake Roosevelt, Banks Lake, and Riffe Lake.

The DNR uses water typing to classify streams and other waterbodies to identify whether streams and waterbodies are used by fish and whether these streams experience perennial or seasonal flow (DNR 2024). Water typing also helps identify the amount of riparian buffer protection required during forest practice activities. The Washington water typing classification system is presented in **Table 3.6-4**.

Table 3.6-4: Water Typing in Washington State

Type	Name	Definition
Type S (formerly type 1)	Shoreline	Streams and waterbodies that are designated “shorelines of the state” as defined in chapter 90.58.030 RCW.
Type F (formerly type 2 or 3)	Fish	Streams and waterbodies that are known to be used by fish or meet the physical criteria to be potentially used by fish. Fish streams may or may not have flowing water all year; they may be perennial or seasonal.
Type Np (formerly type 4)	Non-Fish	Streams that have flow year-round and may have spatially intermittent[165] dry reaches downstream of perennial flow. Type Np streams do not meet the physical criteria of a Type F stream. This also includes streams that have been proven not to contain fish using methods described in Forest Practices Board Manual Section 13.
Type Ns (formerly type 5)	Non-Fish Seasonal	Streams that do not have surface flow during at least some portion of the year, and do not meet the physical criteria of a Type F stream.
Type X	-	Symbol on DNR maps that identifies various water features (for example: irrigation ditches, sanitation ponds, pipeline, etc.), which are not part of the above classifications
Type U	-	Symbol on DNR maps that identifies unknown water features that need to be verified and identified on proposed forest practices activity maps.

Source: DNR 2024.
DNR = Washington State Department of Natural Resources; RCW = revised code of Washington

Riparian

Riparian areas are priority habitats in Washington and provide a large portion of the state’s fish and wildlife habitat (see Priority Habitat, below). In western Washington, these priority habitats are mostly forested, and the most abundant riparian areas occur in lower elevations floodplains (Quinn et al. 2020; WDFW 2024o). The WDFW defines riparian ecosystems as transitional between terrestrial and aquatic ecosystems, and they are distinguished by gradients in biophysical conditions, ecological processes, and biota (WDFW 2024o). Riparian ecosystems are areas through which surface and subsurface hydrology connects waterbodies with their adjacent uplands and include portions of terrestrial ecosystems that substantially influence exchanges of energy and matter with aquatic ecosystems (i.e., a zone of influence or sensitivity). The width of a riparian ecosystem is based on the zone of sensitivity, which is in turn based on the functions that affect aquatic habitats, including root strength, litter fall, coarse woody debris to stream, shading, and pollution removal (Quinn et al. 2020). In relation to fish, riparian ecosystems provide food and nutrient input, cover for fish in the form of large woody debris, regulate temperature by providing shade, and reduce contaminated materials or sediment. Riparian trees are important for the habitat of some fish species, such as chinook salmon (*Oncorhynchus tshawytscha*), because they provide large woody debris that contributes to channels and shading that moderates temperature (WDFW 2015).

Priority Habitat

The WDFW has developed a list of 16 priority habitats and four priority habitat features, for which conservation measures should be taken. These include both terrestrial and aquatic priority habitats. A priority habitat is a habitat type or unique feature on the landscape that provides substantial value to multiple wildlife species (WDFW

[165] As used in hydrology, refers to bodies of water that flow only during certain times of the year, typically after rainfall or snowmelt.

2008). Because of the importance of priority habitats to multiple species, the requirement to conserve these spaces, and the threat posed by development to these aquatic resources, priority habitats were identified as a constraint in this Draft Programmatic EIS.

This section includes freshwater aquatic-related priority habitats, summarized below; see Section 3.5, Vegetation for a description of terrestrial priority habitats.

- **Freshwater Wetland:** Fresh Deepwater: Transitional land between terrestrial and aquatic systems where the water table is usually at or near the surface of the land is covered by shallow water. Fresh deepwater habitats contain permanently flooded lands lying below the deepwater boundary of wetlands. Deepwater habitats include environments where surface water is permanent and often deep, so that water, rather than air, is the principal medium within which the dominant organisms live.
- **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- **Riparian:** The area adjacent to flowing or standing freshwater aquatic systems. Riparian habitat encompasses the area beginning at the ordinary high-water mark and extends to the portion of the terrestrial landscape that is influenced by, or that directly influences, the aquatic ecosystem.

General Aquatic Invertebrate Species

Washington State has identified 57 freshwater aquatic invertebrate species (both native and invasive), which includes 22 arthropod species, 25 crustacean species, and 19 mollusk species (WDFW 2024i). Of 29 species of arthropods (i.e., caddisflies, mayflies, and stoneflies) known to occur within Washington, 22 spend their developmental life stages within freshwater aquatic habit and then emerge during the adult stage to occupy terrestrial habitat (WDFW 2024k). The state has also identified 31 freshwater invasive invertebrate species (24 crustaceans and three mollusks) (WDFW 2024i, 2024o). However, for the majority of species identified, there is no data regarding distribution within Washington. All 31 invasive species have been classified as prohibited by the State of Washington. Both zebra mussel (*Dreissena polymorpha*) and quagga mussel (*Dreissena bugensis*) have been identified as invasive aquatic invertebrate species of greatest concern (WDFW 2024k). Neither species has yet been detected in watercourses in Washington. However, zebra mussels have been recorded in 2021 and 2023 in aquarium moss balls in retail pet and aquarium stores, and quagga mussels have been detected in the Snake River in Idaho, a watercourse that flows through Washington into the Pacific Ocean (WDFW 2023, 2024k).

Fish Priority Species

For this Draft Programmatic EIS, special status fish and freshwater invertebrate species are defined as one or both of the following:

- Listed under the federal ESA
- Listed by Washington State as endangered, threatened, sensitive, or candidate species

There are currently eight fish species in Washington that are federally listed as either threatened or endangered. **Table 3.6-5** summarizes special-status fish species and their abundance status, population status trends, and threats. This list includes freshwater and anadromous fish species but not marine fish species.[166] Anadromous fish are those that primarily occupy marine habitat but will migrate up freshwater rivers to spawn. Some of these species, such as chinook salmon, have specific populations that are federally listed. For example, there are four chinook salmon populations (populations 1, 2, 8, and 15) that are present in Washington and federally listed as threatened and one population (population 12) listed as endangered. Other fish species, such as green sturgeon (*Acipenser medirostris*), have federally listed populations (i.e., southern populations) of which some individuals may be present in Washington and are thus included.

Ten fish species are listed as sensitive or candidate species in Washington. Three of these species are state-listed as sensitive: margined sculpin (*Cottus marginatus*), Olympic mudminnow, and pygmy whitefish (*Prosopium coulterii*) (**Table 3.6-5, Figure 3.6-3**).

In general, the short-term and long-term trends of these species are in a state of decline or they are relatively stable. Threats include habitat degradation from various developments (dams, agriculture, aquaculture,[167] transportation crossings, culverts, and shoreline industry), poor water quality (increased turbidity, pH[168] changes but primarily increased water temperatures), and changes or altered flow regimes, including low summer flows (**Table 3.6-5**).

No freshwater invertebrate species are currently federally listed as either threatened or endangered in Washington State. However, three freshwater invertebrate species are listed as Candidate species at the state level (**Table 3.6-6**).

[166] Programmatic EIS documents address broad, overarching policies, plans, or programs rather than specific projects. Sea cables are considered to be too specific or detailed for the broad focus of this nonproject review. Additionally, sea cables, especially those that cross international water or state boundaries, may fall under different regulatory frameworks or jurisdictions, requiring separate, more specific environmental reviews. Lastly, the environmental impacts and technical considerations of sea cables can be significantly different from those of land-based transmission facilities. These differences might necessitate a distinct, focused EIS to adequately address the unique challenges and impacts. See Section 3.1.

[167] Cultivating aquatic organisms (e.g., fish or shellfish) for food.

[168] A system of measuring the acidity and alkalinity.

Table 3.6-5: Special Status Fish Species in Washington

Species	Federal / State Listing	Habitat	Total Abundance	Abundance in Washington	Short-Term Trends	Long-Term Trends	Threats
Bull trout (Population 2) *Salvelinus confluentus*	FT / SC	Estuary, Marine, Freshwater	100,000 to >1,000,000 globally	No data	Stable (in British Columbia, Canada)	Declining	Increased water temperature, altered runoff timing, increased winter/spring flood events, lower summer flows.
Bull trout (Population 3) *Salvelinus confluentus*	FT / SC	Estuary, Marine, Freshwater	100,000 to >1,000,000 globally	No data	Stable (in British Columbia, Canada)	Declining	Habitat degradation and fragmentation, poor water quality, and introduced non-native fish species.
Chinook salmon (Population 1) *Oncorhynchus tshawytscha*	FT / NA	Estuary, Marine, Freshwater	100,000 to >1,000,000 globally	Spring run populations extirpated	Decline of 10–30%	Declined	Dams, agriculture and aquaculture side effects, habitat loss or degradation from development, transportation crossings, culverts, shoreline industrial uses; increased freshwater temperatures, lower summer flows, increased winter/spring flood events.
Chinook salmon (Population 2) *Oncorhynchus tshawytscha*	FT / NA	Estuary, Marine, Freshwater	1,000 to 2,500	No data	Relatively Stable (<=10% change)	Decline of 80–90%	Dams, habitat loss or degradation from transportation crossings, water diversions and extractions; increased freshwater temperatures, lower summer flows, increased winter/spring flood events.

Species	Federal / State Listing	Habitat	Total Abundance	Abundance in Washington	Short-Term Trends	Long-Term Trends	Threats
Chinook salmon (Population 8) *Oncorhynchus tshawytscha*	FT / NA	Estuary, Marine, Freshwater	250 to 500	No data	Relatively Stable (<=10% change)	Decline of >90%	Dams, agriculture, habitat loss or degradation from development, transportation crossings, culverts, shoreline industrial uses; increased freshwater temperatures, lower summer flows, increased winter/spring flood events.
Chinook salmon (Population 15) *Oncorhynchus tshawytscha*	FT / NA	Estuary, Marine, Freshwater	10,000 to >1,000,000	10,000 to >1,000,000	Decline of 10–30%	No data	Dams, agriculture, habitat loss or degradation from development, transportation crossings, culverts, shoreline industrial uses; increased freshwater temperatures, lower summer flows, increased winter/spring flood events.
Chinook salmon (Population 12) *Oncorhynchus tshawytscha*	FE / NA	Estuary, Marine, Freshwater	2,500–10,000	No data	Decline of >30%	No data	Dams, agriculture, aquaculture side effects, habitat loss or degradation from development, transportation crossings, culverts, shoreline industrial uses; increased freshwater temperatures, lower summer flows, increased winter/spring flood events.

Species	Federal / State Listing	Habitat	Total Abundance	Abundance in Washington	Short-Term Trends	Long-Term Trends	Threats
Chum salmon (Population 2) *Oncorhynchus keta*	FT / NA	Estuary, Marine, Freshwater	10,000 to >1,000,000	9,500	Increase of >10%	Decline of 30–70%	Increased water temperature (freshwater and sea surface), increased winter/spring flood events, lower summer flows.
Chum salmon (Population 3) *Oncorhynchus keta*	FT / NA	Estuary, Marine, Freshwater	10,000 to >1,000,000	2,500 to 10,000	Relatively Stable (<=10% change)	Decline of >90%	Increased water temperature (freshwater and sea surface), increased winter/spring flood events.
Coho salmon (Population 1) *Oncorhynchus kisutch*	FT / NA	Estuary, Marine, Freshwater	1,000–2,500	1,000 to 2,500	Decline of >10%	Decline of >90%	Increased water temperatures (freshwater and sea surface), lower summer flows.
Eulachon smelt (Southern DPS) *Thaleichthys pacificus*	FT / NA	Estuary, Marine, Freshwater	No data	No data	Uncertain but likely relatively stable or slowly declining	Highly variable	Altered runoff timing and magnitude, increased water temperatures (fresh and ocean).
Green sturgeon (Southern DPS) *Acipenser medirostris*	FT / NA	Estuary, Marine, Freshwater	250 to 10,000	No data	Decline of 10–30%	Decline of 50–70%	Harvest-related risk and estuarine degradation are risks. Increased ocean temperatures and declines in pH.
Lake chub *Couesius plumbeus*	NA / SC	Freshwater	>1,000,000	No data	Relatively Stable (<=10% change)	No data	Water temperature, water levels, and turbidity; habitat loss or degradation.
Leopard dace *Rhinichthys falcatus*	NA / SC	Freshwater	No data	No data	Uncertain but likely relatively stable or slowly declining	No data	Increased water temperature, low summer flows, altered timing/magnitude of spring floods.

Species	Federal / State Listing	Habitat	Total Abundance	Abundance in Washington	Short-Term Trends	Long-Term Trends	Threats
Margined sculpin *Cottus marginatus*	NA / SS	Freshwater	10,000 to 100,000	No data	Decline of <30% to relatively stable	No data	Increased water temperature, loss of habitat or degradation.
Mountain sucker *Catostomus platyrhynchus*	NA / SC	Freshwater	100,000 to >1,000,000	No data	Decline of <30% to relatively stable	No data	Increased water temperatures, Altered flow regimes
Olympic mudminnow *Novumbra hubbsi*	NA / SS	Freshwater	2,500 to 100,000	2,500 to 100,000	Relatively Stable (<=10% change)	Decline of <30% to relatively stable	Increased High flood events
Pygmy whitefish *Prosopium coulterii*	NA / SS	Freshwater	No data	No data	Uncertain but likely relatively stable or slowly declining	No data	Increased water temperatures, altered fire regimes
River lamprey *Lampetra ayresii*	NA / SC	Estuary, Marine, Freshwater	>1,000,000	No data	Decline of <30% to relatively stable	No data	Increased water temperatures, low summer/fall flows, increased winter flood events
Sockeye Salmon (Population 1) *Oncorhynchus nerka*	FE / NA	Estuary, Marine, Freshwater	No data	No data	No data	Decline of >90%	Impaired mainstem and tributary passage, habitat degradation, historical commercial fishery, chemical treatment of Sawtooth Valley Lakes (Idaho).
Sockeye salmon (Population 2) *Oncorhynchus nerka*	FT / NA	Estuary, Marine, Freshwater	10,000 to 100,000	10,000 to 100,000	Increasing	No data	Aquaculture side effects and habitat degradation from land use.
Steelhead (Population 12) *Oncorhynchus mykiss*	FT / SC	Estuary, Marine, Freshwater	No data	No data	Decline of 10–30%	No data	Altered spring runoff timing and amount/magnitude, increased water temperature, lower summer flows.

Species	Federal / State Listing	Habitat	Total Abundance	Abundance in Washington	Short-Term Trends	Long-Term Trends	Threats
Steelhead (pop 13) *Oncorhynchus mykiss*	FT / SC	Estuary, Marine, Freshwater	10,000 to 100,000	No data	Unknown	Decline of >50%	Altered spring runoff timing and amount/magnitude, increased water temperature, lower summer flows.
Steelhead (Population 14) *Oncorhynchus mykiss*	FT / SC	Estuary, Marine, Freshwater	No data	No data	Decline of 10–30%	No data	Altered spring runoff timing and amount/magnitude, increased water temperature, lower summer flows.
Steelhead (Population 17) *Oncorhynchus mykiss*	FT / SC	Estuary, Marine, Freshwater	10,000 to >1,000,000	No data	Decline of 10–30%	No data	Altered spring runoff timing and amount/magnitude, increased water temperature, lower summer flows.
Steelhead (Population 37) *Oncorhynchus mykiss*	FT / NA	Estuary, Marine, Freshwater	No data	No data	No data	No data	Altered spring runoff timing and amount/magnitude, increased water temperature, lower summer flows. Increased flood events and associated sedimentation and/or scour.
Umatilla dace *Rhinichthys umatilla*	NA / SC	Freshwater	10,000 to >1,000,000	No data	Decline of 10–30%	No data	Lower Stream flows

Source: NatureServe 2024; WDFW 2024i

DPS = distinct population segment; FE = federally listed as endangered; FT = federally listed as threatened; NA = not applicable; SC = State Candidate for Listing; ST = state-listed as threatened; SS = state-listed sensitive species

Table 3.6-6: Special Status Aquatic Invertebrate Species in Washington

Species[a]	Federal / State Listing[a]	Habitat[b]	Total Abundance	Abundance in Washington State	Short-Term Trends	Long-Term Trends	Threats[b]
Ashy pebblesnail *Fluminicola fuscus*	NA / SC	Occurs under rocks and on vegetation in cold, clear streams, in areas with slow to rapid current speeds.	Unknown[c]	Unknown	Decline[c]	Decline[b c]	▪ Habitat degradation ▪ Habitat loss ▪ Lack of information
California floater mussel *Anodonta californiensis*	NA / SC	Inhabits lakes, reservoirs, and pools in rivers. Prefers sand and silt substrates	100,000 to >1,000,000[c]	Unknown	Decline[c]	Decline[c]	▪ Habitat degradation ▪ Habitat loss ▪ Lack of information
Shortface lanx *Fisherola nuttalli*	NA / SC	Found in large streams and rivers with cobble-boulder substrates, where they live on rocks typically downstream of rapids.	Unknown (probably low)[b]	Unknown	Decline[b]	Decline[c]	▪ Habitat degradation ▪ Habitat loss ▪ Lack of information

Notes:
[a] WDFW 2024 h,l,
[b] WDFW 2015,
[c] NatureServe 2024
NA = not applicable (No Listing); SC = State Candidate for Listing

3.6.2.3 Migration Routes and Corridors

Many of Washington's fish and wildlife species are migratory, moving between ecoregions to access the habitats required for their natural history. Migrations can cover distances exceeding hundreds of miles, such as the spring and fall bird migrations or salmon migrations to and from natal grounds. Other fish and wildlife movements or migrations may be shorter—for example, amphibians moving 1.6 to 3.2 km (1 to 2 miles) between natal ponds and upland living habitat. Both long and short migrations often follow routes that have been established by populations over several generations using landscape features, important stopping locations, available microhabitats, and other cues (e.g., electromagnetic). Information on where these movement corridors are or could be is variable, with some routes being well documented but many poorly understood. The following sections provide descriptions of some of the movement corridors and migration routes in Washington.

Aerial (Birds, Bats, and Monarchs)

Washington lies within the Pacific Flyway[169] bird migration route. The Pacific Flyway extends from Alaska to Patagonia and connects summer and winter grounds along the western portion of the continent (Newcombe et al. 2019). In Washington, the Pacific Flyway extends from the Pacific Ocean to the Rocky Mountain Range. Birds that migrate along this route require stopover locations during their migration, which can be found statewide (Audubon Washington n.d.). One stopover location is Grays Harbor National Wildlife Refuge in western Washington, which supports large congregations of shorebirds and waterfowl, such as snow geese (*Anser caerulescens*), black-bellied plovers (*Pluvialis squatarola*), dunlins (*Calidris alpina*), and western sandpipers (*Calidris mauri*) as they rest during their migration north in the spring, and south in the fall (Audubon n.d. 2024). Similarly, locations such as the WDFW Sunnyside-Snake River Wildlife Area support large concentrations of migrating sandhill crane (WDFW 2021).

Bats migrate during spring and fall, but their migratory routes are poorly understood. Hoary bats (*Lasiurus cinereus*) and silver-haired bats (*Lasionycteris noctivagans*) are long-distance migrants that overwinter in southern North America. In addition, several of the 15 bat species in Washington are thought to be short-distance migrants that move to winter roosts at a different elevation with suitable hibernation temperatures (Hayes and Wiles 2013; Weller et al. 2016).

Monarch butterflies typically arrive in Washington in June, where they lay eggs that will hatch in the summer (Xerces Society 2018, 2019). Summer adults migrate south to California in late summer/early fall. This species relies on milkweed plants during its migration, which typically occur in the Columbia Plateau in Washington.

Land

Terrestrial wildlife species, including mammals, reptiles, and amphibians, seasonally move across the landscape to access breeding, foraging, and hibernating habitat. These movements vary depending on the species and season and are generally poorly recorded.

A statewide analysis of landscape connectivity was published by the Washington Wildlife Habitat Connectivity Working Group (WHCWG) in 2010, the results of which led to region-specific analyses for the Columbia Plateau Ecoregion, Coastal Washington, and Transboundary movements.[170] The WHCWG developed a habitat

---

[169] A path that is annually flown by migratory birds.

[170] Movement across different boundaries; in the context of wildlife studies, transboundary movement refers to movement across ecoregion boundaries..

connectivity tool that models potential wildlife movement corridors in the landscape. The model considers parameters such as habitat (e.g., habitat concentration area[171]), landscape integrity (i.e., areas with limited human impact), and existing barriers to wildlife movement (WHCWG 2024a).

Landscapes in montane regions of Washington, such as the Cascade Range, are relatively intact and provide general connectivity north-south along the range. Wildlife movement in this area is generally affected by linear features such as road networks (WHCWG 2012). Modeled least-cost paths and corridors create a braided network in western Washington, connecting the Cascade Mountains to the west coast (WHCWG 2024b). These routes are fairly contiguous except when bisected by road networks and urban centers such as Olympia and Centralia. Notably, connectivity is currently impacted in this region by US Highway 12, Interstate 5, and State Route 8 (WHCWG 2024b). Conversely, habitat connectivity in the Columbia Plateau Ecoregion has been fragmented by land development limiting movement corridors to narrow bands between patches of remanent habitat[172] (WHCWG 2012). Modeled least-cost paths and corridors create a braided network in western Washington, connecting the Cascade Mountains to the west coast (WHCWG 2024b). These routes are fairly contiguous except when bisected by road networks and urban centers such as Olympia and Centralia. Notably, connectivity is currently impacted in this region by US Highway 12, Interstate 5, and State Route 8 (WHCWG 2024b). Movement between Washington and British Columbia is generally unrestricted, with large concentrations of unfragmented habitat along the Cascade/Coastal range and Purcell Mountains (Conservation Biology Institute 2024). However, movement corridors in the central part of Washington into the Okanagan region of British Columbia are more restricted (Conservation Biology Institute 2024).

The Washington State Department of Transportation has mapped and prioritized roadway habitat connectivity investments throughout the state. While this program does not identify wildlife movement corridors, it does identify areas of higher priority to improve wildlife habitat connectivity and reduce road-based mortality. High-priority areas are located throughout the state, but longer segments are concentrated in the Cascade Range, north of Olympic National Park, along the western edge of the Columbia Plateau, and north of Spokane (WSDOT 2024).

Aquatic (Fish)

For anadromous fishes, such as salmon, the Columbia and Snake Rivers, as well as other smaller coastal streams, are important migration corridors that provide direct access to the ocean. Construction of obstacles that limit migration (such as dams) has affected the distribution and survival of salmon stocks. The mainstem of the Columbia River has 11 dams in Washington, while the Snake River has four dams in Washington. To pass these dams, salmon must navigate through fishways (if the dam has one) to get to their natal streams. Timing of migration for salmon depends on species' life history strategy, population, and location. Some populations of salmon are spring-run or fall-run populations, meaning that adults enter freshwater in either spring or fall on their way to their natal spawning grounds (WDFW 2015). Some juvenile salmon out-migrate to estuaries or to the ocean shortly after emergence, or they can rear for several years in freshwater before migrating out to the ocean, which can begin in late winter extending into the summer (WDFW 2015). For some populations, their natal streams are in other states (e.g., Idaho), and Washington is mostly a migration corridor to their spawning grounds (e.g., sockeye salmon [*Oncorhynchus nerka*] population 1), while others have short migrations (e.g., sockeye

---

[171] A model variable specific to the Washington Habitat Concentration Working Group's modeling of habitat connectivity. Habitat concentration areas are described as areas which are important or suspected to be important to a species of focus based on surveys or modelling data (WHCWG 2012).

[172] An area of land that retains its original natural vegetation and ecological characteristics, having avoided significant disturbance from human activities such as agriculture, urban development, or logging.

salmon population 2 through the Ozette River to hold in Ozette Lake) (NOAA Fisheries 2015; WDFW 2015). Other fish that use the lower portion of the Columbia River for migration include eulachon smelt and green sturgeon. Similarly, river lamprey (*Lampetra ayresii*) migrate to saltwater in late spring/early summer and back to freshwater to spawn in April to June. Some resident freshwater fish also demonstrate spawning migrations between lakes and rivers or within rivers; these include mountain sucker (*Catostomus platyrhynchus*) and lake chub (*Couesius plumbeus*), which may migrate up to 1 mile between spawning and non-spawning habitat (WDFW 2015).

3.6.3 Impacts

Transmission facilities have various effects on wildlife populations. This section summarizes the impacts of transmission facilities on wildlife, biological factors that contribute to impacts, transmission facility features that contribute to impacts, and how transmission facility corridors and structures may occasionally benefit wildlife.

Impacts on wildlife, including fish, from transmission facilities can be broadly grouped into five general categories: direct habitat loss, indirect habitat loss (disturbance), mortality, barriers to movement, and habitat fragmentation. These broad categories of impacts can be further refined as impacts on wildlife through changes to home range[173], changes in reproductive success, changes in behavior, changes in gene flow, changes in predator/prey dynamics, and changes in mortality rates (Biasotto and Kindel 2018). Cumulatively, these changes can alter wildlife population dynamics through establishment of new populations (e.g., invasive plants), increase or decrease in existing population size, isolation of populations, and extirpation (Biasotto and Kindel 2018). These population changes could result in ecosystem or landscape-level changes to species biodiversity and abundance.

The subsequent sections discuss these five impact categories as they apply to each stage of a transmission facility. They also discuss how these five general impacts could impact birds, mammals, amphibians, reptiles, invertebrates, fish, special status species, and movement corridors.

3.6.3.1 Method of Analysis

The Study Area for a project-specific application would typically encompass several key regions and features, such as the following:

- **Project Site and Immediate Vicinity:** Specific location of the project and the surrounding area that might be directly affected by construction, operation and maintenance, and upgrade or modification activities.
- **Protected Areas:** Nearby protected areas that could be affected by the project, such as wildlife preserve, refuge, or conservation area.
- **Aquatic Ecosystems:** Any adjacent rivers, streams, lakes, wetlands, or other waterbodies that could be impacted by the project.
- **Critical Habitat:** Areas designated as critical habitat under the ESA for endangered or threatened species.
- **Sensitive Species Habitat:** Habitats important to the survival of state or federally listed sensitive and priority species. These could include identified core habitats, breeding grounds, nesting sites, overwintering sites, and feeding area

[173] The typical range that an animal will occupy throughout its life.

- **Migration Corridors:** Routes used by wildlife for migration that might be disrupted by the project.

This Draft Programmatic EIS analyzes the affected environment and impacts on habitat, fish, and wildlife within the Study Area defined in Chapter 2. Three project phases for each transmission facility type were considered: construction, operation and maintenance, and upgrade or modification.

This evaluation considers overhead transmission facilities and underground transmission facilities separately for each phase. Overhead transmission facilities consist of transmission lines and substations and similar ancillary infrastructure. Overhead transmission facilities also incorporate aboveground infrastructure that may be associated with underground transmission facilities. Underground transmission facilities consist of underground transmission lines, underground access vaults, and other below-ground infrastructure. The construction of underground transmission facilities includes open trench, trenchless, and underwater construction methods.

Potential interactions between a transmission facility project and wildlife and habitat during construction, operation and maintenance, and upgrade or modification were identified based on information obtained from a review of literature and published information. The discussion of impacts is qualitative given the high-level nature of a Programmatic EIS; quantification would require specific project details to analyze. Information reviewed to identify impacts on habitat, wildlife, and fish in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping. The analysis of impacts and characterization of probable adverse impacts is organized by project phase (i.e., construction, operation and maintenance, and upgrade or modification), overhead and underground transmission, and by impact category as follows:

- Direct habitat loss (permanent and temporary): occurs when habitat is removed to construct or operate a transmission facility project (i.e., footprint loss). Direct habitat loss can be permanent if it is replaced by project components such as transmission facility towers or substations, or it can be temporary if it is required for short-term activities (e.g., construction workspace) and is then restored. However, temporary direct habitat loss can be permanent if it exists in a sensitive ecosystem that will not recover in a reasonable amount of time, such as old growth forest and mature shrubsteppe.
- Indirect habitat loss: may occur due to project-related changes in habitat quality or wildlife use. Indirect habitat loss does not result in the removal of habitat (e.g., footprint loss), but rather in a change in the quality of habitat that may reduce its function for wildlife species (e.g., increased noise disturbance).
- Mortality: sources of wildlife mortality that could result from a transmission facility project include collisions, strikes, electrocution, interaction with toxic materials, and destruction of wildlife that becomes a nuisance.
- Barriers to wildlife movement: occur when project features prevent or change species’ ability to move across the landscape. Barriers can include physical constraints (e.g., fencing), as well as features that species may avoid crossing. Barriers to movement are considered qualitatively in this assessment based on existing literature, including modeled movement corridors.
- Habitat fragmentation: occurs when extensive, continuous tracts of habitat are divided into smaller, more isolated patches (Meffe and Carroll 1994; St-Laurent et al. 2009). The potential for transmission facility projects to fragment wildlife habitat was qualitatively analyzed using data on ecosystem distribution across the state.

Impact Determination

The discussion of impacts is qualitative given the high-level nature of a Programmatic EIS; quantification would require project-specific details to analyze. **Table 3.6-7** describes the criteria used to evaluate impacts from the Action Alternative and No Action Alternative. Information reviewed to identify impacts on wildlife resources in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping.

- Information on the affected environment and impacts provided in this section is based on data and scientific knowledge available at the time of writing. It is expected that the available science on species in Washington and impacts from transmission facilities will change over time. Given the broad nature of the Programmatic EIS and the variability of impacts across fish and wildlife populations, the impact determination is based on a worst-case scenario. That is, the rating has been assigned based on the species group that is expected to be most impacted by a transmission facility project.

Table 3.6-7: Criteria for Assessing the Impact Determination on Biological Resources

Impact Determination	Description
Nil	A project would have no foreseeable impact on wildlife habitat, wildlife movement, result in mortality or other adverse impacts related biological resources during any phase (e.g., construction, operation and maintenance, and upgrade or modification).
Negligible	A project would have minor, adverse impacts on wildlife populations and their habitat. A project would not change the natural variability in wildlife populations or result in impacts on special status species. Best management practices and design considerations are expected to be effective.
Low	A project would have adverse impacts on the viability of a wildlife population, even with the implementation of best management practices and design considerations. However, the impacts would be within the natural population variability and resiliency of a species and therefore not expected to impact the viability of the species or population of a long period of time. Impacts would be short term and nonsignificant.
Moderate	A project would have adverse impacts on wildlife, habitat, and fish, even with the implementation of best management practices and design considerations. A project would result in an incremental impact that results in a clearly defined change that could impact a wildlife population over shorter or longer periods of time; however, changes remain below the level of impact that would exceed the resiliency and adaptability of a species or population. Population levels may stabilize at a lower abundance than before the impact occurred. Moderate impacts may be long-term, occurring over one or more project phases. Moderate impacts have the potential to be significant.
High	A project would have adverse impacts on wildlife, habitat, and fish that are significant and potentially severe even with the implementation of best management practices and design considerations. A project would result in an incremental change that is sufficiently large that it is expected to exceed the resiliency and adaptability of the species or populations thereby potentially impacting the viability of the species or populations. High impacts could be permanent or continue for the duration of the project.

EIS = Environmental Impact Statement

To clearly understand the potential severity of impacts without any interventions, the following impact determinations exclude the use of avoidance criteria and mitigation measures. The ratings assume compliance with all federal, state, and local laws and regulations, as well as standardized BMPs and design considerations. Assessing impacts without avoidance criteria or mitigation measures offers a baseline understanding of potential environmental effects, helping to identify the true extent of these impacts. Environmental laws often require that initial impact assessments be conducted without considering mitigation to maintain the integrity of the environmental review process.

3.6.3.2 Action Alternative

Construction

Overhead Transmission Facilities

Activities during the construction phase of overhead transmission facilities would vary according to the scale of the facility and site characteristics. Construction could include a site preparation phase of relatively short duration (e.g., a few months), followed by a longer construction and start-up phase. It is assumed that the construction phase of overhead transmission facilities, per mile, would have a shorter duration than underground construction. Overhead transmission infrastructure could have the following impacts on habitat, wildlife, and fish during the construction phase:

- Direct Habitat Loss
- Indirect Habitat Loss
- Mortality
- Barriers to Movement
- Fragmentation

Direct Habitat Loss

Site clearing and grubbing is typically one of the most noticeable impacts of a project. Construction of overhead transmission facilities will require clearing of habitat for structure placement, access roads, right-of-way (ROW), and substations, which will have adverse impacts on birds, mammals, amphibians, reptiles, invertebrates, and fish. In general, direct habitat loss occurs early in the construction phase of a project, initiated by vegetation clearing and ground preparations, but the impacts continue through operation and maintenance until the project is removed and land restored.

Tall vegetation, such as shrubs and trees, is typically cleared from the width of the ROW. Complete clearing of the ROW for overhead transmission facilities may not be required in habitats that are naturally devoid of trees, such as talus, shrubsteppe, and meadows. Typical ROW width is 40 to 60 meters (130 to 200 feet), for transmission facilities of at least 230 kV (Nextgen Highways 2023).

In general, direct habitat loss is expected to be more pronounced in the forested ecosystems primarily found in the western portion of the state, in ecoregions such as the Northwest Coast, Puget Trough, West Cascades, North Cascades, East Cascades, and Canadian Rocky Mountains. Naturally open ecosystems generally found in central and eastern Washington in the Columbia Plateau ecoregion and portions of the Blue Mountains ecoregion are likely to be less impacted by direct habitat loss because portions of these habitats can be spanned by transmission lines without a regularly cleared ROW.

Habitat loss can generally be classified as permanent, temporary, or modified. Permanent habitat loss occurs in infrastructure footprint, such as pole or tower locations, substations, and access and maintenance roads. Habitat permanently lost would not be available to wildlife for the duration of operation. Temporary habitat loss includes areas required for project construction that can be restored post-construction, such as construction laydown areas, construction roads, and worker camp sites. Temporarily lost habitat can be restored post-construction; however, the duration for ecosystems to re-establish varies depending on ecosystem type. Some ecosystems such as old growth and mature shrubsteppe may never recover, making habitat loss permanent. Modified habitat includes areas under a transmission line that would be altered to accommodate the ROW but would continue to be available for wildlife in a different state. For example, where a transmission line bisects forested areas, trees will be removed and replaced by grass, forb, or low shrub habitat, which can change habitat suitability for some wildlife species, depending on their life requisites.

The extent of the direct habitat loss would vary depending on project siting and would only be measurable once a project has been proposed. It is expected that the areas cleared for construction of transmission facilities would be approximately 40 to 60 meters (130 to 200 feet) wide. The following section describes the general impacts of direct habitat loss on wildlife groups.

Birds

Direct habitat loss associated with transmission facilities can result in the loss of nesting habitat, foraging areas, and stopover habitat for migrating bird species. Native vegetation that may support food production or be important for insect or mammalian prey may be removed or altered, resulting in a loss or change of food availability (Narango et al. 2017). Birds occur in a variety of habitat types throughout Washington; however, the impact of direct habitat loss is expected to be more pronounced for birds associated with forested habitat, such as northern goshawk, and birds with limited habitat range in the state, such as greater sage-grouse (Staude et al. 2019; Betts et al. 2022).

Clearing forest habitat removes the structural complexity required by forest-dwelling birds for life requisites such as nesting, as is the case for northern spotted owl (Chamberlain et al. 2021). This habitat would be replaced by open grass, forb, or shrub habitat under the transmission line that would likely not provide all the habitat components required to support forest-dwelling birds.

Removal of habitat that supports bird species with small ranges in Washington or birds that occupy specific habitat types (e.g., sand dunes) could result in a disproportionate impact on these species as they may not be able to relocate away from the impacted area. Many birds that have small ranges in Washington or rely on specific habitat types are federally or state listed and are therefore discussed under Special Status Species, below.

Some bird species, such as American white pelican, great blue heron, and some grouse species, concentrate at specific locations during mating and nesting (Larsen et al. 2004; WDFW 2015). Removal of unique habitat features, such as lek sites or breeding colonies, would have a larger effect on these populations than removing equal amounts of habitat in other parts of their range (Larsen et al. 2004). Similarly, snags and trees with cavities provide unique nesting sites for birds but are often removed during project construction as they are considered hazard trees (James 1984). Cavity-nesting birds, like pileated woodpeckers, create nesting cavities that can be used in the future by other species, such as Barrow's goldeneye (*Bucephala islandica*) (Ducks Unlimited Canada 2008). These unique habitat features are generally limited on the landscape, and their removal could result in local population declines (James 1984).

Birds that occur in urban areas or open habitats, or that are habitat generalists, would be less impacted by direct habitat loss during construction than birds that occur in forested habitat or require specific habitat features (e.g., colonial nesters). Direct habitat loss in urban areas and open habitats would be limited to infrastructure footprints as clearing and grubbing of the entire ROW is not expected to be required. Generalist species can adapt to new habitat types and are more likely to use modified habitat within a transmission facility ROW (Shurtliff and Whiting 2021).

Loss of staging grounds and stopover sites where migratory birds rest, refuel, and sometimes molt during their journeys between breeding and wintering grounds can be detrimental to bird populations. These areas are important for the survival of many bird species, as they provide the necessary resources for birds to regain energy and prepare for the next leg of their migration (Warnock 2010).

The impact of direct habitat loss on birds would depend on the habitat type impacted, the extent of habitat impacted, and the species of bird impacted. The impact of habitat loss could vary from negligible for facilities in urbanized or modified habitats to moderate for facilities in mature forest areas. Similarly, mobile species that are generalists, such as American crow, are not likely to be impacted by construction of a transmission facility, and therefore the impact would be negligible; however, the impact of habitat loss on species with a limited distribution or niche habitat requirements (such as the tricolored blackbird; *Agelaius tricolor*) could be moderate.

Mammals

The impact of vegetation clearing and grubbing on mammal species would vary by wildlife guild[174] and habitat type. Conversion of forested or dense shrub habitat could remove forage material and cover for mammals.

Small mammals, such as rodents and insectivores, use shrubs and woody debris as cover from predators (Weldy et al. 2019). Clearing the ROW, particularly in forested and shrub habitats, is expected to remove cover objects required by small mammals, thereby modifying habitat for this group of animals. This effect is expected to be less pronounced in naturally open habitat where direct habitat loss would be generally limited to infrastructure footprints. In open habitat, project construction could remove microhabitat features, such as small mammal burrows; however, it is expected that small mammals could reestablish these features post-construction. Small mammal communities can be robust in transmission facility ROWs with well-managed vegetation (Fortin and Doucet 2008).

Medium-sized mammals, such as martens, that occur in forested habitat require the structural complexity of these habitats to provide tree cavities for denning, cover from predators, and access to prey (Stone 2010). Clearing trees would remove these microhabitat features required for medium size mammals. Construction of transmission facilities in open habitats could remove burrows; however, it is expected that mammals can re-establish these features after construction.

Large mammals, such as bears and ungulates,[175] generally range widely over the landscape to access different habitats for specific life requisites (e.g. denning, foraging) (Lyons et al. 2003; Eggeman et al. 2016; Borowik et al. 2020). Large mammals may use a variety of habitats, from forests to alpine meadows to valley bottoms, depending on seasonal requirements. Direct loss of forested habitat is expected to have a more pronounced impact on ungulates that require the tree canopy for snow interception in winter (Merems et al. 2022). Conversion of forest to grass, forb, or shrub habitat may increase foraging opportunities for some species, such as bears and ungulates (Bartzke et al. 2014). Direct loss of habitat in open areas is not expected to substantially reduce the availability of large-mammal habitat.

The impact of direct habitat loss on mammals would depend on the habitat type impacted, the extent of the impact, and species of mammals impacted. It is expected that the impact might range from negligible to

[174] A group of species that is similar in a specific way, such as in acquiring nutrients, habitat requirements, or in movement mechanisms.

[175] A mammal with hooves, including deer, moose, elk, and caribou.

moderate. Generalist mammal species that can re-establish in ROWs, such as some species of rodent, would likely be less affected than mammal species that rely on mature forests

Amphibians and Reptiles

Vegetation clearing and grubbing during construction can result in direct habitat loss for amphibians and reptiles. Amphibians require specific habitats for breeding (moist areas and aquatic breeding sites), summer foraging habitat, and overwintering sites (Merrell 1977). Direct loss of habitat required for one of the amphibian life requisites can impact local populations. In addition, some amphibian populations, such as Larch Mountain salamanders, have small ranges, which makes them vulnerable to habitat loss (WDFW 2015).

Similar to amphibians, reptiles use different habitats in winter and summer. Loss of one of these habitats can impact reptile populations. Loss of microhabitat features, such as rock crevices, debris piles, or talus that are used as hibernacula, can have a disproportionate effect on reptile populations as these features are critical to reptile lifecycles and are typically limited on the landscape (Lesbarrères et al. 2014).

The impact of direct habitat loss on amphibians and reptiles would depend on the site characteristics (disturbed or undisturbed) and the species present. The impact of habitat loss could range from nil for projects that do not interact with amphibian and reptile habitat, including projects located in urban or previously highly disturbed areas without features required by amphibians and reptiles to moderate for projects that occur in undisturbed habitats that contain unique features that support amphibian and reptile life requisites such as wetlands, talus slope, and streams.

Invertebrates

Terrestrial invertebrates occupy all terrestrial ecosystems in Washington, and the extent of habitat loss on this group would depend on habitat requisites. Species that occur in forest and shrub ecosystems, as well as those that require small, unique habitats, such as vernal pools, are likely to be more impacted by direct habitat loss than species that occupy open areas (Parks Canada Agency 2005). Transmission line corridors can occasionally provide habitat for invertebrates. Two taxa that have been observed to increase in richness and abundance near transmission facilities are butterflies and bees. Management activities by utility companies typically keep vegetation at an early successional stage,[176] providing favorable conditions for these insects, which rely on floral resources (Berg et al. 2016; Wagner et al. 2019). Regardless of location, the extent of the impact of direct habitat loss on invertebrate populations is expected to vary depending on the time of year clearing and grubbing is conducted. For example, loss of floral resources during summer months would be expected to have a greater effect on pollinators that rely on these resources.

The impact of direct habitat loss on invertebrates would depend on site characteristics (forested vs open), timing of construction activities, and the species present. The impact of habitat loss could range from nil for species adapted to open ecosystems and those that require flowering plants that grow in ROWs, to moderate for invertebrates adapted to forested or shrub environments, rely on rare host plants, and/or have niche habitat requirements.

[176] First stages after disturbance of an ecosystem (e.g. clearing or fire) where plants and animals first start recolonizing an area.

Movement Corridors

Movement corridors are the routes that wildlife use when crossing the landscape to access other habitats or habitat patches.[177] Wildlife may move across the landscape seasonally to access breeding grounds and hibernation sites or within seasons to follow changes in food sources. Movement distances vary widely across species, with smaller animals, such as amphibians (Develop with Care 2014), moving up to several miles and large animals, such as ungulates, moving several hundred miles (van de Kerk et al. 2021). Movement may also be elevational, with animals moving between high-elevation habitat and valley bottoms (Seip and Jones 2013). Elevational movements may be undertaken to access calving grounds, access available food (e.g., berries), and avoid deep snow cover.

Wildlife movements on the landscape can follow the same or similar routes seasonally or annually. An example is the Pacific Flyway, which is the route followed by many bird species when migrating between winter and summer grounds (Newcombe et al. 2019). These corridors provide important linkages between habitats that, if lost, can result in habitat fragmentation and barriers to movement.

Construction of transmission facilities in wildlife movement corridors can result in loss of habitat and microhabitat features that support how these corridors function. For example, smaller wildlife may use shrub cover and woody debris to provide shelter from predators when moving across a landscape. Construction activities that remove these features, such as grubbing, may result in a loss or degradation of movement corridors.

Loss of habitat in migratory corridors during construction could be temporary if the habitat can be restored post-construction, or permanent if the area of loss occurs within a project footprint. Similar to loss of other habitat types, conversion of treed habitat or shrubsteppe habitat to low-growing vegetation under a transmission line could be considered a permanent loss of habitat for species that will not use open habitat for movement.

The impact of habitat loss in movement corridors would vary depending on the type of habitat being removed and the extent of similar habitat available to wildlife. For example, loss of habitat in the Pacific Flyway may have a negligible to low impact on migratory songbirds due to their high dispersal capabilities, while loss of habitat at a stopover location on the Pacific Flyway would result in a larger (moderate to high) impact on migrating birds. Removal of habitat along movement corridors used by reptile and amphibian species could result in moderate impacts on local reptile and amphibian populations as these species groups require connectivity between breeding and overwintering habitat to maintain populations.

Impact Determination: Depending on the scale of the facility and the site characteristics, the impact of direct habitat loss on birds, mammals, amphibians, invertebrates, and migration corridors, without mitigation measures incorporated, is anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fish

Direct loss of fish habitat is defined as the immediate and permanent loss or destruction of habitat, which can result from construction activities such as clearing of riparian zones and alteration of stream banks (WDFW 2019b). Riparian vegetation stabilizes watercourse banks, prevents bank erosion, and improves the quality of instream habitat such as spawning or feeding areas (Manitoba Hydro 2010). Loss or alteration of riparian habitat could reduce riparian functions and the services it provides for aquatic resources. These functions include litter

[177] Small areas of habitat. Typically used in the context of habitat loss, where only habitat patches remain.

fall, coarse woody inputs debris to stream, shading, and pollution removal (Beschta 1997; WDFW 2024o). Many of these functions also lead to indirect instream habitat loss, which is discussed in the next section. The type of vegetation that is effective in providing shade varies by riparian zone and stream size, as well as adjacent land use (e.g., agriculture, rangeland, forestry) (Beschta 1997). Construction of culverts and bridges for access roads can constrict watercourses and change flows, which can alter fish habitat. Disturbance to aquatic habitat also may be caused by the operation of construction vehicles or machinery in or near watercourses (Manitoba Hydro 2010).

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of direct habitat loss on fish, without mitigation measures incorporated, is anticipated to vary and could be nil to low.

<u>Special Status Species</u>

The causes of direct habitat loss for special status species are expected to be similar to those described above for other wildlife guilds. However, direct habitat loss may have a greater impact on special status species because their populations are already threatened due to human influence or limited range (WDFW 2015). Habitat loss and degradation is a threat to most special status species, such as northern spotted owl and chinook salmon (WDFW 2015). Other special status species occupy small ranges in Washington or occur in niche habitat that is not widely available (e.g., talus slope) (WDFW 2015). These species tend to have small populations given their limited habitat extent and are vulnerable to habitat loss (WDFW 2015). Sensitive or important habitat for special status species has been identified for some species through mapping of core or critical habitat (WDFW 2015). These areas have been identified by Washington State or the USFWS as areas that are critical to the persistence and recovery of special status species. Loss or degradation of core or critical habitat for special status species can have a disproportionate effect on their populations.

Special status species are also vulnerable to loss or changes of important features in their ranges required for denning, nesting, or foraging (WDFW 2015). For example, direct loss of grassland and shrubsteppe habitat due to development has been identified as a large contributing factor to the population decline of ferruginous hawks, a species listed as endangered in Washington (Hayes and Watson 2021).

Direct impacts on special status fish species are the same as for all fish species, but some special status fish have small ranges in Washington or occur in niche habitat that is not widely available. These species tend to have small populations, given their limited habitat extent, and are vulnerable to habitat loss. For example, the Olympic mudminnow is endemic in Washington and only occurs in the lowlands of the Olympic Mountains and Willapa Hills, so loss of habitat in this region could have a disproportional impact on populations of this species.

Special status species may be disproportionately affected by direct habitat loss as they may rely on rare habitats, have restricted ranges, have small population numbers, and face increased risks of extirpation from the state or extinction. Impacts may range from low for some special status species that have been observed to colonize transmission facility ROWs, such as the Mazama pocket gopher (*Thomomys mazama*), to high for species that exist in habitat types that are not readily replaceable, such as northern spotted owl in old growth forests.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of direct habitat loss on special status species, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Indirect Habitat Loss

Indirect habitat loss refers to change in habitat quality or perceived change associated with the development of a project. Indirect habitat loss can occur due to changes in biotic (e.g., vegetation composition) and abiotic (e.g., noise, artificial light, wind, soil condition) conditions adjacent to a project (Tyler et al. 2014; Biasotto and Kindel 2018). For example, forest cleared for an ROW will create a new forest edge that is subject to changed light regimes and changes in exposure to wind, which can affect soil conditions (Biasotto and Kindel 2018; ECOSTEM 2019). These changes in abiotic factors can alter vegetation composition, and therefore habitat suitability, for wildlife along the edge.

Indirect habitat loss can also result from a perceived change in habitat condition. In these cases, the vegetation characteristics of habitat might not change, but changes in noise levels, human presence, or structures on the landscape can still result in wildlife avoiding the area or changing their behavior. Sensory disturbance from noise and visual distraction can cause habitat loss through displacement (Drewitt and Langston 2006). While the habitat is still present, it is no longer functional or providing the same resources to wildlife. Multiple studies indicate that bird and mammal abundance decrease with increasing proximity to infrastructure, effectively reducing the habitat quality near a project (Drewitt and Langston 2006; Benítez-López et al. 2010; Smith et al. 2020). How different species respond to infrastructure projects varies due to differences in their ability to co-exist with humans; however, multiple studies have found that infrastructure causes indirect impacts on wildlife and wildlife habitat that are greater than the sum of the direct habitat loss impacts (Benítez-López et al. 2010). Changes in ambient conditions such as noise, light, and visual scape may result in a change in wildlife behavior; however, the extent and duration of these changes are difficult to predict.

Noises above certain levels tend to alter wildlife behavior, potentially increasing their metabolic rates and stress levels (Manci et al. 1988) and can contribute to increased energy expenditures due to increased movement around infrastructure (Bradshaw et al. 1997). Depending on the timing and level of stress, potential results of stresses include interference with communication and reduced reproductive success (Habib et al. 2007). For example, noise may cause changes in the frequency and duration of amphibian calling effort and may decrease the pairing success of birds due to interference with communication (Habib et al. 2007; Lengagne 2008). A synthesis of literature on the effects of noise on wildlife suggests that terrestrial wildlife generally respond to noise levels around 40 A-weighted decibels (dBA), with most showing impacts around 50 dBA (Shannon et al. 2016).

There is limited research examining the impacts of light on wildlife. It is often difficult to separate the combined influence of industrial noise, artificial light, and edge effect on wildlife species. Artificial light has the potential to affect the timing of reproductive behavior of wildlife species (Kempenaers et al. 2010). Construction of transmission facilities could require artificial lighting for nighttime work and at construction hubs, such as worker camps.

Construction of overhead transmission facilities are expected to increase noise and light levels throughout the construction period from activities such as a vegetation clearing, earthworks, transportation of materials, heavy machinery use, nighttime work, and general movement around the construction site. These activities could reduce wildlife use of adjacent habitat or change wildlife behavior near the project. The extent of indirect loss adjacent to construction sites would vary by habitat and species. The following sections describe the impacts of indirect habitat loss during construction on birds, mammals, amphibians and reptiles, invertebrates, fish, and special status species. In general, wildlife are expected to respond to changes in noise levels that are 10 decibels (dB) above ambient levels, with some species avoiding construction by over a mile.

Birds

Overhead transmission facility projects may result in indirect habitat loss for birds through increased noise, light, and human presence during construction. Bird species respond to these changes differently, with some species acclimatizing to activities and others avoiding areas under construction (Schöll and Nopp-Mayr 2021). Anthropogenic[178] noise that exceeds ambient noise can have a variety of adverse effects on birds, including interference with acoustic communication, changes to foraging location and behavior, masking important biological signals such as sounds of predators or prey, temporary or permanent hearing loss, increased stress, and altered hormone levels (CALTRANS 2016). Birds may leave areas with high noise levels, resulting in a reduction of usable habitat (Bergamini et al. 2024). However, one report summarizing research on the effects of noise on birds determined that many studies are unable to separate the effects of noise from other variables (Environmental BioAcoustics 2007). The number of different bird species and bird abundance has been found to be lower in areas with greater anthropogenic noise (Bayne et al. 2008; Francis et al. 2009; Proppe et al. 2013). Early laboratory studies on noise masking of bird vocalizations led to a noise level limit guideline of 60 dBA for continuous noise; however, the noise level where masking occurs can vary between species by up to 10 dBA (CALTRANS 2016). The criteria developed by Environment and Climate Change Canada for assessing noise disturbance to land birds is 10 dBA above ambient levels, or greater than 50 dBA (Babic 2017).

Artificial light at night can affect bird behaviors such as activity partitioning between day and night, physiology such as melatonin production and circadian clocks, inter-specific interactions such as predation risk and competition, and population dynamics such as immigration, emigration, births, and deaths (Gaston et al. 2013; Gaston and Bennie 2014).

Increased human presence during construction may also affect bird population density. Transmission lines through undeveloped landscapes would cause a greater impact on bird populations than facilities in developed areas. Transmission line construction could result in mortality of smaller animals that are unable to move away from machinery during clearing and ground preparation works, leading to less prey available for birds that rely on smaller animals for food. The relationship between population density and habitat availability is influenced by many factors that may operate independently of habitat, including population densities of the target species and other species in the area, and the effects of predation pressure, competition, and harvest (Garshelis 2000).

The impact of indirect habitat loss on birds due to the construction of transmission facilities would be most pronounced during activities that produce high noise levels, such as tree clearing, blasting, and helicopter use; activities that produce new or increased light pollution; and vehicle traffic. The impact of indirect habitat loss could range from negligible in areas with higher levels of existing disturbance and species that are adapted to co-existing with humans, such as American crow, to moderate for activities conducted near populations that are sensitive to disturbance or have limited ranges or population numbers, or in areas with less existing disturbance.

Mammals

There is limited research on noise effects on small mammals outside of laboratory settings (Wilson 2016). Consistent exposure to noise levels above 85 dB can result in hearing loss and reduced fertility (NRC 2011). Beyond the physical auditory effects of noise (i.e., hearing loss), laboratory mammals show increased stress response, increased blood pressure, change in estrus cycles, decreased fertility, loss of pregnancy, slower wound healing, and change in sleep patterns in response to increased noise (Turner et al. 2005). D’Souza and Martin

[178] Caused or created by humans.

(1974) reported that sudden noise can result in inhibited milk intake and growth in tree shrews. When greater white-toothed shrews (*Crocidura russula*) were exposed to traffic noise in laboratory experiments, observed behavioral changes included decreases in activity and feeding, and increases in fleeing response. These differences varied slightly between individuals captured from an urban setting and those from a rural setting, with the former showing a greater propensity for feeding and remaining active despite the introduced noise (Oliveira et al. 2021). This may indicate a degree of habituation to disturbances associated with urban environments, though short-term effects are still observable (Oliveira et al. 2021). Anecdotal evidence suggests that mustelids in captivity are sensitive to loud and/or unfamiliar noises, particularly during parturition and kit rearing (AZA Small Carnivore TAG 2010).

Acute noise, like that of a construction site, can startle wildlife, eliciting a flight response. Noise also masks communication cues, impedes foraging activities due to increased visual vigilance, and reduces hunting success for predators. Ungulates rely on hearing for predator detection. In oil and gas development projects, noisy areas have been shown to reduce mule deer habitat, with caribou and white-tailed deer similarly avoiding these areas (Rutherford et al. 2023). Large-bodied mammals like ungulates tend to avoid areas with disturbance and increase their movement, leaving them more vulnerable to predators and with less opportunity to forage (Rutherford et al. 2023).

When an existing 300 kV transmission line in northern Scandinavia was upgraded to a 420 kV line, research found that during construction, reindeer activity decreased by 10 percent within 6 km (3.7 miles) of the line during the calving season and decreased by 12 percent and 13 percent within 3.5 km (2.2 miles) of the line during summer and fall, respectively (Eftestøl 2016).

The impact of indirect habitat loss on mammals due to the construction of a transmission facility would be most pronounced during activities that produce high noise levels, such as tree clearing, blasting, and helicopter use; activities that produce new or increased light pollution; and vehicle traffic. The impact of indirect habitat loss could range from negligible in areas with higher existing levels of disturbance and species that are adapted to co-existing with humans, to moderate for activities conducted near populations that are sensitive to disturbance or have limited ranges or population numbers, or in areas with less existing disturbance.

<u>Amphibians and Reptiles</u>

Noise created during the amphibian breeding season may interfere with calling and mate location. Increases in noise while adults are calling can disturb calling patterns, length of calling, and call assemblages[179] (Barrass 1985; Sun and Narins 2005; Parris et al. 2009; Kaiser et al. 2011). Increased noise during breeding can also affect a female's ability to locate calling males (Bee and Swanson 2007). Amphibian species use different strategies to call and locate mates. For example, northern red-legged frogs call quietly, making calling patterns susceptible to interference from increased ambient noise levels. The coastal populations of western toad do not produce an advertisement call;[180] therefore, mate detectability would be less affected by noise (COSEWIC 2012). Traffic noise has also been shown to result in behavioral changes of tadpoles occurring in roadside ditches. Cuban treefrog (*Osteopilus septentrionalis*) and southern toad (*Anaxyrus terrestris*) tadpoles have displayed increased activity levels, potentially increasing susceptibility to detection by predators, along with decreases in food consumption (Castaneda et al. 2020).

[179] The collection of different calls from different animals at the same time.

[180] A call male frogs use to advertise to female frogs during the breeding season.

Little information is available on noise thresholds above which potential effects may be observed in amphibian species native to Washington. However, a review of available literature on the effects of noise levels on other amphibian species provides some insight. In European tree frogs (*Hyla arborea*), increased noise intensity above 88 dBA has been shown to result in a 50 percent reduction in calling effort due to changes in the frequency and duration of amphibian calling, while noise intensity above 72 dBA resulted in a 29 percent reduction in calling effort (Lengagne 2008). Couch’s spadefoot toads (*Scaphiopus couchii*) emerged from burrows when exposed to recorded motorcycle noises of 95 dBA. Noise intensity of 120 dBA has resulted in immobilization of northern leopard frogs (Nash et al. 1970).

Amphibians have evolved behavioral responses to the daily cycle of night and day (Perry et al. 2008, as cited in Mitchell et al. 2008).. Artificial light that disrupts this natural variation of lighting has negative consequences for amphibians. Artificial light required for construction can change foraging strategies as light can attract prey. Higher prey concentration can benefit amphibians by increasing foraging efficiency; however, it can also result in higher mortality from vehicle strikes due to location of the lighting, such as along roads (Perry et al. 2008). Alternatively, artificial nighttime lighting can alter natural amphibian behavior. Nocturnal foraging species, such as Pacific chorus frogs, tend to feed during the darkest periods of night. Artificial light can delay nighttime emergence and thus reduce foraging time. The physiology of frogs’ eyes is adapted to adjust to the brightest light (Fain et al. 2001), with hours required for new adjustments to be made (Cornell and Hailman 1984). This could reduce foraging efficiency and affect frogs’ movement patterns (Cornell and Hailman 1984; Fain 2001; Perry et al. 2008). Another effect of artificial light during nocturnal periods is the stimulation of melanin production, which is normally produced at a higher rate during the night. Melatonin has multiple functions in amphibians, including regulating hormones involved in metamorphosis, gonadal development, reproductive behavior, and thermoregulation (Erskine and Hutchison 1982; Vanecek 1998; Wise and Buchanan 2006). These can affect individuals’ fitness and overall survival. For example, delayed metamorphosis may result in mortality in cases where amphibians breed in ephemeral aquatic habitats[181] that may be susceptible to drying out.

Research on sensory disturbance to reptiles is limited; however, snakes are known to be sensitive to both ground and airborne vibrations (a product of sound) and are able to perceive sounds through both the inner ear and somatic hearing[182] (Wever 1978; Young 2003; O’Neill and Yurk 2017). Auditory sensitivities are high at lower frequencies (<500 hertz), where somatic hearing is less sensitive but has an increased frequency range (Young 2003). Studies on lizards reported temporary hearing loss when an individual was exposed to sound pressure levels of 95 dB referenced to 20 micropascals[183] for 510 seconds (Manci et al. 1988). Little is known about behavioral responses to these vibrations (O’Neill and Yurk 2017).

Similar to amphibians, reptiles have evolved to respond to fluctuating natural light, and the introduction of artificial light may have various behavioral and physiological effects (Perry et al. 2008). Artificial lighting may increase successful foraging, but it may also increase predation on reptiles (Bouskila 1995). Conversely, some snake prey species are less active as a response to the introduction of artificial light at night, reducing foraging opportunities for snakes (Bouskila 1995; Bowers 1988). Reductions in prey availability and detectability may reduce the quality of otherwise usable habitat for reptiles.

---

[181] A water-based habitat that exists only during certain times of the year when conditions are wet enough.

[182] Hearing by picking up sonic vibrations through the body.

[183] A unit of measurement which is a millionth of a pascal. A pascal is a unit of pressure.

The impact of indirect habitat loss on amphibians and reptiles would vary depending on the proximity of the noise source to unique habitat, such as amphibian breeding ponds; sensitivity of species to noise, light, or other disturbance (e.g., calling amphibians); and the nature of the disturbance source. For example, the impact from periodic loud sound sources, such as blasting, is expected to result in a different impact than continuous noise sources, such as vehicle engine noise. The impact could also vary depending on the seasonal overlap between project construction and species presence. The impact of indirect habitat loss on amphibians and reptiles is expected to range from nil to moderate.

Invertebrates

As with larger animals, anthropogenic noise and light can change the behavior, development, and habitat use for invertebrates as well (Boyes et al. 2021; Van den Broeck 2021). Anthropogenic light pollution is expected to be one of the primary drivers of global insect declines, especially nocturnal insects such as moths (Boyes et al. 2021). Anthropogenic noise has been observed to disrupt communication in some insects, as vibrations caused by human activity can overlap with those used for insect communication (Janža et al. 2024).

If transmission line construction were to increase the movement of damaging invasive insect species that feed on native tree species, such as spongy moth, this would lead to indirect habitat loss for forest species (WISC 2025). If agricultural pest insects were able to spread during the construction phase, this could cause the loss of fruit trees, which may affect wildlife that use them, such as native pollinators.

The impact of indirect habitat loss on invertebrate populations is expected to range from negligible to moderate, depending on the proximity of the disturbance to unique habitats.

Movement Corridors

Indirect impacts on movement corridors during construction are expected to be similar to those described above in terms of changes in biotic and abiotic features. The impacts on wildlife that use these corridors are expected to vary seasonally with their use.

Similar to the direct impacts on movement corridors described above, the impact of indirect habitat loss on movement corridors could vary from negligible to high, depending on site characteristics (e.g. stopover locations), the species affected, and the season.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of indirect habitat loss on birds, mammals, amphibians, invertebrates, and migration corridors, without mitigation incorporated is anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fish

Impacts on fish include indirect loss of habitat, which is defined as loss that occurs later in time or farther away from the project location. Indirect habitat loss for fish primarily results from increased human activity, pollution, and changes in land use adjacent to transmission line corridors. It may change the character or state of the habitat over time by changing water quality and quantity (WDFW 2019b). Water quality degradation arising from soil erosion, sedimentation, and potential contaminants from maintenance activities or accidents related to transmission facilities can degrade fish habitat and cause injury or mortality in fish. Changes to water quality and quantity may occur during the construction of transmission facilities and access roads. Changes to water quality include changes in water temperature, pH, nutrient concentrations, pollution, and sediment. Changes to water quantity could result from removal of riparian vegetation that may impact the water table or increase risk of flash flooding. In addition, noise vibrations during construction (explosives used in or near water or pile driving) may cause damage to incubating eggs or larvae or cause injury or mortality to fish (Wright and Hopky 1998; Popper et al. 2006). Sublethal effects on fish may also occur from in-water noise, including changes in behavior of fish (Wright and Hopky 1998). These changes can lead to changes in fish habitat and aquatic resources over time, which ultimately can affect fish. For example, once salmonids leave the ocean and enter freshwater, they are dependent on the quality of water and instream habitat, particularly for spawning and rearing (Beschta 1997).

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of indirect habitat loss on fish, without mitigation measures incorporated, is anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Special Status Species

It is expected that construction of a transmission facility would result in indirect habitat loss for special status species similar to those described above for birds, mammals, amphibians, reptiles, invertebrates, and fish. The extent of indirect habitat loss adjacent to a transmission facility would vary by species. Species that are sensitive to human activity would be the most affected, as they would maintain the largest distances from construction activities. For example, Stewart et al. (2016) report that wolverines, which are a wide-ranging species, spend less time in habitat close to human-modified areas and generally move through these areas quickly. Greater sage-grouse and Columbian sharp-tailed grouse avoid habitat near tall structures, such as transmission line poles and towers, because they provide perches for raptors and increase predation risk (Stinson and Shroeder 2012).

However, other special status species are more tolerant of human activity and may be more likely to use habitat near a transmission line. For example, Scobie et al. (2016) report that burrowing owls did not substantially avoid habitats with artificial sound associated with compressor stations, oil wells, traffic, and towns, but would change habitat use if changes in vegetation affected prey availability. Similarly, ferruginous hawk nest densities increased by 37 percent after the installation of transmission towers in southwest Alberta, Canada, but returned to pre-construction levels after their removal (Parayko et al. 2021). This may be related to the limited availability of nesting structures in the region.

Beyond species-specific responses to construction disturbance, the extent of indirect habitat loss due to transmission facility construction varies depending on the type of machinery used, construction activities, and surrounding habitat. Project-specific indirect habitat loss can be estimated by analyzing changes in noise levels using project-specific noise modeling, reviewing proximity of roadways and construction lighting to sensitive wildlife features (e.g. streams and wetlands), and considering the seasonality of construction activities. Project-specific information is required to quantify the extent of indirect habitat loss on special status species.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of indirect habitat loss on species status species, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Mortality

This section is limited to general impacts on wildlife from construction-related mortality. These effects can be difficult to predict as data may be hard to obtain and are often incomplete when available (Manitoba Hydro 2010;

Lehman et al. 2010). Sources of wildlife mortality during construction of transmission projects may include the following:

- Vegetation clearing and grubbing activities
- Wildlife-vehicle collisions
- Nest/den destruction and failure
- Removal of nuisance wildlife[184]

Site preparation works, including vegetation clearing and grubbing, are likely to pose the greatest risk of wildlife mortality, particularly for less mobile species such as amphibians, reptiles, and small mammals, which may not be able to move away from machinery and grubbing activity. Young wildlife (e.g., tadpoles, bird nestlings) and wildlife in an immobile stage (eggs) are also at higher risk of mortality from clearing and grubbing.

Wildlife-vehicle collisions may occur when wildlife cross roads to access habitat patches. Wildlife-vehicle collisions may occur during project construction, operation, and decommissioning; however, vehicle traffic is expected to be highest during construction. Road mortalities are generally site-specific, and frequencies of mortality depend on the species and circumstances such as location, traffic volume, and speed (Oxley et al. 1974; Jalkotzy et al. 1997). Collisions are typically more common during dusk and nighttime, when nocturnal species are active and visibility is poor (Gunson et al. 2003).

<u>Birds</u>

Vegetation clearing and site preparation work may result in destruction or disturbance of bird nests. Adult birds are able to move away from clearing activities, but their young may not be able to move if clearing is conducted prior to fledging,[185] resulting in mortality of eggs or young. In addition, birds that are disturbed by construction activities may abandon nests, resulting in nest failure. The impact of potential mortality is expected to vary depending on the season when work is conducted. For example, vegetation clearing during the bird breeding season has a higher risk of causing bird mortality due to the presence of bird nests, eggs, and fledglings than if such work is performed during the winter.

In addition, nests placed on or near the ground could be crushed by vehicles, equipment, and workers moving around the construction site. In open habitats, many bird species nest on the ground, like western meadowlarks; close to the ground, like sage thrashers; or underground like burrowing owls; these nests are often cryptic[186] and difficult to detect.

Bird-vehicle collisions with construction traffic are another potential source of bird mortality. Mortality risk depends on several variables, including traffic volume and speed (Erritzøe et al. 2003; Oddone Aquino and Nkomo 2021); road configuration (Husby 2016); adjacent habitat (Erritzøe et al. 2003; Bishop and Brogan 2013); and bird density and species composition (Santos et al. 2016). The highest bird mortality rates were reported to occur on roads through wetlands, followed by roads through mixed and broadleaf forests (Bishop and Brogan 2013). Traffic

[184] Wildlife that can cause a problems or danger for humans, such as bears which become accustomed to eating garbage.

[185] The process by which an immature bird develops flight feathers.

[186] Designed for concealing or camouflage.

volume and velocity are generally positively correlated with the number of avian mortalities, though this is not always the case (Erritzøe et al. 2003; Oddone Aquino and Nkomo 2021).

The impact of bird mortality during construction would vary depending on habitat and seasonality of construction activities. The impact of mortality is expected to vary from nil for projects located in urban areas with limited bird abundance and nesting potential to low in more complex habitat.

Mammals

Vegetation clearing and site preparation work may result in destruction or disturbance of small mammal dens. Small mammal dens may be destroyed during ground-disturbing works, resulting in mortality of animals in the den. The impact of potential mortality is expected to vary depending on the season when work is conducted.

Vegetation clearing during construction could result in direct mortality of small mammals through destruction of occupied burrow sites and collisions with construction vehicles and equipment. Burrow sites are often used year-round, and potential for mortality remains consistent throughout the year. Mammals, particularly small mammals, that cross construction access roads are at risk of collision with vehicles and equipment moving to and from construction work fronts. Vegetation clearing could result in bat mortality through clearing trees with occupied tree roosts. Removal of anthropogenic structures that provide day and maternity roosts could also result in bat mortality.

Construction materials and household waste created during construction can attract mammals, such as bears, to construction sites, resulting in increased human-wildlife conflicts. The conflicts can result in wildlife mortality. Further, wildlife may consume toxic or hazardous construction materials, such as petroleum products, which also can result in mortality.

The impact of mammal mortality due to construction activities is expected to range from nil in areas with limited habitat (e.g., urban areas) to low in more natural habitats. The impact would depend on habitat characteristics, the species present, and the seasonality of construction activities.

Amphibians and Reptiles

Amphibians and reptiles have limited mobility due to their small size and may not be able to move away from machinery used for clearing and grubbing, making them susceptible to mortality during these activities. Species may be more susceptible at certain times of the year. For example, amphibians are typically less mobile while in the larval life phase (spring/summer) and while hibernating during winter. Amphibians are susceptible to mortality during inter-season movements if access roads are constructed over their migration and dispersal routes (Fukumoto and Herrero 1998). The risk of mortality during amphibian movements would vary depending on road placement and the distance that amphibians move. For example, western toads can move between 1.5 and 6 km (0.9 and 3.7 miles) between breeding and hibernation sites (Bull 2006; Browne and Paszkowski 2010; Wind 2021), increasing the likelihood of encountering a construction access road compared to salamanders in the Ambystomatidae family that typically move short distances (32.1 to 200 meters [105.3 to 656.2 feet]) between breeding and upland habitat (Semlitsch 1998; Maxcy and Richardson 2000). Amphibians may also become trapped in borrow pits[187], ditches, and other excavated structures, as well as construction materials and

[187] An excavated area where dirt has been dug to be used to fill another location.

equipment that are present during construction. These excavated structures can fill with water and could act as population sinks[188] if they dry up or are drained or disturbed during the amphibian breeding season.

Reptiles are more susceptible to mortality from grubbing and moving debris piles during the winter hibernation period when they are congregated in hibernacula, are less mobile, and are not visible. During times when they are active, they may use debris piles for cover and may be susceptible to mortality if the material is disturbed. Reptiles are also prone to vehicle strikes because they use roads to thermoregulate and can freeze as a defensive response when approached by a vehicle (Wagner et al. 2021). Vehicle collisions are more common at night in the spring and summer when reptiles are active. Reptiles may also become entrapped in excavated cavities and construction material, which could lead to mortality.

The introduction of invasive species such as American bullfrog and African clawed frog could impact native amphibians by introducing new predators for native amphibian species and competition for aquatic resources and habitat (WISC 2025). African clawed frogs can also carry diseases that could cause mortality for native species (WISC 2025).

The impact of construction-related amphibian and reptile mortality is expected to vary from nil to moderate, depending on the proximity of construction activities to sensitive features (e.g., wetlands, hibernacula), the seasonality of construction activities, and the limited mobility of amphibians and reptiles.

Invertebrates

Invertebrate mortality from collisions with vehicles could occur during the spring and summer, when insects are most active (Baxter-Gilbert et al. 2015). Vehicle collisions are expected to be greatest during the construction phase, when vehicle traffic is the highest. Clearing of vegetation and grubbing during the winter, when many insects are overwintering, could result in the mortality of insects that are not able to move out of the way of vehicles and construction equipment.

With the implementation of BMPs during vegetation clearing and construction, the impact on invertebrate mortality would be expected be nil to moderate, depending on the habitat being impacted and the seasonality of construction activities.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of mortality on birds, mammals, amphibians, and invertebrates, without mitigation measures incorporated, is anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fish

Death or injury of fish can occur during project construction due to changes in water flow, erosion, or physical injury or death due to the impact of equipment, debris, noise, and/or due to the physical presence of transmission infrastructure. Some activities have a higher risk of mortality or injury than others (WDFW 2019b). Instream works during construction of transmission facilities may include access roads that cross rivers and streams. Direct mortality and/or injury of fish may occur from equipment and other construction vehicles in aquatic habitats,

[188] A type of habitat that can attract organisms but does not have enough resources to support them, resulting in their eventual extirpation from the sink, unless it is constantly supplied by another population.

including culverts and bridges that are installed for road crossings. Sedimentation can smother aquatic insects, mussels, and eggs and damage fish gills, which may lead to mortality (Newcombe and Jensen 1996).

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of mortality on fish, without mitigation measures incorporated, is anticipated to vary and could be negligible to low.

Special Status Species

Sources of mortality of special status species during project construction are expected to be the same as described above for wildlife guilds. Populations of special status species are expected to be more vulnerable to loss of individuals as these populations are typically either naturally small or lower than historical levels.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of mortality on special status species, without mitigation measures incorporated, is anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Barriers to Movement

Habitat fragmentation (discussed under Fragmentation, below) isolates populations by creating physical or perceived barriers to movement. Physical barriers to movement are features that wildlife are not capable of crossing, such as construction fencing and sediment fencing. Perceived barriers to movement represent landscape features such as ecotones,[189] habitat gaps,[190] or matrix habitats[191] that wildlife are physically capable of crossing but typically do not due to behavioral constraints. Barriers to movement can result in decreased genetic flow and less resilient populations, failure to reach breeding grounds or foraging sites, and reduced rates of recolonization[192] (Haddad et al. 2015; Hanski 2015).

Construction of a transmission line project could create both physical and perceived barriers to wildlife movement. Physical barriers, such as construction fencing, sediment and erosion control measures, and material laydowns, would be removed at the end of the construction phase. Perceived barriers would be created during construction and are expected to continue through operation. The following sections discuss sources of barriers to movement specific to construction. Barriers to movement associated with creation of linear corridors are discussed under Operation and Maintenance, below.

Birds

Some bird species may change their behavior to avoid noise and human presence, thereby avoiding approaching or crossing construction areas. Perceived barriers to movement, like construction noise, light, and human presence, generally restrict local or landscape-level movements such as movement within a home range, seasonal shifts in a home range, or dispersal (Harris and Reed 2002). Sensory disturbance associated with construction activities taking place within a transmission line corridor may further reduce the willingness of birds to cross it. Transmission line corridors can extend for hundreds of kilometers and may negatively impact access to resources like breeding areas and foraging grounds, for birds like some small, forest-dwelling songbirds that are

[189] The zone between two different ecological communities.

[190] A gap between two different habitats caused by human infrastructure like roads.

[191] Habitat that occurs between, and connects, habitat patches.

[192] The reestablishment of a species into an area after it was extirpated.

unwilling to cross-transmission line corridors. Daily movement corridors from roosting to foraging sites may overlap with project-related activities, potentially resulting in a new perceived barrier to movement.

The impact of physical or perceived barriers to movement for birds during construction could vary from nil in urban areas where birds are adapted to co-exist with human disturbance to low in areas with less pre-existing disturbance. Some species adapted to human presence, anthropogenic structures, or disturbed environments may perceive fewer barriers to movement than species that are sensitive to noise and human presence. Physical barriers to movement would have a more substantial impact on less mobile species and during the bird breeding season, when young birds are less capable of movement.

Mammals

Noise, light, and human presence may deter mammals from approaching or crossing construction areas. Fencing around construction sites creates physical barriers that can prevent wildlife from accessing or moving through construction sites. Artificial lighting, like that used on construction sites, along bat movement corridors has been shown to reduce activity substantially (Stone et al. 2009; Barré et al. 2023). Exposure to artificial lighting along movement corridors may result in avoidance and longer flying times, potentially resulting in lower fitness levels (Barré et al. 2023). As with foraging, artificial lighting affects bat movement variably, depending on species.

The movement of mammals through their habitat can be restricted by human presence. In areas with high human activity, wildlife movement was one-half to one-third that of areas with no human activity (Tucker et al. 2018). Migratory ungulates are highly sensitive to human disturbance. Fencing has been found to have strong negative effects on pronghorn movement, distribution, and resource selection in Alberta, Manitoba, and Montana. Pronghorn are reluctant to cross fence lines and actively avoid fenced areas (Jones et al. 2019). Construction activities and fencing may have a similar impact on migratory and resident ungulates by reducing or blocking their movement to quality and reliable sources of food, rearing habitat, and shelter.

The impact of barriers to movement for mammals during construction is expected to vary from nil in areas that are outside of movement corridors to moderate if construction is expected to bisect movement corridors or substantially change habitat characteristics (e.g., removing vegetation cover).

Amphibians and Reptiles

Construction activities that overlap or bisect amphibian and reptile habitat may create barriers to amphibian and reptile movement, particularly if construction sites are located between different seasonal habitats, such as those used for breeding and overwintering. Amphibians and reptiles may avoid crossing construction access roads due to changes in microclimate conditions and lack of cover objects. In addition, sediment fencing, berms, and other features of construction sites can create physical barriers to amphibian and reptile movement (Jochimsen et al. 2004).

The impact of barriers to amphibian and reptile movement during construction would vary from nil to moderate, depending on site characteristics, the time of year, and the barriers present on site. Reptiles and amphibians are particularly vulnerable to both perceived and physical barriers to movement. They have specific habitat requirements and are vulnerable to changes in their environment. The impact would be greatest where ROWs present a barrier to movement between habitats used for breeding, dispersal, and hibernation.

Invertebrates

There is limited information on barriers to invertebrate movement during construction activities. Barriers to invertebrate movement are discussed under Operation and Maintenance, below.

The impact of barriers to movement on invertebrates during construction is expected to vary based on habitat, species mobility, and construction seasonality, similar to other wildlife species described above. It is expected that the impact would vary from nil in areas that have been highly modified to low in habitats that would be substantially modified by construction activities (e.g. forests).

Movement Corridors

Landscape-level habitat connectivity is important for wildlife to access seasonal habitats, juvenile dispersal, and gene flow. Wildlife movements can range from a few miles for small animals (e.g., amphibians) to hundreds of miles for larger species (e.g., ungulates). Development in migratory corridors not only removes habitat but can also impede or prevent wildlife movement on the landscape. The creation of barriers to movement would be initiated during construction, but the effects would occur predominantly during operation, given the duration of this phase. Therefore, the impacts of transmission facilities on wildlife migratory corridors are discussed below under Operation and Maintenance.

Creation of barriers to movement that interact with migratory corridors are expected to result in a higher impact on wildlife movement than barriers outside of these routes. However, the impact of barriers to movement on wildlife corridors is expected to vary from nil for projects sited outside of migratory corridors, to negligible for projects in broad migratory pathways such as the Pacific Flyway, to moderate for projects sited in modeled migratory routes for wildlife. Moderate impacts could also occur on reptile and amphibian species if barriers are created between two important habitat areas, such as breeding and overwintering grounds.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of barriers to movement on birds, mammals, amphibians, invertebrates, and migration corridors, without mitigation measures incorporated, is anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fish

Barriers to movement can cause changes to fish behavior or health that can reduce the ability of fish or shellfish to survive and grow (WDFW 2019b). For example, barriers may inhibit migrating salmon from reaching native spawning grounds. Migration routes may be disrupted by linear developments, including access roads. Construction of culverts and bridges, if inappropriately designed and installed, can cause velocity barriers,[193] bank erosion, slumping,[194] insufficient resting areas, noise, and debris jams,[195] which may cause migration blockage to fish.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of barriers to movement on fish, without mitigation measures incorporated, is anticipated to vary and could be nil to low.

Special Status Species

The sources of barriers to movement for special status species during the construction of overhead transmission facilities are expected to be consistent with the other wildlife guilds described above. However, due to the

[193] When the flow velocity over a river structure (ex. culverts or road crossings) exceeds the swimming capacity of the fish and hinders its movements.

[194] Vertical collapse of the bank cause by a slide or rotation away, leaving a concave scar or scarp and a clump of sediment at the base. Can be caused when structures are built too close to the bank of a river, or removal of riparian vegetation.

[195] The buildup of woody material of variable sizes and quantities into a distinctive unit.

sensitivity of special status species to changes in habitat connectivity, barriers to movement are expected to result in increased impacts on these populations.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of barriers to movement on special status species, without mitigation measures incorporated, is anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fragmentation

Habitat fragmentation refers to the division of continuous habitat into smaller, isolated patches through habitat loss (Haddad et al. 2015). Continued fragmentation can result in a patchwork of habitats over the landscape that may be partially connected or completely isolated from each other. Fragmentation results in more habitat exposed to edge effects (described under Indirect Habitat Loss) and can isolate wildlife populations through creation of movement barriers (described under Barriers to Movement). For transmission facilities, the impacts of fragmentation are more pronounced during the operation phase and are therefore discussed under Operation and Maintenance, below.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of fragmentation on wildlife, without mitigation measures incorporated, is anticipated to vary and could be nil to moderate. The impact of fragmentation on fish could be nil to moderate. The impact of fragmentation on special status species could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Activities for the construction phase of underground transmission facilities, including open trench, trenchless (including horizontal directional drilling), or underwater construction methods, would vary depending on the scale of the facility and site characteristics. Similar to overhead transmission facilities, underground construction of underground transmission facilities could include a site preparation phase of relatively short duration, followed by a longer construction and start-up phase. It is assumed that the construction phase for underground transmission facilities, per mile, would have a longer duration than overhead projects. Underground transmission could have the following impacts on habitat, wildlife, and fish during the construction phase:

- Direct Habitat Loss
- Indirect Habitat Loss
- Mortality
- Barriers to Movement
- Fragmentation

Direct Habitat Loss

In general, the impacts of direct habitat loss described in Section 3.6.3.2 for the construction of an overhead transmission facility would be similar to those for an underground transmission facility. Clearing of the ROW would be required prior to construction of underground transmission facilities. Additional grubbing may be required for excavation of a trench. As such, while it is expected that naturally open ecosystems could be retained under overhead transmission facilities, this may not be possible during construction of underground lines. The exception would be habitats that are traversed using trenchless construction methods.

Birds

Direct loss of bird habitat due to underground transmission line construction would be consistent with the impacts described in Section 3.6.3.3 except for species that occur in naturally open habitat, as these habitats would also be cleared to install underground transmission facilities. Shrubs cannot be re-established on top of underground transmission facilities due to potential electrification of root systems. As such, habitat along the ROW would remain as modified grass-dominated areas throughout operation, reducing the availability of foraging and nesting habitat.

Similar to overhead construction, the impact of direct habitat loss on birds would depend on the habitat type impacted, the extent of habitat impacted, and species of bird impacted. The impact of habitat loss could vary from negligible for facilities in urbanized or modified habitats to moderate for facilities in mature forest areas. Similarly mobile species that are generalists, such as American crow are not likely to be impacted by construction of a transmission facility, and therefore the impact would be negligible; however, the impact of habitat loss on species with a limited distribution or niche habitat requirements (tricolored blackbird) could be moderate.

Mammals

Direct loss of mammal habitat due to underground transmission line construction would be consistent with the impacts described in Section 3.6.3.3 except for species that occur in naturally open habitat, as these habitats would also be cleared to install underground transmission facilities. Shrubs cannot be re-established on top of underground transmission facilities due to potential electrification of root systems. As such, habitat along the ROW would remain as modified grass-dominated areas throughout operation, reducing the availability of shelter sites for smaller mammals.

The impact of direct habitat loss on mammals would depend on the species, habitat type impacted, and extent of the impact. It is expected that the impact might range from negligible to moderate. Generalist mammal species that can re-establish in ROWs, such as some species of rodent, would likely be less affected than mammal species that rely on mature forests.

Amphibians and Reptiles

Direct loss of amphibian and reptile habitat due to underground transmission facility construction would be consistent with the impacts described in Section 3.6.3.2 for overhead transmission facilities except for species that occur in naturally open habitat, as these habitats would also be cleared to install underground transmission facilities. As shrubs cannot be reestablished on top of underground transmission facilities, shelter sites for amphibians and reptiles in the ROW are expected to be limited.

The impacts of direct habitat loss on amphibian breeding habitat from installation of an underground transmission line would depend on the installation methods applied. Use of trenchless construction methods with appropriate conditions would have little to no impact on amphibian aquatic breeding sites.

The impact of direct habitat loss on amphibians and reptiles would depend on the site characteristics (disturbed or undisturbed) and the species present. The impact of habitat loss could range from nil for projects that do not interact with amphibian and reptile habitat, including projects located in urban or previously highly disturbed areas without features required by amphibians and reptiles, to moderate for projects that occur in undisturbed habitats that contain unique features that support amphibian and reptile life requisites such as wetlands, talus slope, and streams.

Invertebrates

Direct loss of invertebrate habitat due to underground transmission line construction would be consistent with the impacts described in Section 3.6.3.3 except for species that occur in naturally open habitat, as these habitats would also be cleared to install underground transmission facilities.

The impact of direct habitat loss on invertebrates would depend on site characteristics (forested vs open), timing of construction activities, and the species present. The impact of habitat loss could range from nil for species adapted to open ecosystems and those that require flowering plants that grow in ROWs, to moderate for invertebrates adapted to forested or shrub environments, rely on rare host plants, and/or have niche habitat requirements.

Movement Corridors

The impact of direct loss of movement corridors is expected to be consistent with the description in Section 3.6.3.2 except for corridors through open habitat, as vegetation in these areas would be removed during construction.

The impact of habitat loss in movement corridors would vary depending on the type of habitat being removed and the extent of similar habitat available to wildlife. For example, loss of habitat in the Pacific Flyway may have a negligible to low impact on migratory songbirds due to their high dispersal capabilities, while loss of habitat at a stopover location on the Pacific Flyway would result in a larger (moderate to high) impact on migrating birds. Removal of habitat along movement corridors used by reptile and amphibian species could result in moderate impacts on local reptile and amphibian populations, as these species groups require connectivity between breeding and overwintering habitat to maintain populations.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of direct habitat loss on birds, mammals, amphibians, invertebrates, and migration corridors, without mitigation measures incorporated, is anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fish

Impacts during construction are dependent on the construction methods used. Trenchless construction is the method least impactful on watercourses. Trenchless construction has little to no impact on rivers, lakes, or streams as the construction occurs under the water feature and potentially also avoids riparian areas. If trenchless construction is undertaken under inappropriate soil stabilization conditions, it may result in accidental spills (“frac-out”[196]), causing degradation of aquatic habitat due to release of deleterious substance, including drilling fluid or sediment-laden groundwater.

The next most impactful construction method is underwater crossings, which can cause direct habitat loss, depending on the size and location of the crossing and whether the location disrupts sensitive fish habitat used by fish for one or more life stages.

[196] An unintentional return of drilling fluids to the surface.

The most impactful construction method for an underwater crossing is when the cable is placed in the water or is trenched within the watercourse. Open-cut stream trenching can occur in isolation from flowing water or without diverting a stream around the trench, but both techniques disturb the bed and banks of the stream. In both types of open-trench crossing, sediment loads[197] are elevated during and shortly after construction, and the impact and duration of sediment load is influenced by the size and flow of the waterway, the particle size distribution of the stream bed, and the specific instream activity (Brosius 2010). Effects from sedimentation are further described in the following sections.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of direct habitat loss on fish, without mitigation measures incorporated, is anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to s less than significant impact.

Special Status Species

The impacts on special status species from installation of underground transmission facilities are expected to be consistent with the descriptions above for general wildlife groups. However, special status species may be disproportionately affected by direct habitat loss as they may rely on rare habitats, have restricted ranges, have small population numbers, and face increased risks of extirpation from the state or extinction.

Impacts may range from low for some special status species that have been observed to colonize transmission line ROWs, such as the Mazama pocket gopher, to high for species that exist in habitat types that are not readily replaceable, such as northern spotted owl in old growth forests.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of direct habitat loss on special status species, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Indirect Habitat Loss

The impact of indirect habitat loss during construction of underground transmission facilities is expected to be consistent with construction of overhead transmission facilities described in Section 3.6.3.2 for all wildlife groups and special status species.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of indirect habitat loss on wildlife, without mitigation measures incorporated, is anticipated to vary and could be nil to high. The impact of indirect habitat loss on special status species is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fish

During construction of open-cut trenches, the turbidity plume[198] during construction may decline rapidly, but the excavated sediment deposited downstream and its effect downstream may be longer in duration (Brosius 2010). Sediment deposition downstream can increase embeddedness and change the morphology[199] of the stream (Brosius 2010). Typically, these changes to streambed conditions are considered short-term (six months to two

---

[197] The amount of sediment in the water.

[198] When fine sediments remain suspended in a surface freshwater layer and cause cloudiness or muddiness.

[199] The study of the structure or shape of a stream.

years post-construction), but channel morphology changes may last longer (four years) (Brosius 2010). In addition, fuels, lubricants, and hazardous materials may enter the watercourse, altering water quality or causing mortality to fish. Direct mortality to fish is further described in the following section. Sediment release during construction can also alter the productivity of benthic[200] invertebrates that may last one to two years (Brosius 2010). Buried cables can also cause changes in water quality due to sedimentation, or if hazardous sediments (e.g., mine waste) are exposed during construction. Similar to overhead transmission lines, noise generated during in-water construction may impact fish and fish habitat.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of indirect habitat loss on fish, without mitigation measures incorporated, is anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Mortality

The sources of potential wildlife mortality during construction of underground transmission facilities are expected to be consistent with those described in Section 3.6.3.2 for construction of overhead transmission facilities and include mortality during clearing and grubbing (e.g., destruction of bird nests) and collisions with vehicles. In addition, non-aerial species are at risk of being trapped in open excavations. Mammals, amphibians, reptiles, and some invertebrates may fall into trenches and not be able to escape. Fauna may inadvertently fall into trenches and become entrapped as they move through a construction site (Doody et al. 2003). A study of a pipeline construction trench in Australia found that most of the entrapped species in trenches were reptiles (mainly lizards), followed by mammals (commonly small mammals), frogs, birds (mainly fledglings who could not yet fly), and fish. During the two-year survey period, more than 7,400 animals were retrieved from approximately 800 km (497 miles) of trench (Doody et al. 2003; Randall et al. 2018).

Mammals

In addition to the risks of mammal mortality described in Section 3.6.3.2, underground construction involves the excavation of open trenches to install transmission facilities. These trenches would remain open for days to weeks, creating a barrier to movement and potential death trap for mammals. Mammals, particularly small mammals, that inadvertently fall into open trenches are often unable to escape. Small mammals trapped in trenches without ground cover to conceal themselves become easy prey for predators that may in turn become trapped in the open trenches while attempting to eat. Mammals that fall into trenches or borrow pits may become stuck in the muddy bottom of the pits or drown in pooling water (Doody et al. 2003). Larger mammals, like deer, that have poor depth perception are frequently able to jump over obstacles like trenches, but fawns and other young mammals may not be capable of jumping the trench and may fall in and be unable to get out (Enge et al. 1996).

The impact of mammal mortality due to construction of underground transmission facilities is expected to range from negligible in areas with limited habitat (e.g., urban areas) to low in more natural habitats. The level of impact would depend on habitat characteristics, the species present, and the seasonality of construction activities.

[200] Occurring at the bottom of a body of water.

Amphibians and Reptiles

In addition to the risks of amphibian mortality described in Section 3.6.3.2, open trenches and borrow pits that fill with water can provide amphibian breeding habitat. Amphibians that breed in the active construction site can be crushed by machinery or killed when these features are drained. Further, depressions and other anthropogenic features that are not specifically designed to support amphibian breeding can become a population “sink”[201] by attracting amphibian breeding but providing lower-suitability breeding and rearing habitat than natural systems. Amphibians that breed in these features often have lower survival rates than natural systems.

Dispersing adult and juvenile amphibians could fall into open trenches and become entrapped, thus increasing their risk of being crushed by construction equipment (Doody et al. 2003; Randall et al. 2018).

The impact of amphibian and reptile mortality associated with the construction of an underground transmission facility is expected to vary from nil to moderate, depending on the proximity of construction activities to sensitive features (e.g., wetlands, hibernacula), seasonality of construction activities, extent of trenching or creation of breeding areas that could attract amphibians, and the limited mobility of amphibians and reptiles.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of direct habitat loss on wildlife, without mitigation measures incorporated, is anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fish

Direct mortality of fish and eggs/larvae may occur during trenched methods of crossing streams, rivers, and lakes, from construction vehicles, equipment, and/or mats entering the stream. Cables buried or placed directly on the bed could cause direct physical injury or death. Buried cables can also emit magnetic or electromagnetic fields, depending on the strength of electric current, cable shielding, and other factors that may cause changes in fish behavior. Fish mortality from electromagnetic fields (EMF) has not been documented, but exposure to EMF may change embryonic development of some salmonids (Formicki and Winnicki 1998; Copping et al. 2021). However, the science is currently inconclusive whether these changes are necessarily negative. Similar to overhead transmission facilities, death or injury to fish can occur during project construction due to changes in water flow, erosion, or physical injury or death due to the impact of equipment, debris, noise or the physical presence of transmission infrastructure.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of mortality on fish, without mitigation measures incorporated, is anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Special Status Species

Sources of mortality of special status species during project construction are expected to be the same as described above for wildlife guilds. Populations of special status species are expected to be more vulnerable to loss of individuals as these populations are typically either naturally small or lower than historical levels. Western toad, which is a special status species, is known to breed in trenches and ditches created during construction, which can lead to mortality if they are disturbed.

[201] A type of habitat that can attract organisms but does not have enough resources to support them, resulting in their eventual extirpation from the sink, unless it is constantly supplied by another population.

Due to the sensitivity of special status species to population decline, mortality would have an increased impact, possibly resulting in changes at a population level. Similar to the wildlife guilds described above, the impact would vary from nil for projects in modified areas with limited habitat for special status species to high for projects located in unique habitats, near sensitive wildlife features, or seasonally timed for construction to coincide with sensitive wildlife periods, such as when special status amphibian species may be breeding.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of mortality on special status species, without mitigation measures incorporated, is anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Barriers to Movement

The construction of underground transmission facilities is expected to create the same barriers to movement as construction of overhead transmission facilities for wildlife, except as described below.

Amphibians may move large distances between foraging, overwintering, and breeding habitat to facilitate movement. Amphibians rely on ground cover like trees, logs, coarse woody debris, and snags to avoid detection by predators and exposure to weather. Excavations, including open trenches, can create barriers to amphibian movement between habitats and may influence seasonal movement, population dispersal, and gene flow (Randall et al. 2018).

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of barriers to movement on wildlife, without mitigation measures incorporated, is anticipated to vary and could be nil to moderate. The impact of barriers to movement on special status species is anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fish

Fish may experience barrier to movement from trenched crossings when works are isolated from flowing water and coffer dams are erected, which prevents upstream and downstream movement. Fish also tend to avoid areas of increased sedimentation. Inappropriately designed bridges and culverts that may be required for access can also create velocity or vertical drop barriers that prohibit fish passage.

EMF sensitivity varies by aquatic species, and some aquatic species have been reported to be sensitive to EMF, including salmonids and sturgeon (Fisher and Slater 2010; McIntyre et al. 2016; Copping et al. 2021). For example, salmonids may use the earth’s magnetic field for navigation, and EMF from other sources may disrupt their migration routes (Copping et al. 2021). However, research has not yet determined whether EMF from transmission cables has an impact on fish species, as most of these studies have focused on marine cables or have taken place in laboratory settings. The science is also inconclusive regarding whether migration is impacted, which may depend on fish species, depth of the water, and cable properties (Fisher and Slater 2010; McIntyre et al. 2016; Copping et al. 2021).

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of barriers to movement on fish, without mitigation measures incorporated, is anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fragmentation

Habitat fragmentation created by construction of underground transmission facilities is expected to begin in construction and persist throughout project operation and maintenance. As such, the impacts of fragmentation are described under Operation and Maintenance, below.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of fragmentation on wildlife, without mitigation measures incorporated, is anticipated to vary and could be nil to moderate. Impacts of fragmentation on fish are anticipated to vary and could be negligible to moderate. Impacts of fragmentation on special status species are anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Operation and Maintenance

Overhead Transmission Facilities

Activities during the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and rights-of-way. Overhead transmission facilities could have the following impacts on habitat, wildlife, and fish during the operation and maintenance phase:

- Direct Habitat Loss
- Indirect Habitat Loss
- Mortality
- Barriers to Movement
- Fragmentation

Direct Habitat Loss

The effects of direct habitat loss during project construction are expected to continue through the operation and maintenance phase, except for temporary disturbances such as laydown areas. ROWs established during project construction would be maintained during the operation and maintenance phase of a project. The method of vegetation management is expected to vary depending on topography, proximity to water, and ecosystem type. Vegetation maintenance is likely to be conducted using a combination of mechanical clearing, either by machine or hand, and herbicide application. The description of impacts on wildlife from direct habitat loss provided under Construction, above, would continue through the operation and maintenance phase. Typically, no new direct habitat loss occurs during the Operation and Maintenance phase, with the exception of minor and targeted clearing of adjacent vegetation that could be hazardous to the lines, such as hazard trees.

Birds

Transmission line operation and maintenance includes vegetation maintenance within an ROW through mechanical removal, hand cutting, and herbicide application. Disturbance of vegetation during the bird nesting period can lead to a decrease in bird density along the ROW (Bramble et al. 1986; Bramble et al. 1992). Decreased bird abundance and diversity are generally greater with maintenance that removes habitat structural complexity required to support nesting and foraging, such as mechanical clearing (Bramble et al. 1992).

Invasive plant species can also propagate along transmission line ROWs (see Section 3.5, Vegetation), potentially resulting in dense monocultures and reduced habitat complexity. Areas with extensive invasive plant infestations are generally associated with a reduction in bird biodiversity (Nelson et al. 2017).

Birds, particularly large-bodied birds like raptors, can use transmission line structures, such as lattice poles, as nesting structures. These structures are often used in open habitats (e.g., agricultural fields, shrubsteppe) where natural features are limited. Lines and poles can also provide perches for birds, providing a vantage point for foraging (Biasotto and Kindel 2018). Transmission facility structures may artificially increase limiting habitat features in open habitats but can also result in avoidance behavior for prey species (see Indirect Habitat Loss).

The impact of direct habitat loss on birds during the operation and maintenance phase would be consistent with the impact during construction as habitat loss initiated during construction would persist through operation and maintenance. As such, the impact of habitat loss could vary from negligible for facilities in urbanized or modified habitats to moderate for facilities in mature forest areas. Species that are able to use habitat in the ROW during the operation and maintenance phase could experience periodic habitat loss after vegetation maintenance; however, these habitats are expected to regenerate quickly and therefore the impact is considered low.

Mammals

As with birds, vegetation maintenance along an ROW can change habitat suitability for mammals. Cutting vegetation to ground level removes cover that could be used by small mammals. Multiple studies show that maintenance of native vegetation with proper cover for small mammals results in small mammal communities with greater diversity and abundance (Fortin and Doucet 2008; Ferrer et al. 2020).

Forest-dwelling, medium-sized mammals may not use habitat in a transmission project ROW as it does not provide the requisite features for their natural behavior. Generalist species such as coyotes, black bears, and Canada lynx, however, are expected to use habitat in the ROW for foraging (Dickie et al. 2020; Benoit-Pépin et al. 2024). ROWs may provide access for these generalist species to previously inaccessible areas, which can influence predator/prey dynamics.

Ungulates' use of ROW would vary between species adapted to forests and species that can use clearings and open grasslands. Reports of moose using ROWs versus forested habitat away from the ROW are variable, and selection of the ROW likely changes with the stage of plant regeneration (Hill 2003; Bartzke et al. 2014). ROW maintenance could temporarily reduce foraging for ungulates, with browsing increasing with plant regeneration (Hill 2003; Bartzke et al. 2014). However, while some studies show that certain ungulates prefer ROWs, some species may also avoid them (Bartzke et al. 2014). This is dependent on a variety of factors such as ROW width and vegetation management. Similarly, grasses and forbs that may grow along an ROW after maintenance could provide a food source for omnivores like bears. Bats may also use openings for foraging and could forage over ROW areas during operation.

The impact of direct habitat loss on mammals initiated during construction would persist through operation, and new direct habitat loss would be limited to ROW maintenance and periodic clearing of adjacent hazard trees that are at risk of falling into the transmission facility. The impact would depend on the habitat type impacted, the extent of the impact, and species of mammals impacted. It is expected that the impact might range from negligible to moderate. Generalist mammal species that can re-establish in ROWs, such as some species of rodent, may experience repeated habitat loss during line maintenance. Because these habitats can typically reestablish quickly, however, impacts are expected to be low.

Amphibians and Reptiles

Amphibian species that occur in naturally open habitat (e.g., shrubsteppe) or that can occur in cleared areas (e.g., western toad) could continue to use upland and wetted habitat in the ROW for breeding and living, depending on the level of habitat complexity that remains in the ROW. This is expected to be similar for reptiles that occur in open habitats. The ROW would continue to be considered habitat loss for forest-dwelling species. Similarly, reptiles may continue to use ROW habitat for living and shelter if suitable cover structures are available. The state-listed endangered and federally listed threatened Oregon spotted frog has found habitat in transmission line corridors, showing that with proper management and limited use of herbicides and pesticides, amphibians can make use of ROWs (Bonneville Power Administration 2019).

Periodic ROW maintenance may remove vegetation cover used by amphibians and reptiles for thermoregulation and shelter. As such, direct habitat loss could recur for amphibians and reptiles using the ROW; however, these habitat types are expected to reestablish quickly.

Direct loss of amphibian and reptile habitat initiated during construction would continue through operation along the ROW. Similar to construction, the impact of direct habitat loss would depend on site characteristics (disturbed or undisturbed) and the species present. The impact of habitat loss could range from nil for projects that do not interact with amphibian and reptile habitat (e.g., in urban or previously highly disturbed areas) to moderate for projects that occur in undisturbed habitats that contain unique features that support amphibian and reptile life requisites such as wetlands, talus slope, and streams.

Invertebrates

Invertebrate habitat lost during construction would generally persist through operation; however, butterfly and bee species richness and abundance have been reported to increase near transmission facilities. This is because management activities by utility companies typically keep vegetation at an early successional stage, which favors insects that rely on floral resources (Berg et al. 2016; Wagner et al. 2019; Twerd et al. 2021). In forested habitats, the conversion of tree-covered areas to open habitats with an increase of flowering plants and shrubs can be especially beneficial to pollinators (Berg et al. 2016). Invasive plant management within these corridors is important to provide a habitat dominated by native plants on the ROW.

The impact of direct habitat loss on invertebrates would depend on site characteristics (forested versus open), timing of construction activities, and the species present. However, given that habitat for some species may be increased by the creation of early seral stage habitat, it is expected that the impact of direct habitat loss during the operation and maintenance phase of a transmission facility could range from negligible to low.

Movement Corridors

Habitat in movement corridors lost during the construction of a transmission facility would continue to be lost through operation except for areas, such as laydowns and construction roads, that can be restored post-construction. Loss of habitat used for wildlife movement would be most pronounced in treed areas that cannot be reestablished under a transmission facility, and unique habitats, such as stopover locations. Periodic maintenance of the ROW may continue to disturb early seral stage habitats that are established under the ROW; however, these habitats are expected to be able to re-establish rapidly.

The impact of direct loss of movement corridors during project construction would continue through operation and would vary depending on the type of habitat that was removed and the extent of similar habitat available to wildlife. As such, the impact of habitat loss during the operation and maintenance phase is expected to range from negligible to high. A high-impact loss of movement corridors could include loss of unique stopover locations known to support migratory birds as loss of these features could result in a population collapse.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of direct habitat loss on birds, mammals, amphibians, invertebrates, and migration corridors, without mitigation measures incorporated, is anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fish

Regular riparian vegetation maintenance would be required during operation and maintenance to prevent vegetation from interacting with or falling onto transmission facilities. Clearing/maintenance of riparian zones and alteration of stream banks can cause direct habitat losses to fish and aquatic species, as described for construction, above.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of direct habitat loss on fish, without mitigation measures incorporated, is anticipated to vary and could be nil to low.

Special Status Species

Forest, woodland, and shrub habitats that support special status species lost during construction would remain lost during project operation, reducing the capacity of these systems to support special status species that rely on these habitat types. Special status species that are adapted to open habitats may be able to recolonize habitat in an ROW during the operation and maintenance phase. For example, Mazama pocket gopher has been reported to colonize transmission line corridors as they can provide open habitat, which this species prefers (Stinson 2020). However, corridors can become overgrown with invasive plant species, which limits their usability (Stinson 2020). With management practices focusing on providing habitat for priority species, transmission facilities have potential to continue to provide modified habitat.

Northern spotted owl, marbled murrelet, and other species that exist in forested habitats would be susceptible to direct habitat loss from transmission line development. The old-growth forests that these species use have already been highly impacted by forestry and development, and further habitat loss and fragmentation would jeopardize their recovery and continued existence.

Special status species may continue to be disproportionately affected by habitat loss during construction as these groups typically rely on rare habitats, have restricted ranges, have small population size, and face increased risks of extirpation from the state or extinction.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of direct habitat loss on special status species, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Indirect Habitat Loss

Sources of indirect habitat loss that occur during construction of a transmission facility, such as construction-related noise and light, would not persist into the operation and maintenance phase. Maintenance of a transmission facility would require periodic repairs and vegetation maintenance. These are expected to be infrequent activities and not a substantial source of disturbance to wildlife; however, physical and biological changes to habitat along the edge of an ROW (edge effect) that were initiated during construction would continue through operation and maintenance. Edge effects are expected to be most pronounced in forested areas, where contiguous ecosystem type cannot be maintained under the transmission line. Disturbance to wildlife from mechanical noise and light would occur periodically during line or ROW maintenance but would be less frequent and intense than during the construction phase. In addition, transmission lines may introduce new sources of noises generally from the hum of electricity in the wire, corona discharge,[202] and noise created by wind passing over wires and structures. Unlike construction noise, transmission line noise is expected to be low level and consistent. As such, wildlife are more likely to habituate to the noise source than the type of intermittent loud sounds emitted during construction.

EMFs produced by transmission facilities are a source of indirect habitat loss that would be introduced during the operation. The response of wildlife to EMFs has not been well studied, and the extent of the effect is not well understood (Biasotto and Kindel 2018).

Finally, improved human access to previously inaccessible areas due to new access roads and cleared ROW can disturb wildlife on or near the ROW.

Birds

Birds may avoid habitat adjacent to the ROW during project operation due to continued disturbance, perceived predation risk near the forest edge, and electromagnetic radiation. For example, a study in the subarctic found that density of ground-nesting birds was lower within 50 meters (164 feet) of transmission facilities than approximately 450 to 500 meters (1,476 to 1,640 feet) away (Pálsdóttir et al. 2022). This could be related to an increase in perceived predation risk or due to the introduction of electromagnetic radiation and noise in the landscape, as transmission facilities can emit ultraviolet (UV) light not perceivable to humans (Pálsdóttir et al. 2022). Not all bird species in the study were affected by transmission facilities, with some breeding with the same density near and far from the facility. This study suggests that transmission facilities could cause indirect habitat loss through sensory disturbance not detectable to humans.

Another study found that greater sage-grouse and lesser prairie-chickens avoid areas up to 0.6 and 0.5 km (0.4 and 0.3 miles) from transmission facilities, respectively, while others, such as northern bobwhite (*Colinus virginianus*), appear to be indifferent to transmission line presence at distances less than 0.25 km (0.15 miles) (Biasotto and Kindel 2018).

Improved human access to previously inaccessible areas along transmission line ROWs may have local negative effects on birds of prey, such as eagles, which are vulnerable to human disturbance (Manitoba Hydro 2010).

The impact of indirect habitat loss on birds due to the operation and maintenance of a transmission line would vary depending on the habitat and the sensitivity of bird species to features of a transmission facility, such as EMF and the presence of tall structures. As such, the impact of indirect habitat loss is expected to range from negligible in urbanized areas, where species are able to co-exist with human infrastructure, to moderate for facilities located in more natural areas or near populations of species that are more sensitive to EMF or edge effects.

[202] A discharge of electricity at the surface of a conductor or between two conductors on the same transmission line. There is often an ionization of the surrounding atmosphere and power loss and noise produced.

Mammals

Non-aerial mammals are likely to continue to respond to indirect effects from edge habitat initiated during construction. New noises generated from the transmission facilities may continue to deter mammals from using habitat under the transmission lines and in adjacent ecosystems.

Transmission lines emit low-frequency EMFs that are thought to cause bats to avoid transmission line corridors and may impact their migration paths and movement (Zastrow 2014; Froidevaux et al. 2023). However, bats can be attracted to transmission facilities during high-humidity conditions. Their attraction stems from insects moving toward transmission facilities in these conditions due to the UV light emitted as corona discharges. This attraction does not pose a direct threat to bats as they are able to avoid transmission lines, but it does change their foraging habits.

The impact of indirect habitat loss on mammals during the operation and maintenance phase of a transmission facility is expected to be most pronounced for species that need continuous habitat and avoid edge habitat, as well as species sensitive to EMF. However, there are limited data concluding that mammals avoid transmission corridors due to EMF. The impact of indirect habitat loss on mammals could range from negligible in areas with higher existing levels of disturbance and species that are adapted to co-existing with humans to low for species that generally avoid edge habitat.

Amphibians and Reptiles

Amphibians may be sensitive to electromagnetic radiation, along with chemical pollutants such as herbicides and pesticides, decreased water quality, exposure to novel pathogens,[203] and habitat loss, which have all likely contributed to population declines in amphibians and an increase in deformities (Balmori 2006). Electromagnetic radiation from cellphone towers has been linked to increased deformities, a decrease in movement coordination in tadpoles, and a subsequent increase in mortality (Balmori 2010). However, the effects of extremely low-frequency electromagnetic fields (ELF EMFs), such as those emitted by transmission facilities, on amphibians are not well understood.

Use of herbicides to control vegetation along the ROW during maintenance activities could degrade water quality of ponds and pools in and adjacent to the ROW if chemicals are used near these features. Degradation of these features could lead to continued indirect loss of amphibian aquatic breeding habitat through operation.

The impact of indirect habitat loss on amphibians and reptiles would vary depending on the proximity of the facilities to unique habitat, such as amphibian breeding ponds, sensitivity of species to EMF, and the procedures implemented to apply herbicides and other chemicals during operation. The impact of indirect habitat loss on amphibians and reptiles during project operation and maintenance is expected to range from nil for projects located away from amphibian habitat to low with the application of standard BMPs that would reduce herbicide use near waterbodies.

Invertebrates

Terrestrial invertebrates, such as insects, can perceive EMFs and UV light not detected by humans. For example, transmission facilities emit ELF EMFs, which have been shown to affect honeybees (*Apis mellifera*) by reducing learning abilities; changing flight, foraging, activity, and feeding patterns; and increasing aggression (Shepherd et

[203] A pathogen that a population has never experienced before. A pathogen is a bacteria, fungus, parasite or virus which can cause disease in its host.

al. 2019). Changes to honeybee behavior could impact their ability to pollinate plants and crops. Bees contribute approximately 80 percent of insect pollination, so this could impact vegetation and habitat for other wildlife.

Insects like butterflies, flies, ants, bees, and cockroaches can detect ELF EMFs and use them for movement and navigation. High-voltage transmission facilities emit levels of EMF that mimic real-world phenomena like electrical storms and can impact insect behavior and physiology and, potentially, their distribution. Changes to insect distribution can have whole-ecosystem impacts, including on plant and animal species.

In addition, invertebrates are attracted to the UV corona light emitted from transmission facilities (Zastrow 2014; Froidevaux et al. 2023). This can change the abundance of invertebrate and predator/prey dynamics.

The extent to which invertebrates might respond to EMF, ELF EMF, and UV corona light is not well understood but is expected to change invertebrate behavior near facilities. The impact of indirect habitat loss on invertebrate populations during operation is expected to range from negligible to low, depending on the types of invertebrates occurring near the facilities.

Movement Corridors

Sources of potential indirect habitat loss in movement corridors would be the same as those described above, including edge effect, noise associated with the transmission facilities, and EMF. The impacts on wildlife from indirect habitat loss in movement corridors would also be similar to what has been described for guilds above, except that these impacts may be more pronounced as movement corridors are typically important and limiting features on the landscape. Degradation of these areas can disproportionately affect wildlife’s ability to access adjacent habitats. The impact of indirect habitat loss on movement corridors could vary from negligible to moderate depending on site characteristics (e.g., stopover locations), the species affected, and the season.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of indirect direct habitat loss on birds, mammals, amphibians, invertebrates, and migration corridors, without mitigation measures incorporated, is anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fish

Increased human activity, pollution, and changes in land use can cause indirect habitat loss for fish and aquatic species. Herbicides entering streams harm fish and fish habitat. Maintenance of ROW involves chemical or mechanical control of vegetation, which can contribute to the loss of native plant species diversity, and cleared ROW may be a continuous source of sedimentation into waterways (USFWS 2024a). Roads can also increase runoff and erosion into watercourses, which is detrimental to fish and fish habitat (Knight 2009).

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of indirect habitat loss on fish, without mitigation measures incorporated, is anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Special Status Species

The indirect impacts of transmission facilities on special status species are expected to be similar to the impacts described above, except that populations of special status species may be less resilient to changes in their habitat. For example, transmission facilities have been directly correlated with long-term negative impacts on habitat suitability for greater sage-grouse (LeBeau et al. 2019). A six-year study in Wyoming during the nesting, brooding-rearing, and summer periods found that sage-grouse selected leks further from transmission facilities constructed in high-quality habitat. This study also suggests that transmission facilities reduce habitat suitability for sage-grouse by increasing predation risk by providing avian predators more locations for perching (LeBeau et al. 2019).

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of indirect habitat loss on species status species, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Mortality

Electrocution and collisions with the transmission lines and other overhead structures are the primary causes of wildlife mortality during the operation and maintenance phase. Risk of collision is greatest for aerial species such as birds and bats. Wildlife mortality could also occur through changes in predator-prey dynamics and collisions with maintenance equipment and vehicles.

Birds

Electrocution and collisions with transmission lines are the primary sources of mortality for birds during the operation and maintenance phase of an overhead transmission facility. It is estimated that between 8 and 57 million birds are killed each year in the United States from collisions with transmission lines and another 0.9 to 11.6 million are killed by electrocution (Loss et al. 2014). Electrocutions occur primarily at distribution lines, but collisions occur at both distribution and transmission lines (Loss et al. 2014).

Electrocution risk depends on several factors, including biological factors, habitat, and engineering design. Body size is one of the most important factors in electrocution risk, as birds with greater wing spans are typically at greater risk of electrocution due to the risk of both wings touching two energized conductors (APLIC 2006). For electrocutions to occur, fleshy parts of the bird such as the bill, feet, or wrist (i.e., bend in the wing) need to connect the conductors, as feathers act as insulators. Raptors, such as eagles, hawks, and owls, are particularly vulnerable to electrocutions, especially since they tend to use transmission poles as perches in open areas. Eagles are most often electrocuted, followed by hawks in the genus *Buteo*, and golden eagles are at a much higher risk than bald eagles. It is estimated that 504 golden eagles are electrocuted annually in the United States (USFWS 2016). This is attributed to many old transmission lines not being properly retrofitted to be avian safe and providing perching spots in golden eagle habitat. Owls are also electrocuted, but less often than diurnal[204] raptors. The great horned owl is the most commonly electrocuted owl in North America (APLIC 2006), but snowy owls (*Bubo scandiacus*) have also been known to be electrocuted (APLIC 2006). Another group of birds susceptible to electrocution are corvids (i.e., crows, ravens, and magpies). Common ravens are the most impacted bird in some parts of North American (APLIC 2006). Small birds can also be electrocuted when closely spaced energized equipment is present, such as on transformers, though they are much less vulnerable than larger species (APLIC 2006).

Habitat is the second key factor that can lead to avian electrocution. In habitats where natural perches are limited, especially for raptors in areas with sparse vegetation, transmission line poles, and towers are frequently used for

[204] Active during the day.

perching, hunting, roosting, and nesting. Transmission lines in forested habitats where natural perches are abundant typically have fewer reported electrocutions than those in open habitats (APLIC 2006).

Engineering design is the third key factor in avian electrocution risk, as described below:

a. Electrocutions can occur when the distance between two energized components, or an energized and a grounded component, is less than the distance between the wrists of a bird or between the head and the feet. Avian-safe construction standards presented by the Avian Power Line Interaction Committee (APLIC) (APLIC 2006) suggest that the minimum distance between energized conductors and grounded hardware should be 150 cm (60 inches) (APLIC 2006). High-voltage transmission facilities are typically safer than low-voltage facilities because they typically have larger separation between phase conductors (APLIC 2006).

b. Distribution poles made of wood are typically safer than metal ones (APLIC 2006).

c. The presence of grounded or bonded hardware on top of pole assemblies typically increases the risk of avian electrocution as there is more energized or grounded hardware in close proximity (APLIC 2006).

d. Metal crossarms can pose additional electrocution potential, as electrocutions can occur from contact with a phase conductor and a crossarm (APLIC 2006).

e. Transformers are known to cause a disproportionate number of avian electrocutions, as are other structures with energized equipment that is exposed (APLIC 2006).

f. Energized jumper wires, such as those found on dead-end distribution structures that accommodate line terminations, directional change, and lateral taps, can pose electrocution risks, especially if they are mounted over the crossarms (APLIC 2006).

g. Armless pole configurations can result in avian electrocutions if the conductors are mounted on horizontal post insulators, where a perching bird can simultaneously contact the energized conductor and either the grounded insulator base or a bonding conductor (APLIC 2006).

Bird collisions with transmission lines can be another source of mortality. Mortality estimates for grassland birds have been estimated as 50 deaths per kilometer of transmission line during one migration and one breeding season (Martin et al. 2022). Collision risk is related to several factors, including biological, environmental, and engineering.

Biological factors related to collision risk in birds include morphology, behavior, and vision capabilities. In general, birds with high wing loading (i.e., the ratio of body weight to wing area) and a low wing aspect ratio (i.e., ratio of the square of the wingspan to the wing area) are more susceptible to collisions with transmission lines because they lack the maneuverability to quickly avoid obstacles (APLIC 2012; Smith and Dwyer 2016; Bernardino et al. 2018). Groups of birds that are at the greatest risk of collision include grouse, pelicans, and cranes (Martin et al. 2022). Waterfowl are also susceptible to transmission line collisions, due to their heavy bodies and fast flight style (APLIC 2012; Smith and Dwyer 2016; Bernardino et al. 2018). Collisions with transmission lines have been reported as one of the main causes of population decline in birds, including rare species (Biasotto and Kindel 2018). The cumulative effects of transmission line mortality may take decades to become apparent, at which point the impact on a species may be irreversible (Biasotto and Kindel 2018).

An indirect impact of avian electrocution by transmission lines is the potential for electrified birds to ignite and cause wildfires. A study in 2022 compiled 44 reports in California from 2014 to 2018 on fires ignited by avian electrocutions and urged utility companies to create avian-safe transmission lines to reduce these fires (Barnes et al. 2022).

Environmental factors such as surrounding habitat and landscape features can affect birds' exposure to transmission facilities. Transmission lines that are perpendicular to topographic features that concentrate flight paths, such as coastlines, rivers, mountain passes, and ridges, may pose greater collision risk than when they are parallel (APLIC 2012). Transmission lines located in or near areas of high avian use (e.g., foraging, nesting, or roosting sites) may increase exposure and collision risk. This appears to be especially true when high-use areas are separated by only a short distance because birds typically fly between them at low altitudes, potentially within the range of heights of transmission facilities. Conversely, transmission lines that are in forested habitat and are at or below the height of the surrounding trees generally present low collision risk because birds would be flying at higher altitudes than the canopy and consequently avoid the transmission line (Thompson 1977; APLIC 2012; Bernardino et al. 2018).

Finally, engineering factors such as wire diameter, line placement, line configuration (e.g., vertical or horizontal arrangement of phase conductors), line height, and span length can all contribute to bird collision risk. A study on the use of near-UV light to reduce sandhill crane collisions with transmission lines demonstrated potential novel ways to reduce avian mortality (Dwyer et al. 2019).

Vegetation maintenance within transmission line ROWs has the potential to result in bird mortality through destruction of nests containing eggs or young, if it is conducted during the bird nesting season. Herbicide application to control vegetation growth below transmission lines may lead to negative effects on bird development and physiology. More research needs to be done to determine long-term impacts of herbicides on avian development (Ruuskanen et al. 2020).

With the application of standard BMPs, such as those prepared by APLIC (2006, 2012) for reducing avian collision and electrocution risk, the impact of mortality for birds during operation and maintenance is expected to range from nil to low, depending on their location relative to areas of high bird use and flight paths.

<u>Mammals</u>

Mammals are at risk of mortality from transmission facilities due to both electrocution and the effects that linear features can have on predator-prey interactions. There is evidence of large mammals being electrocuted by transmission lines, including cougars in the United States and Eurasian lynx (*Lynx lynx*) in Iran (Martín Martín et al. 2022), though it is unclear how serious of a threat electrocutions are to large mammals. Evidence of other mammalian species being electrocuted by transmission facilities has been observed in other countries, and the effects of transmission line electrocutions globally is poorly understood (Martín Martín et al. 2022).

The presence of linear features, such as transmission line corridors, in landscapes has been shown to change predator-prey dynamics, primarily between ungulate species such as moose and woodland caribou (*Rangifer tarandus caribou*) and their predators such as wolves, black bears, and Canada lynx (Dickie et al. 2020; Benoit-Pépin et al. 2024). The presence of linear features in boreal ecosystems is associated with population declines of woodland caribou due to the reduction in areas where caribou can hide during calving and the increase in access for wolves (DeMars and Boutin 2018). White-tailed deer fawns have also been observed to experience greater mortality closer to linear features, probably because predators have better olfactory detection and hunting success in areas that have been cleared for linear features (Johnson-Bice et al. 2023).

Small mammals may experience greater predation near transmission facilities that raptors are using for perching. This effect could be difficult to detect when transmission line corridors can provide quality habitat for some small mammals (Fortin and Doucet 2008).

Transmission ROWs and access roads can increase human use in areas not previously accessible due to terrain or forest. This can lead to increased hunting pressure on species that are subject to hunting. Transmission line ROWs are a preferred area for hunting moose (Bartzke et al. 2014). In a study conducted by Goodwin (1975), 89 of 107 hunters said they were hunting in a transmission line ROW.

Less is known about collisions and electrocutions of bats than birds. Large fruit-eating bats can be prone to electrocution, but these species are much larger than the bat species in Washington, and they have different life history strategies (Tella et al. 2020). Bats have been found in bird mortality searches around transmission facilities, though little is known about what causes them to collide with transmission lines and what mitigation could reduce these mortalities (Manville II 2016). It is possible that the same BMPs suggested by APLIC, including line marking, could benefit bats as well (APLIC 2006, 2012; Manville II 2016).

The impact of mammal mortality during operation and maintenance of overhead transmission facilities is expected to range from nil in areas with limited habitat and low wildlife abundance, to negligible for facilities in areas with higher-quality habitat.

Amphibians and Reptiles

Vehicle traffic on access roads is expected to be lower during the operation and maintenance phase than during construction; however, there is still risk of amphibian mortality from vehicle strikes, especially if access roads are also used by public vehicles (Fukumoto and Herrero 1998; Wagner et al. 2021). Arboreal snakes and even amphibians have been electrocuted in other parts of the world, but it is unlikely that the amphibians and reptiles in Washington would be at risk of this due to behavioral differences (Martín Martín et al. 2022).

Use of herbicides near amphibian breeding sites along the ROW could also result in decreased survivorship of eggs and tadpoles. Lab studies have shown that a common herbicide, Roundup Regular, whose active ingredient is glyphosate, was lethally toxic to several amphibian species of the Pacific Northwest at concentrations within the safe drinking levels identified by the U.S. Environmental Protection Agency (King and Wagner 2010).

Ditches and artificial ponds created at borrow pits can become populated by native and invasive amphibian species, such as American bullfrog and African clawed frog, during the operation and maintenance phase. Introduction or proliferation of invasive species can lead to native amphibian mortality through competition and disease spread as well as predation (WISC 2025). While this mortality risk is possible, it is expected to be managed through proper site closure and ditch design.

The impact of amphibian and reptile mortality during operation and maintenance of overhead transmission facilities is expected to vary from nil to low depending on the proximity to sensitive features (e.g., wetlands, hibernacula), vehicle traffic, and vegetation management techniques.

Invertebrates

Invertebrates are expected to have some level of mortality from vehicle strikes on access roads, as described in the Mortality section for the Construction phase, above, and from the potential effects of EMF. There would be less traffic during transmission line operation; however, corona discharges from transmission facilities could attract insects to the ROW, increasing mortality from vehicles (Froidevaux et al. 2023).

The impact of invertebrate mortality during operation and maintenance of overhead transmission facilities is expected to vary from nil to low, depending on habitat characteristics and vehicle traffic.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of mortality on birds, mammals, amphibians, and invertebrates, without mitigation measures incorporated, is anticipated to vary and could be nil to low.

Fish

Linear projects such as transmission facilities and their access roads have the potential to create or increase access to previously inaccessible fishing areas, which may affect fish populations, depending on the remoteness of the population and the number of fishers that may take advantage of the new access (Manitoba Hydro 2010; Cott et al. 2015).

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of mortality on fish, without mitigation measures incorporated, is anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Special Status Species

Potential sources of mortality for special status species are electrocution, collisions with lines and vehicles, changes in predator/prey dynamics, maintenance activities, and use of herbicide. As these species are generally protected, hunting pressure is not expected to increase their mortality. These populations are typically small or are in decline and are unable to adapt to increased mortality. As such, populations may become vulnerable if they lose even a few individuals. For example, greater sage-grouse and Columbian sharp-tailed grouse are both negatively affected by transmission line development, which creates perches for raptors and results in increased predation risk for grouse (Stinson and Shroeder 2012).

The impact of mortality on special status species during operation and maintenance of overhead transmission facilities is expected to vary depending on the species and habitat characteristics. Impacts could range from nil in areas with limited habitat to moderate in areas with higher quality habitat. Due to the typically small or declining population size of special status species, relatively few mortalities could result in lower abundance.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of mortality on special status species, without mitigation measures incorporated, is anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Barriers to Movement

Barriers to movement occur when infrastructure bisects a movement corridor or habitat, reducing or preventing wildlife movement between habitat patches. These barriers can be physical constraints, such as fencing, but also include perceived barriers, such as forest openings, roads, and transmission facilities. While linked to habitat fragmentation, barriers to movement can occur in already fragmented landscapes where wildlife persists. Barrier effects on wildlife can be relatively short-term and limited to the construction phase of projects or can be long-term over the life of a project until restoration occurs. Vehicle traffic can also result in barriers to movement on a daily or seasonal scale.

Clearing for transmission line corridors can create access to a previously inaccessible area, increasing propagation of invasive plant species, particularly near urban centers and agricultural areas. ROW corridors also provide access for recreational activities like all-terrain vehicle riding, snowmobiling, hunting, trapping, gathering, fishing, and hiking (Manitoba Hydro 2010). A study by Lewis et al. (2021) reported that human recreation increased wildlife mortality, spatial and temporal avoidance of trails, altered behavior, and prevalence of invasive species and reduced fitness across wildlife species. Wildlife sensitivity to human presence is species dependent. Wildlife that are moderately to highly sensitive to human presence, like black bear and bobcat, will shift their daily activity patterns to avoid times of day when humans are most active. Diurnal and crepuscular[205] species were the most impacted by human presence and shifted their activity patterns the most, while nocturnal species showed the least amount of activity shift in response to human presence (Lewis et al. 2021).

Many species move throughout the landscape annually or seasonally, following food or shelter resources, to survive. For migratory animals, movement may be over hundreds or thousands of miles. Migration routes are often used by multiple generations of animals. Human land development like transmission line corridors creates obstacles and barriers that can impede movement during migration, which can lead to increased wildlife mortality (TOCS 2024).

Birds

Most movement barriers for birds are perceived, not physical. Features that birds perceive as barriers can affect local or landscape-level movements such as movements within a home range, seasonal movements, or dispersal (Harris and Reed 2002). Considering that birds migrate across whole continents and large bodies of water, transmission facility development is not expected to be a physical barrier for birds. However, it may be a perceived barrier. Birds may change their flight patterns to avoid transmission facilities, indicating that some birds may view transmission facilities and tower guy wires as barriers (Biasotto and Kindel 2018; TOCS 2024).

The permeability of perceived barriers to movement varies among species based on differences in flying ability, habitat preference, and vulnerability to predation, among other things (Bélisle and St. Clair 2001). At the population level, barriers to movement can influence site occupancy, genetic diversity, and population persistence[206] (Tremblay and St. Clair 2011). Forest birds, specifically, may perceive transmission line ROW as a barrier to movement. Forest bird movements can be influenced by gaps in forest cover as small as 50 meters (164 feet) (Desrochers and Hannon 1997; St. Clair et al. 1998). Empirical studies have reported that increased habitat gap width reduces its permeability to movement[207] for forest songbirds (Langlois et al. 2023).. A literature review by Harris and Reed (2002) summarized threshold distances for 24 temperate forest bird species from studies using recordings to lure birds across habitat gaps, translocation experiments,[208] and observational studies. A threshold distance is one where a small change in distance produces an abrupt reduction in the probability of movement across habitat gaps (Harris and Reed 2002). For small bird species, reported threshold distances were typically less than 100 meters (328 feet), though distances over 200 meters (656 feet) have been reported for several woodpecker species, including 600 meters (1,969 feet) for northern flicker (*Colaptes auratus*) (Harris and Reed 2002).

---

[205] Active primarily during dusk and dawn.

[206] The ability of a population of organisms to continue living.

[207] Describes an area's ability to allow animals to move through it. An area with low permeability will allow less movement through it, and an area with high permeability will allow more movement.

[208] An experiment which involves moving an organism from one place to another to see how it adapts and if it can colonize the area.

Little is known about the effects of introduced linear barriers on raptors and herons. Avoidance behavior has been reported in migrating raptors, though this is predominantly associated with new wind power facilities, which include tall infrastructure and generally cover large areas (Cabrera-Cruz and Villegas-Patraca 2016). Human activity has been linked to nest abandonment in great blue herons; however, this species is also capable of habituation, including where both human pedestrians and vehicles are active below colonies (Butler 1997; Vennesland 2000). Further, great blue herons exhibit movement patterns between colony sites and foraging areas of such a distance where it is likely that individuals routinely cross habitat gaps (Butler 1991).

The impact of barriers to movement on birds during operation and maintenance of overhead transmission facilities is expected to vary from nil in open habitats, where the ROW would not constitute an abrupt change in habitat type, to low in habitats such as mature forest, where the ROW may constitute a perceived barrier to movement for some bird species that inhabit the forest interior.

Mammals

Barriers to mammal movement vary across this taxonomic group. Ungulate distribution and density are impacted by transmission line ROW, likely due to higher risk of predation, hindered movement, and decreased habitat quality. However, some studies have found that ungulates are not negatively impacted by transmission facilities and react neutrally toward them (Biasotto and Kindel 2018). In a study conducted by Goodwin (1975), 89 of 107 hunters said they were hunting in a transmission line ROW, suggesting that these areas continue to support ungulates and are permeable to movement by this group of mammals.

Depending on the species, some mammals may use linear features for dispersal or hunting, but others may avoid fragmented landscapes. It is well documented that predators prefer to use open spaces and human trails as travel corridors. This provides predators with easier access to prey and restricts prey movement (Kays et al. 2017). Ungulate species, such as caribou and moose, tend to avoid linear features and fragment landscapes, as these can be used by their predators for hunting (Dickie et al. 2020; Benoit-Pépin et al. 2024).

Due to their size and relatively limited mobility, small mammal movements are constrained by multiple types of natural and anthropogenic barriers, such as transmission line ROW and roads. Small mammals are generally deterred from open linear features due to factors such as lack of cover from predators, disturbances from human activity, and changes in ground surface conditions (e.g., a hard road surface) (Oxley 1974; Gerlach and Musolf 2000; Lambert et al. 2014). For small forest-dwelling mammals, transmission line ROW may present a nearly impassable barrier due to the loss of canopy cover that negatively impacts their movements (Biasotto and Kindel 2018).

Bats' responses to transmission facilities as barriers to movement vary by species and life requisites. Bat species that use open habitat and fly at higher altitudes may avoid transmission facilities altogether (Kahnonitch et al. 2018; Froidevaux et al. 2023). Avoidance of transmission facilities may be more common in low-humidity climates, where there are few corona discharges that attract insects (Froidevaux et al. 2023). Why bats avoid transmission facilities is poorly understood but could be associated with ELF EMFs emitted by transmission facilities, potentially combined with the physical presence of transmission line structures.

The impact of barriers to movement on mammals during operation and maintenance of overhead transmission facilities is expected to vary from nil, as in the case of some large mammals that regularly cross or travel along ROWs, to moderate for some forest-dwelling small mammal species that may avoid crossing ROWs with unsuitable habitat.

Amphibians and Reptiles

Connectivity between breeding, hibernation, and living habitats is important for amphibian population persistence but is frequently lost or modified by land development Chan-McLeod 2003; Rothermel 2004). Temporary ponds and wet depressions are important for thermoregulation during dry summer months, outside of breeding. Non-breeding waterbodies also provide “stepping stones” for juvenile amphibians during dispersal and are important for colonization/re-colonization of new habitat (Mazerolle and Desrochers 2005). Linear developments, such as transmission facilities, can create barriers to amphibian movement, and, due to their size and relative lack of mobility, amphibians may not be capable of navigating over linear features and substantially modified habitat. Gravel and regularly maintained areas also have different microclimatic conditions than naturally vegetated areas. This can increase amphibians’ risk of desiccation,[209] particularly in dry weather, and may lead to avoidance of these areas as amphibians elect to move through moist, vegetated areas instead (Ervin et al. 2001; Gravel et al. 2012). Transmission ROW may limit habitat and population connectivity for small vertebrates like salamanders, but reptiles do not seem to be similarly impacted (Biasotto and Kindel 2018).

Transmission line ROWs may facilitate human access to previously inaccessible wildlife habitat. In a review of 274 scientific papers examining the effects of recreation on wildlife, Larson et al. (2016) observed that 59 percent of the impacts caused by recreation on wildlife were negative. Those negative effects were most frequently documented for reptiles, amphibians, and invertebrates (Colorado State University 2016; Larson et al. 2016). Human recreation in urban areas does not have as much of an impact on wildlife communities as recreation in rural or undeveloped areas (Kays et al. 2017).

The impact of barriers to movement on amphibians and reptiles during operation and maintenance of overhead transmission facilities is expected to vary from nil to moderate, depending on habitat characteristics. The impact would be greatest where ROWs present a barrier to movement between habitats used for breeding, dispersal, and hibernation.

Invertebrates

There is limited research on the barrier effects of transmission lines on invertebrate populations. The creation of linear transmission line corridors can resemble vegetation in managed semi-natural grasslands that are kept in an early successional stage, thus creating novel habitats. However, a study of the diversity of plants and insects along transmission lines found that, although plant diversity increased, there was no increase in insect diversity along transmission line corridors (Dániel-Ferreira et al. 2020). However, other studies on insect diversity have identified higher diversity in transmission line ROW than in surrounding habitats (Berg et al. 2016; Wagner et al. 2019; Twerd et al. 2021). This is likely dependent on the habitat type and surrounding vegetation community.

A potential barrier for insects is the effect of ELF EMF. Insects use EMF to orient themselves and move in the desired direction. Interference by ELF EMFs may negatively impact the ability of insects to orient themselves, which could potentially impact migratory insect species (Balmori 2015).

The impact of barriers to movement on invertebrates during operation and maintenance of overhead transmission facilities is expected to be similar to that described for construction. It is expected that the impact would vary from nil in areas that have been highly modified to low in habitats that would be substantially modified along the ROW (e.g., forests).

[209] The act of drying up.

Movement Corridors

Movement corridors are paths taken by wildlife to move between habitats or undertake long migration and are typically used by generations of wildlife to move across the landscape. Changes to these routes can have a pronounced impact on the wildlife populations that use them. Wildlife's response to linear corridors varies by species and by project type. For example, moose will generally cross transmission lines but are more resistant to crossing roads (Bartzke et al. 2015). Columbian sharp-tailed and greater sage-grouse avoid linear features and tall structures on the landscape, so corridors for movement without these features are important to prevent genetic isolation of populations (Stinson and Schroeder 2012; Stinson 2017).

Migratory ungulates in Washington, such as mule deer and elk, can be affected by linear features such as roads, where busy roads can become movement barriers (Kauffman et al. 2022). If public recreational activities such as all-terrain vehicle riding, snowmobiling, and dirt biking, become common on transmission line access roads, movement barriers for ungulate species could be created. Energy development has been known to affect ungulate movement by changing the amount of stopover time at migration sites, causing mismatches between optimal forage timing and migration timing (Kaufmann et al. 2022; Sawyer et al. 2013). However, the effects of linear features such as pipelines and transmission lines on ungulate migration are still not well understood (Sawyer et al. 2013).

Wildlife corridors, such as those identified in the Columbia Plateau by the WHCWG, are key areas with high levels of habitat connectivity that provide important corridors for wildlife (WHCWG 2012). More than half of the Columbia Plateau ecoregion has been converted to agricultural land or altered by other development, and the remaining habitat is fragmented by these practices and restricted to areas that are less suitable for agriculture (WHCWG 2012). This makes maintaining the remaining intact and interconnected shrubsteppe in the Columbia Plateau a priority for conservation, as several species that inhabit these areas require corridors to move among populations. WHCWG (2012) stated that future infrastructure projects "warrant appropriate consideration of connectivity effects in this area."

The Pacific Flyway is an important migration corridor for migratory birds in western North America every spring and fall, when billions of birds move from their wintering to breeding grounds (Newcombe et al. 2019). Reducing barrier effects on migrants and maintaining quality habitat in the flyway such as wetlands, mudflats, and other foraging areas are important to support migratory populations and reduce continued declines of these populations. While many migratory birds, especially smaller guilds, are not expected to have substantial movement constraints associated with linear features, larger migrants that are susceptible to collisions with transmission lines, such as sandhill cranes, could experience movement changes from transmission lines.

The impact of barriers to movement during operation and maintenance of overhead transmission facilities in movement corridors is expected to be similar to that described for construction. It is expected that the impact would vary from nil for projects sited outside of migratory corridors, to moderate for projects sited in modeled migratory routes for wildlife.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of barriers to movement on birds, mammals, amphibians, invertebrates, and migration corridors, without mitigation measures incorporated, is anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fish

Barriers to habitat for fish and aquatic species during operation of transmission lines are similar to those outlined above for construction.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of barriers to movement on fish, without mitigation measures incorporated, is anticipated to vary and could be negligible to low.

Special Status Species

The impact of barriers to movement on special status species during operation and maintenance of overhead transmission facilities is expected to be similar to that described for construction. Transmission line ROWs are expected to create barriers to the movement for special status species similar to those for other species within the same guilds. It is expected that the permeability of transmission lines to special status species would vary by species and landscape and would need to be considered on a project-by-project basis. In general, cleared ROWs are expected to create more barriers in forested areas where the removal of canopy cover may limit wildlife movement. However, in open areas, transmission line poles provide perch sites that can be used by raptors, which can change predator-prey dynamics and result in prey species avoiding crossing the lines. For example, greater sage-grouse and Columbian sharp-tailed grouse are both negatively affected by transmission line development in their habitat due to their prey species' avoidance of tall structures, which could cause movement barriers (Stinson and Shroeder 2012).

It is expected that the impact would vary from nil in areas that do not support these species to high, particularly in forested habitats where a linear overhead transmission line may create an impassable barrier for smaller, less mobile species.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of barriers to movement on special status species, without mitigation measures incorporated, is anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fragmentation

Fragmentation of large tracts of habitat into smaller patches can result in indirect habitat loss through edge effect, create barriers to movement, reduce biodiversity, change nutrient cycling, and cause changes to gene flow (Haddad et al. 2015).

Habitat can be fragmented in several ways, the most obvious example being the clearing of land to accommodate a project. Fragmentation can also occur through widening existing clearing as the increased distance between habitat patches can reduce wildlife movement and gene flow between the patches. Fragmentation can also occur through increasing the length of the edge of an ecosystem, resulting in increased indirect habitat loss (Haddad et al. 2015). In addition to physical changes in ecosystems, habitat can be fragmented through creation of barriers to movement (discussed in the preceding section).

Approximately one-quarter of the remaining forested ecosystems in the western United States are critical to maintaining wildlife movement over the landscape (habitat outside of this area is critical to support living habitat); however, residential development, roads, and highways have resulted in a loss of 4.5 percent of these habitats, and another 1.2 percent are predicted to be lost by 2030 (Theobald et al. 2011). Fragmentation of ecosystems in Washington has occurred through several changes on the landscape, including urban development, energy development, and forestry. As of 1991, less than 20 percent of Washington's old growth forest remained, and the remaining patches may have been degraded by fragmentation (Lehmkuhl and Ruggiero 1991). As a result, it is estimated that 80 percent of listed species that rely on late-succession stage Doulgas-fir forest are vulnerable to the effects of fragmentation (e.g., increased competition between edge/generalist species and forest-dwelling species, increased nest predation, and microclimate changes) (Lehmkuhl and Ruggiero 1991).

Transmission lines require clearing and maintaining of an ROW, which fragments habitat for the duration of project operation. Linear projects like transmission lines, roads, and seismic lines[210] are more likely to fragment habitat as they can extend for hundreds of miles. However, unlike roads that require paved surfaces, some vegetation can be maintained under transmission lines. As such, transmission lines are more likely to result in fragmentation of forested ecosystems than naturally open ecosystems (e.g., shrubsteppe), though transmission lines can still create barriers to movement in these open habitats (see Barriers to Movement, above).

Birds

Fragmentation of bird habitat by transmission lines would vary depending on whether the species are forest dwelling and how much habitat can be maintained under the ROW. Birds that occur in habitat that cannot be maintained under an overhead transmission line, such as forests or tall shrubs, would be most impacted by habitat fragmentation, whereas limited habitat fragmentation is expected in naturally open landscapes that can be maintained along an ROW.

The impact of habitat fragmentation on birds during operation and maintenance of overhead transmission facilities is expected to vary from nil in open habitats, where the ROW would not constitute an abrupt change in habitat type, to low in habitats such as mature forest, where the ROW may bisect suitable habitat for bird species that inhabit the forest interior.

Mammals

The impacts of fragmentation on mammals would vary by species group, depending on biological factors such as body size, range size, behavior, and habitat specialization,[211] and landscape factors such as proximity to range boundary,[212] patch size, patch isolation[213], and habitat matrix contrast[214] (i.e., the difference in habitat between the patches and intervening areas) (Swihart et al. 2003; Ewers and Didham 2006; Crooks et al. 2017).

Larger species tend to be more mobile and less susceptible to the negative effects of habitat fragmentation as long as either individual habitat patches are sufficiently large or the individuals can move between several habitat patches within their home range (Swihart et al. 2003). Small mammal species can be impacted by habitat fragmentation due to physical and behavioral barriers to crossing these linear features (Oxley et al. 1974; see Barriers to Movement, above). Species may become isolated on “island” patches of remanent habitat, resulting in reduced abundance in these areas (Bayne and Hobson 1998).

Habitat specialization and proximity to range boundary were identified as important factors influencing the persistence of mammalian species in fragmented landscapes (Swihart et al. 2003). Habitat specialization is

---

210 Narrow corridor created by oil and gas exploration to try and locate oil and gas.

211 The act of an organism adapting to a specific habitat.

212 The boundary of species' range.

213 The extent to which a habitat patch is disconnected from other similar habitats.

214 The contrast between different habitat types in matrix habitat.

related to a species' ability to use modified habitat to move between remaining habitat patches. The relationship between fragmentation and proximity to range boundary is related to a species' lower abundance at the periphery of its geographic range, which can hamper dispersal, colonization, and population persistence in habitat patches.

On a landscape level, larger habitat patches typically contain more resources to support robust wildlife populations (Ewers and Didham 2006). The loss of wildlife species is generally greater at more isolated patches due to the reduced rates of dispersal and colonization, especially when there is high habitat matrix contrast (Ewers and Didham 2006). Fragmentation of mammal habitat by transmission lines is expected to be more pronounced for species that have low dispersal or movement rates and occur in habitats that cannot be maintained under the overhead transmission line system, resulting in high habitat matrix contrast.

The impact of habitat fragmentation on mammals during operation and maintenance of overhead transmission facilities could vary based on species, habitat characteristic, patch size, and patch isolation. At one extreme, the impact could be nil for wide-ranging large mammals that move between habitat patches within their home range, especially if the habitat matrix contrast is low. At the other extreme, the impact could be moderate for habitat specialists with low dispersal capabilities, especially if the habitat matrix contrast is high and the smaller habitat patches are able to support fewer individuals.

Amphibians and Reptiles

The effects of fragmentation on reptile and amphibian communities are likely species-specific and depend on habitat preferences. Amphibians and reptiles that inhabit open habitats are expected to be less affected by fragmentation from transmission lines than reptile and amphibian species that inhabit more structurally complex habitats. A study on California kingsnake (*Lampropeltis californiae*) in California found no effect of fragmented landscapes on movement or home range size (Anguiano and Diffendorfer 2015). However, side-blotched lizard (*Uta stansburiana*) in California was negatively affected in areas where habitat was fragmented by anthropogenic disturbance from a wind farm (Keehn et al. 2018). This suggests that species may respond to fragmented habitat differently.

Amphibians that move short distances and require cool and forested areas can be affected by habitat fragmentation when “stepping stone” habitat is lost that connects breeding, living, and overwintering habitats. One study found that salamanders were 86 percent less likely to return to the stream where they were initially captured if required to cross an area with no canopy cover as short as 13 meters (43 feet), with decreasing likelihood as the gap distance increased (Cecala et al. 2014). This can isolate populations and create habitat “islands.”

The impact of habitat fragmentation on amphibians and reptiles during operation and maintenance of overhead transmission facilities could vary based on species, habitat characteristic, patch size, and patch isolation. The impact could vary from nil in open habitats to moderate in structurally complex habitats, especially if fragmentation disrupts connectivity between habitats required for different life requisites such as breeding, dispersal, and hibernation.

Invertebrates

Fragmentation may not result in a substantial impact for many invertebrate species as transmission lines can create habitat for species that prefer open habitat and forage on flowers (Berg et al. 2016; Wagner et al. 2019). Some gastropods may also respond positively to the creation of grass-dominated habitat. However, forest-dwelling species require specific microhabitats that may not be supported by transmission line ROWs and therefore are more susceptible to fragmentation (Biasotto and Kindel 2018).

The impact of habitat fragmentation on invertebrates during operation and maintenance of overhead transmission facilities is expected to vary from nil for species that inhabit open habitats to low for species associated with forested habitats.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of fragmentation on birds, mammals, amphibians, and invertebrates, without mitigation measures incorporated, is anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fish

Fragmentation of habitat for fish and aquatic species during operation and maintenance of overhead transmission facilities is similar to that outlined above for barriers.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of fragmentation on fish, without mitigation measures incorporated, is anticipated to vary and could be negligible to low.

Special Status Species

Due to the sensitivity of special status species to population decline, the impact of habitat fragmentation could be higher than for other species in the same taxonomic guild. The effects of fragmentation on special status species have been reported as a threat to several species. For example, fragmentation of the remaining populations and the effects that would have on genetic structure and population resiliency is one of the greatest threats to Columbian sharp-tailed grouse recovery (Stinson 2017). The addition of more linear features to their habitat increases the chances of fragmentation being a contributing factor to continued population decline and reduced recovery success. This has also been identified as a key factor in the decline of greater sage-grouse, as their habitat exists in a landscape fragmented by agriculture, energy, and livestock (Schroeder et al. 2023).

Northern spotted owls are impacted by fragmentation of old forested habitat, as barred owls (*Strix varia*) are better able to exploit fragmented landscapes and outcompete spotted owl for resources (WDFW 2024r). Transmission line development in old-growth habitat would fragment the landscape, not only by removing habitat but also by providing linear corridors for barred owls.

Habitat fragmentation is also listed as a threat for several special status reptile species identified in the SWAP, including California mountain kingsnake (*Lampropeltis zonata*), sagebrush lizard, pygmy horned lizard (*Phrynosoma douglasii*), and northwestern pond turtle. Similarly, the WDFW has identified Dunn's salamander (*Plethodon dunni*), Van Dyke's salamander, Cascade torrent salamander, Columbia torrent salamander (*R. kezeri*), and Rocky Mountain tailed frog (*Ascaphus montanus*) as vulnerable to fragmentation because these species inhabit cool forested streams with limited dispersal capabilities.

The impact could range from nil for wide-ranging species that move between habitat patches to high for habitat specialists with low dispersal capabilities, such as the special status salamander species.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of fragmentation on special status species, without mitigation measures incorporated, is anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Similar to overhead transmission facilities, activities related to the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs. Underground transmission could have the following impacts on habitat, wildlife, and fish during the operation and maintenance phase:

- Direct Habitat Loss
- Indirect Habitat Loss
- Mortality
- Barriers to Movement
- Fragmentation

Direct Habitat Loss

Direct habitat loss initiated during construction would continue through the operation and maintenance phase of an underground transmission facility. Direct habitat loss during this phase would be generally consistent with the direct habitat loss described under Section 3.6.3.2 for the operation and maintenance of an overhead transmission facility, except that vegetation on the ROW would be limited to grass and forbs. Trees and shrubs cannot be grown on top of underground transmission facilities as the root systems can damage subterranean structures and can become electrified. As such, the suitability of modified habitat along the ROW would be limited to wildlife species that occur in grass- and forb-dominated habitats.

Birds

Habitat along the ROW of an underground facility is not expected to provide foraging or nesting habitat for species other than grassland and ground-nesting species as shrubs and trees cannot be maintained on underground transmission facilities.

The impact of direct habitat loss on birds during operation and maintenance of underground transmission facilities would be consistent with the impact during construction as habitat loss initiated during construction would persist through operation and maintenance. As such, impact of habitat loss could vary from negligible for facilities located in urbanized or modified habitats to moderate for facilities located in mature forests. Species that are able to use habitat in the ROW during the operation and maintenance phase could experience periodic habitat loss after vegetation maintenance operation as habitat would not be allowed to regenerate to its previous state, and therefore the impact is considered low.

Mammals

Habitat along the ROW of an underground transmission facility could provide foraging opportunities for mammals that consume grasses and forbs, such as some rodents, ungulates, and bears. As the ROW would not be replanted with trees or shrubs, there would be limited shelter for smaller mammals. Bat species that forage in open areas could use the ROW during the operational phase.

The impact of direct habitat loss on mammals during operation and maintenance of underground transmission facilities would be consistent with the impact during construction as habitat loss initiated during construction would persist through operation and maintenance. As such, the impact is expected to range from negligible to moderate, depending on the species and habitat characteristics.

Amphibian and Reptiles

As the ROW would not be replanted with shrubs or trees, it would likely provide limited suitable habitat for amphibians and reptiles, which require cover objects for shelter and thermoregulation. As such, habitat loss initiated during construction would persist for amphibians and reptiles through operation and maintenance.

The impact of direct habitat loss on amphibians and reptiles during operation and maintenance of underground transmission facilities would be consistent with the impact during construction as habitat loss initiated during construction would persist through operation and maintenance. As such, the impact is expected to range from nil to moderate, depending on the species and habitat characteristics.

Invertebrates

The ROW would continue to support invertebrate species that forage on grasses and flowers. Invertebrate species that require shrubs, trees, or cover objects would be less likely to occur in the ROW.

The impact of direct habitat loss on invertebrates during operation and maintenance of underground transmission facilities would be consistent with the impact during construction as habitat loss initiated during construction would persist through operation and maintenance. As such, the impact is expected to range from nil to moderate, depending on the species and habitat characteristics.

Movement Corridors

The impact of habitat loss on movement corridors from the operation and maintenance of an underground transmission facility is expected to be consistent with the descriptions above and in Section 3.6.3.2 for overhead transmission facilities.

The impact of habitat loss in movement corridors during operation and maintenance of underground transmission facilities would be consistent with the impact during construction as habitat loss initiated during construction would persist through operation and maintenance. As such, the impact is expected to range from negligible to high, depending on the habitat type.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of direct habitat loss on birds, mammals, amphibians, invertebrates, and migration corridors, without mitigation measures incorporated, is anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fish

Direct habitat losses for fish and aquatic species during operation and maintenance would be similar to those outlined above for overhead and underground transmission facilities for impacts during construction.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts of direct habitat loss on fish, without mitigation measures incorporated, is anticipated to vary and could be nil to low.

Special Status Species

The impact of habitat loss on special status species from the operation and maintenance of an underground transmission facility is expected to be consistent with the descriptions above and in Section 3.6.3.2 for overhead transmission facilities.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of direct habitat loss on special status species, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Indirect Habitat Loss

Indirect habitat loss associated with edge effect initiated during construction of underground transmission facilities would persist through operation and maintenance. The impacts of edge effects on wildlife would be similar to those described for overhead transmission facilities.

Similarly, human disturbance along the ROW due to maintenance and recreational users would be similar for both overhead and underground transmission facilities.

The response of wildlife to EMFs produced by underground transmission facilities would be similar to that described above for overhead facilities. Although underground transmission facilities are constructed within casements and placed at least 6 feet belowground, burying the transmission line does not shield EMF (Grid North Partners 2021).

As underground transmission facilities would not need poles or other overhead structures, it is expected that wildlife that perceive a risk of moving under overhead structures would not be similarly adversely affected by underground transmission facilities.

Indirect habitat losses for fish and aquatic species during operation and maintenance are not anticipated unless instream repairs are required. These impacts would be the same as those outlined above for overhead and underground transmission lines for impacts during construction.

Underground transmission facilities are anticipated to have less indirect habitat loss on terrestrial wildlife than overhead transmission facilities described in Section 3.6.3.2.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of indirect habitat loss on birds, mammals, amphibians, invertebrates, and migration corridors, without mitigation measures incorporated, is anticipated to vary and could be nil to high. The impact of indirect habitat loss on fish is anticipated to vary and could be negligible to moderate. The impact of indirect habitat loss on special status species is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Mortality

Risk of wildlife mortality during the operation and maintenance phase of an underground transmission line system is expected to be limited to vehicle strikes and crushing during line maintenance. Vehicles moving along access roads and vegetation clearings could crush nests and dens and collide with wildlife. Vehicles being operated through aquatic habitat could crush fish and amphibian eggs, larvae, and adults.

Risk of collision or electrocution of areal species is not expected during operation of underground systems. Other impacts on fish are expected to be similar to those described for operation and maintenance of overhead transmission facilities.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of mortality on birds, mammals, amphibians, and invertebrates, without mitigation measures incorporated, is anticipated to vary and could be nil to negligible. The impact of mortality on fish is anticipated to vary and could be nil to moderate. The impact of mortality on special status species is anticipated to vary and could be nil to negligible. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Barriers to Movement

Barriers to wildlife movement for underground transmission facilities would be limited to wildlife's perceived risk of crossing gaps created by ROWs. Underground transmission facilities would not have the same aboveground structures as overhead transmission facilities, which correspond to perceived barriers described in Section 3.6.3.2. Wildlife, particularly forest-dwelling species, that are resistant to crossing gaps in habitat due to lack of shelter objects, would likely perceive an underground transmission line ROW as a barrier to movement. Unlike ROW for overhead transmission facilities, ROW for underground transmission facilities cannot be planted with shrubs or small trees to provide shelter for smaller wildlife like small birds, rodents, and amphibians. The impact could range from negligible in open habitats, where the ROW would not constitute an abrupt change in habitat type, to low in habitats such as mature forest, where the ROW may constitute a perceived barrier to movement for some forest interior species or habitat specialists. For special status species, the impact could range from negligible to high, considering their higher vulnerability to population declines.

Barriers to movement for fish during operation and maintenance are similar to those outlined above for construction, and operation and maintenance, of overhead transmission facilities. The impact for fish would range from negligible to moderate, depending on the location, size, and fish-bearing status of the stream.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of barriers to movement on wildlife, without mitigation measures incorporated, is anticipated to vary and could be negligible to low. the impact of barriers to movement on fish is anticipated to vary and could be negligible to moderate. The impact of barriers to movement on special status species is anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Fragmentation

Operation and maintenance of an underground transmission facility is expected to result in the same impacts on habitat fragmentation as those described in Section 3.6.3.2 for overhead transmission facilities, except for facilities that are developed in naturally open ecosystems. Unlike overhead transmission facilities, underground facilities would require removal of shrubs. As such, underground transmission line ROWs would result in fragmentation of shrubsteppe and other open ecosystems.

The impact of habitat fragmentation during operation and maintenance of underground transmission facilities is expected to vary based on species, habitat characteristic, patch size, and patch isolation. The impact could range from nil for highly mobile, wide-ranging species or facilities in open habitats, where the ROW would not constitute an abrupt change in habitat type, to moderate in habitats such as mature forest, where the ROW may bisect suitable habitat for forest interior species or habitat specialists. The impact for fish would range from negligible to moderate, depending on the location, size, and fish-bearing status of the stream. For special status species, the impact could range from nil to high, because these species are more vulnerable to population declines.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of fragmentation on birds, mammals, amphibians, and invertebrates, without mitigation measures incorporated, is anticipated to vary and could be nil to moderate. The impact of fragmentation on fish is anticipated to vary and could be negligible to moderate. The impact of fragmentation on special status species is anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Upgrade or Modification

Overhead Transmission Facilities

Modifying or upgrading overhead transmission facilities would involve several key steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Upgrades or modification to overhead transmission facilities could have the following impacts on habitat, wildlife, and fish:

- Direct habitat loss
- Indirect habitat loss
- Mortality
- Barriers to movement
- Fragmentation

Direct Habitat Loss

In general, direct habitat loss for wildlife during upgrades or modification would be consistent with the description provided for construction and operation and maintenance. Increasing the capacity of an existing transmission facility could require construction of new structures or widening a transmission line ROW to accommodate taller poles. As such, habitat loss could increase due to upgrades or modifications to existing facilities; however, it would be less than creation of a new transmission ROW. The impact could vary based on habitat type, extent of habitat impacted, and species. The impact could range from nil for projects in urbanized or previously highly disturbed areas or generalist species adapted to modified landscapes, to moderate for special status species or other species with specialized habitat requirements or restricted ranges, as well as facilities in old forest areas. The impact rating for fish could range from nil to moderate, depending on the location and size of stream and fish species present.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of direct habitat loss on wildlife, fish, and special status species, without mitigation measures incorporated, is anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Indirect Habitat Loss

Indirect habitat loss due to upgrades or modification of existing transmission facilities is expected to be consistent with, but generally lower than, the impacts outlined above for construction and operation/maintenance for all wildlife categories (birds, mammals, amphibians, reptiles, invertebrates, fish, and special status species).

The impact could vary based on the level of existing sensory disturbance and species tolerance. The impact could range from nil for facilities in areas with high human activity or for species that are adapted to co-existing with humans, to moderate for facilities in remote areas or for special status species and other species that are sensitive to disturbance. The impact rating for fish could range from nil to moderate depending on the location and size of stream and fish species present. The impact is generally lower than during construction and operation and maintenance of overhead transmission facilities because of the edge effects and sensory disturbance associated with the existing facilities.

An additional potential source of indirect habitat loss related to increasing the capacity of a transmission facility is increased electromagnetic radiation. Several groups of animals, including insects such as bees and cockroaches, ungulates such as caribou, amphibians, and some birds, can see this radiation and may avoid areas where these changes occur, resulting in indirect habitat loss (Balmori 2006, 2010; Zastrow 2014; Biasotto and Kindel 2018; Pálsdóttir et al. 2022; Froidevaux et al. 2023). Corona discharges could become more frequent as a result of increased capacity, which could attract more insects to transmission facilities, in turn affecting bats that may come to feed on these insects.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of indirect habitat loss on wildlife, fish, and special status species, without mitigation measures incorporated, is anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Mortality

Sources of mortality and/or injury of wildlife during the process of upgrading or modifying existing transmission facilities would be consistent with sources described for construction of overhead transmission facilities. Risk of mortality during operation could increase if existing transmission facilities are upgraded to higher voltage; however, upgraded facilities would be expected to meet newer engineering standards to reduce collision and electrocution risk.

The impact could vary based on habitat characteristic, species present, and seasonality of construction activities. The impact could range from nil for facilities in areas with limited habitat and low wildlife abundance, to low for facilities with higher quality habitat or if work occurs during sensitive wildlife periods (e.g., bird nesting season). The impact rating for fish could range from negligible to low, depending on the location, size of stream, and fish species present. The impact rating for special status species could vary from nil to moderate, given their higher vulnerability to population declines.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of mortality on wildlife, fish, and special status species, without mitigation measures incorporated, is anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Barriers to Movement

In general, upgrading or modifying existing facilities would not create new barriers to movement as the infrastructure is already present. If upgrades require widening of the ROW, the additional width could reduce permeability for some wildlife species. However, the widening of roads in North America has previously been documented to not affect large mammal movement, when traffic volume remained relatively constant after the upgrade (Boyle et al. 2020).

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of barrier to movement on wildlife, fish, and special status species, without mitigation measures incorporated, is anticipated to vary and could be nil to negligible.

Fragmentation

Upgrades or modifications to existing transmission facilities would not further fragment the landscape as the changes would occur in an existing ROW. If upgrades require widening of the ROW, the additional width could further impact species.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of fragmentation on wildlife, fish, and special status species, without mitigation measures incorporated, is anticipated to vary and could be nil to negligible.

Underground Transmission Facilities

Modifying or upgrading underground transmission facilities would involve several key steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Upgrades or modification to underground transmission facilities could have the following impacts on habitat, wildlife, and fish:

- Direct Habitat Loss
- Indirect Habitat Loss
- Mortality
- Barriers to Movement

These impacts are expected to be consistent with impacts described in the preceding section for upgrades and modification of overhead transmission facilities, except for mortality because there is no collision or electrocution risk for wildlife from underground transmission facilities. Potential sources of wildlife mortality during upgrades or modification of underground transmission facilities are expected to be limited to incidental take during vegetation clearing and grubbing (e.g., destruction of bird nests), vehicle strikes, and entrapment in open excavations (e.g., amphibians). Habitat fragmentation has not been identified as a potential impact because upgrades or modifications to existing transmission facilities would occur in an existing ROW.

If an underground transmission facility is converted to an overhead transmission facility, then the impacts described in Section 3.6.3.2 for the construction of overhead transmission facilities would apply.

Impact Determination: The impact of wildlife mortality during upgrades or modification of underground transmission facilities is expected to be nil for all terrestrial wildlife categories except special status species. The impact of wildlife mortality on special status species could range from nil to low, considering their higher vulnerability to population declines. The impact of mortality of fish could range from negligible to low.

The impact determination for direct habitat loss, indirect habitat loss, and barriers to movement is the same as that described in the preceding section for the upgrade and modification of overhead transmission facilities. Similarly, avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

3.6.3.3 No Action Alternative

The No Action Alternative represents the scenario in which this Draft Programmatic EIS is not used and current management practices for siting and planning transmission facilities continue unchanged. Under this alternative, each project would continue to be evaluated on a case-by-case basis and reviewed for compliance with existing regulations, codes, and standard practices. While impact determinations would likely be similar to those outlined in this Draft Programmatic EIS, projects would not benefit from the impact reductions associated with the avoidance criteria developed and analyzed in this Draft Programmatic EIS. These criteria are anticipated to provide additional mitigation that further reduces potential environmental impacts.

3.6.4 Potential Mitigation Measures

This section describes measures that would eliminate, reduce the intensity of, or compensate for adverse impacts from construction, operation and maintenance, and upgrade or modification of transmission facilities. All general conditions adopted for this Draft Programmatic EIS, identified in Section 3.1, are relevant to this resource section. Applicants would be responsible for providing information within their application materials documenting the implementation of the general conditions .

Avoidance criteria adopted for this Draft Programmatic EIS have been identified in Section 3.1. Avoidance criteria that are relevant to this resource section are described below:

AVOID-1 – Hazardous Areas: Avoid known hazardous areas, including but not limited to, contaminated soils, geologically hazardous areas, landfills, and cutbanks.

Rationale: Avoiding hazardous areas provides safety for workers, the public, infrastructure, as well as environmental protection. Disturbing sites of known contamination or other hazards may require the development of remediation plans.

AVOID-2 – Wetland Disturbance: Avoid impacts within 300 feet of all wetlands.

Rationale: Protecting wetland vegetation would decrease the chances of wetland degradation during construction activities as these areas are important for sustained wetland function. Wetlands within the project footprint would be delineated following the U.S. Army Corps of Engineers wetland delineation methodology.

AVOID-3 – Sensitive Water Features: Avoid impacting areas sensitive to degradation, including adjusting the layout of new transmission facilities to steer clear of sensitive water features.

Rationale: Avoiding sensitive water features that are susceptible to degradation from construction activities including changes to the water features’ physical characteristics (e.g., banks, bathymetry, and substrate), as well as chemical properties. Avoiding these areas helps preserve their structure and function.

AVOID-4 – Floodplains: Avoid having equipment or infrastructure within floodplains.

Rationale: This avoidance criterion would eliminate the potential for damage to infrastructure and electrical safety hazards because of inundation and would avoid some riparian ecosystems.

AVOID-5 – Areas of Rapid Channel Migration: Avoid having equipment or infrastructure in areas of rapid channel migration.

AVOID-6 – Old-Growth and Mature Forests: Avoid old-growth forests, which include forests older than 200 years in western Washington and greater than 150 years in eastern Washington, and mature forests, which include forests greater than 80 years.

Rationale: This avoidance criterion would reduce direct loss of old-growth and mature forests, which have already lost the majority of their historical extent. Old-growth and mature forests are particularly susceptible to long-term impacts due to the time lag to reestablish current ecological functions if clearing occurs. In addition, linear features through old and mature forest stands increase the impacts from edge effects such as the spread of invasive plants.

AVOID-7 – Rare, Endangered, or Threatened Plant Species and Sensitive Ecosystems: Avoid impacts on rare, endangered, or threatened plant species and sensitive ecosystems.

Rationale: Avoiding rare, endangered, or threatened plant species and sensitive ecosystems would reduce both direct and indirect impacts on, and fragmentation of, these communities.

AVOID-8 – Important Habitat: Avoid impacts on important and sensitive wildlife habitat, including:

- National wildlife refuge, parks, and other state or federally protected areas
- Washington State lands managed as wildlife areas, conservation easements, and other state-managed lands for conservation
- Important Bird Areas
- Known stopover locations for migratory species
- Mapped critical habitat for federally listed species and habitat identified in state or federal management plans for state-listed species
- Mapped ungulate winter range
- Mapped habitat concentration areas
- Wetlands, including a 300-foot buffer
- Known bat maternity colonies and hibernacula
- Known snake hibernacula
- Washington Shrubsteppe Restoration and Resiliency Initiative greater sage-grouse core and corridor areas

Rationale: This avoidance criterion aims to reduce habitat loss and fragmentation that can be caused by linear features, such as transmission facilities.

AVOID-9 – Movement Corridors: Avoid impacts on modeled movement corridors with medium to very high linkage as reported by the Washington Wildlife Habitat Connectivity Working Group unless the project is sited within or adjacent to an existing right-of-way (ROW) or linear feature (e.g., a roadway).

Rationale: This avoidance criterion aims to reduce wildlife barriers to movement.

AVOID-10 – Buffer Setbacks for Wildlife and Wildlife Features: Avoid impacts within the setbacks for wildlife and wildlife features identified in **Appendix 3.6-1**. Applicants would verify and update as new buffers are recommended by Washington State (e.g., Washington Department of Fish and Wildlife [WDFW], Washington State Department of Ecology). Buffers and setbacks would be reviewed with WDFW prior to the submittal of a project-specific application.

Rationale: This avoidance criterion aims to reduce direct and indirect habitat loss and mortality of special status species.

Applicants would be responsible for providing information within their application materials documenting the project’s compliance with the above avoidance criteria.

Potential mitigation measures have been identified to minimize adverse impacts from transmission facility projects. These measures are intended to be broad so that they can be applied to most projects that would be covered under this Programmatic EIS. However, project-specific plans would be needed to adapt the measures for project-specific applications.

When impact determinations are identified as moderate or high, the applicant would either adopt applicable mitigation measures from this Programmatic EIS or the SEPA Lead Agency may require applicable mitigation measures to be implemented to reduce project-specific impacts. When impact determinations are low, applicable mitigation measures should still be considered by the applicant and the SEPA Lead Agency as these measures would help to further reduce project-specific impacts, including the project's contribution to cumulative impacts. These measures would be implemented in addition to compliance with laws, regulations, environmental permits, plans, and design considerations required for transmission facilities.

The following mitigation measures could be adopted to mitigate adverse impacts:

Hab-1 – Use of Pesticides, Herbicides, and Fungicides: Minimize using harmful chemicals, including pesticides, herbicides, and fungicides, during the construction and operation and maintenance phases of transmission facility projects.

Rationale: This mitigation measure aims to reduce the mortality of non-target species and contamination of wildlife features, and aquatic waters.

Hab-2 – Prepare Project-Specific Mitigation Plan: Develop habitat mitigation plans[215] to compensate for unavoidable direct or indirect loss of sensitive wildlife habitat. Habitat mitigation plans would consider strategies and actions outlined in recovery and management plans for special status species. Habitat mitigation plans would be developed in consultation with the Washington Department of Fish and Wildlife and/or U.S. Fish and Wildlife Service and approved by the State Environmental Policy Act Lead Agency prior to implementation.

Rationale: This mitigation measure aims to reduce indirect habitat loss by reducing new disturbances to sensitive wildlife habitat.

Hab-3 – Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines: Minimize transmission line crossings of canyons and draws, along ridge lines, parallel to rivers, and within riparian habitat.

Rationale: This mitigation measure reduces potential barriers to wildlife movement from transmission facility development and employs methods to reduce disturbance and conflicts between wildlife and transmission lines.

Hab-4 – Decommission Nonpermanent Roads: Decommission and restore any access roads not required for operation and maintenance.

Rationale: This mitigation measure aims to restore affected habitat and reduce habitat loss, as well as reduce human access and barriers to movement.

[215] A plan that identifies habitat to protect when a proportion of the same habitat is going to impacted by a development.

Hab-5 – Mitigation Plans: Develop the following wildlife-specific plans for implementation during the construction and operation phases of the project. Mitigation plans must be developed with input from appropriate professionals and in consultation with Washington Department of Fish and Wildlife and Washington State Department of Ecology as appropriate. Plans would be approved by the State Environmental Policy Act Lead Agency.

- Fish and wildlife resources and habitat protection plan (construction and operation)
- Revegetation and restoration plan (see the Draft Programmatic Environmental Impact Statement Section 3.5, Vegetation)
- Special status species management plan

Rationale: This is a required component of project-specific applications necessary to demonstrate regulatory compliance and risk management.

This mitigation measure would mitigate negative impacts from construction activities on surrounding habitat.

Hab-6 – Woody Debris Salvage and Restoration: Salvage and retain large, coarse, woody debris during construction and in-stream works. The post-construction revegetation and restoration plan would include planting native shrubs and replacing woody debris unless prohibited by a state authority due to fire risk. Post-construction revegetation and restoration plans would be provided to the Washington Department of Fish and Wildlife for review prior to approval by the State Environmental Policy Act Lead Agency.

Rationale: This mitigation measure aims to reduce habitat loss and barriers to movement for small mammals, amphibians, and reptiles. During in-stream works, this mitigation measure aims to retain and provide habitat for juvenile salmonids.

Hab-7 – Vehicle and Equipment Use and Maintenance: Prohibit vehicles and other equipment from idling when not in use during construction. Vehicles and other equipment would be inspected daily for leaks and would be kept in good condition. Vehicles and equipment would only be stored with proper spill protection measures in place and in areas where contaminants would not enter the environment, watercourses, or riparian areas if spills were to occur.

Rationale: This mitigation measure aims to reduce the chances of contaminants entering the environment if spills or leaks were to occur and would reduce indirect habitat loss from light, noise, and odor pollution to nearby wildlife.

Hab-8 – Worker Education Program: Develop a worker education program for implementation during project construction and operation. The program would train workers on operating near sensitive wildlife habitat and features, sensitive wildlife periods, working around watercourses and riparian features, management of wildlife attractants, management of special status species, wildlife reporting, and wildlife mortality reporting.

Rationale: This mitigation measure aims to reduce incidental loss of wildlife habitat and features, as well as wildlife mortality.

Hab-9 – Retain Wildlife Trees where Practicable: Wildlife trees are trees with features that are especially beneficial to wildlife. These typically include living and dead trees that are decaying and those that have cavities or good conditions for cavity creation, sloughing bark that can provide roost sites for bats, branches for perching, basal cavities for denning, and foraging opportunities for woodpeckers and other wildlife. Wildlife trees will be retained where safe to do so.

Rationale: This mitigation measure aims to reduce the direct habitat loss for wildlife species.

Wild-1 – Wildlife Timing Windows: Schedule vegetation clearing and grubbing and other activities that could destroy or disturb wildlife to occur outside of the sensitive timing windows in appropriate habitat as listed in **Appendix 3.6-1**. This list and timing periods will be verified with the Washington Department of Fish and Wildlife and updated as needed prior to implementation.

Rationale: This mitigation measure aims to reduce potential disturbance and mortality of wildlife. This measure is site-specific, and not all disturbance windows will apply to every project.

Wild-2 – Preconstruction Surveys: Conduct preconstruction surveys for occupied sensitive wildlife features when it is not possible to avoid suitable habitat during the sensitive windows or setbacks of important wildlife habitat identified in **Appendix 3.6-1**. Methods for preconstruction surveys (e.g., preconstruction bird nesting survey, burrow surveys for mammals) will be developed in consultation with the Washington Department of Fish and Wildlife and approved by the State Environmental Policy Act Lead Agency.

Rationale: This mitigation measure aims to reduce potential wildlife disturbance and mortality.

Wild-3 – Surveys for Special Status Wildlife Species and Management Plans: Conduct surveys for special status wildlife species when transmission facilities are sited in suitable habitat. Survey methods would be developed in consultation with the Washington Department of Fish and Wildlife. The results of surveys would be used to develop species-specific management plans for approval by the State Environmental Policy Act Lead Agency.

Rationale: This mitigation measure aims to reduce direct and indirect impacts on special status wildlife species, including habitat loss, mortality, and barriers to movement.

Wild-4 – Construction Occurs during Daylight Hours: Schedule construction activities during daylight hours, when feasible, to reduce the disturbance to nocturnal species and reduce the risk of wildlife-vehicle collisions.

Rationale: This mitigation measure aims to reduce wildlife disturbance and mortality.

Wild-5 – Incidental Take Permit: Apply for and obtain an Eagle Incidental Take Permit, in accordance with the Bald and Golden Eagle Protection Act, when constructing transmission facilities.

Rationale: This mitigation measure aims to reduce potential mortality of eagles.

Wild-6 – Avian Protection Plan: Develop or follow an existing corporate Avian Protection Plan (APP). The APP should be consistent with guidelines outlined by the Avian Power Line Interaction Committee (APLIC).

Rationale: Following best management strategies published by APLIC is expected to reduce avian mortality.

Wild-7 – Wildlife Entrapment in Open Trenches: Minimize areas where wildlife could be trapped during and following construction. These can include trenches, open containers, borrow pits, netting, damaged fencing, open pipes, and test pits. During the construction of underground transmission facilities, applicants would develop a site-specific plan and mitigation measures to prevent wildlife from becoming trapped in open trenches. The plan would include measures for preventing wildlife from entering trenches, wildlife escape routes, and monitoring requirements of trenches.

Rationale: This mitigation measure aims to reduce potential wildlife injury and mortality during transmission facility construction.

Wild-8 – Line Markers on Transmission Lines over Rivers: Install line markers on overhead transmission lines that cross rivers to improve their visibility to flying birds or site them on bridges or similar infrastructure.

Rationale: This mitigation measure aims to reduce bird collisions with transmission lines near rivers, which attract birds that are susceptible to collision such as waterbirds, pelicans, and wading birds.

Wild-9 – Desktop Analysis of High-Risk Collision Areas: When siting new transmission facilities, conduct a desktop analysis of bird species occurrences, habitat, and congregations (e.g., breeding colonies) along the proposed route to identify areas and species of potential high risk of collisions. When siting new transmission facilities in areas where collision risk is high, a field assessment of bird activity would be completed. This would include surveys in different seasons, especially during migration, to increase chances of detecting susceptible bird species. The results of this survey would be incorporated into the project-specific fish and wildlife resources and habitat protection plan.

Rationale: This mitigation measure aims to identify areas of potential avian collision risk to help inform mitigation to reduce avian mortality.

Wild-10 – Wildlife-Resistant Waste Containers: Use only waste containers that are wildlife resistant.

Rationale: This mitigation measure aims to reduce the potential human-wildlife conflicts, therefore reducing the potential for wildlife mortality.

Wild-11 – Wildlife Monitoring: Document wildlife mortalities during work activities (e.g., from vehicle collisions, strikes, clearing) to the State Environmental Policy Act Lead Agency or an appropriate designee, along with adaptive management strategies to reduce mortality.

Rationale: This mitigation measure aims to reduce wildlife mortalities. Reporting wildlife mortalities related to transmission facility development would enable better management decisions.

Wild-12 – Road Rules during Critical Periods for Wildlife: During critical periods for wildlife (e.g., amphibian migration or ungulate calving season), implement mitigation strategies such as slower speed limits, no-stop areas, and potential road closures in or adjacent to suitable habitat.

Rationale: This mitigation measure aims to reduce impacts on wildlife during life stages when they are most vulnerable.

Wild-13 – No Hunting or Pets: Prohibit construction crews from hunting while on the work site. Do not allow pets at construction sites.

Rationale: This mitigation measure aims to reduce potential injury and mortality of wildlife during construction.

Wild-14 – Access Management Plan: Develop an access management plan to manage human and predator access on the right-of-way (ROW).

Rationale: This mitigation measure aims to reduce wildlife mortality and disturbance through controlling human and predator use of the ROW.

Wild-15 – Wildlife Crossing Opportunities along Open Trenches: During construction, and operation and maintenance, and upgrade or modification of underground transmission facilities, maintain regularly spaced gaps in open trenches to provide crossing opportunities for wildlife.

Rationale: Providing wildlife crossing opportunities across open trenches aims to reduce potential barriers to movement and reduce the risk of entrapment from wildlife falling into trenches.

Wild-16 – Collision Monitoring: A post-construction operational collision monitoring plan would be developed in collaboration with the Washington Department of Fish and Wildlife and approved by the State Environmental Policy Act Lead Agency for portions of the transmission facility identified as high collision risk (refer to Wild-9). The collision monitoring plan would include methods to survey for bird mortality to confirm mitigation is effective, and an adaptive management strategy to be implemented if high mortality is recorded.

Rationale: This mitigation measure aims to reduce avian mortality.

Wild-17 – Perching Deterrents. Design transmission facility towers or structures to include raptor perching deterrents where electrocution risk exists.

Rationale: Perching deterrents are expected to reduce raptor mortalities from electrocution.

Wild-18 – Wildlife-Specific Noise Mitigation: Implement noise control measures (e.g., temporary noise barriers, mufflers) or practices (e.g., restrictions to low-level helicopter flights) where project activities are expected near sensitive wildlife habitat.

Minimize the use of blasting, impact or vibratory driving or other construction methods near water or implement noise reduction strategies to reduce underwater noise.

Rationale: This mitigation measure aims to reduce indirect habitat loss for wildlife from sensory disturbance as well as reduce injury or mortality to fish.

Fish-1 – Least Risk Periods for Fish: Schedule construction and maintenance activities during the most up-to-date least risk periods and outside timing restrictions for salmonids or other sensitive fish species (ex. pacific lamprey [*Entosphenus tridentatus]*) that inhabit the watercourse.

Rationale: This mitigation measure aims to reduce impacts on salmon or other sensitive fish species during sensitive life history phases, such as when there are reeds. Applying least risk windows would time construction during periods when spawning or incubating salmonids or fish are least likely to be in Washington State freshwaters.

Fish-2 – Design Perpendicular Approaches: Construct transmission facility access road approaches and crossings perpendicular to streams or rivers and maintain the existing channel form and dimensions.

Rationale: This mitigation measure aims to reduce loss or disturbance to riparian vegetation, reduce instream habitat impacts, and maintain fish passage.

Fish-3 – Isolate Instream Works: Conduct in-water works in isolation from flowing water, if practicable.

Rationale: This mitigation measure aims to reduce the risk of potential injury to fish during in-water construction and isolation.

Fish-4 – Fords: Minimize low-water crossings (fords) by selecting the use of temporary bridges if temporary access is needed to cross waterways.

Rationale: This mitigation measure aims to minimize habitat loss and alteration, changes in water quality, or direct mortality to fish.

Fish-5 – Delineate Riparian Management Zones: Delineate riparian management zones or buffers where certain activities (e.g., vegetation clearing or herbicide treatment) may be restricted.

Rationale: This mitigation measure aims to maintain water quality and riparian function next to watercourses.

Fish-6 – Use Low-Impact Design for Roads: Use low-impact development techniques (e.g., pervious paving materials and narrow road widths) during the site planning and layout phase of project-specific applications, particularly in areas of high aquatic species diversity or salmonid-bearing streams.

Rationale: This mitigation measure aims to protect salmonid habitat from impacts from roads.

Fish-7 – Work in Dry Conditions: Plan and schedule work in streams during dry conditions or when flows are anticipated to be at their lowest, when possible.

Rationale: This mitigation measure aims to reduce impacts on water quality (contaminants, sediment), water quantity, fish, and aquatic habitat.

Fish-8 – Reduce EMF on Magnet-Sensitive Species: Minimize the impact of electromagnetic fields (EMFs) on magnet-sensitive species.

Rationale: This mitigation measure aims to reduce impacts associated with EMF.

Fish-9 – Decontaminate All Gear: Control the spread of invasive species and diseases by minimizing work in areas known to support invasive plant species, and use decontamination procedures on all equipment and gear as specified for the species or disease.

Rationale: This mitigation measure aims to reduce the spread of invasive species and disease into areas that are not infected.

Fish-10 – Maintain Fish Passage: Design necessary stream crossings to provide in-stream conditions that allow for and maintain uninterrupted movement and safe passage of fish and other aquatic species throughout project construction, operation and maintenance, and upgrade or modification.

Rationale: This mitigation measure aims to maintain fish passage and biodiversity.

Fish-11 – Regular Maintenance of Infrastructure: Regularly inspect and maintain infrastructure during operation to prevent leaks and spills into aquatic habitat.

Rationale: This mitigation measure aims to maintain water quality to prevent injury or death.

Fish-12 – Conduct Aquatic Surveys Prior to Siting: Conduct surveys in aquatic environments (e.g., streams, springs, riparian areas, waterbodies) to identify unique flora and fauna and/or their habitats as part of project characterization and design and prior to project construction activities**.**

Rationale: This mitigation measure aims to maintain fish habitat and passage.

Fish-13 – Reduce Number of Stream Crossings: Design transmission facilities to reduce the number of stream crossings. Access roads and utilities would share common rights-of-way.

Rationale: This mitigation measure aims to reduce impacts on fish and fish habitat and maintain water quality.

Fish-14 – Use Bioengineering: Design stabilization structures to incorporate bioengineering[216] principles; for example, use of living and nonliving plant materials in combination with natural and synthetic support material for slope stabilization, erosion reduction, and vegetation establishment.

Rationale: This mitigation measure aims to reduce changes to water quality and helps to restore riparian functions.

Fish-15 – Removal of Riparian Vegetation: Minimize disturbance to low-growing shrubs and grass species in riparian areas, or tree removal in steep gulches.

Rationale: This mitigation measure aims to maintain riparian functions without full removal of riparian vegetation.

Fish-16 – In-Stream Sediment Disruption: If transmission facility construction requires open-cut trenching or would generate in-stream sedimentation, then establish a dilution zone suitable to the location and flow where sediment impacts are minimized.

Rationale: This mitigation measure aims to reduce impacts on fish and fish habitat from excessive sedimentation.

In addition to the above mitigation measures, the following mitigation measures[217] developed for other resources may be applicable:

W-2 – Clear Spanning or Trenchless Methods for Water Crossings: When feasible, use clear spanning for overhead transmission or trenchless construction for underground transmission to minimize disturbance to riparian areas, wetlands and wetland buffers, and surface waters.

W-4 – Store Chemicals, Operate Equipment, and Conduct Maintenance Away from Water: Store fuel, oils, and lubricants away from watercourses. Maintain, repair, and/or service vehicles and equipment away from watercourses and at designated repair facilities whenever possible. Operate equipment and machinery from the top of the bank and outside of riparian areas, wetlands and wetland buffers, and surface waters.

---

[216] The incorporation of biological materials and structures in engineering design.

[217] The rationales for the identified mitigation measures are provided in their respective resource sections.

W-5 – Implement Erosion and Sediment Control Measures: Implement effective and appropriate erosion control measures in construction and operation to mitigate runoff into streams.

W-6 – Minimize Hydrology Changes: Minimize water diversions or changes to natural hydrology, to the extent possible. Natural hydrology would be restored to the site following construction.

Veg-3 – Site Transmission Facilities in Existing ROW or Disturbed Areas: Site transmission facilities in existing right-of-way (ROW) or disturbed areas, to the greatest extent practicable.

3.6.5 Probable Significant Adverse Environmental Impacts

Determining the significance of an impact involves context and intensity, which, in turn, depend on the magnitude and duration of the impact. “Significant” in the Washington State Environmental Policy Act means a reasonable likelihood of more than a moderate adverse impact on environmental quality. An impact may also be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it did occur (Washington Administrative Code 197-11-794).

Identification of environmental impacts and assignment of discipline-specific ratings is based on professional judgment and information available at the time of writing. A precautionary approach has been taken for the assessment in cases where information is currently unknown or unavailable.

This Draft Programmatic EIS weighs the potential impacts on habitat, wildlife, and fish that would result from transmission facilities after considering the application of laws and regulations; siting and design considerations, including agency guidance and BMPs; and mitigation and makes a resulting determination of significance for each impact. **Table 3.6-8** summarizes the impacts anticipated for the construction, operation and maintenance, and upgrade or modification of transmission facilities.

This Page Intentionally Left Blank

Table 3.6-8: Summary of Impacts, Mitigation Measures, and Significance Rating for Habitat, Wildlife, and Fish

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Wildlife – Direct Habitat Loss	Construction	Permanent or temporary loss of habitat and movement corridors from clearing and grubbing for structure placement, access roads, ROW and substations.	**Overhead:** nil to high **Underground:** nil to high	▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-3:** Sensitive Water Features ▪ **AVOID-4:** Floodplains ▪ **AVOID-6:** Old-growth and Mature Forests ▪ **AVOID-8:** Important Habitat ▪ **AVOID-9:** Movement Corridors ▪ **AVOID-10:** Buffer Setbacks for Wildlife and Wildlife Features ▪ **Hab-2:** Prepare Project-Specific Mitigation Plan ▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-4:** Decommission Nonpermanent Roads ▪ **Hab-5:** Mitigation Plans ▪ **Hab-6:** Woody Debris Salvage and Restoration ▪ **Hab-8:** Worker Education Program ▪ **Hab-9:** Retain Wildlife Trees where Practicable ▪ **Wild-3:** Surveys for Special Status Wildlife Species and Management Plans ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas	Less than Significant	Throughout the life of a transmission facility, habitat on the ROW typically would be permanently lost, unless the vegetation and wildlife communities would not interfere with the transmission facility and therefore can reestablish. Restoration of habitat to a low tree/shrub structure is possible under overhead facilities, while restoration of grass-dominated habitat is feasible over underground facilities. With the implementation of standard BMPs, avoidance criteria, and mitigation measures, the effects of direct habitat loss on wildlife can be reduced.
	Operation and Maintenance	Continued loss of vegetation from transmission line construction and ROW maintenance. Depending on the habitat, some habitat types, such as naturally open habitats, may be able to partially recover under the transmission lines if they are not posing a risk to overhead infrastructure. Shrub or treed habitat cannot be established on underground transmission lines.	**Overhead:** nil to high **Underground:** nil to high			
	Upgrade or Modification	Permanent or temporary loss of vegetation from clearing and grubbing for ROW expansion, structure placement, access roads, and substations.	**Overhead:** nil to moderate **Underground:** nil to moderate			
Fish – Direct Habitat Loss	Construction	Permanent loss of fish habitat, including riparian vegetation and instream fish habitat, would occur during installation of access roads, transmission lines, and substations. Alteration of stream banks would occur during construction of access roads. Aquatic habitat may be disturbed from the use of equipment or machinery in the water.	**Overhead:** nil to low **Underground**: negligible to moderate	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-3:** Sensitive Water Features ▪ **AVOID-4:** Floodplains ▪ **AVOID-8:** Important Habitat ▪ **AVOID-10:** Buffer Setbacks for Wildlife and Wildlife Features	Less than Significant	Implementation of avoidance criteria and mitigation measures are expected to reduce fish habitat loss by reducing stream crossings, impacts on riparian habitat, and instream habitat changes. The requirements of regulatory plans and permits generally prevent and/or minimize habitat loss from project-related activities. With the implementation of these

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
	Operation and Maintenance	Clearing/maintenance of riparian zones and alteration of stream banks can cause direct habitat losses to fish and aquatic species, as described for construction, above.	**Overhead:** nil to low **Underground:** nil to low	▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-4:** Decommission Nonpermanent Roads ▪ **Hab-5:** Mitigation Plans ▪ **Hab-6:** Wood Debris Salvage and Restoration ▪ **Fish-2:** Design Perpendicular Approaches ▪ **Fish-4:** Fords ▪ **Fish-5:** Delineate Riparian Management Zones ▪ **Fish-6:** Use Low-Impact Design for Roads ▪ **Fish-7:** Work in Dry Conditions ▪ **Fish-12:** Conduct Aquatic Surveys Prior to Siting ▪ **Fish-13:** Reduce Number of Stream Crossings ▪ **Fish-14:** Use Bioengineering ▪ **Fish-15:** Removal of Riparian Vegetation ▪ **Fish-16:** In-Stream Sediment Disruption ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **W-4:** Store Chemicals, Operate Equipment, and Conduct Maintenance Away from Water ▪ **W-5:** Implement Erosion and Sediment Control Measures ▪ **W-6:** Minimize Hydrology Changes ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas		avoidance criteria and mitigation measures, it is expected that the impact of a transmission facility related to fish habitat loss would be less than significant.
	Upgrade or Modification	Permanent loss of fish habitat, including riparian vegetation and instream fish habitat, during installation of access roads, transmission lines, and substations. Alteration of stream banks from construction of access roads. Disturbance to aquatic habitat from equipment or machinery in the water.	**Overhead:** nil to moderate **Underground**: nil to moderate			
Special Status Species - Direct Habitat Loss	Construction	Permanent or temporary loss of vegetation from clearing and grubbing for structure placement, access roads, ROW, and substations.	**Overhead:** low to high **Underground:** low to high	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-3:** Sensitive Water Features ▪ **AVOID-4:** Floodplains ▪ **AVOID-6:** Old-growth and Mature Forests ▪ **AVOID-7:** Rare, Endangered, or Threatened Plant Species and Sensitive Ecosystems ▪ **AVOID-8:** Important Habitat ▪ **AVOID-9:** Movement Corridors	Less than Significant	Special status species are generally vulnerable to loss and degradation of habitat. For this reason, the identified avoidance criteria and mitigation measures, which include buffers and management plans are typically more conservative to minimize impacts on these species from direct habitat loss, which could impact populations beyond their natural carrying capacity if not managed. Assuming that sensitive and unique ecological features would be avoided and

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
	Operation and Maintenance	Permanent loss of vegetation from transmission line construction and ROW maintenance. Depending on the habitat, some habitat types may be able to partly recover if they are not posing a risk to overhead infrastructure where vegetation management would be required.	**Overhead:** low to high **Underground:** low to high	▪ **AVOID-10:** Buffer Setbacks for Wildlife and Wildlife Features ▪ **Hab-2:** Prepare Project-Specific Mitigation Plan ▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-4:** Decommission Nonpermanent Roads ▪ **Hab-5:** Mitigation Plans ▪ **Hab-6:** Woody Debris Salvage and Restoration ▪ **Hab-8:** Worker Education Program ▪ **Hab-9:** Retain Wildlife Trees where Practicable ▪ **Wild-2:** Preconstruction Surveys ▪ **Wild-3:** Surveys for Special Status Species and Management Plans ▪ **Fish-2:** Design Perpendicular Approaches ▪ **Fish-4:** Fords ▪ **Fish-5:** Delineate Riparian Management Zones ▪ **Fish-6:** Use Low-Impact Design for Roads ▪ **Fish-7:** Work in Dry Conditions ▪ **Fish-12:** Conduct Aquatic Surveys Prior to Siting ▪ **Fish-13:** Reduce Number of Stream Crossings ▪ **Fish-14:** Use Bioengineering ▪ **Fish-15:** Removal of Riparian Vegetation ▪ **Fish-16:** In-Stream Sediment Disruption ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **W-4:** Store Chemicals, Operate Equipment, and Conduct Maintenance Away from Water ▪ **W-5:** Implement Erosion and Sediment Control Measures ▪ **W-6:** Minimize Hydrology Changes ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas		identified mitigation measures implemented, the significance is expected to be less than significant
	Upgrade or Modification	Permanent or temporary loss of vegetation from clearing and grubbing for ROW expansion, structure placement, access roads, and substations.	**Overhead:** nil to moderate **Underground:** nil to moderate			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Wildlife – Indirect Habitat Loss	Construction	Changes in habitat quality or access due to sensory disturbance (noise, light, visual), human presence, avoidance behavior and changes in water quality (temperature, pH, sediment, contaminants).	**Overhead:** nil to high **Underground:** nil to high	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-3:** Sensitive Water Features ▪ **AVOID-4:** Floodplains ▪ **AVOID-6:** Old-growth and mature forests ▪ **AVOID-7:** Rare, Endangered, or Threatened Plant Species and Sensitive Ecosystems ▪ **AVOID-8:** Important Habitat ▪ **AVOID-9:** Movement Corridors ▪ **AVOID-10:** Buffer Setbacks for Wildlife and Wildlife Features ▪ **Hab-1:** Use of Pesticides, Herbicides, and Fungicides ▪ **Hab-2:** Prepare Project-Specific Mitigation Plan ▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-4:** Decommission Nonpermanent Roads ▪ **Hab-5:** Mitigation Plans ▪ **Hab-6:** Woody Debris Salvage and Restoration ▪ **Hab-7:** Vehicle and Equipment Use and Maintenance ▪ **Hab-8:** Worker Education Program ▪ **Hab-9:** Retain Wildlife Trees where Practicable ▪ **Wild-2:** Preconstruction Surveys ▪ **Wild-14:** Access Management Plan ▪ **Wild-18:** Wildlife-Specific Noise Mitigation ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **W-4:** Store Chemicals, Operate Equipment, and Conduct Maintenance Away from Water ▪ **W-5:** Implement Erosion and Sediment Control Measures ▪ **W-6:** Minimize Hydrology Changes ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas	Less than Significant	Change in disturbance during construction can result in temporary shifts in wildlife habitat use and avoidance patterns. During operation, some species may continue to avoid ROWs and edge habitat due to reduced habitat quality or perceived predation risk. Other species may be attracted to or deterred from the ROW due to EMF and corona discharges from the transmission facilities. Disturbance due to noise and light that is expected during construction would not persist in operation. Construction of upgrades and modifications would result in short-term sensory disturbances to wildlife that would end during operation. If all identified avoidance criteria and mitigation measures are properly followed, indirect habitat loss is expected to have a less than significant impact.
	Operation and Maintenance	Changes in habitat quality or access due to sensory disturbance (noise, light, visual), EMF, use of herbicides and other chemicals, human presence, avoidance behavior, and changes in water quality (temperature, pH, sediment, contaminants).	**Overhead:** nil to high **Underground:** nil to high			
	Upgrade or Modification	Changes in habitat quality or access due to sensory disturbance (noise, light, visual), EMF, use of herbicides and other chemicals, human presence, avoidance behavior, and changes in water quality (temperature, pH, sediment, contaminants).	**Overhead:** nil to moderate **Underground:** nil to moderate			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Fish – Indirect Habitat Loss	Construction	Indirect habitat loss could result from changes in water quality, water quantity, and fish habitat due to installation of access roads, transmission lines, and substations. Changes to water quality include changes in water temperature, pH, nutrient concentrations, pollution, and sediment. These changes can lead to changes in fish habitat and aquatic resources over time, which ultimately can affect fish.	**Overhead:** negligible to moderate **Underground:** negligible to high	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-3:** Sensitive Water Features ▪ **AVOID-4:** Floodplains ▪ **AVOID-8:** Important Habitat ▪ **Hab-1:** Use of Pesticides, Herbicides, and Fungicides ▪ **Hab-6:** Woody Debris Salvage and Restoration ▪ **Hab-8:** Worker Education Program ▪ **Fish-2:** Design Perpendicular Approaches ▪ **Fish-4:** Fords ▪ **Fish-5:** Delineate Riparian Management Zones ▪ **Fish-6:** Use Low-Impact Design for Roads ▪ **Fish-7:** Work in Dry Conditions ▪ **Fish-9:** Decontaminate All Gear ▪ **Fish-11:** Regular Maintenance of Infrastructure ▪ **Fish-12:** Conduct Aquatic Surveys Prior to Siting ▪ **Fish-13:** Reduce Number of Stream Crossings ▪ **Fish-14:** Use Bioengineering ▪ **Fish-15:** Removal of Riparian Vegetation ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **W-4:** Store Chemicals, Operate Equipment, and Conduct Maintenance Away from Water ▪ **W-5:** Implement Erosion and Sediment Control Measures ▪ **W-6:** Minimize Hydrology Changes ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas	Less than Significant	The requirement of regulatory plans and permits generally prevent and/or minimize spills from project-related activities. However, uncontrolled spills or instream works could have short- to long-term effects on aquatic habitat. Standard BMPs such as silt fences, sediment basins, and erosion control blankets are commonly used. Standard BMPs along with the identified avoidance criteria and mitigation measures are generally effective at managing erosion and sediment transport. Standard BMPs, avoidance criteria, and mitigation measures to preserve or minimize impacts on existing riparian vegetation are generally effective at managing changes to fish habitat, depending on size of stream and type of vegetation (grass versus trees).
	Operation and Maintenance	Increased human activity, changes in water quality, and changes in land use (roads) can result in indirect loss of fish habitat.	**Overhead:** negligible to moderate **Underground:** negligible to moderate			
	Upgrade or Modification	Indirect habitat loss could result from changes in water quality, quantity, and fish habitat due to installation of access roads, transmission lines, and substations. Changes to water quality include changes in water temperature, pH, nutrient concentrations, pollution, and sediment. These changes can lead to changes in fish habitat and aquatic resources over time, which ultimately can affect fish.	**Overhead:** nil to moderate **Underground:** nil to moderate			
Special Status Species - Indirect Habitat Loss	Construction	Changes in habitat quality or access due to sensory disturbance (noise, light, visual), human presence, avoidance behavior and changes in water quality (temperature, pH, sediment, contaminants).	**Overhead:** low to high **Underground:** low to high	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-3:** Sensitive Water Features ▪ **AVOID-4:** Floodplains ▪ **AVOID-6:** Old-growth and mature forests	Less than Significant	Special status species are expected to be more vulnerable to indirect habitat loss than other wildlife guilds as these species have limited ranges or have small or declining populations. During operation, some wildlife species may continue to avoid ROWs and edge habitat due to reduced habitat quality, EMF, or perceived

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
	Operation and Maintenance	Changes in habitat quality or access due to sensory disturbance (noise, light, visual), EMF, use of herbicides and other chemicals, human presence, avoidance behavior, and changes in water quality (temperature, pH, sediment, contaminants).	**Overhead:** low to high **Underground:** low to high	▪ **AVOID-7:** Rare, Endangered, or Threatened Plant Species and Sensitive Ecosystems ▪ **AVOID-8:** Important Habitat ▪ **AVOID-9:** Movement Corridors ▪ **AVOID-10:** Buffer Setbacks for Wildlife and Wildlife Features ▪ **Hab-1:** Use of Pesticides, Herbicides, and Fungicides ▪ **Hab-2:** Prepare Project-Specific Mitigation Plan ▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-4:** Decommission Nonpermanent Roads ▪ **Hab-5:** Mitigation Plans ▪ **Hab-6:** Woody Debris Salvage and Restoration ▪ **Hab-8:** Worker Education Program ▪ **Hab-9:** Retain Wildlife Trees where Practicable ▪ **Wild-2:** Preconstruction Surveys ▪ **Wild-3:** Surveys for Special Status Wildlife Species and Management Plans ▪ **Wild-6:** Avian Protection Plan ▪ **Wild-14:** Access Management Plan ▪ **Wild-18:** Wildlife-Specific Noise Mitigation ▪ **Fish-2:** Design Perpendicular Approaches ▪ **Fish-4:** Fords ▪ **Fish-5:** Delineate Riparian Management Zones ▪ **Fish-6:** Use Low-Impact Design for Roads ▪ **Fish-7:** Work in Dry Conditions ▪ **Fish-8:** Reduce EMF on Magnet-Sensitive Species ▪ **Fish-9:** Decontaminate All Gear ▪ **Fish-11:** Regular Maintenance of Infrastructure ▪ **Fish-12:** Conduct Aquatic Surveys Prior to Siting ▪ **Fish-13:** Reduce Number of Stream Crossings ▪ **Fish-14:** Use Bioengineering ▪ **Fish-15:** Removal of Riparian Vegetation ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings		predation risk, and some fish species may avoid habitat due to increased human activity and other identified impacts. Disturbance due to noise and light that is expected during construction would not persist in operation. Following the identified avoidance criteria and mitigation measures is expected to reduce this impact to less than significant.
	Upgrade or Modification	Changes in habitat quality or access due to sensory disturbance (noise, light, visual), EMF, use of herbicides and other chemicals, human presence, avoidance behavior, and changes in water quality (temperature, pH, sediment, contaminants).	**Overhead:** nil to moderate **Underground:** nil to moderate			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
				▪ **W-4:** Store Chemicals, Operate Equipment, and Conduct Maintenance Away from Water ▪ **W-5:** Implement Erosion and Sediment Control Measures ▪ **W-6:** Minimize Hydrology Changes ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas		
Wildlife – Mortality	Construction	Sources of wildlife mortality due to construction of transmission facilities include nest and burrow destruction, collisions with wildlife, entrapment in trenching and other open features, and destruction of nuisance wildlife.	**Overhead:** nil to moderate **Underground:** nil to moderate	▪ **AVOID-8:** Important Habitat ▪ **AVOID-9:** Movement Corridors ▪ **AVOID-10:** Buffer Setbacks for Wildlife and Wildlife Features ▪ **Hab-1:** Use of Pesticides, Herbicides, and Fungicides ▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-4:** Decommission Nonpermanent Roads ▪ **Hab-8**: Worker Education Program ▪ **Wild-1:** Wildlife Timing Windows ▪ **Wild-2:** Preconstruction Surveys ▪ **Wild-3:** Surveys for Special Status Wildlife Species and Management Plans ▪ **Wild-4:** Construction Occurs during Daylight Hours ▪ **Wild-5:** Incidental Take Permit ▪ **Wild-6:** Avian Protection Plan ▪ **Wild-7:** Wildlife Entrapment in Open Trenches ▪ **Wild-8:** Line Markers on Transmission Lines over Rivers ▪ **Wild-9:** Desktop Analysis of High-Risk Collision Areas ▪ **Wild-10:** Wildlife-Resistant Waste Containers ▪ **Wild-11:** Wildlife Monitoring ▪ **Wild-12:** Road Rules during Critical Periods for Wildlife ▪ **Wild-13:** No Hunting or Pets ▪ **Wild-14:** Access Management Plan ▪ **Wild-15:** Wildlife Crossing Opportunities along Open Trenches ▪ **Wild-16:** Collision Monitoring ▪ **Wild-17:** Perching Deterrents ▪ **Wild-18:** Wildlife-Specific Noise Mitigation	Less than Significant	With the application of avoidance criteria and mitigation measures, wildlife mortality during construction is expected to be mostly avoidable. Operation of overhead transmission facilities could still pose risks for wildlife collisions and electrocutions. Maintenance activities, such as herbicide use and road collisions may pose a risk to wildlife, although implementation of mitigation measures is expected to reduce these risks. Underground transmission facilities are not expected to pose a mortality risk to wildlife during operation and maintenance except for wildlife-vehicle collisions during maintenance and required vegetation maintenance. Modifications or upgrades of existing transmission facilities can provide opportunities to apply mitigation to reduce mortality like adding line markers and perching deterrents to reduce risks of collision and electrocution.
	Operation and Maintenance	Wildlife mortality during operation and maintenance could occur from collisions with lines, electrocutions, road mortality, destruction of nests and burrows during ROW maintenance, wildlife-vehicle collisions, and herbicide/pesticide use.	**Overhead:** nil to low **Underground:** nil to negligible			
	Upgrade or Modification	Sources of wildlife mortality during construction could occur from nest and burrow destruction, destruction of nuisance wildlife, collisions with lines, electrocutions, road mortality, destruction of nests and burrows during ROW maintenance, and herbicide/ pesticide use.	**Overhead:** nil to low **Underground:** nil			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Fish – Mortality	Construction	Mortality during in-stream works could occur from changes in water quality or machinery/infrastructure impacts.	**Overhead:** negligible to low **Underground:** negligible to moderate	▪ **AVOID-9:** Important Habitat ▪ **Hab-1:** Use of Pesticides, Herbicides, and Fungicides ▪ **Hab-8:** Worker Education Program ▪ **Wild-18:** Wildlife-Specific Noise Mitigation ▪ **Fish-1:** Least Risk Periods for Fish ▪ **Fish-3:** Isolate Instream Works ▪ **Fish-4:** Fords ▪ **Fish-7:** Work in Dry Conditions ▪ **Fish-8:** Reduce EMF on Magnet-Sensitive Species ▪ **Fish-11:** Regular Maintenance of Infrastructure ▪ **Fish-16:** In-stream Sediment Disruption ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **W-4:** Store Chemicals, Operate Equipment, and Conduct Maintenance Away from Water ▪ **W-5:** Implement Erosion and Sediment Control Measures ▪ **W-6:** Minimize Hydrology Changes ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas	Less than Significant	The application of standard BMPs, engineering design considerations, avoidance criteria, and mitigation measures are expected to reduce potential fish mortality. These mitigation measures include using least risk periods for fish, working in isolation, and implementing sediment and erosion control measures. The requirement of regulatory plans and permits generally prevent and/or minimize changes to water quality impacts related to fish mortality from project-related activities.
	Operation and Maintenance	Fish mortality during operation could occur from water quality changes and operation/maintenance machinery.	**Overhead:** nil to moderate **Underground:** nil to moderate			
	Upgrade or Modification	Fish mortality during upgrade or modification could occur during in-stream works from changes in water quality or machinery impacts.	**Overhead:** negligible to low **Underground:** negligible to low			
Special Status species - Mortality	Construction	Sources of wildlife mortality due to construction of transmission facilities include nest and burrow destruction, collisions with wildlife, entrapment in trenching and other open features, and destruction of nuisance wildlife.	**Overhead:** nil to high **Underground:** nil to high	▪ **AVOID-7:** Rare, Endangered, or Threatened Plant Species and Sensitive Ecosystems ▪ **AVOID-8:** Important Habitat ▪ **AVOID-9:** Movement Corridors ▪ **AVOID-10:** Buffer Setbacks for Wildlife and Wildlife Features ▪ **Hab-1:** Use of Pesticides, Herbicides, and Fungicides ▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-4:** Decommission Nonpermanent Roads ▪ **Hab-8:** Worker Education Program ▪ **Wild-1:** Wildlife Timing Windows ▪ **Wild-2:** Preconstruction Surveys ▪ **Wild-3:** Surveys for Special Status Wildlife Species and Management Plans ▪ **Wild-4:** Construction Occurs during Daylight Hours ▪ **Wild-5:** Incidental Take Permit ▪ **Wild-6:** Avian Protection Plan	Less than Significant	Populations of special status species can be more vulnerable to loss of individuals than other wildlife species. They may be more susceptible to a variety of the listed impacts such as collision and electrocution, road mortality, herbicide exposure for wildlife and in-stream works, water quality changes, and effects of heavy machinery. However, with application of avoidance criteria and mitigation measures, mortalities are expected to be uncommon for special status species.
	Operation and Maintenance	Wildlife mortality during operation and maintenance could occur from collisions with lines, electrocutions, road mortality, destruction of nests and burrows during ROW maintenance, wildlife-vehicle collisions, and herbicide/pesticide use.	**Overhead:** nil to moderate **Underground:** nil to negligible			
	Upgrade or Modification	Sources of wildlife mortality during construction could occur from nest and burrow destruction, destruction of nuisance wildlife, collisions with lines, electrocutions, road mortality, destruction of nests and burrows during ROW maintenance, and herbicide/ pesticide use.	**Overhead:** nil to moderate **Underground:** nil to low			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[a]	Significance after Applying Mitigation	Rationale for Significance Rating
				▪ **Wild-7:** Wildlife Entrapment in Open Trenches ▪ **Wild-8:** Line Markers on Transmission Lines over Rivers ▪ **Wild-9:** Desktop Analysis of High-Risk Collision Areas ▪ **Wild-10:** Wildlife-Resistant Waste Containers ▪ **Wild-11:** Wildlife Monitoring ▪ **Wild-12:** Road Rules during Critical Periods for Wildlife ▪ **Wild-13:** No Hunting or Pets ▪ **Wild-14:** Access Management Plan ▪ **Wild-15:** Wildlife Crossing Opportunities along Open Trenches ▪ **Wild-16:** Collision Monitoring ▪ **Wild-17:** Perching Deterrents ▪ **Wild-18:** Wildlife-Specific Noise Mitigation ▪ **Fish-1:** Least Risk Periods for Fish ▪ **Fish-3:** Isolate Instream Works ▪ **Fish-4:** Fords ▪ **Fish-7:** Work in Dry Conditions ▪ **Fish-8:** Reduce EMF on Magnet-Sensitive Species ▪ **Fish-11:** Regular Maintenance of Infrastructure ▪ **Fish-16:** In-stream Sediment Disruption ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **W-4:** Store Chemicals, Operate Equipment, and Conduct Maintenance Away from Water ▪ **W-5:** Implement Erosion and Sediment Control Measures ▪ **W-6:** Minimize Hydrology Changes ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas		
Wildlife – Barriers to Movement	Construction	Barriers to movement during construction could occur from physical (fences, erosion control measures, culverts) or perceived barriers to wildlife movement.	**Overhead:** nil to moderate **Underground:** nil to moderate	▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-3:** Sensitive Water Features ▪ **AVOID-6:** Old-Growth and Mature Forests ▪ **AVOID-8:** Important Habitat ▪ **AVOID-9:** Movement Corridors ▪ **AVOID-10:** Buffer Setbacks for Wildlife and Wildlife Features	Less than Significant	Creation of new linear features on the landscape is expected to create barriers to movement, though the magnitude of these effects are expected to be reduced through careful project siting, access management planning, and restoration. Upgrades or modification to existing systems are not expected to substantially change barriers to movement during operations.
	Operation and Maintenance	Barriers to movement during operation and maintenance could occur from physical and perceived barriers (e.g., EMF) to wildlife movement, changes to predator-prey dynamics, and restricted animal movement across a landscape.	**Overhead:** nil to moderate **Underground:** negligible to low			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
	Upgrade or Modification	Upgrades or modifications are not expected to substantially change existing barriers to movement. Widening the ROW could exacerbate existing barriers by widening ROW but is not expected to add new barriers.	**Overhead:** nil to negligible **Underground:** nil to negligible	▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-4:** Decommission Nonpermanent Roads ▪ **Hab-5:** Mitigation Plans ▪ **Hab-6:** Woody Debris Salvage and Restoration ▪ **Hab-8:** Worker Education Program ▪ **Hab-9:** Retain Wildlife Trees where Practicable ▪ **Wild-1:** Wildlife Timing Windows ▪ **Wild-4:** Construction Occurs during Daylight Hours ▪ **Wild-14:** Access Management Plan ▪ **Wild-15:** Wildlife Crossing Opportunities along Open Trenches ▪ **Wild-18:** Wildlife-Specific Noise Mitigation ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **W-6:** Minimize Hydrology Changes ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas		
Fish – Barriers to Movement	Construction	In-stream works can cause barriers to fish passage from velocity barriers, bank erosion, slumping, noise, and debris jams from construction of stream crossings.	**Overhead:** nil to low **Underground**: negligible to moderate	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-3:** Sensitive Water Features ▪ **AVOID-4:** Floodplains ▪ **Hab-1:** Use of Pesticides, Herbicides, and Fungicides ▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-6:** Woody Debris Salvage and Restoration ▪ **Wild-18:** Wildlife-Specific Noise Mitigation ▪ **Fish-1:** Least Risk Periods for Fish ▪ **Fish-2:** Design Perpendicular Approaches ▪ **Fish-3:** Isolate Instream Works ▪ **Fish-4:** Fords ▪ **Fish-5:** Delineate Riparian Management Zones ▪ **Fish-6:** Use Low-Impact Design for Roads ▪ **Fish-7:** Work in Dry Conditions ▪ **Fish-8:** Reduce EMF on Magnet-Sensitive Species ▪ **Fish-10:** Maintain Fish Passage	Less than Significant	Barriers to fish passage are expected be avoidable if all BMPs, regulatory plans or permits, avoidance criteria, and mitigation measures are properly implemented, including those from Section 3.4, Water Resources (use trenchless construction rather than open-cut or laying on bottom of water).
	Operation and Maintenance	In-stream works can cause barriers to fish passage, including EMF from underground lines.	**Overhead:** negligible to low **Underground:** negligible to moderate			
	Upgrade or Modification	In-stream works can cause barriers to fish passage, from velocity barriers, bank erosion, slumping, noise and debris jams from construction of stream crossings, and EMF from underground lines.	**Overhead:** nil to negligible **Underground:** nil to negligible			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
				▪ **Fish-12:** Conduct Aquatic Surveys Prior to Siting ▪ **Fish-13:** Reduce Number of Stream Crossings ▪ **Fish-15:** Removal of Riparian Vegetation ▪ **Fish-16:** In-stream Sediment Disruption ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **W-4:** Store Chemicals, Operate Equipment, and Conduct Maintenance Away from Water ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas		
Special Status species – Barriers to Movement	Construction	Barriers to movement during construction could occur from physical (fences, erosion control measures, culverts) or perceived barriers to wildlife movement.	**Overhead:** nil to high **Underground:** nil to high	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-3:** Sensitive Water Features ▪ **AVOID-6:** Old-Growth and Mature Forests ▪ **AVOID-7:** Rare, Endangered, or Threatened Plant Species and Sensitive Ecosystems ▪ **AVOID-8:** Important Habitat ▪ **AVOID-9:** Movement Corridors **AVOID-10:** Buffer Setbacks for Wildlife and Wildlife Features ▪ **Hab-1:** Use of Pesticides, Herbicides, and Fungicides ▪ **Hab-2:** Prepare Project-Specific Mitigation or Offsetting Plan ▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-4:** Decommission Nonpermanent Roads ▪ **Hab-5:** Mitigation Plans ▪ **Hab-6:** Woody Debris Salvage and Restoration ▪ **Hab-8:** Worker Education Program ▪ **Hab-9:** Retain Wildlife Trees where Practicable ▪ **Wild-1:** Wildlife Timing Windows ▪ **Wild-3:** Surveys for Special Status Species and Management Plans ▪ **Wild-4:** Construction Occurs during Daylight Hours ▪ **Wild-14:** Access Management Plan ▪ **Wild-15:** Wildlife Crossing Opportunities along Open Trenches ▪ **Wild-18:** Wildlife-Specific Noise Mitigation ▪ **Fish-1:** Least Risk Periods for Fish	Less than Significant	Special status species may be more sensitive to changes in their habitat, resulting in smaller habitat changes causing barriers to movement and perceived barriers to movement compared to other species. For this reason, avoidance criteria, species-specific management plans, mitigation strategies, and BMPs typically contain actions that are stricter, resulting in reduced impacts to these species. By carefully planning and implementing BMPs and mitigation measures, the impact is expected to be less than significant.
	Operation and Maintenance	Barriers to movement during operation and maintenance could occur from physical and perceived barriers (e.g., EMF) to wildlife movement, changes to predator-prey dynamics, and restricted animal movement across a landscape.	**Overhead:** nil to high **Underground:** negligible to high			
	Upgrade or Modification	Upgrades or modifications are not expected to substantially change existing barriers to movement. Widening the ROW could exacerbate existing barriers but is not expected to add new barriers.	**Overhead:** nil to negligible **Underground:** nil to negligible			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[a]	Significance after Applying Mitigation	Rationale for Significance Rating
				▪ **Fish-2:** Design Perpendicular Approaches ▪ **Fish-3:** Isolate Instream Works ▪ **Fish-4:** Fords ▪ **Fish-5:** Delineate Riparian Management Zones ▪ **Fish-6:** Use Low-Impact Design for Roads ▪ **Fish-7:** Work in Dry Conditions ▪ **Fish-8:** Reduce EMF on Magnet-Sensitive Species ▪ **Fish 10:** Maintain Fish Passage ▪ **Fish-12:** Conduct Aquatic Surveys Prior to Siting ▪ **Fish-13:** Reduce Number of Stream Crossings ▪ **Fish-15:** Removal of Riparian Vegetation ▪ **Fish-16:** In-stream Sediment Disruption ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **W-4:** Store Chemicals, Operate Equipment, and Conduct Maintenance Away from Water ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas		
Wildlife - Fragmentation	Construction	Construction of new facilities can fragment habitat, particularly forested habitats that cannot be maintained on ROW. Habitat fragmentation results in a patchwork of isolated fragment of habitat with increased edge effects, and movement barriers.	**Overhead:** nil to moderate **Underground:** nil to moderate	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-3:** Sensitive Water Features ▪ **AVOID-6:** Old-Growth and Mature Forests ▪ **AVOID-8:** Important Habitat ▪ **AVOID-9:** Movement Corridors ▪ **AVOID-10**: Buffer Setbacks for Wildlife and Wildlife Features ▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-4:** Decommission Nonpermanent Roads ▪ **Hab-5:** Mitigation Plans ▪ **Hab-6:** Woody Debris Salvage and Restoration ▪ **Hab-8:** Worker Education Program ▪ **Hab-9:** Retain Wildlife Trees where Practicable ▪ **Wild-1**: Wildlife Timing Windows ▪ **Wild-4:** Construction Occurs during Daylight Hours ▪ **Wild-14:** Access Management Plan	Less than Significant	Fragmentation can cause long-term changes to wildlife habitat. Application of BMPs, avoidance criteria, and mitigation measures is expected to reduce the extent of fragmentation so that this impact does not result in a significant impact on wildlife.
	Operation and Maintenance	Fragmentation initiated during construction would continue through operation and maintenance.	**Overhead:** nil to moderate **Underground:** nil to moderate			
	Upgrade or Modification	Upgrade or modification of systems is not expected to further fragment habitat as these projects would be located in or adjacent to existing ROW.	**Overhead:** nil to moderate **Underground:** N/A			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
				▪ **Wild-15:** Wildlife Crossing Opportunities along Open Trenches ▪ **Wild-18:** Wildlife-Specific Noise Mitigation ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **W-6:** Minimize Hydrology Changes ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas		
Fish - Fragmentation	Construction	In-stream works can cause barriers to fish passage, preventing fish from migrating, which could fragment fish populations.	**Overhead:** nil to moderate **Underground**: negligible to moderate	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-3:** Sensitive Water Features ▪ **AVOID-4:** Floodplains ▪ **AVOID-8:** Important Habitat ▪ **Hab-1:** Use of Pesticides, Herbicides, and Fungicides ▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-6:** Woody Debris Salvage and Restoration ▪ **Wild-18:** Wildlife-Specific Noise Mitigation ▪ **Fish-1:** Least Risk Periods for Fish ▪ **Fish-2:** Design Perpendicular Approaches ▪ **Fish-3:** Isolate Instream Works ▪ **Fish-4:** Fords ▪ **Fish-5:** Delineate Riparian Management Zones ▪ **Fish-6:** Use Low-Impact Design for Roads ▪ **Fish-7:** Work in Dry Conditions ▪ **Fish-8:** Reduce EMF on Magnet-Sensitive Species ▪ **Fish-10:** Maintain Fish Passage ▪ **Fish-12:** Conduct Aquatic Surveys Prior to Siting ▪ **Fish-13:** Reduce Number of Stream Crossings ▪ **Fish-15:** Removal of Riparian Vegetation ▪ **Fish-16:** In-stream Sediment Disruption ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **W-4:** Store Chemicals, Operate Equipment, and Conduct Maintenance Away from Water ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas	Less than Significant	Fragmentation of fish habitat is expected to be avoidable if avoidance criteria and mitigation measures are properly implemented, including those from Section 3.4 Water (use trenchless construction rather than open-cut or laying on bottom of water).
	Operation and Maintenance	Bridges and culverts may cause velocity barriers, slumping, or debris jams that hinder fish migration. EMF sensitivity varies by aquatic species but may cause behavioral changes to fish.	**Overhead:** negligible to low **Underground**: negligible to moderate			
	Upgrade or Modification	In-stream works can cause barriers to fish passage, preventing fish migration, which could fragment fish populations.	**Overhead:** nil to moderate **Underground**: N/A			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Special Status Species – Fragmentation	Construction	Construction of new facilities can fragment habitat, particularly forested habitats that cannot be maintained on ROW. Habitat fragmentation results in a patchwork of isolated fragment of habitat with increased edge effects, and movement barriers.	**Overhead:** nil to high **Underground:** nil to high	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-3:** Sensitive Water Features ▪ **AVOID-6:** Old-Growth and Mature Forests ▪ **AVOID-7:** Rare, Endangered, or Threatened Plant Species and Sensitive Ecosystems ▪ **AVOID-8:** Important Habitat ▪ **AVOID-9:** Movement Corridors **AVOID-10:** Buffer Setbacks for Wildlife and Wildlife Features ▪ **Hab-1:** Use of Pesticides, Herbicides, and Fungicides ▪ **Hab-2:** Prepare Project-Specific Mitigation or Offsetting Plan ▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-4:** Decommission Nonpermanent Roads ▪ **Hab-5:** Mitigation Plans ▪ **Hab-6:** Woody Debris Salvage and Restoration ▪ **Hab-8:** Worker Education Program ▪ **Hab-9:** Retain Wildlife Trees where Practicable ▪ **Wild-1:** Wildlife Timing Windows ▪ **Wild-3:** Surveys for Special Status Species and Management Plans ▪ **Wild-4:** Construction Occurs during Daylight Hours ▪ **Wild-14:** Access Management Plan ▪ **Wild-15:** Wildlife Crossing Opportunities along Open Trenches ▪ **Wild-18:** Wildlife-Specific Noise Mitigation ▪ **Fish-1:** Least Risk Periods for Fish ▪ **Fish-2:** Design Perpendicular Approaches ▪ **Fish-3:** Isolate Instream Works ▪ **Fish-4:** Fords ▪ **Fish-5:** Delineate Riparian Management Zones ▪ **Fish-6:** Use Low-Impact Design for Roads ▪ **Fish-7:** Work in Dry Conditions ▪ **Fish-8:** Reduce EMF on Magnet-Sensitive Species ▪ **Fish-10:** Maintain Fish Passage ▪ **Fish-12:** Conduct Aquatic Surveys Prior to Siting	Less than Significant	Special status species may be more sensitive to fragmentation, but with the application of identified avoidance criteria and mitigation strategies, fragmentation is not expected to be a significant impact on special status species.
	Operation and Maintenance	Fragmentation initiated during construction would continue through operation and maintenance.	**Overhead:** nil to high **Underground:** nil to high			
	Upgrade or Modification	Upgrade or modification of systems is not expected to further fragment habitat as these projects would be located in or adjacent to existing ROW.	**Overhead:** nil to high **Underground:** N/A			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[a]	Significance after Applying Mitigation	Rationale for Significance Rating
				▪ **Fish-13:** Reduce Number of Stream Crossings ▪ **Fish-15:** Removal of Riparian Vegetation ▪ **Fish-16:** In-stream Sediment Disruption ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **W-4:** Store Chemicals, Operate Equipment, and Conduct Maintenance Away from Water ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas		

Notes:

[a] Appendix 3.1-1 provides a detailed listing of each general condition, avoidance criteria, and mitigation measure. Having these details in an appendix serves as a comprehensive reference section that can be consulted independently of the main text. This is particularly useful for detailed guidance and technical specifications that may be referred to multiple times. Additionally, including this information in an appendix allows for easier updates and revisions. If mitigation measures or guidelines change, the appendix can be updated without altering the main content.

BMP = best management practice; ROW = right-of-way

This Page Intentionally Left Blank

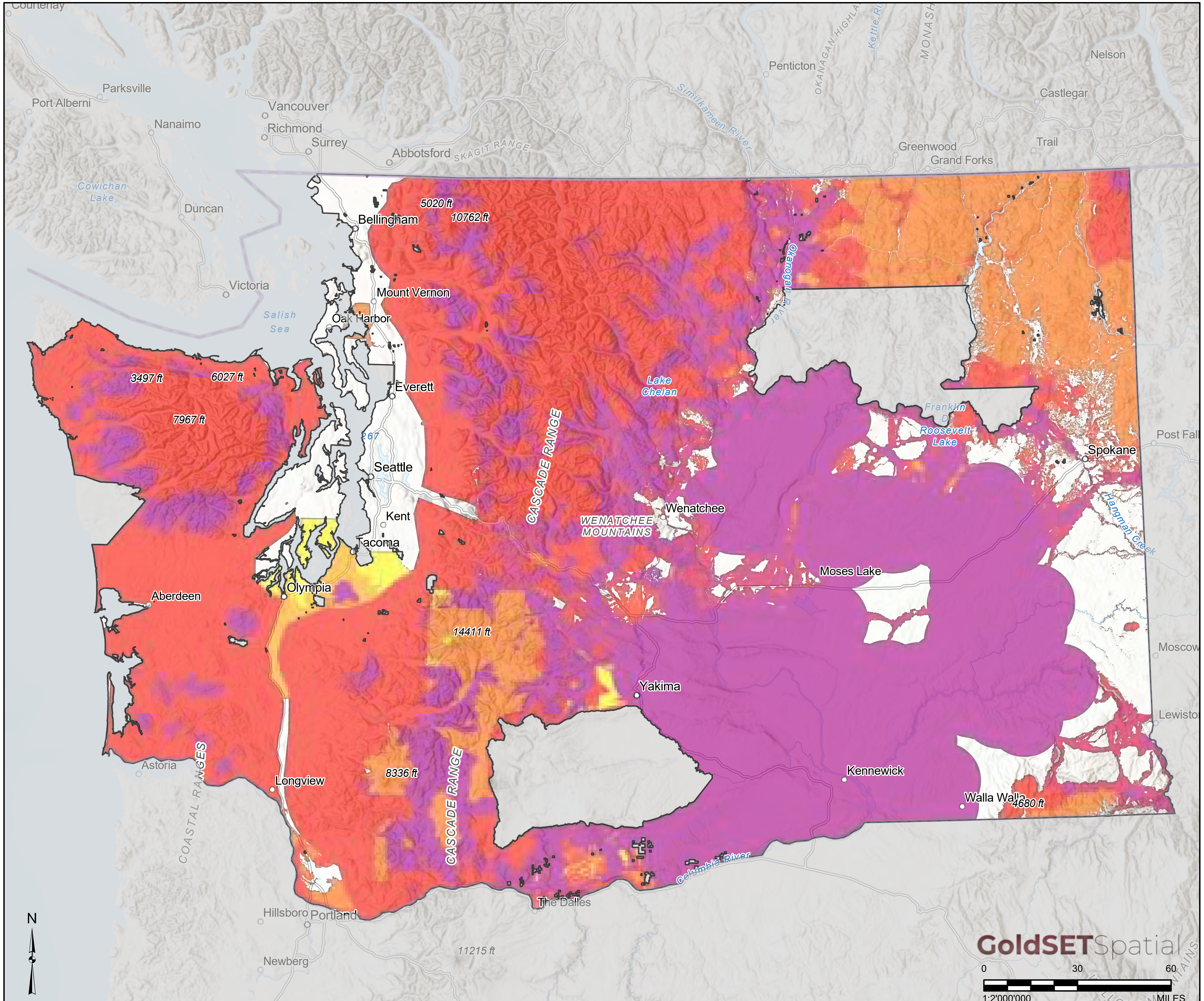
3.6.1 Suitability Map

Project-specific reviews would include a comprehensive review and analysis to identify the site-specific adverse impacts on resources to determine the suitability of this Draft Programmatic EIS. Environmental review may be phased by incorporating relevant information from this Draft Programmatic EIS by reference while evaluating site-specific adverse impacts of the individual project applications. For more information on phased reviews, please refer to Chapter 1, Introduction.

Project-specific applications would include details about the precise location and site-specific conditions. This Draft Programmatic EIS provides a suitability map that, when incorporated with project-specific applications, could be used to facilitate more informative and efficient environmental planning.

Figure 3.6-4 through Figure 3.6-7 represent the suitability map for habitat, wildlife, and fish resources and identifies the appropriateness of areas using applicable laws and regulations, criteria specific to the siting of transmission facilities, and knowledge from subject matter experts. The suitability maps incorporate all the data, conflict weights, and impact categories to create a statewide perspective of all the potential wildlife impacts and least conflict or highest conflict areas; these four maps are a wildlife overhead suitability map, wildlife underground suitability map, fish overhead suitability map, and fish underground suitability map.

This Page Intentionally Left Blank



LEGEND

Study Area

Conflict Indicator Key

- Neutral
- Low
- Low-Medium
- Medium
- Medium-High
- High
- Very High

EFSEC
Energy Facility Site Evaluation Council

THE SEAL OF THE STATE OF WASHINGTON 1889

REFERENCES AND NOTES

1. WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS; ESRI, USGS
2. THE CONFLICT INDICATOR KEY CAN BE USED TO IDENTIFY AND HIGHLIGHT AREAS WHERE DIFFERENT PROJECT CONSTRAINTS MAY OVERLAP, POTENTIALLY LEADING TO CONFLICTS. THE KEY USES DIFFERENT COLORS TO REPRESENT THE INTENSITY OR LIKELIHOOD OF CONFLICT.

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

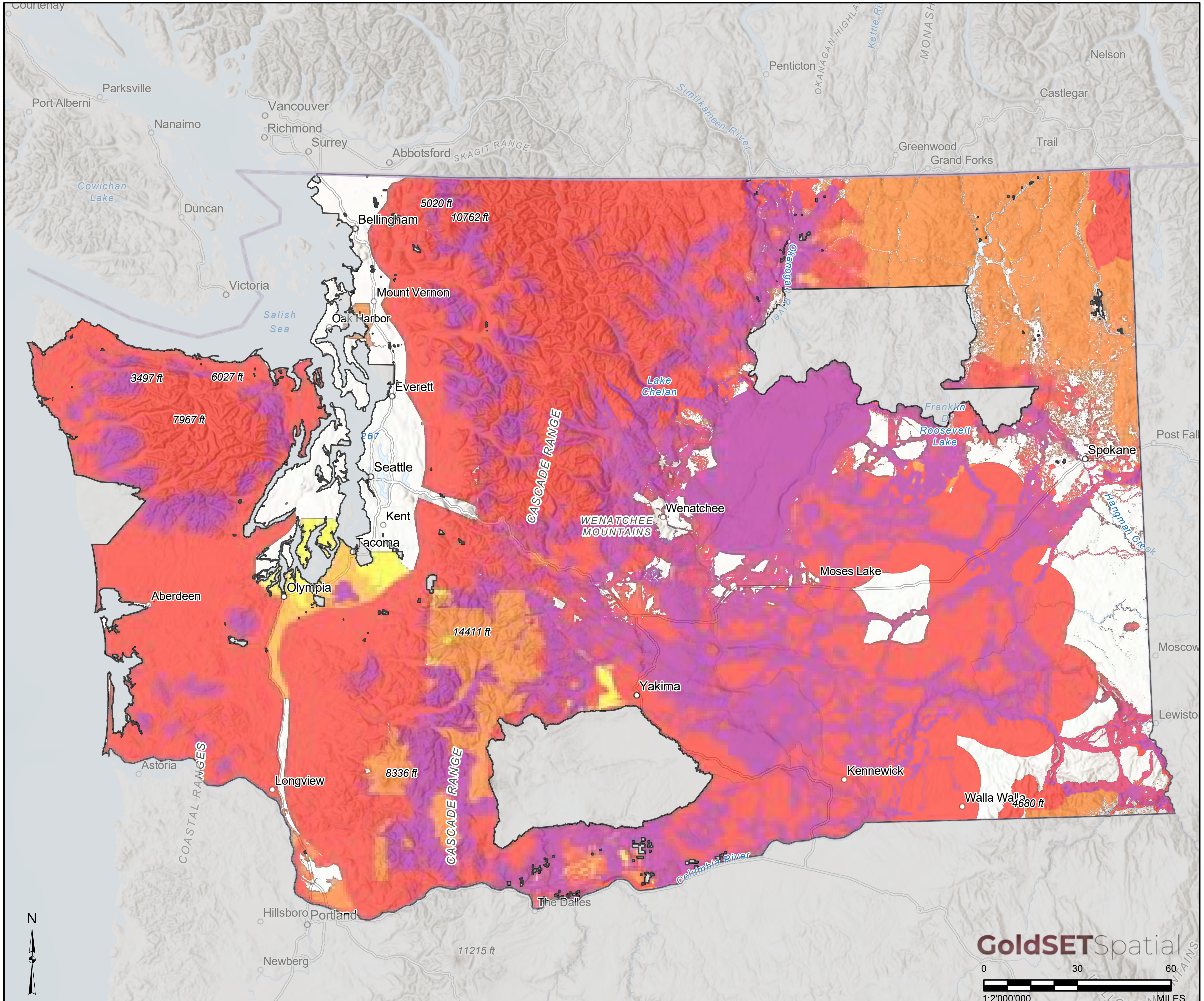
SUITABILITY MAP WILDLIFE - OVERHEAD TRANSMISSION LINE

YYYY-MM-DD 2025-02-27

CONSULTANT wsp

FIGURE 3.6-4

This Page Intentionally Left Blank



LEGEND

Study Area

Conflict Indicator Key

- Neutral
- Low
- Low-Medium
- Medium
- Medium-High
- High
- Very High

EFSEC
Energy Facility Site Evaluation Council

THE SEAL OF THE STATE OF WASHINGTON 1889

REFERENCES AND NOTES

1. WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS; ESRI, USGS
2. THE CONFLICT INDICATOR KEY CAN BE USED TO IDENTIFY AND HIGHLIGHT AREAS WHERE DIFFERENT PROJECT CONSTRAINTS MAY OVERLAP, POTENTIALLY LEADING TO CONFLICTS. THE KEY USES DIFFERENT COLORS TO REPRESENT THE INTENSITY OR LIKELIHOOD OF CONFLICT.

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

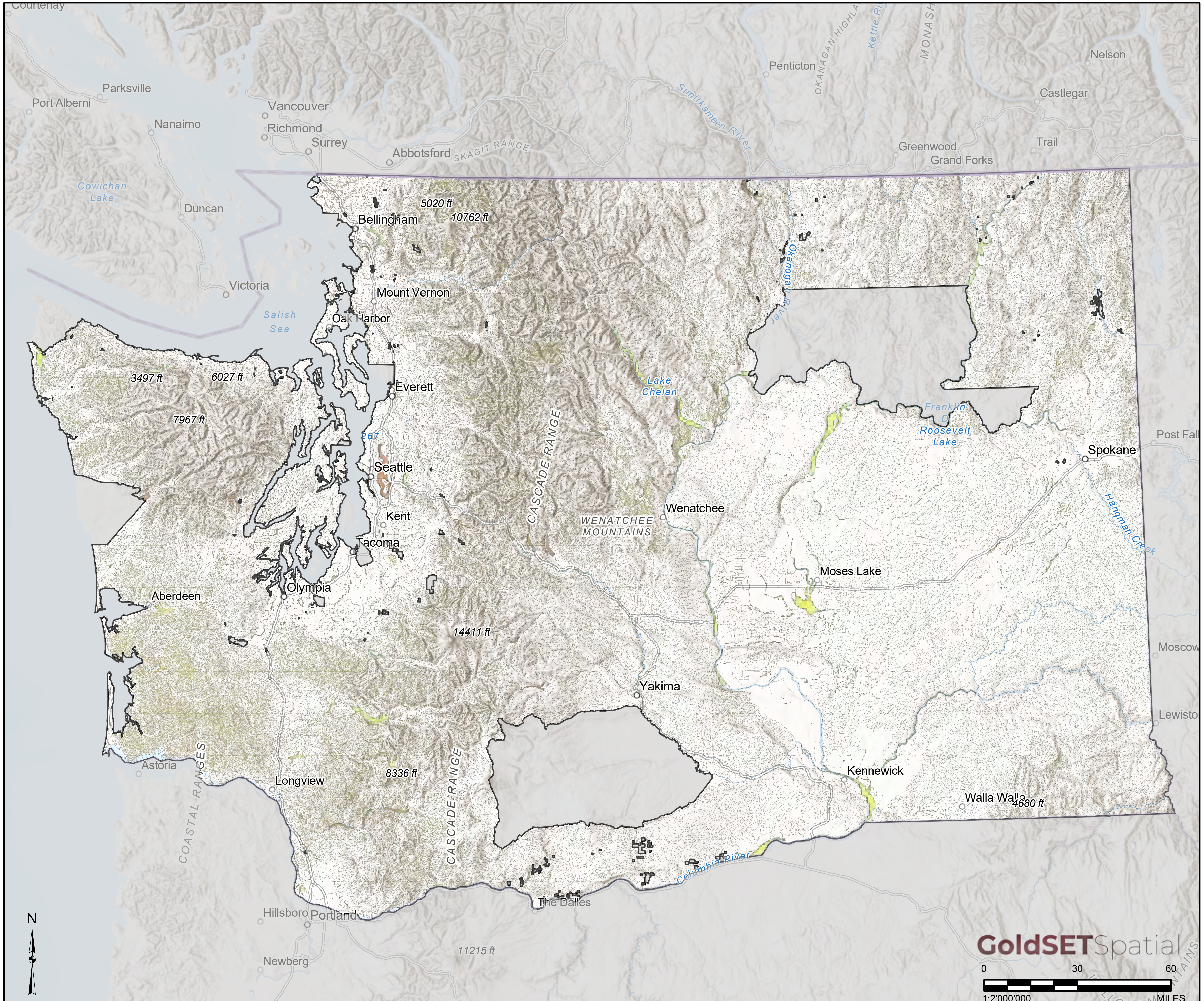
SUITABILITY MAP WILDLIFE - UNDERGROUND TRANSMISSION LINE

YYYY-MM-DD 2025-02-27

CONSULTANT wsp

FIGURE 3.6-5

This Page Intentionally Left Blank



LEGEND

Study Area

Conflict Indicator Key

- Neutral
- Low
- Low-Medium
- Medium
- Medium-High
- High
- Very High

THE SEAL OF THE STATE OF WASHINGTON 1889

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES

1. WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS; ESRI, USGS
2. THE CONFLICT INDICATOR KEY CAN BE USED TO IDENTIFY AND HIGHLIGHT AREAS WHERE DIFFERENT PROJECT CONSTRAINTS MAY OVERLAP, POTENTIALLY LEADING TO CONFLICTS. THE KEY USES DIFFERENT COLORS TO REPRESENT THE INTENSITY OR LIKELIHOOD OF CONFLICT.

PROJECT
DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

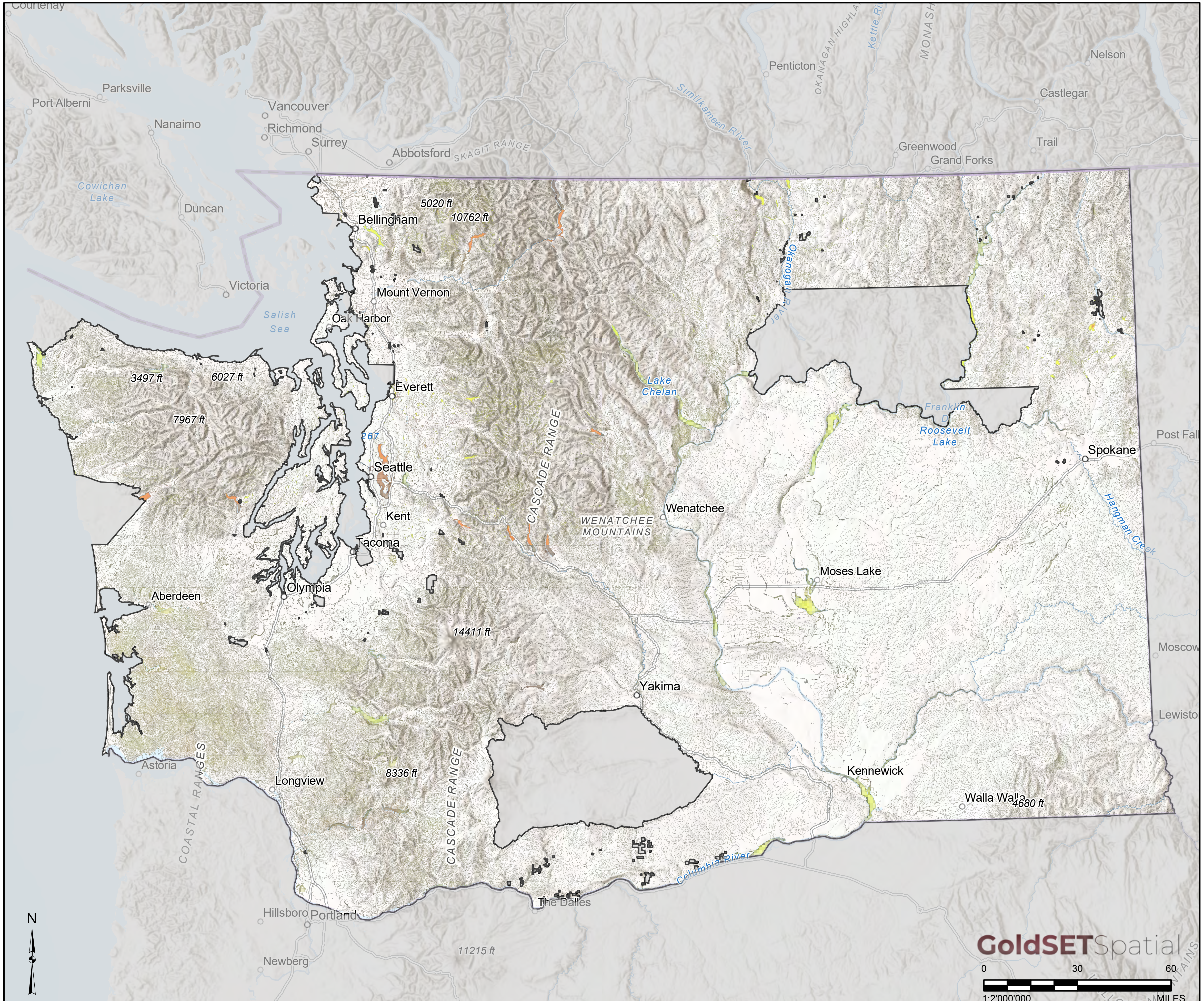
TITLE
SUITABILITY MAP FISH - OVERHEAD TRANSMISSION

YYYY-MM-DD 2025-02-07 CONSULTANT wsp FIGURE 3.6-6

GoldSETSpatial

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

This Page Intentionally Left Blank



LEGEND

Study Area

Conflict Indicator Key

- Neutral
- Low
- Low-Medium
- Medium
- Medium-High
- High
- Very High

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES

1. WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS; ESRI, USGS
2. THE CONFLICT INDICATOR KEY CAN BE USED TO IDENTIFY AND HIGHLIGHT AREAS WHERE DIFFERENT PROJECT CONSTRAINTS MAY OVERLAP, POTENTIALLY LEADING TO CONFLICTS. THE KEY USES DIFFERENT COLORS TO REPRESENT THE INTENSITY OR LIKELIHOOD OF CONFLICT.

PROJECT
DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE
SUITABILITY MAP FISH - UNDERGROUND TRANSMISSION

YYYY-MM-DD 2025-02-07
CONSULTANT wsp
FIGURE 3.6-XX

This Page Intentionally Left Blank

3.6.1.1 Suitability Map Methodology

The suitability map evaluates various criteria and assigns a suitability score to different areas based on how well those areas meet the desired conditions.

A number of siting decision criteria, referred to as indicators in GoldSET, were identified by subject matter experts (SMEs) for inclusion in this resource's suitability map. SMEs assigned a weighting based on the degree of constraint (i.e., high, medium, or low), or potential difficulty for a transmission facility to traverse an area. Each of the GoldSET Indicator cards describing the criteria chosen and the source of the data layers used are provided in **Appendix 3.6-2.**

Each of the spatial data layers were digitally combined by GoldSET to produce the multi-criteria map of transmission facility suitability across the Study Area.

The wildlife GoldSET cards were created by assessing the susceptibility of wildlife and fish species to the impacts of constructing, operating, or upgrading a transmission facility. Wildlife features, such as critical and core habitat, nesting sites, breeding colonies, known dens, movement corridors, and wetlands and watercourses were assigned a significance weighting of either high, medium, or low depending on how susceptible these features would be to the construction and operation of a transmission facility. Data used for wildlife cards included Priority Habitat and Species data from WDFW (including data such as grouse lek sites, colony locations, amphibian breeding sites, and snake hibernacula), critical habitat data from USFWS, IBA locations, and wildlife habitat connectivity priority areas. Buffer distances for watercourses and waterbodies, and from important wildlife features were also based off the best available information, with the wildlife buffers that were used being found in **Appendix 3.6-1**.

Five impact categories, direct habitat loss, indirect habitat loss, mortality, barriers to movement, and fragmentation, were assessed independently. The sensitivity of wildlife to these impacts were considered for overhead and underground transmission lines to separate the varying effects transmission line development can have. Assignment of sensitivity rankings was based on available scientific literature and management recommendations. Not all significance ratings (e.g., high, medium, low) were applied to all impact categories. If an impact category is not described below (e.g., no high conflict of fish habitat loss) this signifies that no data layer category was identified at this significance rating.

A summary of the criteria used to produce each GoldSET card is provided below.

Overhead Transmission Facilities

Habitat Wildlife and Fish: Low Conflict – Direct Wildlife Habitat Loss

Areas that are at low risk of direct habitat loss include habitats with minimal interaction with transmission facilities, such as open areas and those areas with fewer unique or critical wildlife features. Wildlife in naturally open habitats or wetlands, which can often be spanned by transmission lines and restored after construction, are less likely to be significantly impacted by transmission facilities.

Note that a 500-meter buffer around Western Pond Turtle habitat and a 300-meter buffer around Golden Eagle nests were provided in the dataset.

Habitat Wildlife and Fish: Medium Conflict – Direct Wildlife Habitat Loss

Areas that are at medium risk of direct habitat loss include areas that are vulnerable to habitat loss from transmission facilities and have federal or state listed species. These areas include forests or important wildlife habitats (e.g., Important Bird Areas, or critical habitat). Species with limited ranges or heightened sensitivity to habitat loss may be significantly impacted by transmission right-of-way (ROW) construction. The loss of unique, limiting, or high-value habitats, identified through habitat concentration areas and IBAs, can have a greater impact on wildlife.

Note that a 20-kilometer around from Ferruginous Hawk nests, a 150-meter buffer around Common Loon breeding areas, and a 30-meter buffer around Streaked Horned Lark critical habitat and breeding areas were provided in the dataset.

Habitat Wildlife and Fish: High Conflict – Direct Wildlife Habitat Loss

Areas that are at risk of direct habitat loss include areas with endangered species and species with highly limited habitat. Wildlife species with highly specialized habitat requirements (e.g. specific breeding colony locations) or species that require contiguous mature forest (e.g., spotted owl) are highly sensitive to loss of habitat.

Note that a 1,600-meter buffer around American White Pelican breeding occurrences and a 5-mile buffer around Sage Grouse Lek breeding occurrences were provided in the dataset.

Habitat Wildlife and Fish: Low Conflict - Indirect Wildlife Habitat Loss

Indirect habitat loss for species less sensitive to disturbance or state or federally listed species that inhabit areas which can be spanned or avoided. Species in such habitats, or those less affected by disturbance, may experience reduced vulnerability to indirect habitat loss from overhead transmission lines.

Note that a 1,600-meter buffer around American White Pelican breeding sites and a 500-meter buffer around Western Pond Turtle critical habitat were provided in the dataset.

Habitat Wildlife and Fish: Medium Conflict- Indirect Wildlife Habitat Loss

Areas at risk of indirect habitat loss for state or federally listed endangered and threatened species, as well as non-listed species sensitive to disturbance. Federally and state listed species may be particularly vulnerable to behavioral disruptions and other forms of indirect habitat loss caused by overhead transmission lines.

Note that a 20-kilometer buffer around Ferruginous Hawk nests, a 150-meter buffer around Common Loon breeding areas, and a 5-mile buffer around Sage Grouse Lek breeding occurrences were provided in the dataset.

Habitat Wildlife and Fish: Low Conflict - Sensitive Wildlife At Risk of Mortality

Species in habitats that can be spanned by transmission lines (e.g., wetlands), non-aerial species, or species that do not fly at the height of transmission lines are less likely to interact with overhead transmission facilities.

Note that a 150-meter buffer around Common Loon breeding areas was provided in the dataset.

Habitat Wildlife and Fish: Medium Conflict - Sensitive Wildlife Species At Risk of Mortality

Habitat for species with populations vulnerable to individual losses and vulnerable to mortality from transmission lines (e.g. large-bodied birds). Transmission facilities can increase avian species mortality due to collisions, electrocutions, and changes in predator/prey dynamics.

Note that a 5-mile buffer around Sage Grouse Lek breeding occurrences was provided in the dataset.

Habitat Wildlife and Fish: High Conflict - Sensitive Wildlife At Risk of Mortality

Habitat of federally and state listed species that are vulnerable to mortality from the construction and operation of overhead transmission lines. Overhead transmission line construction and operation can increase mortality due to collisions, electrocutions, and changes in predator/prey dynamics. With populations of federally and state listed species already in decline, these species are particularly vulnerable to further losses.

Note that a 20-kilometer buffer around Ferruginous Hawk nests and a 1,600-meter buffer from American White Pelican breeding sites were provided in the dataset.

Habitat Wildlife and Fish: Low Conflict – Wildlife Habitat Fragmentation

Habitats that would have a low vulnerability to fragmentation from overhead or underground transmission facilities include naturally open areas or areas that can be spanned or avoided. Naturally open areas, habitats that can be avoided, and areas that can be restored during operation are less vulnerable to fragmentation.

Note that a 150-meter buffer around Common Loon breeding areas, a 1,600-meter buffer around American White Pelican breeding sites, and a 500-meter buffer around Western Pond Turtle habitat were provided in the dataset

Habitat Wildlife and Fish: Medium Conflict - Wildlife Habitat Fragmentation

Habitats that support higher concentrations of biodiversity and habitats that support species that are moderately vulnerable to fragmentation from transmission line impacts.

Note that a 20-kilometer buffer around Ferruginous Hawk breeding habitat core areas and a 5-mile buffer around Sage Grouse Lek breeding occurrences were provided in the dataset.

Habitat Wildlife and Fish: High Conflict – Wildlife Habitat Fragmentation

Habitat for threatened or endangered species that are highly sensitive to habitat fragmentation. Sensitive wildlife that are dependent on contiguous mature forest are highly vulnerable to fragmentation due to transmission line impacts.

No buffers were provided in this dataset.

Habitat Wildlife and Fish: Low Conflict - Barriers to Wildlife Movement

This criterion includes movement corridors are rated as low as well as naturally open habitat areas where the impacts of transmission line construction and operation are minimal. Species that occur in naturally open areas and habitats that can be spanned by a transmission line are less vulnerable to barriers created by transmission construction and operation. Similarly, transmission construction and operation in low-rated wildlife corridors are less likely to hinder wildlife movement.

Note that a 500-meter buffer around Western Pond Turtle habitat, a 150-meter buffer around Common Loon breeding areas, and a 1,600-meter buffer around American White Pelican breeding sites were provided in the dataset.

Habitat Wildlife and Fish: Medium Conflict - Barriers to Wildlife Movement

This criterion includes wildlife movement corridors rated as medium as well as where transmission line construction and operation would create physical or perceived barriers to the movement patterns of federally or state listed endangered and threatened species with some ability to cross right-of-ways (ROWs). Some wildlife species are moderately capable of moving over ROWs due to their natural habitat selection (e.g. open habitat) or ability to use matrix habitat that includes open and closed habitats.

Note that a 20-kilometer buffer around Ferruginous Hawk nests was provided in the dataset.

Habitat Wildlife and Fish: High Conflict – Barrier to Wildlife Movement

This criterion includes wildlife movement corridors rated as high or very high along with areas where transmission line construction and operation would create physical or perceived barriers to the movement patterns of federally or state listed endangered and threatened species with limited ability to cross rights-of-way (ROWs). Transmission lines and ROWs can disrupt wildlife movement, particularly for species in forested areas or unique habitats (e.g., leks). These barriers to movement limit access to essential resources and can fragment critical habitats, making species more vulnerable.

Note that a 5-mile buffer around Sage Grouse Lek breeding occurrences was provided in the dataset.

Habitat Wildlife and Fish: Low Conflict - Fish Habitat Loss

Habitat extent for candidate species at risk of direct impacts as well as habitat for federally listed endangered, threatened, and candidate species at risk of indirect impacts. The included species that are federally listed as endangered or threatened are more tolerant to short-term changes in habitat or less likely to be impacted by transmission line construction or operations due to habitat location or the types of waterbodies that they inhabit.

Note that a 100-foot on either side of watercourses was provided in the dataset.

Habitat Wildlife and Fish: - Medium Conflict - Fish Habitat Loss

Habitat extent of federally listed (endangered or threatened) fish species that would be directly impacted by transmission line construction and operations. The includes species that are highly sensitive to habitat disturbance, have low population abundance, limited range, or are located in watercourses where underground transmission construction and operations will impact habitat. Watercourses or waterbodies that have been compensated or adopted by local governments are also vulnerable to impacts from transmission line construction and operations.

Note that a 100-foot buffer around all habitat areas was provided in the dataset.

Habitat Wildlife and Fish: Low Conflict - Watercourses

Waterbodies and watercourses including those that are non-fish-bearing. Instream impacts may still occur in all watercourses and waterbodies which includes changes downstream to fish-bearing habitat, or possible fish presence.

Note that a 100-foot buffer around watercourses and water bodies was provided in the dataset.

Underground Transmission Facilities

Habitat Wildlife and Fish: Low Conflict – Direct Wildlife Habitat Loss

Areas with low risk of habitat loss include habitats with minimal interaction with transmission lines, such as open areas and those with fewer unique or critical wildlife features. Wildlife in naturally open habitats or wetlands, which can often be spanned by transmission lines and restored after construction, are less likely to be significantly impacted by transmission line construction and operations.

Note that a 500-meter buffer around Western Pond Turtle habitat and a 300-meter buffer around Golden Eagle nests were provided in the dataset.

Habitat Wildlife and Fish: Medium Conflict – Direct Wildlife Habitat Loss

Areas at risk of habitat loss for federally or state listed species in areas vulnerable to habitat loss from transmission lines, such as forests or important wildlife habitats (e.g., Important Bird Areas [IBAs], or critical habitat). Species with limited ranges or heightened sensitivity to habitat loss may be significantly impacted by transmission right-of-way (ROW) construction. The loss of unique, limiting, or high-value habitats, identified through habitat concentration areas and IBAs, can have a greater impact on wildlife.

Note that a 20-kilometer around from Ferruginous Hawk nests, a 150-meter buffer around Common Loon breeding areas, and a 30-meter buffer around Streaked Horned Lark critical habitat and breeding areas were provided in the dataset.

Habitat Wildlife and Fish: High Conflict – Direct Wildlife Habitat Loss

Areas at risk of habitat loss for endangered species and species with highly limited habitat. Wildlife species with highly specialized habitat requirements (e.g. specific breeding colony locations) or species that require contiguous mature forest (e.g. spotted owl) are highly sensitive to loss of habitat.

Note that a 1,600-meter buffer around American White Pelican breeding occurrences and a 5-mile buffer around Sage Grouse Lek breeding occurrences were provided in the dataset.

Habitat Wildlife and Fish: Low Impact – Indirect Wildlife Habitat Loss

Indirect habitat loss for species less sensitive to disturbance or state or federally listed species that inhabit areas which can be spanned or avoided. Species in such habitats, or those less affected by disturbance, may experience reduced vulnerability to indirect habitat loss from underground transmission lines.

Note that a 20-kilometer buffer around Ferruginous Hawk nests, a 5-mile buffer around Sage Grouse Lek breeding occurrence, a1,600-meter buffer around American White Pelican breeding sites, and a 500-meter buffer around Western Pond Turtle critical habitat were provided in the dataset.

Habitat Wildlife and Fish: Medium Impact - Indirect Wildlife Habitat Loss

Areas at risk of indirect habitat loss for state or federally listed endangered and threatened species, as well as non-listed species sensitive to disturbance. Federally and state listed species may be particularly vulnerable to behavioral disruptions and other forms of indirect habitat loss caused by underground transmission lines.

No buffers were provided in this dataset.

Habitat Wildlife and Fish: Low Conflict –Sensitive Wildlife Risk of Mortality

Habitat for species and populations that are less likely to be at risk from mortality from underground transmission lines. Species that occur in habitats that can be spanned by transmission lines (e.g. wetlands) are less likely to interact with the construction or operation of underground transmission lines.

Note that a 1,600-meter buffer around American White Pelican breeding sites, a 20-kilometer buffer around Ferruginous Hawk nests, a 5-mile buffer around Sage Grouse Lek breeding occurrence, a 300-meter buffer around Golden Eagle breeding sites, and a 150-meter buffer around Common Loon breeding areas were provided in the dataset.

Habitat Wildlife and Fish: High Conflict – Sensitive Wildlife at Risk of Mortality

Habitat of federally and state listed species that are vulnerable to mortality from the construction and operation of underground transmission lines. Construction and operation of underground transmission lines can increase mortality due to changes in predator/prey dynamics. With populations of federally and state listed species already in decline, these species are particularly vulnerable to further losses.

No buffers were provided in this dataset.

Habitat Wildlife and Fish: Low Conflict – Wildlife Habitat Fragmentation

Habitats that would have a low vulnerability to fragmentation from overhead or underground transmission lines include naturally open areas or areas that can be spanned or avoided. Naturally open areas, habitats that can be avoided, and areas that can be restored during operation are less vulnerable to fragmentation.

Note that a 150-meter buffer around Common Loon breeding areas, a 1,600-meter buffer around American White Pelican breeding sites, and a 500-meter buffer around Western Pond Turtle habitat were provided in the dataset.

Habitat Wildlife and Fish: Medium Conflict - Wildlife Habitat Fragmentation

Habitats that support higher concentrations of biodiversity and habitats that support species that are moderately vulnerable to fragmentation from transmission line impacts.

Note that a 20-kilometer buffer around Ferruginous Hawk breeding habitat core area and a 5-mile buffer around Sage Grouse Lek breeding occurrences were provided in the dataset.

Habitat Wildlife and Fish: High Conflict – Wildlife Habitat Fragmentation

Habitat for threatened or endangered species that are highly sensitive to habitat fragmentation. Sensitive wildlife that are dependent on contiguous mature forest are highly vulnerable to fragmentation due to transmission line impacts.

No buffers were provided in this dataset.

Habitat Wildlife and Fish: Low Conflict - Barriers to Wildlife Movement

This criterion includes movement corridors are rated as low as well as naturally open habitat areas where the impacts of transmission line construction and operation are minimal. Species that occur in naturally open areas and habitats that can be spanned by a transmission line are less vulnerable to barriers created by transmission construction and operation. Similarly, transmission construction and operation in low-rated wildlife corridors are less likely to hinder wildlife movement.

Note that a 500-meter buffer around Western Pond Turtle habitat, a 150-meter buffer around Common Loon breeding areas, and a 1,600-meter buffer around American White Pelican breeding sites were provided in the dataset.

Habitat Wildlife and Fish: Medium Conflict - Barriers to Wildlife Movement

This criterion includes wildlife movement corridors rated as medium as well as where transmission line construction and operation would create physical or perceived barriers to the movement patterns of federally or state listed endangered and threatened species with some ability to cross rights-of-way (ROWs). Some wildlife species are moderately capable of moving over ROWs due to their natural habitat selection (e.g. open habitat) or ability to use matrix habitat that includes open and closed habitats.

Note that a 20-kilometer buffer around Ferruginous Hawk nests was provided in the dataset.

Habitat Wildlife and Fish: High Conflict - Barriers to Wildlife Movement

This criterion includes wildlife movement corridors rated as high or very high along with areas where transmission line construction and operation would create physical or perceived barriers to the movement patterns of federally or state listed endangered and threatened species with limited ability to cross rights-of-way (ROWs). Transmission lines and ROWs can disrupt wildlife movement, particularly for species in forested areas or unique habitats (e.g., leks). These barriers to movement limit access to essential resources and can fragment critical habitats, making species more vulnerable.

Note that a 5-mile buffer around Sage Grouse Lek breeding occurrences was provided in the dataset.

Habitat Wildlife and Fish: Low Conflict - Fish Habitat Loss

Directly impacted habitat for candidate species at risk of direct impacts or indirectly impacted habitat for federally listed endangered, threatened, and candidate species. The included species that are federally listed as endangered or threatened are less likely to be impacted by transmission line construction and operations due to their habitat location or the waterbodies that they inhabit (lakes, large river systems, or deep water).

Note that a 100-foot buffer around all habitat areas was provided in the dataset.

Habitat Wildlife and Fish: Medium Conflict - Fish Habitat Loss

Federally listed (endangered or threatened) fish habitat that would be directly lost from transmission line construction and operations. The included species that are highly sensitive to habitat disturbance, have low population abundance, have limited range, or are located in watercourses where underground transmission construction and operations will impact habitat. Watercourses or waterbodies that have been compensated or adopted by local governments are also vulnerable to impacts from transmission line construction and operations.

Note that a 100-foot buffer around all habitat areas was provided in the dataset.

Habitat Wildlife and Fish: Low Conflict - Watercourse

Waterbodies and watercourses including those that are non-fish-bearing. Instream impacts may still occur in all watercourses and waterbodies which includes changes downstream to fish-bearing habitat, or possible fish presence.

Note that a 100-foot buffer around watercourses and water bodies was provided in the dataset.

3.7 Energy and Natural Resources

This Draft Programmatic Environmental Impact Statement (EIS) considers impacts on energy and natural resources for the types of facilities described in Chapter 2. This section addresses the following topics related to the construction, operation and maintenance, and upgrade or modification of high-voltage electric transmission facilities (transmission facilities) in the State of Washington:

- Section 3.7.1 identifies regulatory, siting, and design considerations.
- Section 3.7.2 describes the affected environment.
- Section 3.7.3 describes impacts.
- Section 3.7.4 describes potential mitigation measures.
- Section 3.7.5 identifies probable significant adverse environmental impacts on energy and natural resources.

3.7.1 Regulatory, Siting, and Design Considerations

This Draft Programmatic EIS establishes a broad framework for compliance, outlining general laws, regulations, best management practices (BMPs), and design considerations. It is assumed that project-specific applications will be developed within this pre-established regulatory context and are expected to comply with existing laws and regulations. If the project does not comply with applicable laws and regulations or fails to adhere to design considerations or BMPs, additional project-specific environmental review and mitigation would be required. The applicable federal and state laws and regulations relevant to energy and natural resources are summarized in **Table 3.7-1**.

Table 3.7-1: Laws and Regulations for Energy and Natural Resources

Applicable Legislation	Agency	Summary Information
16 USC §§791a et seq. - Federal Power Act	Federal Energy Regulatory Commission	Originally enacted in 1920 and amended in 1935, the FPA grants FERC jurisdiction over wholesale electric power transactions[218] and interstate transmission of electric power.
42 USC Chapter 134 - Energy Policy Act	U.S. Department of Energy Multiple federal agencies	This act, originally enacted in 1992, is a comprehensive piece of legislation aimed at addressing various energy-related issues in the United States, including energy efficiency and conservation, alternative fuels,[219] electricity market reforms, renewable energy, and nuclear and fossil fuels. A significant amendment in 2005 introduced major changes including: Loan Guarantees, Biofuel Mandates, Electricity Grid Reliability, Market Manipulation Prevention, and Public Utility Holding Company Act Repeal This amendment also includes provisions to improve the reliability of the electric grid and streamline the permitting process for transmission projects. It expands FERC's authority,

[218] Involves the buying and selling of large quantities of electricity between electricity producers (such as power plants) and electricity suppliers (such as utility companies). These transactions typically occur in wholesale electricity markets, which were established during the deregulation of the electricity markets in the 1990s.

[219] Refers to energy sources that can be used to generate electricity as a substitute for traditional fossil fuels like coal, oil, and natural gas. These alternative fuels are often more sustainable and often considered more environmentally friendly.

Applicable Legislation	Agency	Summary Information
		including “backstop” siting[220] authority for transmission facilities in designated National Interest Electric Transmission Corridors.[221]
42 USC Chapter 152 - Energy Independence and Security Act	Multiple federal agencies	This act aims to enhance U.S. energy security[222] and promote clean energy. The EISA set ambitious targets for biofuels[223] to reduce dependence on oil.
49 USC Chapter 53 - Bipartisan Infrastructure Law	Multiple federal agencies	This law includes significant investments in modernizing the electric grid, including funding for new transmission facilities and grid upgrades.
Washington State Environmental Policy Act	Washington Energy Facility Site Evaluation Council Washington State Department of Ecology Local governments	This act is a process that identifies and analyzes environmental impacts that can be related to issuing permits. SEPA helps permit applicants and decision-makers understand how a proposed project will impact the environment. Certain projects, as defined in the SEPA Rules (WAC 197-11-704) and that are not exempt, are required to go through the SEPA process.
RCW 19.285 – Washington State Energy Independence Act	Washington State Department of Commerce[(a)]	This act requires electrical utilities serving at least 25,000 retail customers to use renewable energy and energy conservation over a 10-year period and set two-year targets.
RCW 19.405 – Washington State Clean Energy Transformation Act	Washington State Department of Commerce[(a)]	This act mandates that Washington’s electricity supply be 100% carbon-neutral[224] by 2030 and 100% renewable or non-emitting[225] by 2045. It also established the Transmission Corridors Work Group to identify and address the need for upgraded and new transmission facilities.
RCW 36.70A – Washington State Growth Management Act	Washington Department of Commerce[(a)]	This act requires cities and counties to plan for growth while conserving natural resources and protecting critical areas such as wetlands and forests.
RCW 70A.535 – Clean Fuel Standard	Washington State Department of Ecology[(a)]	This program aims to reduce the carbon intensity of transportation fuels and promote the use of low-carbon and renewable alternatives.
RCW 70A.65 – Climate Commitment Act	Washington State Department of Ecology[(a)]	This act establishes a comprehensive program to reduce carbon pollution and achieve the GHG limits set in state law.

[220] Refers to FERC's limited authority to approve the siting of certain electric transmission lines when state authorities fail to do so. This authority is granted under specific conditions outlined in the Energy Policy Act of 2005 and further clarified by the Infrastructure Investment and Jobs Act of 2021.

[221] Geographic areas designated by the DOE where electricity transmission limitations are significantly affecting consumers. These corridors are identified based on findings from the National Transmission Needs Study and other relevant data.

[222] Refers to the reliable and affordable access to sufficient energy resources to meet a nation's needs. It encompasses the ability to produce or obtain enough energy to support economic stability, national security, and the daily activities of its citizens.

[223] A type of fuel derived from biological materials, such as plants, algae, or animal waste. Unlike fossil fuels, which take millions of years to form, biofuels are produced over a much shorter time span and are considered renewable.

[224] Refers to achieving a balance between emitting carbon and absorbing carbon from the atmosphere in carbon sinks. Any CO_2 released into the atmosphere from activities such as burning fossil fuels is offset by an equivalent amount of CO_2 being removed, resulting in no net increase in atmospheric CO_2.

[225] Refers to energy sources or technologies that do not release greenhouse gases during their operation.

Applicable Legislation	Agency	Summary Information
WAC Title 463 – Energy Facility Site Evaluation Council	State of Washington Energy Facility Site Evaluation Council[(a)]	This regulation covers various aspects of energy facility siting, construction, and operation.

Notes:

(a) The agency responsible for administering most permits or authorizations for the identified regulation. However, if EFSEC is determined to be the agency responsible for approving a proposal, EFSEC can administer several types of permits at the state and local levels. EFSEC provides a streamlined process for siting and licensing major energy facilities, including transmission facilities in Washington State. EFSEC coordinates all evaluation and licensing steps, specifies the conditions for construction and operation, and issues a Site Certification Agreement, which assumes the responsibility for issuing individual state or local permits. By consolidating these permits into a single Site Certification Agreement, EFSEC can simplify the regulatory process for energy facility developers. While EFSEC itself does not directly administer federal permits, it works closely with federal agencies to ensure that all necessary federal requirements are met during the evaluation and licensing of energy facilities.

DOE = Department of Energy; EFSEC = Energy Facility Site Evaluation Council; EISA = Energy Independence and Security Act; FERC = Federal Energy Regulatory Commission; FPA = Federal Power Act; GHG = greenhouse gas; RCW = Revised Code of Washington; SEPA = State Environmental Policy Act; WAC = Washington Administrative Code

The siting of transmission facilities is determined by engineering, technical, environmental, and socioeconomic factors. **Table 3.7-2** summarizes guidance documents and management plans that outline the design considerations and BMPs generally used to avoid or minimize impacts on energy and natural resources.

Table 3.7-2: Siting and Design Considerations for Energy and Natural Resources

Siting and Design Consideration	Description
Siting: Finding a Home for Renewable Energy and Transmission (Zichella and Hladik n.d.)	This document from the U.S. Department of Energy focuses on the challenges and strategies for siting renewable energy projects and transmission facilities. Strategies for effective siting include: ▪ Optimizing existing infrastructure ▪ Early stakeholder engagement ▪ Interagency coordination ▪ Innovative compensation ▪ "Smart from the start," a strategy aimed at using criteria to prioritize low-impact areas for development to avoid environmental and cultural conflicts
Recommended Siting Practices for Electric Transmission Developers (Americans for a Clean Energy Grid 2023)	This document outlines best practices for siting electric transmission facilities. Recommended practices include: ▪ Early and transparent engagement ▪ Respect and fair dealing ▪ Environmental considerations ▪ Interagency coordination ▪ Use of existing infrastructure
North American Electric Reliability Corporation Standard Processes Manual VERSION 5 Effective November 28, 2023 (NERC 2023)	NERC Reliability Standards are developed using an industry-driven process that: ▪ Ensures the process is open to all persons who are directly and materially affected by the reliability of the North American bulk power system ▪ Ensures the process is transparent to the public ▪ Demonstrates the consensus for each standard ▪ Fairly balances the interests of all stakeholders ▪ Provides for reasonable notice and opportunity for comment ▪ Enables the development of standards in a timely manner

Siting and Design Consideration	Description
Transmission Corridors Work Group Final Report (EFSEC 2022)	The final TCWG report concludes the following: ▪ **Regional and interregional planning:** Washington has long relied on out-of-state sources for its energy needs. Reliance on those sources is likely to increase in the state's clean energy future. It will be critical to have a strong state presence at the table for enhanced regional and interregional transmission planning. Timely engagement in clean energy transmission planning will ensure that the renewable energy the state needs can reach the homes and businesses that require it. ▪ **Staff resources in state agencies:** The state's critical role in transmission planning would be enhanced by the designation (and funding) of a team dedicated to incorporating state input into regional planning processes. Sufficient staff are also needed to perform the transmission siting work that will be required in the coming years, particularly in the realm of archaeology and historic preservation. ▪ **Enhanced resources for Tribes:** The burden of paying for siting-related archaeological and cultural review should not fall on the Tribes. It is critical to identify mechanisms for funding Tribal governments to carry out this vital work. ▪ **Pre-application planning and coordination:** Key stakeholders believe the state currently lacks sufficient transmission infrastructure to meet CETA's 2030 targets for renewable energy. Given that it can take over 10 years to properly site a major transmission project, the needed planning work is already overdue and should begin as soon as possible.

CETA = Clean Energy Transformation Act; NERC = North American Electric Reliability Corporation; TCWG = Transmission Corridors Work Group

3.7.1.1 Energy Programs

To ensure a robust and resilient electric grid, various federal initiatives and programs have been established to support transmission planning, cost allocation, and infrastructure development.

Federal Initiatives

- **Building a Better Grid Initiative:** Administered by the U.S. Department of Energy's (DOE's) Grid Deployment Office, this initiative focuses on developing long-distance, high-voltage transmission facilities and modernizing distribution facilities to ensure reliable and affordable electricity.
- **Order No. 1920:** The Federal Energy Regulatory Commission (FERC) issued Order No. 1920, which mandates long-term regional transmission planning. This involves scenario planning over a 20-year horizon to identify and address future transmission needs.

Federal Energy Programs

- **U.S. State Energy Program:** Administered by the DOE, the U.S. State Energy Program provides funding and technical assistance to states to promote energy efficiency and renewable energy projects.
- **The Transmission Facilitation Program:** Administered by the DOE, the Transmission Facilitation Program is administered by the DOE and supports the development of new transmission facilities and upgrades through financial tools like capacity contracts, loans, and public-private partnerships. The program aims to overcome financial barriers and accelerate the deployment of critical transmission infrastructure.
- **Grid Resilience and Innovation Partnership Programs:** These programs, managed by the DOE, offer $110.5 billion in funding to enhance grid resilience and support innovative transmission projects.

- **Coordinated Interagency Transmission Authorizations and Permits Program:** The Coordinated Interagency Transmission Authorizations and Permits Program, administered by the DOE, aims to streamline environmental reviews and permitting processes, reducing the time required for federal permits.
- **National Interest Electric Transmission Corridors:** Designations under this program unlock critical federal financing and permitting resources to spur transmission development, including direct loans and public-private partnerships.

Among the acts included in **Table 3.7-1**, Washington State also has key programs and initiatives focused on transmission to support its clean energy goals, including those described below.

Transmission Corridors Work Group

The Clean Energy Transformation Act (CETA) included a directive for EFSEC to establish the Transmission Corridors Work Group (TCWG). The TCWG included members from several state agencies, industry stakeholders, and organizations, as follows:

- Washington State Department of Commerce
- Washington Utilities and Transportation Commission
- Washington State Department of Ecology
- Washington Department of Fish and Wildlife
- Washington State Department of Natural Resource
- Washington State Department of Transportation
- Washington State Department of Archaeology and Historic Preservation
- Washington State Military Department

Additionally, the TCWG included the following non-state participants:

> *two representatives designated by the association of Washington cities, one from central or eastern Washington and one from western Washington; two representatives designated by the Washington state association of counties, one from central or eastern Washington and one from western Washington; two members designated by sovereign tribal governments; one member representing affected utility industries; one member representing public utility districts; and two members representing statewide environmental organizations. The Bonneville Power Administration and the United States Department of Defense were also invited to participate as ex officio work group member* (Senate Bill 5116, 2019).

The TCWG final report presents a list of guiding principles that provide foundational, solution-oriented direction throughout transmission system development. The principles were formulated to address the impacts of transmission facilities, the needs of overburdened communities, background findings, geographic considerations, and transmission-related challenges (EFSEC 2022). The TCWG's guiding principles are organized according to phases of transmission development, beginning with overarching principles that apply to all phases and ending with best practices that may apply to multiple phases. These principles are as follows:

Overarching Principles

1) *Interregional transmission capacity is key in enabling Washington, as well as other states, to build a diverse portfolio of clean and reliable electricity resources.*
2) *Allow sufficient lead time for planning and engagement.*
3) *Properly fund or provide authorization to receive funding to Tribes and federal, state, and local agencies providing essential project review (e.g., EFSEC, Department of Archaeology and Historic Preservation).*
4) *Overburdened communities should not bear higher costs and risks associated with the loss of health, environment, native foods, and cultural resources as Washington strives to meet its CETA goals through new or upgraded transmission infrastructure.*

Principles for Transmission System Planning

1) *Designate and fund a person or organization within state government responsible for coordinating participation in transmission development activities and long-term transmission planning.*
2) *Leverage opportunities to access federal funding for transmission development and grid enhancement.*
3) *Ensure that practicable alternatives to building additional transmission infrastructure are considered.*
4) *Optimize grid operations and enhance the capacity of existing infrastructure.*
5) *Efficiently utilize system capacity.*
6) *Upgrade existing infrastructure.*
7) *Establish transmission planning practices that include proactive, long-term, interregional assessments on a regular basis.*
8) *Continue to explore creation of a regional transmission organization (RTO) and expanded participation in regional markets that would allow efficient dispatch of least cost resources given transmission and other constraints.*
9) *Pursue practicable and cost-effective opportunities to site new electrical generation near electrical load and existing transmission.*
10) *Explore opportunities to use transportation rights-of-way for co-locating new transmission lines.* (EFSEC 2022)

Grid Modernization Grants

Washington State's Grid Modernization Grants are part of the state's Clean Energy Fund, administered by the Washington State Department of Commerce. These grants aim to enhance the reliability, resilience, and efficiency of the electric grid. The grants support projects that modernize the electric grid, integrate renewable energy, and improve grid resilience against natural disasters like wildfires and extreme weather. Funded projects include microgrids[226], smart buildings,[227] and renewable integration. The grants often involve partnerships between utilities, technology providers, and local communities. These projects aim to create a more efficient, flexible, and economical power grid, ultimately supporting Washington's goal of achieving 100 percent clean electricity by 2045.

3.7.2 Affected Environment

Transmission facilities play a crucial role in the electrical grid by transporting electricity from electric generation facilities to distribution networks and ultimately to consumers. This section describes the energy and natural resources within the Study Area defined in Chapter 2, which include several key components:

- Energy Resources and Power Generation
- Energy Grid
- Resource Consumption

3.7.2.1 Energy Resources and Power Generation

The state's energy providers have the capacity to produce approximately 102,961 thousand megawatt-hours per year (EIA 2024a). The Northwest Power and Conservation Council (NWPCC) maintains an online map that illustrates the location of each electricity-generating facility in Washington (NWPCC 2024a). Washington State leverages a diverse mix of energy sources to generate electricity, categorized into renewable and non-renewable (conventional). Non-renewable energy supplies are finite and extracted from the earth, while renewable energy comes from sources that naturally replenish.

Non-Renewable Energy Sources

Currently, there are 30 conventional energy facilities operating in Washington. These facilities have a combined nameplate generating capacity[228] of 6,032 megawatts (MW), which represents the maximum designed output of these generators when running at full capacity (NWPCC 2024a). Washington's non-renewable electricity-generating portfolio includes the following:

- **Natural Gas:** In 2023, Washington's 26 natural gas energy facilities represented the second-largest source of in-state net power generation and were responsible for producing 18 percent of the state's total electricity. Washington's utilities and energy producers import natural gas because the state maintains no petroleum or natural gas reserves. Washington consumes less natural gas by volume than more than half of the other states, and it uses less per capita than all but four other states and the District of Columbia (EIA 2024b; NWPCC 2024a).
- **Nuclear:** Nuclear power provides a stable and carbon-free electricity source to complement renewable energy resources. Nuclear power supplied about 8 percent of Washington's net electricity generation in

[226] A small, controllable electrical system that can generate its own power and operate independently from the main power grid.

[227] Structures that use advanced technologies to enhance the efficiency, comfort, and safety of their operations.

[228] In terms of generating capacity, nameplate capacity (also known as rated capacity or nominal capacity) refers to the maximum amount of electrical power that a generator or power plant can produce under specific conditions, as determined by the manufacturer. This capacity is typically measured in MW or kilowatts and represents the full-load sustained output of the facility. For example, a power plant with a nameplate capacity of 100 MW can theoretically produce 100 megawatts of electricity when operating at full capacity under ideal conditions. However, actual output can vary due to factors like maintenance, fuel availability, and operational efficiency.

2023. The Columbia Generating Station nuclear power plant in south-central Washington is the state's fifth-largest power-producing facility by capacity. It has been in operation since 1984 and is currently the only operational nuclear power facility. By resource, nuclear power represents Washington's third-largest provider of electricity (EIA 2024b; NWPCC 2024a).

- **Coal:** Although being phased out, there are still two coal-fired power plants operating in Washington. Coal is Washington's fifth-largest source of energy, accounting for approximately 4 percent of Washington's energy generation in 2023. The TransAlta Centralia coal-fired power plant is one of the state's largest non-renewable electricity-producing facility by capacity. In 2020, TransAlta Centralia retired one of its two coal-fired units, and the company plans to retire its last remaining operational unit in 2025. Although Washington has more than 700 million tons of recoverable coal reserves, the last coal mine in the state closed in 2006 (EIA 2024a; NWPCC 2024a).

Renewable Energy Sources

Washington has a significant number of renewable power facilities. Other than hydroelectric power, renewable resources accounted for almost 10 percent of the state's electricity generation in 2023 (EIA 2024b). The status of renewable energy production in Washington is described below:

- **Hydropower:** Washington is the nation's largest producer of hydroelectric power. Approximately 93 hydroelectric projects, ranging from smaller hydroelectric projects to large-scale dams, are located in Washington. Hydroelectric power typically accounts for more than 60 percent of Washington's electricity generation, as shown in **Figure 3.7-1**. Nine of the 10 highest electricity-generating facilities in Washington are hydroelectric power facilities (EIA 2024a, 2024b; NWPCC 2024a).
- **Wind:** Washington has 25 operational wind energy projects that, at maximum generating capacity, form the second-largest energy source in the state. In 2023, wind accounted for approximately 8 percent of the state's power generation and 80 percent of the state's nonhydroelectric renewable electricity (EIA 2024b; NWPCC 2024a; EFSEC n.d.).
- **Solar:** Solar energy accounts for less than 1 percent of Washington's electricity production, but is growing rapidly. Generation from solar facilities more than quadrupled between 2022 and 2023 and is anticipated to continue to grow in the near future, with a number of large solar facilities in active development (EIA 2024b; EFSEC n.d.).
- **Biomass:** Biomass power facilities in Washington primarily convert organic materials, such as wood waste from forestry operations, into electricity. In 2023, biomass accounted for about 1 percent of Washington's total electricity generation, with 28 biomass projects in operation (EIA 2024a; NWPCC 2024a).

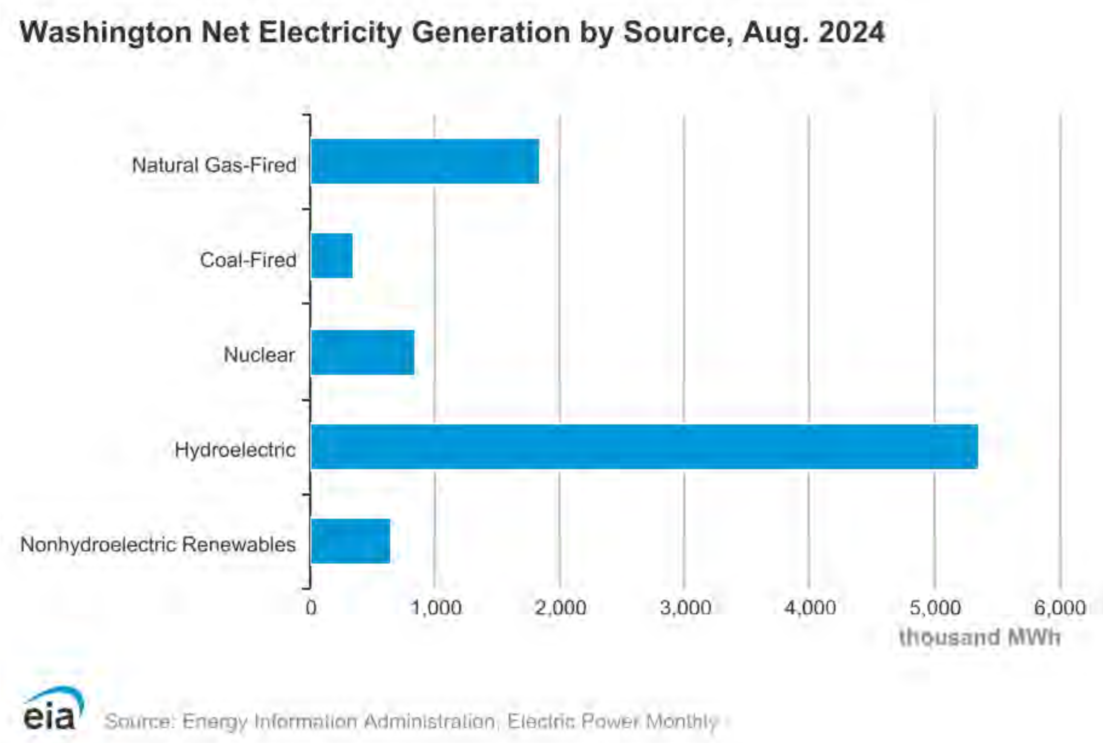


Figure 3.7-1: Washington Net Electricity Generation

Source: EIA 2024b

3.7.2.2 Energy Grid

Planning

National Interest Electric Transmission Corridors (NIETCs) are specific geographic areas identified by the DOE where significant transmission capacity constraints or congestion negatively impacts consumers.[229] These designations aim to promote the development of new transmission infrastructure to enhance grid reliability, integrate renewable energy, and lower consumer costs.

NIETC designation unlocks federal financing tools, such as public-private partnerships through the Transmission Facilitation Program under the Bipartisan Infrastructure Law and the Transmission Facility Financing Loan Program under the Inflation Reduction Act. Within NIETCs, FERC can issue permits for siting transmission facilities if state authorities do not act on an application within a year or if they deny it, expediting the development of critical transmission projects.

In Washington, NIETCs are part of a broader national strategy to support the state's clean energy goals. NIETC designation facilitates the development of necessary transmission infrastructure and integrates renewable energy sources to enhance grid resilience.

[229] The DOE designates NIETCs based on findings from the National Transmission Needs Study, public input, and recommendations on transmission capacity constraints and congestion. The process involves collaboration with states, Tribes, local communities, industry, and other stakeholders.

NIETCs also help address transmission bottlenecks within major grid interconnections. Major grid interconnections are large, synchronized grids that transmit electricity over vast areas. The North American Electric Reliability Corporation (NERC) oversees these interconnections to maintain power system reliability and stability and balance electricity supply and demand. Washington is part of the Western Interconnection, which comprises about 156,000 miles of transmission lines that span 14 states, the Canadian provinces of British Columbia and Alberta, and northern Baja California in Mexico. The Western Interconnection serves 90 million people (WECC 2024).

The NWPCC is responsible for developing and maintaining a comprehensive power plan specifically for Washington, Oregon, Idaho, and Montana, known as the Northwest Power Plan (NWPCC 2022). This plan ensures an adequate, efficient, economical, and reliable power supply for the region and aligns with the goals of NIETCs. The NWPCC's regional plans help identify areas where NIETC designations might be beneficial. The NWPCC updates the Northwest Power Plan every five years, addressing the following key areas:

- **Energy Efficiency:** Emphasizes energy efficiency as the most cost-effective and environmentally friendly resource, setting targets for energy savings and outlining strategies to achieve these goals.
- **Resource Adequacy:** Assesses the region's ability to meet future electricity demand with existing resources and identifies the need for new resources to ensure reliability.
- **Renewable Energy Integration:** Supports the integration of renewable energy sources, such as wind and solar, into the grid, evaluating the potential for renewable energy development and the necessary transmission infrastructure.
- **Climate Change Mitigation:** Includes strategies to reduce greenhouse gas (GHG) emissions and adapt to climate change impacts, involving the transition to cleaner energy sources and enhancing grid resilience.
- **Fish and Wildlife Mitigation:** Addresses the environmental impacts of energy production and transmission, particularly on fish and wildlife, including measures to mitigate these impacts and promote ecosystem health.

The Pacific Northwest Transmission Grid, supported by the NWPCC's comprehensive planning and the strategic designation of NIETCs, helps ensure that the region's energy needs are met efficiently and sustainably. Key features of the Pacific Northwest transmission grid include the following:

- **Hydropower Integration:** The grid is designed to connect remote renewable energy resources, such as hydropower dams, to major load centers.[230] This design supports the transfer of seasonal energy influences by rainfall and snowmelt.[231] Washington generates more electricity from hydropower than any other state, accounting for about 25 percent of the nation's total utility-scale hydroelectric generation (EIA 2024b). The Grand Coulee Dam, located on the Columbia River, is the largest power facility in the United States by capacity (EIA 2024b).

---

[230] Refer to areas with high concentrations of electricity demand.

[231] During periods of heavy rainfall or snowmelt, the increased water flow can be harnessed to generate electricity, ensuring a reliable and consistent energy supply throughout the year. This approach maximizes the use of natural water cycles, enhancing the overall efficiency and sustainability of hydroelectric power generation.

- **Authorities:** The region does not have a single regional transmission operator or independent system operator. Instead, multiple balancing authorities ensure that electricity generation meets demand within their designated areas.
- **Transmission Planning:** Organizations facilitate regional transmission planning across the Pacific Northwest and Intermountain West, ensuring coordinated efforts to maintain and expand the grid.
- **Transmission Infrastructure:** Washington State maintains over 4,527 miles of high-voltage transmission lines (greater than 230 kilovolts [kV]) and more than 3,321 miles of low-voltage transmission lines (less than 230 kV) (DOE 2021).
- **Modernization Efforts:** Efforts are ongoing to modernize the grid, incorporating smart grid technologies and enhancing resilience against natural disasters.

Source and Availability

As the transmission network expands to meet demand, the surplus capacity of transmission facilities is gradually consumed. If not managed properly, this cycle of expansion and increased usage can lead to transmission congestion. Transmission congestion—i.e., when a specific transmission path cannot handle increased power flow—can occur due to inadequate infrastructure, high demand peaks, or unexpected outages. Without careful coordination of capacity, grid expansion, and generation, the system may face reliability risks, making it essential to plan and manage these elements together.

Washington benefits from access to abundant, low-cost energy from renewable resources. The state's net generation often exceeds its electricity demand, allowing energy producers to send excess power to the Western Interconnection (EIA 2024b).

Management

FERC and NERC oversee the reliability of the interstate bulk power system, which includes large generators and the transmission network. These organizations issue and enforce mandatory reliability standards. Additionally, professional organizations like the Institute of Electrical and Electronics Engineers, the International Electrotechnical Commission, and the International Council on Large Electric Systems provide guidelines and technical standards.

In Washington, the electricity grid is managed using a comprehensive approach to ensure its reliability, resilience, and efficiency. The Washington State Department of Commerce administers programs to strengthen and modernize the grid against threats like wildfires, extreme weather, and other natural disasters. Their programs include the Grid Resilience State and Tribal Formula Grants program, a program that funds projects aimed at enhancing the grid's reliability and reducing the frequency and duration of power outages.

The state also focuses on energy assurance planning to prepare for potential energy disruptions. This involves assessing vulnerabilities at critical facilities and implementing mitigation activities to ensure a continuous energy supply during emergencies. Washington is actively investing in grid modernization through initiatives like the Grid Modernization Grants, a grant program that supports projects to improve grid reliability, resilience, and efficiency.

Demand

Electricity demand in Washington is on the rise due to several key factors, including:

- **Electrification of Transportation:** More charging infrastructure is being developed, and more vehicles are powered by electricity.
- **Artificial Intelligence and Data Centers:** Artificial intelligence (AI) applications and data centers require substantial electricity for operations and cooling. Data centers are projected to consume up to 9 percent of total U.S. electricity demand by 2030, with the largest growth dedicated to developing AI capabilities and scaling AI applications to millions of consumers (DOE n.d.).
- **Residential and Commercial Electrification:** The shift toward electric appliances and heating systems in homes and businesses increases electricity use.
- **Population Growth:** Washington's population continues to grow, and so does the overall demand for electricity to support residential, commercial, and industrial activities.

Projections suggest that electricity demand in the Pacific Northwest, including Washington, could increase by 30 percent over the next decade (PNUCC 2024). This increase underscores the need for modernizing the grid and expanding transmission infrastructure to meet future electricity needs.

Risks

The DOE's State Energy Risk Profile examines the relative magnitude of the risks that Washington's energy infrastructure routinely encounters in comparison with the probable impacts of the events. The DOE states that the top three causes for transmission systems outages in the United States are:

- **Weather (excluding lightning):** Severe weather events such as hurricanes, ice storms, and high winds can cause significant damage to transmission infrastructure.
- **Fire:** Wildfires and other fires can damage transmission facilities and related equipment, resulting in power disruptions.
- **Failed Protection System Equipment:** Malfunctions or failures in protection of system equipment, which are designed to safeguard the grid, can lead to outages when they do not operate correctly.

The DOE's analysis of Washington concluded that, for electric transmission outages related to severe weather, high winds were identified as the cause of the most widespread power disruptions (DOE 2021).

Climate Change

The energy sector is the largest emitter of GHG emissions, primarily from burning fossil fuels for electricity, heat, and transportation. These emissions contribute significantly to climate change, which in turn affects transmission in several ways:

- **Impact on Energy Infrastructure:** Climate change affects energy infrastructure through extreme weather events, rising temperatures, and sea level rise. For example, sea level rise threatens coastal energy facilities, such as substations, with flooding and erosion, necessitating costly adaptations or relocations to ensure continued operation and safety.

- **Energy Demand:** Climate change influences energy demand patterns. Historically, electricity demand in Washington increases in the winter. However, warmer summers have increased the use of air conditioning, while more and increasingly severe winter events have also created higher demand in the winter (NWPCC 2024b).

Transitioning to renewable energy sources like wind, solar, and hydropower is crucial for reducing GHG emissions. However, climate change can also impact the availability and efficiency of these resources. For instance, changes in precipitation patterns can affect hydropower generation.

3.7.2.3 Resource Consumption

Resource consumption refers to human use of natural resources to meet needs and wants. These resources include water, minerals, fossil fuels, forests, and land. Resource consumption is defined by the quantity of a resource needed for a particular process or project; the rate of use, or how quickly a resource is consumed over time; and the efficiency, or how effectively a resource is used to achieve a desired outcome. Generally, once consumed, renewable resources can be replenished naturally over time, whereas non-renewable resources are finite and cannot be replaced. The following factors influence resource consumption:

- **Population Growth:** As the global population increases, so does the demand for resources.
- **Economic Development:** Industrialization and economic growth often lead to higher resource consumption.
- **Technological Advancements:** New technologies can either increase efficiency and reduce resource use or lead to higher consumption through new applications.
- **Lifestyle Choices:** Individual and societal choices, such as diet, transportation, and energy use, significantly impact resource consumption.

Resource consumption can have the following environmental impacts:

- **Resource Depletion:** Overuse of non-renewable resources can lead to shortages and increased costs.
- **Pollution:** Resource extraction and use can result in air, water, and soil pollution.
- **Climate Change:** The burning of fossil fuels for energy is a major contributor to GHG emissions and global warming.

Understanding the resource consumption required for a project is essential for minimizing environmental impact and ensuring resource availability. Transmission facilities consist of various components and materials designed for efficient, reliable, and safe transmission of electrical power over long distances. Key materials used in the construction, operation and maintenance, and upgrade or modification are described below.

Non-renewable Resources

Materials used for the construction, operation and maintenance, and upgrade or modification of transmission facilities are selected based on their specific properties, which meet the demands of transmission infrastructure while balancing performance with environmental and economic considerations.

Steel

Steel is a crucial material in the construction, operation and maintenance, and upgrade or modification of transmission infrastructure because of its strength, durability, and versatility. Steel is used for transmission facilities in the following ways:

- **Transmission Towers:** Steel provides strength and durability needed for transmission towers, while minimizing weight. The production of steel involves significant energy consumption and GHG emissions. An average high-voltage transmission tower includes about 40,000 to 60,000 pounds of steel (AISI 2024).
- **Reinforcement in Transmission Cables:** For a 1455-sized aluminum conductor steel-reinforced (ACSR) cable, 270 pounds of steel is needed to manufacture 1,000 feet of line (AISI 2024).
- **Substation Construction:** Steel is used extensively for constructing substation frameworks, support structures, and enclosures due to its strength and durability.
- **Underground Utilities**: Small amounts of steel (e.g., rebar) may be embedded within the concrete of underground vaults to enhance tensile strength and structural integrity.

In 2023, approximately 80 million tons of raw steel were produced in the United States, and about 1,900 million tons were produced globally. Domestic production is augmented by an abundant global supply chain, with the United States importing 25 million tons of steel in 2023, primarily from Canada and Mexico (USGS 2024a).

Aluminum

Aluminum is widely used in transmission infrastructure due to its favorable properties. Aluminum is used for transmission facilities primarily in the following ways:

- **Transmission Cables:** Aluminum is used in transmission cables due to its greater strength-to-weight ratio and lower density, giving it twice the conductivity-to-weight ratio of copper. This makes aluminum a good option for high-voltage overhead transmission lines.
- **ACSR Cables:** Featuring a central core of steel strands surrounded by aluminum strands, ACSR cables are the most commonly used type of cable for overhead transmission. The steel core provides mechanical strength, while the aluminum strands offer good electrical conductivity.
- **Innovative Conductors:** Newer conductors may incorporate ceramic fibers in a matrix of aluminum for added strength with lighter weight.
- **Busbars and Conductors:** Aluminum is often used for busbars and other conductors because of its high conductivity-to-weight ratio.

In 2023, the United States produced 750 thousand tons of primary aluminum and 3.3 million tons of secondary aluminum recovered from scrap. Domestic production is augmented by an abundant global supply chain, with the United States importing 5.6 million tons of aluminum in 2023, primarily from Canada. Global resources of bauxite[232] are estimated to be between 55 billion and 75 billion tons and are sufficient to meet world demand for metal well into the future (USGS 2024b).

---

[232] Bauxites are rocks composed of aluminum oxides, along with other minerals, and are the world's primary source of aluminum. After mining, bauxite is refined into *alumina*, which is then converted into aluminum.

Copper

Copper is a crucial material in transmission infrastructure due to its electrical conductivity and durability. Copper is used in transmission infrastructure primarily in the following ways:

- **Transmission Cables:** Copper is used in transmission cables, especially for submarine and underground cables, due to its higher conductivity compared to aluminum (PSCW 2011).
- **Transformer Windings:** Copper is often used for windings in transformers due to its excellent conductivity (TTES 2024).

In 2023, the recoverable copper content of U.S. mine production was estimated at 1.1 million tons. Old (post-consumer) scrap, converted to refined metal, alloys, and other forms, provided an estimated 150,000 tons of copper in 2023, and an estimated 700,000 tons of copper was recovered from new (manufacturing) scrap derived from fabricating operations. The most recent U.S. Geological Survey assessment of global copper resources indicated that, as of 2015, identified resources contained 2.1 billion tons of copper, and undiscovered resources contained an estimated 3.5 billion tons. Domestic production is augmented by an abundant global supply chain, with the United States importing 894,000 tons of copper in 2023 (USGS 2024c).

Cast Iron and Composite Materials

Cast iron plays a small role in the materials used in the construction of transmission components. Current uses of cast iron include the following:

- **Underground Facilities:** Cast iron is commonly used for maintenance hatch covers, ladders, and steps in underground transmission facilities. Its durability and strength make it ideal for these applications, ensuring long-lasting performance and safety.
- **Substation Components:** Cast iron is also used in some substation components, providing robust support and protection for electrical equipment. Cast iron is used in the construction of transformer housings and other electrical equipment due to its thermal conductivity and ability to withstand high temperatures.

Ongoing research and development are leading to new uses for composite materials in transmission infrastructure, such as advanced insulators and support structures that benefit from the unique properties of composites. Composite materials are used in transmission facilities in the following ways:

- **Cable Reinforcement:** Composite materials, such as those incorporating ceramic fibers in a matrix of aluminum, are used to reinforce transmission cables. These materials offer high strength with reduced weight, improving the overall efficiency and performance of the cables.
- **Structural Components**: In some cases, composite materials are used for structural components in transmission facilities. Their high strength-to-weight ratio and resistance to environmental factors make them suitable for various applications.

Concrete

Concrete is essential for the foundations of transmission towers, ensuring their stability and support. Its production involves large quantities of aggregate (sand, gravel, or crushed stone), cement, and water. The amount of aggregate needed for concrete footings varies based on a tower’s size and design, with a single foundation typically requiring several cubic meters of concrete. The extraction and transportation of aggregate can disrupt habitats, increase dust and noise pollution, and increase carbon emissions.

Concrete is also used for foundations and other structural components of substations, providing necessary stability and support.

For underground transmission facilities, concrete vaults are buried at regular intervals along the construction route. These vaults are crucial for splicing cables during construction and for providing permanent access, maintenance, and repair (PSCW 2011). Concrete offers the strength and durability needed to withstand environmental stresses and support the weight of the soil above.

Concrete is a non-renewable resource that is usually a mixture of aggregates and cement paste. The aggregates are sand and gravel or crushed stone, and the paste consists of water and cement. Typically, concrete is a mixture of about 10 to 15 percent cement, 60 to 75 percent aggregate, and 15 to 20 percent water (Portland Cement Association 2024). There are several active aggregate mining operations throughout Washington.

Aggregates

Aggregates are necessary for making ready-mixed concrete, asphalt, and many other building materials. Sand, gravel deposits, and bedrock may be mined or quarried to produce raw materials known as aggregates. In 2023, 920 million tons of construction sand and gravel was produced from 6,500 pits across the United States, with Washington listed among the top 10 producing states (USGS 2024d).

Fuel

Fuel is essential at various phases of transmission facility construction, operation and maintenance, and upgrade or modification including the following:

- **Vegetation Clearing and Ground Leveling:** Heavy machinery, powered by fuel, is used to clear vegetation and level the ground.
- **Access Road Construction:** Fuel-powered equipment is used for grading and constructing access roads to a site.
- **Foundation Excavation:** Diesel-powered excavators and backhoes dig foundations for transmission towers.
- **Concrete Mixing and Pouring:** Diesel engines power concrete mixers and pumps to mix and pour concrete for tower foundations.
- **Tower Erection:** Cranes and other lifting equipment, typically running on diesel, are used to erect the steel or aluminum towers.
- **Material Transportation:** Trucks and trailers, powered by diesel or gasoline, transport tower components and other materials to construction sites.
- **Helicopter Use:** In difficult terrain, helicopters may be used to transport tower components or erect towers, consuming aviation fuel.
- **Stringing Conductors:** Specialized equipment like winches and pullers, powered by diesel engines, are used to string conductors between towers. Helicopters may also be used in difficult terrain, consuming aviation fuel.
- **Portable Generators**: Diesel-powered generators provide electricity for tools and lighting at remote construction sites.

- **Transportation:** Construction crews use fuel-powered vehicles for transportation to and from the site.
- **Line Inspections and Vegetation Management:** Specialized tools and equipment may use fuel.
- **Access and Repair**: Maintenance crews often use specialized vehicles such as bucket trucks and all-terrain vehicles to access and repair transmission facilities, especially in remote or difficult-to-reach areas.

Petroleum products, including gasoline and diesel fuels used for vehicles, equipment, and machinery lubricants, are available at numerous commercial outlets. Fuel for large projects is sourced through a combination of local production and imports. Washington has a robust infrastructure for fuel production and distribution, supported by several refineries within the state.

Land

Land is a finite, non-renewable resource. The size of the footing required for high-voltage transmission facilities depends on the voltage of the transmission line, soil conditions, and the design of the tower. The right-of-way (ROW) for a transmission facility includes land where the facility is sited, as well as land needed to perform maintenance and land that is cleared to avoid risk of fires and other accidents. It provides a safety margin between high-voltage lines and surrounding structures and vegetation. In some cases, access roads constitute a portion of the ROW and provide more convenient access for repair and inspection vehicles. The width of a transmission facility ROW varies depending on the type and voltage of the transmission facility. The width of a transmission facility ROW is typically around 100 to 200 feet (FERC 2024). Typically, access roads do not require a substantial input of raw materials.

The amount of land needed for a high-voltage substation can vary significantly based on the size and complexity of the substation. A simple distribution substation may require less than 1 acre of land. More complex substations, that handle higher and/or multiple voltages and interconnections, have more equipment and can require up to 6 acres or more. The exact land requirement depends on factors such as the number of lines, the size of the transformers, and the type of switchgear used. For example, an air-insulated switchgear substation typically requires more land compared to gas-insulated switchgear substations to maintain safe distances between live components. The land on and adjacent to the substation may also have gravel or other aggregate surrounding the components.

Vaults required for underground transmission can vary in size, typically ranging from shallow installations about 8 feet deep with a volume of 340 cubic feet to deeper setups of around 30 feet deep with a volume of 3,000 cubic feet (Grajek 2016). Adequate space around the vault is necessary for safe access and maintenance activities. When vaults are located near roadways, additional land may be required to implement traffic control measures and protect workers from vehicular hazards.

Synthetics

Synthetic materials used in transmission facility construction, operation and maintenance, and upgrade or modification include insulation materials and insulating oil or gas. Transmission cables use various insulation materials to ensure safety, reliability, and efficiency. Polyethylene is commonly used for its good insulating properties and ease of processing. Cross-linked polyethylene offers enhanced thermal and mechanical properties. Polyvinyl chloride (PVC) is widely used due to its flexibility, durability, and resistance to environmental factors. Natural rubber provides excellent flexibility and insulation but is less resistant than vulcanized rubber to environmental degradation. Vulcanized rubber is an enhanced version of natural rubber with improved durability and resistance to heat and chemicals. Ethylene propylene rubber is a synthetic rubber with excellent insulating properties, flexibility, and resistance to heat and chemicals. Ceramic fibers have been incorporated into some newer conductors to add strength while reducing weight. Production of insulation materials often involves chemical processes that can release pollutants and GHG emissions. The production of these materials can be energy-intensive, adding to the overall carbon footprint.

Oil or gas in transformers and switchgear provide electrical insulation and cooling. Mineral oil is the most commonly used insulating oil in transformers. It serves multiple purposes, including acting as a dielectric material, providing electrical insulation, and cooling the transformer by dissipating heat. It also protects the internal components from moisture and oxidation. Silicone oil is used in some applications for its stability at high temperatures and excellent insulating properties. Sulfur hexafluoride (SF_6) is widely used in gas-insulated switchgear due to its excellent insulating and arc-quenching[233] properties. SF_6 is a very potent GHG, with a global warming potential 23,500 times greater than that of carbon dioxide. For this reason, there are active collaborative agency and industry efforts underway to find suitable alternatives to SF_6-insulated switchgear.

Renewable Resources

The construction, operation and maintenance, and upgrade or modification of transmission facilities involve the use of various renewable resources, including the following:

- **Timber:** Timber is used frequently during construction of transmission facilities for support structures, scaffolding and formwork, road construction, and as construction materials. The annual harvest of trees is about 2.7 billion board feet in Washington, making it the second-largest state producer of lumber in the United States. Approximately 85 percent of that is harvested from forests in western Washington (Washington State Department of Commerce n.d.). Timber is considered a renewable resource if sustainably managed.

- **Water:** Water is a key component in the production of concrete, which is used for the foundations of transmission towers and underground transmission vaults. During construction activities, water is often sprayed to suppress dust or to moisten soil during compaction processes. Water is also used to clean equipment and tools.

  During the operation and maintenance of a transmission facility, water may be used in cooling systems to manage the heat generated by electrical equipment. Water is a critical resource for fire suppression systems, protecting the facility and surrounding areas from potential fire hazards.

  Due to Washington's varied land uses, terrain, and precipitation levels, water availability varies dramatically across the state. Increasing demands for water over time, from ongoing population growth, agriculture, and other consumptive uses, as well as associated land use practices, have resulted in lower stream flows and declining groundwater levels in some areas of Washington. These decreases have the potential to impact important resources for fisheries and general stream health. Water resources are discussed in Section 3.4 of this Draft Programmatic EIS.

- **Energy:** Energy can be categorized as renewable or non-renewable. The transmission of electrical energy from generating facilities to consumers involves some energy loss, primarily due to resistance in the

[233] Arc-quenching refers to the process of extinguishing an electrical arc that forms when current-carrying contacts in a circuit breaker or switchgear separate. This arc is a highly ionized, conductive path that can cause significant damage if not properly managed. Effective arc-quenching is crucial for ensuring the safe and efficient interruption of electrical currents.

transmission lines. On average, 5 percent of energy generated between 2018 and 2022 was lost during transmission and distribution. This loss can vary with factors like the distance the electricity travels, the efficiency of the transmission infrastructure, and the voltage levels used. Transmission at higher voltages loses less energy than lower voltages (EIA 2023; Energy Basics n.d.).

3.7.3 Impacts

An assessment of impacts was completed for the construction, operation and maintenance, and upgrade or modification of transmission facilities within the Study Area.

3.7.3.1 Method of Analysis

The Study Area for a project-specific application would typically encompass several key regions and features, such as the following:

- **Project Site and Immediate Vicinity:** This includes the specific location of the project and the surrounding area that might be directly affected by construction, operation and maintenance, and upgrade or modification activities. The project site would include the transmission facility ROWs, substation locations, transmission towers, access roads, and construction yards and associated laydown areas. The immediate vicinity would be based on transmission facility voltages and setback requirements within local land use codes.
- **Affected Geography:** The consumption of energy and natural resources during a project’s construction would be measurable and could impact resource availability within and outside the borders of Washington State. The demand for these resources can lead to increased extraction and production activities, affecting local ecosystems and communities.

This Draft Programmatic EIS analyzes the affected environment and impacts on energy and natural resources within the Study Area defined in Chapter 2. Three project phases for each transmission facility type were considered: construction, operation and maintenance, and upgrade or modification. This evaluation considers overhead transmission facilities and underground transmission facilities for each phase. Overhead transmission facilities consist of transmission lines and substations and similar ancillary infrastructure. Overhead transmission facilities also incorporate aboveground infrastructure that may be associated with underground transmission facilities. Underground transmission facilities consist of underground transmission lines, underground access vaults, and other below-ground infrastructure. The construction of underground transmission facilities includes open trench, trenchless, and underwater construction methods.

Impact Determination

This discussion of impacts is qualitative given the high-level nature of a Programmatic EIS; quantification would require specific project details to analyze. **Table 3.7-3** includes a description of the criteria used to evaluate impacts from the Action Alternative and No Action Alternative. Information reviewed to identify impacts on energy and natural resources in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping.

Table 3.7-3: Criteria for Assessing the Impact Determination on Energy and Natural Resources

Impact Determination	Description
Nil	A project would have no foreseeable impact on renewable or non-renewable supply availability or strain energy resources during any phase (e.g., construction, operation and maintenance, and upgrade or modification).

Impact Determination	Description
Negligible	A project would have minor, adverse impacts on renewable or non-renewable resources and would not have an effect on resource availability or the environment. Adverse impacts on energy resources would be minor, and changes to local ecosystems or resources levels would not be noticeable. Best management practices and design considerations are expected to be effective.
Low	A project would have adverse impacts on energy and natural resources, even with the implementation of best management practices and design considerations. Energy consumption would surpass minimal levels, but the effects on local supply chains would be manageable. Minor, localized changes to resource levels and ecosystems would occur. Impacts would be short-term and nonsignificant.
Moderate	Adverse impacts would occur even with the implementation of best management practices and design considerations. Consumption of energy and natural resources would be measurable, leading to noticeable effects on resource availability and the environment. Changes to resource levels could disrupt supply chains or existing natural resource management plans. Moderate impacts may be long-term, occurring over one or more project phases. Moderate impacts have the potential to be significant.
High	A project would have adverse and potentially severe impacts on energy and natural resources even after the implementation of best management practices and design considerations. Consumption of energy and natural resources would be measurable, causing major effects on resource availability and the environment. Renewable and non-renewable resource consumption would lead to depletion of local supplies. Energy consumption would be high, leading to an increased demand on local energy grids. Extensive changes to resource levels and ecosystems would occur. High impacts may be permanent or continue for the duration of the project.

EIS = Environmental Impact Statement

To clearly understand the potential severity of impacts without any interventions, the following impact determinations exclude the use of avoidance criteria and mitigation measures. The ratings assume compliance with all federal, state, and local laws and regulations, as well as standardized BMPs and design considerations. Assessing impacts without avoidance criteria or mitigation measures offers a baseline understanding of potential environmental effects, helping to identify the true extent of these impacts. Environmental laws often require that initial impact assessments be conducted without considering mitigation to maintain the integrity of the environmental review process.

3.7.3.2 Action Alternative

Construction

Overhead Transmission Facilities

Activities for the construction phase of overhead transmission facilities would vary and depend on the scale of the facility and site characteristics. Construction could include a site preparation phase of relatively short duration (e.g., a few months), followed by a longer construction and start-up phase. It is assumed that the construction phase of overhead transmission, per mile, would have a shorter duration than underground construction. Overhead transmission facilities infrastructure could have the following identified impacts during the construction phase:

- Consumption of Non-Renewable Resources
- Consumption of Renewable Resources
- Consumption of Energy

Consumption of Non-Renewable Resources

The construction of overhead transmission facilities would involve the consumption of non-renewable resources, including the following:

- **Metal:** Metal is essential for the structural integrity and functionality of transmission facilities. Mineral resources such as copper, steel, and aluminum would be mined and refined regionally, nationally, and globally, and components that require those materials would be manufactured regionally, nationally, and globally. The manufactured parts used in the construction of transmission facilities would be shipped to project sites and installed by construction workers and electricians. The manufacturing of equipment like poles, conductor cables, and switchgear components like transformers, insulators, and circuit breakers also consumes substantial resources. These components ensure the safe and efficient operation of the transmission system.
- **Aggregate:** In addition to soils, bulk materials such as aggregate gravel and sand would be required for laydown areas, substations, roads, and concrete mixtures. Bulk materials such as aggregate gravel and sand, in addition to soils, would likely be supplied locally from existing quarries.
- **Concrete:** Concrete is used primarily for the foundations of transmission towers and poles for overhead transmission lines.
- **Fuel:** Transporting workers, materials, and equipment to construction sites involves fuel consumption, as does the construction process, including site preparation, assembly, and installation. Machinery lubricants would be purchased from commercial outlets in the vicinity of specific projects. Electricity for construction equipment would be provided by portable generators that require fuel to operate.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on non-renewable resources, without mitigation measures incorporated, is anticipated to vary and could be negligible to low.

Consumption of Renewable Resources

Construction activities often require consumption of renewable resources, including the following:

- **Land:** The construction process can have environmental impacts both directly and indirectly, such as land disturbance and habitat disruption, which need to be managed through careful planning and mitigation measures. See Section 3.2, Earth Resources; Section 3.6, Habitat, Wildlife, and Fish; and Section 3.9, Land and Shoreline Use.
- **Water:** Water from local utilities would be used to mix concrete for structural foundations and to suppress fugitive dust during grubbing, clearing, grading, trenching, and soil compaction. See Section 3.4, Water Resources.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on renewable resources, without mitigation measures incorporated, are anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Consumption of Energy

During construction, electricity would be required to operate equipment and machinery, as well as to power construction lighting. Electricity may be provided on site through generators powered by nonrenewable resources, including diesel fuel. Electricity may also be sourced from a local utility, in which case a utility provider would establish or expand the electrical distribution network to the project site.

Impact Determination: Without mitigation measures incorporated, impacts on energy resources, without mitigation measures incorporated, is anticipated to vary and could be nil to negligible.

Underground Transmission Facilities

Activities for the construction phase of underground transmission facilities, including open-trench, trenchless (including directional drilling), or underwater construction methods, would vary depending on the scale of the facility and site characteristics. Similar to overhead transmission facilities, construction underground could include a site preparation phase of relatively short duration, followed by a longer construction and start-up phase. It is assumed that the construction phase for underground transmission facilities, per mile, would have a longer duration than overhead projects. Underground transmission could have the following identified impacts during the construction phase:

- Consumption of Non-Renewable Resources
- Consumption of Renewable Resources
- Consumption of Energy

The consumption of energy and natural resources during construction of underground transmission facilities would be measurable and could impact resource availability within the vicinity of the project location and in the State of Washington more broadly.

Consumption of Non-Renewable Resources

The construction of underground transmission facilities would require measurable consumption of non-renewable resources, including the following:

- **Metal:** Significant amounts of metals like copper, steel, and aluminum are required for cables, conduits, and other components. These materials are mined and refined at various scales and locations, then manufactured into parts that are shipped to project sites for installation by construction workers and electricians. The production of equipment such as transformers, insulators, and circuit breakers also demands substantial metal resources.
- **Aggregate:** Bulk materials like gravel, sand, and soils are necessary for creating stable foundations, backfilling trenches, and constructing access roads. Gravel and sand are typically sourced from local quarries.
- **Concrete:** Concrete is crucial for the construction of underground transmission facilities, particularly for encasing cables and building vaults and maintenance hatches. It ensures structural integrity and protection against environmental factors.
- **Fuel:** Fuel is consumed in transporting workers, materials, and equipment to construction sites. Site preparation, trenching, and installation require fuel for machinery and generators. Lubricants for machinery are required, and electricity for construction equipment is often provided by portable generators that consume fuel.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on non-renewable resources, without mitigation measures incorporated, is anticipated to vary and could be negligible to low.

Consumption of Renewable Resources

Underground construction activities would require considerable consumption of renewable resources including the following:

- **Land:** The construction of underground transmission facilities can impact the environment through land disturbance and habitat disruption. See Section 3.2, Earth Resources; Section 3.6, Habitat, Wildlife, and Fish; and Section 3.9, Land and Shoreline Use.
- **Water:** Water from local utilities is used for mixing concrete, suppressing dust during construction activities, and soil compaction (see Section 3.4, Water Resources).

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on renewable resources, without mitigation measures incorporated, are anticipated to vary and could be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Consumption of Energy

During construction, electricity would be required to operate equipment and machinery, as well as to power construction lighting. Electricity may be provided on site through generators powered by nonrenewable resources, including diesel fuel. Electricity may also be sourced from a local utility in which case a utility provider would establish or expand the electrical distribution network to the project site.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on energy resources, without mitigation measures incorporated, are anticipated to vary and could be nil to negligible.

Operation and Maintenance

Overhead Transmission Facilities

Activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and rights-of-way. Overhead transmission facilities would have a less intensive use of resources during their operations phase when compared to their construction phase. The following impacts could occur during an overhead transmission facility's operation and maintenance phase:

- Consumption of Non-Renewable Resources
- Consumption of Renewable Resources
- Consumption of Energy

Typical consumption of energy and natural resources occurs during transmission facility operation and maintenance. Operation and maintenance would require both renewable and non-renewable resources.

Consumption of Non-Renewable Resources

The operation and maintenance of overhead transmission facilities would require the consumption of non-renewable resources, including the following:

- **Metal:** Replacement parts such as conductors, joints, and insulation materials are regularly required.
- **Fuel:** Fuel is required for the operation and maintenance vehicles and portable generators used at the sites. Operation and maintenance vehicles would need a continuous supply of fuel.
- **Oil:** Maintenance activities may require replacement parts, lubricants, and fluids.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on non-renewable resources, without mitigation measures incorporated, are anticipated to vary and could be negligible to low.

Consumption of Renewable Resources

Maintenance activities often require consumption of renewable resources such as the following;

- **Water:** Water may be needed for certain maintenance activities, such as cooling equipment or suppressing dust during earthwork. Water for operation and maintenance activities would be purchased from local vendors or through water rights agreements managed in accordance with state and local laws and regulations (see Section 3.4, Water Resources).

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on renewable resources, without mitigation measures incorporated, are anticipated to vary and could be nil to low.

Consumption of Energy

During operation and maintenance, overhead transmission facilities would have the following impacts related to energy consumption:

- **Energy:** The transmission of electrical energy from power plants to consumers involves some energy loss. The operation of monitoring systems and other equipment would require a continuous supply of electrical energy.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact on energy resources, without mitigation measures incorporated, is anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Similar to overhead transmission facilities, activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and rights-of-way, similar to any other linear industrial facility. Underground transmission could have the following identified impacts during the operation and maintenance phase:

- Consumption of Non-Renewable Resources
- Consumption of Renewable Resources
- Consumption of Energy

Consumption of Non-Renewable Resources

Operation and maintenance would require consumption of non-renewable resources, including:

- **Metal:** Replacement parts such as cables, joints, and insulation materials are regularly required.
- **Fuel:** Fuel is required for the operation and maintenance vehicles and portable generators used at the sites. Operation and maintenance vehicles would need a continuous supply of fuel. Maintenance crews use specialized vehicles to transport equipment and materials to various sites. These vehicles are equipped to handle the specific needs of underground maintenance.
- **Oil:** Maintenance activities may require replacement parts, lubricants, and fluids.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on non-renewable resource, without mitigation measures incorporated, are anticipated to vary and could be negligible to low.

Consumption of Renewable Resources

During operation and maintenance, underground facilities would require consumption of renewable resources including the following:

- **Water:** Water may be needed for certain maintenance activities, such as cooling equipment or suppressing dust during excavation. Water for operation and maintenance activities would be purchased from local vendors or through water rights agreements managed in accordance with state and local laws and regulations (see Section 3.4, Water Resources).

Impact Determination: Depending on the scale of the facility and site characteristics, the impact determination, without mitigation measures incorporated, is anticipated to vary and could be negligible to low.

Consumption of Energy

The transmission of electrical energy from power plants to consumers involves some energy loss. The operation of monitoring systems and other equipment requires a continuous supply of electrical energy.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on energy resources, without mitigation measures incorporated, are anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Upgrade or Modification

Overhead Transmission Facilities

Upgrading or modifying overhead transmission facilities would involve several steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Overhead transmission could have the following identified impacts during the upgrade or modification phase:

- Consumption of Non-Renewable Resources
- Consumption of Renewable Resources
- Consumption of Energy

While adverse impacts would be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing structures and footprints, which minimizes the consumption of land and other renewable resources. New construction requires land consumption for facility siting and can have larger impacts on the environment, and both renewable and non-renewable resources.
- **Infrastructure Utilization:** Existing infrastructure can be reused or enhanced, reducing the need for extensive new development and consumption of both non-renewable and renewable resources.

Underground Transmission Facilities

Upgrading or modifying underground transmission facilities would involve several steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Underground transmission could have the following identified impacts during the upgrade or modification phase:

- Consumption of Non-Renewable Resources
- Consumption of Renewable Resources
- Consumption of Energy

While adverse impacts would be similar to construction, adverse impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing structures and footprints, which minimizes the consumption of land and other renewable resources. New construction requires land consumption for facility siting and can have larger impacts on both renewable and non-renewable resources.
- **Infrastructure Utilization:** Existing infrastructure can be reused or enhanced, reducing the need for extensive new development and consumption of both non-renewable and renewable resources.

3.7.3.3 No Action Alternative

The No Action Alternative represents the scenario in which this Draft Programmatic EIS is not used and current management practices for siting and planning transmission facilities continue unchanged. Under this alternative, each project would continue to be evaluated on a case-by-case basis and reviewed for compliance with existing regulations, codes, and standard practices. While impact determinations would likely be similar to those outlined in this Draft Programmatic EIS, projects would not benefit from the impact reductions associated with the avoidance criteria developed and analyzed in this Draft Programmatic EIS. These criteria are anticipated to provide additional mitigation that further reduces potential environmental impacts.

While the State of Washington maintains adequate transmission capacity for its current generation, the continued expansion of clean renewable energy may lead to congestion of the grid if new transmission facilities are not constructed or existing transmission facilities are not upgraded or modified.

3.7.4 Potential Mitigation Measures

This section describes measures that would eliminate, reduce the intensity of, or compensate for adverse impacts from construction, operation and maintenance, and upgrade or modification of transmission facilities. All general conditions adopted for this Draft Programmatic EIS, identified in Section 3.1, are relevant to this resource section. Applicants would be responsible for providing information within their application materials documenting the implementation of the general conditions.

Potential mitigation measures have been identified to minimize adverse impacts from transmission facility projects. These measures are intended to be broad so that they can be applied to most projects that would be covered under this Programmatic EIS. However, project-specific plans would be needed to adapt the measures for project-specific applications.

When impact determinations are identified as moderate or high, the applicant would either adopt applicable mitigation measures from this Programmatic EIS or the SEPA Lead Agency may require applicable mitigation measures to be implemented to reduce project-specific impacts. When impact determinations are low, applicable mitigation measures should still be considered by the applicant and the SEPA Lead Agency as these measures would help to further reduce project-specific impacts, including the project’s contribution to cumulative impacts. These measures would be implemented in addition to compliance with laws, regulations, environmental permits, plans, and design considerations required for transmission facilities.

The following mitigation measures could be adopted to mitigate adverse impacts:

ENR-1 – Recycle Components: Recycle components that have the potential to be used as raw materials in commercial or industrial applications to the extent practicable.

Rationale: Recycling components can reduce the environmental footprint of projects, reducing the demand on natural resources.

ENR-2 – Source Recycled Materials: Source recycled or alternative materials to the extent practicable.

Rationale: Using recycled materials and alternative, lower-impact materials can reduce the environmental footprint of projects, reducing the demand on natural resources.

ENR-3 – High-Efficiency Lighting: Install high-efficiency lighting to reduce energy needs for the project’s operation and maintenance.

Rationale: High-efficiency lighting, such as LED lights, consumes significantly less energy compared to traditional lighting options. High-efficiency lights typically have a longer operational life, reducing the frequency of replacements and maintenance. By reducing energy consumption, high-efficiency lighting helps decrease greenhouse gas emissions associated with electricity generation. Longer-lasting lights mean fewer replacements, leading to less waste and lower environmental impact from manufacturing and disposal.

ENR-4 – Energy Supply: Power monitoring systems and maintenance equipment with renewable energy sources and use electric or hybrid vehicles for operation and maintenance, when feasible.

Rationale: Integrating renewable resources into the lifecycle of transmission facilities enhances environmental sustainability and reduces reliance on non-renewable resources. The use of electric or hybrid vehicles for the operation and maintenance of transmission facilities, when feasible, can also serve several advantages including reduced emissions, energy efficiency, noise reduction, and sustainability.

ENR-5 – Source Locally: Locally source raw materials, components, and fuel to the extent practicable.

Rationale: Local sourcing minimizes the distance materials need to travel, which reduces fuel consumption and lowers greenhouse gas emissions associated with transportation. Shorter transportation distances mean less energy is required to move materials from the source to the site, promoting overall energy efficiency.

In addition to the above mitigation measures, the following mitigation measures[234] developed for other resources may be applicable:

W-1 – Minimize Water Use: Minimize water use, to the greatest extent practicable.

PSU-4 – Waste Management Plan: Develop and implement a waste management plan to identify the type, amount, and disposal location of solid waste that is to be expected during construction, operation and maintenance, and upgrade or modification.

3.7.5 Probable Significant Adverse Environmental Impacts

Determining the significance of an impact involves context and intensity, which, in turn, depends on the magnitude and duration of the impact. “Significant” in SEPA means a reasonable likelihood of more than a moderate adverse impact on environmental quality. An impact may also be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred (Washington Administrative Code 197-11-794).

Identification of environmental impacts and assignment of discipline-specific ratings is based on information available at the time of writing and professional judgment. A precautionary approach has been taken for the assessment where information is currently unknown or unavailable.

This Draft Programmatic EIS weighs the impacts on energy and natural resources that could result from transmission facilities after considering the application of laws and regulations; siting and design considerations, including agency guidance and BMPs; and mitigation and makes a resulting determination for significance for each impact. **Table 3.7-4** summarizes the impacts anticipated for the construction, operation and maintenance, and upgrade or modification of transmission facilities.

[234] The rationales for the identified mitigation measures are provided in their respective resource sections.

Table 3.7-4: Summary of Impacts, Mitigation Measures, and Significance Rating for Energy and Natural Resources

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Energy and Natural Resources – Consumption of Non-Renewable Resources	Construction	The construction of overhead transmission facilities would require the manufacturing of steel transmission towers, aluminum and steel conductors, substations, and substation components. As a result of the raw materials being globally abundant and available, the changes are not anticipated to hinder supply chains or the management and distribution of natural resources. The construction of underground transmission facilities generally requires more raw materials than overhead transmission. Underground cables need extensive insulation and protective sheathing. The installation of underground cables involves trenching, which typically requires additional materials for backfilling and protective layers. Specialized equipment and labor are also needed, increasing the overall material usage.	**Overhead:** negligible to low **Underground:** negligible to low	▪ **ENR-1:** Recycle Components ▪ **ENR-2**: Source Recycled Materials ▪ **ENR-4:** Energy Supply ▪ **ENR-5:** Source Locally ▪ **PSU-4:** Waste Management Plan	Less than Significant	The implementation of BMPs and mitigation measures collectively contribute to the lower impact of non-renewable resource consumption for overhead transmission facility construction and upgrade or modification. The amount of non-renewable resources used during the operation and maintenance phase is relatively small compared to other industrial activities. Implementation of mitigation measures further reduces the reliance on non-renewable resources.
	Operation and Maintenance	The use of fuel could be required during operation and maintenance for transmission facility inspections, vegetation management, and facility repairs. The use of non-renewable resources, such as fossil fuels, for powering maintenance vehicles and equipment would be intermittent; however, it would occur throughout the operation and maintenance phase.	**Overhead:** negligible to low **Underground:** negligible to low			
	Upgrade or Modification	The upgrade or modification of an overhead transmission facility often involves processes and considerations similar to those identified in new construction. Generally, most resources are used during the production of the materials used for construction. While both upgrade or modification might involve reinforcing or replacing existing towers, poles, and conductor cables with resources similar to those used in new construction, this analysis assumes that existing structures could be used in many cases and therefore fewer resources would be consumed. The upgrade or modification of an underground transmission facility involves processes and considerations similar to those used for new construction. A large amount of excavation and site preparation is required for upgrade or modification projects. This includes re-digging trenches, removing existing infrastructure, and preparing the site for new installations. Upgrade or modification often involves installing new, more efficient cables and components, which could be as complex as installing them for the first time.	**Overhead:** negligible to low **Underground:** negligible to low			
Energy and Natural Resources – Consumption of Renewable Resources	Construction	Materials like sustainably sourced wood or bio-based products might be used in construction or maintenance. Water is essential for mixing concrete used in the construction of foundations and other structural components. Water is used for dust suppression during construction, operation and maintenance, and upgrade or modification.	**Overhead:** negligible to moderate **Underground:** low to moderate	▪ **ENR-2**: Source Recycled Materials ▪ **ENR-5:** Source Locally ▪ **W-1:** Minimize Water Use	Less than Significant	Underground cables are designed to be durable and require less frequent maintenance, which would offset some of the initial impacts. However, the upfront resource consumption remains. Implementation of mitigation measures helps in reducing impacts to less than significant. Sourcing recycled materials like wood or bio-based materials would reduce a project's overall demand for natural resources.
	Operation and Maintenance	Materials like sustainably sourced wood or bio-based products might be used in construction or maintenance. Water is essential for mixing concrete used in the construction of foundations and other structural components. Water is used for dust suppression during construction, operation and maintenance, and upgrade or modification. During operation and maintenance, water is used for cooling systems, cleaning, and vegetation management.	**Overhead:** nil to low **Underground:** negligible to low			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
	Upgrade or Modification	Water is used for dust suppression during construction, operation and maintenance, and upgrade or modification.	**Overhead:** negligible to low **Underground:** negligible to low			The amount of water required for construction activities is relatively small compared to other industrial processes. Water use during construction is typically short term and localized. The ongoing water needs for operation and maintenance are minimal.
Energy and Natural Resources – Consumption of Energy	Construction	Construction activities, equipment, and lighting would require electricity from diesel generators or from a utility provider.	**Overhead:** nil to negligible **Underground:** nil to negligible	▪ **ENR-3:** High-Efficiency Safety Lighting ▪ **ENR-4:** Energy Supply	Less than Significant	Mitigation measures help mitigate the impacts of electricity consumption and promote more sustainable practices in the construction, operation and maintenance, and upgrade or modification of transmission facilities.
	Operation and Maintenance	The operation of monitoring systems and other electrical transmission equipment would require a continuous supply of electrical energy. Similarly, the transmission of electrical energy from energy facilities to consumers involves some energy loss.	**Overhead:** negligible to moderate **Underground:** negligible to moderate			
	Upgrade or Modification	Electricity would be necessary to power equipment and lighting during upgrade or modification activities.	**Overhead:** nil to negligible **Underground:** nil to negligible			

Notes:
(a) Appendix 3.9-1 provides a detailed listing of each general condition, avoidance criterion, and mitigation measure. Having these details in an appendix serves as a comprehensive reference section that can be consulted independently of the main text. This is particularly useful for detailed guidance and technical specifications that may be referred to multiple times. Additionally, including this information in an appendix allows for easier updates and revisions. If mitigation measures or guidelines change, the appendix can be updated without altering the main content.
BMP = best management practice

3.7.6 Suitability Map

Project-specific reviews would include a comprehensive review and analysis to identify the site-specific adverse impacts on resources to determine the suitability of this Draft Programmatic EIS. Environmental review may be phased by incorporating relevant information from this Draft Programmatic EIS by reference while evaluating site-specific adverse impacts of the individual project applications. For more information on phased reviews, please refer to Chapter 1, Introduction.

Project-specific applications would include details about the precise location and site-specific conditions. This Draft Programmatic EIS provides a suitability map that, when incorporated with project-specific applications, could be used to facilitate more informative and efficient environmental planning.

Criteria specific to energy and natural resources were not identified that would impact project siting decisions at a broad, programmatic level. Consequently, no suitability map was developed for this resource. Energy and natural resource consumption can vary significantly over time and across individual projects. Therefore, a more detailed, site-specific analysis is required to determine the suitability of a project in any area. This variability can make it difficult to create a static suitability map that accurately reflects current conditions and accounts for the impacts of transmission facilities on energy and natural resources.

This Page Intentionally Left Blank

3.8 Public Health and Safety

This Draft Programmatic Environmental Impact Statement (EIS) considers impacts on public health and safety resulting from the types of facilities described in Chapter 2. This section addresses the following topics related to the construction, operation and maintenance, and upgrade or modification of high-voltage electric transmission facilities (transmission facilities) in the State of Washington:

- Section 3.8.1 identifies regulatory, siting, and design considerations.
- Section 3.8.2 describes the affected environment.
- Section 3.8.3 describes impacts.
- Section 3.8.4 describes potential mitigation measures.
- Section 3.8.5 identifies probable significant adverse environmental impacts on public health and safety.
- Section 3.8.6 provides a suitability map and scoring for the siting of transmission facilities as it relates to public health and safety, based on the identified considerations, impacts, and mitigation measures.

3.8.1 Regulatory, Siting, and Design Considerations

This Draft Programmatic EIS establishes a broad framework for compliance, outlining general laws, regulations, best management practices (BMPs), and design considerations. It is assumed that project-specific applications will be developed within this pre-established regulatory context and are expected to comply with existing laws and regulations. If the project does not comply with applicable laws and regulations or fails to adhere to design considerations or BMPs, additional project-specific environmental review and mitigation would be required. The applicable federal, state, and local laws and regulations relevant to public health and safety are summarized in **Table 3.8-1**.

Table 3.8-1: Laws and Regulations for Public Health and Safety

Applicable Legislation	Agency	Summary Information
42 USC §7401 – Clean Air Act	U.S. Environmental Protection Agency	This comprehensive federal law regulates air emissions from stationary and mobile sources. Among other things, this law authorizes the EPA to establish National Ambient Air Quality Standards to protect public health and public welfare and to regulate emissions of hazardous air pollutants. This law outlines requirements for Risk Management Plans to improve chemical accident prevention at facilities.
42 USC §9601 et seq. – Comprehensive Environmental Response, Compensation, and Liability Act	U.S. Environmental Protection Agency	This act provides a comprehensive framework for identifying, assessing, and addressing environmental contamination; holding responsible parties accountable; and involving communities in the cleanup process. The EPA enforces requirements regarding the safe handling, treatment, storage and disposal of hazardous waste through a compliance monitoring program.
Title III of SARA; 40 CFR 302–313, Emergency Planning and Community Right-to-Know Act	U.S. Environmental Protection Agency	This act aims to enhance community safety and environmental protection by promoting emergency planning, increasing transparency about chemical hazards, and improving public access to information regarding hazardous substances in their communities.

Applicable Legislation	Agency	Summary Information
29 CFR, Labor	Occupational Safety and Health Administration	This law establishes workplace safety and health standards across various industries to protect workers from occupational hazards.
40 CFR Parts 239–282, Resource Conservation and Recovery Act	U.S. Environmental Protection Agency	This act aims to manage the treatment, storage, and disposal of hazardous and non-hazardous waste to protect human health and the environment by promoting waste minimization, resource conservation, and proper waste management practices.
49 CFR, Transportation	U.S. Department of Transportation	This law addresses the requirements for the safe transportation of hazardous materials like lithium batteries and combustible liquids, as well as for packaging, labeling, and documentation.
Washington State Environmental Policy Act	Washington Energy Facility Site Evaluation Council Washington State Department of Ecology Local governments	This act is a process that identifies and analyzes environmental impacts that can be related to issuing permits. SEPA helps permit applicants and decision-makers understand how a proposed project will impact the environment. Certain projects, as defined in the SEPA Rules (WAC 197-11-704) and that are not exempt, are required to go through the SEPA process.
RCW 70.105D, Model Toxics Control Act	Washington State Department of Ecology[(a)]	This act establishes regulations for the identification, investigation, cleanup, and management of contaminated sites to protect human health and the environment in Washington. Specific regulations outline requirements for site hazard assessments and implementation of clean-up plans (Ecology 2013).
RCW 90.48, Water Pollution Control Act	Washington State Department of Ecology[(a)]	This act establishes the framework for managing and controlling water pollution in Washington, focusing on protecting water quality and ensuring safe water resources.
WAC 296-24, General Safety and Health Standards	Washington State Department of Labor and Industries[(a)]	This legislation outlines a variety of comprehensive safety regulations across general industries, primarily focusing on occupational safety and health standards.
WAC 296-45, Electric Power Generation, Transmission and Distribution	Washington State Department of Labor and Industries[(a)]	This legislation provides a framework for ensuring safety in electrical operations, including management of overhead transmission facilities.
WAC 296-800, Safety and Health Core Rules	Washington State Department of Labor and Industries[(a)]	This legislation aims to improve workplace safety and health standards by updating regulations, enhancing enforcement mechanisms, and addressing emerging safety issues.
WAC 296-809 – Safety Standards for Confined Spaces	Washington State Department of Labor and Industries[(a)]	This legislation provides comprehensive safety requirements for entering and working in confined spaces to protect workers from associated hazards.
WAC 296-901, Globally Harmonized System for Hazard Communication	Washington State Department of Labor and Industries[(a)]	This legislation establishes general safety and health requirements for hazard communication that apply across various industries.
WAC 332-24, Forest Protection	Washington State Department of Natural Resources[(a)]	This legislation provides guidelines and requirements for protecting forest lands from fire and other threats.

Applicable Legislation	Agency	Summary Information
WAC 480-100, Electric Companies	Washington Utilities and Transportation Commission[(a)]	This legislation establishes standards for the reliability and quality of electric service. This law requires that Utilities meet certain performance criteria regarding the frequency and duration of outages.

Note:

(a) The agency responsible for administering most permits or authorizations for the identified regulation. However, if EFSEC is determined to be the agency responsible for approving a proposal, EFSEC can administer several types of permits at the state and local levels. EFSEC provides a streamlined process for siting and licensing major energy facilities, including transmission facilities in Washington State. EFSEC coordinates all evaluation and licensing steps, specifies the conditions for construction and operation, and issues a Site Certification Agreement, which assumes the responsibility for issuing individual state or local permits. By consolidating these permits into a single Site Certification Agreement, EFSEC can simplify the regulatory process for energy facility developers. While EFSEC itself does not directly administer federal permits, it works closely with federal agencies to ensure that all necessary federal requirements are met during the evaluation and licensing of energy facilities.

CFR = Code of Federal Regulations; EFSEC = Energy Facility Site Evaluation Council; EPA = U.S. Environmental Protection Agency; RCW = Revised Code of Washington; SARA = Superfund Amendments and Reauthorization Act; SEPA = State Environmental Policy Act; USC = United States Code; WAC = Washington Administrative Code

The siting of transmission facilities is determined by engineering, technical, environmental, and socioeconomic factors. **Table 3.8-2** summarizes guidance documents and management plans that outline the design considerations and BMPs generally used to avoid or minimize impacts on public health and safety.

Table 3.8-2: Siting and Design Considerations for Public Health and Safety

Siting and Design Consideration[(a)]	Description
National Electrical Code	Also known as National Fire Protection Association 70, the NEC is a standard for the safe installation of electrical wiring and equipment in the United States. The NEC sets the minimum requirements for safe electrical installations to protect people and property from electrical hazards.
Institute of Electrical and Electronics Engineers Standards	The IEEE and internal committees publish various standards relevant to electrical transmission, including the NESC, a crucial set of standards for ensuring the safety of electrical and communication systems. Sections of the NESC cover the following: ▪ General requirements ▪ Rules for the safe design, construction, and maintenance of electrical substations ▪ Guidelines for the installation and maintenance of overhead electric supply and communication lines ▪ Safety standards for underground electric supply ▪ Safety-related work practices for the operation and maintenance of electric supply
National Institute for Occupational Safety and Health Standards	NIOSH provides guidelines and recommendations for controlling and reducing workplace hazards, as well as best practices for various industries to improve occupational health and safety standards.
Federal Energy Regulatory Commission Guidelines	FERC revises and approves guidelines for the siting and permitting of interstate electric transmission facilities, including environmental impact assessments and public engagement processes.

Siting and Design Consideration[a]	Description
North American Electric Reliability Corporation Standards	NERC develops reliability standards for the electric grid to ensure reliability and security of the North American bulk power system. NERC works with federal organizations like FERC for the review, approval, and enforcement of standards.
American Society of Civil Engineers Guidelines	ASCE provides guidelines for the structural loading and design of transmission facilities, to ensure they can withstand environmental and operational stresses.
American Concrete Institute Standards	ACI develops and publishes standards and guidelines for the design, construction, and maintenance of concrete structures.
International Code Council Codes and Standards	The ICC develops and publishes model codes and standards used in the construction and building industry. ICC codes are designed to ensure safety and resilience of infrastructure and are often incorporated into jurisdictions like states, counties, or cities.
U.S. Department of Energy Reviews	The DOE coordinates federal authorizations and environmental reviews for interstate transmission projects, aiming to streamline the permitting process while ensuring compliance with environmental and cultural protection laws.
International Commission on Non-Ionizing Radiation Protection Guidelines and Standards	The ICNIRP publishes guidelines and standards related to non-ionizing radiation, including EMF.
Federal Aviation Association Regulations	The FAA publishes a range of regulations related to aviation safety, operations, and standards.
Storm Water Best Management Practice: Hazardous Material Storage (EPA 2021)	This resource provides best management practices for the storage of hazardous materials and includes regulatory requirements, general considerations, and limitations.
Recommended Siting Practices for Electric Transmission Developers (Americans for a Clean Energy Grid 2023)	This document outlines best practices for siting electric transmission facilities. Recommended practices include: ▪ Early and transparent engagement ▪ Respect and fair dealing ▪ Environmental considerations ▪ Interagency coordination ▪ Use of existing infrastructure

ACI = American Concrete Institute; ASCE = American Society of Civil Engineers Guidelines; DOE = U.S. Department of Energy; EMF = electromagnetic fields; FAA = Federal Aviation Administration; ICC = International Code Council; ICNIRP = International Commission on Non-Ionizing Radiation Protection; IEEE = Institute of Electrical and Electronics Engineers; NEC = National Electrical Code; NESC = National Electrical Safety Code; NIOSH = National Institutes of Science and Health

3.8.2 Affected Environment

There are several key health and safety concerns that should be considered when analyzing the construction, operation and maintenance, and upgrade or modification of transmission facilities, including the following:

- Occupational Safety
- Wildfire
- Hazardous Materials
- Electromagnetic Fields
- Power Outages

Other safety concerns are analyzed in other sections; noise and vibration are analyzed in Section 3.13, air quality is analyzed in Section 3.3, and traffic hazards are analyzed in Section 3.10.

3.8.2.1 Occupational Safety

According to the U.S. Bureau of Labor Statistics (2023), the leading causes of worker injury-related fatalities in 2022 were transportation incidents (37 percent of total fatalities), followed by construction and natural resource extraction incidents (19 percent). From 2011 to 2022, electrical fatalities accounted for 6 percent of all workplace fatalities, of which the leading causes were working on or near live wires (48 percent) or contact with overhead transmission lines (41 percent) (Electrical Safety Foundation International 2023). According to the latest available data, in Washington, the industry sector with the highest number of work fatalities in 2019 was construction, followed by transportation and warehousing, then agriculture, forestry, fishing, and hunting (Washington State Department of Labor & Industries 2019). Motor vehicle incidents were the most common cause of death across all industries, accounting for 37 percent of all workplace fatalities; followed by homicide (19 percent); being struck by objects (13 percent); and falls (11 percent) (Washington State Department of Labor & Industries 2019).

Worker safety in construction and industrial settings is federally regulated by the Occupational Safety and Health Administration (OSHA), and compliance with OSHA standards (e.g., 29 Code of Federal Regulations [CFR] 1910 and 29 CFR 1926) is required in the United States. The State of Washington enforces its own workplace safety programs, which incorporate OSHA regulations and include other requirements as outlined in Washington Administrative Code (WAC) 296-800, WAC 296-45, and WAC 296-24. The construction, operation and maintenance, and upgrade or modification phases of electrical transmission operations in Washington are required to comply with OSHA and state standards to protect workers from potential construction and industrial accidents, as well as to minimize exposure to workplace hazards (e.g., noise, chemicals).

3.8.2.2 Hazardous Materials

Hazardous materials include a variety of substances that represent a threat to human and environmental health when not managed properly. Hazardous materials include those listed under OSHA Hazard Communication Standards (29 CFR 1910.1200), as well as substances defined under U.S. Department of Transportation regulations at 49 CFR, Parts 170–177. The Resource Conservation and Recovery Act—specifically, 40 CFR 262—details the identification and management of hazardous waste. Several hazardous substances are utilized throughout the construction, operation, and maintenance of overhead and underground electrical transmission lines. High-voltage power switches, inverters, converters, controller devices, and other power electronics contain lead, brominated fire retardants, and cadmium in their printed circuit boards (EPA 2019). Further, diesel fuel delivery and storage are required for backup or emergency power generation. Substations also require periodic cleaning, yielding hazardous waste. The San Diego Gas and Electric Company (2008) identified the following materials containing hazardous substances that are common to electrical transmission construction and operation:

- 1,1,1 trichloroethene
- ABC fire extinguisher
- Acetylene gas
- Air tool oil
- Ammonium hydroxide
- Antifreeze (ethylene glycol)
- Automatic transmission fluid
- Battery acid (in vehicles and in the meter house of the substations)
- Bottled oxygen

- Brake fluid
- Canned spray paint
- Chain lubricant (contains methylene chloride)
- Connector grease (penotox)
- Contact Cleaner 2000
- Diesel deicer
- Diesel fuel
- Diesel fuel additive
- Eyeglass cleaner (contains methylene chloride)
- Gasoline
- Gasoline treatment
- Hot stick cleaner (cloth treated with polydimethylsiloxane)
- Hydraulic fluid
- Insulating oil (inhibited, non-PCB)
- Insect killer
- Lubricating grease
- Mastic coating
- Methyl alcohol
- Motor oils
- Paint thinner
- Pesticide
- Propane
- Puncture seal tire inflator
- Safety fuses
- Starter fluid
- Sulfur hexafluoride (within circuit breakers in the substations)
- Two-cycle oil (contains distillates and hydrotreated heavy paraffinic)
- WD-40 (penetrating oil)
- ZEP (safety solvent)

Washington has contaminated sites that have required hazardous materials cleanup by the Washington State Department of Ecology's Toxic Cleanup Program. More than 6,000 currently contaminated sites are listed in Washington's contaminated site register as either undergoing or awaiting cleanup (Ecology 2024). Contaminated sites can result from active and inactive industrial land uses such as mineral extraction, processing or manufacturing, and landfill operations, or from commercial activities like fuel storage and vehicle maintenance. Cleanup sites may harbor hazardous materials that are no longer permitted such as polychlorinated biphenyls (PCBs). PCBs are manufactured chemicals that were commonly used as coolants and lubricants in transformers, capacitors, and other electrical equipment before their manufacture was banned in 1979 (EPA 2016). PCBs are carcinogenic to humans and animals and have been shown to cause toxic effects on their immune system, nervous system, reproductive system, and endocrine system. Further, they do not readily break down in the environment, and if contaminated sites are encountered, they can still pose health and safety risks to exposed workers. PCBs can travel long distances in air or water and can accumulate in soil and marine animals.

3.8.2.3 Wildfire

In 2023, more than 55,000 wildfires burned over 2,600,000 acres across the United States (NOAA National Center for Environmental Information 2024). In the same year, Washington experienced the second highest number of ignitions in its recorded history, with more than 1,800 wildfires burning approximately 165,000 acres (DNR 2023). More than 2.2 million homes are exposed to wildfire risk in Washington, and the threat is increasing as fire seasons are prolonged due to hotter, drier summers and a decline in forest health (DNR 2019). The Washington State Department of Natural Resources has recognized the wildfire crisis as a top priority, prompting the creation of the Washington State Wildland Fire Protection 10-Year Strategic Plan (DNR 2019). The plan outlines goals for community resilience, fire prevention, and public safety to address the escalating risks of wildfires.

Wildfire behavior is dependent on several biophysical and anthropogenic factors, including the following:

- **Fuels:** This factor refers to combustible materials such as vegetation, debris, and organic matter that can ignite and sustain a fire. Certain variables like vegetation composition, cover, and moisture content can increase flammability and fuel availability.
- **Climate:** This factor refers to different climatic variables that can cumulatively increase risks of wildfires, such as high temperatures, low humidity, and high wind velocity.
- **Topography:** This factor refers to the slope and aspect of the landscape that can influence what areas are more prone to fire ignition based on orientation, and how quickly a fire might spread.
- **Ignition sources:** This factor refers to environmental wildfire ignition sources such as lightning, as well as anthropogenic sources, including human activities like smoking, and construction activities like heat and sparks from vehicles, equipment, and welding.

Construction activities for both overhead and underground transmission facilities can be ignition sources for wildfires. Overhead transmission lines can also be a source of ignition during operation and can be an obstacle to fighting wildfires. Electrical faults, like overloaded or short-circuited lines, can generate excess heat and ignite nearby combustible materials like encroaching vegetation. Equipment failure, like transformer failure, can increase fire risks. Due to their height, overhead lines are vulnerable to lightning strikes and collision with air traffic, both of which can cause damage to structures and result in fire. Overhead transmission lines are also susceptible to damage from extreme weather events. High winds can cause breakage, swaying, and line sag, which may cause phase-to-phase or phase-to-ground electrical arcing[235] if wires encounter adjacent lines or vegetation. Arcing can generate intense heat and sparks and ignite fires when in contact with flammable materials. Similar effects can result from extreme heat and ice or snow accumulation. Falling branches and contact with wildlife can cause short circuits and downed lines, acting as sources of ignition. As underground transmission lines are protected from external environmental stressors, they are generally not regarded as a common ignition source for wildfires during operation.

3.8.2.4 Electromagnetic Fields

Electromagnetic fields (EMF) are present wherever electricity is used, such as in household appliances, cell phones, wristwatches, lamps, computers, and transmission facilities. Electric fields are produced by voltage and are present even when a transmission facility is not carrying currents. Electric fields occur naturally, radiating from the earth’s core to the atmosphere, and can be easily shielded by walls and objects. Magnetic fields are produced by current and naturally occur through current production in the earth’s core. The strength of EMFs is proportional to current and voltage, and both electric and magnetic fields diminish across distance.

EMFs are typically grouped into two categories based on their frequency: ionizing and non-ionizing. Mid- to high-frequency EMFs (10^{16} hertz [Hz] and above), including those from x-rays and gamma rays, are associated with

[235] Occurs when an electric current jumps across a gap between two conductive points, creating a visible discharge of electricity. The arc generates heat, which can cause burns or ignite flammable materials. Sparks may fly from the point of discharge.

ionizing radiation, which has been shown to cause cellular damage in humans with prolonged exposure (NIEHS 2024). Low- to mid-frequency EMFs (10^{15} Hz and below) like microwaves and radio frequencies, and extremely low frequency (ELF) EMFs, like those associated with electrical transmission facilities, are considered non-ionizing radiation (NIEHS 2024). Non-ionizing radiation is generally regarded as posing little to no risk to human health (Healthline n.d.). High-voltage direct current transmission systems produce static EMFs that are unidirectional and comparable to the Earth's magnetic field. These static fields do not induce currents or voltages and have not raised as many health concerns as their high-voltage alternating current counterparts (NIEHS 2024).

Most studies on health impacts from transmission lines focus on high-voltage alternating current systems, which produce alternating currents at ELFs of 60 Hz. While many regulatory agencies regard low-frequency EMFs as generally harmless to human health (NIEHS 2024), conflicting research over the years has contributed to ongoing debate. A study by Wertheimer and Leeper (1979) that linked EMFs to cancer in children sparked a 40-year-long research initiative to investigate the effects of EMF on public health. Numerous scientific review panels have been conducted by various agencies, including the National Institute for Environmental Health Sciences (NIEHS 1999), and the International Commission on Non-Ionizing Radiation Protection (ICNIRP) (ICNIRP 2010). The overarching consensus of the scientific panel reviews is that neither electric nor magnetic fields are conclusively likely to cause adverse health effects at the long-term, low-exposure levels associated with electrical transmission. The only established link between electric or magnetic fields and negative biological or health effects occurs when the body experiences a shock-like effect due to electric currents at extremely high exposure levels. International organizations like ICNIRP, as well as U.S. nongovernmental groups like the Institute of Electrical and Electronics Engineers Standards, provide recommendations and guidelines for exposure limits to protect against acute adverse effects from short-term exposure (ICNIRP 2010; IEEE 2019). Different frequencies of EMFs have been recorded as impairing the functioning of implanted cardiac pacemakers. Reported sources include cell phones, power tools, refrigerator magnets, and escalators, among others. Studies have shown that electric fields from transmission lines could affect some models of pacemakers with monopolar implants that are sensitive to the electric power frequency of 60 Hz. Although buildings, vegetation, and other objects can effectively shield electric fields, pacemaker manufacturers have implemented many design features that are highly effective at minimizing the risks of exogenous[236] electrical sources, including electric fields.

It can be difficult to predict safe distances from transmission facilities, as the public health and safety impacts of EMFs remain contentious, with little consensus among researchers and regulatory bodies regarding their potential health effects. While there are no federal regulations for public exposure to low frequency EMFs in the United States, due to the far-reaching implications of a few studies, EMFs remain a public health and safety concern. A safe, minimum distance of 100 feet from transmission facilities is recommended to minimize the health effects of EMFs (NIEHS 2024).

3.8.2.5 Heat Generation

Underground transmission facilities generate heat due to the electrical resistance of the conductors. Unlike overhead transmission facilities, which dissipate heat into the air, underground cables are surrounded by soil and insulation materials that retain heat. This makes heat management of underground transmission facilities more challenging. Various cooling methods are employed to manage the heat generated by underground cables including water cooling or forced air ventilation (Electrical Engineering Portal 2017). Advanced modeling

---

[236] Refers to something that originates from outside an organism, system, or process.

techniques are used to assess the thermal behavior of underground cables. These models consider geological and meteorological conditions to optimize cable performance and prevent overheating (Electrical Engineering Portal 2017).

3.8.3 Impacts

An assessment of impacts was completed for the construction, operation and maintenance, and upgrade or modification of transmission facilities within the Study Area.

3.8.3.1 Method of Analysis

The study area for a project-specific application would typically encompass several key regions and features, such as the following:

- **Project Site and Immediate Vicinity:** This includes the specific location of the project and the surrounding area that might be directly affected by construction, operation and maintenance, and upgrade or modification activities.

This Draft Programmatic EIS analyzes the affected environment and impacts on public health and safety within the Study Area defined in Chapter 2. Three project phases for each transmission facility type were considered: construction, operation and maintenance, and upgrade or modification. This evaluation considers overhead transmission facilities and underground transmission facilities for each phase. Overhead transmission facilities consist of transmission lines and substations and similar ancillary infrastructure. Overhead transmission facilities also incorporate aboveground infrastructure that may be associated with underground transmission facilities (e.g., clearing footprint required for launch and retrieval shafts for trenchless construction). Underground transmission facilities consist of underground transmission lines, underground access vaults, and other below-ground infrastructure. The construction of underground transmission facilities includes open trench, trenchless, and underwater construction methods.

The approach to evaluating impacts on public health and safety includes assessing the design, construction, and operational standards and guidelines for electric transmission facilities. Human health concerns related to noise and vibration impacts from the construction, operation, and maintenance of transmission facilities are analyzed in Section 3.13. Human health concerns related to air quality impacts from the construction, operation, and maintenance of transmission facilities are analyzed in Section 3.3, Air Quality. Traffic hazards resulting from the construction, operation, and maintenance of transmission facilities are analyzed in Section 3.10, Transportation. Impacts from the construction, operation, and maintenance of transmission facilities on emergency response teams are analyzed in Section 3.11, Public Services and Utilities.

Impact Determination

The discussion of impacts is qualitative given the high-level nature of a Programmatic EIS; quantification would require project-specific details to analyze. **Table 3.8-3** describes the criteria used to evaluate impacts from the Action Alternative and No Action Alternative. Information reviewed to identify impacts on public health and safety in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping.

Table 3.8-3: Criteria for Assessing the Impact Determination on Public Health and Safety

Impact Determination	Description
Nil	No foreseeable impacts are expected. A transmission facility would not increase the risk of fire or threaten public health or safety during any phase (e.g., construction, operation and maintenance, or upgrade or modification). A project would not cause worker injury or exposure to hazardous materials or EMF, and power outages would have no impact on service reliability or the public.
Negligible	Changes would either be non-detectable or, if detected, would have only slight effects. A project would cause very minor exposure to hazardous materials and EMF with minimal impacts on occupational safety. The risk of fire would be slight and easily avoidable through standard safety measures. Power outages would be infrequent and of short duration, with little impact on service reliability or public health and safety. Best management practices and design considerations are expected to be effective.
Low	A project is expected to have minor and noticeable effects on public health, even with the implementation of best management practices and design considerations. There may be limited exposure to hazardous materials, but spills would be small and easily manageable. EMF exposure may be slightly above the recommended limit, but impacts on public health would be mitigatable. The risk of fire would be low, and potential fires would be easily extinguishable with minimal damage to project property and occupational safety. Worker injuries may occur, but would be easily treatable. Power outages may cause nuisance to affected communities but would not compromise public health and safety. Impacts would be short-term and nonsignificant.
Moderate	Adverse impacts are likely to occur even with the implementation of best management practices and design considerations. A project would have noticeable impacts from increased exposure to hazardous materials or elevated EMF levels in some areas, compromising occupational and public health. Power outages could affect service reliability in the short term. Workplace accidents and injuries may be more severe or occur more frequently and require stringent safety measures. Small, confined fires may spread from the project area, increasing the risk of damage to adjacent land and requiring emergency response efforts. These risks can be managed but would require continuous monitoring and mitigation efforts. Moderate impacts may be long-term, occurring over one or more project phases. Moderate impacts have the potential to be significant.
High	A project is expected to have significant and potentially severe effects on public health and safety. A project would cause elevated EMF levels that highly exceed recommended safety thresholds, substantial exposure to hazardous materials through major spill events, and extreme occupational safety hazards, including severe or fatal accidents. The risk of wildfire would be high, potentially leading to excessive damages and decreased air quality, with widespread impacts on the surrounding community. Frequent and extended power outages would have a significant impact on service reliability and would adversely impact the health and safety of affected individuals. High impacts may be permanent or continue for the duration of the project.

EMF = electromagnetic field

To clearly understand the potential severity of impacts without any interventions, the following impact determinations exclude the use of avoidance criteria and mitigation measures. The ratings assume compliance with all federal, state, and local laws and regulations, as well as standardized BMPs and design considerations. Assessing impacts without avoidance criteria or mitigation measures offers a baseline understanding of potential environmental effects, helping to identify the true extent of these impacts. Environmental laws often require that initial impact assessments be conducted without considering mitigation to maintain the integrity of the environmental review process.

3.8.3.2 Action Alternative

Construction

Overhead Transmission Facilities

Activities for the construction phase of overhead transmission facilities would vary and depend on the scale of the facility and site characteristics. Construction could include a site preparation phase of relatively short duration (e.g., a few months), followed by a longer construction and start-up phase. It is assumed that the construction phase of overhead transmission, per mile, would have a shorter duration than underground construction. Overhead transmission facilities infrastructure could have the following identified impacts during the construction phase:

- Increase in Accidents and Injuries
- Exposure to Hazardous Materials
- Increased Risk of Wildfire

Increase in Accidents and Injuries

Worker safety is a public health and safety concern for both construction, operation and maintenance, and upgrade or modification phases of electrical transmission operations. During construction, risks to workers include injury from motor vehicle and equipment handling; extreme weather exposure; risks associated with working at extreme heights, including falls; electricity-related risks such as electric shock; and chemical hazards such as exposure to hazardous substances. Hot-work activities[237], such as cutting and welding, can cause fire-related injuries, including burns, expose workers to toxic fumes, and lead to ocular exposure to ultraviolet and infrared radiation. General construction activities like working on uneven surfaces, lifting heavy materials, and exposure to occupational noise can also lead to worker injury. Soil disturbance associated with construction activities can expose workers to fugitive dust. Airborne dust particles can cause respiratory issues, and eye and skin irritation, and potentially expose workers to harmful chemicals and biological hazards. If construction activities take place in south-central Washington, workers may be exposed to Valley Fever (Coccidioidomycosis), a disease caused by a fungus found in dust and soil.

When constructing overhead transmission facilities, strict safety regulations, protocols, and comprehensive personnel training are required by industry and regulatory agencies, including OSHA.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Exposure to Hazardous Materials

The risks associated with hazardous materials during construction typically result from the accidental release of hazardous materials due to improper handling or storage. The health and safety impacts of a release depend on the material, amount, and location of release. Oil and diesel fuel are typical materials in transmission construction, and potential release could range from small oil or diesel fuel spills during transfer or refueling, to large releases as the result of a vehicle accident involving a refueling truck. Greater impacts on public health and safety could

[237] Work that generates heat, sparks, or open flames, which can pose significant safety risks.

occur if hazardous materials were released at sensitive locations like aquifers or agricultural land, where contamination could compromise drinking water supplies and affect food safety.

Encountering pre-existing contaminated air, soil, or groundwater (e.g., from hydrocarbon contamination) during construction could pose risks to public health and safety as exposure to chemicals can lead to toxic reactions or carcinogenic effects on human health. Airborne contaminants as outlined in WAC 296-841 could be encountered during construction and pose a serious risk to occupational and public health and safety, depending on the type of contaminant, level of exposure, and an individual's pre-existing health conditions.

When constructing transmission facilities, strict regulations mandate the safe handling and disposal of hazardous materials and outline protocols for the identification and management of contaminated sites, as required by federal agencies such as the U.S. Environmental Protection Agency (EPA).

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary, and could be nil to low.

Increased Risk of Wildfire

Wildfire can result from many construction activities, including hot-work activities, operation of combustion engines, operation of motor vehicles over vegetated areas, clearing vegetation, workers smoking, and other practices that could inadvertently ignite vegetation. The risk of fire is a public health and safety concern for various reasons. Near residential areas, fires caused by transmission facilities can lead to property damage, result in loss of homes, and cause direct harm to people. Smoke from fires can have adverse effects on respiratory health, particularly for individuals with pre-existing conditions.

Industry standards like the National Electrical Code, set by the National Fire Protection Agency, maintain comprehensive safety practices for the installation of electrical equipment in the United States.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Activities for the construction phase of underground transmission facilities, including open trench, trenchless (including horizontal directional drilling), or underwater construction methods, would vary depending on the scale of the facility and site characteristics. Similar to overhead transmission facilities, construction underground could include a site preparation phase of relatively short duration, followed by a longer construction and start-up phase. It is assumed that the construction phase for underground transmission facilities, per mile, would have a longer duration than overhead projects. Underground transmission could have the following identified impacts during the construction phase:

- Increase in Accidents and Injuries
- Exposure to Hazardous Materials
- Increased Risk of Wildfire

Underground transmission construction requires a complex installation process involving specialized equipment and personnel. Underground transmission facilities can take up to six times longer to construct than overhead lines, which extends the duration of risk exposure and increases overall potential construction hazards (Xcel Energy 2021).

Increase in Accidents and Injuries

During construction, risks to workers include injury from equipment handling, extreme weather exposure, fire- and electricity-related risks such as electric shock, burns, and hot-work related injuries; biological hazards such as harmful interactions with plants and animals; and chemical hazards such as exposure to hazardous substances. Further, underground electrical transmission construction introduces additional risks to workers from trenching and excavation activities, machinery risks from moving parts associated with drilling, and risks associated with pressurized systems and working in confined spaces. Underground transmission construction commonly requires continuous trenching, which can cause worker injury or fatality from cave-ins, falling debris, and exposure to fumes or vapor that can collect in confined spaces. Further, the soil disturbance associated with trenching can expose workers to fugitive dust, which can cause respiratory, ocular, and skin issues and, in some parts of Washington, can cause Valley Fever. If construction occurs in areas with pre-existing buried utilities, trenching, and directional drilling activities can cause accidental utility strikes, which can result in serious injury to workers and bystanders, increase hazardous conditions such as fires or flooding, and disrupt utility services (see Section 3.11, Public Services and Utilities). During construction of underwater transmission lines, workers face hazards associated with specialized barges and equipment, and working near water.

When constructing underground transmission facilities, strict safety regulations, protocols, and comprehensive personnel training are required by industry and regulatory agencies, including OSHA.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Exposure to Hazardous Materials

The risks associated with hazardous materials and wastes during underground construction typically result from accidental release of hazardous materials due to improper handling or storage. Oil and gas are typically used during construction to fuel equipment and vehicles, and a potential release could range from small fuel spills during transfer or refueling, to large releases as the result of a vehicle accident involving a refueling truck. Greater impacts on public health and safety could occur if hazardous materials were released at sensitive locations like aquifers or agricultural land, where contamination could compromise drinking water supplies and affect food safety. For underwater construction, a hazardous material release could impact water quality, making it unsafe for drinking, swimming and other recreational uses.

During construction, encountering contaminated soil, air, or groundwater (e.g., from hydrocarbon contamination) could pose risks to public health and safety as exposure to chemicals can lead to toxic reactions or carcinogenic effects on human health. Excavation activities associated with trenching can result in large soil piles and increase dust exposure for up to six times longer than for overhead construction (Xcel Energy 2021). This soil disturbance can increase health and safety risks associated with contaminated soil. While HDD can reduce soil disturbance, if contaminated soil is uplifted during underwater construction, water quality can be impacted, making it unsafe for swimmers and other recreational users.

When constructing transmission facilities, strict regulations mandate the safe handling and disposal of hazardous materials and necessitate protocols for the identification and management of contaminated sites, as required by federal agencies like the EPA.

Impact Determination Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary, and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Increased Risk of Wildfire

Wildfire can result from nearly all construction activities due to blasting, operation of combustion engines, workers smoking, hot-work activity, and other practices that could inadvertently ignite vegetation. Environmental conditions like high temperatures and low humidity can also increase the risk of ignition from construction activities, as surrounding vegetation can become more flammable (NPS n.d.). Wildfires pose a direct threat to construction workers and, if not contained, can impact public health and safety through decreased air quality and damage to communities and infrastructure.

Industry standards like the National Electrical Code, set by the National Fire Protection Agency, maintain comprehensive safety practices for the installation of electrical equipment in the United States.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary, and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Operation and Maintenance

Overhead Transmission Facilities

Activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and rights-of-way (ROWs), similar to any other linear industrial facility. Overhead transmission facilities could have public health and safety impacts during the operation and maintenance phase relating to the following:

- Increase in Accidents and Injuries
- Exposure to Hazardous Materials
- Increased Risk of Wildfire
- Exposure to EMF

Increase in Accidents and Injuries

Impacts on occupational safety may occur during routine maintenance or repairs. Depending on the repairs necessary, occupational hazards could be similar to those involved in construction and include motor vehicle and equipment handling, extreme weather exposure, risks associated with working at heights, electricity-related risks such as electric shock, biological and chemical hazards, and hot-work and general construction-related injuries. Because maintenance typically requires fewer workers than construction, the occupational risks of the operation and maintenance phase are considered lower.

During the operational phase of transmission facilities, strict safety regulations, protocols, and comprehensive personnel training are required by industry and regulatory agencies, including OSHA.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary, and could be negligible to low.

Exposure to Hazardous Materials

Risks associated with hazardous materials during operation and maintenance typically involve the use of oils and gases and are similar in nature to those described above for construction but are expected to be much lower since operation and maintenance activities require less handling of hazardous materials and waste. If a spill or leak occurs during operation and maintenance, the health and safety impacts of the release would depend on the material, amount, and location of release. Oil and diesel fuel are materials common to maintenance and repair activities, and potential release could range from small oil or diesel fuel spills during transfer or refueling, to large releases resulting from a vehicle accident involving a refueling truck. Greater impacts on public health and safety could occur if hazardous materials were released at sensitive locations like aquifers or agricultural land, where contamination could compromise drinking water supplies and affect food safety.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be negligible to low.

Increased Risk of Wildfire

Wildfire poses a threat to public health and safety because it can contribute to power outages, decrease air quality, and directly impact infrastructure and community safety. During operation and maintenance, transmission facilities can be sources of ignition for wildfires, as well as create obstacles for fire suppression efforts. Ignition points related to maintenance and repair activities such as hot work, vehicle ignition, blading, and overland travel would be similar to those described for construction. Operating transmission facilities can be a source of ignition for wildfires due to contact with vegetation or wildlife, damages from extreme weather like wind and lightning, and general system malfunctions. Environmental conditions can also increase the risk of wildfires. High temperatures and low humidity can dry out vegetation, making it more flammable, and periods of strong winds can cause lines to sway and increase the chances of contacting vegetation. Transmission structures could be an obstacle for emergency response teams and also become another feature that requires fire suppression efforts. An energized line could be a risk to firefighters on the ground and limit the area in which airplanes could assist in fire suppression (see Section 3.11 Public Services and Utilities).

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Exposure to EMF

EMF generated by overhead transmission lines are regarded as a public health and safety concern due to studies suggesting a potential link between EMF and various forms of cancer. While there are currently no laws regulating levels of EMF, due to the few implications, the effects of EMF should be minimized where possible. The safe distance from high-voltage transmission lines can vary, but a common guideline is to maintain a distance of at least 100 feet to reduce exposure (NIEHS 2024).

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be nil to low.

Underground Transmission Facilities

Similar to overhead transmission facilities, activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs, similar to any other linear industrial facility. Underground transmission could have the following identified impacts during the operation and maintenance phase:

- Increase in Accidents and Injuries
- Exposure to Hazardous Materials
- Exposure to EMF
- Excess Heat Generation
- Inundation of Vaults in Floodplains

Increase in Accidents and Injuries

Impacts on occupational safety associated with the maintenance and repair of underground transmission are the same as described for construction and include exposure to hazardous chemical and biological materials, working in confined spaces, worker injuries from electric shock, trenching and hot-work activities, and use of heavy machinery. As cables are underground, it can take longer to pinpoint damaged areas. Specialized equipment and expertise are required to detect and diagnose issues, often leading to prolonged maintenance time and increased likelihood of hazards.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be negligible to low.

Exposure to Hazardous Materials

Unlike their overhead counterpart, underground cable conductors require robust insulation in order to withstand high voltage. Insulation methods depend on the type of cable used, but some cable technologies include use of insulating fluids, such as mineral oil, which pose a threat to public health and safety in the event of a leak or system malfunction. Leakage of insulating fluids can contaminate soil and groundwater, as well as above waterbodies if lines are installed underwater.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be negligible to low.

Exposure to EMF

Magnetic field intensity decreases with distance, so a stronger magnetic field is usually found at ground level directly above an underground cable compared to directly below an overhead line. While underground transmission lines also produce EMF like their overhead counterparts, the intensity of electric fields is significantly weaker due to the shielding effect of surrounding soil and insulation materials.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be nil to low.

Excess Heat Generation

Underground transmission lines generate heat during operation, which can affect the surrounding soil and infrastructure. Excessive heat is a public safety concern because it can lead to thermal stress on nearby structures and affect soil stability. Heat generated from underground transmission lines can cause damage to both the transmission lines and adjacent environments.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary, and could be negligible to low.

Inundation of Vaults in Floodplains

Underground transmission facilities that are located in floodplains could pose public health and safety hazards and environmental impacts (see Section 3.4, Water Resources). In the event of a flood, vaults can become inundated with water creating electrical safety hazards for maintenance workers. Electrical components, such as transformers and switchgear, are not designed to be submerged in water. Flooding can damage these components, leading to required repairs. Maintenance and repair work in flooded vaults can be dangerous for workers due to the risk of electrocution and other hazards.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact, without mitigation measures incorporated, is anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Upgrade or Modification

Overhead Transmission Facilities

Upgrading or modifying underground transmission facilities would involve several steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Overhead transmission could have public health and safety impacts during the upgrade or modification phase relating to the following:

- Increase in Accidents and Injuries
- Exposure to Hazardous Materials
- Increased Risk of Wildfire

While adverse impacts would be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing structures and footprints, which minimizes the disturbance to surrounding ecosystems and communities. New construction often requires new ROWs and clearing of land, which can disrupt existing land uses and impact previously undisturbed communities.
- **Infrastructure Utilization:** Existing infrastructure can be reused or enhanced, reducing the need for extensive new development and minimizing associated health and safety risks for workers and the public.

Underground Transmission Facilities

Upgrading or modifying underground transmission facilities would involve several steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Underground transmission could have public health and safety impacts during the upgrade or modification phase relating to the following:

- Increase in Accidents and Injuries
- Exposure to Hazardous Materials
- Increased Risk of Wildfire

While adverse impacts would be similar to construction, adverse impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing structures and footprints, which minimizes the disturbance to surrounding ecosystems and communities. New construction often requires new ROWs and clearing of land, which can disrupt existing land uses and impact previously undisturbed communities.
- **Infrastructure Utilization:** Existing infrastructure can be reused or enhanced, reducing the need for extensive new development and minimizing associated health and safety risks for workers and the public.

3.8.3.3 No Action Alternative

The No Action Alternative represents the scenario in which this Draft Programmatic EIS is not used and current management practices for siting and planning transmission facilities continue unchanged. Under this alternative, each project would continue to be evaluated on a case-by-case basis and reviewed for compliance with existing regulations, codes, and standard practices. While impact determinations would likely be similar to those outlined in this Draft Programmatic EIS, projects would not benefit from the impact reductions associated with the avoidance criteria developed and analyzed in this Draft Programmatic EIS. These criteria are anticipated to provide additional mitigation that further reduces potential environmental impacts.

3.8.4 Potential Mitigation Measures

This section describes measures that would eliminate, reduce the intensity of, or compensate for adverse impacts from construction, operation, and maintenance of transmission facilities.

All general conditions adopted for this Draft Programmatic EIS, identified in Section 3.1, are relevant to this resource section. Applicants would be responsible for providing information within their application materials documenting their attempts at implementing the general conditions.

Avoidance criteria[238] adopted for this Programmatic EIS have been identified in Section 3.1. Avoidance criteria that are relevant to this resource section are described below:

AVOID-1 – Hazardous Areas: Avoid known hazardous areas, including but not limited to, contaminated soils, geologically hazardous areas, landfills, and cutbanks.

[238] The complete list of avoidance criteria and their rationales can be found in Section 3.1, as well as Appendix 3.1-1.

Rationale: Avoiding hazardous areas provides safety for workers, the public, infrastructure, as well as environmental protection. Disturbing sites of known contamination or other hazards may require the development of remediation plans.

AVOID-4 – Floodplains: Avoid having equipment or infrastructure within floodplains.

Rationale: This avoidance criterion would eliminate the potential for damage to infrastructure and electrical safety hazards because of inundation and would avoid some riparian ecosystems.

AVOID-11 – Oil-Containing Conductor Cables: When installing underground transmission facilities, avoid the use of oil-containing equipment for cooling. Cooling should be achieved through cross-linked polyethylene (XLPE) insulation material or other, best available technology.

Rationale: This avoidance criterion aims to eliminate the risk of insulation fluid leaks associated with oil-containing equipment underground.

AVOID-12 – Heat Sources: Avoid collocation with other heat sources like steam mains.

Rationale: This avoidance criterion aims to eliminate the risks associated with excess heat generation.

Applicants would be responsible for providing information within their application materials documenting the project's compliance with the above avoidance criteria.

Potential mitigation measures have been identified to minimize adverse impacts from transmission facility projects. These measures are intended to be broad so that they can be applied to most projects that would be covered under this Programmatic EIS. However, project-specific plans would be needed to adapt the measures for project-specific applications.

When impact determinations are identified as moderate or high, the applicant would either adopt applicable mitigation measures from this Programmatic EIS or the SEPA Lead Agency may require applicable mitigation measures to be implemented to reduce project-specific impacts. When impact determinations are low, applicable mitigation measures should still be considered by the applicant and the SEPA Lead Agency as these measures would help to further reduce project-specific impacts, including the project's contribution to cumulative impacts. These measures would be implemented in addition to compliance with laws, regulations, environmental permits, plans, and design considerations required for transmission facilities.

The following mitigation measures could be adopted to mitigate adverse impacts:

H&S-1 – Fire Mitigation Plan: Develop a fire mitigation plan that includes both preventative and remedial measures for potential ignition source operations.

Rationale: This is a required component of project-specific applications necessary to demonstrate regulatory compliance and risk management.

This mitigation measure aims to reduce the potential of wildfire ignition and spread and increase the efficiency and effectiveness of emergency communication and coordination.

H&S-2 – Early Fault Detection: Install early fault detection sensors that detect the radio frequency signal generated by partial discharge arcing on alternating current circuits and use precise time measurements of events to locate the source along the conductors.

Rationale: This mitigation measure aims to reduce the risk of fire and power outages through early detection of failing equipment and encroaching vegetation.

H&S-3 – Hazardous Material Management Plan: Develop and implement a project-specific Hazardous Material Management Plan that outlines procedures for air contaminants, contaminated soil, or groundwater encountered incidentally during construction, including emergency notification and suspension of construction activities in the suspected area until the type and extent of contamination are determined.

Rationale: This is a required component of project-specific applications necessary to demonstrate regulatory compliance and risk management.

This mitigation measure aims to reduce the impacts of hazardous material exposure to personnel and public health.

H&S-4 – Risk Management Strategy: Develop and apply an electromagnetic field (EMF) and electromagnetic interference[239] (EMI) risk management strategy that regularly considers the consequence, likelihood, and significance of EMF and EMI on public health and existing infrastructure, such as transportation systems, based on emerging research studies and guidelines.

Rationale: This mitigation measure aims to reduce the impacts of EMF exposure on the public and EMI on existing infrastructure through informed decision making and adaptive risk management. Techniques to decrease the risk of EMF and EMI would be implemented to ensure safety of the public and reliability of infrastructure systems.

H&S-5 – Anonymous Tip Hotline: Establish an anonymous tip hotline for workers during construction and operation of transmission facilities.

Rationale: This mitigation measure aims to enhance worker safety by fostering a strong workplace safety culture.

H&S-6 – Emergency Management Plan: Develop and implement a project-specific emergency management plan in coordination with local emergency service providers that addresses safety-related standards and procedures for potential emergency-related incidents during facility construction and operation.

Rationale: This is a required component of project-specific applications necessary to demonstrate regulatory compliance and risk management.

This mitigation measure aims to enhance worker safety through streamlined emergency response procedures and increased emergency coordination.

[239] A disturbance generated by an external source that affects an electrical circuit; when this disturbance occurs in the radio frequency spectrum, it is known as radio-frequency interference.

In addition to the above mitigation measures, the following mitigation measures[240] developed for other resources may be applicable:

Geo-2 – Geotechnical Surveys: Conduct thorough geotechnical investigations to assess soil and rock conditions before construction begins.

Geo-3 – Slope Stabilization: Use retaining walls, terracing, and vegetation to stabilize slopes and prevent landslides when appropriate to do so.

Geo-4 – Seismic Design: Design structures to withstand seismic forces, including flexible foundations and reinforcement.

Geo-7– Environmental Assessments: Perform detailed environmental assessments to identify potential contamination.

Air-1 – Traffic Speeds: Restrict traffic speeds to under 15 miles per hour on unpaved areas that do not have designated speed limits.

Hab-1 – Use of Pesticides, Herbicides, and Fungicides: Minimize using harmful chemicals, including pesticides, herbicides, and fungicides, during the construction and operation and maintenance phases of transmission facility projects.

TR-1 – Complete a TIA: Complete a Traffic Impact Assessment (TIA) to ensure public safety and identify any negative effects.

TR-2 – Coordination with Aviation Groups: Work closely with aviation groups and authorities to ensure that transmission facilities are marked on aviation maps and that pilots, both commercial and recreational, are aware of their locations.

TR-3 – Transportation Plan: Prepare a comprehensive transportation plan for transmission component materials and large construction equipment.

TR-4 – Planning Coordination: Consult local authorities regarding planned construction activity near or crossing roads, waterways, railways, and airports.

PSU-1 – Utility Coordination: Contact impacted or potentially impacted utility service providers as early as possible in the planning process to identify conflicts or issues.

PSU-2 – Law Enforcement and Emergency Management Coordination: Contact local law enforcement and emergency management departments to identify and address potential issues.

PSU-3 – Site Security Plan: Develop and implement a site security plan to minimize public access to construction areas and permanent structures.

PSU-4 – Waste Management Plan: Develop and implement a waste management plan to identify the type, amount, and disposal location of solid waste that is to be expected during construction, operation and maintenance, and upgrade or modification.

[240] The rationales for the identified mitigation measures are provided in their respective resource sections.

Noise-5 – Prevent Hearing Loss: Identify when construction activities may produce on-site and off-site noise levels that exceed 85 A-weighted decibels (dBA) as an equivalent noise level over 8 hours ($L_{eq[8Hr]}$) and the associated engineering or administrative controls in place to reduce the potential for hearing loss.

Rec-4 – Informational Signage and Precautionary Safety Measures: Place informational signage, placards, safety fencing, and other precautionary indicators in areas where transmission facilities are within or adjacent to existing recreational facilities.

Rec-5 – Notice to Air Missions: Coordinate with the appropriate aviation authorities, such as the Federal Aviation Administration, to determine the necessity and content of a Notice to Air Missions (NOTAM).

SE-1 – Communication Plan: Prepare a communication plan that includes a mechanism for handling complaints.

3.8.5 Probable Significant Adverse Environmental Impacts

Determining the significance of an impact involves context and intensity, which, in turn, depend on the magnitude and duration of the impact. “Significant” in the State Environmental Policy Act means a reasonable likelihood of more than a moderate adverse impact on environmental quality. An impact may also be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred (WAC 197-11-794).

Identification of potential environmental impacts and assignment of discipline-specific ratings is based on professional judgment and information available at the time of writing. A precautionary approach has been taken for the assessment in cases where information is currently unknown or unavailable.

This Draft Programmatic EIS weighs the impacts on public health and safety that could result from transmission facilities after considering the application of laws and regulations; siting and design considerations, including agency guidance and BMPs; and mitigation and makes a resulting determination of significance for each impact. **Table 3.8-4** summarizes the impacts anticipated for the construction, operation and maintenance, and upgrade or modification of transmission facilities.

Table 3.8-4: Summary of Impacts, Mitigation Measures, and Significance Rating for Public Health and Safety

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Public Health and Safety – Increase in Accidents and Injuries	Construction	Construction of transmission facilities could result in injuries associated with overhead and underground transmission such as falls, ground collapse, electrical shocks, and equipment-related accidents that could lead to serious physical harm or fatality, result in long-term health complications, and reduce quality of life for the affected individual.	**Overhead:** negligible to high **Underground:** low to high	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-4:** Floodplains ▪ **H&S-1:** Fire Mitigation Plan ▪ **H&S-3:** Hazardous Material Management Plan ▪ **H&S-5:** Anonymous Tip Hotline ▪ **H&S-6:** Emergency Management Plan ▪ **Geo-2:** Geotechnical Surveys ▪ **Geo-3:** Slope Stabilization ▪ **Geo-4**: Seismic Design ▪ **Geo-7:** Environmental Assessments ▪ **Air-1:** Traffic Speeds ▪ **TR-1:** Complete a TIA ▪ **TR-2:** Coordination with Aviation Groups ▪ **TR-3:** Transportation Plan ▪ **TR-4:** Planning Coordination ▪ **PSU-1:** Utility Coordination ▪ **PSU-2:** Law Enforcement and Emergency Management Coordination ▪ **PSU-3:** Site Security Plan ▪ **PSU-4:** Waste Management Plan ▪ **Noise-5:** Prevent Hearing Loss ▪ **Rec-4:** Informational Signage and Precautionary Safety Measures ▪ **Rec-5:** Notice to Air Missions ▪ **SE-1:** Communication Plan	Less than Significant	Strict regulatory requirements and guidelines ensure worker wellbeing through implementation of safety programs and inspections. Compliance with these regulations helps minimize health and safety impacts to workers. Standard BMPs like comprehensive employee trainings are typically used. Standard BMPs, along with the identified mitigation measures, are generally effective at managing accidents and injuries to workers.
	Operation and Maintenance	Operation and maintenance of transmission facilities could result in injuries associated with overhead and underground transmission such as falls, electrical shocks, and equipment-related accidents that could lead to serious physical harm or fatality, result in long-term health complications, and reduce quality of life for the affected individual.	**Overhead:** negligible to low **Underground:** negligible to low			
	Upgrade or Modification	Upgrade or modification of transmission facilities could result in injuries associated with the upgrade or modification of transmission facilities would be similar to those described for construction and may include electrical shocks and equipment-related accidents, among others. Such accidents could lead to serious physical harm or fatality, result in long-term health complications, and reduce quality of life for the affected individual.	**Overhead:** negligible to high **Underground:** low to high			
Public Health and Safety – Exposure to Hazardous Materials	Construction	During the construction of transmission facilities, several hazardous materials may be encountered or used. Hazardous materials could cause health effects. If these materials leak or are improperly managed, they can contaminate soil and water, posing risks to workers, as well as nearby infrastructure and communities.	**Overhead:** nil to low **Underground:** negligible to moderate	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-11:** Oil Containing Conductor Cables ▪ **H&S-3:** Hazardous Material Management Plan ▪ **H&S-5:** Anonymous Tip Hotline ▪ **H&S-6:** Emergency Management Plan ▪ **Geo-2:** Geotechnical Surveys	Less than Significant	Strict regulatory requirements and guidelines ensure that construction projects implement effective hazardous materials and waste management. Compliance with these regulations helps minimize the public health and safety impacts of activities. Standard BMPs such as proper labeling, storage and inspection of containers, proper storage of
	Operation and Maintenance	Hazardous materials are utilized during the operation and maintenance of transmission facilities. Hazardous materials could cause health effects. If these materials leak or are improperly managed, they can contaminate soil and water, posing risks to workers, as well as nearby infrastructure and communities.	**Overhead:** negligible to low **Underground:** negligible to low			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
	Upgrade or Modification	Hazardous materials involved in the upgrade or modification process of transmission facilities could cause health effects. If these materials leak or are improperly managed, they can contaminate soil and water, posing risks to workers as well as nearby infrastructure and communities.	**Overhead:** nil to low **Underground:** negligible to moderate	▪ **Geo-7:** Environmental Assessments ▪ **Hab-1:** Use of Pesticides, Herbicides, and Fungicides ▪ **Rec-4:** Informational Signage and Precautionary Safety Measures ▪ **SE-1:** Communication Plan		containers, comprehensive employee training, and spill control measures are commonly used. Standard BMPs, along with the identified mitigation measures, are generally effective at managing impacts of hazardous materials and waste on public health and safety.
Public Health and Safety – Increased Risk of Wildfire	Construction	Wildfires can result from construction activities, including blasting, operation of combustion engines, and other activities that may inadvertently spark surrounding vegetation.	**Overhead:** low to moderate **Underground:** negligible to high	▪ **AVOID-1:** Hazardous Areas ▪ **H&S-1:** Fire Mitigation Plan ▪ **H&S-2:** Early Fault Detection ▪ **PSU-2:** Law Enforcement and Emergency Management Coordination ▪ **SE-1:** Communication Plan	Less than Significant	Strict regulatory requirements and design standards ensure that construction projects implement effective fire control measures. Compliance with these regulations helps minimize the public health and safety impacts of wildfires linked to electrical transmission sources. Standard BMPs such as vegetation management and lightning protection measures are typically used. Standard BMPs, along with the identified mitigation measures, are moderately effective at managing impacts of wildfire on public health and safety.
	Operation and Maintenance	The operation and maintenance of transmission facilities can increase the risk of wildfire with potential ignition sources, failure of transmission structures, or during vegetation management.	**Overhead:** low to moderate **Underground:** N/A			
	Upgrade or Modification	Wildfires can result from many upgrade or modification activities, including blasting, operation of combustion engines and other activities that may inadvertently spark surrounding vegetation.	**Overhead:** low to moderate **Underground:** negligible to high			
Public Health and Safety – Exposure to EMF	Construction	This impact is not anticipated to occur during construction of overhead or underground transmission facilities.	**Overhead:** N/A **Underground:** N/A	▪ **H&S-4:** Risk Management Strategy ▪ **SE-1:** Communication Plan	Less than Significant	Although there are no federal or state regulations regarding EMF exposure, compliance with recommended exposure limits and implementation of the identified mitigation measures can help minimize health and safety impacts of EMF exposure.
	Operation and Maintenance	Overhead and underground transmission facilities could generate EMF. Studies have suggested a link between EMF and various health issues, including cancer, headaches, and sleep disturbances.	**Overhead:** nil to low **Underground:** nil to low			
	Upgrade or Modification	This impact is not anticipated to occur during upgrade or modification of overhead or underground transmission facilities.	**Overhead:** N/A **Underground:** N/A			
Public Health and Safety – Excess Heat Generation	Construction	This impact is not anticipated to occur during construction of overhead or underground transmission facilities.	**Overhead:** N/A **Underground:** N/A	▪ **AVOID-11:** Oil-Containing Conductor Cables ▪ **AVOID-12:** Heat Sources ▪ **H&S-1:** Fire Mitigation Plan ▪ **H&S-6**: Emergency Management Plan ▪ **Geo-2:** Geotechnical Surveys ▪ **Geo-4:** Seismic Design ▪ **PSU-1:** Utility Coordination ▪ **SE-1:** Communication Plan	Less than Significant	Strict regulatory requirements and design standards ensure that construction projects implement effective heat control measures. Compliance with these regulations helps minimize the public health and safety impacts of excess heat generation in underground transmission facilities. Standard BMPs such as cooling systems are commonly used.
	Operation and Maintenance	Prolonged heat exposure can affect soil and ground stability, potentially leading to subsidence or ground deformation, which can impact the stability of structures and roadways above the transmission facilities. Excessive heat generation can cause degradation of insulation materials, leading to potential failures or breakdowns in the electrical system and increase risk of fire.	**Overhead:** N/A **Underground:** negligible to low			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[a]	Significance after Applying Mitigation	Rationale for Significance Rating
	Upgrade or Modification	This impact is not anticipated to occur during upgrade or modifications of overhead or underground transmission facilities.	**Overhead:** N/A **Underground:** N/A			Standard BMPs, along with the identified mitigation measure, are generally effective at managing impacts of excessive heat generation on public health and safety in underground transmission facilities.
Public Health and Safety – Inundation of Vaults in Floodplains	Construction	This impact is not anticipated to occur during construction of overhead or underground transmission facilities.	**Overhead:** N/A **Underground:** N/A	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-4:** Floodplains ▪ **H&S-6:** Emergency Management Plan	Less than Significant	Locating vaults outside of floodplains is an effective measure for controlling potential damage and electrical safety hazards.
	Operation and Maintenance	Submergence of underground vaults in the event of a flood could damage electrical equipment requiring maintenance and repair work. Maintenance and repair work in flooded vaults can be dangerous for workers due to the risk of electrocution and other hazards.	**Overhead:** N/A **Underground:** negligible to high			
	Upgrade or Modification	This impact is not anticipated to occur during upgrade or modification of overhead or underground transmission facilities.	**Overhead:** N/A **Underground:** N/A			

[a] Appendix 3.9-1 provides a detailed listing of each general condition, avoidance criteria, and mitigation measure. Having these details in an appendix serves as a comprehensive reference section that can be consulted independently of the main text. This is particularly useful for detailed guidance and technical specifications that may be referred to multiple times. Additionally, including this information in an appendix allows for easier updates and revisions. If mitigation measures or guidelines change, the appendix can be updated without altering the main content.

BMP = best management practice; EMF = electromagnetic fields; N/A = not applicable

This Page Intentionally Left Blank

3.8.6 Suitability Map

Project-specific reviews would include a comprehensive review and analysis to identify the site-specific adverse impacts on resources to determine the suitability of this Draft Programmatic EIS. Environmental review may be phased by incorporating relevant information from this Draft Programmatic EIS by reference while evaluating site-specific adverse impacts of the individual project applications. For more information on phased reviews, please refer to Chapter 1, Introduction.

Project-specific applications would include details about the precise location and site-specific conditions. This Draft Programmatic EIS provides a suitability map that, when incorporated with project-specific applications, could be used to facilitate more informative and efficient environmental planning.

No criteria specific to public health and safety were identified that would impact project siting decisions. No suitability map was developed for this resource.

This Page Intentionally Left Blank

3.9 Land and Shoreline Use

This Draft Programmatic Environmental Impact Statement (EIS) considers impacts on land and shoreline use for the types of facilities described in Chapter 2. This section addresses the following topics related to the construction, operation and maintenance, and upgrade or modification of high-voltage electric transmission facilities (transmission facilities) in the State of Washington:

- Section 3.9.1 identifies regulatory, siting, and design considerations.
- Section 3.9.2 describes the affected environment.
- Section 3.9.3 describes impacts.
- Section 3.9.4 describes potential mitigation measures.
- Section 3.9.5 identifies probable significant adverse environmental impacts on land and shoreline use.
- Section 3.9.6 provides a suitability map and scoring for the siting of transmission facilities as it relates to land and shoreline use, based on the identified considerations, impacts, and mitigation measures.

3.9.1 Regulatory, Siting, and Design Considerations

This Draft Programmatic EIS establishes a broad framework for compliance, outlining general laws, regulations, best management practices (BMPs), and design considerations. It is assumed that project-specific applications will be developed within this pre-established regulatory context and are expected to comply with existing laws and regulations. If the project does not comply with applicable laws and regulations or fails to adhere to design considerations or BMPs, additional project-specific environmental review and mitigation would be required. The applicable federal and state laws and regulations relevant to land and shoreline use are summarized in **Table 3.9-1**.

Please refer to **Appendix 3.9-1** for all relevant goals and policies identified in county comprehensive plans.

Table 3.9-1: Laws and Regulations for Land and Shoreline Use

Applicable Legislation	Agency	Summary Information
Federal		
36 CFR Part 254, Landownership Adjustments	U.S. Forest Service	This regulation sets procedures for conducting exchanges of National Forest System lands and requires consideration of the public interest, including protection of fish and wildlife habitats, cultural resources, watersheds, and wilderness and aesthetic values, as well as enhancement of recreation opportunities and public access. Exchanges must be consistent with land and resource management plans. After an agreement to initiate an exchange is signed, the authorized officer shall begin an environmental analysis in accordance with the National Environmental Policy Act, Council on Environmental Quality regulations, and U.S. Forest Service environmental policies and procedures.

Applicable Legislation	Agency	Summary Information
36 CFR Part 251.53, Special Uses	U.S. Forest Service	The U.S. Forest Service has the authority to issue right-of-way permits for National Forest System Lands for a variety of uses. Applicants must obtain land use authorization with the U.S. Forest Service before construction can begin. Authorizations may be granted with permits or easements depending on the project.
Public Law 94-588, National Forest Management Act 36 CFR Part 219, Subpart A, National Forest System Land and Resource Management Planning	U.S. Forest Service	This act governs the administration of national forests and removal of trees. It includes requirements for consideration, treatment, and protection of intangible resources such as scenery and aesthetics. If a project is located on a National Forest System unit, it must comply with the U.S. Forest Service's National Strategic Plan, National Forest System unit plans, and requirements for activity planning established in the U.S. Forest Service directive system.
Public Law 97–98, 7 USC §4201, Farmland Protection Policy Act	Natural Resources Conservation Service	This act requires federal agencies to examine the potentially adverse effects on "prime" and "unique" farmland resources before approving any action that would irreversibly convert farmlands to non-farm uses. Applicants must complete Farmland Conversion Impact Rating Form if there is the potential to convert important farmland (b) to non-farm use and federal funds are involved.
43 USC §1701 et seq., Federal Land Policy and Management Act	Bureau of Land Management	This act directs management of public lands, administered by the BLM, to protect the quality of the land and preserve certain public lands in their natural conditions. Applicants must obtain land use authorization from the BLM before construction can begin. Authorizations may be granted with leases, permits, or easements, depending on the project.
43 USC 1761(a)(5) Section 501 of the Federal Land Policy and Management Act	Bureau of Land Management	This act authorizes the BLM to issue ROW authorizations for transmission facilities on National Forest System Lands, except lands designated as wilderness. The BLM requires that a project applicant submit any plans, contracts, or other info related to the use, or intended use, of the ROW. The BLM determines, based on the information provided, whether an ROW shall be granted, issued, or renewed and the terms and conditions that should be included in the ROW. Applicants must comply with all applicable requirements of the Federal Energy Regulatory Commission under the Federal Power Act.
43 USC 1763 Section 503 of the Federal Land Policy and Management Act	Bureau of Land Management	This act governs issuance and management of ROW for various uses on public lands.

Applicable Legislation	Agency	Summary Information
16 USC 1451 et seq. Coastal Zone Management Act	National Oceanic and Atmospheric Administration	The CZMA was enacted to protect the coastal environment from growing demands associated with residential, recreational, commercial, and industrial uses. The CZMA encourages coastal states to develop and implement coastal zone management programs to manage and balance competing uses of the coastal zone.[241] Washington's program is discussed in the Washington Coastal Zone Management Program of this table. The CZMA requires that federal actions that are reasonably likely to affect any land or water use or natural resource of the coastal zone be consistent with enforceable policies of a state's federally approved coastal management program.
14 CFR Part 77 – Safe, Efficient Use, and Preservation of the Navigable Airspace	Federal Aviation Administration	The FAA has broad authority to regulate safe and efficient use of navigable airspace. 14 CFR 77 outlines the regulations and standards for ensuring the safety efficient use of the airspace. The FAA requires a notice of proposed construction for a project so that it can determine whether it would adversely affect commercial, military, or personal air navigation safety. The FAA also requires the notice of a proposed project when there is any construction or alteration that is more than 200 feet in height above ground level.
10 USC 183a – Military Aviation and Installation Assurance Siting Clearinghouse	Secretary of Defense	The Military Aviation and Installation Assurance Siting Clearinghouse conducts a preliminary review of applications for energy projects[242] that may have an adverse impact on military operations and readiness. The review consists of assessing the likely scope, duration, and level of risk of any adverse impact of such energy project on military operations and readiness and identify any feasible and affordable actions that could be taken to mitigate the adverse impact while allowing the energy project to proceed.
32 CFR Part 211 - Mission Compatibility Evaluation Process	Department of Defense	DOD is responsible for ensuring that the robust development of renewable energy sources and the increased resiliency of the commercial electrical grid may move forward in the United States, while minimizing or mitigating any adverse impacts on military operations and readiness. DOD provides two review processes for a proposed project; including a formal and informal review, both of which are processed through the Military Aviation and Installation Assurance Siting Clearinghouse. The DOD is the single point of contact for Federal agencies, State, Indian tribal, and local governments, developers, and landowners, and provide a central forum to resolve siting issues.

[241] Coastal Zone refers to the coastal waters and adjacent shorelands that are strongly influenced by each other and in proximity to the shorelines of the several coastal states, and includes islands, transitional and intertidal areas, salt marshes, wetlands, and beaches (USC 1453).

[242] The term "energy project" is defined under 10 USC 183a as a project that provides for the generation or transmission of electrical energy.

Applicable Legislation	Agency	Summary Information
State		
Washington Coastal Zone Management Program	Washington State Department of Ecology [(a)]	Ecology administers Washington's Coastal Zone Management Program, which applies to the state's coastal zone, which comprises 15 coastal counties with marine shorelines. The coastal zone includes all lands and waters within these coastal counties, as well as submerged lands seaward out to 3 nautical miles (about 3.5 miles).[(c)] Projects within a coastal zone are required to comply with the State of Washington's Coastal Zone Management Program Enforceable Policies. The Washington Coastal Zone Management Program's enforceable policies are found in the following laws, regulations, and plans: ▪ Shoreline Management Act ▪ Water Pollution Control Act ▪ Washington Clean Air Act ▪ Ocean Resources Management Act ▪ The Marine Spatial Plan for Washington's Pacific Coast
RCW 36.70A, Growth Management – Planning by Selected Counties and Cities	Washington State Department of Commerce [(a)]	The Washington State Growth Management Act requires that cities and counties adopt comprehensive, long-term land use plans[243] for physical development within their jurisdictions. The comprehensive land use plans include a land use element that establishes the desired pattern of appropriate land use, as well as policies and guidelines for the development of those uses. The Growth Management Act requires that all projects must comply with policies outlined in the comprehensive plans of the county and/or city the project resides (RCW 36.70A.040). Furthermore, projects that propose development that is incompatible with military installations are prohibited under RCW 36.70A.530.
RCW 36.70B, Local Project Review	Washington State Department of Commerce [(a)]	This regulation requires a proposed project to determine its consistency with a local government's development regulations adopted under RCW 36.70A, or, in the absence of applicable development regulations, the appropriate elements of the comprehensive plan adopted under RCW 36.70A.
RCW 76.09, Forests and Forest Products	Washington State Department of Natural Resources [(a)]	Forestland resources are among the most valuable of all resources in the state. Projects that propose converting forestland to other uses are required to submit a Forest Practices Application/Notification form.
RCW 79.17.200, Real property – Transfer or disposal without public auction	Washington State Department of Natural Resources [(a)]	With the approval of the Board of Natural Resources, the DNR may directly transfer or dispose of real property, without public auction. Projects that require transfer of real property without public auction need approval of the Board of Natural Resources.

[243] A document that guides the land use decisions of a local government.

Applicable Legislation	Agency	Summary Information
RCW 79.36, Easements over Public Lands	Washington State Department of Natural Resources [a]	The DNR may grant easements and rights in public lands, including rights-of-way for roads, telephone lines, transmission lines, or drainages. An easement of rights in public lands can be granted only if they are not otherwise provided by law, and the full market value of the estate or interest granted has been ascertained and safely secured to the state (RCW 79.36.355). A right-of-way through, over, and across any state lands or state forestlands may be granted to an entity proposing to construct a transmission line for the purpose of generating or transmitting electricity for light, heat, or power (RCW 79.36.510). The entity proposing to construct such transmission line shall file with DNR a map, accompanied by the field notes of the survey and location, and shall make payment as provided in RCW 79.36.530. The land within the right-of-way shall be limited to an amount necessary for access, construction, and maintenance. The grant shall include the right to cut all standing timber, and/or reproduction within said right-of-way, and shall include the right to cut trees that pose a threat or danger to the operation and maintenance of the transmission line (RCW 79.36.520).
RCW 90.58, Shoreline Management Act of 1971	Washington State Department of Ecology [a]	The Washington State Shoreline Management Act requires all counties and most towns and cities with shorelines in Washington to develop and implement SMPs. Under the Shoreline Management Act, SMPs must contain a public access element, including provisions for public access to publicly owned areas. The Shoreline Management Act also requires that applicable communities include an element for preserving and enlarging recreational opportunities. Projects within a coastal zone are required to: ▪ Comply with SMP objectives and policies outlined in county/city SMPs in which the project resides. ▪ Apply for a development permit with the Washington State Department of Transportation. ▪ Apply for a substantial development permit from local government for substantial developments, as defined under RCW 90.58.030(3)(e). ▪ Apply for a conditional use permit[244] from Ecology. Apply for a variance permit when there is an extraordinary circumstance (criteria can be found in WAC 173-27-170).
WAC 197-11, Washington State Environmental Policy Act	Washington Energy Facility Site Evaluation Council Washington State Department of Ecology Local governments	This act is a process that identifies and analyzes environmental impacts that can be related to issuing permits. SEPA helps permit applicants and decision-makers understand how a proposed project will impact the environment. Certain projects, as defined in the SEPA Rules (WAC 197-11-704) and that are not exempt, are required to go through the SEPA process.

[244] A permit that allows a use of land that does not conform to the standard zoning regulations for a given area.

Applicable Legislation	Agency	Summary Information
WAC 463-28, State Preemption	Washington Energy Facility Site Evaluation Council	When a proposed facility would be inconsistent with local land use plans and zoning ordinances, EFSEC has the authority to recommend to the governor that the state preempt local regulations. Project applicants will be required to make every effort to comply with all local land use plans, zoning ordinances, shoreline master plans, and/or other relevant plans and programs such as habitat conservation plans and long-range plans, in effect at the date of the application filing.

Notes:
(a) The agency responsible for administering most permits or authorizations for the identified regulation. However, if EFSEC is determined to be the agency responsible for approving a proposal, EFSEC can administer several types of permits at the state and local level. EFSEC provides a streamlined process for siting and licensing major energy facilities, including transmission facilities in Washington State. EFSEC coordinates all evaluation and licensing steps, specifies the conditions for construction and operation, and issues a Site Certification Agreement, which assumes the responsibility for issuing individual state or local permits. By consolidating these permits into a single Site Certification Agreement, EFSEC can simplify the regulatory process for energy facility developers. While EFSEC itself does not directly administer federal permits, it works closely with federal agencies to ensure that all necessary federal requirements are met during the evaluation and licensing of energy facilities.
(b) Important Farmland includes prime farmland, unique farmland, and land of statewide or local importance (see Section 3.9.2.5 for more detail).
(c) As described in Section 1.4, Scope of Analysis, the Study Area for this Draft Programmatic EIS excludes offshore and undersea areas.
BLM = U.S. Department of the Interior, Bureau of Land Management; CFR = Code of Federal Regulations; CZMA = Coastal Zone Management Act; DNR = Washington State Department of Natural Resources; DOD = Department of Defense, Ecology = Washington Department of Ecology; EFSEC = Washington Energy Facility Site Evaluation Council; FAA = Federal Aviation Administration; Forest Service = U.S. Department of Agriculture, Forest Service; RCW = Revised Code of Washington; ROW = right-of-way; SEPA = Washington State Environmental Policy Act; SMP = Shoreline Master Program; USC = United States Code; WAC = Washington Administrative Code

The siting of transmission facilities is determined by engineering, technical, environmental, and socioeconomic factors. **Table 3.9-2** summarizes guidance documents and management plans that outline the design considerations and BMPs generally used to avoid or minimize impacts on land and shoreline use.

Table 3.9-2: Siting and Design Considerations for Land and Shoreline Use

Siting and Design Consideration[a]	Description
Recommended Siting Practices for Electric Transmission Developers (Americans for a Clean Energy Grid 2023)	This document outlines best practices for siting electric transmission facilities. Recommended practices include: ▪ Early and transparent engagement ▪ Respect and fair dealing ▪ Environmental considerations ▪ Interagency coordination ▪ Use of existing infrastructure

Note:
(a) Siting and design considerations are intended to include best management practices.

3.9.2 Affected Environment

This section describes the existing land and shoreline use resources within the Study Area defined in Chapter 2, which include several key components:

- Land Ownership
- Land Use Patterns
- Existing Land Use Plans
- Shoreline Master Program
- Agriculture and Rangelands
- Military Utilized Airspace and Civilian Airfields

Impacts related to visual quality are analyzed in Section 3.12; impacts related to noise and vibration are analyzed in Section 3.13; impacts related to recreation are analyzed in Section 3.14; and impacts related to historic and cultural resources are analyzed in Section 3.15.

3.9.2.1 Land Ownership

The total land area, including inland perennial waters, in Washington is estimated to be approximately 43.6 million acres (U.S. Census Bureau 2010). Land ownership in the state is classified into four main categories: private, federal, state, and Tribal.

Private Land

Approximately 50 percent of land in the state is private land (NRSIG 2014). Private land includes small and large parcels or holdings by individual landowners. Most private land in the state falls into the land use categories of developed lands, agricultural farms, and forest and timber lands.

Federal Land

The federal government manages a variety of land types and uses in Washington, including military bases, national wildlife refuges, national forests, national parks, monuments, historic sites, national laboratory, wilderness areas, national conservation lands, water projects, and dams. The federal government owns approximately 28 percent of the land in Washington, which amounts to about 12.2 million acres (Congressional Research Service 2020). Five federal agencies manage the majority of federal lands throughout the state, as outlined in **Table 3.9-3**.

Table 3.9-3: Federal Government Land Ownership

Agency	Acres	Percentage of Federal Land Owned
U.S. Forest Service	9,335,431	76.6%
U.S. National Park Service	1,834,616	15.0%
U.S. Bureau of Land Management	437,342	3.6%
U.S. Department of Defense	421,675	3.5%
U.S. Fish and Wildlife Service	163,791	1.3%
Total	**12,192,855**	

Source: Congressional Research Service 2020.

The majority of this land is managed by the U.S. Forest Service (USFS). Other significant federal land managers include the National Park Service (NPS), Bureau of Land Management (BLM), Department of Defense (DOD), and U.S. Fish and Wildlife Service (USFWS). Federal agency land ownership in Washington is described in more detail below:

- The NPS, BLM, UFWS, and USFS manage 31 designated Wilderness Areas in Washington (Washington Wild 2024).
- The USFS manages approximately 9 million acres of land in Washington, including seven national forests, four national scenic area, and one national volcanic monument (USFS 2023[a], [b], and [c]).
- The NPS manages approximately 1.8 million acres of land in Washington, including 17 officially designated NPS units. These designated NPS units include three national parks; two national recreation areas; and 12 national historic trails, parks, reserves, and sites (NPS n.d.).
- The USFWS manages approximately 164,000 acres of land in Washington, including 23 national wildlife refuges, 10 national fish hatcheries, and one national monument (USFWS n.d.).
- The BLM manages approximately 422,000 acres of land in Washington, including one national monument, and two national scenic trails (BLM n.d.).
- The DOD owns and operates various military installations across the state, including but not limited to,14 armory centers; eight readiness centers; and seven training centers, support facilities, and Air Force bases (Washington National Guard n.d.).

State Land

The Washington State government owns approximately 6,500,000 acres of land comprising state parks, wildlife areas, state forests, trust lands, and natural areas as shown in **Table 3.9-4**.

Table 3.9-4: Summary of State Land Ownership

Agency	Acres	Percentage of State Land Owned
Washington State Parks and Recreation Commission	142,400	2.2%
Washington Department of Fish and Wildlife	614,300	9.5%
Washington State Department of Natural Resources	5,700,000	88.2%
Total	**6,456,700**	

Source: NRSIG 2014

State land ownership is discussed in more detail below:

- The Washington State Parks and Recreation Commission manages approximately 124 state parks, including historic sites, trails, and marine parks (Washington Governor Jay Inslee n.d.).
- The Washington Department of Fish and Wildlife manages over 1,000,000 acres of land, divided into 33 wildlife management areas (WDFW 2024).

- The Washington Department of Natural Resources (DNR) manages almost 6 million acres of state land that fall into three categories: state trust lands, state-owned aquatic lands, and state natural areas (DNR n.d.).
  - The DNR manages approximately 3 million acres of state trust lands that provide revenue-producing activities such as timber, biomass, agriculture, mining, and renewable energy.
  - The DNR's Aquatic Resources Division manages approximately 2.6 million acres of state-owned aquatic lands as a public trust for the people of Washington. Aquatic lands include navigable lakes, rivers, streams, and marine waters such as Puget Sound and many beaches and tidelands. Revenue from aquatic land leases is reinvested to restore aquatic ecosystems, protect the health and productivity of aquatic resources, and fund local projects that create public access to aquatic lands, ensuring sustainability of these aquatic lands for generations to come, including the state's aquatic reserves.
  - Washington has 92 Natural Areas managed by the DNR, which includes 56 Natural Area Preserves and 36 Natural Resources Conservation Areas on more than 152,000 acres statewide.

Tribal Lands

Washington counts 29 federally recognized Native American tribes located on reservations throughout the state (President of the Washington State Senate n.d.). **Table 3.9-5** identifies all Tribal reservations and the total acreage associated with each reservation. For additional information regarding Tribal lands, see Section 3.15, Historic and Cultural Resources.

Table 3.9-5: Native American Tribal Lands

Tribe Name	Reservation Name	Acres
Confederated Tribes of the Chehalis Reservation	Chehalis Reservation	4,400
Confederated Tribes of the Colville Reservation	Colville Reservation	1,400,000
Cowlitz Indian Tribe	Cowlitz Indian Tribe	152
Hoh Tribe	Hoh Reservation	447
Jamestown S'Klallam Tribe	Jamestown S'Klallam Reservation	13.5
Kalispel Tribe of Indians	Kalispel Reservation	4,557
Lower Elwha Klallam Tribe	Lower Elwha Reservation	1,000
Lummi Nation	Lummi Reservation	13,000
Makah Tribe	Makah Reservation (including Ozette)	27,000
Muckleshoot Indian Tribe	Muckleshoot Reservation	4,000
Nisqually Indian Tribe	Nisqually Reservation	5,000
Nooksack Indian Tribe	Nooksack Reservation	444
Port Gamble S'Klallam Tribe	Port Gamble Reservation	1,234
Puyallup Tribe of Indians	Puyallup Reservation	18,500
Quileute Tribe	Quileute Reservation	2,172
Quinault Indian Nation	Quinault Reservation	208,150
Samish Indian Nation	Samish Indian Tribe, Washington	380
Sauk-Suiattle Indian Tribe	Sauk-Suiattle Reservation	34
Shoalwater Bay Indian Tribe	Shoalwater Reservation	355
Skokomish Indian Tribe	Skokomish Reservation	5,000
Snoqualmie Indian Tribe	Snoqualmie Tribe	12,000

Tribe Name	Reservation Name	Acres
Spokane Tribe of Indians	Spokane Reservation	159,000
Squaxin Island Tribe	Squaxin Island Reservation	1,449
Stillaguamish Tribe	Stillaguamish Reservation	64
Suquamish Tribe	Port Madison Reservation	7,657
Swinomish Indian Tribal Community	Swinomish Reservation	10,400
Tulalip Tribes	Tulalip Reservation	22,000
Upper Skagit Indian Tribe	Upper Skagit Reservation	110
Confederated Tribes and Bands of the Yakama Nation	Yakama Reservation and Trust Land	1,200,000
Total		**3,108,519**

Sources: Columbia River Inter-Tribal Fish Commission 2024; Cowlitz Indian Tribe 2017; Puyallup Tribe of Indians 2017; Stillaguamish Tribe of Indians 2023; Muckleshoot Indian Tribe 2024; Nisqually Indian Tribe 2024; Port Gamble S'Klallam Tribe 2024.; Suquamish Tribe 2024; EPA n.d.; Renker n.d.; Samish Indian Nation n.d.; Shoalwater Bay Indian Tribe n.d.; Snoqualmie Tribe 2022; National Congress of American Indians n.d.; Office of Washington n.d.

3.9.2.2 Land Use Patterns

For this analysis, Washington is classified into primary land use groups based on coverage type as forest and woodlands, agricultural, developed land, and public land/surface water/other land covers. **Table 3.9-6** shows the estimated total land area by cover type in Washington.

Table 3.9-6: Land Cover by Type

Land Use	Acres [(a)]	Percent of Land
Forest and Woodlands	18,110,875	39.7%
Agricultural	11,469,995	25.2%
Developed Land	2,603,331	5.7%
Scrub, Grassland, and Vegetation	10,037,762	22.0%
Waters	3,002,483	6.6%
Other Land Covers	345,841	0.8%
Total	**45,570,287**	

Source: USGS 2019.
Note:
[(a)] Values are approximate.

3.9.2.3 Existing Land Use Plans

Under the Washington State Growth Management Act, cities and counties must adopt comprehensive, long-term land use plans for physical development within their jurisdictions. Comprehensive land use plans specify the types of present and future land development that can occur within an identified area. In most cases, the preparation of comprehensive land use plans occurs through a public participation process. Once the plans are finalized, publicly elected officials approve them. The intent of this process is to capture local values and attitudes toward future development. Within Washington, land use regulations and zoning ordinances vary by local government jurisdiction. The comprehensive land use plans include a land use element that establishes the desired pattern of appropriate land use, as well as policies and guidelines for development of those uses. The land use element designates the proposed general distribution and general location and extent of the uses of land, where appropriate, for the following purposes:

- Agriculture and timber production
- Housing
- Commerce and industry
- Recreation and open spaces
- General aviation airports
- Public utilities and facilities
- Other land uses

Local governments and their resource managers use local zoning ordinances, specific plans, and maps to implement the land use element within a comprehensive land use plan.

Comprehensive Plan and Zoning Ordinance Analyses

Land use regulations and zoning ordinances vary by local government jurisdiction. Site-specific application would be required to be consistent with the applicable jurisdiction's development regulations. These include, but are not limited to, the zoning code, subdivision code, Critical Areas Ordinance, Shoreline Master Program (SMP), and permit review processes. Revised Code of Washington (RCW) 36.70B.040 requires that, at minimum, Growth Management Act-regulated counties and cities must consider the following four factors in determining regulations within their comprehensive land use plans:

- The type of land use allowed, such as the land use designation
- The level of development allowed, such as units per acre or other measures of density
- Infrastructure, such as the adequacy of public facilities and services to serve a proposed project
- The characteristics of the proposed development, measured by the degree to which a project conforms to specific development regulations or standards

Local governments use zoning ordinances to implement the land use element within a comprehensive land use plan. Zoning ordinances include the applicable zoning map, development restrictions, and associated definitions. Furthermore, zoning ordinances contain details about building controls, grading requirements, and regulations for the design and improvement of private and county lands.

Transmission facility projects have two pathways critical to planning and development as it relates to land use and zoning consistency analyses and are described below.

Local Government Permitting Processes

Future transmission facility projects that are proposed through local governmental processes are required to be consistent with the applicable jurisdiction's development regulations. These include, but are not limited to, the zoning code and ordinances, subdivision codes, Critical Areas Ordinance, SMP, and permit review processes.

EFSEC Permitting Processes

As described in Chapter 1 of this Draft Programmatic EIS, certain projects are required to participate in the Washington Energy Facility Site Evaluation Council's (EFSEC's) permitting process, and some may elect to participate. Should a future transmission facility project utilize EFSEC's permitting process, Washington Administrative Code (WAC) 463-28 requires that EFSEC determine whether the proposed project is consistent with local land use plans and applicable zoning ordinances. If EFSEC finds that any aspect of the proposed project is not consistent with applicable development regulations, EFSEC may consider recommending that the state preempt local land use plans or zoning ordinances for a site or portions of a site.

The proposed project must first meet the requirements of RCW 80.50. Secondly, an applicant must make every effort, including changes to the project design, to comply with all local land use plans, zoning ordinances, and shoreline management plans in effect at the date of the application filing. An applicant who is unable to resolve the issue of noncompliance related to consistency with land use and zoning regulations may file a written request for state preemption of those regulations (WAC 463-28-020).

If preemption is requested, and EFSEC approves the request, EFSEC must make a recommendation to the governor. The recommendation must include conditions that give due consideration to state or local governmental or community interests affected by the proposed activity, as well as to the purposes of laws, ordinances, rules, or regulations that would be superseded (WAC 463-28-070).

EFSEC's permitting process provides a streamlined approach for large energy projects, including high-voltage transmission facilities. This permitting process can simplify the evaluation and licensing steps, making it more efficient than navigating multiple local and state agencies. EFSEC takes lead responsibility in coordinating with various state and federal agencies to ensure that all environmental, safety, and community impacts are thoroughly reviewed. Furthermore, EFSEC is the only agency with the authority to preempt local zoning ordinances and regulations for large energy projects. With this authority, EFSEC can issue a Site Certification Agreement that supersedes any other state or local permits, thereby streamlining the process for developers.

3.9.2.4 Shoreline Master Program

Per RCW 90.58, local governments with shorelines are required to adopt and implement an SMP that includes local land-use policies and regulations that guide use of Washington shorelines. SMPs apply to both public and private uses for Washington's more than 28,000 miles of lake, stream, and marine shorelines. They protect natural resources, provide for public access to waters and shores, and plan for water-dependent uses. SMPs are both planning and regulatory documents, designed to carry out the policies of the Shoreline Management Act on local shorelines. An SMP consists of a comprehensive use plan, use regulations, maps, diagrams or other descriptive material, and a statement of desired goals and standards. SMPs are based on state laws and rules and are tailored to local geographic and environmental conditions and existing development patterns.

In addition to applicable land use and zoning ordinances outlined in city and county comprehensive plans, future transmission facility projects are required to comply with the policies and regulations outlined in SMPs. The local governments that have adopted and implemented an SMP are outlined in **Table 3.9-7**.

Table 3.9-7: Local Governments with a Shoreline Master Program

County	Local Government With an SMP
Adams	Adams County
Asotin	Asotin County, City of Clarkston
Benton	Benton County, City of Benton, City of Kennewick, City of Pasco, City of Prosser, City of Richland, City of West Richland
Chelan	Chelan County, City of Cashmere, City of Chelan, City of Entiat, City of Leavenworth, City of Wenatchee
Clallam	Clallam County, City of Forks, City of Port Angeles, City of Sequim
Clark	Clark County, City of Battle Ground, City of Camas, City of La Center, City of Ridgefield, City of Vancouver, City of Washougal
Columbia	Columbia County, City of Dayton, Town of Starbuck
Cowlitz	Cowlitz County, City of Castle Rock, City of Kalama, City of Kelso, City of Longview, City of Woodland
Douglas	Douglas County, City of Bridgeport, City of East Wenatchee, City of Rock Island
Ferry	Ferry County, City of Republic
Franklin	Franklin County, City of Pasco
Garfield	Garfield County
Grant	Grant County, City of Coulee, City of Electric, City of Grand Coulee, Town of Krupp, City of Moses Lake, City of Soap Lake, Town of Wilson Creek
Grays Harbor	Grays Harbor County, City of Aberdeen, City of Cosmopolis, City of Elma, City of Hoquiam, City of McCleary, City of Montesano, City of Ocean Shores, City of Westport
Island	Island County, Town of Coupeville, City of Langley, City of Oak Harbor
Jefferson	Jefferson County, City of Port Townsend
King	King County, City of Auburn, Town of Beaux Arts Village, City of Bellevue, City of Black Diamond, City of Burien, City of Carnation, City of Covington, City of Des Moines, City of Duvall, City of Enumclaw, City of Federal Way, Town of Hunts Point, City of Issaquah, City of Kenmore, City of Kent, City of Kirkland, City of Lake Forest, City of Maple Valley, City of Medina, City of Mercer Island, City of Normandy Park, City of North Bend, City of Pacific, City of Redmond, City of Renton, City of Sammamish, City of SeaTac, City of Seattle, City of Shoreline, Town of Skykomish, City of Snoqualmie, City of Tukwila, City of Woodinville, Town of Yarrow Point
Kitsap	Kitsap County, City of Bainbridge Island, City of Bremerton, City of Poulsbo, City of Port Orchard
Kittitas	Kittitas County, City of Cle Elum, City of Ellensburg, Town of South Cle Elum
Klickitat	Klickitat County, City of Bingen, City of Goldendale, City of White Salmon
Lewis	Lewis County, City of Centralia, City of Chehalis, City of Morton, City of Napavine, Town of Pe Ell, City of Toledo, City of Vader, City of Winlock
Lincoln	Lincoln County, Town of Odessa, Town of Reardan
Mason	Mason County, City of Shelton
Okanogan	Okanogan County, City of Brewster, Town of Conconully, Town of Coulee Dam, City of Okanogan, City of Omak, City of Orville, City of Pateros, Town of Riverside, City of Tonasket, Town of Twisp, Town of Winthrop
Pacific	Pacific County, City of Ilwaco, City of Long Beach, City of Raymond, City of South Bend
Pend Oreille	Pend Oreille County, Town of Cusick, Town of Ione, Town of Metaline, Town of Metaline Falls, City of Newport
Pierce	Peirce County, City of Bonney Lake, City of Buckley, City of DuPont, Town of Eatonville, City of Fife, City of Gig Harbor, City of Lakewood, City of Milton, City of

County	Local Government With an SMP
	Orting, City of Puyallup, City of Roy, City of Ruston, Town of South Prairie, Town of Steilacoom, City of Sumner, City of Tacoma, City of University Place, Town of Wilkeson
San Juan	San Juan County, Town of Friday Harbor
Skagit	Skagit County, City of Anacortes, City of Burlington, Town of Concrete, Town of Hamilton, Town of La Conner, Town of Lyman, City of Mount Vernon, City of Sedro Woolley
Skamania	Skamania County, City of North Bonneville, City of Stevenson
Snohomish	Snohomish County, City of Arlington, City of Bothell, City of Brier, Town of Darrington, City of Edmonds, City of Everett, City of Gold Bar, City of Granite Falls, Town of Index, City of Lake Stevens, City of Lynnwood, City of Marysville, City of Monroe, City of Mountlake Terrace, City of Mukilteo, City of Snohomish, City of Stanwood, City of Sultan, Town of Woodway
Spokane	Spokane County, Town of Latah, City of Medical Lake, City of Millwood, Town of Rockford, City of Spokane, City of Spokane Valley, Town of Waverly
Stevens	Stevens County, City of Chewelah, City of Kettle Falls, Town of Marcus, Town of Northport
Thurston	Thurston County, Town of Bucoda, City of Lacey, City of Olympia, City of Tenino, City of Tumwater
Wahkiakum	Wahkiakum County, Town of Cathlamet
Walla Walla	Walla Walla County, City of Prescott, City of Waitsburg, City of Walla Walla
Whatcom	Whatcom County, City of Bellingham, City of Blaine, City of Everson, City of Ferndale, City of Lynden, City of Nooksack, City of Sumas
Whitman	Whitman County, Town of Albion, City of Colfax, Town of Malden, City of Palouse, City of Pullman, Town of Rosalia, City of Tekoa
Yakima	Yakima County, City of Grandview, City of Granger, City of Mabton, Town of Naches, City of Selah, City of Toppenish, City of Union Gap, Town of Wapato, City of Yakima, City of Zillah

Source: Ecology n.d.
SMP = Shoreline Master Program

3.9.2.5 Agriculture and Rangelands

The Farmland Protection Policy Act (FPPA) is intended to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses. It ensures that, to the extent possible, federal programs are administered to be compatible with state, and local units of government, and private programs and policies to protect farmland. Projects that may irreversibly convert farmland (directly or indirectly) to nonagricultural uses and are completed by or with assistance from a federal agency are subject to FPPA requirements (USDA 2024a).

For the purpose of the FPPA, Important Farmland includes Prime Farmland, Unique Farmland, and Farmland of Statewide or Local Importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land (USDA 2024b). Below is a description of all lands included in the classification “Important Farmland.”

- **Prime Farmland**: Land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion, as determined by the Secretary of Agriculture. Prime farmland includes land that possesses the above characteristics but is being used currently to produce livestock and timber. It does not include land already in use for or committed to urban development or water storage.

- **Unique Farmland**: Land other than Prime Farmland that is used for production of specific high-value food and fiber crops, as determined by the Secretary of Agriculture. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high-quality or high yields of specific crops when treated and managed according to acceptable farming methods. Examples of such crops include citrus, tree nuts, olives, cranberries, fruits, and vegetables.
- **Farmland of Statewide or Local Importance**: Farmland, other than Prime or Unique Farmland, that is of statewide or local importance for the production of food feed, fiber, forage, or oilseed crops, as determined by the appropriate state or unit of local government agency or agencies, and that the Secretary of Agriculture determines should be considered as farmland for this subtitle.

Washington's farms power a diverse agricultural economy, led by the state's apple industry, which produces 70 percent of the apples grown in the United States (Washington State Department of Agriculture n.d.). The state's agricultural production, food processing, and trade are significant factors in Washington's economy. Washington's 2022 agricultural production totaled $12.8 billion, which was higher than the previous record high of $10.4 billion in 2015 and up 27 percent from the 2021 value of $10.1 billion (USDA 2023). The value of Washington's crop production in 2022 was $8.60 billion, up 22 percent from 2021. The value of livestock production in 2022 totaled $4.18 billion, up 38 percent from the previous year. Both crop and livestock production values were at record highs (USDA 2023). **Table 3.9-8** identifies the top 10 agricultural products and their total value for Washington in 2022.

Table 3.9-8: Top 10 Agricultural Product Values for Washington State in 2022

Product	Total Value
Apples	$2,067,829,000
Milk	$1,678,291,000
Wheat	$1,171,388,000
Cattle and Calves	$1,018,952,000
Potatoes	$942,651,000
Hay	$882,595,000
Eggs	$459,994,000
Hops	$434,460,000
Cherries	$407,727,000
Grapes	$394,865,000

Source: USDA 2023

Table 3.9-9 outlines the total number of acres of agricultural land and the top three crops produced in each county in 2023.

Table 3.9-9: Total Agricultural Lands and Top Three Crops by County in Washington (2023)

County	Total Acres of Agricultural Lands	Top Three Crops (Total Acres)
Adams	872,439	▪ Wheat (288,049) ▪ Wheat Fallow (250,334) ▪ CRP/Conservation (171,866)

County	Total Acres of Agricultural Lands	Top Three Crops (Total Acres)
Asotin	175,490	▪ Pasture (52,215) ▪ Pasture, Forest (42,110) ▪ CRP/Conservation (24,983)
Benton	503,268	▪ Wheat (114,897) ▪ Wheat Fallow (89,180) ▪ CRP/Conservation (69,710)
Chelan	260,777	▪ Pasture, Forest (213,456) ▪ Pasture (16,990) ▪ Pear (7,264)
Clallam	34,971	▪ Shellfish (23,245) ▪ Pasture (4,370) ▪ Grass Hay (4,172)
Clark	39,923	▪ Pasture (14,622) ▪ Grass Hay (12,445) ▪ Developed (3,167)
Columbia	224,324	▪ Wheat (104,774) ▪ CRP/Conservation (30,238) ▪ Wheat Fallow (27,131)
Cowlitz	9,963	▪ Grass Seed (2,725) ▪ Grass Hay (2,505) ▪ Pasture (2,277)
Douglas	608,843	▪ CRP/Conservation (186,511) ▪ Wheat Fallow (171,225) ▪ Wheat (153,891)
Ferry	485,643	▪ Pasture, Forest (460,659) ▪ Pasture (14,746) ▪ Grass Hay (2,991)
Franklin	498,318	▪ CRP/Conservation (101,262) ▪ Wheat (72,611) ▪ Alfalfa Hay (61,419)
Garfield	258,139	▪ Wheat (87,899) ▪ Wheat Fallow (56,874) ▪ Pasture (38,717)
Grant	863,419	▪ Wheat (136,414) ▪ Alfalfa Hay (101,844) ▪ Wheat Fallow (96,023)
Grays Harbor	80,683	▪ Shellfish (56,458) ▪ Grass Hay (9,768) ▪ Pasture (9,335)
Island	35,348	▪ Shellfish (22,285) ▪ Grass Hay (3,793) ▪ Pasture (3,736)

County	Total Acres of Agricultural Lands	Top Three Crops (Total Acres)
Jefferson	29,350	▪ Wheat (24,280) ▪ Pasture (2,389) ▪ Grass Hay (1,938)
King	40,881	▪ Pasture (15,692) ▪ Grass Hay (7,723) ▪ Shellfish (5,834)
Kitsap	34,433	▪ Shellfish (30,444) ▪ Pasture (1,958) ▪ Golf Course (881)
Kittitas	322,559	▪ Pasture, Forest (199,788) ▪ Pasture (59,501) ▪ Timothy (20,695)
Klickitat	249,164	▪ Pasture (73,735) ▪ Wheat (50,720) ▪ CRP/Conservation (35,354)
Lewis	75,243	▪ Grass Hay (31,529) ▪ Pasture (26,243) ▪ Christmas Tree (4,180)
Lincoln	917,993	▪ Wheat (354,942) ▪ Wheat Fallow (251,450) ▪ CRP/Conservation (114,900)
Mason	30,937	▪ Shellfish (24,878) ▪ Grass Hay (2,212) ▪ Pasture (2,182)
Okanogan	979,784	▪ Pasture, Forest (763,518) ▪ Pasture (125,163) ▪ Apple (18,832)
Pacific	73,197	▪ Shellfish (61,176) ▪ Pasture (5,915) ▪ Grass Hay (3,543)
Pend Oreille	147,069	▪ Pasture, Forest (122,391) ▪ Grass Hay (8,973) ▪ Pasture (8,560)
Pierce	41,501	▪ Pasture (14,443) ▪ Shellfish (12,330) ▪ Grass Hay (5,521)
San Juan	13,520	▪ Pasture (4,862) ▪ Grass Hay (3,549) ▪ Shellfish (3,180)
Skagit	84,287	▪ Grass Hay (18,187) ▪ Pasture (11,541) ▪ Shellfish (9,936)

County	Total Acres of Agricultural Lands	Top Three Crops (Total Acres)
Skamania	19,442	▪ Pasture, Forest (16,218) ▪ Pasture (1,285) ▪ Grass Hay (825)
Snohomish	55,072	▪ Pasture (14,428) ▪ Grass Hay (12,369) ▪ Shellfish (5,899)
Spokane	380,850	▪ Wheat (143,725) ▪ Pasture (23,988) ▪ Canola (21,668)
Stevens	313,764	▪ Pasture, Forest (203,608) ▪ Pasture (39,717) ▪ Grass Hay (16,584)
Thurston	50,537	▪ Pasture (16,909) ▪ Shellfish (16,896) ▪ Grass Hay (9,603)
Wahkiakum	8,934	▪ Pasture (5,016) ▪ Grass Hay (2,464) ▪ Wildlife Feed (660)
Walla Walla	595,690	▪ Wheat (201,376) ▪ Wheat Fallow (131,697) ▪ CRP/Conservation (117,799)
Whatcom	99,638	▪ Grass Hay (32,119) ▪ Shellfish (17,465) ▪ Corn, Field (14,027)
Whitman	1,159,436	▪ Wheat (538,410) ▪ Wheat Fallow (157,171) ▪ Pasture (133,752)
Yakima	596,455	▪ Pasture, Forest (178,261) ▪ Pasture (98,366) ▪ Corn, Field (50,570)
TOTAL	11,271,284[a]	

Source: Washington State Department of Agriculture 2023
Note:
[a] The source provides 11,271,282 acres, while the independent calculation provides 11,271,284 acres.
CRP = Conservation Reserve Program[245]

Despite the increase in agricultural product value, Washington State's agricultural areas face an increase in pressure to convert productive farmland to non-farmland uses. In 2022, there were 32,076 farms and ranches in

[245] A program administered by the Farm Service Agency, in which farmers receive a yearly payment in exchange for removing environmentally sensitive land from agricultural production.

Washington (down 10 percent from 2017), with an average size of 432 acres (up 5 percent) on 13.9 million acres of farmland (down 6 percent) (USDA 2024c).

3.9.2.6 Military Utilized Airspace and Civilian Airfields

The nation's global defense infrastructure is comprised of various types of military installations[246] and critical testing, training, and operating areas. Every military installation has its own unique mission and role (DOC 2022b). The military and defense community is the second largest public employer in Washington, which is home to 95,079 active duty, reserve, guard, and civilian personnel. It supports over $15 billion in annual procurement, working with nearly 1,900 businesses across the State of Washington (REPI 2023). **Table 3.9-10** below lists the major military installations in Washington with the addition of the Coast Guard's base in King County and the Yakima Training Center in Yakima County. In addition to these major installations, Washington has several other ground-based military and defense facilities not listed here and the Northwest Training Range Complex (NWTRC), including Naval Weapons Systems Training Facility (NWSTF) Boardman in Oregon, serves training units from Washington (DOC 2022b).

Table 3.9-10: Military Installations in Washington

County	Military Facility Name	Service Branch	Location
Island County	Naval Air Station Whidbey Island (NASWI)	Navy Active	2853 Langley Blvd. Oak Harbor, WA 98278
	NASWI Seaplane Base	Navy Active	2110 Coral Sea Ave. Oak Harbor, WA 98278
	Navy Outlying Field (NOLF) - Coupeville	Navy Active	18025 State Rte 20. Coupeville, WA 98239
Jefferson County	Naval Magazine Indian Island (NAVMAG-II)	Navy Active	100 Indian Is Anx Rd. Port Hadlock-Irondale, WA 98339
King County	US Coast Guard District 13 (USCG - DISTRICT 13)	U.S. Coast Guard	915 2nd Ave. Seattle, WA 98174
Kitsap County	National Guard Bremerton	Army Guard	1211 Carver St. Bremerton, WA 98312
	Naval Base Kitsap	Navy Active	120 S Dewey St. Bremerton, WA 98314
	Naval Base Kitsap Bangor	Navy Active	USN Bangor Main Gate Visitor Control Center Silverdale, WA 98315
	Naval Base Kitsap Bremerton	Navy Active	1 Boone Rd. Bremerton, WA 98312
	Naval Base Kitsap Keyport	Navy Active	610 Dowell Rd. Keyport, WA 98345
	Puget Sound Naval Shipyard (PSNS) & Intermediate Maintenance Facility (IMF)	Navy Active	1400 Farragut St, Bremerton, WA 98314
	Manchester Fuel Depot (MDF)	Navy Active	Olympic Dr, Port Orchard, WA 98366

[246] Title 10 United States Code (USC) refers to military installations as "a base, camp, post, station, center, [or] homeport facility for any ship or other activity under the jurisdiction of the U.S. Department of Defense, including any leased facility".

County	Military Facility Name	Service Branch	Location
Pend Oreille County	Cusick Survival Training Area	Air Force	Coordinates: 48.541577, -117.3763441
Pierce County	Joint Base Lewis-McChord	Army Active	2140 Liggett Ave., JBLM, WA 98433
	Camp Murray	Washington Military Department	Camp Murray Tacoma, WA 98430
Snohomish County	Naval Station Everett	Navy Active	2000 W Marine View Dr. Everett, WA 98207
Spokane County	Fairchild Air Force Base	Air Force	Fairchild Air Force Base, WA 99011
	White Bluff	Air Force	11604 W. Newkirk Road Spokane, WA 99224
Yakima County	Yakima Training Center	Army	1221 Firing Center Rd. Yakima, WA 98901

Sources: DOD 2023; DOC 2022a; and DOC 2022b

Military testing, training, and operating areas are actively used by military personnel to properly carryout their missions. Military installations may include waterways, offshore areas, airspace routes, and ranges on land. The unique locations, geographies, and resources of each training and operating area means they cannot be easily moved or replaced once the ability to use them is lost (DOC 2022b). Military utilized airspace and civilian airports are considered in this analysis with a primary focus on military utilized airspace. Greater detail on civilian airports is provided in Section 3.10, Transportation.

The Federal Aviation Administration (FAA) categorizes airspace into two areas; regulatory and nonregulatory. Within these two categories, there are four types of airspace or airspace areas: controlled, uncontrolled, special use, or other airspace. These classifications are determined by the complexity or density of aircraft movements, the nature of the operations conducted within the airspace, the level of safety required, and national and public interest (FAA n.d.[a]). Below is a description of some of the special airspace designations that support military testing and training:

- Special Use Airspace (SUA) – SUAs may consist of military operations, prohibited, restricted, warning, and alert areas “wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not part of those activities, or both.” (FAA n.d. [b]). Special Use Airspaces in Washington are a minimum altitude of Surface level to 1,000-feet above ground level (AGL) (DOC 2022b).
- Military Operations Area (MOA) – MOAs are special use airspaces designated for routine nonhazardous military flight training including, but not limited to “air combat tactics, air intercepts, aerobatics, formation training, and low altitude tactics.” (FAA n.d. [b], [c]). This airspace area segregates non-participating Instrument Flight Rules (IFR) aircraft[247] from participating military operations and to inform the Visual Flight Rules (VFR) pilot[248] when such activity is being conducted (DOD 2016).

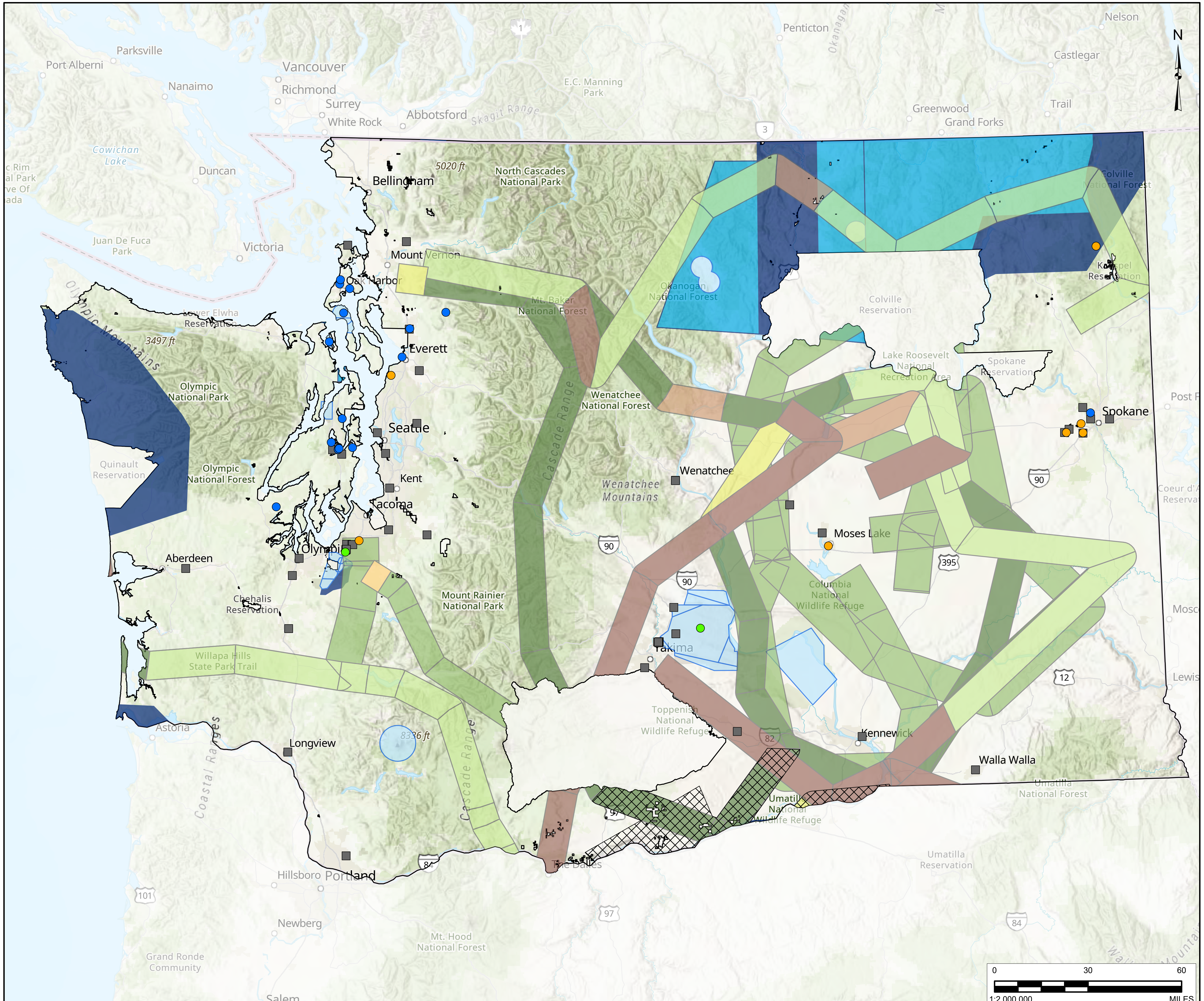
[247] IFR Aircrafts are considered civilian aircrafts equipped to fly in low visibility conditions, such as clouds or fog, using instruments and electronic signals instead of visual reference.

[248] A VFR pilot is a pilot who operates an aircraft in clear weather conditions, using visual cues to navigate and avoid other aircraft.

- Military Training Route (MTR) – MTRs are other airspace areas used by military aircraft to train a wide range of tactical flying, including “low level” combat tactics. The required maneuvers and high speeds of these low level combat tactics can occasionally compromise safety for all flight operations; therefore, the MTR program was created. MTRs are mutually developed by the FAA and DOD for low-altitude military training (as low as 100ft AGL) at airspeeds that can exceed 250 knots (over 287 miles per hour) (FAA n.d.[d]). MTRs in Washington occur at a minimum altitude of 200-feet AGL to 1,000-feet AGL (DOC 2022b).
- Geographic Area of Concern (GAOC) – GAOCs are designated areas where an energy development project could have an adverse impact on military operations and readiness. GAOCs is a tool used to improve public awareness by describing where a future energy project or energy-related project could have an adverse effect military activities (DOD 2022b). A project in a designated GAOC does not equate to resulting in an unacceptable risk. A project within a designated GAOC means that it would have an adverse impact and requires further review by the Military Aviation and Installation Assurance Siting Clearinghouse to assess potential risks (Federal Register 2018).

As presented in **Figure 3.9-1**, military installations and special airspace designations that support military missions are widespread across Washington State.

This Page Intentionally Left Blank



LEGEND

- Study Area
- Boardman Geographic Area of Concern (WSDOC, 2022)
- Washington Military Department Facility (WSDOC, 2022)

Military Installation (WSDOC, 2022)

- U.S. Air Force
- U.S. Army
- U.S. Navy

Military Training Route (WSDOC, 2022)

Floor Elevation

- 200'
- 300'
- 500'
- 1,000'
- 1,200'
- 1,500'
- > 1,500'

Special Use Airspace (WSDOC, 2022)

Floor Elevation

- Surface
- 300'
- > 1,000'

EFSEC Energy Facility Site Evaluation Council

REFERENCES AND NOTES

1. SERVICE LAYER CREDITS: WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS, ESRI, USGS
2. MILITARY INSTALLATION, MILITARY TRAINING ROUTE, SPECIAL USE AIRSPACE, WA MILITARY DEPARTMENT FACILITY, BOARDMAN GEOGRAPHIC AOC: DOC, 2022b

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

MILITARY INSTALLATIONS AND UTILIZED AIRSPACE

YYYY-MM-DD 2025-03-24 CONSULTANT wsp FIGURE 3.9-1

This Page Intentionally Left Blank

3.9.3 Impacts

An assessment of impacts was completed for the construction, operation and maintenance, and upgrade or modification of transmission facilities within the Study Area.

3.9.3.1 Method of Analysis

The study area for a project-specific application would typically encompass several key regions and features, such as the following:

- **Project Site and Immediate Vicinity:** This includes the specific location of the project and the surrounding area that might be directly affected by construction, operation and maintenance, and upgrade or modification activities.
- **Agriculture and Rangelands:** The study area would be large enough to determine if there were any impacts on agricultural lands and rangelands.
- **Shorelines**: The study area would be large enough to determine if there were any impacts on shorelines.
- **Military Utilized Airspace and Civilian Airfields**: The study area would be large enough to determine if there were any impacts on military utilized airspace and civilian airfields.

This Draft Programmatic EIS analyzes the affected environment and impacts on land and shoreline use within the Study Area defined in Chapter 2. Three project phases for each transmission facility type were considered: construction, operation and maintenance, and upgrade or modification.

This evaluation considers overhead transmission facilities and underground transmission facilities for each phase. Overhead transmission facilities consist of transmission lines and substations and similar ancillary infrastructure. Overhead transmission facilities also incorporate aboveground infrastructure that may be associated with underground transmission facilities. Underground transmission facilities consist of underground transmission lines, underground access vaults, and other below-ground infrastructure. The construction of underground transmission facilities includes open trench, trenchless, and underwater construction methods.

Laws and regulations used to determine the potential impacts of transmission facilities on land and shoreline use are summarized in **Table 3.9-1**. Information reviewed to identify impacts on land and shoreline use in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping. Impacts related to visual quality are analyzed in Section 3.12; impacts related to noise and vibration are analyzed in Section 3.13; and impacts related to recreation are analyzed in Section 3.14.

A review of each county's comprehensive land use plan in Washington was conducted as part of the land and shoreline analysis (**Appendix 3.9-1**). **Appendix 3.9-1** identifies relevant goals, policies, and considerations for transmission facility development. Goals and policies that are not applicable to transmission facilities are not addressed in **Appendix 3.9-1**.

Impact Determination

The discussion of impacts is qualitative given the high-level nature of a Programmatic EIS; quantification would require project-specific details to analyze. **Table 3.9-11** describes the criteria used to evaluate impacts from the Action Alternative and No Action Alternative. Information reviewed to identify impacts on Water resources in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping.

Table 3.9-11: Criteria for Assessing the Impact Determination on Land and Shoreline Use

Impact Determination	Description
Nil	A project would have no foreseeable impacts on land and shoreline uses. The transmission facility would not temporarily or permanently change or conflict with land and shoreline use during any phase (e.g., construction, operation and maintenance, and upgrade or modification). A project would not conflict with any relevant goals or policies. No impact on GMA Agricultural lands, military utilized airspace, or civilian airfield operations would occur.
Negligible	A project would a have minor, adverse impact on land and shoreline use due to changes or conflicts with the existing land or shoreline use. A project would have minor, adverse impacts as a result of conflicts with relevant goals or policies. However, best management practices and design considerations are expected to be effective. No impacts on GMA Agricultural lands, agricultural production, military utilized airspace, or civilian airfield operations would occur.
Low	A project would have adverse impacts on land and shoreline uses due to changes or conflicts with the existing land or shoreline use. These impacts would occur even with the implementation of BMPs and design considerations. A project would have adverse impacts on land use as a result of conflicts with relevant goals or policies. Adverse impacts on agricultural production or loss of GMA Agricultural lands would occur, but the impacts would not permanently affect the ability of a farm to remain profitable and continue operations. Minor, adverse impacts on military utilized airspace or civilian airfield operations would occur. Impacts would be short-term and nonsignificant.
Moderate	A project is expected to have a moderate adverse impact on land and shoreline use due to changes or conflicts with the existing land or shoreline use. These moderate adverse impacts would occur even with the implementation of BMPs and design considerations. A project would have moderate adverse impacts as a result of conflicts with relevant goals or policies. Adverse impacts on military activities or civilian airfield operations would occur. Changes to agricultural production or loss of GMA Agricultural lands would impact profitability and operations. Impacts could be long-term, occurring over one or more project phases. Moderate impacts have the potential to be significant.
High	A project would have a significant and potentially severe adverse impact on land and shoreline use due to changes or conflicts with the existing land or shoreline use. These impacts would occur even with the implementation of BMPs and design considerations. Significant adverse impacts would occur from conflicts with relevant goals or policies. Significant adverse impacts on military utilized airspace or civilian airfield operations would affect the military's ability to conduct flight training and/or operations. Significant adverse impacts on agricultural production or loss of GMA Agricultural lands would affect the ability of a farm to remain profitable and continue operations. Impacts would be permanent or continue for the duration of the project.

BMPs = best management practices; GMA = Growth Management Act

To clearly understand the potential severity of impacts without any interventions, the following impact determinations exclude the use of avoidance criteria and mitigation measures. The ratings assume compliance with all federal, state, and local laws and regulations, as well as standardized BMPs and design considerations. Assessing impacts without avoidance criteria or mitigation measures offers a baseline understanding of potential environmental effects, helping to identify the true extent of these impacts. Environmental laws often require that initial impact assessments be conducted without considering mitigation to maintain the integrity of the environmental review process.

3.9.3.2 Action Alternative

Construction

Overhead Transmission Facilities

Activities for the construction phase of overhead transmission facilities would vary and depend on the scale of the facility and site characteristics. Construction could include a site preparation phase of relatively short duration (e.g., a few months), followed by a longer construction and start-up phase. It is assumed that the construction phase of overhead transmission, per mile, would have a shorter duration than underground construction. During the construction phase, overhead transmission facilities infrastructure could have impacts on the following:

- Incompatibility with Land Use
- Conflict with Relevant Goals and Policies
- Loss of Function and Value of Shorelines
- Loss of Function and Value of Agricultural Land and Rangelands
- Conflict with Military Utilized Airspace and Civilian Airfield Operations

Incompatibility with Land Use

Construction activities associated with the installation of overhead transmission facilities could result in direct and indirect impacts on existing land uses. Site clearing and grubbing are typically one of the most noticeable impacts of constructing an overhead transmission facility project. Construction of overhead transmission facilities could require clearing areas for structure placement, access roads, rights-of-way (ROWs), and substations. Construction activities could require obtaining easements or land acquisitions from private property owners or public land administrators, which could result in incompatible land use. Construction within new easements could result in a loss of the existing land use and an incompatible use. There could be permanent land use impacts if the construction of an overhead transmission facility requires the conversion of land use and substantially reduces that overall land use type. The overall reduction and impact may depend on the given abundance of the land use type or total disturbance in the city or county.

New easements or ROWs could also create perceived or indirect incompatibilities on adjacent or nearby property owners, including residents, visitors, and businesses. The impacts could begin during construction and continue through the life of the project.

As described in Section 3.14, Recreation, overhead transmission facilities constructed within or a designated wilderness area, national park, or state park could result in an adverse impact on this land use.

Impact Determination: Depending on the scale of the facility and site characteristics, impacts on land use from incompatible uses, without mitigation measures incorporated, are anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Conflict with Relevant Goals and Policies

Construction of overhead transmission facilities could be inconsistent with the goals and policies outlined in relevant planning documents, such as county or citywide comprehensive plans, shoreline master programs, habitat conservation plans, and active transportation plans. Conflicts with relevant goals and policies could result in impacts beginning in construction and could continue through the life of the project.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on land use resulting from conflicts with relevant goals and policies, without mitigation measures incorporated, are anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Loss of Function and Value of Shorelines

Construction activities within or adjacent to shorelines could degrade sensitive habitat, ecological processes, and the ecological qualities of the shoreline. Vegetation clearing, foundation construction, and material laydown could cause substantial erosion of soils and sediment to be deposited into waters. Furthermore, construction activities could have the potential to limit public access and recreational opportunities and impact the visual character of the shoreline. Impacts could begin during construction and continue through the life of the project.

Impact Determination: Depending on the scale of the facility and site characteristics, impacts on the function and value of shorelines, without mitigation measures incorporated, it anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Loss of Function and Value of Agriculture Land and Rangelands

Construction activities could interfere with existing agricultural and rangeland uses from equipment, laydown and staging areas, and temporary access roads. Construction activities may damage agricultural crops, productivity, and soils or present obstacles for agricultural activities such as irrigation, seeding and spraying, and harvesting. Impacts on rangelands could include disrupting the movement of livestock and limiting areas for livestock grazing. Impacts from the construction of overhead transmission facilities could begin during construction and continue through the life of the project.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on the function and value of agricultural land and rangelands, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Conflict with Military Utilized Airspace and Civilian Airfield Operations

The construction of overhead transmission facilities could interfere with or degrade military utilized airspaces and civilian airfield operations. Military utilized airspace and civilian airfields are located throughout the state and have varying requirements and regulations. Generally, safety regulations specify that aircrafts must operate at least 500 feet away from the tallest structure[249]. Therefore, siting and constructing overhead transmission facilities near lower altitude military utilized airspaces or civilian airports could create a vertical obstruction that limits an aircraft's maneuverability or military training route boundaries. These impacts could begin in construction and continue for the life of the project.

Construction activities could require the use of helicopters to access the site, deliver materials, and place structures or wires. Construction of overhead transmission facilities and the use of helicopters could interfere with civilian airport operations, military readiness, and low-altitude aircraft training across the state.

[249] CFR 91.119 Minimum Safe Altitudes: General.

Impact Determination: Depending on the scale of the facility and siting characteristics, the impacts on military utilized airspace and civilian airfield operations, without mitigation measures incorporated, are anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Activities for the construction phase of underground transmission facilities, including open trench, trenchless (including directional drilling), or underwater construction methods, would vary depending on the scale of the facility and site characteristics. Similar to overhead transmission facilities, construction underground could include a site preparation phase of relatively short duration, followed by a longer construction and start-up phase. It is assumed that the construction phase for underground transmission facilities, per mile, would have a longer duration than overhead projects. During the construction phase, underground transmission could have impacts on the following:

- Incompatibility with Land Use
- Conflict with Relevant Goals and Policies
- Loss of Function and Value of Shorelines
- Loss of Function and Value of Agricultural Land and Rangelands

Incompatibility with Land Use

Similar to the construction of overhead transmission facilities, underground transmission facilities could result in direct and indirect impacts to existing land uses. Construction of underground transmission facilities could include ROW clearing, trenching/blasting, material laydown, duct bank and vault installation, backfilling, cable installation, and site restoration. Underground transmission facilities generally require a larger ROW easement and must be free of both trees and deep-rooted shrubs. Temporary and/or permanent easements could be required from private property owners or public land administrators, which could result in a direct and/or indirect incompatible land use. As described in Section 3.14, Recreation, transmission facilities constructed within designated wilderness areas would violate the Wilderness Act, thereby resulting in an adverse impact on this land use.

Impact Determination: Depending on the scale of the facility and site characteristics, impacts on land use from incompatible uses, without mitigation measures incorporated, are anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Conflict with Relevant Goals and Policies

Construction of underground transmission facilities could be inconsistent with the goals and policies outlined in relevant planning documents, such as county or citywide comprehensive plans, shoreline master programs, and hazard mitigation plans. Conflicts with relevant goals and policies could result in impacts beginning in construction and could continue through the life of the project.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on land use resulting from conflicts with relevant goals and policies, without mitigation measures incorporated, is anticipated to vary and could be nil to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Loss of Function and Value of Shorelines

Construction of underground transmission facilities within or adjacent to shorelines could degrade sensitive habitat, ecological processes, and ecological qualities of the area. The use of HDD is preferred over open trenching as it generally causes less surface disruption, making it ideal for environmentally sensitive locations. Regardless of the construction method used, visual impacts and public access to shorelines could be temporarily impaired.

Impact Determination: Depending on the scale of the facility and site characteristics, impacts on the function and value of shorelines, without mitigation measures incorporated, it anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Loss of Function and Value of Agricultural Land and Rangelands

Construction of underground transmission facilities could interfere with agricultural and rangeland uses. Open trenching requires significant surface disruption and could damage agricultural crops, productivity, and soils. Open trenching could also present an obstacle to farming activities such as seeding, spraying, and harvesting. Impacts on rangelands could include disrupting the movement of livestock and limiting areas for livestock grazing. Furthermore, using backfill materials or soils from greater depths to restore construction sites could alter the composition of surface soils and lead to less productive crops in the future.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on the function and value of agricultural land and rangelands, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Operation and Maintenance

Overhead Transmission Facilities

Activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs, similar to any other linear industrial facility. Overhead transmission facilities could have the impacts on the following during the operation and maintenance phase:

- Loss of Function and Value of Shorelines
- Loss of Function and Value of Agricultural Land and Rangelands
- Conflict with Military Utilized Airspace and Civilian Airfield Operations

Loss of Function and Value of Shorelines

Degradation of sensitive habitat and ecological processes of the shoreline could generally persist throughout operation and maintenance; however, the overall footprint could be reduced to areas only supporting the permanent features of the transmission facility. Periodic maintenance activities within shoreline areas could have result in similar impacts as discussed for construction. However, impacts are expected to occur for a shorter duration and be of less severity.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on the function and value of shorelines, without mitigation measures incorporated, it anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Loss of Function and Value of Agricultural Land and Rangelands

Maintenance of the ROW and access roads could require vegetation removal using a variety of methods, including mechanical removal, hand cutting, and herbicide application. These maintenance activities could interfere with farming operations or activities and livestock grazing. Furthermore, the use of herbicides to control vegetation along the ROW could impact nearby crop production and interfere with organic farms or other herbicides used by farm workers.

Overhead transmission facilities could restrict allowable crop types, such as orchards, hops, and tree farms. Certain farming equipment and irrigation systems, and their maneuverability, could be restricted due to conflicts with overhead lines and towers. Other farming activities such as aerial spraying via aircraft or field surveying using drones could also be impacted by overhead transmission facilities.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on the function and value of agricultural land and rangelands, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Conflict with Military Utilized Airspace and Civilian Airfield Operations

Overhead transmission facilities could produce electromagnetic energy that interferes with radar and communication frequencies. The height, angle, type, and number of transmission facilities may influence the loss of radar detection or signal (Z. Jiangong, *et al*. 2018). Other potential conflicts with military utilized airspace and civilian airfields could arise if a crane or helicopter is required for maintenance activities, such as routine inspections or repairs.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on military utilized airspace and civilian airfield operations, without mitigation measures incorporated, are anticipated to vary and could be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Similar to overhead transmission facilities, activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs, similar to any other linear industrial facility. During the operation and maintenance phase, underground transmission could have impacts on the following:

- Loss of Function and Value of Shorelines
- Loss of Function and Value of Agricultural Land and Rangelands

Loss of Function and Value of Shorelines

Generally, the normal operation of underground transmission facilities is not expected to have permanent impacts on shoreline activities. However, if repairs are required, similar impacts to those described for construction could occur. These impacts are expected to be of less severity and for a shorter duration.

Impact Determination: Depending on the scale of the facility and site characteristics, impacts on the function and value of shorelines, without mitigation measures incorporated, it anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Loss of Function and Value of Agricultural Land and Rangelands

Planting deep-rooted shrubs or trees would not be allowed within the ROW of underground transmission facilities. This could restrict allowable crop types leading to adverse impacts on the function of agricultural lands. Additionally, maintaining the ROW and access roads could require vegetation removal using a variety of methods, including mechanical removal, hand cutting, and herbicide application. These maintenance activities could interfere with farming operations or activities and livestock grazing. Furthermore, the use of herbicides to control vegetation along the ROW could impact nearby crop production and interfere with organic farms or other herbicides used by farm workers.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on the function and value of agricultural land and rangelands, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Upgrade or Modification

Overhead Transmission Facilities

Modifying or upgrading overhead transmission facilities would involve several key steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. During upgrade or modification, overhead transmission could have impacts on the following:

- Incompatibility with Land Use
- Conflict with Relevant Goals and Policies
- Loss of Function and Value of Shorelines
- Loss of Function and Value of Agricultural Land and Rangelands
- Conflict with Military Utilized Airspace and Civilian Airfield Operations

While impacts could be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors:

- **Disturbance Minimization:** Upgrade or modification typically involve working within existing structures and footprints, which minimizes the disturbance to surrounding land and ecosystems. New construction often requires clearing land, which could disrupt existing land uses.
- **Infrastructure Utilization:** Existing infrastructure could be reused or enhanced, reducing the need for extensive new development. This can help preserve natural landscapes and reduce the impact on shorelines.

Underground Transmission Facilities

Modifying or upgrading underground transmission facilities would involve several key steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Underground transmission could have the following identified impacts during the upgrade or modification phase:

- Incompatibility with Land Use
- Conflict with Relevant Goals and Policies
- Loss of Function and Value of Shorelines
- Loss of Function and Value of Agricultural Land and Rangelands

While impacts could be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors:

- **Disturbance Minimization:** Upgrade or modification typically involve working within existing structures and footprints, which minimizes the disturbance to surrounding land and ecosystems. New construction often requires clearing land, which could disrupt existing land uses.
- **Infrastructure Utilization:** Existing infrastructure could be reused or enhanced, reducing the need for extensive new development. This can help preserve natural landscapes and reduce the impact on shorelines.

3.9.3.3 No Action Alternative

The No Action Alternative represents the scenario in which this Draft Programmatic EIS is not used and current management practices for siting and planning transmission facilities continue unchanged. Under this alternative, each project would continue to be evaluated on a case-by-case basis and reviewed for compliance with existing regulations, codes, and standard practices. While impact determinations would likely be similar to those outlined in this Draft Programmatic EIS, projects would not benefit from the impact reductions associated with the avoidance criteria developed and analyzed in this Draft Programmatic EIS. These criteria are anticipated to provide additional mitigation that further reduces potential environmental impacts.

3.9.4 Potential Mitigation Measures

This section describes measures that would eliminate, reduce the intensity of, or compensate for adverse impacts from construction, operation and maintenance, and upgrade or modification of transmission facilities. All general conditions adopted for this Draft Programmatic EIS, identified in Section 3.1, are relevant to this resource section. Applicants would be responsible for providing information within their application materials documenting the implementation of the general conditions.

Avoidance criteria adopted for this Draft Programmatic EIS have been identified in Section 3.1. Avoidance criteria that are relevant to this resource section are described below:

AVOID-3 – **Sensitive Water Features:** Avoid impacting areas sensitive to degradation, including adjusting the layout of new transmission facilities to steer clear of sensitive water features.

Rationale: Avoiding sensitive water features that are susceptible to degradation from construction activities including changes to the water features’ physical characteristics (e.g., banks, bathymetry and substrate), as well as chemical properties. Avoiding these areas helps preserve their structure and function.

AVOID-13 – Land Use and Zoning Incompatibility and Conflicts: Avoid incompatible land uses and zoning. Demonstrate that there are no indirect or adjacent land use conflicts with private property owners or public land administrators.

Rationale: This avoidance criterion aims to avoid conflicts with land use and zoning. Avoiding land use and zoning conflicts will also help to reduce adverse impacts on property owners, agricultural landowners, noise, visual, and socioeconomics.

AVOID-14 – Civilian Airports and Military Installations: Avoid impacts on civilian airports, surrounding runway protection zones, and military installations, such as the Yakima Training Center, National Security Area, and Boardman Geographic Area of Concern.

Rationale: This avoidance criterion aims to avoid impacts on designated areas within which some forms of development could have an adverse impact on airport and military operations and/or readiness.

AVOID-18 – Exceptional Recreation Assets: Avoid impacts on, or within the viewshed of, exceptional recreation assets as defined by the Washington State Recreation and Conservation Office (RCO).

Rationale: This avoidance criterion aims to protect exceptional recreational assets. These places provide a unique experience or activity that may not be available in all areas of the state. Coordination with the RCO early in the project planning process is a crucial step to adequately avoid these areas.

AVOID-19 – Wilderness Areas: Avoid impacts on, or within the viewshed of, designated wilderness areas.

Rationale: This avoidance criterion aims to protect wilderness areas. Wilderness areas are valued for their untouched natural beauty. The Wilderness Act of 1964 mandates the preservation of the natural conditions of designated wilderness areas.

AVOID-20 – Limit Closure of Recreation Resources: Consider closure and restrictions only after other mitigation strategies and alternatives have been explored. Avoid long-term closure and restriction of recreation resources lasting more than 24 months.

Rationale: This avoidance criterion establishes the definition of “long-term closure” in relation to impacts on recreation resources from the construction, operation and maintenance, and upgrade or modification of transmission facilities.

Applicants would be responsible for providing information within their application materials documenting the project’s compliance with the above avoidance criteria.

Potential mitigation measures have been identified to minimize adverse impacts from transmission facility projects. These measures are intended to be broad so that they can be applied to most projects that would be covered under this Draft Programmatic EIS. However, project-specific plans would be needed to adapt the measures for project-specific applications.

When impact determinations are identified as moderate or high, the applicant would either adopt applicable mitigation measures from this Draft Programmatic EIS or the SEPA Lead Agency may require applicable mitigation measures to be implemented to reduce project-specific impacts. When impact determinations are low, applicable mitigation measures should still be considered by the applicant and the SEPA Lead Agency as these measures would help to further reduce project-specific impacts, including the project's contribution to cumulative impacts. These measures would be implemented in addition to compliance with laws, regulations, environmental permits, plans, and design considerations required for transmission facilities.

The following mitigation measures could be adopted to mitigate adverse impacts:

LSU-1 – Construction Schedule: Develop and distribute a schedule of construction activities to potentially affected farm operators at least three months in advance of ground disturbance.

Rationale: This mitigation measure aims to allow sufficient time for agricultural landowners to plan planting, harvesting, or maintenance activities in advance of construction activities.

LSU-2 – Livestock: Coordinate with property owners to keep livestock out of construction areas.

Rationale: This mitigation measure aims to reduce mortality to livestock. During project construction and maintenance activities, it may be necessary to remove cattle or livestock from areas where blasting or heavy equipment operations are taking place.

LSU-3 – Reseed Disturbed Rangelands: Coordinate with rangeland property owners to determine the appropriate seed mix used in revegetation actions.

Rationale: This mitigation measure aims to restore rangelands to the pre-construction conditions or better.

LSU-4 – Consult with the Northwest DOD Regional Coordination Team: Conduct early and ongoing consultation with the Northwest Department of Defense (DOD) Regional Coordination Team to address any potential conflicts with military utilized airspaces or land uses.

Rationale: This mitigation measure aims to mitigate impacts on military operations and testing facilities while fostering the viability of a project-specific application. Coordination with military representatives from the Northwest DOD Regional Coordination Team is a crucial step in the planning and development of transmission facilities and may identify land use conflicts, rules that govern development, and land use concepts specific to the area.

In addition to the above mitigation measures, the following mitigation measures[250] developed for other resources may be applicable:

Rec-1 – Stakeholder and Agency Coordination: Coordinate with potentially affected federal, state, and local agencies, communities, and recreation-based organizations to mitigate impacts on recreational facilities and during seasonal activities.

Rec-2 – Public Notification of Temporary Closure: Notify appropriate stakeholders of temporary closures at least six months prior to the start of the closure.

Rec-3 – Trail Detours: Consider phased closures or explore alternative solutions such as rerouting trails, creating temporary access points, or scheduling work during off-peak times to minimize disruption.

[250] The rationales for the identified mitigation measures are provided in their respective resource sections.

Rec-4 – Informational Signage and Precautionary Safety Measures: Place informational signage, placards, safety fencing, and other precautionary indicators in areas where transmission facilities are within or adjacent to existing recreational facilities.

Rec-5 – Notice to Air Missions: Coordinate with the appropriate aviation authorities, such as the Federal Aviation Administration, to determine the necessity and content of a Notice to Air Missions (NOTAM).

H&S-4 – Risk Management Strategy: Develop and apply an electromagnetic field (EMF) and electromagnetic interference (EMI) risk management strategy that regularly considers the consequence, likelihood, and significance of EMF and EMI on public health and existing infrastructure, such as transportation systems, based on emerging research studies and guidelines.

TR-2 – Coordination with Aviation Groups: Work closely with aviation groups and authorities to ensure that transmission facilities are marked on aviation maps and that pilots, both commercial and recreational, are aware of their locations.

TR-4 – Planning Coordination: Consult local authorities regarding planned construction activity near or crossing roads, waterways, railways, and airports.

Vis-1 – Route Planning: Carefully select routes that minimize visual and ecological disruption. Route lines parallel to the contour line of slopes, where possible, and limit siting facilities to the following:

- On visually prominent ridgelines
- Near prominent landscape features and landmarks
- In proximity to visually sensitive viewpoints, including National Historic Trails and Sites

Vis-2 – Selection of Finishes: Use dull and/or dark painted surfaces, textured surfaces, and low-reflectivity finishes on facilities. Finishes and colors should be appropriate to their location and context.

Vis-4 – Underground Construction: Use underground construction methods in areas with high scenic quality and/or open rural areas, depending on geologic conditions.

Vis-6 – Visual Impact Assessment: Conduct a visual impact assessment during project planning that defines the project’s viewshed and identifies an assessment zone large enough to capture all non-negligible visual impacts..

These measures would be implemented in addition to compliance with environmental permits, plans, and authorizations required for transmission facilities.

3.9.5 Probable Significant Adverse Environmental Impacts

Determining the significance of an impact involves consideration of context and intensity, which, in turn, depend on the magnitude and duration of the impact. “Significant” in the Washington State Environmental Policy Act (SEPA) means a reasonable likelihood of more than a moderate adverse impact on environmental quality. An impact may also be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred (WAC 197-11-794).

Identification of environmental impacts and assignment of discipline-specific ratings is based on information available at the time of writing and professional judgment. A precautionary approach has been taken for the assessment where information is currently unknown or unavailable.

This Draft Programmatic EIS weighs the impacts on land and shoreline resources that would result from transmission facilities after considering the application of laws and regulations; siting and design considerations, including agency guidance and BMPs; and mitigation and makes a resulting determination of significance for each impact. **Table 3.9-12** summarizes the impacts anticipated for the construction, operation and maintenance, and upgrade or modification of transmission facilities.

This Page Intentionally Left Blank

Table 3.9-12: Summary of Impacts, Mitigation Measures, and Significance Rating for Land and Shoreline Use

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Land and Shoreline Use – Incompatibility with Land Use	Construction	Construction of transmission facilities could be incompatible with existing land uses designations. The impacts could begin during construction and continue through the life of the project.	**Overhead:** nil to high **Underground:** nil to high	▪ **AVOID-13:** Land Use and Zoning Incompatibility and Conflicts ▪ **AVOID-18:** Exceptional Recreation Assets ▪ **AVOID-19:** Wilderness Areas ▪ **AVOID-20**: Limit Closure of Recreation Resources ▪ **LSU-4:** Consult with the Northwest DOD Regional Coordination Team ▪ **Rec-1**: Stakeholder and Agency Coordination ▪ **Rec-2:** Public Notification of Temporary Closure ▪ **Rec-3:** Trail Detours ▪ **Rec-4:** Informational Signage and Precautionary Safety Placards	Less than Significant	Potentially significant impacts would be addressed through early and ongoing coordination, land use consistency determinations, approval of conditional use permits, and site restoration plans. Significant adverse impacts would be reduced to less than significant with the implementation of and compliance with standard BMPS, general conditions, avoidance criteria and mitigation measures.
	Operation and Maintenance	Impacts to land and shoreline use are not anticipated to occur during operation and maintenance of overhead or underground transmission facilities.	**Overhead:** N/A **Underground:** N/A			
	Upgrade or Modification	Upgrade or modification of overhead or underground transmission facilities could result in expanding or widening an existing ROW or easement to accommodate the facility upgrade or modification. This could result in impacts to land and shoreline uses similar to those described above for construction, including loss of or incompatible land or shoreline use.	**Overhead:** nil to high **Underground:** nil to high			
Land and Shoreline Use – Conflict with Relevant Goals and Policies	Construction	Construction of transmission facilities could result in inconsistencies with the goals and policies outlined in relevant county and citywide comprehensive plans, shoreline management programs, and/or other plans and programs. Conflicts with relevant goals and policies could result in impacts beginning in construction and could continue through the life of the project.	**Overhead:** nil to high **Underground:** nil to high	▪ **AVOID-13:** Land Use and Zoning Incompatibility and Conflicts ▪ **LSU-4:** Consult with the Northwest DOD Regional Coordination Team	Less than Significant	Relevant county-level comprehensive plan goals, policies, and are outlined in **Appendix 3.9-1**. With the implementation and compliance with general conditions, such as Gen-3 – Consistency with Policies and Ordinances, adverse impacts would be reduced to less than significant.
	Operation and Maintenance	This impact is not anticipated to occur during operation and maintenance of overhead or underground transmission facilities.	**Overhead:** N/A **Underground:** N/A			
	Upgrade or Modification	Upgrade or modification of existing transmission facilities could require expanding, widening, or creating new ROW areas. Increased ROW could result in inconsistencies with land or shoreline use goals and policies.	**Overhead:** nil to high **Underground:** nil to high			
Land and Shoreline Use – Loss of Function and Value of Shorelines	Construction	Vegetation clearing associated with the construction of both overhead and underground transmission facilities could impact sensitive habitats, ecological processes, and the ecological qualities of shoreline areas. Construction equipment and staging areas could degrade visual impacts and limit public access to shorelines.	**Overhead:** negligible to high **Underground:** negligible to high	▪ **AVOID-3:** Sensitive Water Features ▪ **AVOID-13:** Land Use and Zoning Incompatibility and Conflicts ▪ **AVOID-18:** Exceptional Recreation Assets ▪ **AVOID-19:** Wilderness Areas ▪ **AVOID-20**: Limit Closure of Recreation Resources ▪ **Rec-1:** Stakeholder and Agency Coordination ▪ **Rec-2:** Public Notification of Temporary Closure	Less than Significant	With the implementation and compliance with standard BMPs, general conditions, avoidance criteria, and mitigation measures, adverse impacts on shorelines would be reduced to less than significant.
	Operation and Maintenance	Permanent transmission facility features could continue to degrade sensitive habitat and ecological processes of a shoreline through operation and maintenance. Periodic or ongoing maintenance activities could limit public access and recreational opportunities of a shoreline through the life of the transmission facility. Overhead transmission facilities within a shoreline area could have a permanent impact on scenic views.	**Overhead:** negligible to moderate **Underground:** negligible to moderate			
	Upgrade or Modification	Upgrade or modification of existing transmission facilities could result in similar impacts as those described for construction. However, these impacts are	**Overhead:** nil to high			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
		anticipated to be less than those for constructing new transmission facilities due to minimized footprint disturbances and utilizing existing infrastructure.	**Underground:** nil to high	▪ **Rec-3:** Trail Detours ▪ **Rec-4:** Informational Signage and Precautionary Safety Placards ▪ **Vis-1:** Route Planning ▪ **Vis-2:** Selection of Finishes ▪ **Vis-4:** Underground Construction ▪ **Vis-6:** Visual Impact Assessment		
Land and Shoreline Use – Loss of Function and Value of Agricultural Land and Rangelands	Construction	Construction of transmission facilities may impact or interfere with existing agricultural and rangeland uses from equipment use, laydown and staging areas, and temporary access roads. Construction activities may damage agricultural crops, productivity, and soils or present obstacles for agricultural activities such as irrigation, seeding and spraying, and harvesting. Development of overhead transmission facilities could restrict orchard trees from growing beneath, while underground transmission facilities could restrict deep-rooted vegetation and trees. Farming equipment and irrigation systems, and their maneuverability, could be restricted due to conflicts with overhead lines and towers. Other farming activities such as aerial spraying via aircrafts or field surveying using drones could also be impacted by overhead transmission facilities. Impacts from the construction of overhead transmission facilities could begin during construction and continue through the life of the project.	**Overhead:** low to high **Underground:** low to high	▪ **AVOID-13:** Land Use and Zoning Incompatibility and Conflicts ▪ **LSU-1:** Construction Schedule ▪ **LSU-2:** Remove Livestock ▪ **LSU-3:** Reseed Disturbed Rangelands ▪ **Vis-4:** Underground Construction	Less than Significant	With implementation of and compliance with standard BMPs, general conditions, avoidance criteria and mitigation measures, adverse impacts would be reduced to less than significant.
	Operation and Maintenance	Routine maintenance of the ROW is expected to keep a clear and accessible area. Maintaining the ROW and access roads could require vegetation removal using a variety of methods. The use of herbicides to control vegetation along the ROW could impact nearby crop production and rangeland grasses, and interfere with organic farms or other herbicides used by farmers. Transmission facilities could restrict allowable crop types within the ROW. Certain farming equipment and irrigation systems, and their maneuverability, could be restricted due to conflicts with overhead lines and towers. Other farming activities such as aerial spraying via aircraft or field surveying using drones could be impacted by overhead transmission lines.	**Overhead:** low to high **Underground:** low to high			
	Upgrade or Modification	Upgrade or modification of existing transmission facilities could require expanding, widening, or creating new ROW areas. Increased ROW could result in similar impacts described above for construction.	**Overhead:** low to high **Underground:** low to high			
Land and Shoreline Use – Conflict with Military Utilized Airspace and Civilian Airfield Operations	Construction	Constructing overhead transmission facilities near low altitude military utilized airspaces or civilian airfields could create a vertical obstruction that limits an aircraft's maneuverability or its training route boundaries. These impacts could begin in construction and continue for the life of the project. Impacts are not expected to occur during the construction of underground transmission facilities.	**Overhead:** low to high **Underground:** N/A	▪ **AVOID-14:** Civilian Airports and Military Installations ▪ **LSU-4:** Consult with the Northwest DOD Regional Coordination Team ▪ **Rec-5:** Notice to Air Missions	Less than Significant	The construction of overhead transmission facilities would be required to adhere to FAA regulations. Additionally, with the implementation of and compliance with standard BMPs, general conditions, avoidance criteria

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied(a)	Significance after Applying Mitigation	Rationale for Significance Rating
	Operation and Maintenance	Overhead transmission facilities could produce electromagnetic energy that interferes with radar and communication frequencies. Other potential conflicts could arise if a crane or helicopter is required for maintenance activities. Impacts are not expected to occur during the construction of underground transmission facilities.	**Overhead:** low to moderate **Underground:** N/A	▪ **H&S-4:** Risk Management Strategy ▪ **TR-2:** Coordination with Aviation Groups ▪ **TR-4:** Planning Coordination		and mitigation measures, it is not expected for impacts to military utilized airspace or civilian airfield operations to result in a significant adverse impact.
	Upgrade or Modification	Upgrade or modification of existing overhead transmission facilities could result in similar impacts on military utilized airspace and civilian airfield operations as described for construction.	**Overhead:** low to high **Underground:** N/A			

(a) **Appendix 3.9-1** provides a detailed listing of each general condition, avoidance criteria, and mitigation measure. Having these details in an appendix serves as a comprehensive reference section that can be consulted independently of the main text. This is particularly useful for detailed guidance and technical specifications that may be referred to multiple times. Additionally, including this information in an appendix allows for easier updates and revisions. If mitigation measures or guidelines change, the appendix can be updated without altering the main content.

BMPs = best management practices; FAA = Federal Aviation Administration; LSU = land and shoreline use; N/A = not applicable

This Page Intentionally Left Blank

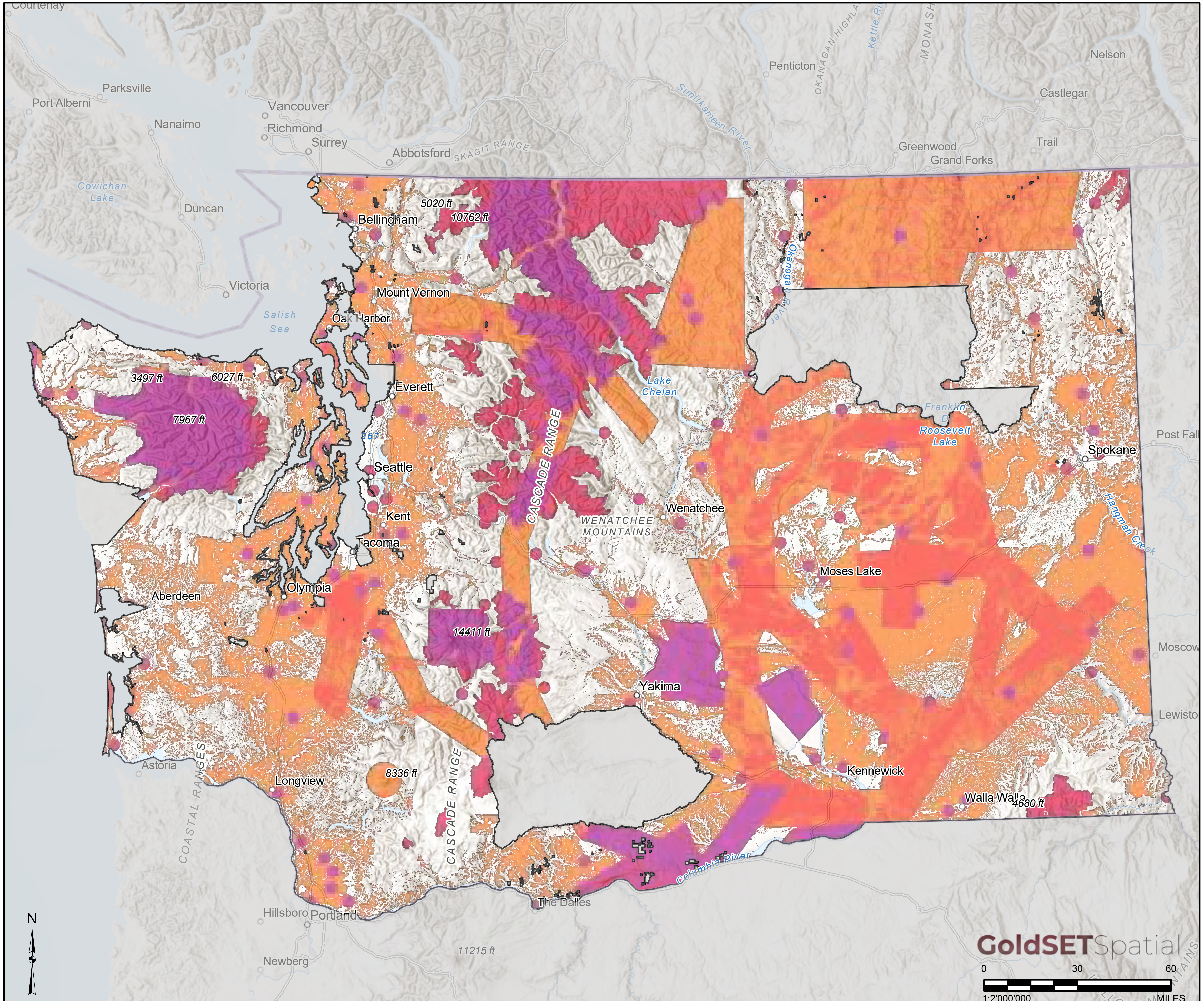
3.9.6 Suitability Map

Project-specific reviews would include a comprehensive review and analysis to identify the site-specific adverse impacts on resources to determine the suitability of this Draft Programmatic EIS. Environmental review may be phased by incorporating relevant information from this Draft Programmatic EIS by reference while evaluating site-specific adverse impacts of the individual project applications. For more information on phased reviews, please refer to Chapter 1, Introduction.

Project-specific applications would include details about the precise location and site-specific conditions. This Draft Programmatic EIS provides a suitability map that, when incorporated with project-specific applications, could be used to facilitate more informative and efficient environmental planning.

Figure 3.9-2 represents the suitability map for land and shoreline use and identifies the appropriateness of areas using applicable laws and regulations, criteria specific to the siting of transmission facilities, and knowledge from subject matter experts.

This Page Intentionally Left Blank



LEGEND

Study Area

Conflict Indicator Key

- Neutral
- Low
- Low-Medium
- Medium
- Medium-High
- High
- Very High

EFSEC
Energy Facility Site Evaluation Council

THE SEAL OF THE STATE OF WASHINGTON 1889

REFERENCES AND NOTES

1. WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS; ESRI, USGS
2. THE CONFLICT INDICATOR KEY CAN BE USED TO IDENTIFY AND HIGHLIGHT AREAS WHERE DIFFERENT PROJECT CONSTRAINTS MAY OVERLAP, POTENTIALLY LEADING TO CONFLICTS. THE KEY USES DIFFERENT COLORS TO REPRESENT THE INTENSITY OR LIKELIHOOD OF CONFLICT.

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

SUITABILITY MAP FOR LAND AND SHORELINE USE

YYYY-MM-DD 2025-02-07

CONSULTANT wsp

FIGURE 3.9-2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

This Page Intentionally Left Blank

3.9.6.1 Suitability Map Methodology

The suitability map evaluates various criteria and assigns a suitability score to different areas based on how well those areas meet the desired conditions.

A number of individual siting decision criteria, referred to as indicators in GoldSET, were identified by subject matter experts for inclusion in this resource's suitability map. Subject matter experts assigned a weighting based on the degree of constraint (i.e., high, medium or low), or potential difficulty for a transmission facility to traverse an area. Each of the GoldSET Indicator cards describing the criteria chosen and the source of the data layers used are provided in **Appendix 3.9-2.**

A summary of the criteria used to produce each GoldSET card is provided below.

Land Use GoldSET Card – Medium Conflict – Land Use

Areas of medium conflict with land use include national parks, state parks, and areas designated as prime farmland. Transmission facility development within these areas would have adverse impacts to the function and value of these land uses.

Land Use GoldSET Card – Medium Conflict – Military Operations

Areas of medium conflict with military utilized airspace and operations include military installations other than those identified as high conflict, and Military Training Routes used by military aircraft for training purposes that can be flown at altitudes less than or equal to 500 feet above ground level (AGL). Transmission facility development within these areas could interfere with and jeopardize military readiness and training operations.

Note that a 0.5-mile buffer around military installations was provided in the dataset.

Land Use GoldSET Card – High Conflict – Land Use

Areas of high conflict with land use include civilian airfield operations and nationally designated wilderness areas. Transmission facility development within airport operation areas and designated wilderness areas would result in impacts to the function and value of the land use.

Note that a 2-mile buffer around airport point features was provided in the dataset in accordance with runway protection zones and professional judgment.

Land Use GoldSET Card – High Conflict – Military Operations

Areas of high conflict with military operations include the Yakima Training Center, National Security Area, and Boardman Geographic Area of Concern. Transmission facility development within these areas would jeopardize the effectiveness of military operations and readiness.

This Page Intentionally Left Blank

3.10 Transportation

This Draft Programmatic Environmental Impact Statement (EIS) considers impacts on transportation resulting from the types of facilities described in Chapter 2. This section addresses the following topics related to the construction, operation and maintenance, and upgrade or modification of high-voltage electric transmission facilities (transmission facilities) in the State of Washington:

- Section 3.10.1 identifies regulatory, siting, and design considerations.
- Section 3.10.2 describes the affected environment.
- Section 3.10.3 describes impacts.
- Section 3.10.4 describes potential mitigation measures.
- Section 3.10.5 identifies probable significant adverse environmental impacts on transportation.
- Section 3.10.6 provides a suitability map and scoring for the siting of transmission facilities as it relates to transportation, based on the identified considerations, impacts, and mitigation measures.

3.10.1 Regulatory, Siting, and Design Considerations

This Draft Programmatic EIS establishes a broad framework for compliance, outlining general laws, regulations, best management practices (BMPs), and design considerations. It is assumed that project-specific applications will be developed within this pre-established regulatory context and are expected to comply with existing laws and regulations. If the project does not comply with applicable laws and regulations or fails to adhere to design considerations or BMPs, additional project-specific environmental review and mitigation would be required. The applicable federal and state laws and regulations relevant to transportation are summarized in **Table 3.10-1**.

A variety of federal, state, and local agencies administer and regulate roadways, railways, and airports. The American Association of State Highway and Transportation Officials (AASHTO) and the Federal Highway Administration (FHWA) are responsible for interstate and U.S. highways. The Washington State Department of Transportation (WSDOT) is responsible for state highways and routes. County and local roads are controlled by the presiding jurisdiction (city or county). Other roads on federal lands are managed by the applicable federal agencies (National Park Service, Bureau of Land Management, U.S. Forest Service, etc.). Railroad operations in the state are regulated by the Federal Railroad Administration and the Washington Utilities and Transportation Commission. Aviation is governed by the Federal Aviation Administration (FAA). Each of these regulatory and governing agencies and the military has its own authority.

Table 3.10-1: Laws and Regulations for Transportation

Applicable Legislation	Agency	Summary Information
43 USC Chapter 35 – Federal Land Policy and Management	Bureau of Land Management	This act provides for the management, protection, development, and enhancement of public lands, including requirements for land use planning, land acquisition, and disposition, as well as regulations for rights-of-way. This act outlines requirements and authorizations for grants, issuance, or renewals of rights-of-way over, upon, under, or through such lands for uses, including systems generation, transmission, and distribution of electric energy, as well as transportation systems including roads and highways.

Applicable Legislation	Agency	Summary Information
36 CFR 212 –Travel Management	U.S. Forest Service	This code governs the management of roads and trails within the National Forest System. It addresses construction and maintenance and traffic rules of National Forest System roads, as well as the requirements for construction or road use across lands and assignable easements owned by the United States and administered by the U.S. Forest Service, and the principles for sharing use of roads.
36 CFR 251 – Land Uses	U.S. Forest Service	This code outlines the procedures and regulations for land use authorizations on National Forest System lands, including requirements for special use proposals, as well as operating plans and agreements for transmission facilities. It also addresses application requirements for any new, changed, or additional uses or areas, including any changes that involve any activity that has an impact on the environment, other uses, or the public.
23 CFR 645 – Utilities	Federal Highway Administration	This code outlines policies, procedures, and reimbursement provisions for the adjustment and relocation of utility facilities on federal aid and direct federal projects, as well as policies and procedures regarding the accommodation of utility facilities and private lines on the right-of-way of federal aid or direct federal highway projects[251].
14 CFR 77 – Safe, Efficient Use, and Preservation of the Navigable Airspace	Federal Aviation Administration	This legislation governs the safety of navigable airspace in the United States. It includes requirements to provide notice to the FAA of certain proposed construction, or the alteration of existing structures; the standards for determining obstructions to air navigation, navigational, and communication facilities; the process for studying obstructions to air navigation and navigational facilities; and the process to petition FAA determinations.
49 CFR 212 – State Safety Participation Regulations	Federal Railroad Administration	This legislation covers state safety participation regulations, including established standards and procedures for state participation in investigative and surveillance activities under the federal railroad safety laws and regulations. This code aims to promote safety in all areas of railroad operations to reduce deaths, injuries, and damage to property resulting from railroad accidents.
47 CFR 15 – Radio Frequency Devices	Federal Communications Commission	This code governs regulations for radio frequency devices, including unintentional and intentional radiators.[252] It covers testing, labeling, and certification requirements to prevent electromagnetic interference between devices.
RCW 14.12.110 – Airport Zoning	Washington State Department of Transportation [(a)]	This legislation establishes regulations regarding permits for constructing, altering, or repairing any structures in airport zones. This section of code also outlines the required installation of hazard markers and lighting on structures to minimize hazards to air navigation.

[251] A highway construction, reconstruction, rehabilitation, repair, or improvement project that is directly managed and funded by the federal government.

[252] Devices that generate and emit radio frequency by radiation or induction.

Applicable Legislation	Agency	Summary Information
RCW 36.70A.070 – Comprehensive Plans – Mandatory Elements	Washington Department of Commerce	This legislation governs the mandatory requirements for the comprehensive plans of a county or city in Washington, including objectives, principles, and standards used to develop the comprehensive plan. It includes criteria for utilities, such as the general location, proposed location, and capacity of all existing and proposed utilities, including electrical services. It also provides criteria for transportation, including impacts on level of service impacts for state-owned transportation, as well as facilities and service needs.
RCW 36.81.121 – Perpetual advanced six-year plans for coordinated transportation program, expenditures—Nonmotorized transportation—Railroad right-of-way	Board of Adjustment	This legislation directs counties to prepare a six-year transportation program, including road, bridge, ferry, rail, and nonmotorized transportation projects, in alignment with adopted comprehensive plans.
RCW 47.06 – Statewide Transportation Planning	Washington State Department of Transportation [(a)]	This legislation governs the planning and design of the state transportation system, including comprehensive requirements for plans relating to multimodal transportation, aviation, marine ports and navigation, rail, and public transit. This code also sets forth level of service standards for state highways and state ferry routes of statewide significance.
RCW 47.44 – Franchises on State Highways	Washington State Department of Transportation [(a)]	This legislation regulates franchise use of any state highway for the construction and maintenance of different utilities, including electric transmission facilities and conduits. It outlines application requirements, grant of franchise conditions, and penalties.
RCW 47.52 – Limited Access Facilities	Washington State Department of Transportation [(a)]	This code grants highway authorities the power to design, establish, and control limited access facilities. It also establishes standards and rules for the construction, maintenance, and operation of limited access facilities.
RCW 47.68.340 – Aeronautics	Washington State Department of Transportation[(a)]	This legislation outlines requirements for structures and obstacles that obstruct airspace above ground or water level. It mandates that structures be plainly marked, illuminated, painted, lighted, or designated in a manner to be approved in accordance with the general rules of the department so that the structure or obstacle will be clearly visible to “airmen or airwomen.”
RCW 79.36 – Easements Over Public Lands	Washington State Department of Natural Resources	This legislation pertains to easements over public lands in Washington. This chapter outlines the procedures and regulations for acquiring, granting, and managing easements on public lands.
RCW 80.32 – Electric Franchises and Rights-of-way	Washington Utilities and Transportation Commission [(a)]	This legislation governs the granting of electric franchises and the use of rights-of-way for the construction and operation of electric utility infrastructure in Washington. It outlines the authority of cities, towns, or counties to approve electric transmission installation and operation on public streets or roads. It also outlines the requirements for public hearings and the conditions under which utilities can occupy public rights-of-way, ensuring that these operations do not interfere with public use of the land or roadways.

Applicable Legislation	Agency	Summary Information
RCW 80.50 - Energy Facilities - Site Locations	Washington Energy Facility Site Evaluation Council	This code establishes EFSEC's role in siting, constructing, and operating major energy facilities in Washington. It provides the legal framework for EFSEC to streamline the permitting process and ensure compliance with state environmental and safety standards.
WAC 468-30-110 – Highway Property	Washington State Department of Transportation [a]	This legislation outlines requirements for the "nonhighway use of airspace on state highways." It mandates that any use of such space is subject to both approval by the FHWA and compliance with all applicable city, town, or county zoning requirements.
WAC 468-34 – Utility Lines – Franchises and Permits	Washington State Department of Transportation [a]	This legislation governs the design, siting, and installation of utility lines within the right-of-way of state highways in Washington, outlining the process for obtaining franchises and permits for utility companies. This legislation provides requirements for both overhead and underground transmission facilities related to siting, construction, and clearances.
WAC 479-05 – Program Requirements	Washington Transportation Improvement Board [a]	This legislation outlines factors related to transportation improvement board projects, standard specifications, and right-of-way costs. It provides criteria for transportation funding and project development, including requirements for utility adjustments or relocations.
WAC 463-60-372 – Built environment—Transportation	Washington Energy Facility Site Evaluation Council	This legislation outlines the requirements for energy facility applications to identify transportation impacts, including the identification of affected transportation systems, expected traffic volumes, and access routes for construction and operation. It mandates the assessment of impacts on road, rail, waterborne, and air traffic, along with plans for mitigation, road improvements, and maintenance responsibilities. Applications must also address parking needs, changes in the movement of people or goods, and traffic hazards, ensuring safety and consistency with local transportation plans.
Washington State Environmental Policy Act	Washington Energy Facility Site Evaluation Council Washington State Department of Ecology All State and local governments	This act is a process that identifies and analyzes environmental impacts that can be related to issuing permits. SEPA helps permit applicants and decision-makers understand how a proposed project will impact the environment. Certain projects, as defined in the SEPA Rules (WAC 197-11-704) and that are not exempt, are required to go through the SEPA process.

Notes:

[a] The agency responsible for administering most permits or authorizations for the identified regulation. However, if EFSEC is determined to be the agency responsible for approving a proposal, EFSEC can administer several types of permits at the state and local level. EFSEC provides a streamlined process for siting and licensing major energy facilities, including transmission facilities in Washington State. EFSEC coordinates all evaluation and licensing steps, specifies the conditions for construction and operation, and issues a Site Certification Agreement, which assumes the responsibility for issuing individual state or local permits. By consolidating these permits into a single Site Certification Agreement, EFSEC can simplify the regulatory process for energy facility developers. While EFSEC itself does not directly administer federal permits, it works closely with federal agencies to ensure that all necessary federal requirements are met during the evaluation and licensing of energy facilities.

CFR = Code of Federal Regulations; FAA = Federal Aviation Administration; EFSEC = Energy Facility Site Evaluation Council; FHWA = Federal Highway Administration; RCW = Revised Code of Washington; SEPA = State Environmental Policy Act; USC = United States Code; WAC = Washington Administrative Code

The siting of transmission facilities is determined by engineering, technical, environmental, and socioeconomic factors. **Table 3.10-2** summarizes guidance documents and management plans that outline the design considerations and BMPs generally used to avoid or minimize impacts on transportation. In general, AASHTO and the FHWA define design standards, specifications, and guidelines for roadways (interstate and U.S. highways) throughout the United States.

Table 3.10-2: Siting and Design Considerations for Transportation

Siting and Design Consideration	Description
IEEE National Electrical Safety Code	The NESC is a set of standards designed to ensure the safe installation, operation, and maintenance of electric supply and communication systems. It covers guidelines for overhead and underground electrical lines, equipment, and structures, including aspects such as clearances, grounding, and other protective measures to prevent electrical hazards.
ISO 11452	This set of international standards outlines immunity testing[253] of automotive electrical components to narrowband radiated electromagnetic energy from off-vehicle sources. The standard covers passenger cars and commercial vehicles and applies to gas, diesel, and electric vehicles.
BLM Manual 9113 (BLM 2015)	This manual section provides for inventory, functional classification, condition assessment, and establishment of maintenance intensities of the BLM's roads for incorporation into the BLM Planning System; BLM road standards; and guidelines for road project planning, design, construction, and maintenance.
BLM Manual 9102 (BLM 2014)	This manual section presents the responsibilities, policies, and procedures for design used within the BLM to manage resources and facilities.
AASHTO Guide for Accommodating Utilities within Highways and Freeways (AASHTO 2024)	Provides comprehensive guidelines for the installation, adjustment, accommodation, and maintenance of utilities within highway right-of-way. WSDOT is required to follow this guidance document per WAC 468-34-120.
AASHTO Guidelines for Geometric Design of Very Low-Volume Local Roads (average daily traffic ≤ 400) (AASHTO 2001)	This document provides design standards specifically tailored for local roads with low traffic volumes. It emphasizes safety, cost-effectiveness, and functionality and offers recommendations on geometric elements such as lane width, shoulder design, and horizontal and vertical alignments.
AASHTO Roadside Design Guide (AASHTO 2011)	This guide provides standards and recommendations for the design of roadside features to enhance safety and minimize hazards for drivers, pedestrians, and vehicles.
FHWA Manual on Uniform Traffic Control Devices (FHWA 2023)	This manual provides standardized guidelines for the design, placement, and maintenance of traffic control devices, including signs, signals, and pavement markings.

[253] Evaluates how components and vehicles respond to electromagnetic fields from external sources.

Siting and Design Consideration	Description
WSDOT Manuals and Handbooks	WSDOT manuals and guidelines provide comprehensive frameworks and standards for the planning, design, construction, and maintenance of transportation infrastructure in Washington. These documents cover a wide range of topics, including highway geometric design, materials specifications, right-of-way acquisition, rail safety oversight, and environmental considerations. They emphasize safety, efficiency, and best practices, ensuring that projects meet regulatory requirements and align with state and federal standards.
Highway Capacity Manual, Sixth Edition: A Guide for Multimodal Mobility Analysis (Transportation Research Board 2016)	This manual provides methods for quantifying highway capacity and serves as a fundamental reference for concepts, performance measures, and analysis techniques for evaluating the multimodal operation of streets, highways, freeways, and off-street pathways.
FAA Advisory Circular 70/7460- 1L (FAA 2018)	This document sets standards for marking and lighting obstructions that have been deemed a hazard to navigable airspace.
Regional Road Maintenance Forum Best Management Practices Guide (WSDOT 2021)	This guidebook identifies common road maintenance activities and provides a training tool for road maintenance staff to select, install, and maintain BMPs to achieve the following environmental outcomes: ▪ Protect water quality ▪ Maximize habitat ▪ Contain pollutants
Best Management Practices Field Guide for ESA § 4 (d) Habitat Protection (WSDOT 2018)	This manual provides guidance for WSDOT maintenance crews and regional maintenance environmental coordinators working in sensitive priority areas identified on the Highway Activity Tracking System base map. It aims to conserve habitat for ESA listed salmonid species through application of BMPs based on the following outcomes: ▪ Minimize erosion ▪ Minimize sedimentation ▪ Minimize pollutant impacts ▪ Protect vegetation
WSDOT Planning Study Guidance (WSDOT 2025a)	This guidance provides comprehensive tools and guidelines for conducting and documenting planning studies.
Recommended Siting Practices for Electric Transmission Developers (Americans for a Clean Energy Grid 2023)	This document outlines best practices for siting electric transmission facilities. Recommended practices include: ▪ Early and transparent engagement ▪ Respect and fair dealing ▪ Environmental considerations ▪ Interagency coordination ▪ Use of existing infrastructure

AASHTO = American Association of State Highway and Transportation Officials; BLM = Bureau of Land Management; BMP = best management practices; ESA = Endangered Species Act; FAA = Federal Aviation Administration; FHWA = Federal Highways Administration; IEEE = Institute of Electrical and Electronics Engineers; ISO = International Organization for Standardization; NESC = National Electric Security Code; WAC = Washington Administrative Code; WSDOT = Washington State Department of Transportation

3.10.2 Affected Environment

This section describes the state and local transportation networks serving the Study Area and characterizes typical and representative transportation planning considerations within those networks. The primary topics addressed are roadway systems, design standards, traffic volumes, traffic congestion, safety, and maintenance. In addition, this section addresses planning considerations related to the presence of railroads, airports, and military airspace operating areas within the Study Area. Transportation-related topics addressed in other sections include off-road highway vehicle use (Section 3.14, Recreation) and travel restrictions in areas of special designation (Section 3.9, Land and Shoreline Use). Impacts on other resources such as vegetation, soils, water quality, wildlife habitats, and visual quality caused by access road construction and use are discussed in other sections of this Draft Programmatic EIS.

Washington has a diverse and comprehensive transportation system that includes various modes of travel to meet the needs of its residents and businesses.

Washington Administrative Code (WAC) 463-60-372 requires applications for site certification to provide information pertaining to the following:

- Transportation systems
- Vehicular traffic
- Waterborne, rail, and air traffic
- Parking
- Movement/circulation of people or goods
- Traffic hazards

Washington is an economic gateway state, connecting Asian markets to U.S. industries, Alaska to the rest of the United States, and Canada to the U.S. West Coast. Imports to Washington support U.S. manufacturers and provide goods to consumers, while agricultural exports support family farms throughout the Pacific Northwest and Midwest. Goods coming into Washington by container ship often go to the Midwest and East Coast.

Regional economies in Washington—and their manufacturing, agriculture, construction, and forestry components—depend on an effective and efficient freight transportation system. Businesses in Washington rely on the freight system to ship their products to local customers in the state, U.S. markets in California and on the East Coast, and worldwide. Freight-dependent industries provide 45 percent of all jobs in Washington (WSDOT 2022). These jobs occur in the most heavily freight-dependent industry sectors such as wholesale and retail, manufacturing, construction, agriculture, and transportation. These sectors rely on the multimodal freight network to conduct day-to-day business.

3.10.2.1 Transportation Systems

Public transit in Washington plays a critical role in supporting mobility, reducing traffic congestion, and providing sustainable transportation options across the state. The State of Washington’s Growth Management Act (Revised Code of Washington [RCW] 36.70A.070) requires that cities and counties include a transportation element in their comprehensive plans. The State of Washington has several comprehensive plans to improve and expand public transit, including the following:

- **State Public Transportation Plan:** This 20-year blueprint guides decisions to enhance public transportation across the state. It focuses on improving transit, carpools, vanpools, walking, and other transportation options to support families, communities, the economy, and the environment.
- **Statewide Human Services Transportation Plan:** Completed in 2022, this plan addresses the transportation needs of people with special needs, including those with physical or mental limitations, low

income, or advanced age. It identifies unmet needs, gaps, and barriers, and develops strategies to improve access, mobility, safety, and user experience.

- **Transportation Demand Management Strategic Plan:** This plan aims to advance management goals over a five-year period (2019 to 2024). It focuses on reducing congestion and improving the efficiency of the transportation system through strategies like promoting telecommuting, flexible work hours, and ridesharing.
- **Local Human Services Transportation Plans:** These regional plans, developed by 18 regional transportation planning organizations, identify local transportation needs and strategies. They help inform the statewide plan and ensure that regional and local priorities are addressed.
- **Washington Transportation Plan 2040 and Beyond:** This long-range plan provides a vision for improving the state's transportation network, including public transit. It includes policy recommendations and implementation strategies to enhance the overall transportation system.

WSDOT establishes level of service (LOS) standards for state highways and ferry routes of statewide significance based on RCW 47.06.140(2). LOS is a qualitative measure that predicts the quality of experience by motorists using the infrastructure. LOS analysis evaluates the impact a project may have on LOS. LOS analysis provides a standardized means of categorizing efficiency and experiential quality by assigning a letter grade to it. LOS ratings range from A to F, with A representing the best conditions and F representing unacceptably high congestion and delays. Regional transportation planning organizations and WSDOT jointly develop and establish LOS standards for regionally significant state highways and ferry routes based on RCW 47.80.030(1)(c).

After adopting comprehensive plans, local jurisdictions must adopt and enforce ordinances that prohibit development approval if the development causes the LOS on a locally owned transportation facility to decline below the standards adopted in the transportation element of the comprehensive plan, unless transportation improvements or strategies to accommodate the impacts of development are made concurrently with the development. These strategies may include increased public transportation service, ride-sharing programs, demand management, and other transportation system management strategies.

RCW 36.81.121 requires the development of a perpetual, advanced, six-year transportation improvement program for coordinated transportation that describes the road maintenance and improvement program. Transportation and roadway projects are identified to meet stated performance measures addressing safety, pavement, and bridges, as well as system performance, freight, and congestion mitigation.

Washington has several governance structures under which public transportation services are funded and operated, in coordination with WSDOT, including:

- Public transportation benefit areas (PTBA) (Chapter 36.57A RCW)
  - PTBAs are special districts created to provide public transportation services within a defined geographic area. They are established through a public process involving local governments and are governed by a board of directors composed of elected officials from the participating jurisdictions.
  - PTBAs have the authority to levy taxes, issue bonds, and enter into contracts to fund and operate public transportation systems. They can also acquire, construct, and maintain transportation jurisdictions.
- City transit systems (Chapter 35.95 RCW)
  - City transit systems are established by municipalities to provide public transportation services within city limits. These systems are funded through local taxes, fares, and federal and state grants.

  - The governing body of the city, such as the city council, oversees the transit system's operations, including budgeting, planning, and service delivery.

- County public transportation authority (Chapter 36.57 RCW)
  - Counties in Washington, except those with metropolitan municipal corporations performing public transportation functions, can create county public transportation authorities. These authorities are responsible for providing public transportation services in unincorporated areas and can extend services to incorporated areas through agreements.
  - The county public transportation authority is governed by a board of directors, which may include county commissioners and representatives from cities within the county.
- Regional transit authority (Chapter 81.112 RCW) (WSDOT 2023)
  - Regional transit authorities (RTAs) are established to plan, develop, and operate high-capacity transportation systems across multiple counties. RTAs are created through voter approval and are governed by a board of directors appointed by the participating counties and cities.
  - RTAs have the authority to levy taxes, issue bonds, and enter into agreements to fund and operate regional transit services, such as light rail, commuter rail, and express bus services.

Other local and regional public transportation providers in Washington include the following:

- Tribal transportation providers
- Community transportation providers
- Medicaid transportation brokers
- Travel Washington intercity bus program lines
- Ferry systems

There is a growing emphasis on active transportation, with investments in bike lanes, trails, and pedestrian pathways to promote safe and sustainable travel options. Washington has an extensive network of trails and bike lanes, promoting active transportation and recreation. Trails and bike lanes are discussed in Section 3.14, Recreation.

3.10.2.2 Vehicular Transportation

The Washington Freight and Goods Transportation System (FGTS) classifies freight corridors by mode in Washington based on annual freight tonnage moved. Each modal network is classified into five tiers based on the specific annual tonnage thresholds for freight moved. FGTS truck corridors are categorized as follows:

- T-1 corridors: more than 10 million tons
- T-2 corridors: 4 million to 10 million tons
- T-3 corridors: 300,000 to 4 million tons
- T-4 corridors: 100,000 to 300,000 tons
- T-5 corridors: at least 20,000 tons in 60 days and less than 100,000 tons per year

Roads and Highways

Washington is home to over 80,000 miles of roadways, including more than 7,000 miles of state and interstate highways and 1,600 miles of U.S. highways (FHWA 2025). Other roadway jurisdictions include cities and counties, as well as the Washington State Department of Natural Resources, Washington State Parks and Recreation Commission, port districts, Tribes U.S. Forest Service, and National Parks (WSDOT 2025b).

Per WAC 468-34-290, the vertical clearance for high-voltage transmission lines above the highway and the lateral and vertical clearance from bridges shall conform with the National Electrical Safety Code (NESC) and/or with the clearances specified in WAC 468-34-290, whichever is greater. On and along highways, poles and related facilities must be located as near as practicable to the right-of-way (ROW) line (WAC 468-34-300).

- **Interstate Highways:** Washington has an extensive highway system, including 764 miles of interstate highways (FHWA 2025). These corridors play a crucial role in the state's transportation network, functioning as key freight routes and facilitating the movement of regional and international cargo. Interstate highways also provide vital commuting and recreational access, connecting communities and supporting economic activity across the region.
- **State Highways:** Washington's state highway network stretches over 7,000 miles, serving as a vital component of the state's transportation infrastructure. These highways provide essential connections for both local and regional travel, linking communities across urban, rural, and remote areas. They play a critical role in facilitating the movement of people, goods, and services; supporting economic development; and ensuring access to recreational and cultural destinations. Washington's state highways also provide key access points for freight and transit, serving as important corridors for both daily commuting and long-distance travel.

Transmission facilities along highway structures may be allowed where such attachment conforms with sound engineering considerations for preserving the highway, including its safe operation, maintenance, and appearance. WAC 468-34-270 requires additional considerations when attempting to attach utilities to highway structures.

WSDOT requires variances for proposed transmission projects that do not comply with the established Utilities Accommodation Policy. This occurs if any proposed utility installation deviates from WSDOT policy. Examples of such are if any above-ground utility facilities need to be placed within the control zone[254] of a highway, which is typically reserved for clear zones to enhance safety; when the installation involves non-standard methods for installation; or if the transmission project is too close to other critical infrastructure like bridges, overpasses, or existing utilities and cannot meet the standard separation distances.

3.10.2.3 Waterborne, Rail, and Air Transportation

Waterborne Transportation

Waterborne traffic in Washington State is a significant component of its transportation infrastructure, involving both domestic and international trade. Washington is home to the largest ferry system in the nation, with most routes operated by WSDOT's Washington State Ferries across Puget Sound and its inland waterways. Ferries in

[254] Refers to a designated area where specific regulations and guidelines are applied to manage traffic and ensure safety.

Washington provide vital connections to island communities, areas separated by Puget Sound, and interstate and international destinations and, in many cases, act as connections to other public transportation systems.

Key aspects of waterborne traffic in Washington are described below:

- **Ports:** Washington is home to a robust network of ports that play a crucial role in its economy.
  - Number and Distribution: Washington has 75 public port districts, more than any other state. The ports are spread across 33 of the state's 39 counties (WPPA n.d.).
  - Major Ports: Some of the state's major ports are the Port of Seattle, Port of Tacoma, Port of Everett, and Port of Vancouver. These ports handle a significant portion of the state's international trade, particularly with Asia.
  - Deep-Draft Ports: Eleven of these ports, including Seattle, Tacoma, and Grays Harbor, have deep-draft facilities capable of accommodating large ocean-going vessels.
- **Economic Impact:** Washington ports handle about 7 percent of U.S. exports and 6 percent of imports, despite the state representing only 2 percent of the U.S. population (WPPA n.d.). They are vital for the movement of goods and contribute significantly to the local and national economy.
  - Diverse Functions: Besides marine terminals, many ports also operate airports, marinas, railroads, and industrial parks. They are involved in various economic development activities, including tourism promotion.
- **Ferry System:** The Washington State Ferries system is the largest in the United States, providing essential transportation for both passengers and vehicles across Puget Sound and other waterways.
- **Cargo Movement:** The state handles a significant volume of cargo, including containerized goods, bulk commodities, and automobiles. This cargo is transported via various waterways, contributing to the state's economy.
- **Environmental Considerations:** Efforts are ongoing to balance economic activity with environmental protection, ensuring sustainable use of waterways.

The Washington FGTS categorizes waterway corridors based on the annual freight tonnage moved. These categories help identify and prioritize the most heavily used freight transportation networks within the state. The specific waterway corridors are categorized as follows:

- W-1 corridors: more than 25 million tons
- W-2 corridors: 10 million to 25 million tons
- W-3 corridors: 5 million to 10 million tons
- W-4 corridors: 2.5 million to 5 million tons
- W-5 corridors: 0.9 million to 2.5 million tons

These classifications help in planning and investment decisions to support efficient freight movement across the state. By identifying the most heavily used corridors, planners can select routes that are already optimized for high freight volumes, ensuring efficient transportation of materials and goods. Alternatively, identifying less congested corridors can provide other routes in case of disruptions, ensuring that project timelines are met.

Rail Transportation

A robust freight rail network supports the movement of goods across the state and beyond. Washington has approximately 3,100 route miles of active railroad tracks (Burns 2024). The ROW width for a railroad can vary significantly depending on the location and type of track. The Washington State Utilities and Transportation Commission oversees railroad operations and operators and makes public decisions involving railroad safety matters. Specific procedures and standards apply in each state for shared corridor operations and modification of at-grade crossings.

The NESC sets policies for practical safeguarding of persons during the installation, operation, or maintenance of electric supply and communication lines and associated equipment. It is assumed that any railroad/overhead utility crossing interaction would conform to NESC and other applicable code requirements. Key requirements of the NESC include the following four items:

- Poles or other structures supporting power must be 50 feet from the centerline of main running tracks, centralized traffic control sidings, and heavy tonnage spurs. Poles located adjacent to industry tracks must provide at least a 30-foot clearance from the centerline of track when measured at right angles. If they are located adjacent to a curved track, then the clearance must be increased at a rate of 1.5 inches per degree of curved track.
- Regardless of the voltage, unguyed poles shall be located a minimum distance from the centerline of any track equal to the height of the pole above the ground line plus 10 feet. If guying is required, the guys shall be placed in such a manner as to keep the pole from leaning or falling in the direction of the tracks.
- High-voltage poles and structures (345 kilovolts and higher) must be located outside of railroad ROW.
- Crossings must not be installed under or within 500 feet from the end of any railroad bridge or 300 feet from the centerline of any culvert or switch area.

The Washington FGTS categorizes rail corridors based on the annual freight tonnage moved. These categories help identify and prioritize the most heavily used freight transportation networks within the state. The specific rail corridors are categorized as follows:

- R-1 corridors: more than 5 million tons
- R-2 corridors: 1 million to 5 million tons
- R-3 corridors: 500,000 to 1 million tons
- R-4 corridors: 100,000 to 500,000 tons
- R-5 corridors: less than 100,000 tons

Air Transportation

Air transportation in Washington is robust and diverse, serving both passenger and cargo needs. Seattle-Tacoma International Airport (Sea-Tac) is the primary international gateway in Washington, while other airports like Spokane International and Paine Field Airport serve regional needs. Numerous smaller airports support general aviation and local air travel.

Sea-Tac, King County International Airport, and Spokane International Airport handle significant domestic and international cargo routes. Airlift Northwest and Life Flight Network handle many of the medical air transports.

Transmission facility projects would consider airspace management and obstacle evaluations. For any transmission facility proposed within 20,000 feet of an existing public or military airport, the FAA requires notice of proposed construction for a project so that it can determine whether it would adversely affect commercial, military, or personal air navigation safety. This is to ensure that the project does not adversely affect commercial, military, or personal air navigation safety. The process allows the FAA to evaluate the impacts on air navigation and identify any necessary mitigating measures. The FAA also requires notice of proposed projects that would involve construction or alteration that is more than 200 feet in height above ground level. This is to ensure that the construction does not pose a hazard to air navigation.

3.10.2.4 Parking

The requirements of WAC 463-60-372 ensure that parking facilities associated with energy projects are adequately planned and managed, minimizing their impact on the environment and surrounding communities. Parking areas often require regular maintenance to ensure they remain functional and safe, including measures to control runoff or strategies to manage stormwater and prevent pollution of nearby waterbodies.

3.10.2.5 Movement and Circulation of People or Goods

WSDOT is charged with planning, funding, implementing, constructing, and maintaining the multimodal transportation system in Washington. WSDOT is responsible for managing and directing the state’s freight and passenger rail capital and operating programs.

Washington's freight system is vital to the state’s economy and communities, facilitating commerce both locally and internationally. This freight movement is made possible by Washington’s expansive multimodal transportation system of roads, railroads, ports and waterways, intermodal facilities, airports and air routes, pipelines, and logistics facilities. The Washington State Freight System Plan (FSP) defines the state’s freight transportation trends, issues, and needs to inform freight policy and guide investment decisions. The FSP fulfills federal freight planning requirements under the Bipartisan Infrastructure Law and supports the state’s six transportation policy goals. The FSP is updated every four years to reflect new data, trends, and stakeholder feedback, ensuring that the plan remains relevant and effective in addressing the state’s freight transportation needs.

In addition to being aligned with the Washington Transportation Plan 2040 and Beyond, the FSP incorporates and aligns with findings and recommendations from other Washington State transportation plans, such as the Highway System Plan, the Safety Rest Area Strategic Plan, the Aviation System Plan, and the State Rail System Plan. It describes how the FSP will improve Washington’s ability to meet the National Multimodal Freight Policy Goals and National Highway Freight Program Goals.

3.10.2.6 Traffic Hazards

Traffic hazards typically include road closures and detours, heavy equipment movement, reduced visibility and distractions, lane shifts and narrowing, pedestrian safety, work zone safety, and emergency access. By addressing these hazards through careful planning, communication, and implementation of safety measures, the risks associated with a project can usually be reduced.

From 2011 to 2020, transportation incidents resulted in more than 370,000 fatalities across the United States. The majority of these deaths were due to roadway incidents, accounting for 94.2 percent of the total, followed by railroad incidents (2 percent), water transportation (2 percent), air travel (1.1 percent), transit-related incidents (0.7 percent), and pipeline accidents (0.03 percent) (USDOT 2022).

Active transportation and motorcyclist fatalities are at a historical high in Washington. In the last two years, traffic fatalities have increased by 20 percent (from 674 in 2021 to 810 in 2023) and are at the highest rate since 1990 (825 fatalities) (WTSC 2024). Since 2021, Washington has seen more than 2,000 fatalities and more than 9,000 serious traffic-related injuries, with the most fatal crashes occurring on state routes, followed by city streets and county roads. Nearly half of the fatal crashes in 2023 occurred in only five counties: King, Pierce, Snohomish, Spokane, and Yakima (WTSC 2024).

The U.S. Department of Transportation has recognized the roadway safety crisis as a national top priority and has committed to the ambitious long-term goal of reaching zero roadway fatalities through implementation of the National Roadway Safety Strategy. In Washington, the Washington Traffic Safety Commission (WTSC) has adopted a similar goal to reduce traffic fatalities and serious injuries to zero by 2030. As the state’s designated highway safety office codified under RCW 43.59, the WTSC uses a combination of federal and state systems and traffic safety data for planning, measuring performance, and ensuring accountability.

The WSDOT Clear Zone/Control Zone guidelines focus on ensuring roadside safety by managing the placement of utility objects, such as transmission towers or poles, within highway rights-of-way. The Clear Zone, which is synonymous with the Control Zone, is the total roadside border area available for use by errant vehicles, starting at the edge of the traveled way. It aims to provide a safe recovery area for vehicles that leave the roadway. The Control Zone Policy ensures that utility infrastructure is located outside the Control Zone whenever possible. Utility poles, especially those carrying high-voltage transmission lines, are considered large roadside hazards. The guidelines aim to reduce the risk of collisions with these poles by either relocating them outside the Clear Zone or implementing safety measures such as barriers.

School zones and bus stops are also considered traffic hazards. Regulations emphasize the importance of safety in these areas due to the high volume of pedestrian and vehicular traffic during school commute times. These areas are often monitored closely to manage traffic flow and protect students.

Along with the typical traffic hazards that can occur during transmission projects, electromagnetic interference[255] (EMI) from transmission facilities can also impact transportation systems. Transmission facilities can produce corona discharge, which generates radio noise and can interfere with communication systems. Discharges from faulty insulators or sharp objects on transmission lines can also cause EMI.

3.10.3 Impacts

An assessment of impacts was completed for the construction, operation and maintenance, and upgrade or modification of transmission facilities within the Study Area.

[255] Also known as radio-frequency interference (RFI) when in the radio frequency spectrum. It is a disturbance generated by an external source that affects an electrical circuit.

3.10.3.1 Method of Analysis

The Study Area for a project-specific application would typically encompass several key regions and be determined by key features, such as the following:

- **Project Site and Immediate Vicinity:** This includes the specific location of the project and the surrounding area that might be directly affected by construction, operation and maintenance, and upgrade or modification activities.
- **Transportation Corridors:** This includes identified routes for the transportation of materials and equipment to construction sites, which may involve freight transported by road, water, rail, or air. Identified routes would also include both existing and anticipated LOS during project development.
- **Transportation Infrastructure:** It is essential to identify and evaluate various types of transportation infrastructure that could be affected by the construction, operation and maintenance, and upgrade or modification of projects, including bridges and overpasses, railways, airports and airspace, ports and waterways, public transit systems, and pedestrian and bicycle infrastructure.
- **Airspace and Flight Paths:** Applicants would work closely with the FAA to ensure the project does not interfere with controlled airspace. This includes filing necessary forms and obtaining approvals. Areas of special consideration would be identified for environmental review.
- **Safety and Reliability:** Areas requiring road improvements, traffic management, and coordination with local authorities would be identified.

This Draft Programmatic EIS analyzes the affected environment and impacts on transportation within the Study Area defined in Chapter 2. Three project phases for each transmission facility type were considered: construction, operation and maintenance, and upgrade or modification. This evaluation considers overhead transmission facilities and underground transmission facilities for each phase. Overhead transmission facilities consist of transmission lines and substations and similar ancillary infrastructure. Overhead transmission facilities also incorporate above-ground infrastructure that may be associated with underground transmission facilities (e.g., clearing footprint required for launch and retrieval shafts for trenchless construction). Underground transmission facilities consist of underground transmission lines, underground access vaults, and other below-ground infrastructure. The construction of underground transmission facilities includes open trench, trenchless, and underwater construction methods.

Impact Determination

The discussion of impacts is qualitative given the high-level nature of a Programmatic EIS; quantification would require specific project details to analyze. **Table 3.10-3** describes the criteria used to evaluate impacts from the Action Alternative and No Action Alternative. Information reviewed to identify impacts on transportation in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping.

Table 3.10-3: Criteria for Assessing the Impact Determination on Transportation

Impact Determination	Description
Nil	There would be no foreseeable impacts on transportation. The presence of a transmission facility would not pose a safety risk to transportation infrastructure or operations. There would be no risk of accidents or hazards. There would be no foreseeable disruptions or delays in traffic flow due to the construction, operation and maintenance, and upgrade or modification of these facilities. The structural integrity of roads, bridges, and other transportation infrastructure would remain unaffected by the proximity of transmission facilities.
Negligible	Minor, adverse impacts would occur. Modifications to transportation infrastructure or operations locally or regionally would not be noticeable within existing supply chains or cause alterations to the management and distribution of people or materials. There would be no risk of accidents or hazards. Any impacts on traffic flows and structural integrity of transportation facilities would not be noticeable. Best management practices and design considerations are expected to be effective.
Low	Adverse impacts on transportation infrastructure or operations would occur even with the implementation of best management practices and design considerations. However, the impacts would be minor enough that they would not hinder supply chains or the management and distribution of people or materials. Temporary road closures or detours during the construction, maintenance, and upgrade or modification of transmission facilities would occur. There would be a low risk of accidents or hazards related to the proximity of transmission facilities to transportation routes, and adequate safety measures would be in place. Impacts on traffic flows and structural integrity of transportation facilities would be low. Impacts would be short-term and nonsignificant.
Moderate	Adverse impacts on transportation would occur even with the implementation of best management practices and design considerations. Changes to transportation infrastructure or operations would be measurable and have impacts that disrupt supply chains or the distribution of people or materials. There would be more frequent or longer-term road closures and detours during the construction and maintenance of transmission facilities, which would cause moderate inconvenience to commuters. There would be measurable and frequent interference with electronic devices and communication systems. There would be an increased risk of accidents or hazards, particularly during construction phases, necessitating enhanced safety measures and monitoring. Impacts may be long-term, occurring over one or more project phases. Moderate impacts have the potential to be significant.
High	Adverse impacts on transportation infrastructure or operations would occur and would have consequences for supply chains or the management and distribution of people or materials. Prolonged road closures or detours during the construction and maintenance of transmission facilities would cause major inconvenience to commuters. Substantial interference with electronic devices and communication systems would occur. Transmission facilities may pose increased risks of accidents and hazards. High impacts may be permanent or continue for the duration of the project.

To clearly understand the potential severity of impacts without any interventions, the following impact determinations exclude the use of avoidance criteria and mitigation measures. The ratings assume compliance with all federal, state, and local laws and regulations, as well as standardized BMPs and design considerations. Assessing impacts without avoidance criteria or mitigation measures offers a baseline understanding of potential environmental effects, helping to identify the true extent of these impacts. Environmental laws often require that initial impact assessments be conducted without considering mitigation to maintain the integrity of the environmental review process.

Transportation-related impacts are anticipated to occur primarily during construction and upgrade or modification of transmission facilities as there would be limited regular traffic during operation and maintenance. The location of a transmission facility could have impacts on the local road network involving traffic and wear and tear on infrastructure such as bridges. Transportation-related impacts (e.g., project delays, costs, safety, and complexity) are also anticipated any time there is a transportation-related project (i.e., planned maintenance of a highway) where transmission facilities are present and in conflict with transportation-related projects or infrastructure.

3.10.3.2 Action Alternative

Construction

Overhead Transmission Facilities

Activities for the construction phase of overhead transmission facilities would vary and depend on the scale of the facility and site characteristics. Construction could include a site preparation phase of relatively short duration (e.g., a few months), followed by a longer construction and start-up phase. It is assumed that the construction phase of overhead transmission, per mile, would have a shorter duration than underground construction. Overhead transmission facilities infrastructure could have the following identified impacts during the construction phase:

- Impacts on Vehicular Transportation
- Impacts on Waterborne Transportation
- Impacts on Rail Transportation
- Impacts on Air Transportation

Impacts on non-motorized transportation (trails and bike lanes) are discussed in Section 3.14, Recreation.

Impacts on Vehicular Transportation and Infrastructure

The following activities during the construction phase could cause impacts on vehicular transportation:

- **Closures and Diversions** - The construction of transmission facilities often requires temporary road closures or detours to ensure the safety of both workers and drivers. This could lead to increased congestion in affected areas and increase the risk of collision. Implementing detours could confuse drivers and increase the risk of accidents if not well-marked and communicated. Even if roads remain open, construction activities could reduce the number of available lanes, causing bottlenecks, slowing down traffic, and causing safety hazards for affected drivers, bicyclists, and pedestrians.
- **Increased Traffic and Increased Collison Risk** - Workers commuting to and from construction sites may also contribute to increased traffic, especially during peak hours, leading to a higher risk of collision. The movement of heavy construction vehicles and equipment can also pose hazards, especially when entering and exiting construction sites. The addition of oversized loads can disrupt traffic and require special permits and escorts. Increased traffic and oversized loads are of particular concern when traffic hazards, such as school zones and bus stops, are en route.
- **Impacts from Access Road Construction** - The construction of access roads could lead to an expansion of the local roadway network, resulting in increased roadway access and associated safety hazards, especially in areas of steep or mountainous terrain. Construction of access roads would also cause environmental disturbance (see Sections 3.4, Water Resources; 3.5, Vegetation; and 3.2, Earth). Under RCW 47.52, certain areas and uses are prohibited on limited access facilities. These prohibitions help maintain the safety and functionality of limited access facilities.

- **Impacts on Road Authority** - Transmission construction within roadway ROWs presents several challenges and encumbrances on road authorities, including the traffic disruptions and collision risks described above, as well as maintenance challenges. Construction of transmission facilities and placement of infrastructure within ROWs can complicate routine road maintenance activities of road authorities, requiring maintenance crews to navigate around transmission structures, slowing down operations, and possibly increasing costs.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on vehicular transportation, without mitigation measures incorporated, are anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Impacts on Waterborne Vessels and Infrastructure

The construction of transmission facilities could have the following identified impacts on waterborne transportation, particularly in areas where transmission facilities cross or run parallel to navigable waterways:

- **Closures and Diversions** - Construction activities could temporarily disrupt navigation routes, requiring vessels to detour or slow down. This could affect commercial shipping schedules and increase operational costs. Delays and disruptions in waterborne traffic could have economic repercussions, particularly for industries that rely on the timely shipping of goods.
- **Increased Collision Risk** - The presence of construction equipment and personnel near waterways could pose safety risks for both construction workers and vessel operators. Proper coordination and communication are essential to mitigate collision risks.
- **Impacts from Infrastructure Modification** - Existing waterborne infrastructure, such as docks and piers, may need to be modified or reinforced to accommodate construction activities. This could lead to additional cost and logistical challenges, interrupting access to and use of waterborne transportation, as well as cause a nuisance to public and private users.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on waterborne transportation, without mitigation measures incorporated, are anticipated to vary and could be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Impacts on Rail Transportation and Infrastructure

The construction of transmission facilities can impact railway operations, particularly in areas that require railroad crossings. The following impacts on rail transportation could occur during the construction phase:

- **Closures and Diversions** - Construction activities near rail lines can lead to temporary disruptions and delays. This could affect train schedules, resulting in increased travel times and potential inconvenience for passengers and freight operators.
- **Increased Collision Risk** - The presence of construction equipment and personnel near rail tracks can pose collision risks. Proper safety protocols and coordination between construction personnel and rail operators are essential to mitigate safety concerns.
- **Impacts on Rail Stability** - Construction activities, especially those involving heavy machinery, can generate noise and vibration that may affect nearby rail operations. This vibration could impact the stability of rail tracks and compromise passengers' comfort.

- **Impacts from Infrastructure Modification** - In some cases, existing rail infrastructure may need to be modified or reinforced to accommodate transmission facility construction, adding costs and logistical challenges.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on rail transportation, without mitigation measures incorporated, is anticipated to vary and could be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Impacts on Air Transportation and Infrastructure

The construction of transmission facilities could have the following identified impacts on air transportation.

- **Impacts from Airspace Restrictions** - Construction activities, especially those involving tall structures like transmission towers, could lead to temporary airspace restrictions. These restrictions could affect flight paths and schedules, requiring pilots to adjust their routes. Helicopter operations needed for the construction of overhead transmission facilities may require temporary airspace restrictions or no-fly zones to ensure safety.
- **Increased Collision Risk** - The presence of cranes and other tall equipment near airports or flight paths could pose safety hazards. Proper coordination with aviation authorities is essential to ensure that these structures are clearly marked and communicated to pilots to minimize risks of collision.
- **Decreased Visibility** - Construction activities could create visual obstructions and interfere with navigational aids. This could be particularly challenging during poor weather conditions or for low-flying aircraft. Similarly, vibration from construction equipment could affect nearby airports and air traffic control operations, leading to temporary disruptions in navigational aids. Vibration could affect the accuracy of navigational aids. These systems rely on precise signals, and excessive vibration could cause signal distortion. Construction can lead to environmental changes, such as dust and emissions, which can affect air quality and visibility and could indirectly impact air traffic, especially in areas with high construction activity. Other impacts of dust and emissions are discussed in Section 3.3, Air Quality.

Section 3.9, Land and Shoreline Use, analyzes impacts on military utilized airspace and civilian airfield operations.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on air transportation, without mitigation measures incorporated, are anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission

Activities for the construction phase of underground transmission facilities, including open trench, trenchless (including horizontal directional drilling), or underwater construction methods, would vary depending on the scale of the facility and site characteristics. Similar to overhead transmission facilities, underground construction could include a site preparation phase of relatively short duration, followed by a longer construction and start-up phase. It is assumed that the construction phase for underground transmission facilities, per mile, would have a longer duration than overhead projects. Underground transmission could have the following identified impacts during the construction phase:

- Impacts on Vehicular Transportation
- Impacts on Waterborne Vessels

- Impacts on Rail Transportation
- Impacts on Air Transportation

Impacts on Vehicular Transportation

Like its overhead counterpart, the construction of underground transmission facilities could have the following impacts on vehicular transportation:

- **Closures and Diversions –** Construction activities often require temporary road closures or detours to ensure the safety of both workers and drivers. Heavy construction vehicles, such as trucks carrying underground cables, equipment, and excavation materials, often require frequent access to and from construction sites, potentially disrupting traffic flow. These vehicles are often large and can block lanes or create bottlenecks, increasing congestion. Excavation work may require road closures, lane reductions, or detours to ensure worker safety and accommodate necessary construction equipment.
- **Increased Traffic and Increased Collison Risk** – Workers commuting to and from construction sites may also contribute to increased traffic, especially during peak hours. The movement of heavy construction vehicles and equipment could also pose hazards, especially when entering and exiting construction sites. The addition of oversized loads could disrupt traffic and require special permits and escorts. Increased traffic and oversized loads are of particular concern when traffic hazards, such as school zones and bus stops, are en route. These roadway disruptions could increase the potential for traffic accidents and cause delays, requiring drivers to navigate detours or alternate routes. Given that underground construction generally takes longer than overhead construction, the resulting impacts on vehicular transportation may be more prolonged.
- **Impacts from Access Road Construction** – The construction of access roads could lead to an expansion of the local roadway network, resulting in increased roadway access and associated safety hazards, especially in areas of steep or mountainous terrain. Construction of access roads would also cause environmental disturbance (see Sections 3.4, Water Resources; 3.5, Vegetation; and 3.2, Earth). Under RCW 47.52, certain areas and uses are prohibited on limited access facilities[256], such as freeways and some highways. These prohibitions help maintain the safety and functionality of limited access facilities.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on vehicular transportation, without mitigation measures incorporated, are anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Impacts on Waterborne Transportation

During construction of underground facilities, the following identified impacts on waterborne transportation may occur:

- **Closures and Diversions** – Waterborne vessels may be impacted by underground transmission construction, as activities such as the installation of cables or the excavation of trenches for infrastructure could disrupt waterways, affect docking areas, and create temporary obstructions. The construction of underwater facilities can particularly impact waterborne transportation as specialized barges that are used to

[256] Defined as a highway or street especially designed or designated for through traffic, and over, from, or to which owners or occupants of abutting land, or other persons, have no right or easement, or only a limited right or easement of access, light, air, or view by reason of the fact that their property abuts upon such limited access facility, or for any other reason to accomplish the purpose of a limited access facility.

lay cables on the waterbed can create temporary disruptions to traffic by blocking navigation channels or restricting access to certain areas. Similarly, construction methods typically associated with underwater cable installation require precise positioning and extended time on site, which could delay other vessels or cause congestion in busy waterways. Underwater construction activities would require coordination of marine traffic control measures to ensure safety and minimize disruptions to shipping schedules.

- **Increased Collision Risk** – The construction of transmission facilities underwater could increase the risk of collisions. The presence of construction equipment and materials in the water poses hazards to navigation, requiring additional safety measures and coordination. Vessels colliding with underwater transmission infrastructure could cause damage to both the vessels and the transmission lines, potentially leading to power outages, costly repairs, and other safety concerns.
- **Impacts from Infrastructure Modification** – Construction activities may require new or modified infrastructure (e.g., docks, loading areas) which could alter waterway dynamics, potentially improving or complicating waterborne transportation depending on the design and implementation. Effective scheduling and coordination minimize conflicts between construction activities and regular waterborne transportation operations.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on waterborne transportation, without mitigation measures incorporated, are anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Impacts on Rail Transportation

Like overhead facility construction, underground construction activities could have the following identified impacts on rail transportation:

- **Closures and Diversions** – Construction near railroads could cause temporary railroad disruptions, affecting train schedules, increasing travel times, and inconveniencing passengers and freight operators.
- **Increased Collision Risk** – The presence of construction equipment and personnel near tracks may pose safety risks to workers and rail operators.
- **Impacts on Rail Stability** – Heavy machinery used for trenching could generate noise and vibration that may compromise rail track stability and passenger comfort. Similarly, trenching activities could disrupt soil, potentially leading to erosion and ground instability, which could destabilize tracks (see Section 3.2, Earth Resources).
- **Impacts from Infrastructure Modification** – In some cases, existing rail infrastructure may need reinforcement to accommodate transmission facility construction, requiring track closures or rerouting, which could further complicate scheduling, increase operational challenges, and disrupt services.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on rail transportation, without mitigation measures incorporated, are anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Impacts on Air Transportation

Construction activities could have the following impacts on air transportation:

- **Temporary Airspace Restrictions** – The construction of underground facilities would not have as large of an impact on air transportation as overhead construction, as it would occur at and below ground level. While underground construction does not typically interfere with flight paths or airspace, there may be temporary airspace restrictions on the height of construction equipment like cranes, which could interfere with flight paths if the construction site is near an airport.
- **Increased Collision Risk** – Even though the transmission lines are underground, temporary tall structures or equipment may be used during construction, affecting airspace and increasing collision risk.
- **Decreased Visibility** – Construction activities could indirectly impact air transportation as a result of vibration and decreased air quality (see Section 3.13, Noise and Vibration and Section 3.3, Air Quality). Vibration could affect the accuracy of navigational aids. These systems rely on precise signals, and excessive vibration could cause signal distortion. Construction can lead to environmental changes, such as dust and emissions, which could affect air quality and visibility and could indirectly impact air traffic, especially in areas with high construction activity.

Section 3.9, Land and Shoreline Use, analyzes impacts on military utilized airspace and civilian airfield operations.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on air transportation, without mitigation measures incorporated, are anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Operation and Maintenance

Overhead Transmission Facilities

Activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs, similar to any other linear industrial facility. Overhead transmission facilities could have the following identified impacts during the operation and maintenance phase:

- Impacts on Vehicular Transportation
- Impacts on Waterborne Transportation
- Impacts on Rail Transportation
- Impacts on Air Transportation

Impacts on Vehicular Transportation

Overhead transmission facilities could have the following identified impacts on vehicular transportation during the operation and maintenance phase:

- **Increased Collision Risks** – Transmission facilities along roadways pose potential collision risks, as they are physical obstructions that drivers may inadvertently strike, especially in areas with limited visibility, narrow lanes, or high-speed traffic. Collisions with electrical towers could cause harm to individuals involved, as well as road closures and traffic diversions. The use of large equipment and vehicles for maintenance could increase the risk of collisions with other vehicles, especially in areas of high traffic.

- **Closures and Diversions** – Repair and maintenance activities may also necessitate temporary road or lane closures, leading to increased travel times and congestion in affected areas; however, overhead facilities can typically be repaired quickly.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on vehicular transportation, without mitigation measures incorporated, are anticipated to vary and could be negligible to low.

<u>Impacts on Waterborne Transportation</u>

Transmission lines that cross waterways can pose navigation hazards for vessels. The following identified impacts on waterborne transportation could occur during the operation and maintenance phase:

- **Increased Collision Risk** – Transmission facilities near or crossing waterways could pose potential collision risks, as they form physical obstructions that vessels may inadvertently strike.
- **Visual Obstructions** – Proper marking and lighting of these lines are essential to ensure that they are visible to ship operators, especially at night or in poor weather conditions. Transmission towers and lines could also act as visual obstructions that complicate ship navigation, particularly in areas with complex waterways or near ports, where precise maneuvering is crucial for safe passage.
- **Closures and Diversions** – Regular maintenance and repair of transmission facilities may require temporary access to areas near or over waterways, which may cause coordination challenges and potential disruptions to navigation routes and shipping schedules.
- **Electromagnetic Interference** – Transmission facilities could generate EMI that may interfere with navigational equipment vessels. This interference could affect the accuracy of instruments and require ship operators to take additional safety precautions. Understanding and mitigating EMI is crucial to ensure the safe and efficient operation of transportation systems near transmission facilities.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on waterborne transportation, without mitigation measures incorporated, are anticipated to vary and could be negligible to low.

<u>Impacts on Rail Transportation</u>

During operation and maintenance, overhead transmission facilities could have the following impacts on rail transportation.

- **Increased Collision Risks** – Transmission lines and towers near rail tracks could pose collision risks, especially during periods of maintenance and repair activities involving vehicles and equipment. Regular maintenance and repair activities may require temporary access to areas near rail tracks. This could cause temporary disruptions and delays, affecting train schedules; however, overhead lines and facilities can typically be repaired quickly.
- **Electromagnetic Interference** – Transmission facilities could generate EMI that may interfere with railway signaling and communication systems. This could affect the reliability and safety of rail operations. Understanding and mitigating EMI is crucial to ensure the safe and efficient operation of transportation systems near transmission facilities.

- **Impacts on Rail Stability** – Transmission facilities could lead to soil erosion or changes in surrounding vegetation (see Section 3.2, Earth Resources and Section 3.5, Vegetation). These environmental changes could indirectly impact rail reliability and operations.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on rail transportation, without mitigation measures incorporated, are anticipated to vary and could be nil to low.

Impacts on Air Transportation

During operation and maintenance, overhead transmission facilities could have the following impacts on air transportation:

- **Temporary Airspace Restrictions** – During the operation and maintenance of transmission facilities, there may be temporary airspace restrictions on the height of construction equipment like cranes, which could interfere with flight paths if the construction site is near an airport.
- **Increased Risk of Collision** – Transmission towers and lines could pose collision risks for low-flying aircraft such as helicopters and small planes. Proper marking and lighting of these structures are essential to ensure they are visible to pilots.
- **Electromagnetic Interference** – EMI could disrupt the operation of navigation systems used in aviation, potentially leading to safety hazards. This could affect the accuracy of instruments and require additional precautions by pilots and air traffic controllers. Understanding and mitigating EMI is crucial to ensure the safe and efficient operation of transportation systems near transmission facilities.
- **Visual Obstructions** – Transmission facilities could create visual obstructions, particularly in areas with complex terrain or near airports. This could be challenging for pilots during takeoff, landing, and low-altitude flight operations.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on air transportation, without mitigation measures incorporated, are anticipated to vary and could be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Similar to overhead transmission facilities, activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and rights-of-way, similar to any other linear industrial facility.

During normal operation, underground transmission facilities may impact vehicles and railway systems through electromagnetic interference. EMI may affect certain electronic systems in vehicles, including navigation and communication systems. Similarly, induced currents from the magnetic fields of underground cables could disrupt railway systems, leading to issues such as signal interference, malfunctioning control systems, and the potential degradation of equipment reliability. The level of interference and impact depends on several factors, including the strength of the magnetic field, the proximity of the underground cables to the railway and vehicular systems, and the design of both the transmission cables and the railway infrastructure.

During normal operation, no other impacts on transportation are expected to occur; however, in the event of system malfunction, lengthy maintenance and repair times could have the following identified impacts during the operation and maintenance phase:

- Impacts on Vehicular Transportation
- Impacts on Waterborne Transportation
- Impacts on Rail Transportation
- Impacts on Air Transportation

Impacts on Vehicular Transportation

During operation and maintenance, extended repair activities could have the following identified impacts on vehicular transportation:

- **Closures and Diversions** – Due to the nature of underground transmission systems, lengthy repairs involving complex procedures and specialized equipment could disrupt vehicular traffic and lead to increased congestion. Access to underground vaults may necessitate excavation activities, which often require road closures, lane reductions, or detours to ensure worker safety and accommodate construction equipment.
- **Increased Collision Risk** – Roadway obstructions could increase the risk of collision. Regular maintenance requires the presence of vehicles and equipment, which could also create obstacles and increase the risk of collisions with other vehicles or infrastructure. Maintenance zones often have reduced visibility due to equipment, materials, and temporary structures, making it harder for operators and drivers to navigate safely.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on vehicular transportation, without mitigation measures incorporated, are anticipated to vary and could be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Impacts on Waterborne Transportation

The following identified impacts on waterborne transportation could occur due to extended repair activities during the operation and maintenance phase:

- **Closures and Diversions** – Waterborne transportation may be impacted due to the lengthy process of underwater fault detection, access, and repair. Specialized vessels required for cable recovery could temporarily disrupt marine traffic by blocking navigation channels or restricting access to certain areas.
- **Increased Collision Risk** – Similarly, the complex repair process could lead to extended time on site, which could delay other vessels or cause congestion in busy waterways. Disruptions of busy waterways could increase the risk of collision with other waterborne vessels.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on waterborne transportation, without mitigation measures incorporated, are anticipated to vary and could be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Impacts on Rail Transportation

Underground transmission facilities may have the following identified impacts on rail transportation during operation and maintenance if vaults occur near railway systems:

- **Closures and Diversions** – Access to underground vaults may necessitate excavation activities, which could cause temporary railroad disruptions, affecting train schedules, increasing travel times, and inconveniencing passengers and freight operators.
- **Increased Collision Risk** – Maintenance activities to transmission facilities near rail lines can bring equipment and personnel close to active rail tracks, increasing the risk of collisions. Maintenance work may involve temporary obstructions, such as vehicles, equipment, and materials, which could interfere with rail operations. Visual obstructions during maintenance activities could make it more difficult for train operators to see and respond to potential hazards.
- **Impacts on Rail Stability** – Heavy machinery used in the excavation process could compromise track stability and passenger comfort through generation of noise and vibration, and the presence of machinery and personnel near tracks may pose safety risks to workers, rail operators, and passengers.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on rail transportation, without mitigation measures incorporated, are anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Impacts on Air Transportation

Underground transmission facilities may have the following identified impact on air transportation if vaults occur near airports:

- Temporary Airspace Restrictions – Access to underground vaults may necessitate excavation activities, which may require the use of equipment such as cranes or excavators, requiring temporary airspace restrictions.

The operation of underground transmission facilities is expected to have less of an impact on air transportation than overhead transmission facilities due to the underground nature, which typically prevents the risk of collision and visual obstruction.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on air transportation, without mitigation measures incorporated, are anticipated to vary and could be nil to low.

Upgrade or Modification

Along with upgrade or modification at the need of customers or utility provider, transportation-related projects may also necessitate the replacement, relocation, or removal of transmission facilities located on State ROW.

Overhead Transmission Facilities

Upgrading or modifying overhead transmission facilities would involve several key steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Overhead transmission could have the following impacts during the upgrade or modification phase:

- Impacts on Vehicular Transportation

- Impacts on Waterborne Transportation
- Impacts on Rail Transportation
- Impacts on Air Transportation

While adverse impacts would be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Shorter Duration:** Upgrades or modifications typically take less time than building new facilities, leading to shorter periods of impact on transportation.
- **Reduced Construction Activities:** The scope of work is often smaller, involving less heavy machinery and fewer construction activities, which minimizes disruptions to transportation.
- **Use of Existing Infrastructure:** Upgrading or modifying typically uses existing ROW and infrastructure, reducing the need for extensive construction.

Underground Transmission

Upgrading or modifying underground transmission facilities would involve several key steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Underground transmission could have the following impacts during the upgrade or modification phase:

- Impacts on Vehicular Transportation
- Impacts on Waterborne Transportation
- Impacts on Rail Transportation
- Impacts on Air Transportation

While impacts would be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Shorter Duration:** Upgrades or modifications typically take less time than building new facilities, leading to shorter periods of impact on transportation.
- **Reduced Construction Activities:** The scope of work is often smaller, involving less heavy machinery and fewer construction activities, which minimizes disruptions to transportation.
- **Use of Existing Infrastructure:** Upgrading or modifying typically uses existing ROW and infrastructure, reducing the need for extensive construction.

3.10.3.3 No Action Alternative

The No Action Alternative represents the scenario in which this Draft Programmatic EIS is not used and current management practices for siting and planning transmission facilities continue unchanged. Under this alternative, each project would continue to be evaluated on a case-by-case basis and reviewed for compliance with existing regulations, codes, and standard practices. While impact determinations would likely be similar to those outlined in this Draft Programmatic EIS, projects would not benefit from the impact reductions associated with the avoidance criteria developed and analyzed in this Draft Programmatic EIS. These criteria are anticipated to provide additional mitigation that further reduces potential environmental impacts.

3.10.4 Potential Mitigation Measures

This section describes measures that would eliminate, reduce the intensity of, or compensate for adverse impacts from construction, operation and maintenance, and upgrade or modification of transmission facilities. All general conditions adopted for this Draft Programmatic EIS, identified in Section 3.1, are relevant to this resource section. Applicants would be responsible for providing information within their application materials documenting the implementation of the general conditions.

Avoidance criteria adopted for this Draft Programmatic EIS are identified in Section 3.1. Avoidance criteria that are relevant to this resource section are described below:

AVOID-14 – Civilian Airports and Military Installations: Avoid impacts on civilian airports, surrounding runway protection zones, and military installations, such as the Yakima Training Center, National Security Area, and Boardman Geographic Area of Concern.

Rationale: This avoidance criterion aims to avoid impacts on designated areas within which some forms of development could have an adverse impact on airport and military operations and/or readiness.

AVOID-15 – Non-Compliance with Utilities Accommodation Policy: Avoid planning, siting, and constructing transmission facilities that are not properly accommodated within highway rights-of-way (ROWs).

Rationale: Comprehensive analysis of impacts and mitigation strategies would be required by WSDOT when transmission facilities are planned or designed within ROWs. In cases where utility providers are noncompliant with the Utilities Accommodation Policy, the utility company must submit a detailed variance application to the applicable department for review. The variance application requires an environmental review and, if approved, additional mitigation measures may be required.

AVOID-16 – Decrease in LOS Below Acceptable Levels: Levels: Avoid a decrease in level of service (LOS) below level C on roads used during construction and avoid additional LOS reductions during construction on roads already below level C.

Rationale: This avoidance criterion aims to maintain LOS. LOS can be directly related to safety issues related to traffic density and flow. For example, higher traffic volumes and lower LOS can increase the risk of accidents.

Applicants would be responsible for providing information within their application materials documenting the project's compliance with the above avoidance criteria.

Potential mitigation measures have been identified to minimize adverse impacts from transmission facility projects. These measures are intended to be broad so that they can be applied to most projects that would be covered under this Programmatic EIS. However, project-specific plans would be needed to adapt the measures for project-specific applications.

When impact determinations are identified as moderate or high, the applicant would either adopt applicable mitigation measures from this Programmatic EIS or the SEPA Lead Agency may require applicable mitigation measures to be implemented to reduce project-specific impacts. When impact determinations are low, applicable mitigation measures should still be considered by the applicant and the SEPA Lead Agency as these measures would help to further reduce project-specific impacts, including the project's contribution to cumulative impacts. These measures would be implemented in addition to compliance with laws, regulations, environmental permits, plans, and design considerations required for transmission facilities.

The following mitigation measures could be adopted to mitigate adverse impacts:

TR-1 – Complete a TIA: Complete a Traffic Impact Assessment (TIA) to ensure public safety and identify any negative effects.

Rationale: This is a required component of project-specific applications necessary for SEPA Lead Agencies to evaluate baseline conditions.

This mitigation measure aims to identify how the project would affect local traffic patterns, road safety, and transportation infrastructure.

TR-2 – Coordination with Aviation Groups: Work closely with aviation groups and authorities to ensure that transmission facilities are marked on aviation maps and that pilots, both commercial and recreational, are aware of their locations.

Rationale: This mitigation measure aims to reduce the risk of accidents and alert low-flying aircraft and helicopters or other aerial recreationists in the area, including private aircraft, paragliders, hang-gliders, and skydivers to overhead transmission facilities.

TR-3 – Transportation Plan: Prepare a comprehensive transportation plan for transmission component materials and large construction equipment.

Rationale: This is a required component of project-specific applications necessary for SEPA Lead Agencies to evaluate baseline conditions.

This mitigation measure aims to enhance transportation safety and efficiency through compliance with state regulations and industry best practices.

TR-4 – Planning Coordination: Consult local authorities regarding planned construction activity near or crossing roads, waterways, railways, and airports.

Rationale: This mitigation measure aims to streamline transportation processes and reduce impacts by optimizing routes, schedules, and operations for all types of transportation to meet the needs of affected stakeholders, minimize disruptions, and address potential concerns.

TR-5 – Carpool Program: Create a carpool program that connects workers commuting from similar areas.

Rationale: This mitigation measure aims to limit traffic volume increases associated with commuting workers by decreasing the number of potential cars on the road. It also aims to reduce a project's environmental impact by minimizing emissions from vehicles.

In addition to the above mitigation measures, the following mitigation measures[257] developed for other resources may be applicable:

H&S-4 – Risk Management Strategy: Develop and apply an electromagnetic field (EMF) and electromagnetic interference (EMI) risk management strategy that regularly considers the consequence, likelihood, and significance of EMF and EMI on public health and existing infrastructure, such as transportation systems, based on emerging research studies and guidelines.

H&S-6 – Emergency Management Plan: Develop and implement a project-specific emergency management plan in coordination with local emergency service providers that addresses safety-related standards and procedures for potential emergency-related incidents during facility construction and operation.

LSU-4 – Consult with the Northwest DOD Regional Coordination Team: Conduct early and ongoing consultation with the Northwest Department of Defense (DOD) Regional Coordination Team to address any potential conflicts with military utilized airspaces or land uses.

PSU-2 – Law Enforcement and Emergency Management Coordination: Contact local law enforcement and emergency management departments to identify and address potential issues.

Rec-5 – Notice to Air Missions[258]: Coordinate with the appropriate aviation authorities, such as the Federal Aviation Administration, to determine the necessity and content of a Notice to Air Missions (NOTAM).

3.10.5 Probable Significant Adverse Environmental Impacts

Determining the significance of an impact involves context and intensity, which, in turn, depend on the magnitude and duration of the impact. “Significant” in the Washington State Environmental Policy Act means a reasonable likelihood of more than a moderate adverse impact on environmental quality. An impact may also be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred (WAC 197-11-794).

Identification of environmental impacts and assignment of discipline-specific ratings is based on professional judgment and information available at the time of writing. A precautionary approach has been taken for the assessment where information is currently unknown or unavailable.

This Draft Programmatic EIS weighs the impacts on transportation that would result from transmission facilities after considering the application of laws and regulations; siting and design considerations, including agency guidance and BMPs; and mitigation, and makes a resulting determination of significance for each impact. **Table 3.10-4** summarizes the impacts anticipated for the construction, operation and maintenance, and upgrade or modification of transmission facilities.

[257] The rationales for the identified mitigation measures are provided in their respective resource sections.

[258] A notice containing information that is essential to pilots and other air personnel.

Table 3.10-4: Summary of Impacts, Mitigation Measures, and Significance Rating for Transportation

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Transportation – Impacts on Vehicular Transportation	Construction	The following impacts could occur during the construction phase of both overhead and underground transmission facilities: ▪ Closures and Diversions ▪ Increased Traffic ▪ Increased Collision Risk ▪ Impacts from Access Road Construction Due to overhead transmission facilities involving above-ground infrastructure that can cause obstructions, the following impact is anticipated to occur for overhead transmission facilities: ▪ Impacts on Road Authority	**Overhead:** low to high **Underground:** low to high	▪ **AVOID-15:** Non-Compliance with Utilities Accommodation Policy ▪ **AVOID-16** Decrease in LOS Below Acceptable Levels ▪ **TR-1:** Complete a TIA ▪ **TR-3:** Transportation Plan ▪ **TR-4:** Planning Coordination ▪ **TR-5:** Carpool Program ▪ **H&S-6:** Emergency Management Plan ▪ **PSU-2:** Law Enforcement and Emergency Management Coordination	Less than Significant	Federal and state regulatory requirements ensure that construction projects implement effective traffic guidelines during roadway operations. Standard BMPs like traffic control signs and markers, along with the identified mitigation measures, would be generally effective at minimizing impacts from road closures and traffic diversions. International safety guidelines ensure that electronic components of vehicles and other modes of transportation meet electromagnetic compatibility standards.
	Operation and Maintenance	The following impacts could occur during the operation and maintenance phase of both overhead and underground transmission facilities: ▪ Increased Collision Risks ▪ Closures and Diversions	**Overhead:** negligible to low **Underground:** low to moderate			
	Upgrade or Modification	Impacts would be similar to the construction phase for upgrading or modifying existing transmission facilities.	**Overhead:** low to high **Underground:** low to high			
Transportation – Impacts on Waterborne Transportation	Construction	The following impacts could occur during the construction phase of both overhead and underground transmission facilities: ▪ Closures and Diversions ▪ Increased Collision Risk ▪ Impacts from Infrastructure Modification	**Overhead:** low to moderate **Underground:** low to high	▪ **AVOID-15:** Non-Compliance with Utilities Accommodation Policy ▪ **TR-1:** Complete a TIA ▪ **TR-3:** Transportation Plan ▪ **TR-4:** Planning Coordination ▪ **H&S-4:** Risk Management Strategy ▪ **H&S-6:** Emergency Management Plan ▪ **PSU-2:** Law Enforcement and Emergency Management Coordination	Less than Significant	Federal and state requirements ensure the safe construction of transmission facilities. Standard BMPs and the identified mitigation measures would effectively minimize impacts on navigation routes and shipping schedules. International safety guidelines ensure that electronic components of vehicles and other modes of transportation meet electromagnetic compatibility standards. BMPs like shielding methods, along with the identified mitigation measures, would be effective at minimizing electromagnetic interference.
	Operation and Maintenance	The following impacts could occur during the operation and maintenance phase of both overhead and underground transmission facilities: ▪ Increased Collision Risk ▪ Closures and Diversions The following impacts would be specific to the operation and maintenance of overhead transmission facilities: ▪ Electromagnetic Interference ▪ Visual Obstructions	**Overhead:** negligible to low **Underground:** low to moderate			
	Upgrade or Modification	Impacts would be similar to the construction phase for upgrading or modifying existing transmission facilities.	**Overhead:** low to moderate **Underground:** low to high			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Transportation – Impacts on Rail Transportation	Construction	The following impacts could occur during the construction phase of both overhead and underground transmission facilities: ▪ Closures and Diversions ▪ Increased Collision Risk ▪ Impacts on Rail Stability ▪ Impacts from Infrastructure Modification	**Overhead:** low to moderate **Underground:** low to high	▪ **AVOID-15:** Non-Compliance with Utilities Accommodation Policy ▪ **TR-1:** Complete a TIA ▪ **TR-3:** Transportation Plan ▪ **TR-4:** Planning Coordination ▪ **H&S-4:** Risk Management Strategy ▪ **H&S-6:** Emergency Management Plan ▪ **PSU-2:** Law Enforcement and Emergency Management Coordination	Less than Significant	Federal and state requirements ensure the safe construction of transmission facilities. Standard industry practices and the identified mitigation measures would be effective at minimizing impacts from infrastructure modification. International safety guidelines ensure that electronic components of vehicles, and other modes of transportation, meet electromagnetic compatibility standards. BMPs like shielding methods, along with the identified mitigation measures, would be effective at minimizing electromagnetic interference.
	Operation and Maintenance	The following impacts could occur during the operation and maintenance phase of both overhead and underground transmission facilities: ▪ Increased Collision Risks ▪ Impacts on Rail Stability The following impacts would be specific to the operation and maintenance of overhead transmission facilities: ▪ Electromagnetic Interference The following impacts would be specific to the operation and maintenance of underground transmission facilities: ▪ Closures and Diversions	**Overhead:** nil to low **Underground:** nil to moderate			
	Upgrade or Modification	Impacts would be similar to the construction phase for upgrading or modifying existing transmission facilities.	**Overhead:** low to moderate **Underground:** low to high			
Transportation – Impacts on Air Transportation	Construction	The following impacts could occur during the construction phase of both overhead and underground transmission facilities: ▪ Temporary Airspace Restrictions ▪ Increased Collision Risk ▪ Decreased Visibility	**Overhead:** low to high **Underground:** nil to moderate	▪ **AVOID-15:** Non-Compliance with Utilities Accommodation Policy ▪ **AVOID-14:** Civilian Airports and Military Installations ▪ **TR-1:** Complete a TIA ▪ **TR-2:** Coordination with Aviation Groups ▪ **TR-3:** Transportation Plan ▪ **TR-4:** Planning Coordination ▪ **H&S-4:** Risk Management Strategy ▪ **H&S-6:** Emergency Management Plan ▪ **LSU-4:** Consult with the Northwest DOD Regional Coordination Team ▪ **PSU-2:** Law Enforcement and Emergency Management Coordination ▪ **Rec-5:** Notice to Air Missions	Less than Significant	Federal and state regulatory requirements ensure that construction projects minimize safety hazards to air traffic. Standard BMPs like effective dust suppression, along with the identified mitigation measures, would be generally effective at minimizing risks of visual obstructions to air traffic. International safety guidelines ensure that electronic components of vehicles, and other modes of transportation, meet electromagnetic compatibility standards. BMPs like shielding methods, along with the identified mitigation measures, would be effective at minimizing electromagnetic interference.
	Operation and Maintenance	The following impacts could occur during the operation and maintenance phase of both overhead and underground transmission facilities: ▪ Temporary Airspace Restrictions The following impacts would be specific to the operation and maintenance of overhead transmission facilities: ▪ Increased Risk of Collision ▪ Electromagnetic Interference ▪ Visual Obstructions	**Overhead:** low to moderate **Underground:** nil to low			
	Upgrade or Modification	Impacts would be similar to the construction phase for upgrading or modifying existing transmission facilities.	**Overhead:** low to high **Underground:** nil to moderate			

Notes:

(a) Appendix 3.9-1 provides a detailed listing of each general condition, avoidance criteria, and mitigation measure. Having these details in an appendix serves as a comprehensive reference section that can be consulted independently of the main text. This is particularly useful for detailed guidance and technical specifications that may be referred to multiple times. Additionally, including this information in an appendix allows for easier updates and revisions. If mitigation measures or guidelines change, the appendix can be updated without altering the main content.

BMP = best management practice; EIS = environmental impact statement; N/A = not applicable; TIA = Traffic Impact Assessment

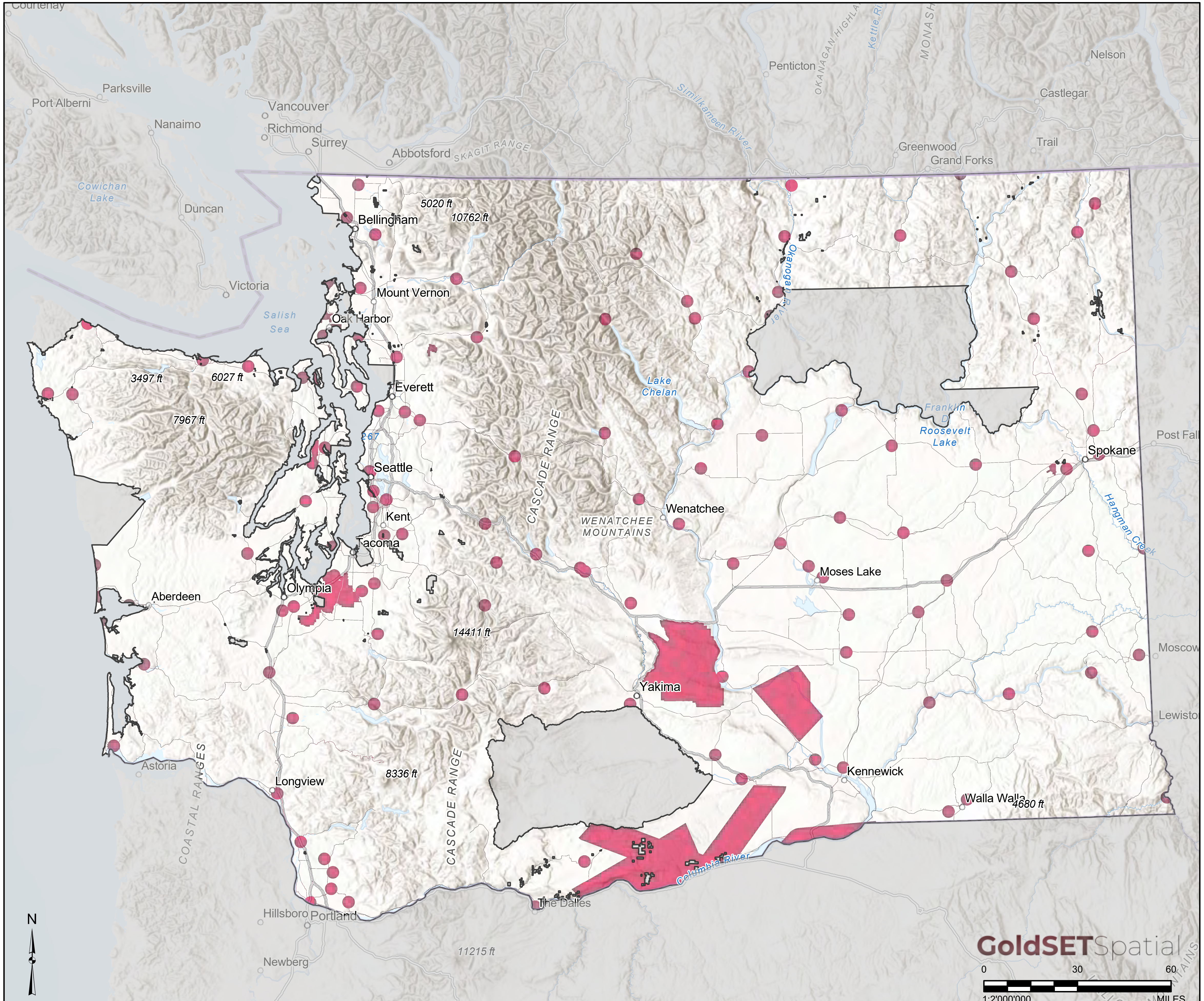
3.10.6 Suitability Map

Project-specific reviews would include a comprehensive review and analysis to identify the site-specific adverse impacts on resources to determine the suitability of this Draft Programmatic EIS. Environmental review may be phased by incorporating relevant information from this Draft Programmatic EIS by reference while evaluating site-specific adverse impacts of the individual project applications. For more information on phased reviews, please refer to Chapter 1, Introduction.

Project-specific applications would include details about the precise location and site-specific conditions. This Draft Programmatic EIS provides a suitability map that, when incorporated with project-specific applications, could be used to facilitate more informative and efficient environmental planning.

Figure 3.10-1 represents the suitability map for transportation and identifies the appropriateness of areas using laws and regulations, criteria specific to the siting of transmission, and knowledge from subject matter experts.

This Page Intentionally Left Blank



LEGEND

Study Area

Conflict Indicator Key

- Neutral
- Low
- Low-Medium
- Medium
- Medium-High
- High
- Very High

THE SEAL OF THE STATE OF WASHINGTON 1889

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES

1. WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS; ESRI, USGS
2. THE CONFLICT INDICATOR KEY CAN BE USED TO IDENTIFY AND HIGHLIGHT AREAS WHERE DIFFERENT PROJECT CONTRAINTS MAY OVERLAP, POTENTIALLY LEADING TO CONFLICTS. THE KEY USES DIFFERENT COLORS TO REPRESENT THE INTENSITY OR LIKELIHOOD OF CONFLICT.

PROJECT

DRAFT PROGRAMMATIC EIS HIGH-VOLTAGE TRANSMISSION

TITLE

SUITABILITY MAP FOR TRANSPORTATION

YYYY-MM-DD 2025-02-07

CONSULTANT wsp

FIGURE 3.10-1

This Page Intentionally Left Blank

3.10.6.1 Suitability Map Methodology

The suitability map evaluates various criteria and assigns a suitability score to different areas based on how well those areas meet the desired conditions.

A number of individual siting decision criteria, referred to as indicators in GoldSET, were identified by subject matter experts for inclusion in this resource's suitability map. Subject matter experts assigned a weighting based on the degree of constraint (i.e., high, medium, or low), or potential difficulty for a transmission facility to traverse an area. Each of the GoldSET Indicator cards describing the criteria chosen and the source of the data layers used are provided in **Appendix 3.10-1.**

A summary of the criteria used to produce each GoldSET card is provided below.

Transportation GoldSET Card – Medium Conflict - Infrastructure Strains

Bridge locations of structures owned and managed by WSDOT. Transporting large components may require special permits and considerations for bridge load limits.

Note that a 250-foot buffer around bridge line features was provided in the dataset.

Transportation GoldSET Card – High Conflict - Traffic Disruptions

Sections of road, rail, and waterways with a level of service rating 'C' or lower. Increased heavy vehicle, rail, or water traffic during construction can lead to additional congestion and potential safety hazards potentially decreasing the level of service below acceptable levels.

Note that a 250-foot buffer around road, rail, and waterway line features was provided in the datasets.

Transportation GoldSET Card– High Conflict - Air Traffic

Civilian airports, surrounding runway protection zones, and military installations, including the Yakima Training Center, National Security Area, and Boardman Geographic Area of Concern. Transmission towers and lines in these areas could create visual and physical barriers that could potentially affect navigation. Transmission facility development in these areas would compromise military operations and readiness to a level that is of high severity.

Note that a 2-mile buffer around airport point features was provided in the dataset in accordance with runway protection zones and professional judgment.

This Page Intentionally Left Blank

3.11 Public Services and Utilities

This Draft Programmatic Environmental Impact Statement (EIS) considers impacts on public services and utilities for the types of facilities described in Chapter 2. This section identifies the regulatory, siting, and design considerations; affected environment; impacts; and mitigation measures for public services and utilities related to the construction, operation and maintenance, and upgrade or modification of high-voltage electric transmission facilities (transmission facilities) in the State of Washington.

- Section 3.11.1 identifies regulatory, siting, and design considerations.
- Section 3.11.2 describes the affected environment.
- Section 3.11.3 describes impacts.
- Section 3.11.4 describes potential mitigation measures.
- Section 3.11.5 identifies probable significant adverse environmental impacts on public services and utilities.
- Section 3.11.6 provides a suitability map and scoring for the siting of transmission facilities as it relates to public services and utilities, based on the identified considerations, impacts, and mitigation measures.

3.11.1 Regulatory, Siting, and Design Considerations

This Draft Programmatic EIS establishes a broad framework for compliance, outlining general laws, regulations, best management practices (BMPs), and design considerations. It is assumed that project-specific applications will be developed within this pre-established regulatory context and are expected to comply with existing laws and regulations. If the project does not comply with applicable laws and regulations or fails to adhere to design considerations or BMPs, additional project-specific environmental review and mitigation would be required. The applicable federal, state, and local laws and regulations relevant to public services and utilities are summarized in **Table 3.11-1**.

Table 3.11-1: Laws and Regulations for Public Services and Utilities

Applicable Legislation	Agency	Summary Information
42 USC chapter 82 § 6901 et seq. – Solid Waste Disposal	U.S. Environmental Protection Agency	The Resource Conservation and Recovery Act establishes requirements for the management of solid waste and provides for "cradle to grave"[259] regulation of hazardous waste.
23 CFR 645, Utilities, Subparts A and B	U.S. Department of Transportation, Federal Highway Administration	This regulation governs utility relocations, adjustments, and reimbursement and accommodation of utilities on the right-of-way of federal-aid or direct federal highway projects.[260] The Washington State Department of Transportation accommodates utilities through the approval of joint use agreements,[261] traffic control plans, corrective measures, and use and occupancy agreements.

[259] Refers to the entire lifecycle of a product or system, from its creation (cradle) to its disposal (grave).

[260] Highway construction, reconstruction, rehabilitation, repair, or improvement projects that are directly managed and funded by the federal government.

[261] A legally binding contract that allows multiple utility companies to share the same infrastructure or right-of-way.

Applicable Legislation	Agency	Summary Information
NFPA 99, Health Care Facilities Code	National Fire Protection Association	This code sets minimum requirements for healthcare facilities to protect life and property. Requirements include standards for backup power sources, such as generators, battery systems, or a health care microgrid[262] system.
Washington State Environmental Policy Act	Washington Energy Facility Site Evaluation Council Washington State Department of Ecology Local Governments	This act is a process that identifies and analyzes environmental impacts that can be related to issuing permits. SEPA helps permit applicants and decision-makers understand how a proposed project will impact the environment. Certain projects, as defined in the SEPA Rules (WAC 197-11-704) and that are not exempt, are required to go through the SEPA process.
RCW 19.280, Electric Utility Resource Plans	Washington State Department of Commerce[(a)]	This portion of the code encourages electric utilities to develop comprehensive resource plans that describe the combination of generation and demand-side resources necessary to meet their customers' electricity needs in the short and long term.
RCW 19.405, Washington Clean Energy Transformation Act	Washington State Department of Commerce[(a)]	The Washington Clean Energy Transformation Act requires the state's electric utilities to eliminate coal-fired electricity and transition the state's electricity supply to 100% carbon-neutral by 2030 and 100% carbon-free by 2045. Electric utilities must meet all standards established under RCW 19.405.030(1) and 19.405.040(1), which require utilities to eliminate coal-fired resources from its allocation of electricity and all retail sales of electricity to consumers be greenhouse gas neutral by January 1, 2030.
RCW 36.70A.070, Comprehensive Plans – Mandatory Elements	Washington State Department of Commerce[(a)]	The Washington State Growth Management Act requires cities and counties to include a utilities element in their comprehensive plans. Projects must comply and be consistent with all relevant goals and policies outlined in the utilities element of the comprehensive plans in the area in which the project resides.
RCW 70A.45, Limiting Greenhouse Gas Emissions	Washington State[(a)] Department of Ecology	This regulation requires the state to reduce overall greenhouse gas emissions to 70 percent below 1990 levels by 2040. The state, state agencies, and political subdivisions of the state may only consider the siting and placement of new or expanded best-in-class facilities with lower carbon-emitting processes. It also requires the state to track progress toward meeting the emission reductions established in this subsection. Progress reporting will include emissions from key sectors of the economy, including, but not limited to, electricity, transportation, buildings, manufacturing, and agriculture.

[262] A small, controllable electrical system that can generate its own power and operate independently from the main power grid.

Applicable Legislation	Agency	Summary Information
RCW 80.50.010, Energy Facilities – Site Locations et seq.	Washington Energy Facility Site Evaluation Council	The legislature finds that the present and predicted growth in energy demands in Washington requires a procedure for the selection and use of sites for energy facilities and the identification of a state position with respect to each proposed site. The intent of this policy is to streamline application review for energy facilities to meet the state's energy goals.
RCW 54.04, General Provisions	Washington State Utilities and Transportation Commission[(a)]	This regulation requires that electrical facility construction or improvement bid proposals for any construction or improvement of any electrical facility shall be made using the contract proposal form supplied by the district commission[263] and in no other manner (RCW 54.04.085).
RCW 80, Public Utilities	Washington State Utilities and Transportation Commission[(a)]	RCW 80.01.040 grants EFSEC with its existing jurisdiction to exercise its powers prescribed in titles 80, 81, and any other law.
RCW 70A.205, Solid Waste Management – Reduction and Recycling	Washington State Department of Ecology[(a)]	This regulation establishes regulations for the management, reduction, and disposal of solid waste in Washington. RCW 70A.205.120 requires permits for solid waste handling facilities and disposal sites.
RCW 90.03.260, Appropriation procedure – Application – Contents	Washington State Department of Ecology[(a)]	A water right is required for the use of any amount of surface water or groundwater from a well. A water right is not needed if water is received from a utility with the necessary rights.
WAC 51-54A-0510, Emergency responder communication coverage	Washington State Building Code Council[(a)]	This regulation requires emergency responder communication coverage to have standby power for a minimum of 12 hours.
WAC 388-107-1030, Backup power	Washington State Department of Social and Health Services[(a)]	This regulation requires enhanced service facilities[264] to have an alternate source of power and automatic transfer equipment[265] to connect the alternate source within ten seconds of the failure of the normal source.
WAC 480-100, Electric Companies	Washington State Utilities and Transportation Commission[(a)]	Electric utilities must comply with all regulations outlined in RCW 80.28 and will be regulated by the UTC regarding requirements for consumer protection, financial records and reporting, electric metering, and electric safety and standards.

Notes:

(a) The agency responsible for administering most permits or authorizations for the identified regulation. However, if EFSEC is determined to be the agency responsible for approving a proposal, EFSEC can administer several types of permits at the state and local levels. EFSEC provides a streamlined process for siting and licensing major energy facilities, including transmission facilities in Washington State. EFSEC coordinates all evaluation and licensing steps, specifies the conditions for construction and operation, and issues a Site Certification Agreement, which assumes the responsibility for issuing individual state or local permits. By consolidating these permits into a single Site Certification Agreement, EFSEC can simplify the regulatory process for energy facility developers. While EFSEC itself does not directly administer federal permits, it works closely with federal agencies to ensure that all necessary federal requirements are met during the evaluation and licensing of energy facilities.

---

263 Refers to a governing body or board responsible for overseeing various functions within a district.

264 Specialized residential settings designed to provide care for individuals with complex personal care and behavioral challenges that do not require institutionalization.

265 Refers to systems and devices that automatically switch a power supply from its primary source to a backup source when a failure or outage occurs.

Table 3.11-1 Notes Continued
CFR = Code of Federal Regulations; EFSEC = Washington Energy Facility Site Evaluation Council; NFPA = National Fire Protection Agency; RCW = Revised Code of Washington; SEPA = State Environmental Policy Act; USC = United States Code UTC = Washington State Utilities and Transportation Commission; WAC = Washington Administrative Code

The siting of transmission facilities is determined by engineering, technical, environmental, and socioeconomic factors. **Table 3.11-2** summarizes guidance documents and management plans that outline the design considerations and BMPs generally used to avoid or minimize impacts on public services and utilities.

Table 3.11-2: Siting and Design Considerations for Public Services and Utilities

Siting and Design Consideration	Description
National Electrical Safety Code	The NESC covers basic provisions for safeguarding persons from hazards arising from the installation, operation, or maintenance of conductors and equipment and provides work rules for electric supply and communication lines and equipment. Relevant sections include the following: ▪ Part 2 – Sections 20-23: Rules for overhead line clearances ▪ Part 3 – Sections 30-39: Rules for underground lines ▪ Part 4 – Sections 40-43: Work rules
North American Electric Reliability Corporation Reliability Guidelines: Gas and Electrical Operational Coordination Considerations	The purpose of this guideline is to assist grid operators and owners in the effective coordination of electric operations with natural gas providers. The reliability guideline provides key practices and information to responsible entities that depend on natural gas for a portion of the electric grid.
Federal Energy Regulatory Commission Guidance	FERC regulates the interstate transmission of natural gas, oil, and electricity by overseeing transmission rates, market practices, and infrastructure development.
American Society of Civil Engineers Standards and Guidelines: ▪ ASCE/UESI/CI 75-22: Standard Guideline for Recording and Exchanging Utility Infrastructure Data ▪ ASCE/SEI 7-22: Minimum Design Loads and Associated Criteria for Buildings and Other Structures	The ASCE develops standards and guidelines relevant to the design, construction and maintenance of infrastructure, including electrical transmission systems and public utilities. These standards provide guidance about the collection and exchange of utility infrastructure data to support a wide range of uses including safeguarding utility infrastructure while expediting construction delivery with reduced risk. The standards also provide guidelines for the design and maintenance of transmission facilities, including considerations for corrosion. These guidelines emphasize the importance of robust insulation and proper materials to withstand environmental conditions.
U.S. Department of Energy, Transmission Siting and Permitting Efforts (DOE n.d.)	This guide ensures that the siting process considers the impact on public services and utilities, including the need for reliable power supply, environmental protection, and community engagement.
Recommended Siting Practices for Electric Transmission Developers (Americans for a Clean Energy Grid 2023)	This document outlines best practices for siting electric transmission facilities. Recommended practices include: ▪ Early and transparent engagement ▪ Respect and fair dealing ▪ Environmental considerations ▪ Interagency coordination ▪ Use of existing infrastructure

Siting and Design Consideration	Description
IEEE 2445-2018 Draft Standard Practice - Inspection and Assessment of Below Grade and Groundline Corrosion on Weathering Steel on Electrical Transmission and Distribution Structures	This standard provides recommendations to help utilities identify structures that may be at a high risk for below-grade corrosion.

ASCE = American Society of Civil Engineers; FERC = Federal Energy Regulatory Commission; IEEE = Institute of Electrical and Electronics Engineers; NERC = North American Electric Reliability Corporation; NESC = National Electric Safety Code

3.11.2 Affected Environment

This section discusses the existing public services and utilities in Washington. Affected public service agencies include law enforcement, fire protection, emergency medical services, and schools. This section also discusses utilities that would be affected by transmission facility development, including those related to existing electrical systems and transmission facilities, water, wastewater, solid waste, natural gas, and communication services. Impacts related to water quality are discussed in Section 3.4, Water Resources.

3.11.2.1 Public Services

Public services in Washington generally consist of services and systems necessary to maintain a safe community. Below is an overview of emergency response services in Washington. **Table 3.11-3** summarizes the total public service facilities in Washington. School and library counts are included in this table because these facilities can serve as possible evacuation centers. **Table 3.11-4** identifies the total number of first responder personnel, including dispatch, fire and rescue, law enforcement, and emergency medical personnel in the state.

Emergency response services in Washington comprise the following:

- **Law enforcement services:** Local, county, and state agencies, including sheriff offices, the Washington State Patrol, and the Washington Department of Fish and Wildlife, provide law enforcement services throughout the state.
- **Fire prevention and response** – Local county fire departments are primarily responsible for responding to structure fires and implementing fire-preventive measures.
- **Wildfire response services** – Local fire departments respond to wildfires with the support of the Washington State Department of Natural Resources assets, such as hand crews, engines, water tenders, helicopters, and planes.
- **Search and rescue services** – Search and rescue resources in the state come primarily from citizen volunteers and local law enforcement. The Washington Military Department, Emergency Management Division may deploy specialized resources to conduct further search and rescue operations, including urban structural collapse, maritime/coastal/waterborne search and rescue, and land search and rescue.
- **Emergency medical response and services** – Emergency medical services can be provided by city fire departments, regional fire service authorities, and fire districts.[266] Public hospital districts and private ambulance services can also respond to and provide emergency medical services.

[266] Special-purpose governmental entities created to provide fire protection and emergency medical services to a specific geographic area.

- **Emergency response and healthcare facilities** – Emergency response facilities, healthcare facilities, and enhanced services facilities[267] have stringent requirements for secondary power to ensure patient safety and continuous communication coverage during power outages.

Table 3.11-3: Public Service Facilities in Washington

Public Resource Type	Total
Law enforcement agencies	209
Fire departments	405
Hospitals	111
Schools (public, private, charter, and State-Tribal Education Compact schools)	3,208
Libraries	60

Sources: Washington Secretary of State 2023; U.S. Department of Justice 2022; AESD n.d; U.S. Fire Administration 2025; Washington State Department of Health n.d.

Table 3.11-4: First Responder Personnel in Washington

First Responder Personnel	Total
Police, fire, and ambulance dispatchers	2,330
Fire and rescue personnel	10,220
Law enforcement personnel	12,870
Emergency medical technicians and paramedics	4,640

Source: BLS 2023.

3.11.2.2 Utilities

Electricity and Transmission Lines

Washington is the nation’s largest hydroelectric power producer, and this form of power generation accounted for approximately 60 percent of Washington’s total electricity generation in 2023 (EIA 2024). The Columbia River runs through the eastern half of the state and borders the southern edge of the state until reaching the Pacific Ocean. It has an average annual runoff of 198 million acre-feet of water at its mouth, which makes it the second largest river system in the United States by runoff (BPA 2001). The Columbia River provides water for 19 hydroelectric projects between the United States and Canada, including Washington’s Grand Coulee Dam (American Rivers n.d.). The Grand Coulee Dam is one of the largest hydroelectric power plants in the world and typically produces more than 21 million megawatt-hours of electricity each year. This electricity supplies power to eight western states and parts of Canada (EIA 2024).

Natural gas, other renewable resources, nuclear energy, and coal provide almost all the rest of Washington's in-state electricity generation. Natural gas is the second-largest in-state source of net generation, fueling about 18 percent of the state’s total electricity generation in 2023. Renewable resources other than hydroelectric power, such as wind and solar energy, accounted for about 10 percent of the state’s energy generation. Nuclear energy provided about 8 percent of Washington’s total in-state generation, originating from the Columbia Generating Station, the state’s only operating nuclear power plant. In 2023, coal-fueled was about 4 percent of the total electricity generated in Washington, almost all of it from one coal-fired power plant, the TransAlta Centralia

[267] A specialized residential setting designed to provide care for individuals with complex personal care and behavioral challenges who do not require institutionalization.

plant. One of TransAlta Centralia's two coal-fired units permanently shut down at the end of 2020, and the other is scheduled for retirement in 2025.

Currently, Washington's net electricity generation generally exceeds demand in the state. Therefore, excess electricity is sent to the Western Interconnection, a regional grid that stretches from Canada to the northern part of Baja California, Mexico (EIA 2024). Though the state currently exports more electricity than it imports, electricity demand in Washington State is projected to increase based on several factors, including electrification of transportation, artificial intelligence and data centers, and population growth (see Section 3.7, Energy and Natural Resources for more information). The Washington State Department of Commerce projects that as much as 40 percent of Washington's electricity will be imported by 2050 due to population growth and the transition from fossil fuels to cleaner sources of energy (Ecology 2024a). Furthermore, changes in climate have influenced energy demand patterns. Historically, the state experiences a peak in electricity demand during the winter; however, warmer summers have increased the use of air conditioners while more and increasingly severe winter events have created higher demand in the winter (NWPCC 2024).

Washington has approximately 60 electric utilities, with three being investor-owned companies and the remainder being public entities (see **Table 3.11-5**). Investor-owned utilities are for-profit companies that are regulated by the Washington Utilities and Transportation Commission. Public entity electric utilities are operated by local municipalities, public utility districts[268], rural electric cooperatives, Tribes, and the federal government. Municipal utilities are each governed by their own elected commissioners and/or city council (Solar Washington n.d.). Most public electric utilities purchase electricity wholesale from the Bonneville Power Administration, which is a federal agency that generates power from 31 hydroelectric dams in the Columbia River Basin. Several public utility districts own and operate their own hydroelectric facilities, such as Chelan, Grant, Pend Oreille, and Cowlitz County Public Utility Districts (WPUDA n.d. [a]).

Table 3.11-5: Electric Utilities in Washington

Investor-Owned Companies
Puget Sound Energy
Avista
Pacific Power
Public Utility Districts
Asotin County PUD
Benton County PUD
Chelan County PUD
Clallam County PUD
Clark County PUD
Cowlitz County PUD
Douglas County PUD
Ferry County PUD
Franklin County PUD

[268] A community-owned, not-for-profit utility that provides essential services such as electricity, water, and, sometimes sewer, to residents within a specific geographic area.

Grant County PUD
Grays Harbor County PUD
Jefferson County PUD
Kitsap County PUD
Kittitas County PUD
Klickitat County PUD
Mason County PUD #1
Mason County PUD #3
Okanogan PUD
Pacific County PUD
Pend Oreille PUD
Skamania PUD
Snohomish County PUD
Wahkiakum County PUD
Whatcom County PUD
Other Electric Utility Providers
Blaine City Light
Centralia City Light
Cheney Power
City of Cashmere
City of Chewelah, Electric Department
City of Cheney
City of Coulee Dam Light Department
City of Ellensburg
City of McCleary
City of Milton
City of Richland
City of Sumas
Clearwater Power
Columbia Rural Electric Association
Elmhurst Power & Light Co.
Inland Power & Light
Kootenai Electric Cooperative Inc.
Lakeview Light & Power
Modern Electric Water Company (Spokane Valley)
Nespelem Valley Electric Cooperative
Ohop Mutual Light Co
Okanogan County Electric Co-op
Orcas Power and Light
Parkland Light & Power
Peninsula Light Company
Port Angeles City Light
Seattle City Light
Tacoma Power
Tanner Electric Cooperative
Town of Eatonville

Town of Ruston
Town of Steilacoom
Vera Water & Power

Source: Washington State Department of Labor & Industries n.d.
PUD = Public Utility District

Washington has approximately 4,527 miles of high-voltage (greater than 230 kilovolt [kV]) transmission lines and 3,321 miles of low-voltage (less than 230 kV) transmission lines (DOE 2015). Transmission lines can be considered an "interstate highway" for transporting and delivering electricity from power sources to places where it is either used or stored closer to the end user. Electric power systems require constant, second-by-second balancing of power supply, power demand, and power transmission capability. Transmission system operations are organized into "control areas," where operators continuously balance electricity demands with electricity generation while keeping power flows within specific limits for system operating reliability. Failure to maintain control over the transmission facilities can result in an overload, leading to a failure of the electrical system causing a power blackout (NWPCC 2025).

Water

Washington's drinking water comes from three sources: groundwater (wells and springs), surface water (lakes and rivers), and snowpack/snowmelt (supply for rivers, lakes, and aquifers). While more than 85 percent of the state's population gets their drinking water from public water systems, 15 percent obtain their water from domestic supplies. The use and development of surface water or spring for a domestic water supply typically requires water rights permitting from the Washington State Department of Ecology (Ecology) (Washington State Department of Health n.d.).

As with investor-owned electricity providers, the Washington State Utilities and Transportation Commission (UTC) regulates privately owned water companies. A total of 48 water companies are currently being regulated by the UTC (UTC 2022a). Additionally, public utility districts provide water and water-sewer service across the state, often specializing in rural and satellite systems. There are a total of 18 public utility districts that provide water service in Washington (WPUDA n.d. [b]).

Wastewater

Wastewater includes water from sources like sinks, showers, toilets, pulp mills, and manufacturing companies. Wastewater contains a variety of contaminants and pollutants, depending on how and where the water was originally used. Wastewater must be treated at regulated facilities called wastewater treatment plants to remove pollutants before the water can be released back into the environment to protect human health and aquatic life. There are more than 300 wastewater treatment plants in Washington, and all facilities are required to meet Ecology's water quality standards (Ecology n.d.). Further discussion of water quality can be found in Section 3.4, Water Resources.

Solid Waste

Ecology provides technical assistance and guidance to local municipalities for managing solid waste, particularly through the State Solid and Hazardous Waste Plan (Ecology 2021). This plan promotes sustainable materials management with an overall vision to reduce waste. Local governments are also required to develop solid waste regulations and management plans. These plans serve as a guiding document for their local solid waste programs, including information on existing solid waste facilities and 20-year estimates for needed future solid waste facilities. The plan also provides detailed information about recycling programs, waste reduction and reuse strategies, and schedules for program implementation.

Washington has 524 permitted and 504 exempt solid waste handling facilities, including landfills and composters. Recovering and recycling waste can help reduce the amount of waste disposed of in landfills, thereby reducing greenhouse gas emissions and other environmental impacts. In 2021, Washington's recycling and recovery efforts resulted in a reduction of approximately 11.2 million tons, or 2,918 pounds, of greenhouse gas emissions per person. This is similar to conserving 1.1 billion gallons of gasoline, which would be enough to power 1.5 million homes, or nearly half the households in Washington, per year (Ecology 2024b).

Natural Gas

Washington has no natural gas wells or processing plants; however, there are three storage fields and 9,600 miles of interstate pipelines in the state (DOE 2015). A total of 40 companies operate natural gas pipelines across 32 counties in Washington (UTC 2022b).

Communications

Washington's commercial telecommunications industry and infrastructure are robust, with multiple service providers offering products and services via the full spectrum of telecommunications technologies. Washington's State trust lands provide ideal locations for communication towers, particularly the hilltops and mountaintops located throughout many parts of the state.

State trust lands include more than 100 wireless telecommunication sites in diverse and prime locations to serve the large population centers of the Puget Sound lowlands, Spokane, and the Tri-Cities. In addition, sites that provide ideal coverage for rural and urban populations are located across the state. Of the large portfolio of state trust land assets, the communication resources asset class[269] represents the smallest in geographical size. As of 2018, the total acreage of the asset class comprised approximately 91 acres, spread across 103 communication sites in six management regions. Approximately 68 communication sites (66 percent) are located west of the Cascade Range, and the remaining 35 sites (34 percent) are located east of the mountains (Deloitte 2020).

Generally, state trust lands leased for communication uses are located on mountaintops or in areas with topographic relief that allows for unobstructed sight lines. The Washington Department of Natural Resources categorizes communication sites into five site classes based on population density, road access, topographic advantage, traffic density of serviced areas, and supply of comparable sites:

- *Class 1: A site that serves a high population density, brings communications to a broad geographic area, and/or has road access with commercial and standby power available.*
- *Class 2: A site that has the same physical attributes as a Class 1 site, except it does not serve a high population density or it has some limitations serving a broad geographic area.*
- *Class 3: A site with road access, but it serves a smaller population density or geographic area than Class 2 sites.*

[269] Resource asset class refers to the various types of state lands and state forestlands held in trust and managed by the Department of Natural Resources. The various asset classes include, but are not limited to, timberlands; irrigated agriculture; dryland agriculture, including grazing lands; commercial real estate; and mining.

- *Class 4: A remote site with limited road access, and power may or may not be available.*
- *Class 5: A site used only by county emergency management services (EMS), for counties with fewer than 5,000 people.* (Deloitte 2020)

3.11.3 Impacts

An assessment of impacts was completed for the construction, operation and maintenance, and upgrade or modification of transmission facilities within the Study Area.

3.11.3.1 Method of Analysis

The Study Area for a project-specific application would typically encompass several key regions and features, such as the following:

- **Project Site and Immediate Vicinity:** This includes the specific location of the project and the surrounding area that might be directly affected by construction, operation and maintenance, and upgrade or modification activities.
- **Existing Utilities:** The study area would be large enough to determine if there might be any impacts on existing utilities or infrastructure systems, such as local landfills, electric utilities, sewer districts, etc.

This Draft Programmatic EIS analyzes the affected environment and impacts on public services and utilities within the Study Area defined in Chapter 2. Three project phases for each transmission facility type were considered: construction, operation and maintenance, and upgrade or modification. This evaluation considers overhead transmission facilities and underground transmission facilities for each phase. Overhead transmission facilities consist of transmission lines and substations and similar ancillary infrastructure. Overhead transmission facilities also incorporate aboveground infrastructure that may be associated with underground transmission facilities. Underground transmission facilities consist of underground transmission lines, underground access vaults, and other below-ground infrastructure. The construction of underground transmission facilities includes open trench, trenchless, and underwater construction methods.

The Study Area for public services and utilities resources is defined in Chapter 2. Laws and regulations used to determine the impacts of transmission facilities on public services and utilities are summarized in **Table 3.11-1**. Information reviewed to identify impacts on public services and utilities uses and areas in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping. Impacts related to public health and safety are analyzed in Section 3.8. Impacts related to water resources are analyzed in Section 3.4.

Impact Determination

The discussion of impacts is qualitative given the high-level nature of a Programmatic EIS; quantification would require project-specific details to analyze. **Table 3.11-6** describes the criteria used to evaluate impacts from the Action Alternative and No Action Alternative. Information reviewed to identify impacts on earth resources in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping.

Table 3.11-6: Criteria for Assessing the Impact Determination on Public Services and Utilities

Impact Determination	Description
Nil	No foreseeable impacts are expected. A project would not result in a foreseeable increase in demand for public services or utilities, including solid waste or water. A project would not result in a foreseeable increase in emergency response times or risk of power outages at public service facilities. A project would have no foreseeable conflicts with existing utility infrastructure.
Negligible	A project would have minor, adverse impacts on public utilities or services due to increases in demand. Additionally, a project would result in minimal increases in emergency response times and would not risk power outages at public service facilities. A project would have minor, adverse impacts on existing utility infrastructure. Best management practices and design considerations are expected to be effective.
Low	A project would have adverse impacts on public services and utilities, even with implementation of BMPs and design considerations. A project would result in increases in the demand for public services or utilities. A project would increase emergency response times and the risk of power outages at public service facilities. There would be conflicts with existing utility infrastructure. Impacts would be short-term and nonsignificant.
Moderate	A project would have adverse impacts on public services and utilities even with implementation of BMPs and design considerations. Adverse impacts on the demand for public services or utilities, emergency response times, or the risk of power outages at public service facilities would occur. Adverse impacts on existing utility infrastructure would occur. Moderate impacts may be long-term, occurring over one or more project phases. Moderate impacts have the potential to be significant.
High	A project would have adverse impacts and potentially severe effects on public services and utilities even with implementation of BMPs and design considerations. Adverse impacts on the demand for public services or utilities, emergency response times, or the risk of power outages at public service facilities would occur. Adverse impacts on existing utility infrastructure would occur. High impacts may be permanent or continue for the duration of the project.

To clearly understand the potential severity of impacts without any interventions, the following impact determinations exclude the use of avoidance criteria and mitigation measures. The ratings assume compliance with all federal, state, and local laws and regulations, as well as standardized BMPs and design considerations. Assessing impacts without avoidance criteria or mitigation measures offers a baseline understanding of potential environmental effects, helping to identify the true extent of these impacts. Environmental laws often require that initial impact assessments be conducted without considering mitigation to maintain the integrity of the environmental review process.

3.11.3.2 Action Alternative

Construction

Overhead Transmission Facilities

Activities for the construction phase of overhead transmission facilities would vary and depend on the scale of the facility and site characteristics. Construction could include a site preparation phase of relatively short duration (e.g., a few months), followed by a longer construction and start-up phase. It is assumed that the construction phase of overhead transmission, per mile, would have a shorter duration than underground construction. Overhead transmission facilities infrastructure could have the following identified impacts during the construction phase:

- Conflict with Existing Utility Infrastructure

- Increased Solid Waste Production
- Increased Water Demand
- Increased Demand for Fire Protection Services, Law Enforcement, and Emergency Responders
- Increased Emergency Response Times
- Increased Risk of Power Outages at Public Service Facilities

Conflict with Existing Utility Infrastructure

Construction activities associated with the installation of overhead transmission facilities could conflict with existing utility infrastructure, such as other overhead transmission facilities, aboveground pipelines and ancillary facilities, telecommunication lines, water towers, and radio towers. There is also the risk of impacting existing underground utilities when excavating for structure footings or foundations. Conflicts with existing utility infrastructure could result in property damage, service or power outages, and/or the need for unanticipated timely and costly repairs. If existing utilities need to be de-energized or relocated to accommodate the construction of underground transmission facilities, temporary disruption to services would occur. In addition, direct conflicts with existing utility infrastructure could result in hazardous conditions, such as electrocution, flooding, fire, and exposure to hazardous materials and pollutants. More details can be found in Section 3.8, Public Health and Safety.

Impact Determination: Depending on the scale of the transmission facility and site characteristics, construction of an overhead transmission project is expected to have a negligible to high impact on existing utility infrastructure. Mitigation measures may be required for areas of special consideration to reduce the rating to a less than significant impact.

Increased Solid Waste Production

Construction of transmission facilities could generate excess solid waste from excavated vegetation and soils, packing materials, and consumables.[270] Other waste materials generated during construction activities may include wood, concrete debris, metal or cable scraps, batteries, and used oil from machinery. Improper disposal of these materials could lead to adverse impacts on soil and water quality. Without proper planning, the disposal of construction-related waste could present challenges such as exceeding the capacity of local infrastructure, which could result in unanticipated construction delays or costs.

Impact Determination: Depending on the scale of the transmission facility and site characteristics, construction of an overhead transmission facility is expected to have negligible to high impacts as a result of increased solid waste production. Mitigation measures may be required to reduce a project’s impacts to a less than significant level.

Increased Water Demand

Construction could result in an increase in water demand for activities such as dust control, concrete mixing, fire control, and revegetation. Increased water demand could strain local water resources, including groundwater. A discussion of water rights and quantity is provided in Section 3.4, Water Resources.

[270] Items that are intended to be used up relatively quickly and need to be replaced regularly.

Impact Determination: Depending on the scale of the transmission facility and site characteristics, a project is expected to have negligible to high impacts as a result of increased water demand. Mitigation measures may be required to reduce the significance determination to a less than significant level.

Increased Demand for Fire Protection Services, Law Enforcement, and Emergency Responders

As previously discussed, a project could conflict with existing utilities resulting in fires and/or worker injuries, such as electrocution. Construction activities could introduce other fire risks through the use of mechanical equipment, flammable materials, and gas-powered equipment, thereby increasing the demand for fire protection services. These impacts could increase the demand for fire protection services, emergency responders, and emergency medical facilities. Additional information on public health and safety can be found in Section 3.8, Public Health and Safety.

Increased traffic volumes from construction workers commuting to and from a project site would lead to a higher risk of collision. The transport of construction materials or equipment could also pose hazards. The increased risks or hazards associated with vehicular transportation could increase the demand for law enforcement and emergency responders. Increased demand for law enforcement agents may also result from increased hazards relating to road closures and detours. Increased law enforcement demand could also result from incidents of theft, vandalism, or trespassing on a project site.

Impact Determination: Depending on the scale of the transmission facility and site characteristics, the magnitude of impacts without mitigation measures incorporated is to have a negligible to high impact on fire protection services, law enforcement, and emergency responders. Mitigation measures may be required to reduce the rating to a less than significant impact.

Increased Emergency Response Times

Construction of transmission facilities could impact emergency response times due to temporary road closures, detours, increased traffic, and impacts from access road construction. Impacts to vehicular transportation are discussed in Section 3.10, Transportation.

Impact Determination: Depending on the scale of the facility and site characteristics, the construction of transmission facilities without mitigation measures incorporated is expected to have a negligible to high impact on emergency response times.

Increased Risk of Power Outages at Public Service Facilities

As previously discussed, the construction of overhead transmission facilities could conflict with existing utilities and, in some cases, cause a power outage. Power outages could impact public service facilities, such as local police departments, fire stations, and emergency medical facilities, thereby disrupting operation of these facilities and risking public safety.

Impact Determination: Depending on the scale of the facility and site characteristics, the magnitude of impacts on public service facilities, without mitigation measures incorporated, is anticipated to vary and could be low to high.

Underground Transmission Facilities

Activities for the construction phase of underground transmission facilities, including open-trench, trenchless (including horizontal directional drilling), or underwater construction methods, would vary depending on the scale of the facility and site characteristics. Similar to overhead transmission facilities, underground construction could include a site preparation phase of relatively short duration, followed by a longer construction and start-up phase. It is assumed that the construction phase for underground transmission facilities, per mile, would have a longer duration than overhead projects. Underground transmission facilities could have the following identified impacts during the construction phase:

- Conflict with Existing Utility Infrastructure
- Increased Solid Waste Production
- Increased Water Demand
- Increased Demand for Fire Protection Services, Law Enforcement, and Emergency Responders
- Increased Emergency Response Times
- Increased Risk of Power Outages at Public Service Facilities

Conflict with Existing Utility Infrastructure

The construction of underground transmission facilities could conflict with existing overhead utilities when clearing trees or constructing new access roads. However, a conflict with existing overhead utilities is less likely to occur with underground transmission facility construction activities than with overhead transmission facilities. Excavation and trenching operations associated with underground transmission facilities could conflict with existing underground utility infrastructure such as gas, water, and wastewater pipelines or fiber optic cables. It is anticipated that a conflict with existing underground utilities would be more likely with underground transmission facilities than overhead.

Conflicts with existing utility infrastructure would result in impacts similar to those described for overhead transmission facilities. These impacts could include hazardous conditions, property damage, unanticipated timely and/or costly repairs, and service or power outages.

Impact Determination: Depending on the scale of the transmission facility and site characteristics, a project is expected to have a negligible to high impact on existing utility infrastructure. Mitigation measures may be required for areas of special consideration to reduce the rating to a less than significant impact.

Increased Solid Waste Production

It is expected that the construction of underground transmission facilities to increase solid waste production in a similar manner as with the construction of overhead transmission facilities. However, construction associated with underground transmission facilities could result in greater quantities of unused soil, rock, and concrete from trenching.

Impact Determination: Depending on the scale of the facility and site characteristics, construction of an underground transmission project is expected to have negligible to high impacts as a result of increased solid waste production. Mitigation measures may be required to reduce a project’s impacts to a less than significant level.

Increased Water Demand

Construction could result in increased water demand for activities such as dust control, mixing concrete, fire control, and revegetation. Increased water demand could strain local water resources, including groundwater. Water demand and quantity are discussed further in Section 3.4, Water Resources.

Impact Determination: Depending on the scale of the transmission facility and site characteristics, construction of an underground project is expected to have a negligible to high impact as a result of increased water demand. Mitigation measures may be required to reduce the significance determination to a less than significant level.

Increased Demand for Fire Protection Services, Law Enforcement, and Emergency Responders

Construction of underground facilities requires trenching or blasting that could result in trench collapse or worker injury. A conflict with an existing utility could also create hazardous conditions or result in worker injury. Because underground transmission facilities generally take longer to construct, the duration of risk exposure is greater than with overhead transmission facilities. Trench collapse and a conflict with existing utilities would increase the demand for emergency responders, including fire protection services and law enforcement.

Increased demand for public service providers due to changes in vehicular transportation and increased risk of theft or trespassing would result in similar impacts as described for overhead transmission facilities.

Impact Determination: Depending on the scale of the facility and site characteristics, the magnitude of impacts on public service providers, without mitigation measures incorporated, is anticipated to vary and could be negligible to high. Mitigation measures may be required to reduce the rating to a less than significant impact.

Increased Emergency Response Times

Construction of transmission facilities could increase emergency response times due to temporary road closures, detours, increased traffic, and impacts from access road construction. Because constructing underground transmission facilities generally takes longer than overhead, impacts are expected to occur for a longer duration. A discussion on impacts to vehicular transportation is provided in Section 3.10, Transportation.

Impact Determination: Depending on the scale of the facility and site characteristics, the construction of transmission facilities without mitigation measures incorporated is expected to have a negligible to high impact on emergency response times.

Increased Risk of Power Outages at Public Service Facilities

As previously discussed, the construction of underground transmission facilities could conflict with existing utilities and, in some cases, may cause a power outage. Power outages could impact public service facilities, such as local police departments, fire stations, and emergency medical facilities. This could disrupt operation of these facilities and risk public safety. Because constructing underground transmission facilities generally takes longer than overhead, impacts are expected to occur for a longer duration.

Impact Determination: Depending on the scale of the facility and site characteristics, the magnitude of impacts on public service facilities, without mitigation measures incorporated, is anticipated to vary and could be low to high.

Operation and Maintenance

Overhead Transmission Facilities

Activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and rights-of-way, similar to any other linear industrial facility. Overhead transmission facilities could have the following identified adverse impacts during the operation and maintenance phase:

- Conflict with Existing Utility Infrastructure

- Increased Emergency Response Times
- Increased Demand for Fire Protection Services, Law Enforcement, and Emergency Responders
- Increased Risk of Power Outages at Public Service Facilities

Conflict with Existing Utility Infrastructure

Once overhead transmission facilities are constructed, it is not anticipated that there would be impacts on other utility infrastructure. Operation of transmission facilities could improve electricity service and reliability. However, during maintenance activities, impacts similar to those described for construction could occur.

Impact Determination: Depending on the scale of the facility and site characteristics, the operation and maintenance of overhead transmission facilities without mitigation measures incorporated is expected to have a negligible to high impact on emergency response times.

Increased Emergency Response Times

Maintenance activities could necessitate temporary road or lane closures, leading to detours and/or increased vehicular traffic. Overhead facilities can typically be repaired quicker than underground facilities. Therefore, the duration of impacts on emergency response times as a result of maintenance of overhead facilities would be less than for underground facilities.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on emergency response times, without mitigation measures incorporated, are anticipated to vary and could be negligible to low.

Increased Demand for Fire Protection Services, Law Enforcement, and Emergency Responders

Overhead transmission facilities could pose an obstacle for emergency responders. While access roads can increase remote fire accessibility for ground responders, overhead structures can act as barriers for search and rescue aircraft, decrease firefighting water drop accuracy and maneuverability, and increase the risk of collisions. In extreme weather events, damaged overhead transmission structures can collapse or ignite fires, exacerbating the progression of active wildfires and posing significant risks to ground responders. This increased risk of collisions and exacerbation of wildfires could increase demand for fire, law, and emergency responders.

Maintenance activities could introduce other fire risks through the use of mechanical equipment, flammable materials, and gas-powered equipment, thereby increasing the demand for fire and emergency responders.

Impact Determination: Depending on the scale of the facility and site characteristics, the magnitude of impacts on public service providers, without mitigation measures incorporated, is anticipated to vary and could be negligible to high. Mitigation measures may be required to reduce the rating to a less than significant impact.

Increased Risk of Power Outages at Public Service Facilities

The continuous operation of public service facilities may be impacted in the event that maintenance of overhead transmission facilities results in a power outage. These repairs would generally be quicker to fix than for underground transmission facilities.

Impact Determination: Depending on the scale of the facility and site characteristics, the magnitude of impacts on public service facilities, without mitigation measures incorporated, is anticipated to vary and could be low to high.

Underground Transmission Facilities

Similar to overhead transmission facilities, activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and rights-of-way, similar to any other linear industrial facility. Underground transmission facilities could have the following identified adverse impacts during the operation and maintenance phase:

- Conflict with Existing Utility Infrastructure
- Increased Emergency Response Times
- Increased Demand for Fire Protection Services, Law Enforcement, and Emergency Responders
- Increased Risk of Power Outages at Public Service Facilities

Conflict with Existing Utility Infrastructure

Once overhead transmission facilities are constructed, it is not anticipated for there to be impacts on other utility infrastructure or service. Operation of transmission facilities could improve electricity service and reliability.

Underground transmission facilities located near existing metallic pipelines could cause the pipeline infrastructure to corrode through induced currents. Over time, corrosion of infrastructure could lead to leaks or ruptures, increasing the risk of explosions, fires, or soil, groundwater, or surface water contamination. A conflict with existing underground infrastructure is typically harder to resolve than a conflict in overhead contexts due to access constraints and maneuverability. Access and maintenance activities for underground transmission facilities would result in impacts similar to those described for construction.

Impact Determination: Depending on the scale of the facility and site characteristics, the operation and maintenance of underground transmission facilities, without mitigation measures incorporated, is expected to have a negligible to high impact on existing utility infrastructure.

Increased Emergency Response Times

Once underground transmission facilities are constructed, all trenched areas and vault pits would be backfilled and restored to pre-construction conditions. Therefore, access for public service providers through typical operations would not be impacted. However, if maintenance or repair activities are required, they could necessitate temporary road or lane closures, leading to detours and/or increased vehicular traffic. These impacts could create delays that increase emergency response times. Underground transmission facilities generally take longer to repair than overhead facilities. Therefore, the duration of impacts on emergency response times would be longer than for overhead transmission facilities.

Impact Determination: Depending on the scale of the facility and site characteristics, the construction of transmission facilities without mitigation measures incorporated is expected to have a low to high impact on emergency response times.

Increased Demand for Fire Protection Services, Law Enforcement, and Emergency Responders

It is not expected for underground transmission facilities to be damaged or compromised once operational since they would not create a surface-level obstruction or be exposed to weather events.

However, maintenance associated with underground transmission facilities would require activities similar to what was described under construction activities, such as trenching and excavation. Trench collapse or worker injuries would increase the demand for emergency responders, including fire protection services and law enforcement. Maintenance activities could introduce other fire risks through the use of mechanical equipment, flammable materials, and gas-powered equipment. Furthermore, a conflict with an existing underground utility could result from trenching and excavating. This potential risk would result in impacts similar to those from construction.

Accessing and repairing underground transmission facilities would take longer than for overhead transmission facilities. Therefore, the increased demand for emergency responders would be longer in duration.

Impact Determination: Depending on the scale of the facility and site characteristics, the operation and maintenance of underground transmission facilities, without mitigation measures incorporated, is expected to have a negligible to high impact. Mitigation measures may be required to reduce the rating to a less than significant impact.

Increased Risk of Power Outages at Public Service Facilities

The continuous operation of public service facilities may be impacted should maintenance of underground transmission facilities result in a power outage.

Impact Determination: Depending on the scale of the facility and site characteristics, the operation and maintenance of underground transmission facilities, without mitigation measures incorporated, is expected to have a low to high impact.

Upgrade or Modification

Overhead Transmission Facilities

Upgrading or modifying overhead transmission facilities could involve several key steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Overhead transmission could have the following impacts during the upgrade or modification phase:

- Conflict with Existing Utility Infrastructure
- Increased Solid Waste Production
- Increased Water Demand
- Increased Demand for Fire Protection Services, Law Enforcement, and Emergency Responders
- Increased Emergency Response Times
- Increased Risk of Power Outages at Public Service Facilities

While adverse impacts would be similar to those of construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Reduced Construction Activities:** The scope of work is often smaller, resulting in less solid waste, and water use.
- **Shorter Duration:** Upgrades and modifications typically take less time construct than building new facilities, leading to shorter periods of increased demand for fire protection services, law enforcement, and emergency

responders. Impacts on the transportation system would also be shorter in duration, which would reduce the duration of impacted emergency response times.

Underground Transmission Facilities

Upgrading or modifying underground transmission facilities would involve several steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Underground transmission could have the following identified impacts during the upgrade or modification phase:

- Conflict with Existing Utility Infrastructure
- Increased Solid Waste Production
- Increased Water Demand
- Increased Demand for Fire Protection Services, Law Enforcement, and Emergency Responders
- Increased Emergency Response Times
- Increased Risk of Power Outages at Public Service Facilities

While adverse impacts would be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Reduced Construction Activities:** The scope of work is often smaller, resulting in less solid waste, and water use.
- **Shorter Duration:** Upgrades and modifications typically take less time to perform than building new facilities, leading to shorter periods of increased demand for fire protection services, law enforcement, and emergency responders. Impacts on the transportation system would also be shorter in duration, which would reduce the duration of impacted emergency response times.

3.11.3.3 No Action Alternative

The No Action Alternative represents the scenario in which this Draft Programmatic EIS is not used and current management practices for siting and planning transmission facilities continue unchanged. Under this alternative, each project would continue to be evaluated on a case-by-case basis and reviewed for compliance with existing regulations, codes, and standard practices. While impact determinations would likely be similar to those outlined in this Draft Programmatic EIS, projects would not benefit from the impact reductions associated with the avoidance criteria developed and analyzed in this Draft Programmatic EIS. These criteria are anticipated to provide additional mitigation that further reduces potential environmental impacts.

3.11.4 Potential Mitigation Measures

This section describes measures that would eliminate, reduce the intensity of, or compensate for adverse impacts from construction, operation and maintenance, and upgrade or modification of transmission facilities.

All general conditions adopted for this Draft Programmatic EIS, identified in Section 3.1, are relevant to this resource section. Applicants would be responsible for providing information within their application materials documenting at implementing the general conditions.

Avoidance criteria[271] adopted for this Draft Programmatic EIS have been identified in Section 3.1. Avoidance criteria that are relevant to this resource section are described below:

AVOID-1 – Avoid Hazardous Areas: Carefully select areas of disturbance to avoid known hazardous areas.

> **Rationale:** Avoiding hazardous areas provides safety for workers and the public, as well as environmental protection. Disturbing sites of known contamination or other hazards may require the development of remediation plans.

Applicants would be responsible for providing information within their application materials documenting the project's compliance with the above avoidance criteria.

Potential mitigation measures have been identified to minimize adverse impacts from transmission facility projects. These measures are intended to be broad so that they can be applied to most projects that would be covered under this Programmatic EIS. However, project-specific plans would be needed to adapt the measures for project-specific applications.

When impact determinations are identified as moderate or high, the applicant would either adopt applicable mitigation measures from this Programmatic EIS or the SEPA Lead Agency may require applicable mitigation measures to be implemented to reduce project-specific impacts. When impact determinations are low, applicable mitigation measures should still be considered by the applicant and the SEPA Lead Agency as these measures would help to further reduce project-specific impacts, including the project's contribution to cumulative impacts. These measures would be implemented in addition to compliance with laws, regulations, environmental permits, plans, and design considerations required for transmission facilities.

The following mitigation measures could be adopted to mitigate adverse impacts:

PSU-1 – Utility Coordination: Contact impacted or potentially impacted utility service providers as early as possible in the planning process to identify conflicts or issues.

> **Rationale: This is a required component of project-specific applications necessary for SEPA Lead Agencies to evaluate baseline conditions.**
>
> This mitigation measure aims to identify and address utility conflicts early in the planning and design process and throughout operation and maintenance.

PSU-2 – Law Enforcement and Emergency Management Coordination: Contact local law enforcement and emergency management departments to identify and address potential issues.

> **Rationale: This is a required component of project-specific applications necessary to demonstrate regulatory compliance and risk management.**
>
> This mitigation measure aims to mitigate impacts on law enforcement and emergency management response times, accessibility, and general operations. Ongoing coordination would support safe and efficient emergency response operations.

[271] The complete list of avoidance criteria and their rationales can be found in Section 3.1 as well as Appendix 3.1-1.

PSU-3 – Site Security Plan: Develop and implement a site security plan to minimize public access to construction areas and permanent structures.

Rationale: This is a required component of project-specific applications necessary to demonstrate regulatory compliance and risk management.

This mitigation measure aims to reduce the demand for police and law enforcement services.

PSU-4 – Waste Management Plan: Develop and implement a waste management plan to identify the type, amount, and disposal location of solid waste that is to be expected during construction, operation and maintenance, and upgrade or modification.

Rationale: This is a required component of project-specific applications necessary to demonstrate regulatory compliance and risk management.

This mitigation measure aims to identify and address whether local landfills have sufficient capacity for waste associated with project construction and whether any potentially hazardous waste is handled and disposed of properly.

PSU-5 – Corrosion Analysis: Identify and delineate existing metallic pipes or pumping wells near the project-specific application. Coordinate with adjacent utility providers to determine the need for a corrosion analysis, design modifications, and/or additional mitigation strategies.

Rationale: This mitigation measure aims to mitigate the impacts of electric currents or accelerated corrosion of metallic pipes and/or pumping wells from high-voltage transmission facilities.

In addition to the above mitigation measures, the following mitigation measures[272] developed for other resources may be applicable:

Geo-1 – Minimize Soil Disturbance: Minimize soil disturbance, including footprints related to access roads and permanent structures, to the greatest extent practicable. Minimize the use of construction techniques that would be harmful to topsoil composition, where feasible.

W-1 – Minimize Water Use: Minimize water use, to the greatest extent practicable.

Veg-3 – Site Transmission Facilities in Existing ROW or Disturbed Areas: Site transmission facilities in existing right-of-way (ROW) or disturbed areas, to the greatest extent practicable.

ENR-1 – Recycle Components: Recycle components that have the potential to be used as raw materials in commercial or industrial applications to the extent practicable.

ENR-2 – Source Recycled Materials: Source recycled or alternative materials to the extent practicable.

H&S-1 – Fire Mitigation Plan: Develop a fire mitigation plan that includes both preventative and remedial measures for potential ignition source operations.

H&S-3 – Hazardous Material Management Plan: Develop and implement a project-specific Hazardous Material Management Plan that outlines procedures for air contaminants, contaminated soil, or groundwater

[272] The rationales for the identified mitigation measures are provided in their respective resource sections.

encountered incidentally during construction, including emergency notification and suspension of construction activities in the suspected area until the type and extent of contamination are determined.

H&S-4 – Risk Management Strategy: Develop and apply an electromagnetic field (EMF) and electromagnetic interference (EMI) risk management strategy that regularly considers the consequence, likelihood, and significance of EMF and EMI on public health and existing infrastructure, such as transportation systems, based on emerging research studies and guidelines.

H&S-6 – Emergency Management Plan: Develop and implement a project-specific emergency management plan in coordination with local emergency service providers that addresses safety-related standards and procedures for potential emergency-related incidents during facility construction and operation.

TR-1 – Complete a TIA: Complete a Traffic Impact Assessment (TIA) to ensure public safety and identify any negative effects.

TR-2 – Coordination with Aviation Groups: Work closely with aviation groups and authorities to ensure that transmission facilities are marked on aviation maps and that pilots, both commercial and recreational, are aware of their locations.

TR-3 – Transportation Plan: Prepare a comprehensive transportation plan for transmission component materials and large construction equipment.

TR-4 – Planning Coordination: Consult local authorities regarding planned construction activity near or crossing roads, waterways, railways, and airports.

These measures would be implemented in addition to compliance with environmental permits, plans, and authorizations required for transmission facilities.

3.11.5 Probable Significant Adverse Environmental Impacts

Determining the significance of an impact involves consideration of context and intensity, which, in turn, depend on the magnitude and duration of the impact. “Significant” in SEPA means a reasonable likelihood of more than a moderate adverse impact on environmental quality. An impact may also be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred (Washington Administrative Code 197-11-794).

Identification of environmental impacts and assignment of discipline-specific ratings is based on professional judgment and information available at the time of writing. A precautionary approach has been taken for the assessment in cases where information is currently unknown or unavailable.

This Draft Programmatic EIS weighs the impacts on public services and utilities that would result from transmission facilities after considering the application of laws and regulations; siting and design considerations, including agency guidance and BMPs; and mitigation and makes a resulting determination of significance for each impact. **Table 3.11-7** summarizes the impacts on public services and utilities anticipated for the construction, operation and maintenance, and upgrade or modification of transmission facilities.

This Page Intentionally Left Blank

Table 3.11-7: Summary of Impacts, Mitigation Measures, and Significance Rating for Public Services and Utilities

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Public Services and Utilities – Conflict with Existing Utility Infrastructure	Construction	A conflict with existing utilities could occur during the construction of both overhead and underground transmission facilities. Impacts could result in service or power outages and the need for unanticipated timely and costly repairs. A conflict with existing utilities could also result in hazardous conditions or worker injury, such as electrocution, fire, flooding, and exposure to hazardous materials.	**Overhead:** negligible to high **Underground:** negligible to high	▪ **AVOID-1:** Avoid Hazardous Areas ▪ **PSU-1:** Utility Coordination ▪ **PSU-2:** Law Enforcement and Emergency Management Coordination ▪ **PSU-5:** Corrosion Analysis ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas ▪ **H&S-1:** Fire Mitigation Plan ▪ **H&S-3:** Hazardous Material Management Plan ▪ **H&S-4:** Risk Management Strategy ▪ **H&S-6:** Emergency Management Plan	Less than Significant	Compliance with standard design considerations such as National Electric Safety Code Section 20-23 would ensure adequate overhead transmission line clearances. Implementation of and compliance with general conditions, avoidance criteria, and mitigation measures, such as utility coordination, corrosion analyses and safety plans would ensure a less than significant impact.
	Operation and Maintenance	Conflicts with existing utilities could occur during the operation and maintenance of both overhead and underground transmission facilities. Impacts could result in service or power outages and the need for unanticipated timely and costly repairs. Conflicts with utilities could also result in hazardous conditions, such as electrocution, fire, flooding, and exposure to hazardous materials. Operation of underground transmission facilities in close proximity to existing metallic pipelines could accelerate corrosion, leading to pipe failures.	**Overhead:** negligible to high **Underground:** negligible to high			
	Upgrade or Modification	Conflicts with other utilities could occur during upgrade and modification of both overhead and underground transmission facilities. Impacts could result in service or power outages and the need for unanticipated timely and costly repairs. Conflicts with utilities could also result in hazardous conditions, such as electrocution, fire, flooding, and exposure to hazardous materials.	**Overhead:** negligible to high **Underground:** negligible to high			
Public Services and Utilities – Increased Solid Waste Production	Construction	Construction of overhead and underground transmission facilities could result in excess solid waste, such as vegetation, rock, soil, packing materials, consumables, wood, concrete debris, metal, batteries, and used oil. Construction of underground transmission facilities could result in greater quantities of soil, rock, and concrete from trenching. Without proper planning, the disposal of construction-related waste could present challenges such as exceeding the capacity of local infrastructure, and improper disposal of hazardous waste could lead to adverse impacts on soil and water quality.	**Overhead:** negligible to high **Underground:** negligible to high	▪ **AVOID-1:** Avoid Hazardous Areas ▪ **PSU-4:** Waste Management Plan ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas ▪ **ENR-1:** Recycle Components ▪ **ENR-2:** Source Recycled Materials ▪ **H&S-3:** Hazardous Material Management Plan	Less than Significant	With the implementation of general conditions, avoidance criteria, and mitigation measures, impacts would be reduced to less than significant. Mitigation strategies would ensure that local landfills have sufficient capacity, all recyclable materials are disposed of at an appropriate recycling facility, and any hazardous materials are handled, stored, transported, and disposed of appropriately.
	Operation and Maintenance	This impact is not anticipated to occur during operation and maintenance of overhead or underground transmission facilities.	**Overhead:** N/A **Underground:** N/A			
	Upgrade or Modification	Reduced scope of construction activities associated with an upgrade and modification would likely result in less solid waste production. However, there could still be excess excavated vegetation and soils, concrete, packing materials, and consumables. Impacts would be similar to construction, but generally lower.	**Overhead:** negligible to high **Underground:** negligible to high			
Public Services and Utilities – Increased Water Demand	Construction	Construction of overhead and underground transmission facilities could increase water demand as a result of dust and fire control, concrete mixing, and revegetation efforts.	**Overhead:** negligible to high **Underground:** negligible to high	▪ **Geo-1:** Minimize Soil Disturbance ▪ **W-1:** Minimize Water Use	Less than Significant	Minimizing water use, identifying available water sources and, if applicable, providing an executed agreement for water use in project-specific application materials would

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
	Operation and Maintenance	This impact is not anticipated to occur during operation and maintenance of overhead or underground transmission facilities.	**Overhead:** N/A **Underground:** N/A	▪ **Veg-3**: Site Transmission Facilities in Existing ROW or Disturbed Areas		demonstrate sufficient water supply is available.
	Upgrade or Modification	The shorter duration and reduced scope of construction activities associated with an upgrade or modification would reduce the overall demand for water use. However, there could still be a slight increase in water demand for dust control, concrete mixing, fire control, and revegetation efforts.	**Overhead:** nil to low **Underground:** nil to low			
Public Services and Utilities – Increased Demand for Fire Protection Services, Law Enforcement, and Emergency Responders	Construction	Construction of overhead and underground transmission facilities could conflict with existing utilities, resulting in hazardous conditions or worker injury. Trenching and blasting for the construction of underground transmission facilities could also result in worker injury. Increased traffic volumes, transport of construction materials, and road closures could lead to a higher risk of collision or hazard. Incidents of theft, vandalism, or trespassing on a project site could also occur. These potential risks and hazards would lead to an increased demand for fire protection services, law enforcement, and emergency responders.	**Overhead:** negligible to high **Underground:** negligible to high	▪ **AVOID-1:** Avoid Hazardous Areas ▪ **PSU-1:** Utility Coordination ▪ **PSU-2:** Law Enforcement and Emergency Management Coordination ▪ **PSU-3:** Site Security Plan ▪ **H&S-1:** Fire Mitigation Plan ▪ **H&S-3:** Hazardous Material Management Plan ▪ **H&S-4:** Risk Management Strategy ▪ **H&S-6:** Emergency Management Plan ▪ **TR-1:** Complete a TIA ▪ **TR-2:** Coordination with Aviation Groups ▪ **TR-3:** Transportation Plan ▪ **TR-4:** Planning Coordination	Less than Significant	As described in Chapter 3.8, Public Health and Safety, strict regulatory requirements and guidelines would help to ensure workers' wellbeing, and implementing an emergency response plan would ensure that the appropriate steps are taken in the event of an emergency, thereby reducing the demand for emergency responders. With the implementation of general conditions, avoidance criteria, and mitigation measures, impacts on the demand for fire protection services, law enforcement, and emergency responders would be less than significant.
	Operation and Maintenance	Overhead transmission facilities pose a risk of collision. Extreme weather events may damage overhead structures, exacerbating wildfire conditions. These potential risks would increase the demand for fire protection services, law enforcement, and emergency responders. Maintenance activities for overhead and underground transmission facilities would introduce other fire risks through the use of mechanical equipment, flammable materials, and gas-powered equipment. Trenching and excavating for the maintenance of underground transmission facilities could result in worker injury.	**Overhead:** negligible to high **Underground:** negligible to high			
	Upgrade or Modification	The shorter duration and reduced scope of construction activities associated with an upgrade and modification would reduce the overall demand for fire protection services, law enforcement, and emergency responders. However, there could still be a slight increase from a conflict with existing utilities, worker injury, higher risk of collision, and incidents of theft, vandalism, or trespassing.	**Overhead:** negligible to high **Underground:** negligible to high			
Public Services and Utilities – Increased Emergency Response Times	Construction	Construction of overhead and underground transmission facilities could impact emergency response times due to temporary road closures, detours, increased traffic, and impacts from access road construction.	**Overhead:** negligible to high **Underground:** negligible to high	▪ **PSU-2:** Law Enforcement and Emergency Management Coordination ▪ **H&S-1:** Fire Mitigation Plan ▪ **H&S-6:** Emergency Management Plan ▪ **TR-1:** Complete a TIA ▪ **TR-3:** Transportation Plan ▪ **TR-4:** Planning Coordination	Less than Significant	Mitigation measures would include ongoing coordination with law enforcement and emergency responders to ensure that the construction, operation and maintenance, and upgrade or modification of transmission facilities would not have significant adverse impacts on emergency response service times.
	Operation and Maintenance	Maintenance activities of overhead and underground transmission facilities could necessitate temporary road or lane closures, leading to detours and/or increased vehicular traffic. Overhead transmission facilities can typically be repaired more quickly than underground facilities. Therefore, the duration of impacts on emergency response times as a result of maintenance of overhead facilities would be less than underground facilities.	**Overhead:** negligible to low **Underground:** low to high			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
	Upgrade or Modification	Upgrade or modification of an existing overhead or underground transmission facility could impact emergency response times due to temporary road closures, detours, increased traffic, and impacts from access road construction.	**Overhead:** negligible to high **Underground:** negligible to high			
Public Services and Utilities – Increased Risk of Power Outages at Public Service Facilities	Construction	The construction of overhead and underground transmission facilities could conflict with existing utilities and, in some cases, cause a power outage. Power outages could impact public service facilities, such as local police departments, fire stations, and emergency medical facilities, thereby disrupting operation of these facilities and risking public safety.	**Overhead:** low to high **Underground:** low to high	▪ **AVOID-1:** Avoid Hazardous Areas ▪ **PSU-1:** Utility Coordination ▪ **PSU-2:** Law Enforcement and Emergency Management Coordination ▪ **PSU-5:** Corrosion Analysis ▪ **H&S-1:** Fire Mitigation Plan ▪ **H&S-4:** Risk Management Strategy ▪ **H&S-6:** Emergency Response Plans	Less than Significant	Public service facilities would be sufficiently prepared for power outages by complying with all applicable state and federal requirements for secondary energy sources. The construction, operation and maintenance, and upgrade or modification of transmission facilities would result in a less than significant impact with the implementation of and compliance with all general conditions, avoidance criteria, and mitigation measures.
	Operation and Maintenance	The continuous operation of public service facilities may be impacted should maintenance of transmission facilities result in a power outage.	**Overhead:** low to high **Underground:** low to high			
	Upgrade or Modification	Upgrade or modification of an existing overhead and underground transmission facility could conflict with existing utilities, leading to a power outage at public service facilities.	**Overhead:** low to high **Underground:** low to high			

(a) Appendix 3.9-1 provides a detailed listing of each general condition, avoidance criterion, and mitigation measure. Having these details in an appendix serves as a comprehensive reference section that can be consulted independently of the main text. This is particularly useful for detailed guidance and technical specifications that may be referred to multiple times. Additionally, including this information in an appendix allows for easier updates and revisions. If mitigation measures or guidelines change, the appendix can be updated without altering the main content.

BMP = best management practice; N/A = not applicable; ROW = right-of-way; TIA = traffic impact analysis

This Page Intentionally Left Blank

3.11.6 Suitability Map

Project-specific reviews would include a comprehensive review and analysis to identify the site-specific adverse impacts on resources to determine the suitability of this Draft Programmatic EIS. Environmental review may be phased by incorporating relevant information from this Draft Programmatic EIS by reference while evaluating site-specific adverse impacts of the individual project applications. For more information on phased reviews, please refer to Chapter 1, Introduction.

Project-specific applications would include details about the precise location and site-specific conditions. This Draft Programmatic EIS provides a suitability map that, when incorporated with project-specific applications, could be used to facilitate more informative and efficient environmental planning.

No criteria specific to public services or utilities were identified that would impact project siting decisions. No suitability map was developed for this resource.

This Page Intentionally Left Blank

3.12 Visual Quality

This Draft Programmatic Environmental Impact Statement (EIS) considers impacts on visual quality resulting from the types of facilities described in Chapter 2. This section addresses the following topics related to the construction, operation and maintenance, and upgrade or modification of high-voltage electric transmission facilities (transmission facilities) in the State of Washington:

- Section 3.12.1 identifies regulatory, siting, and design considerations.
- Section 3.12.2 describes the affected environment.
- Section 3.12.3 describes impacts.
- Section 3.12.4 describes potential mitigation measures.
- Section 3.12.5 identifies probable significant adverse environmental impacts on visual quality.
- Section 3.12.6 provides a suitability map and scoring for the siting of transmission facilities as it relates to visual quality, based on the identified considerations, impacts, and mitigation measures.

3.12.1 Regulatory, Siting, and Design Considerations

This Draft Programmatic EIS establishes a broad framework for compliance, outlining general laws, regulations, best management practices (BMPs), and design considerations. It is assumed that project-specific applications will be developed within this pre-established regulatory context and are expected to comply with existing laws and regulations. If the project does not comply with applicable laws and regulations or fails to adhere to design considerations or BMPs, additional project-specific environmental review and mitigation would be required. The applicable federal, state, and local laws and regulations relevant to visual quality are summarized in **Table 3.12-1**.

Table 3.12-1: Laws and Regulations for Visual Quality

Applicable Legislation	Agency	Summary Information
16 USC Chapter 27 – National Trails System Act	National Park Service; Bureau of Land Management; and U.S. Forest Service	This act designates national scenic trails to be continuous, extended routes of outdoor recreation within protected corridors. It promotes the enjoyment and appreciation of trails while encouraging greater public access. It establishes four classes of trails: national scenic trails, national historic trails, national recreation trails, and side and connecting trails.
23 USC §131 et seq. – Highway Beautification Act	Federal Highway Administration	This law was enacted to provide effective control of outdoor advertising and junkyards, protect public investment, promote the safety and recreational value of public travel, preserve natural beauty, and provide landscapes and roadside development reasonably necessary to accommodate the traveling public.
42 USC Chapter 55 – National Environmental Policy Act	U.S. Environmental Protection Agency	This act requires environmental analysis of federal agency actions to consider a project's impacts on urban quality, historic and cultural resources, and the design of the built environment.
43 USC Chapter 35 – Federal Land Policy and Management Act	Bureau of Land Management	The BLM has the responsibility to manage lands they administer in a manner that will protect the quality of scenic values.

Applicable Legislation	Agency	Summary Information
		Section 505 of the act requires that: “Each ROW shall: “(ii) minimize damage to scenic and aesthetic values and fish and wildlife habitat and otherwise protect the environment”
16 USC Chapter 28 – National Wild and Scenic Rivers Act	Bureau of Land Management National Park Service U.S. Forest Service U.S. Fish and Wildlife Service	This act protects and enhances river values, including free-flow, water quality, and outstandingly remarkable values of designated wild, scenic, and recreational rivers.
National Forest Management Act (Public Law 94-588)	U.S. Forest Service	This regulation governs the administration of national forests and removal of trees. It Includes requirements for consideration, treatment, and protection of intangible resources such as scenery and aesthetics.
National Forest System Land and Resource Management Planning (36 CFR Part 219)	U.S. Forest Service	This regulation involves creating and maintaining comprehensive plans for managing national forests and grasslands. Long-term management plans are created to guide the sustainable use and conservation of forest resources aiming to balance ecological, economic, and social needs.
Landownership Adjustments (36 CFR Part 254)	U.S. Forest Service	This regulation sets procedures for conducting exchanges of National Forest System lands and requires consideration of the public interest, including protection of fish and wildlife habitats, cultural resources, watersheds, and wilderness and aesthetic values.
USDOT Act, Section 4(f)	Federal Highway Administration	This act declares a national policy to make a special effort to preserve the natural beauty of the countryside and public park and recreation sites, wildlife and waterfowl refuges, and historic sites.
Scenic and Recreational Highway Act, RCW 47.39.020, Designation of portions of existing highways and ferry routes as part of system	Washington State Department of Transportation[a]	The Scenic and Recreational Highways Program designates highways that could be developed to promote tourist activity and provide concurrent economic growth while protecting scenic and recreational quality.
Washington Highway Beautification Act, RCW 47.40.010, Improvement and beautification a highway purpose	Washington State Department of Transportation[a]	This act declares improvement and beautification of any state highway right-of-way to be a “proper highway purpose.” It specifically mentions the following improvements: “planting and cultivating of any shrubs, trees, hedges or other domestic or native ornamental growth; the improvement of roadside facilities and viewpoints; and the correction of unsightly conditions.”
RCW 84.34, Open Space Preservation	Washington State Legislature[a]	This regulation ensures the use and enjoyment of natural resources and scenic beauty for the economic and social well-being of the state and its citizens. It defines open space as including any land area that would preserve visual quality along highway, road, and street corridors or scenic vistas.
Growth Management Act, WAC 365-196-425, Rural Element	Washington State Department of Commerce[a]	This act describes aspects of rural character, including visual characteristics.

Applicable Legislation	Agency	Summary Information
WAC 468-34-330, Scenic Enhancement	Washington State Legislature[(a)]	This regulation requires undergrounding of new lines within scenic areas where none currently exist and use of existing towers for new lines where existing corridors are present. Special exemptions may be made for power lines less than 35 kilovolts when less visually impactful alternative locations are not available or unusually difficult or where undergrounding would be technically infeasible or unreasonably costly.
Washington State Environmental Policy Act	Washington Energy Facility Site Evaluation Council Washington State Department of Ecology Local governments	This act is a process that identifies and analyzes environmental impacts that can be related to issuing permits. SEPA helps permit applicants and decision-makers understand how a proposed project will impact the environment. Certain projects, as defined in the SEPA Rules (WAC 197-11-704) and that are not exempt, are required to go through the SEPA process.

Notes:

(a) The agency responsible for administering most permits or authorizations for the identified regulation. However, if EFSEC is determined to be the agency responsible for approving a proposal, EFSEC can administer several types of permits at the state and local levels. EFSEC provides a streamlined process for siting and licensing major energy facilities, including transmission facilities in Washington State. EFSEC coordinates all evaluation and licensing steps, specifies the conditions for construction and operation, and issues a Site Certification Agreement, which assumes the responsibility for issuing individual state or local permits. By consolidating these permits into a single Site Certification Agreement, EFSEC can simplify the regulatory process for energy facility developers. While EFSEC itself does not directly administer federal permits, it works closely with federal agencies to ensure that all necessary federal requirements are met during the evaluation and licensing of energy facilities.

BLM = U.S. Department of the Interior, Bureau of Land Management; CFR = Code of Federal Regulations; EFSEC = Washington Energy Facility Site Evaluation Council; RCW = Revised Code of Washington; ROW = right-of-way; SEPA = State Environmental Policy Act; USC = United States Code; USDOT = U.S. Department of Transportation; WAC = Washington Administrative Code

The siting of transmission facilities is determined by engineering, technical, environmental, and socioeconomic factors. **Table 3.12-2** summarizes guidance documents and management plans that outline the design considerations and BMPs generally used to avoid or minimize impacts on visual quality.

Table 3.12-2: Siting and Design Considerations for Visual Quality

Siting and Design Consideration	Description
Federal Energy Regulatory Commission Guidelines	FERC provides comprehensive guidelines for the siting of interstate electric transmission facilities. These guidelines include considerations for visual impacts as they relate to environmental justice, tribal engagement, and public participation.
Federal Agency Visual Impact Mitigation Guidance (BLM n.d.)	This guide provides practical advice for implementing best management practices and discusses the visual characteristics and impacts associated with the construction, operation, and decommissioning of renewable energy and electric transmission facilities.

Siting and Design Consideration	Description
Mitigating Visual Impacts of Utility-Scale Energy Projects (Donaldson n.d.)	This document focuses on approaches, processes, and techniques for mitigating visual impacts of utility-scale energy projects, including transmission facilities. It explores the effectiveness of commonly employed mitigation techniques and addresses public concerns about changes to visual character and quality.
Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Installations (CIE 2017)	This guide provides guidelines for evaluating existing lighting conditions and developing best practices for effective lighting that minimizes light pollution.
Night Sky and Dark Environments: Best Management Practices for Artificial Light at Night on BLM-Managed Lands (Sullivan et al. 2023)	This technical note provides a reference for a variety of ways the BLM can protect night skies and dark environments by reducing or avoiding sources of light pollution from BLM-managed lands to maintain visible clarity of night skies and ensure a healthful dark environment for wildlife and people.
National Policy Statement for Electricity Networks Infrastructure (Department for Energy Security and Net Zero 2023)	This policy provides the framework for decisions on applications for electricity network infrastructure in the United Kingdom. Although not a U.S. publication, the document outlines general and technology-specific assessment principles, emphasizing the need for good design, climate change adaptation, and resilience.
Recommended Siting Practices for Electric Transmission Developers (Americans for a Clean Energy Grid 2023)	This document outlines best practices for siting electric transmission facilities. Recommended practices include: ▪ Early and transparent engagement ▪ Respect and fair dealing ▪ Environmental considerations ▪ Interagency coordination ▪ Use of existing infrastructure

BLM = Bureau of Land Management; CIE = Commission Internationale de l'Éclairage; FERC = Federal Energy Regulatory Commission; U.S. = United States

3.12.2 Affected Environment

This section describes the types of visual resources in Washington, as well as the types of viewing locations from which scenic resources are commonly viewed. In Washington, scenic resources and aesthetics are defined and approached differently, reflecting their unique roles in environmental and cultural preservation. Key components of this section include:

- Scenic Natural Resources
- Aesthetics
- Night-sky Environment

3.12.2.1 Scenic Natural Resources

Scenic natural resources refer to the natural and cultural landscapes that contribute to the visual quality and character of an area. They include:

- **Protected Scenic Areas and Parks:** Crucial for preserving Washington's natural heritage, supporting biodiversity, and providing recreational opportunities for residents and visitors

- **National Wild and Scenic River Systems:** Play a vital role in maintaining the ecological integrity, cultural heritage, and recreational value of America's rivers
- **Scenic Byways:** Designated routes that highlight the state's natural beauty, cultural heritage, and recreational opportunities
- **Vistas:** Expansive views or panoramas that can be seen from a particular vantage point

Protected Scenic Areas and Parks

Protected areas often include travel routes such as trails and designated viewpoints from which scenic areas may be viewed. Additionally, protected areas may include visually prominent landscape features such as landforms that may be viewed from nearby travel routes and/or communities. As such, the lands surrounding protected areas may be considered visually sensitive (areas where concern about visual quality is typically high). Washington State contains various types of protected areas, such as:

- National Parks
- State Parks
- National Monuments
- Natural Resource Conservation Areas
- Columbia Gorge National Scenic Area
- National Wilderness Areas
- National Wildlife Refuges

Section 3.14, Recreation analyzes many of these protected areas. Additionally, protected areas may include visually prominent landscape features such as landforms that may be viewed from nearby travel routes and/or communities. A unique aspect of Washington is that five massive, inactive volcanoes form distinctive, visually prominent scenic features when viewed from many locations within western Washington. The volcanoes are part of the Cascade Range, and all have protected area status (USGS n.d.). These five volcanoes are:

- Mount Baker
- Mount Rainier
- Glacier Peak
- Mount St. Helens
- Mount Adams

National Wild and Scenic Rivers System

Washington is home to several rivers designated under the National Wild and Scenic Rivers System (NWSRS), which aims to preserve rivers with outstanding natural, cultural, and recreational values. Washington has approximately 197 miles of rivers designated as wild and scenic (NWSRS n.d.). NWSRS-designated rivers are listed in **Table 3.12-3**.

Table 3.12-3: Rivers Designated Under the National Wild and Scenic Rivers System

River	Designation Year	Length (Miles)	Outstandingly Remarkable Values	Classification
Skagit River System	1978	158.5	Fish, Scenery, Wildlife,	Recreational – 58.5 miles Scenic – 100 miles
Klickitat River	1986	10.8	Culture, Fish, Geology, Hydrology	Recreational – 10.8 miles
White Salmon River	1986	27.7	Culture, Fish, Geology, Hydrology, Recreation, Scenery,	Scenic – 21 miles Wild – 6.7 miles
Middle Fork Snoqualmie River	2014	627.4	Scenic Fish, Recreation, Wildlife	Scenic – 21 miles Wild – 6.4 miles
Illabot Creek	2014	14.3	Fish, Wildlife	Recreational – 10 miles Wild – 4.3 miles
Pratt River	2014	9.5	Fish, Wildlife	Wild – 9.5 miles

Source: NWSRS n.d.

The NWSRS is crucial for several reasons:

- **Preservation of Natural Beauty:** The NWSRS helps protect rivers that possess outstanding natural, cultural, and recreational values and maintain them in a free-flowing condition for the enjoyment of present and future generations.
- **Environmental Protection:** By designating rivers as wild, scenic, or recreational, the NWSRS ensures the conservation of water quality, wildlife habitats (see Section 3.6, Habitat, Wildlife, and Fish), and overall health of river ecosystems.
- **Cultural and Historical Significance:** Many rivers in the NWSRS have significant cultural and historical importance. Protecting these rivers helps preserve the heritage and stories associated with them.
- **Recreational Opportunities:** The NWSRS provides numerous recreational opportunities such as fishing, boating, hiking, and camping (see Section 3.14, Recreation), which contribute to the well-being and quality of life for many people.
- **Economic Benefits:** Protected rivers often attract tourism, which can boost local economies through activities like guided tours, lodging, and related services.

State and National Scenic Byways in Washington

Washington is home to numerous scenic byways and natural resources that showcase its natural resources and beauty. These routes often pass through diverse terrains, including mountains, forests, and coastlines, offering travelers picturesque views and access to various attractions. Examples of scenic byways include the Cascade Loop, Pacific Coast Scenic Byway, Chinook Scenic Byway, and Columbia River Gorge. Highways in this system are developed and maintained in accordance with the criteria developed by the Washington State Department of Transportation under Revised Code of Washington 47.39.020. Byway logo signing is used to identify and guide travelers along state-designated scenic byways.

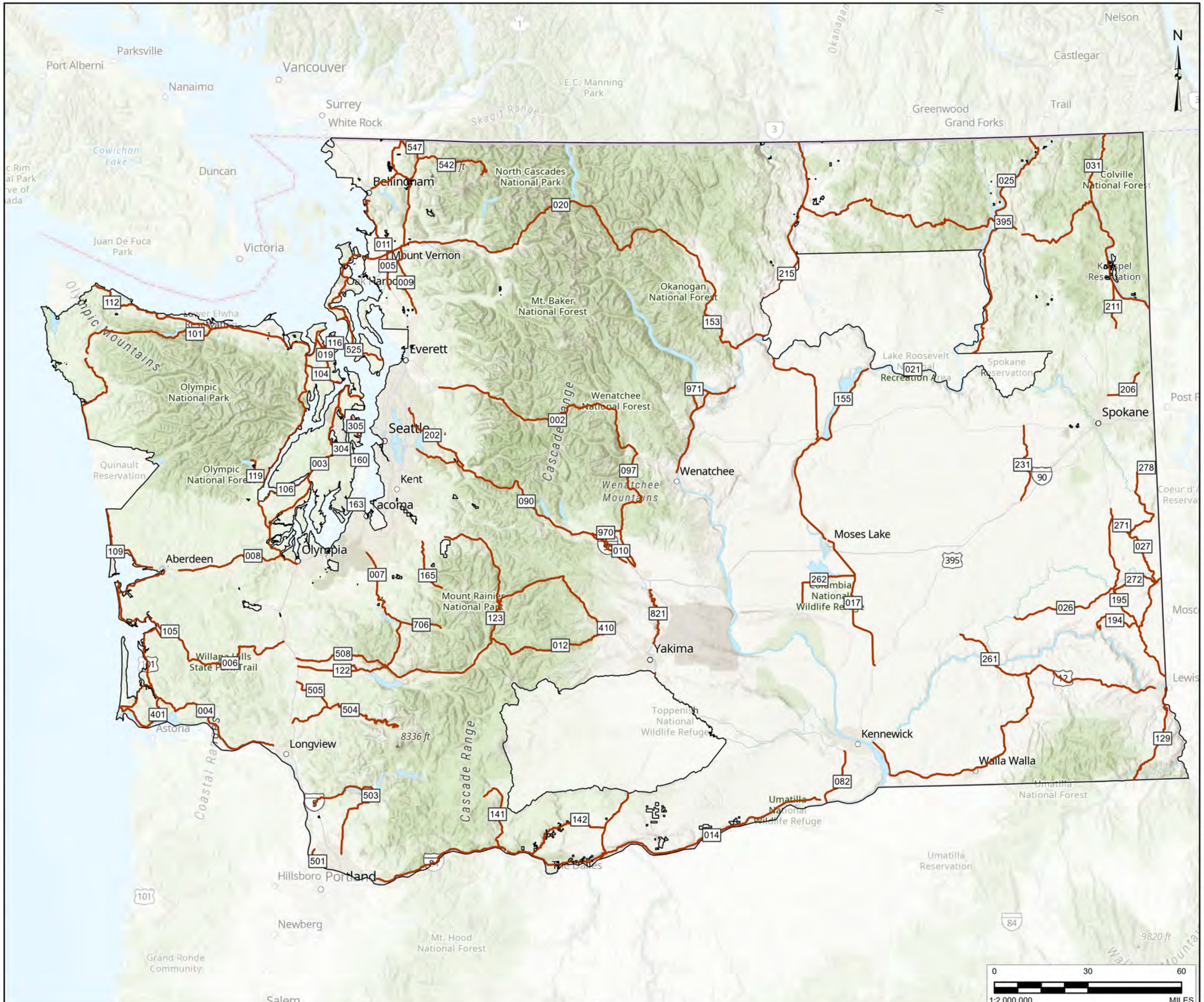
The Washington State Department of Transportation participates with local communities to develop a Corridor Management Plan (CMP) for each scenic byway. A CMP includes a strategy for maintaining and enhancing the byway's intrinsic scenic qualities. The level of protection for different parts of a National Scenic Byway or All-American Road can vary, with the highest level of protection provided to the parts that most reflect their intrinsic values. All nationally recognized scenic byways should, however, be maintained with particularly high standards for preserving the highest levels of visual integrity and attractiveness. Each CMP is designed to respond to new applications and developments along the byway corridor (USDOT 2002). **Table 3.12-4** lists the scenic byways in Washington State. **Figure 3.12-1** identifies the scenic byways in Washington.

Table 3.12-4: Washington State Scenic Byways

Byway	Location	Intrinsic Qualities
American Roads		
Chinook Scenic Byway	SR-410 from Enumclaw to Naches (84 miles)	Scenic and natural
International Selkirk Loop (All-American Road)	SR-20 and SR-31 between Newport and Nelway in British Columbia, Canada	Natural, historic, recreational, and scenic
National Scenic Byways		
Cascade Loop	440-mile loop in northwestern Washington following US-97 on the east, US-2 on the south, SR-20 on the north, and SR-525 on the west	Natural, recreational, and scenic
Coulee Corridor Scenic Byway	150-mile byway following SR-155 and SR-17 from Omak to east of Othello	Scenic and natural
Mountains to Sound Greenway	I-90 from Seattle to Thorp	Historic, recreational, and scenic
Stevens Pass Greenway	US-2 from Cashmere to west of Monroe	Historic, natural, and scenic
Strait of San Juan de Fuca Highway	SR-112 from US-101 to Sea Stacks	Natural, recreational, and scenic
White Pass Scenic Byway	US-12 from Naches to Lewis and Clark State Park	Recreational and scenic
State Scenic Byways		
Cape Flattery Tribal Scenic Byway	SR-112 between the eastern boundary of the Makah Indian Reservation and Cape Flattery	Archaeological, cultural, recreational, and scenic
Cascade Valley Heritage Corridor	Snoqualmie River Valley (SR-202) between Woodinville and North Bend	Historic and scenic
Chuckanut Drive	SR-11 from Bellingham to near Burlington	Historic and scenic
Columbia River Gorge Scenic Byway	136-mile loop in southern Washington and northern Oregon following SR-14 on the north and US-84 on the south	Historic and scenic
Cranberry Coast Scenic Byway	SR-105 from Aberdeen to Raymond	Historic and scenic
Hidden Coast Scenic Byway	SR-109 from Taholah to Hoquiam	Historic, recreational, and scenic
Mount Baker Scenic Byway	Bellingham to base of Mount Baker	Recreational, natural, and scenic

Byway	Location	Intrinsic Qualities
North Pend Oreille Scenic Byway	Located within Colville National Forest	Recreational, natural, historic, and scenic
Okanogan Trails Scenic Byway	SR-97 from Canadian border to Pateros	Recreational, historic, and scenic
Pacific Coast Scenic Byway	SR-101 from Olympia to Ilwaco	Recreational, historic, and scenic
Palouse Scenic Byway	Palouse region in southeastern Washington between Uniontown, Hooper, and Rockford	Natural, historic, and scenic
San Juan Islands Scenic Byway	Three segments: the 30 miles along the Washington State Ferries routes, a route around San Juan Island, and a route on Orcas Island	Natural, historic, and scenic
Sherman Pass Scenic Byway	US-2, SR-20, SR-21, and SR-24 in and around Lake Roosevelt	Natural, historic, and scenic
Spirit Lake Memorial Highway	SR-504 from Longview to Spirit Lake (Mount St. Helens crater)	Natural, historic, and scenic
Swiftwater Corridor	Vantage Highway and SR-903 from Vantage to north of Roslyn	Natural, historic, and scenic
Thurston Bountiful Byway	60-mile loop from Nisqually Valley, south to Yelm, west to Capital Forest, north to the intersection of Mud Bay Road and Delphi Road Southwest	Recreational, natural, historic, and scenic
Whidbey Island Scenic Byway	Whidbey Island from Clinton to Deception Pass	Natural, historic, and scenic
Yakama Scenic Byway	US-97 from Yakima to near Goldendale	Natural, historic, and scenic
Yakima River Canyon Scenic Byway	SR-821 from south of Ellensburg to I-82	Recreational, natural, historic, and scenic

Sources: ExperienceOlympia.com 2025, n.d.; Scott n.d.; State of Washington 2025; USDOT n.d.
I = Interstate; SR = State Route; US = US Highway; WA = Washington



LEGEND

Study Area

Scenic Byway (WSDOT, 2024)

EFSEC

Energy Facility Site Evaluation Council

REFERENCES AND NOTES

1. SERVICE LAYER CREDITS: SOURCES: ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY, ESRI, USGS

2. SCENIC BYWAYS: WSDOT, 2024

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

SCENIC BYWAYS

YYYY-MM-DD 2025-03-18

CONSULTANT wsp

FIGURE

3.12-1

This Page Intentionally Left Blank

Vistas

Vistas, or scenic views, often showcase expansive and visually appealing scenes that highlight natural resources, unique landmarks, and notable geographical features. They can range from large panoramic views to smaller intimate glimpses of specific elements within the landscape. Examples of popular vistas in Washington include Hurricane Ridge in Olympic National Park, Diablo Lake in the North Cascades, and Palouse Falls.

3.12.2.2 Aesthetics

Aesthetics generally pertain to the principles of beauty and artistic taste, often applied in various fields such as urban planning and architecture. Aesthetics can refer to the visual and sensory qualities of environments and objects, including the design and appearance of buildings and public spaces. The focus of aesthetics in design is on creating visually pleasing and harmonious environments that enhance the quality of life and the well-being of residents and visitors. As shown in **Figure 3.12-2** below, emulating natural vegetation characteristics for long linear rights-of-way (ROW) is often implemented to create more harmony between built and natural environments.

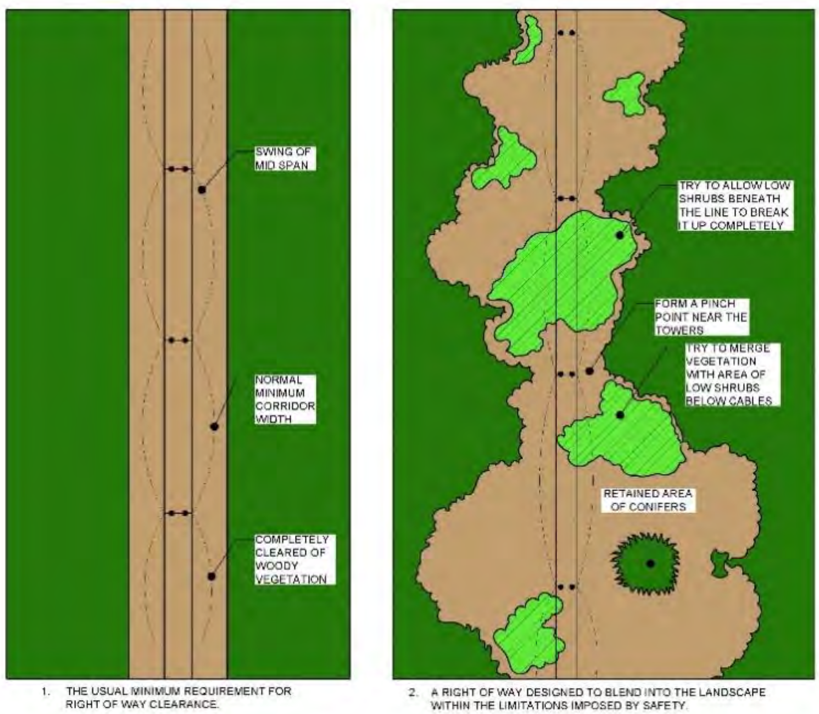


Figure 3.12-2: Visual Appeal of ROWs

The aesthetic environment refers to the character of the built environment, such as housing and transportation systems, in population centers as well as in rural communities. Washington's Growth Management Act (WAC 365-196-425) identifies rural character as:

> *...patterns of land use and development that:*
>
> *(i) Allow open space, the natural landscape, and vegetation to predominate over the built environment;*
>
> *(ii) Foster traditional rural lifestyles, rural-based economies, and opportunities to both live and work in rural areas; and*
>
> *(iii) Provide visual landscapes that are traditionally found in rural areas and communities...*

3.12.2.3 Night-sky Environment

Use of an area for night-based recreation and tourism, astronomical activities (both professional and amateur), or other darkness-dependent activities may be identified through research and/or public consultation. Organizations like DarkSky International and local astronomy clubs may conduct educational programs and outreach to raise awareness about the importance of dark skies and how to protect them. Existing lighting conditions may be classified based on definitions and descriptions from Commission Internationale de l'Eclairage (CIE) guidelines, which consist of a set of established Environmental Light Zones for classifying exterior light levels (CIE 2017). These zones range from areas that are intrinsically dark to areas of high ambient brightness. **Table 3.12-5** presents the CIE environmental lighting zone and descriptions.

Table 3.12-5: Environmental Light Zones for Classifying Exterior Light Levels

Zone	Surrounding	Environmental Light Level	Examples
E0	Protected	Intrinsically dark	The United Nations Educational, Scientific and Cultural Organization Starlight Reserves, International Dark-Sky Association Dark Sky Parks, major optical observatories
E1	Natural	Dark	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, International Dark-Sky Association buffer zones
E2	Rural	Low district brightness	Sparsely inhabited rural areas, villages, or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well-inhabited rural and urban settlements, small town centers of suburban locations
E4	Urban	High district brightness	Town and city centers and other commercial areas

Source: CIE 2017

Two widely used indicators for describing existing light conditions are light trespass and sky glow, described below:

- **Light Trespass:** The effect of light or illuminance that strays from its intended purpose onto neighboring areas, illuminating areas where lighting may be undesirable
- **Sky Glow:** Stray light being scattered in the atmosphere due to a project, resulting in a brightening of the natural sky background level and a reduction in star visibility

Several locations in Washington are recognized for their efforts to minimize light pollution and preserve dark skies, including:

- Brooks Memorial State Park
- Colville National Forest
- Mount Rainier National Park
- Olympic National Park
- North Cascades National Park

The International Dark Sky Places Program, managed by DarkSky International, works with communities, parks, and other entities to certify and protect areas with exceptional night skies. Washington has several areas that participate in the program (GO ASTRONOMY 2025).

Many communities in Washington have adopted lighting ordinances to reduce light pollution. These regulations often include guidelines for outdoor lighting to ensure that it is shielded and directed downward to minimize skyglow and preserve the natural night environment.

3.12.3 Impacts

In general, the types of visual impacts from transmission facilities may be described as changes in the existing level of visual quality that are typically negative. These changes may be categorized as the degradation of scenic natural resources, the degradation of aesthetic character, and/or the degradation of the night-time dark sky environment.

3.12.3.1 Method of Analysis

The study area for a project-specific application would typically encompass several key regions and features, such as the following:

- **Project Site and Immediate Vicinity:** This includes the specific location of the project and the surrounding area that might be directly affected by construction and operation and maintenance activities.
- **Assessment Zone:** The assessment zone establishes an area surrounding the proposed transmission facilities within which the applicant would assess the visual impacts that may be found within that zone.
- **Viewshed:** This includes the total landscape seen or potentially seen from a point, or from all or a logical part of a travel route, use area, or water body. Viewshed analysis is a geographic information system (GIS)-based procedure that determines what locations within the assessment zone will have an uninterrupted line-of-sight to the project features. Viewshed analysis is an important part of a visual impact assessment and is a useful tool to help determine key observation points (KOPs).[273]

This Draft Programmatic EIS analyzes the affected environment and impacts on visual quality within the Study Area defined in Chapter 2. Three project phases for each transmission facility type were considered: construction, operation and maintenance, and upgrade or modification. This evaluation considers overhead transmission facilities and underground transmission facilities for each phase. Overhead transmission facilities consist of transmission lines and substations and similar ancillary infrastructure. Overhead transmission facilities also incorporate aboveground infrastructure that may be associated with underground transmission facilities (e.g., clearing footprint required for launch and retrieval shafts for trenchless construction). Underground transmission facilities consist of underground transmission lines, underground access vaults, and other below-ground infrastructure. The construction of underground transmission facilities includes open trench, trenchless, and underwater construction methods.

Laws and regulations used to determine the impacts of transmission facilities on visual quality are summarized in **Table 3.12-1**. Information reviewed to identify impacts on visual quality in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping. Existing data were reviewed,

[273] A typical or sensitive viewing location that represents a critical place from which the public would view a project; used to assess visual impacts.

including state and federal government documents and websites, standards, and guidelines; journal articles; maps and spatial data, including available mapping data of transportation networks, parks, and protected areas; recreation areas and amenities; community locations; and terrain data.

Impact Determination

The discussion of impacts is qualitative given the high-level nature of a Programmatic EIS; quantification would require project-specific details to analyze. **Table 3.12-6** describes the criteria used to evaluate impacts from the Action Alternative and No Action Alternative. Information reviewed to identify impacts on visual quality in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping.

Table 3.12-6: Criteria for Assessing the Impact Determination on Visual Quality

Impact Determination	Description
Nil	A project would have no foreseeable impacts on visual quality. The transmission facility would not adversely affect the existing aesthetic or scenic character of the landscape.
Negligible	A project would have minor, adverse impacts on the existing aesthetic and/or scenic character, however, best management practices and design considerations are expected to be effective. ▪ Aesthetic and scenic character: no visual contrast resulting from changes; changes to the view are very small in scale/size; duration of changes is limited to construction phase ▪ Night sky: sky glow and/or light trespass are imperceptible
Low	A project would have adverse impacts on aesthetic and/or scenic character, even with the implementation of best management practices and design considerations. A project would cause some visual disturbance, but it would be limited in extent and duration. Impacts would be short-term and nonsignificant. ▪ Aesthetic and scenic character: weak visual contrast resulting from changes; changes to view are small in scale/size; duration of changes is short-term ▪ Night sky: sky glow and/or light trespass may be perceptible but are within applicable CIE zone criteria
Moderate	A project would have adverse impacts even with the implementation of best management practices and design considerations. A project would result in noticeable and distinct changes to the existing aesthetic and/or scenic character. ▪ Aesthetic and scenic character: Moderate visual contrast resulting from changes and changes to view are moderate in scale/size ▪ Night sky: sky glow and/or light trespass are evident but are within applicable CIE zone criteria Moderate impacts may be long-term, occurring over one or more project phases. Moderate impacts have the potential to be significant.
High	A project would have adverse impacts that are significant and potentially severe even with the implementation of best management practices and design considerations. A project would result in uncharacteristic and extensive changes to the existing aesthetic and/or scenic character. These impacts may be difficult to fully mitigate. ▪ Aesthetic and scenic character: Strong visual contrast resulting from changes and changes to view are large in scale/size ▪ Night sky: sky glow and/or light trespass are obvious and may exceed applicable CIE zone criteria High impacts may be permanent or continue for the duration of the project.

CIE = Commission Internationale de l’Éclairage;

To clearly understand the potential severity of impacts without any interventions, the following impact determinations exclude the use of avoidance criteria and mitigation measures. The ratings assume compliance with all federal, state, and local laws and regulations, as well as standardized BMPs and design considerations. Assessing impacts without avoidance criteria or mitigation measures offers a baseline understanding of potential environmental effects, helping to identify the true extent of these impacts. Environmental laws often require that initial impact assessments be conducted without considering mitigation to maintain the integrity of the environmental review process.

3.12.3.2 Scenic Natural Resources

Visual impacts on scenic natural resources occur when a project results in visual contrast. The degree to which an industrial facility affects the visual quality of a landscape depends on the visual contrast created between the project and the existing landscape (BLM 1986). Visual contrast can be measured by comparing the project features with the major features in the existing landscape. The basic design elements of form, line, color, and texture are used to make this comparison and to describe the visual contrast created by the project. This assessment process provides a means for determining visual impacts and for identifying measures to mitigate these impacts (BLM 1986).

The degree of visual contrast of project components at key viewpoints may be determined by characterizing the design elements of each of the project feature’s interactions related to landform, vegetation, and built structures and comparing these to the existing landscape conditions. The degree of contrast may be characterized using the following descriptive categories (BLM 1986):

- **None:** The element 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 the characteristic landscape.
- **Strong:** The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

3.12.3.3 Action Alternative

Construction

Overhead Transmission Facilities

Activities for the construction phase of overhead transmission facilities would vary and depend on the scale of the facility and site characteristics. Construction could include a site preparation phase of relatively short duration (e.g., a few months), followed by a longer construction and start-up phase. It is assumed that the construction phase of overhead transmission, per mile, would have a shorter duration than underground construction. Overhead transmission facilities infrastructure could have the following identified impacts during the construction phase:

- Degradation of Scenic Natural Resources
- Degradation in Aesthetics
- Degradation of Night Sky

Degradation of Scenic Natural Resources

During the construction phase, site preparation may include vegetation clearing and grubbing, as well as earthworks and grading, that may alter natural topographic variations. The impact of natural vegetation removal may be visually prominent, especially in forested areas where the clearing of a linear right-of-way (ROW) corridor may be conspicuous. Site preparation and access road construction require the presence of vehicles and equipment.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of degradation of scenic natural resources, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Degradation in Aesthetics

The assembly of overhead transmission facilities (foundation and structure assembly) and the assembly of substations could create visual contrast. Similarly, the construction of infrastructure (e.g., access roads, fencing, bridges, temporary laydown areas, turnaround areas, watercourse crossings, and construction camps) contrasts with landscape character.[274] Dust may result in visual impacts in some areas.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of degradation in aesthetics, without mitigation measures incorporated, is anticipated to vary and could be low to high impact. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Degradation of Night Sky

Construction has the potential to temporarily introduce nighttime lighting related to the transportation of materials and equipment to the project site. Construction safety lighting is required if work is to proceed at night and may result in light trespass[275] and glare.[276]

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of degradation of the night sky, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Activities for the construction phase of underground transmission facilities, including open trench, trenchless (including horizontal directional drilling), or underwater construction methods, would vary depending on the scale of the facility and site characteristics. Similar to overhead transmission facilities, construction underground could include a site preparation phase of relatively short duration, followed by a longer construction and start-up phase. It is assumed that the construction phase for underground transmission facilities, per mile, would have a longer duration than overhead projects. Underground transmission could have the following identified impacts during the construction phase:

- Degradation of Scenic Natural Resources

[274] The overall visual appearance of a given landscape, including both natural features and human-created modifications.

[275] Light falling where it is not intended or needed.

[276] Light reflected off of a stationary object.

- Degradation in Aesthetics
- Degradation of Night Sky

Degradation in Scenic Natural Resources

Activities that may cause visual contrast during construction include vegetation clearing and grubbing, and grading of the corridor; open trenching; installation of pre-formed concrete sections and conduit; construction of access roads, laydown areas, and construction camps; equipment and material delivery; and trench backfilling. Degradation of visual quality may also result from the visual contrast of stockpiled construction equipment vehicles, and fugitive dust (depending on site conditions).

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of degradation in scenic natural resources, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Degradation in Aesthetics

After trenching is complete, color contrast may result from exposed soils placed during backfilling. Re-establishment of vegetation may take several years, and the contrast in vegetation color and texture with the adjacent landscape may be visually apparent even after establishment.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of degradation in aesthetics, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Degradation of Night Sky

Construction has the potential to temporarily introduce nighttime lighting related to the transportation of materials and equipment to the project site. Construction safety lighting is required if work is to proceed at night and may result in light trespass and glare.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of degradation of night sky, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Operation and Maintenance

Overhead Transmission Facilities

Activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs, similar to any other linear industrial facility. Overhead transmission facilities could have the following identified impacts during the operation and maintenance phase:

- Degradation of Scenic Natural Resources
- Degradation in Aesthetics
- Degradation of Night Sky

Degradation in Scenic Natural Resources

Both overhead and underground transmission facilities generally require large, permanent cleared corridors through forests, fields, and other natural areas, typically 125-250ft in width. This can disrupt the visual continuity of the landscape, creating an eyesore that detracts from the natural character of the area. The presence of tall towers and extensive wiring from overhead transmission facilities can also alter the scenic quality of previously undisturbed or minimally impacted areas. Design factors that influence the visual contrast of transmission towers include:

- Tower type, as shown in **Figure 3.12-3**, including:
  - Galvanized Lattice: Lattice or guyed towers are less visually obtrusive on the rural landscape than monopoles (BLM 2013). Height typically ranges between 90 and 180ft.
  - Monopole: The solid surfaces of monopoles can be highly reflective if the surfaces are light in color and do not employ low-reflectivity coatings (BLM 2013). Height typically ranges between 50 and 150ft.
  - H-Frame: Typically, smaller and used for lower-voltage lines. Height typically ranges between 60 and 90ft.
- Tower scale and height affect visual prominence (how easy to see a project element is in the landscape)
- Materials influence reflectivity, color, and textural contrast

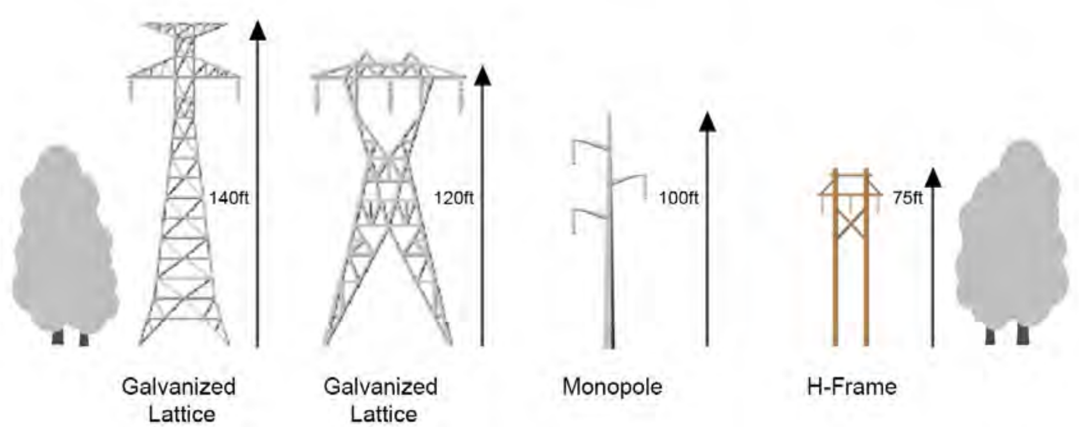


Figure 3.12-3: Tower Types

Many factors may influence the visual perception of scenic landscapes, including viewer characteristics, lighting, atmospheric conditions, viewing angle, and, especially, viewing distance. For example: “In general, visual contrasts are greater when objects are seen at close range. If other visibility factors are held constant, the greater the distance, the less detail is observable and the more difficult it will be for an observer to distinguish individual features” (Landscape Institute 2002).

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of degradation in scenic natural resources, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Degradation in Aesthetics

The aesthetic character of settlements and rural communities may be affected by the visual contrast created by transmission facilities, especially at close viewing range. Transmission facilities are visually conspicuous linear features that can extend for many miles across open rural landscapes. The large size of transmission towers, combined with their strongly vertical form and their angular geometry, may contrast strongly with the character of nearby rural landscapes as well as residential communities. Depending on site-specific conditions, the requirement for clear zones that are free of vegetation may create views of the transmission facilities and/or other industrial development.

Scenic areas often hold cultural and recreational value for local communities (see Section 3.15, Historic and Cultural Resources). Transmission facilities can diminish these values by altering the landscape in ways that reduce its attractiveness for activities like hiking, birdwatching, and photography. In such areas, because the level of viewer concern for landscape visual quality is typically high, the area is considered visually sensitive.

The existence of a cleared linear ROW corridor through forested areas or other natural vegetation communities can result in a strong line that may be visible for many miles (BLM 2013). Rugged terrain and areas with more subtle topographic variation such as forested rolling hills could be impacted due to their visual prominence. In open areas, the field of view may be wide and expansive from elevated KOPs, resulting in a conspicuous line created by the cleared ROW and transmission facilities.

Reflectivity and glare may result from the presence of the conductor and towers. This impact may be limited to certain times of the day when the angle of the sun results in reflectivity. Substation and tower infrastructure results in visual contrast due to the angular geometric forms, color, and reflectivity of the materials.

Visibility of towers from river corridors and bodies of water, as well as visibility from scenic byways, may contrast with the scenic character that is valued by recreational viewers. The visibility of towers and cleared vegetation against the skyline is one of the most visually intrusive impacts.

Degradation of community and rural character may result if infrastructure is sited near settlements and residential areas. The impact is generally lessened as viewing distance increases. Visual prominence results from the large scale of transmission towers, especially when they are visible in the foreground at viewing distances up to approximately 0.5 mile. Residential viewers are sensitive to changes in the visual character of the landscape as viewed from their property.

Impact Determinations: Depending on the scale of the facility and site characteristics, the impact of degradation in aesthetics, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Degradation of Night Sky

Quantification of changes to sky glow and light trespass is based on the CIE environmental lighting zones described in **Table 3.12-5** (CIE 2017). One metric used to characterize sky glow is the change in sky brightness compared to a natural dark sky (percentage of brightness above natural dark sky background). Another closely related metric is sky quality: the brighter the night sky, the lower its sky quality. Sky quality can be measured in magnitudes per square arcsecond and converted into units of luminance, from which the measure of sky glow is obtained. Illuminance[277] (measured in lux[278]) may be used as the indicator to represent light trespass levels.

Operational lighting at substations for security and safety has the potential to contribute to sky glow, light trespass, and glare. Substations are not universally required to have lights on at night when unattended; however, the National Electrical Safety Code recommends certain illumination levels for safety and security, depending on the facility. For example, general horizontal illumination should be around 22 lux, and specific vertical illumination should be around 2.2 lux.

Additionally, the Federal Aviation Administration (FAA) has specific requirements for marking and lighting transmission towers to ensure they are visible to aircraft and do not pose a hazard to air navigation. Any structure exceeding 200 feet above ground level must be marked and/or lighted according to FAA standards. New regulations require marking for towers between 50 and 200 feet if they are located in rural areas and could pose a hazard to low-flying aircraft. Light specifications include:

- **Red Lights:** Typically used for night-time marking. These lights are steady-burning or flashing and are often combined with paint for daytime visibility.
- **White Lights:** High-intensity white lights can be used both day and night. These are often used as an alternative to red lights and paint, especially in urban areas to reduce visual clutter.

The Federal Communications Commission requires an FAA determination of “no hazard” before granting construction permits for transmission towers. This ensures that the proposed tower meets all FAA safety standards.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of degradation of night sky, without mitigation measures incorporated, is anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Similar to overhead transmission facilities, activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs, similar to any other linear industrial facility. Underground transmission could have the following identified impacts during the operation and maintenance phase:

- Degradation of Scenic Natural Resources
- Degradation in Aesthetics

Degradation in Scenic Natural Resources

Degradation of visual quality may result from linear corridors that contrast vegetation color and texture with the surrounding landscape character. Because of the strongly linear nature of transmission facility ROWs, they may detract from the surrounding valued landscape, especially in undisturbed or largely natural areas. In rural or

---

[277] Measurement of the amount of light falling onto and spreading over a given surface area.

[278] A unit of measurement for illuminance, which indicates how much light is received on a surface. One lux is equal to one lumen per square meter.

residential areas, the linear corridor may be visually apparent and may contrast with the aesthetic characteristics of the landscape. The contrast may be highest in open landscapes where the linear ROW may occupy a wide field of view.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of degradation in scenic and natural resources, without mitigation measures incorporated, is anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Degradation in Aesthetics

In forested landscapes, the removal of mature trees in the ROW for maintenance access clear zones can result in a sharply contrasting parallel-sided corridor that dissects the landscape. The effect can be visually intrusive, especially along visually prominent skylines and ridgetops or in rugged, mountainous terrain.

Due to the spatial requirements for equipment placement underground, the total ROW width may be greater for undergrounding than for overhead transmission. The conductor sections would require aboveground vault structures at each end to provide access points for maintenance and repairs.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact of degradation in aesthetics, without mitigation measures incorporated, is anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Upgrade or Modification

Overhead Transmission Facilities

Modifying or upgrading overhead transmission facilities would involve several key steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Overhead transmission could have the following identified impacts during the upgrade or modification phase:

- Degradation of Scenic Natural Resources
- Degradation in Aesthetics
- Degradation of Night Sky

Upgrades or modifications to overhead transmission facilities could be installed in the same location or in close proximity to the original location of transmission facilities. Another possibility for the upgrade or modification of a transmission facility could be increasing the capacity of existing overhead transmission facilities. This upgrade or modification could require expanding or widening an existing ROW or easement to accommodate the facility upgrade or modification. Increasing the ROW could result in impacts similar to those described above for construction.

While adverse impacts would be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing structures and footprints, which minimizes the disturbance to surrounding land and ecosystems. New construction often requires clearing land, which can disrupt existing land uses.

- **Infrastructure Utilization:** Existing infrastructure can be reused or enhanced, reducing the need for extensive new development. This can help preserve natural landscapes and reduce the impact on shorelines.

Underground Transmission Facilities

Upgrading or modifying underground transmission facilities would involve several key steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Underground transmission could have the following identified impacts during the upgrade or modification phase:

- Degradation of Scenic Natural Resources
- Degradation in Aesthetics

Upgrades or modifications to underground transmission facilities could be installed in the same location or in close proximity to the original location of transmission facilities. Another possibility for the upgrade or modification of a transmission facility could be increasing the capacity of existing underground transmission facilities. This upgrade or modification could require expanding or widening an existing ROW or easement to accommodate the facility upgrade or modification. Increasing the ROW could result in impacts similar to those described above for construction.

While adverse impacts would be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing structures and footprints, which minimizes the disturbance to surrounding land and ecosystems. New construction often requires clearing land, which can disrupt existing land uses.
- **Infrastructure Utilization:** Existing infrastructure can be reused or enhanced, reducing the need for extensive new development. This can help preserve natural landscapes and reduce the impact on shorelines.

3.12.3.4 No Action Alternative

The No Action Alternative represents the scenario in which this Draft Programmatic EIS is not used and current management practices for siting and planning transmission facilities continue unchanged. Under this alternative, each project would continue to be evaluated on a case-by-case basis and reviewed for compliance with existing regulations, codes, and standard practices. While impact determinations would likely be similar to those outlined in this Draft Programmatic EIS, projects would not benefit from the impact reductions associated with the avoidance criteria developed and analyzed in this Draft Programmatic EIS. These criteria are anticipated to provide additional mitigation that further reduces potential environmental impacts.

3.12.4 Potential Mitigation Measures

This section describes measures that would eliminate, reduce the intensity of, or compensate for adverse impacts from construction, operation and maintenance, and upgrade or modification of transmission facilities.

All general conditions adopted for this Draft Programmatic EIS, identified in Section 3.1, are relevant to this resource section. Applicants would be responsible for providing information within their application materials documenting their attempts at implementing the general conditions.

Avoidance Criteria[279] adopted for this Draft Programmatic EIS have been identified in Section 3.1. Avoidance Criteria that are relevant to this resource section are described below:

AVOID-6 – Old-Growth and Mature Forests: Avoid old-growth forests, which include forests older than 200 years in western Washington and greater than 150 years in eastern Washington, and mature forests, which include forests greater than 80 years.

Rationale: This avoidance criterion would reduce direct loss of old-growth and mature forests, which have already lost the majority of their historical extent. Old-growth and mature forests are particularly susceptible to long-term impacts due to the time lag to reestablish current ecological functions if clearing occurs. In addition, linear features through old and mature forest stands increase the impacts from edge effects such as the spread of invasive plants.

AVOID-13 – Land Use and Zoning Incompatibility and Conflicts: Avoid incompatible land uses and zoning. Demonstrate that there are no indirect or adjacent land use conflicts with private property owners or public land administrators.

Rationale: This avoidance criterion aims to avoid conflicts with land use and zoning. Avoiding land use and zoning conflicts will also help to reduce adverse impacts on property owners, agricultural landowners, noise, visual, and socioeconomics.

AVOID-17 – Night Sky: Avoid the construction of overhead transmission facilities in areas managed for the protection of night sky.

Rationale: This avoidance criterion aims to protect designated night sky areas.

AVOID-18 – Exceptional Recreation Assets: Avoid impacts on, or within the viewshed of, exceptional recreation assets as defined by the Washington State Recreation and Conservation Office (RCO).

Rationale: This avoidance criterion aims to protect exceptional recreational assets. These places provide a unique experience or activity that may not be available in all areas of the state. Coordination with the RCO early in the project planning process is a crucial step to adequately avoid these areas.

AVOID-19 – Wilderness Areas: Avoid impacts on, or within the viewshed of, designated wilderness areas.

Rationale: This avoidance criterion aims to protect wilderness areas. Wilderness areas are valued for their untouched natural beauty. The Wilderness Act of 1964 mandates the preservation of the natural conditions of designated wilderness areas.

AVOID-22 – Visual Impacts on Historic and Cultural Resources: Avoid visual impacts on historic and cultural resources.

[279] The complete list of Avoidance Criteria and their rationale can be found in Section 3.1 as well as Appendix 3.1-1.

Rationale: Visual impacts may be considered an adverse effect if the integrity of the historic property's setting and feeling are important to its significance. This avoidance criterion aims to avoid adverse visual impacts on historic and cultural resources.

AVOID-24 – Visual Impacts on Tribal Resources and TCPs: Avoid visual impacts on Tribal resources and Tribal Cultural Places (TCPs).

Rationale: This avoidance criterion aims to avoid adverse visual impacts on Tribal resources and TCPs.

Applicants would be responsible for providing information within their application materials documenting the project's compliance with the above avoidance criteria.

Potential mitigation measures have been identified to minimize adverse impacts from transmission facility projects. These measures are intended to be broad so that they can be applied to most projects that would be covered under this Programmatic EIS. However, project-specific plans would be needed to adapt the measures for project-specific applications.

When impact determinations are identified as moderate or high, the applicant would either adopt applicable mitigation measures from this Programmatic EIS or the SEPA Lead Agency may require applicable mitigation measures to be implemented to reduce project-specific impacts. When impact determinations are low, applicable mitigation measures should still be considered by the applicant and the SEPA Lead Agency as these measures would help to further reduce project-specific impacts, including the project's contribution to cumulative impacts. These measures would be implemented in addition to compliance with laws, regulations, environmental permits, plans, and design considerations required for transmission facilities.

The following mitigation measures could be adopted to mitigate adverse impacts:

Vis-1 – Route Planning: Carefully select routes that minimize visual and ecological disruption. Route lines parallel to the contour line of slopes, where possible, and limit siting facilities to the following:

- On visually prominent ridgelines
- Near prominent landscape features and landmarks
- In proximity to visually sensitive viewpoints including National Historic Trails and Sites

Rationale: This mitigation measure aims to mitigate the construction of transmission facilities in areas that are especially sensitive to development, such as ridgelines visible against the sky from travel routes and other viewpoints. Prominent landscape features draw the viewer's attention, so facilities should not be aligned with features. Waterbodies are often valued elements in the landscape, both visually and for recreation.

Vis-2 – Selection of Finishes: Use dull and/or dark painted surfaces, textured surfaces, and low-reflectivity finishes on transmission facilities. Finishes and colors should be appropriate to their location and context.

Rationale: This mitigation measure is intended to mitigate impacts from surface glare.

Vis-3 – Visual Appeal of ROWs: Create varied, feathered vegetation edges for cleared areas and linear rights-of-way (ROWs) that are sinuous horizontally and layered vertically. Strategically retain or plant native vegetation within the ROW where practicable in visually sensitive areas.

Rationale: This mitigation measure aims to reduce the visual contrast resulting from straight ROW corridors by emulating natural vegetation character using curvilinear edges.

Vis-4 – Underground Construction: Use underground construction methods in areas with high scenic quality and/or open rural areas, depending on geologic conditions.

Rationale: This mitigation measure aims to mitigate surface visual impacts on visually sensitive areas by using underground construction methods.

Vis-5 – Visual Screening: Use techniques such as berms, fencing, or vegetative screening to conceal or improve the appearance of distribution substations, above-ground vaults, and other facilities.

Rationale: Depending on site conditions and the scale of facilities, visual screening can be an effective method to reduce visual contrast resulting from transmission facilities.

Vis-6 – Visual Impact Assessment: Conduct a visual impact assessment during project planning that defines the project's viewshed and identifies an assessment zone large enough to capture all non-negligible visual impacts.

Rationale: This is a required component of project-specific applications necessary for SEPA Lead Agencies to evaluate baseline conditions.

This mitigation measure aims to preserve scenic quality, engage the public and stakeholders, and offer mitigation planning. By identifying visual impacts early, planners can develop strategies to mitigate visual effects. Visual impact assessments contribute to broader environmental stewardship by ensuring that infrastructure development is balanced with the preservation of natural and cultural landscapes.

Vis-7 – Span Length: Maximize the span length when using overhead lines crossing highways and other linear viewing locations.

Rationale: This mitigation measure aims to decrease visual contrast at highway crossings by moving the tower structures as far from the road as possible.

Vis-8 – Selection of Structure Type: Use the type of proposed transmission structure (i.e., H-frame or monopole) that best matches any adjacent transmission facilities.

Rationale: This mitigation measure aims to mitigate visual clutter from the potential introduction of different structure types into the landscape.

In addition to the above mitigation measures, the following mitigation measures[280] developed for other resources may be applicable:

Geo-1 – Minimize Soil Disturbance: Minimize soil disturbance, including footprints related to access roads and permanent structures, to the greatest extent practicable. Minimize the use of construction techniques that would be harmful to topsoil composition, where feasible.

---

[280] The rationales for the identified mitigation measures are provided in their respective resource sections.

W-2 – Clear Spanning or Trenchless Methods for Water Crossings: When feasible, use clear spanning for overhead transmission or trenchless construction for underground transmission to minimize disturbance to riparian areas, wetlands and wetland buffers, and surface waters.

W-6 – Minimize Hydrology Changes: Minimize water diversions or changes to natural hydrology, to the extent possible. Natural hydrology would be restored to the site following construction.

Veg-3 – Site Transmission Facilities in Existing ROW or Disturbed Areas: Site transmission facilities in existing right-of-way (ROW) or disturbed areas, to the greatest extent practicable.

Hab-3 – Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines: Minimize transmission line crossings of canyons and draws, along ridge lines, parallel to rivers, and within riparian habitat.

Hab-6 – Woody Debris Salvage and Restoration: Salvage and retain large, coarse, woody debris during construction and in-stream works. The post-construction revegetation and restoration plan would include planting native shrubs and replacing woody debris unless prohibited by a state authority due to fire risk. Post-construction revegetation and restoration plans would be provided to the Washington Department of Fish and Wildlife for review prior to approval by the State Environmental Policy Act Lead Agency.

Hab-9 – Retain Wildlife Trees where Practicable: Wildlife trees are trees with features that are especially beneficial to wildlife. These typically include living and dead trees that are decaying and those that have cavities or good conditions for cavity creation, sloughing bark that can provide roost sites for bats, branches for perching, basal cavities for denning, and foraging opportunities for woodpeckers and other wildlife. Wildlife trees will be retained where safe to do so.

Wild-4 – Construction Occurs during Daylight Hours: Schedule construction activities during daylight hours, when feasible, to reduce the disturbance to nocturnal species and reduce the risk of wildlife-vehicle collisions.

Fish-15 – Removal of Riparian Vegetation: Minimize disturbance to low-growing shrubs and grass species in riparian areas, or tree removal in steep gulches.

LSU-3 – Reseed Disturbed Rangelands: Coordinate with rangeland property owners to determine the appropriate seed mix used in revegetation actions.

3.12.5 Probable Significant Adverse Environmental Impacts

Determining the significance of an impact involves context and intensity, which, in turn, depend on the magnitude and duration of the impact. “Significant” in the State Environmental Policy Act means a reasonable likelihood of more than a moderate adverse impact on environmental quality. An impact may also be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred (Washington Administrative Code 197-11-794).

Identification of environmental impacts and assignment of discipline-specific ratings is based on professional judgment and information available at the time of writing. A precautionary approach has been taken for the assessment in cases where information is currently unknown or unavailable.

This Draft Programmatic EIS weighs the impacts on visual quality that could result from transmission facilities after considering the application of laws and regulations; siting and design considerations, including agency guidance and best management practices; and mitigation and makes a resulting determination of significance for each impact. **Table 3.12-7** summarizes the impacts anticipated for the construction, operation and maintenance, and upgrade or modification of transmission facilities.

This Page Intentionally Left Blank

Table 3.12-7: Summary of Impacts, Mitigation Measures, and Significance Rating for Visual Quality

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Visual Quality – Degradation of Scenic Natural Resources	Construction	Vegetation clearing and grading associated with both overhead and underground transmission facilities could be visually prominent and contrast with the natural landscape character, especially in forested areas. Installing overhead transmission facilities, specifically towers and substations, could create a visual obstruction that degrades scenic natural resources. Trenching or other trenchless construction methods used for underground transmission facilities could create surface disturbance that alters the natural landscape character.	**Overhead:** low to high **Underground:** low to high	▪ **AVOID-6:** Old-Growth and Mature Forests ▪ **AVOID-13:** Land Use and Zoning Incompatibility and Conflicts ▪ **AVOID-17:** Night Sky ▪ **AVOID-18:** Exceptional Recreation Assets ▪ **AVOID-19:** Wilderness Areas ▪ **Vis-1:** Route Planning ▪ **Vis-2:** Selection of Finishes ▪ **Vis-3:** Visual Appeal of ROWs ▪ **Vis-4:** Underground Construction ▪ **Vis-5:** Visual Screening ▪ **Vis-6:** Visual Impact Assessment ▪ **Vis-7:** Span length ▪ **Vis-8:** Selection of Structure Type ▪ **Geo-1:** Minimize Soil Disturbance ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **W-6:** Minimize Hydrology Changes ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas ▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-6:** Woody Debris Salvage and Restoration ▪ **Hab-9:** Retain Wildlife Trees where Practicable ▪ **Fish-15:** Removal of Riparian Vegetation	Less than Significant	Visual impacts are likely to occur and would be unavoidable even with the implementation of mitigation measures. The visual impact assessment predicts how the proposed project will alter the visual environment. If the project is likely to have moderate or high visual impacts, the visual impact assessment may include proposed mitigation measures to minimize visual intrusion. Additional coordination with the SEPA Lead Agency or stakeholders may be warranted to ensure that other effective measures are chosen on a project-specific basis for the visual impact assessment so that impacts remain less than significant.
	Operation and Maintenance	Both overhead and underground transmission facilities generally require large, permanent cleared ROW corridors, which could be through forests, fields, or other natural areas. This can disrupt the visual continuity of the landscape that detracts from the natural character of the area. The long-term presence of tall towers and extensive wiring from overhead transmission facilities can alter the scenic quality of previously undisturbed or minimally impacted areas. When underground transmission facilities need repairing, trenching activities similar to those described for construction could be required. These activities may alter the natural landscape character. However, reclamation and revegetation after construction, during operation, or after maintenance activities would provide less of a visual impact than overhead transmission facilities.	**Overhead:** low to high **Underground:** negligible to high			
	Upgrade or Modification	Impacts related to the degradation of scenic natural resources from the upgrade or modification of both overhead and underground transmission facilities could be similar to those expected for construction. However, these impacts could be less due to the minimized disturbance footprints and utilizing existing infrastructure.	**Overhead:** low to high **Underground:** low to high			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
				▪ **LSU-3:** Reseed Disturbed Rangelands		
Visual Quality – Degradation in Aesthetics	Construction	Degradation in aesthetics could result from the construction of both overhead and underground transmission facilities. Vegetation clearing, grading, temporary laydown areas, and constructing access roads could contrast with the landscape character and degrade the area's aesthetics. Since the ROW would need to be maintained for the duration of a project, this impact could begin in construction and continue through operation and maintenance. The assembly of overhead transmission facilities could create visual contrast with rural or community character. These impacts could begin in construction and continue through operation and maintenance.	**Overhead:** low to high **Underground:** low to high	▪ **AVOID-6:** Old-Growth and Mature Forests ▪ **AVOID-13:** Land Use and Zoning Incompatibility and Conflicts ▪ **AVOID-17:** Night Sky ▪ **AVOID-18:** Exceptional Recreation Assets ▪ **AVOID-19:** Wilderness Areas ▪ **Vis-1:** Route Planning ▪ **Vis-2:** Selection of Finishes ▪ **Vis-3:** Visual Appeal of ROWs ▪ **Vis-4:** Underground Construction ▪ **Vis-5:** Visual Screening ▪ **Vis-6:** Visual Impact Assessment ▪ **Vis-7:** Span length ▪ **Vis-8:** Selection of Structure Type ▪ **Geo-1:** Minimize Soil Disturbance ▪ **W-2:** Clear Spanning or Trenchless Methods for Water Crossings ▪ **W-6:** Minimize Hydrology Changes ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas ▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-6:** Woody Debris Salvage and Restoration ▪ **Hab-9:** Retain Wildlife Trees where Practicable ▪ **Fish-15:** Removal of Riparian Vegetation	Less than Significant	Visual impacts are likely to occur and would be unavoidable even with the implementation of mitigation measures. The visual impact assessment predicts how the proposed project will alter the visual environment. If the project is likely to have moderate or high visual impacts, the visual impact assessment may include proposed mitigation measures to minimize visual intrusion. Additional coordination with the SEPA Lead Agency or stakeholders may be warranted to ensure that other effective measures are chosen on a project-specific basis. With implementation of standard mitigation, visual impacts are short term.
	Operation and Maintenance	The large size of overhead transmission towers, combined with their strongly vertical form and their angular geometry, may contrast strongly with the character of nearby rural landscapes as well as residential communities. Overhead transmission facilities can diminish cultural and recreational value of scenic areas for local communities. Reflectivity and glare could also result from overhead transmission facilities. Cleared ROW corridors for both overhead and underground transmission facilities, especially through forested areas or other natural vegetation communities, can result in a sharply contrasting parallel-sided corridor that dissects the landscape. However, reclamation and revegetation after construction, during operation, or after maintenance activities would provide less of a visual impact than overhead transmission facilities.	**Overhead:** low to high **Underground:** negligible to high			
	Upgrade or Modification	The degradation in aesthetics from the upgrade or modification of both overhead and underground transmission facilities could result in impacts similar to those expected for construction. However, these impacts could be less due to the minimized disturbance footprints and utilizing existing infrastructure.	**Overhead:** low to high **Underground:** low to high			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
				▪ **LSU-3:** Reseed Disturbed Rangelands		
Visual Quality – Degradation of Night Sky	Construction	Construction of both overhead and underground transmission facilities could introduce nighttime lighting relates to the transportation of materials and equipment to the project site. Construction safety lighting is required if work occurs at night, which could result in light trespass, sky glow, or glare.	**Overhead:** low to high **Underground:** low to high	▪ **AVOID-17**: Night Sky ▪ **Vis-1:** Route Planning ▪ **Vis-6:** Visual Impact Assessment ▪ **Wild-4:** Construction Occurs during Daylight Hours	Less than Significant	Visual impacts are unlikely to occur with implementation of standard mitigation. Construction activities are considered temporary, and any light pollution they cause is usually limited to the duration of the construction phase. Visual impacts are unlikely to occur with avoidance of areas managed for the protection of night skies and implementation of standard mitigation.
	Operation and Maintenance	Operational lighting associated with overhead transmission facilities could result in sky glow and/or light trespass and glare. Particularly, these impacts could result from safety and security lighting on substations and FAA requirements for marking and lighting transmission towers. This impact is not anticipated to occur during the operation and maintenance of underground transmission facilities.	**Overhead:** negligible to high **Underground:** N/A			
	Upgrade or Modification	The degradation of night sky from the upgrade or modification of both overhead and underground transmission facilities could result in impacts similar to those expected for construction. However, these impacts could be less due to utilizing existing infrastructure.	**Overhead:** low to high **Underground:** low to high			

(a) Appendix 3.9-1 provides a detailed listing of each general condition, avoidance criteria, and mitigation measure. Having these details in an appendix serves as a comprehensive reference section that can be consulted independently of the main text. This is particularly useful for detailed guidance and technical specifications that may be referred to multiple times. Additionally, including this information in an appendix allows for easier updates and revisions. If mitigation measures or guidelines change, the appendix can be updated without altering the main content.

BMP = best management practice; ROW = right-of-way; SEPA = State Environmental Policy Act

This Page Intentionally Left Blank

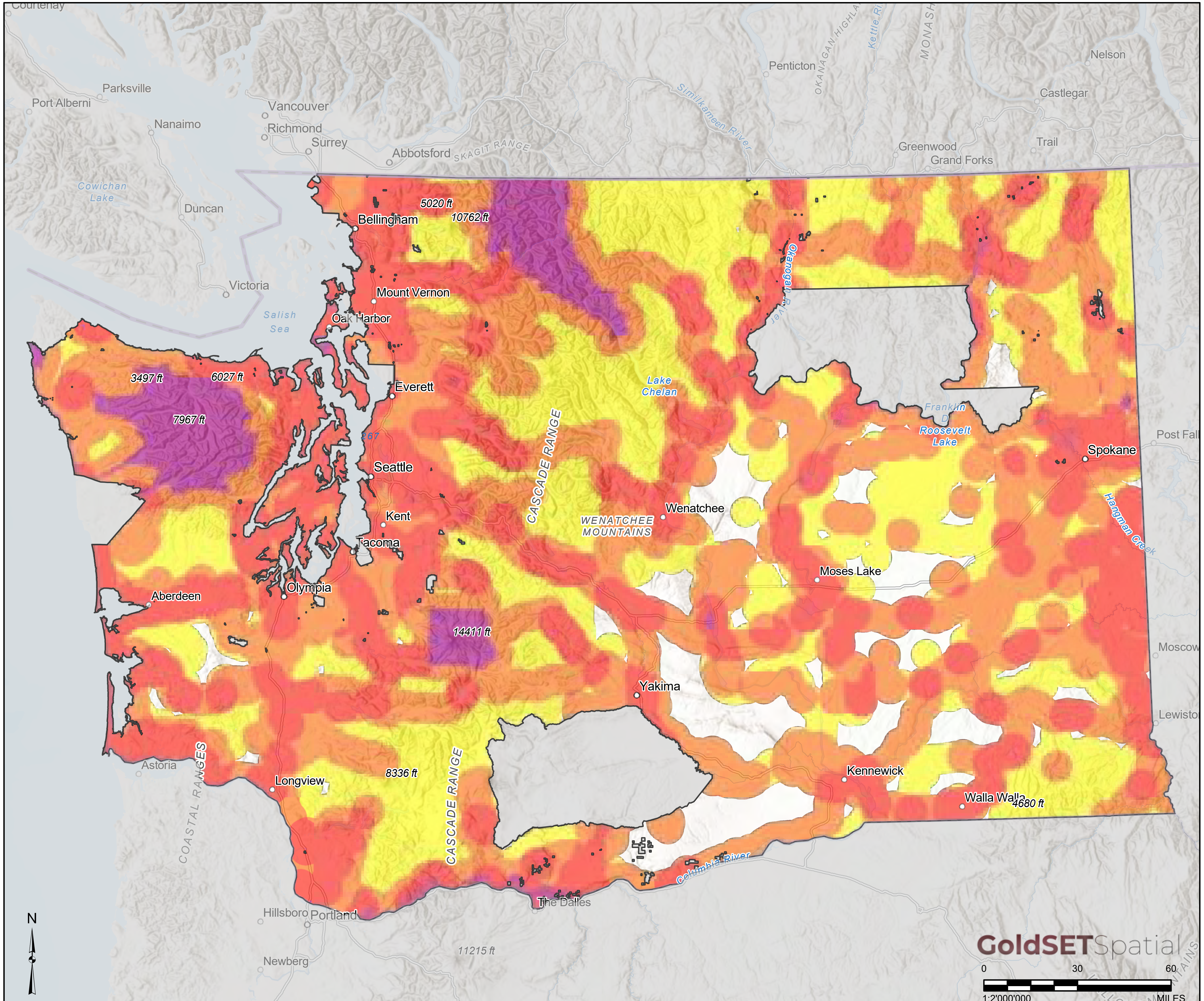
3.12.6 Suitability Map

Project-specific reviews would include a comprehensive review and analysis to identify the site-specific adverse impacts on resources to determine the suitability of this Draft Programmatic EIS. Environmental review may be phased by incorporating relevant information from this Draft Programmatic EIS by reference while evaluating site-specific adverse impacts of the individual project applications. For more information on phased reviews, please refer to Chapter 1, Introduction.

Project-specific applications would include details about the precise location and site-specific conditions. This Draft Programmatic EIS provides a suitability map that, when incorporated with project-specific applications, could be used to facilitate more informative and efficient environmental planning.

Figure 3.12-4 represents a suitability map for visual quality and identifies the appropriateness of areas using applicable laws and regulations, criteria specific to the siting of transmission facilities, and knowledge from subject matter experts. The map may be used as a guide for transmission facility developers to assist in identifying visually sensitive areas to be avoided to the extent feasible; and where avoidance is not feasible, to help determine impacts and mitigation measures that may be necessary in consideration of an area's visual sensitivity.

This Page Intentionally Left Blank



LEGEND

Study Area

Conflict Indicator Key

- Neutral
- Low
- Low-Medium
- Medium
- Medium-High
- High
- Very High

THE SEAL OF THE STATE OF WASHINGTON 1889

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES

1. ESRI, CGIAR, USGS; WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS
2. THE CONFLICT INDICATOR KEY CAN BE USED TO IDENTIFY AND HIGHLIGHT AREAS WHERE DIFFERENT PROJECT CONSTRAINTS MAY OVERLAP, POTENTIALLY LEADING TO CONFLICTS. THE KEY USES DIFFERENT COLORS TO REPRESENT THE INTENSITY OR LIKELIHOOD OF CONFLICT.

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

SUITABILITY MAP FOR VISUAL QUALITY

YYYY-MM-DD 2024-12-18 CONSULTANT wsp

FIGURE
3.12-4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

This Page Intentionally Left Blank

3.12.6.1 Suitability Map Methodology

The suitability map evaluates various criteria and assigns a suitability score to different areas based on how well those areas meet the desired conditions.

A number of individual siting decision criteria, referred to as indicators in GoldSET, were identified by subject matter experts for inclusion in this resource's suitability map. Subject matter experts assigned a weighting based on the degree of constraint (i.e., high, medium, or low), or potential difficulty for a transmission facility to traverse an area. Each of the GoldSET Indicator cards describing the criteria chosen and the source of the data layers used are provided in **Appendix 3.12-1.**

A five-mile setback was used as a threshold to represent the beginning of the background distance zone (BLM 2013). At background viewing distances, detail is more difficult to discern and in general visual prominence is lower and visual impact levels are reduced.

A summary of the criteria used to produce each GoldSET card is provided below.

Visual Quality GoldSET Card – Low-Conflict Scenic Natural Resources

Low conflict scenic natural resources are areas designated for some scenic value and/or used for recreation. This includes immediate lands surrounding US Forest Service Lands and Washington State Water Bodies. These areas attract a variety of viewers who appreciate their scenic qualities. Transmission facilities in these locations may introduce visual contrasts, potentially affecting their aesthetic appeal.

Spatial analysis includes a five-mile buffer around US Forest Service Lands and Washington State Water Bodies.

Visual Quality GoldSET Card – Medium-Conflict Scenic Natural Resources

Medium conflict scenic natural resources are areas designated for medium scenic value or recreational use. Lands surrounding scenic areas are often considered visually sensitive due to a heightened concern for visual quality. Scenic byways provide travelers with picturesque views and access to attractions, while the National Wild and Scenic Rivers System highlights rivers with exceptional natural and scenic values for recreation. Transmission facilities in these areas may create noticeable visual contrasts, potentially impacting their scenic qualities. This constraint indicator may not show all medium conflict areas as some scenic natural resources are not within federal or state protected areas.

Spatial analysis includes a five-mile buffer around National Scenic Areas, National Park Service Lands, Washington State Parks, State and Scenic Byways, and the National Wild and Scenic Rivers System.

Visual Quality GoldSET Card – Medium-Conflict Visually Aesthetic Areas

Medium conflict visually aesthetic areas include population centers and the immediate surrounding area. The aesthetic character of settlements and communities may be affected by the visual contrast created by transmission facilities, especially at close viewing range.

Spatial analysis includes a five-mile buffer around population centers.

Note that population centers are defined as incorporated cities and towns, including their urban growth areas, and census designated places in Washington State, per RCW 47.04.010.

Visual Quality GoldSET Card – High-Conflict Scenic Natural Resources

High conflict scenic natural resources are areas designated for high scenic value or recreational use. This includes National Scenic Areas, National Park Service Lands, and Washington State Parks. Transmission facilities in these areas often create a significant visual contrast, impacting their exceptional scenic qualities. This constraint indicator may not show all high conflict areas as some significant scenic natural resources are not protected. This constraint indicator may not show all high conflict areas as some significant scenic natural resources are not within federal or state protected areas.

3.13 Noise and Vibration

This Draft Programmatic Environmental Impact Statement (EIS) considers impacts on noise[281] and vibration[282] resulting from the types of facilities described in Chapter 2. This section addresses the following topics related to the construction, operation and maintenance, and upgrade or modification of high-voltage electric transmission facilities (transmission facilities) in the State of Washington:

- Section 3.13.1 identifies regulatory, siting, and design considerations.
- Section 3.13.2 describes the affected environment.
- Section 3.13.3 describes impacts.
- Section 3.13.4 describes potential mitigation measures.
- Section 3.13.5 identifies probable significant adverse environmental impacts related to noise and vibration.
- Section 3.13.6 provides a suitability map and scoring for the siting of transmission facilities as it relates to noise and vibration, based on the identified considerations, impacts, and mitigation measures.

3.13.1 Regulatory, Siting, and Design Considerations

This Draft Programmatic EIS establishes a broad framework for compliance, outlining general laws, regulations, best management practices (BMPs), and design considerations. It is assumed that project-specific applications will be developed within this pre-established regulatory context and are expected to comply with existing laws and regulations. If the project does not comply with applicable laws and regulations or fails to adhere to design considerations or BMPs, additional project-specific environmental review and mitigation would be required. The applicable federal, state, and local laws and regulations relevant to noise and vibration are summarized in **Table 3.13-1**.

Note that only King County and Snohomish County have more stringent requirements than what is defined in the Washington Administrative Code (WAC). Other county laws relevant to noise and vibration are summarized in **Appendix 3.13-1.** It is assumed that the WAC limits will be applied in counties without their own noise limits. Many cities have adopted their own noise ordinances, which may include both decibel-based standards and subjective “public disturbance noise” (nuisance) standards. However, local ordinances associated with noise and vibration are not analyzed in this Draft Programmatic EIS below the county level.

[281] A sound that is “unwanted”—i.e., this term is based on human perception.

[282] The oscillating movement of a particle or object around its stationary reference position. This movement can be caused by mechanical processes, such as machinery operation, construction activities, or transportation systems.

Table 3.13-1: Laws and Regulations for Noise and Vibration

CFR 1910.95, Occupational noise exposure	Occupational Safety and Health Administration	This regulation pertains to occupational noise exposure. OSHA is responsible for setting and enforcing standards to ensure safe working conditions, including those related to noise exposure and hearing conservation.
Washington State Environmental Policy Act	Washington Energy Facility Site Evaluation Council Washington State Department of Ecology Local governments	This act is a process that identifies and analyzes environmental impacts that can be related to issuing permits. SEPA helps permit applicants and decision-makers understand how a proposed project will impact the environment. Certain projects, as defined in the SEPA Rules (WAC 197-11-704) and that are not exempt, are required to go through the SEPA process.
RCW 70A.20, Noise Control	Washington State Department of Ecology	This chapter outlines the state's policy on noise control, including the powers and duties of Ecology to adopt rules for maximum permissible noise levels in different environments.
WAC 173-60, Maximum Environmental Noise Levels	Washington State Department of Ecology[(a)]	This section of the WAC sets noise control regulations, including permissible noise levels and requirements for noise abatement[283] during construction activities.
WAC 296-817, Hearing Loss Prevention (Noise)	Washington State Department of Labor and Industries[(a)]	This section of the WAC covers hearing loss prevention as it relates to noise. Key points of this section include noise exposure monitoring, hearing protection requirements, audiometric testing[284] requirements, training and education requirements, and recordkeeping.
King County Code, Section 12.86, County Noise Ordinance	King County, County Council	This ordinance sets forth the county policy to minimize the exposure of citizens to the physiological and psychological dangers of excessive noise and to protect, promote, and preserve public health, safety, and welfare.
A Codification of the General Ordinances of Snohomish County, Chapter 10.01 Noise Control	Snohomish County, County Council	The purpose of this ordinance is to minimize the exposure of citizens to the physiological and psychological dangers of excessive noise and to protect, promote, and preserve public health, safety, and welfare.

Notes:

(a) The agency responsible for administering most permits or authorizations for the identified regulation. However, if EFSEC is determined to be the agency responsible for approving a proposal, EFSEC can administer several types of permits at the state and local levels. EFSEC provides a streamlined process for siting and licensing major energy facilities, including transmission facilities in Washington State. EFSEC coordinates all evaluation and licensing steps, specifies the conditions for construction and operation, and issues a Site Certification Agreement, which assumes the responsibility for issuing individual state or local permits. By consolidating these permits into a single Site Certification Agreement, EFSEC can simplify the regulatory process for energy facility developers. While EFSEC itself does not directly administer federal permits, it works closely with federal agencies to ensure that all necessary federal requirements are met during the evaluation and licensing of energy facilities.

CFR = Code of Federal Regulations; Ecology = Washington State Department of Ecology; EFSEC = Energy Facility Site Evaluation Council; OSHA = Occupational Safety and Health Administration; RCW = Revised Code of Washington; SEPA = State Environmental Policy Act; WAC = Washington Administrative Code

283 Refers to a set of strategies or techniques aimed at reducing and controlling annoying or harmful noise in an environment

284 A method used to evaluate a person's hearing ability. It involves a series of tests that measure how well a person can hear sounds of varying frequencies and intensities.

3.13.1.1 State Regulations

WAC 173-60 establishes noise limits based on the Environmental Designation for Noise Abatement (EDNA)[285] of the sound source and the receiving properties.

- **Class A EDNA** – "Lands where people reside and sleep." These areas typically include residential property; multiple family living accommodations; recreational facilities with overnight accommodations such as camps, parks, camping facilities, and resorts; and community service facilities, including orphanages, homes for the aged, hospitals, and health and correctional facilities. These are commonly referred to as sensitive receptors.
- **Class B EDNA** – "Lands involving uses requiring protection against noise interference with speech." These areas typically include commercial living accommodations; commercial dining establishments; motor vehicle services; retail services; banks and office buildings; recreation and entertainment property not used for human habitation such as theatres, stadiums, fairgrounds, and amusement parks; and community service facilities not used for human habitation (e.g., educational, religious, governmental, cultural and recreational facilities).
- **Class C EDNA** – "Lands involving economic activities of a nature that noise levels higher than those experienced in other areas are normally to be anticipated." Typical Class A EDNA uses generally are not permitted in such areas. Typically, Class C EDNA uses include storage, warehouse, and distribution facilities; industrial property used for the production and fabrication of durable and nondurable manmade goods; and agricultural and silvicultural property used for the production of crops, wood products, or livestock.

WAC 173-60 also classifies land into different categories of "receiving properties." A receiving property is defined as "real property within which the maximum permissible noise levels specified herein shall not be exceeded from sources outside such property." Land used for agricultural purposes is defined as a Class C receiving property. Agricultural properties principally used for residential purposes with no clearly visible farming or ranching activities are identified as Class A receiving properties. The WAC does maintain flexibility for interpretation in the classification of the appropriate EDNA on both the state and local levels. In this assessment, receiving properties consist of Class A lands and Class C lands containing Class A residential structures. At night, defined as the hours between 10:00 p.m. and 7:00 a.m., the noise limitations are reduced by 10 A-weighted decibels (dBA)[286] for receiving property within Class A EDNAs. WAC 173.60.050 exempts temporary construction noise from the state noise limits.

For this assessment, the most limiting noise levels by EDNA classifications are considered given that the WAC maintains flexibility for interpretation in the classification of EDNA at both state and local levels. The most limiting noise levels are at Class A lands: 45 dBA at night and 55 dBA during the daytime, defined as 7 a.m. to 10 p.m.

The WAC regulatory limits are absolute and independent of the existing acoustic environment; therefore, a baseline noise survey is not requisite to determine conformance. Additionally, WAC regulatory limits do not

---

[285] A classification system used to establish maximum permissible noise levels within specific areas or zones. This system helps manage and control noise pollution by setting different noise limits based on the type of environment.

[286] A scale expressing relative loudness as perceived by the human ear. The A-weighting curve de-emphasizes low and very high frequencies, which the human ear is less sensitive to, and emphasizes frequencies in the mid-range, where our hearing is most sensitive making dBA a more accurate representation of perceived loudness.

prevent local governments from regulating noise from any source as a nuisance; therefore, local regulations will need to be considered.

WAC 296-817 focuses on hearing loss prevention and requires employers to conduct noise exposure monitoring if employees are exposed to noise levels at or above 85 dBA over an 8-hour time-weighted average. Employees must use hearing protection when noise exposure equals or exceeds 85 dBA. The primary goal of this regulation is to prevent occupational hearing loss by minimizing noise exposure in the workplace. It sets clear standards for monitoring, controlling, and mitigating noise levels. The regulation mandates that employers conduct regular noise exposure monitoring, provide audiometric testing, and maintain detailed records.

3.13.1.2 County Regulations

As part of this Draft Programmatic EIS process, county ordinances were reviewed to determine if any had more restrictive noise limits than the WAC standards. Additionally, county-level exemptions were reviewed to identify any that would be applicable to transmission facilities and/or utility services in general.

King and Snohomish Counties are neighboring counties in northwestern Washington with similar regulatory purpose, language, and limitations. These counties have more restrictive limits than WAC regulations and include a land use category for rural areas that is more restrictive than residential land uses. The regulations for rural and residential land uses are outlined below:

- Rural receptor limits: 49 dBA daytime and 39 dBA nighttime
- Residential receptor limits: 52 dBA daytime and 42 dBA nighttime

Based on the review of the county noise regulations, the following counties have exemptions that would be applicable, at least in part, to transmission facilities:

- Douglas County – Nighttime noise exemption for substations
- Grant County – Noise exemption for substations
- Jefferson County – Noise exemption for electrical substations
- King County – Noise exemption for electrical substations
- Kitsap County – Noise exemption for electrical substations
- Pierce County – Noise exemption for electrical substations
- Skagit County – Noise exemption for operation of existing electrical substations
- Snohomish County – Nighttime, pure tone,[287] and impulsive noise[288] exemption for substations and transmission lines

[287] Refers to a sound that consists of a single frequency

[288] Refers to short bursts of sound that are significantly louder than the ambient noise level.

The siting of transmission facilities is determined by engineering, technical, environmental, and socioeconomic factors. **Table 3.13-2** summarizes guidance documents and management plans that outline the design considerations and BMPs generally used to avoid or minimize impacts on noise and vibration.

Table 3.13-2: Siting and Design Considerations for Noise and Vibration

Federal Energy Regulatory Commission Guidelines	FERC provides comprehensive guidelines for assessing and mitigating noise and vibration impacts during the construction and operation of energy infrastructure projects, including transmission facilities. FERC also provides detailed guidance on HDD, emphasizing the importance of monitoring noise levels during HDD operations.
American National Standards Institute Guidelines and Standards, including ANSI/ASSP A10.46 and ANSI/ASA S2.71	ANSI provides standards for noise and vibration control, which can be applied to transmission projects to ensure compliance with acceptable levels.
U.S. Environmental Protection Agency Noise Guidelines (EPA 1974)	The EPA offers guidelines for exposure to protect human health and guidelines for noise control, which include BMPs for minimizing noise impacts during construction activities.
IEEE 1829-2017 (IEEE 2017)	The IEEE provides a uniform procedure for conducting corona tests on hardware for overhead transmission lines and substations
Washington State Department of Transportation Environmental Manual	This manual includes guidelines for assessing and mitigating noise and vibration impacts during construction projects. It provides detailed procedures for noise measurement, prediction, and mitigation.
Federal Transit Administration Transit Noise and Vibration Impact Assessment Manual, FTA Report No. 0123 (FTA 2018)	This report outlines guidelines and standards for construction noise, including recommended nighttime levels and methodology to calculate noise and vibration.
Federal Highway Administration Construction Noise Handbook (FHWA 2017)	While not specific to Washington, this handbook is widely used and provides comprehensive guidance on measuring, predicting, and mitigating construction noise.
U.S. Department of Defense Unified Facilities Criteria 3-450-01 (DOD 2022)	This document provides criteria for noise and vibration control in the design and construction of facilities, including transmission projects.
Recommended Siting Practices for Electric Transmission Developers (Americans for a Clean Energy Grid 2023)	This document outlines best practices for siting electric transmission facilities. Recommended practices include: ▪ Early and transparent engagement ▪ Respect and fair dealing ▪ Environmental considerations ▪ Interagency coordination ▪ Use of existing infrastructure

ANSI = American National Standards Institute; BMP = best management practice; DOD = U.S. Department of Defense; EPA = U.S. Environmental Protection Agency; FERC = Federal Energy Regulatory Commission; FHWA = Federal Highway Administration; FTA = Federal Transit Administration; HDD = horizontal directional drilling; IEEE = Institute of Electrical and Electronics Engineers

3.13.1.3 Guidelines and Standards

Construction noise is typically regulated by different standards due to its temporary nature and the fact that it is primarily a daytime issue (limited potential for sleep disturbance). Many noise regulations focus on time-of-day restrictions. Daytime construction on public roadways and for public utilities is typically exempt from noise limits due to the temporary and necessary nature of the noise source. This exemption can even extend into nighttime hours for some counties in Washington. Given the nature of the work, nighttime work is not anticipated as part of a typical construction schedule.

For informational purposes, the FTA has published guidelines and standards for construction noise, with recommended nighttime levels of 70 dBA as an equivalent continuous sound level (L_{eq}) over 8 hours ($L_{eq(8hr)}$) and 80 dBA L_{eq} over 1 hour at the exterior of a residence (FTA 2018).

Construction noise levels can be estimated based on noise calculation methodologies or noise modeling. Typical noise levels generated by construction equipment have been published in various reference documents, including the following:

- The Federal Highway Administration (FHWA) Roadway Construction Noise Model User's Guide, version 2, is one of the more complete and recent references for this type of evaluation (FHWA 2017). This guide provides a comprehensive assessment of noise levels from construction equipment and a detailed noise source database. Noise levels from construction methods can be calculated or modeled using project-specific schedules, equipment lists, and construction layouts/areas. When detailed construction methodologies are unavailable, proxy source sound power levels can be estimated using FHWA's detailed noise source database. This involves using average third octave spectra[289] and assuming hemispherical propagation[290], along with a detailed project description. These proxy sources can then be utilized in noise attenuation calculations or as inputs for noise propagation modeling software.
- The FTA Transit Noise and Vibration Impact Assessment Manual outlines methodologies to calculate both construction noise and vibration at varying distances from construction areas (FTA 2018).

An alternative to noise attenuation calculation is to conduct predictive noise modeling. The most typically used environmental noise model is the CadnaA® noise modeling software developed by DataKustik. CadnaA is an industry standard state-of-the-art modeling tool that evaluates environmental noise propagation from a vast array of noise sources. It implements International Organization for Standardization Standard 9613 for outdoor noise and is approved for use to predict noise propagation by many federal agencies and state and local authorities (ISO 1993).

Predictive noise modeling ideally uses noise source input data from established sources, like equipment vendors. However, vendor-provided equipment specifications and noise source input data are often not known at the time of conducting such assessments. Consequently, through discussions between the SEPA Lead Agency and applicant, experience on similar electrical infrastructure projects, and professional engineering judgment, proxy noise source levels[291] for the proposed noise-emitting equipment can be identified and calculated. For example, noise emissions from transformers can be calculated using Method 2, Table 4.5, Sound Power Levels of Transformers, Electric Power Plant Environmental Noise Guide as found in Bolt Beranek and Newman (1984). In accordance with this method, the National Electrical Manufacturers Association (NEMA) standard equipment can be adjusted up to an attenuation of -6 dBA from the calculated noise level based on field measurements. Where

[289] The division of the audible frequency range into smaller bands, each spanning one-third of an octave.

[290] A decrease in level that occurs when a sound wave propagates away from a source uniformly in all directions aboveground.

[291] Noise source levels used in acoustic modeling to estimate the sound levels produced by various activities or equipment when direct measurements are not available. These proxy levels are derived from similar activities or equipment in comparable environments.

more modern transformers are quieter on average, compared to when the above methodology was created, the NEMA -5 dBA or NEMA -6 dBA calculation can be used as a noise source for modeling.

These modeling results can be used to quantify noise levels at neighboring sensitive receptors and can be combined with existing baseline noise environments to calculate an overall predicted noise level during operation. These predicted noise levels can then be compared with state or local standards and limits, federal guidelines, and project/location-specific design goals. These comparisons can be used to identify the potential for health concerns from noise exposure, risks of a noise-related nuisance, and/or whether mitigation of noise sources is needed. Substation operations are typically assumed to be constantly operating at 100 percent capacity, though cooling equipment would not be operating continuously during cooler hours (nighttime) or winter (cooler) months.

3.13.2 Affected Environment

This section provides an overview of noise and ground-borne vibration that should be considered when analyzing the construction, operation and maintenance, and upgrade or modification of transmission facilities. It also discusses existing conditions and background noise levels that can be found in the Study Area. Specifically, this section discusses the following:

- Noise
- Existing Conditions
- Climate and Transmission Line Noise
- Ground-Borne Vibration

3.13.2.1 Noise

Noise is generally defined as unwanted and/or harmful sound that is typically associated with the environment and workplace. Environmental noise is considered unwanted and/or harmful outdoor sound created by human activities, including noise from road traffic, railway traffic, airports, and industrial sites. Occupational noise is distinct from environmental noise in that it is associated with the workplace (APHA 2021).

Loud noise can cause hearing loss and tinnitus, and can contribute to non-auditory health problems. Chronic noise, even at low levels, can cause annoyance, sleep disruption, and stress that contribute to cardiovascular disease, cerebrovascular disease, metabolic disturbances, exacerbation of psychological disorders, and premature mortality. Noise interferes with cognition and learning, contributes to behavior problems, and reduces achievement and productivity (APHA 2021).

The degree of audibility of a new or modified source of noise depends, in part, on the relative level of the existing ambient noise.[292] Variations in a noise environment are typically due to existing land uses, population density, and proximity to transportation corridors. Elevated existing ambient sound levels in the region occur near major transportation corridors such as interstate highways and in areas with higher population densities. Principal contributors to the existing noise environment likely include motor vehicle traffic on parkways and local roadways; typical rural/agricultural noise sources; and natural sounds from birds, insects, and leaf or vegetation rustle during

[292] Also known as background noise, refers to the surrounding sounds in an environment that are not the primary focus of attention.

elevated wind conditions. Diurnal effects result in sound levels that are typically quieter at night than during the daytime, except during periods when evening and nighttime insect noise dominate in warmer seasons.

3.13.2.2 Existing Conditions

The Study Area for this statewide assessment includes all variations of typical ambient noise environments. It is typical for large projects with significant noise sources to implement a baseline noise study to collect measurements of existing noise levels over days, weeks, or longer to assess the existing noise environment. However, in the absence of ambient measurement data, the existing (baseline) noise environment in the vicinity of a facility can be estimated with a method published by the Federal Transit Administration (FTA) in Table 4-17 of its *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). This document presents the general assessment of baseline noise levels based on the population density per square mile and proximity to area noise sources such as roadways and rail lines.

Washington has a variety of population density and proximity to existing noise sources such as roadways and rail lines. **Tables 3.13-3** and **3.13-4** summarize the ranges of daytime and nighttime noise levels based on population density and proximity to roadways, respectively.

Table 3.13-3: Daytime Baseline Noise Levels Based on Population Density and Proximity to Roadways

Distance from Highway (feet) [(a)]	Interstate Highway Noise (dBA) [(b)]	Population Density Noise Level (dBA)							Other Roadway Noise (dBA) [(c)]	Distance from Roadway (feet) [(a)]
		1–100	100–300	300–1,000	1,000–3,000	3,000–10,000	10,000–30,000	30,000 and up		
		35	40	45	50	55	60	65		
Insignificant	0	35	40	45	50	55	60	65	0	Insignificant
800 and up	50	50	50	51	53	56	60	65	50	400–800
400–800	55	55	55	55	56	58	61	65	55	200–400
200–400	60	60	60	60	60	61	63	66	60	100–200
100–200	65	65	65	65	65	65	66	68	65	50–100
50–100	70	70	70	70	70	70	70	71	70	10–50
10–50	75	75	75	75	75	75	75	75	-	-

Notes: Population density based on number of people per square mile. Insignificant distance from roadway means that the roadway noise level would be insignificant compared to existing conditions. Noise levels calculated by logarithmically adding the noise levels based on population density across the top of the table with the corresponding roadway noise levels down the table.

(a) Distances do not include shielding[293] from intervening rows of buildings. Generally, for estimating shielding attenuation in populated areas, assume one row of buildings every 100 feet, 4.5 dBA for the first row, and 1.5 dBA for every subsequent row up to a maximum of 10 dBA attenuation.

(b) Roadways with four or more lanes that permit trucks, with traffic at 60 mph.

(c) Parkways with traffic at 55 mph, but without trucks, and city streets with the equivalent of 75 or more heavy trucks per hour and 300 or more medium trucks per hour at 30 mph.

dBA = A-weighted decibels; mph = miles per hour

[293] Refers to the reduction in noise levels that occurs when buildings are positioned between the noise source and the receiver.

Table 3.13-4: Nighttime Baseline Noise Levels Based on Population Density and Proximity to Roadways

Distance from Roadway (feet) [(a)]	Interstate Highway Noise (dBA) [(b)]	Population Noise Level (Population / Square Mile)							Other Roadway Noise (dBA) [(c)]	Distance from Roadway (feet) [(a)]
		1–100	100–300	300–1,000	1,000–3,000	3,000–10,000	10,000–30,000	30,000 and up		
		25	30	35	40	45	50	55		
Insignificant	0	25	30	35	40	45	50	55	0	Insignificant
800 and up	40	40	40	41	43	46	50	55	40	400–800
400–800	45	45	45	45	46	48	51	55	45	200–400
200–400	50	50	50	50	50	51	53	56	50	100–200
100–200	55	55	55	55	55	55	56	58	55	50–100
50–100	60	60	60	60	60	60	60	61	60	10–50
10–50	65	65	65	65	65	65	65	65	-	-

Notes: Population density based on number of people per square mile. Insignificant distance from roadway means that the roadway noise level would be insignificant to existing conditions. Noise levels calculated by logarithmically adding the noise levels based on population density across the top of the table with the corresponding roadway noise levels down the table.

[(a)] Distances do not include shielding from intervening rows of buildings. Generally, for estimating shielding attenuation in populated areas, assume one row of buildings every 100 feet, 4.5 dBA for the first row, and 1.5 dBA for every subsequent row up to a maximum of 10 dBA attenuation.

[(b)] Roadways with four or more lanes that permit trucks, with traffic at 60 mph.

[(c)] Parkways with traffic at 55 mph, but without trucks, and city streets with the equivalent of 75 or more heavy trucks per hour and 300 or more medium trucks per hour at 30 mph.

dBA = A-weighted decibel; mph = miles per hour

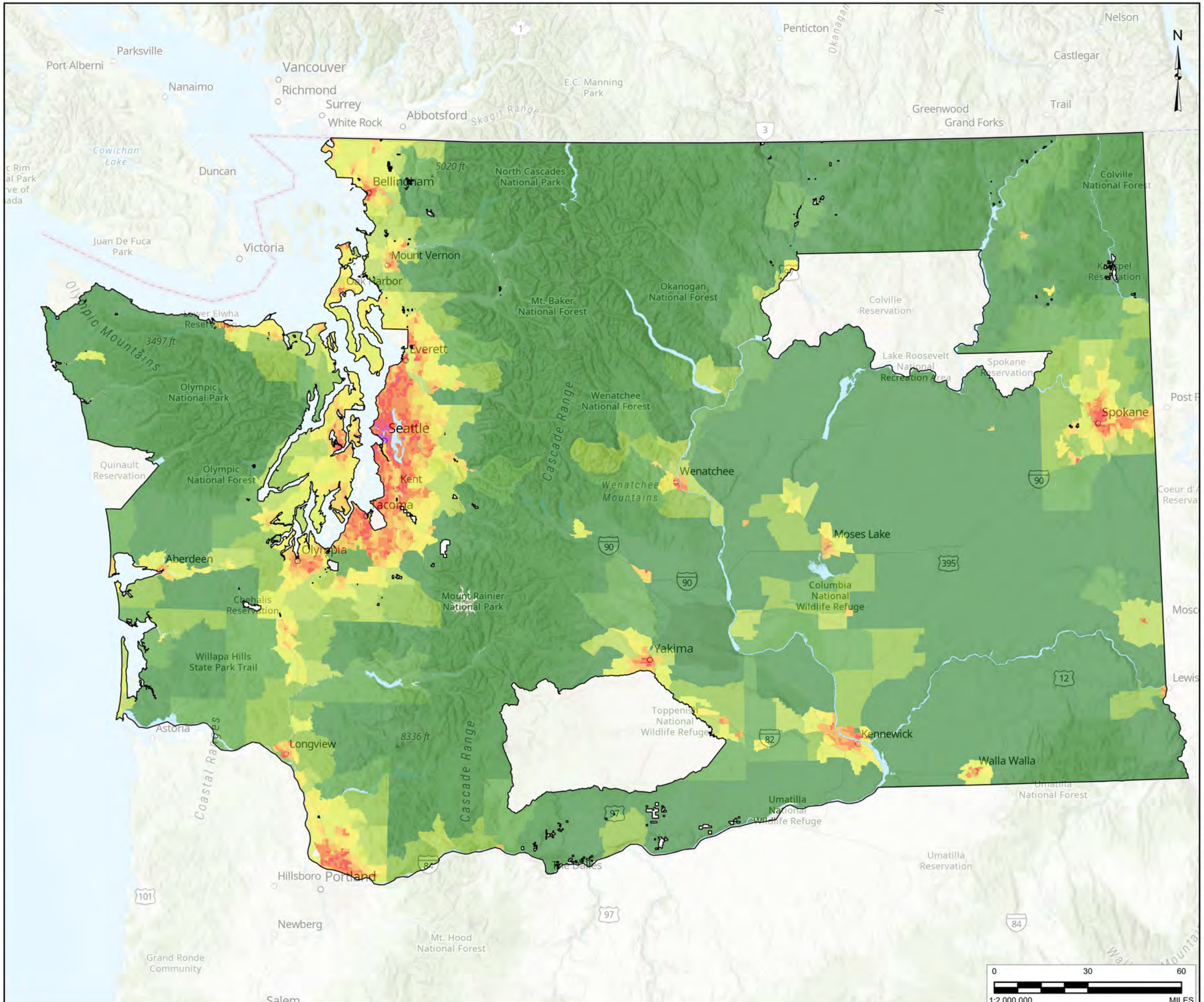
Based on projected population densities per square mile, no cities in Washington have a population density greater than 10,000 (Seattle has a population density of 9,047) (World Population Review 2024). Washington can generally be categorized into five noise environments based on population densities and proximity to roadways:

- **Remote/Natural** – Population density less than 100 with little to no anthropogenic[294] sources of noise
- **Rural/Agricultural** – Population density less than 300 with moderate anthropogenic sources of noise
- **Suburban** – Population density between 300 and 3,000 with constant anthropogenic sources of noise
- **Urban** – Population density greater than 3,000 with constant anthropogenic sources of noise
- **Travel Corridor** – Varying population density with constant audible noise from roadway or train traffic

In Washington, there are 90 cities with a population density between 3,000 and 10,000; 208 cities with a population density between 1,000 and 3,000; 192 cities with a population density between 300 and 1,000; 84 cities with a population density between 100 and 300; and 60 cities with a population density of less than 100. **Figure 3.13-1** shows the state's population density.

[294] Caused or created by humans.

This Page Intentionally Left Blank



LEGEND

- Study Area

Population Density (People per square mile)

- < 5
- 5 - 10
- 10 - 25
- 25 - 50
- 50 - 100
- 100 - 250
- 250 - 500
- 500 - 1000
- 1000 - 2000
- 2000 - 5000
- > 5000

EFSEC
Energy Facility Site
Evaluation Council

REFERENCES AND NOTES
1. SERVICE LAYER CREDITS: WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS, ESRI, USGS
2. POPULATION DENSITY: U.S. CENSUS BUREAU, 2020

PROJECT
DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE
STATE OF WASHINGTON POPULATION DENSITY

YYYY-MM-DD 2025-02-17
CONSULTANT wsp
FIGURE
3.13-1

This Page Intentionally Left Blank

3.13.2.3 Climate and Transmission Line Noise

Overhead transmission lines can generate noise by interacting with the surrounding environment and creating the phenomenon known as corona. Corona is the ionization of the air that occurs at the surface of the energized conductor and suspension hardware attributable to very high electric field strength at the surface of the metal during certain conditions. Corona may cause radio and television reception interference, audible noise, light, and the production of ozone. Corona noise[295] is generally a principal concern with transmission lines of 345 kilovolts (kV) and greater and with lines that are at higher elevations. Corona is also significantly influenced by weather—specifically, rain, fog, dew, or any other event that places moisture on the transmission lines. These events can generally be considered “foul weather” events during which the conductor produces the greatest amount of corona noise. However, during heavy rain, the ambient noise generated by the rain is typically greater than the ambient noise generated by corona. Audible noise from a transmission line during typical fair-weather conditions is not predicted to exceed noise limits or create a nuisance.

For larger transmission facilities, audible corona noise from transmission lines can be modeled using the following two main programs:

- Electric and Magnetic Fields (EMF) Workstation: ENVIRO
- Corona and Field Effects (CAFÉ) program

The ENVIRO program is a Windows-based model developed by the Electric Power Research Institute (EPRI) and uses algorithms from the U.S. Department of Energy (DOE) and Bonneville Power Administration (BPA). These algorithms were originally described in the CAFÉ program that BPA developed. Both programs calculate expected levels of audible noise from transmission lines based on project-specific inputs like tower and conductor configurations and line voltage (Idaho Power 2018). The programs predict noise levels at identified sensitive receptors within a project’s analysis area.

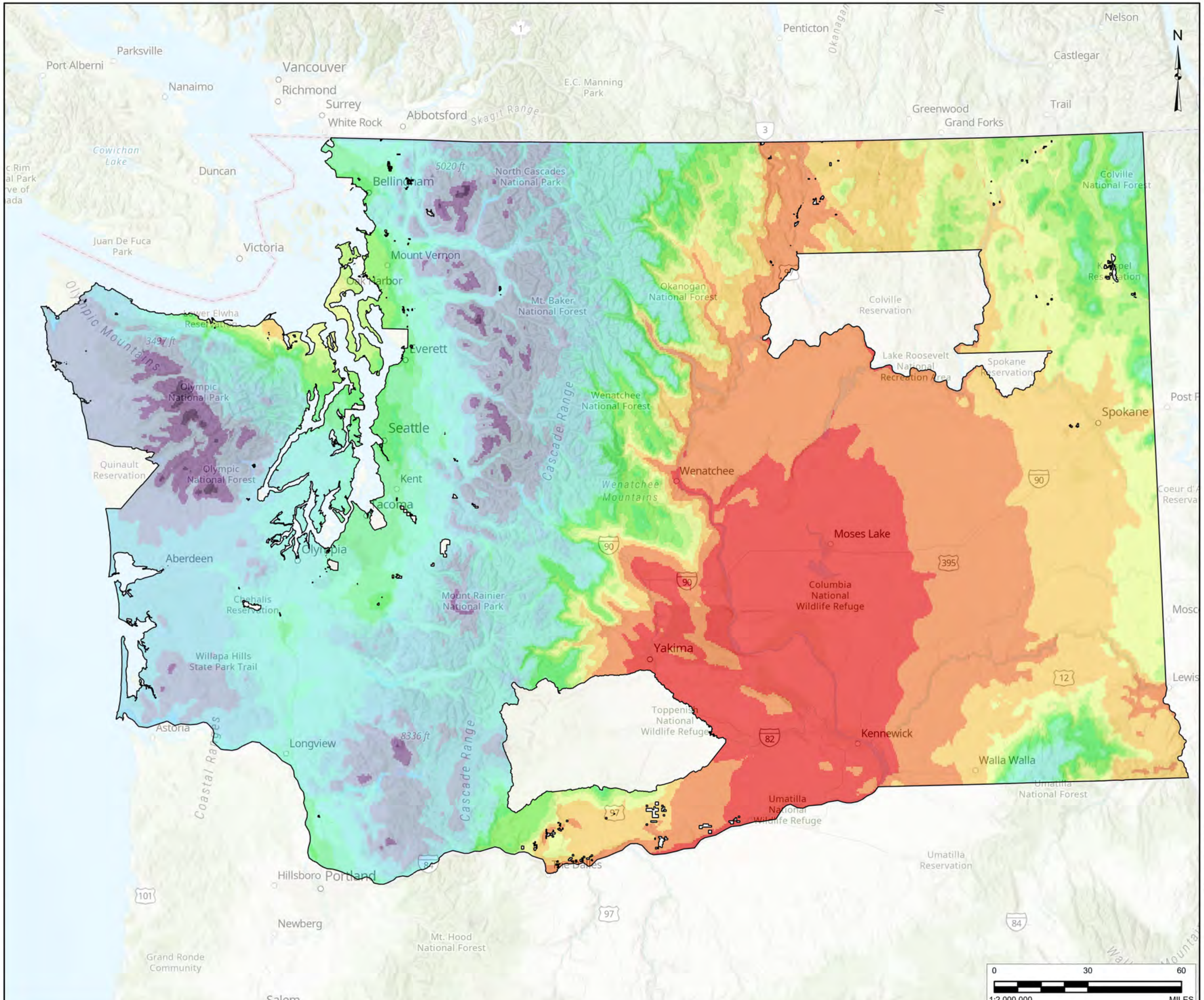
To determine the frequency of foul weather conditions in a project’s specific analysis area, an analysis of representative and most recent historical meteorological data would be conducted at available data collection stations located near the project. Verified meteorological data can be obtained from the Western Regional Climate Center, which is one of six regional climate centers in the United States and provides meteorological monitoring data for the Pacific Northwest region. The regional climate center program is administered by the National Oceanic and Atmospheric Administration, with oversight by the National Climatic Data Center of the National Environmental Satellite, Data and Information Service. The data would be analyzed to effectively determine the frequency of relevant foul weather conditions in the vicinity of potentially impacted receptors.

Foul weather events generally follow precipitation events and periods of high humidity. The greater the amount of rainfall and the higher the humidity of an area, the greater the percentage of time that noise generated by weather events would affect an environment. Annual average rainfall for Washington is presented below in **Figure 3.13-2**. Similar to rainfall, relative humidity levels vary greatly across the state, as well as from west to east. Foul weather events are likely above average in the western half of the state and below average in the central and eastern areas.

---

[295] Ionization of the air that occurs at the surface of electrical conductors and power lines under some conditions, leading to loss of energy, audible noise, and release of ozone gas.

This Page Intentionally Left Blank



EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES
1. SERVICE LAYER CREDITS: WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS, ESRI, USGS
2. ANNUAL PRECIPITATION: NACSE, 2024

PROJECT
DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE
STATE OF WASHINGTON MEAN ANNUAL PRECIPITATION

YYYY-MM-DD 2025-02-17
CONSULTANT wsp
FIGURE
3.13-2

This Page Intentionally Left Blank

3.13.2.4 Ground-Borne Vibration

Ground-borne vibration can result from common construction activities such as blasting, pile-driving, and operating heavy earth-moving equipment. The effects of ground-borne vibration can vary from feelable movement of building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. In some extreme cases, the vibration can damage buildings or structures. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by only a small margin.

3.13.3 Impacts

An assessment of impacts was completed for the construction, operation and maintenance, and upgrade or modification of transmission facilities within the Study Area.

3.13.3.1 Method of Analysis

The Study Area for a project-specific application would typically encompass several key regions and features, such as the following:

- **Project Site and Immediate Vicinity:** This includes the specific location of a project and the surrounding area that might be directly affected by construction, operation and maintenance, and upgrade or modification activities. The site characteristics that can affect noise propagation[296] include, but are not limited to, topography, foliage, ground cover, and surrounding barriers/buildings.
- **Existing Noise Environment:** The existing noise environment encompasses all existing noise sources and is generally affected by population density, proximity to travel corridors, and the natural soundscape.[297]
- **Climate and Elevation:** Weather-related conditions can influence noise propagation in general and can be a source of noise such as wind or—specific to transmission lines—corona noise. Additionally, corona noise is generally a principal concern with lines that are at higher elevation.

This Draft Programmatic EIS analyzes the affected environment and impacts on noise and vibration within the Study Area defined in Chapter 2. Three project phases for each transmission facility type were considered: construction, operation and maintenance, and upgrade or modification. This evaluation considers overhead transmission facilities and underground transmission facilities for each phase. Overhead transmission facilities consist of transmission lines and substations and similar ancillary infrastructure. Overhead transmission facilities also incorporate aboveground infrastructure that may be associated with underground transmission facilities (e.g., clearing footprint required for launch and retrieval shafts for trenchless construction). Underground transmission facilities consist of underground transmission lines, underground access vaults, and other below-ground infrastructure. The construction of underground transmission facilities includes open trench, trenchless, and underwater construction methods.

Laws and regulations used to determine the impacts of transmission facilities on noise and vibration are summarized in **Table 3.13-1**. Information reviewed to identify impacts on noise and vibration in the Study Area was obtained from federal agencies, state agencies, and public scoping. Noise and vibration impacts created during construction of transmission facilities would be common to overhead and underground transmission facilities and at their ancillary facilities such as substations and switchyards. Noise and vibration impacts created

[296] Refers to the way sound waves travel through different environments.

[297] The acoustic environment as perceived by humans, encompassing all the sounds within a particular area.

during the operation of transmission facilities would be common to overhead transmission lines and substations with large electrical transformers and similar equipment. Underground transmission facilities are not expected to be a source of operational noise.

Any new temporary (short-term) or permanent (long-term) source of noise must comply with state and local noise regulations and limits. Additionally, because a project that meets state and local regulations may still generate noise complaints, the potential to generate noise complaints should be considered.

Impact Determination

The discussion of impacts is qualitative given the high-level nature of a Programmatic EIS; quantification would require project-specific details to analyze. **Table 3.13-5** describes the criteria used to evaluate impacts from the Action Alternative and No Action Alternative. Information reviewed to identify impacts related to noise and vibration in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping.

Table 3.13-5: Criteria for Assessing the Impact Determination on Noise and Vibration

Impact Determination	Description
Nil	No foreseeable noise and vibration impacts are expected to occur during any phase (e.g., construction, operation and maintenance, and upgrade or modification). The project would not cause an increase in noise or vibration levels. There would be no loss of hearing.
Negligible	Minor, adverse noise and/or vibration impacts would occur; however, best management practices and design considerations are expected to be effective. There would be no loss of hearing.
Low	Adverse noise and/or vibration impacts would occur even with the implementation of best management practices and design considerations. However, impacts would be short term and nonsignificant. There would be no loss of hearing.
Moderate	Adverse noise and/or vibration impacts would affect sensitive receptors and/or structures even with the implementation of best management practices and design considerations. There would be temporary loss of hearing. Moderate impacts may be long-term, occurring over one or more project phases. Moderate impacts have the potential to be significant.
High	Permanent adverse noise and/or vibration impacts would have significant and potentially severe effects on sensitive receptors and/or structures even with the implementation of best management practices and design considerations. Permanent loss of hearing would occur. Noise and/or vibration impacts may be permanent or continue for the duration of the project.

To clearly understand the potential severity of impacts without any interventions, the following impact determinations exclude the use of avoidance criteria and mitigation measures. The ratings assume compliance with all federal, state, and local laws and regulations, as well as standardized BMPs and design considerations. Assessing impacts without avoidance criteria or mitigation measures offers a baseline understanding of potential environmental effects, helping to identify the true extent of these impacts. Environmental laws often require that initial impact assessments be conducted without considering mitigation to maintain the integrity of the environmental review process.

3.13.3.2 Action Alternative

Construction

Overhead Transmission Facilities

Activities for the construction phase of overhead transmission facilities would vary and depend on the scale of the facility and site characteristics. Construction could include a site preparation phase of relatively short duration (e.g., a few months), followed by a longer construction and start-up phase. It is assumed that the construction phase of overhead transmission, per mile, would have a shorter duration than underground construction. Overhead transmission facilities could have the following noise, and vibration impacts during the construction phase:

- Increased Noise at Sensitive Receptors
- Ground-borne Vibration at Off-Site Structures
- Hearing Loss

Increased Noise at Sensitive Receptors

Noise from general construction activities would be similar to other infrastructure projects and would include activities such as the following:

- Transportation of materials
- Staging of materials
- Assembly of transmission line towers and other project features
- Construction and repair of access roads
- Vehicle traffic from commuting workers and trucks moving material to and from the work sites

The construction equipment that would be used for construction overhead transmission facilities is similar to that used during typical public works projects and tree service operations (e.g., road resurfacing, storm-sewer installation, natural gas line installation, and tree removal). Some atypical sources of noise that could be associated with overhead transmission facility construction includes blasting and rock breaking, implosive devices used during conductor stringing, and helicopter operations. These temporary increases in noise could have adverse impacts on sensitive receptors. However, the impacts on sensitive receptors would depend on a variety of factors, including the distance from the construction activities, equipment type, and natural soundscape.

Increased noise could also disturb wildlife, leading to changes in feeding, mating, and rearing behaviors. Some species may avoid noisy areas, resulting in changes to habitat use and migration patterns and leading to ecological imbalances. See Section 3.6, Habitat, Wildlife, and Fish, regarding impacts on biological resources.

Impact Determination: Depending on the scale of the facility and site characteristics, impacts on sensitive receptors from increased noise, without mitigation measures incorporated, is anticipated vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Ground-borne Vibration at Off-site Structures

Ground-borne vibration during the construction of overhead transmission facilities can be caused by heavy machinery, helicopters, and increased traffic. Vibration can be a concern for off-site structures for several reasons, including the following:

- **Structural Damage:** Vibration can cause minor damage such as cracks in plaster, drywall, or paint. Prolonged or intense vibration can affect the structural integrity of buildings, potentially leading to more severe damage.
- **Impact on Sensitive Equipment:** Facilities with sensitive equipment, such as hospitals and research labs, can experience disruptions. Vibration can interfere with the operation of delicate instruments and machinery. Industries that rely on precision manufacturing may face operational challenges due to vibration affecting the accuracy of their processes.
- **Human Perception and Comfort:** Continuous or high levels of vibration can cause discomfort, annoyance, and stress to occupants of nearby buildings. Vibration, especially during nighttime construction, can disrupt sleep patterns, leading to health issues.

The effects of ground-borne vibration depend on several factors, such as the intensity, frequency, duration, geology and soil type of the site, and the design and material of the off-site structure. Construction activities that may generate ground-borne vibration could have adverse impacts on both the structures and those who inhabit them.

Impact Determination: Depending on the scale of the facility and site characteristics, impacts on off-site structures from ground-borne vibration, without mitigation measures incorporated, could have a negligible to moderate impact. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Hearing Loss

Both on-site and off-site hearing loss can be caused by high noise levels from various construction activities and equipment. Sources of noise that can cause hearing loss can be impulsive or continuous in nature. Construction activities such as drilling and use of heavy machinery can produce levels exceeding 85 dBA $L_{eq(8hr)}$, which is the threshold for potential hearing damage.

It is expected for projects that meet the FTA Noise and Vibration Impact Assessment guidelines and standards would not have the potential to cause hearing loss. Additionally, OSHA sets standards to protect workers from hazardous conditions, including excessive noise. These standards require workplaces to implement a Hearing Conservation Program (HCP) when employees are exposed to noise levels that reach or exceed 85 dBA. OSHA also requires employers to use feasible engineering or administrative controls to reduce noise levels for employees and the public.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on hearing, without mitigation measures incorporated, is anticipated to vary and could be negligible to low.

Underground Transmission Facilities

Activities for the construction phase of underground transmission facilities, including open trench, trenchless (including directional drilling), or underwater construction methods, would vary depending on the scale of the facility and site characteristics. Similar to overhead transmission facilities, construction underground could include a site preparation phase of relatively short duration, followed by a longer construction and start-up phase. It is assumed that the construction phase for underground transmission facilities, per mile, would have a longer duration than overhead projects. Construction noise impacts at aboveground substations and switchyards for underground transmission facilities would be assessed the same way as overhead transmission facility projects and are not analyzed for underground transmission. Underground transmission facilities could have the following noise, and vibration impacts during the construction phase:

- Increased Noise at Sensitive Receptors
- Ground-borne Vibration at Off-Site Structures
- Hearing Loss

Increased Noise at Sensitive Receptors

While open trenching would likely occur only during daytime hours, trenchless crossings (including HDD) could require continuous 24-hour operations. While these sites would likely involve typical construction equipment, they could also incorporate other equipment specific to drilling or tunneling operations. Similar to overhead transmission facility construction, underground transmission facility construction could occur in sequential phases, including site preparation, drilling, pulling pipe, and final site work. The drilling and pulling pipe phases could be conducted continuously until completion and require nighttime operations.

Temporary increases in noise due to the construction of underground transmission facilities could have adverse impacts on sensitive receptors. Although these impacts are similar to those described for the construction of overhead transmission facilities, they would be more severe due to potential nighttime operations, longer construction durations, and different construction methods.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on sensitive receptors from increased noise, without mitigation measures incorporated, is anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Ground-borne Vibration at Off-site Structures

It is expected for the construction of underground transmission facilities to result in similar impacts as described for the construction of overhead transmission facilities. However, the construction of underground transmission facilities are expected to have more severe impacts due to the likelihood for blasting, tunneling, and extensive earthwork activities. Blasting is expected to be one of the greatest concerns as it relates to impacts from ground-borne vibration. Blasting could be required where hard rock or soils need to be precisely demolished or penetrated with minimal effort. These activities could result in immediate and intense ground-borne vibration.

The effects of ground-borne vibration on off-site structures depend on several factors, such as the intensity, frequency, duration, geology and soil type of the site, and the design and material of the off-site structure. Ground-borne vibration could affect those within the building and could cause damage to the structure, such as cracks in the foundation, walls, and ceilings. Ground-borne vibration could also affect the operation of sensitive equipment or instruments, such as microscopes, medical imaging machines, and lasers. Construction activities that may generate ground-borne vibration could have adverse impacts on both the structures and those who inhabit them.

Impact Determination: Depending on the scale of the facility and site characteristics, impacts on off-site structures from ground-borne vibration, without mitigation incorporated, is anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Hearing Loss

The potential for hearing loss resulting from the construction of underground transmission facilities is comparable to that of overhead transmission facilities. Underground transmission facility projects that meet the FTA Noise and Vibration Impact Assessment guidelines and standards, as well as OSHA requirements, are not anticipated to cause hearing loss.

Impact Determination: Depending on the scale of the facility and site characteristics, a project is anticipated to have a negligible to low impact without mitigation measures incorporated.

Operation and Maintenance

Overhead Transmission Facilities

Activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and rights-of-way (ROWs), similar to other linear industrial facilities. Overhead transmission facilities could have the following identified impacts during the operation and maintenance phase:

- Increased Noise at Sensitive Receptors
- Ground-borne Vibration at Off-Site Structures
- Hearing Loss

Increased Noise at Sensitive Receptors

During the operation and maintenance phase of an overhead transmission facility, increased noise at sensitive receptors could result from both permanent and temporary noise sources. Permanent impacts can be associated with both intermittent and continuous sources of operational noise. Intermittent noise sources could include corona discharge[298], which frequently occurs during foul weather. Other intermittent noise could occur during routine inspections and maintenance of overhead transmission facilities. General maintenance would include on-site component safety inspections, including possible repair or replacement of equipment. Depending on the accessibility of the site, vehicles or helicopters could be used to transport crews and identify areas requiring maintenance activities. Additionally, vegetation management along the right-of-way may require the use of chainsaws, tractors, or helicopters.

Continuous operational noise may result from typical transmission facility equipment including, but not limited to, substations, transformers, and cooling systems. The primary source of noise from transmission facility equipment is anticipated to be from transformers. Transformers can create low-frequency humming or buzzing. If cooling systems are required, these too can produce noise from their components. Cooling systems would be expected to occur periodically and only during warmer weather conditions.

[298] A discharge of electricity at the surface of a conductor or between two conductors on the same transmission line.

Impacts on sensitive receptors from increased noise levels could occur depending on their distance from the noise source, the equipment's specifications, and the existing natural soundscape.

Impact Determination: Depending on the scale of the facility and site characteristics, impacts on sensitive receptors from increased noise, without mitigation measures incorporates, is anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Ground-borne Vibration at Off-site Structures

Ground-borne vibration at off-site structures is not expected under the normal operating conditions of overhead transmission facilities. However, during maintenance or repair activities, ground-borne vibration at nearby structures could occur. The impacts during these activities could be similar to those described for construction; however, effects would be reduced because fewer pieces of equipment would be required, and the duration of the activities would be shorter.

Impact Determination: Depending on the scale of the facility and site characteristics, impacts on off-site structures from ground-borne vibration, without mitigation measures incorporated, is anticipated to vary and could be negligible to low.

Hearing Loss

Although hearing loss is not anticipated under the normal operating conditions of overhead transmission facilities, the use of equipment during maintenance or repair activities could result in adverse impacts. However, by complying with the regulatory requirements and guidelines outlined in 3.13.1, adverse impacts related to hearing loss would not be expected.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on hearing, without mitigation measures incorporated, is anticipated to vary and could be negligible to low.

Underground Transmission Facilities

Similar to overhead transmission facilities, activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs, similar to other linear industrial facilities.

Because corona noise occurs from overhead transmission lines, underground lines would have no operational noise sources. Impacts associated with maintenance and ROW management would be similar to those associated with overhead transmission lines: limited to daylight hours only, shorter in duration, generate less noise energy than the initial construction phase. Underground transmission could have the following identified impacts during the operation and maintenance phase:

- Increased Noise at Sensitive Receptors
- Ground-borne Vibration at Off-Site Structures
- Hearing Loss

Increased Noise at Sensitive Receptors

Adverse impacts from noise are not expected to occur during normal operations of underground transmission facilities. However, if repairs are required, temporary noise impacts could occur due to the use of heavy machinery needed to access the underground transmission facilities. Temporary noise impacts would be similar to those expected during construction, although they would be shorter in duration.

Impact Determination: Depending on the scale of the facility and site characteristics, impacts on sensitive receptors from increased noise, without mitigation measures incorporated, is anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Ground-borne Vibration at Off-site Structures

Adverse impacts on off-site structures from ground-borne vibration are not expected to occur during normal operations of underground transmission facilities. However, if repairs are required, temporary ground-borne vibration impacts could occur due to the use of heavy machinery needed to access the underground transmission facilities. Temporary impacts on off-site structures from ground-borne vibration would be similar to those expected during construction, although they would be shorter in duration and of less severity.

Impact Determination: Depending on the scale of the facility and site characteristics, impacts on off-site structures from ground-borne vibration, without mitigation measures incorporated, is anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Hearing Loss

The potential for hearing loss resulting from the operation and maintenance of underground transmission facilities would be similar to the potential for hearing loss from the operation and maintenance of overhead transmission facilities.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on hearing, without mitigation measures incorporated, is anticipated to vary and could be negligible to low.

Upgrade or Modification

Overhead Transmission Facilities

Upgrading or modifying overhead transmission facilities would involve several steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Overhead transmission could have the following adverse impacts during the upgrade or modification phase:

- Increased Noise at Sensitive Receptors
- Ground-borne Vibration at Off-Site Structures
- Hearing Loss

While adverse impacts would be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing footprints, which minimizes the disturbance to sensitive noise environments.

- **Infrastructure Utilization:** Existing infrastructure can be reused or enhanced, reducing the need for extensive new development thereby reducing potential sources of noise.

Underground Transmission Facilities

Upgrading or modifying underground transmission facilities would involve several steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Underground transmission could have the following noise impacts during the upgrade or modification phase:

- Increased Noise at Sensitive Receptors
- Ground-borne Vibration at Off-Site Structure
- Hearing Loss

While adverse impacts would be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing footprints, which minimizes the disturbance to sensitive noise environments.
- **Infrastructure Utilization:** Existing infrastructure can be reused or enhanced, reducing the need for extensive new development; thereby reducing potential sources of noise.

3.13.3.3 No Action Alternative

The No Action Alternative represents the scenario in which this Draft Programmatic EIS is not used and current management practices for siting and planning transmission facilities continue unchanged. Under this alternative, each project would continue to be evaluated on a case-by-case basis and reviewed for compliance with existing regulations, codes, and standard practices. While impact determinations would likely be similar to those outlined in this Draft Programmatic EIS, projects would not benefit from the **impact reductions associated with the avoidance criteria** developed and analyzed in this Draft Programmatic EIS. These criteria are anticipated to provide additional mitigation that further reduces potential environmental impacts.

3.13.4 Potential Mitigation Measures

This section describes measures that would eliminate, reduce the intensity of, or compensate for adverse impacts from construction, operation and maintenance, and upgrade or modification of transmission facilities. All general conditions adopted for this Draft Programmatic EIS, identified in Section 3.1, are relevant to this resource section. Applicants would be responsible for providing information within their application materials documenting the implementation of the general conditions.

Avoidance criteria adopted for this Draft Programmatic EIS are identified in Section 3.1. Avoidance criteria that are relevant to this resource section are described below:

AVOID-9 – Important Habitat: Avoid impacts on important and sensitive wildlife habitat, including:

- National wildlife refuges, parks, and other state or federally protected areas

- Washington State lands managed as wildlife areas, conservation easements, and other state-managed lands for conservation
- Important Bird Areas
- Known stopover locations for migratory species
- Mapped critical habitat for federally listed species and habitat identified in state or federal management plans for state-listed species
- Mapped ungulate winter range
- Mapped habitat concentration areas
- Wetlands, including a 300-foot buffer
- Known bat maternity colonies and hibernacula
- Known snake hibernacula
- Washington Shrubsteppe Restoration and Resiliency Initiative greater sage-grouse core and corridor areas

Rationale: This avoidance criterion aims to reduce habitat loss and fragmentation that can be caused by linear features, such as transmission facilities.

AVOID-10 – Buffer Setbacks for Wildlife and Wildlife Features: Avoid impacts within the setbacks for wildlife and wildlife features identified in Appendix 3.6-1. Applicants would verify and update as new buffers are recommended by Washington State (e.g., Washington Department of Fish and Wildlife [WDFW], Washington State Department of Ecology). Buffers and setbacks would be reviewed with WDFW prior to the submittal of a project-specific application.

Rationale: This avoidance criterion aims to reduce direct and indirect habitat loss and mortality of special status species.

AVOID-21 – Physical Impacts on Historic and Cultural Resources: Avoid physical impacts on historic and cultural resources.

Rationale: This criterion aims to avoid adverse physical impacts on historic and cultural resources (identified through survey for the project-specific application within 5 years of the project). Physical impacts within the boundaries of cultural and historic properties (i.e. buildings, archaeological sites, etc.) may be considered an adverse effect if the feature impacted contributes to the significance of the property.

AVOID-23 – Physical Impacts on Tribal Resources and TCPs: Avoid physical impacts on Tribal resources and Tribal Cultural Places (TCPs).

Rationale: This avoidance criterion aims to avoid adverse physical impacts on Tribal resources and TCPs.

Applicants would be responsible for providing information within their application materials documenting the project’s compliance with the above avoidance criteria.

Potential mitigation measures have been identified to minimize adverse impacts from transmission facility projects. These measures are intended to be broad so that they can be applied to most projects that would be covered under this Programmatic EIS. However, project-specific plans would be needed to adapt the measures for project-specific applications.

When impact determinations are identified as moderate or high, the applicant would either adopt applicable mitigation measures from this Programmatic EIS or the SEPA Lead Agency may require applicable mitigation measures to be implemented to reduce project-specific impacts. When impact determinations are low, applicable mitigation measures should still be considered by the applicant and the SEPA Lead Agency as these measures would help to further reduce project-specific impacts, including the project's contribution to cumulative impacts. These measures would be implemented in addition to compliance with laws, regulations, environmental permits, plans, and design considerations required for transmission facilities.

The following mitigation measures could be adopted to mitigate adverse impacts:

Noise-1 – Limit Construction Hours: With the exception of trenchless crossings that require continuous day/night operations, limit noise-generating equipment used in construction, maintenance, upgrades, and modifications that would impact sensitive receptors to weekdays and daytime hours.

Rationale: This mitigation measure aims to limit construction noise to daytime hours.

Noise-2 – Use Noise Barriers for Construction: Use noise barriers or other mitigation measures for construction activities, like trenchless crossings, that require continuous day/night operations or during upgrades and maintenance where the potential exists to exceed state and/or local noise standards to mitigate the impact on noise-sensitive receptors.

Rationale: This mitigation measure aims to reduce noise impacts on sensitive receptors.

Noise-3 – Use of Operational Noise Mitigation: Provide vendor-supplied noise mitigation or acoustic barriers for substation transformers and equipment located near noise sensitive areas.

Rationale: This mitigation measure aims to reduce noise impacts on sensitive receptors when there is a potential for the project to exceed state and/or local noise standards or otherwise cause a nuisance when sources cannot be moved away from sensitive receptors.

Noise-4 – Prevent Hearing Loss: Identify when construction activities may produce on-site and off-site noise levels that exceed 85 A-weighted decibels (dBA) as an equivalent noise level over 8 hours ($L_{eq[8Hr]}$) and the associated engineering or administrative controls in place to reduce the potential for hearing loss.

Rationale: Prolonged exposure to noise levels above 85 dBA $L_{eq(8Hr)}$ can cause irreversible hearing loss. Identifying high noise levels early allows for timely implementation of protective measures to prevent hearing loss.

Noise-5 – Noise Assessment: Prepare a noise assessment that includes measuring existing baseline noise environments, predicting future noise levels from either construction and/or operation and maintenance, and evaluating the potential impacts on surrounding sensitive noise receptors.

Rationale: This assessment will help identify sensitive noise receptors, evaluate the potential noise impacts, and determine the effectiveness of potential noise mitigation measures.

Noise-6 – Vibration Assessment: Prepare a vibration assessment when project activities could create vibration leading to building damage or prolonged annoyance.

Rationale: Construction activities can result in varying degrees of ground-born vibration, depending on the equipment and construction method. While ground-borne vibrations from construction activities do not often reach the levels that can damage structures, fragile buildings must receive special consideration. This assessment will help to identify sensitive resources and structures, evaluate the potential impacts, and determine construction vibration mitigation measures.

In addition to the above mitigation measures, the following mitigation measures[299] developed for other resources may be applicable:

Hab-8 – Worker Education Program: Develop a worker education program for implementation during project construction and operation. The program would train workers on operating near sensitive wildlife habitat and features, sensitive wildlife periods, working around watercourses and riparian features, management of wildlife attractants, management of special status species, wildlife reporting, and wildlife mortality reporting.

Wild-1 – Wildlife Timing Windows: Schedule vegetation clearing and grubbing and other activities that could destroy or disturb wildlife to occur outside of the sensitive timing windows in appropriate habitat as listed in Appendix 3.6-1. This list and timing periods will be verified with the Washington Department of Fish and Wildlife and updated as needed prior to implementation.

Wild-18 – Wildlife-Specific Noise Mitigation: Implement noise control measures (e.g., temporary noise barriers, mufflers) or practices (e.g., restrictions to low-level helicopter flights) where project activities are expected near sensitive wildlife habitat.

Minimize the use of blasting, impact or vibratory driving, or other construction methods near water or implement noise reduction strategies to reduce underwater noise.

Hist/Cultural-1 – WISAARD Database: While planning transmission facilities, gather information on previously surveyed historic and cultural resources.

Hist/Cultural-2 – Early Engagement: Conduct early engagement with interested parties, including Tribes.

Hist/Cultural-3 – Survey Methodology Approval: Obtain concurrence from the Washington State Department of Archaeology and Historic Preservation (DAHP) and Tribes on historic and cultural resource survey methodologies prior to conducting the surveys.

SE-1 – Communication Plan: Prepare a communication plan that includes a mechanism for handling complaints.

3.13.5 Probable Significant Adverse Environmental Impacts

Determining the significance of an impact involves context and intensity, which, in turn, depend on the magnitude and duration of the impact. “Significant” in the State Environmental Policy Act means a reasonable likelihood of

[299] The rationales for the identified mitigation measures are provided in their respective resource sections.

more than a moderate adverse impact on environmental quality. An impact may also be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred (WAC 197-11-794).

Identification of potential environmental impacts and assignment of discipline-specific ratings is based on professional judgment and information available at the time of writing. A precautionary approach has been taken for the assessment where information is currently unknown or unavailable.

This Draft Programmatic EIS weighs the impacts on noise and vibration that could result from transmission facilities after considering the application of laws and regulations; siting and design considerations, including agency guidance and BMPs; and mitigation and makes a resulting determination of significance for each impact. **Table 3.13-6** summarizes the impacts anticipated for the construction, operation and maintenance, and upgrade or modification of transmission facilities.

This Page Intentionally Left Blank

Table 3.13-6: Summary of Impacts, Mitigation Measures, and Significance Rating for Noise and Vibration

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Noise – Increased Noise at Sensitive Receptors	Construction	The construction of both overhead and underground transmission facilities could impact sensitive receptors from increased noise levels as a result of using heavy equipment, helicopters, and additional construction vehicles. The construction of underground transmission facilities could result in more severe impacts on sensitive receptors due to activities such as blasting, tunneling, and rock breaking. Additionally, these activities could require continuous nighttime work.	**Overhead:** negligible to high **Underground:** low to high	▪ **AVOID-9:** Important Habitat ▪ **AVOID-10:** Buffer Setbacks for Wildlife and Wildlife Features ▪ **Noise-1:** Limit Construction Hours ▪ **Noise-2:** Use Noise Barriers for Construction ▪ **Noise-3:** Use Operational Noise Mitigation ▪ **Noise-4:** Prevent Hearing Loss ▪ **Noise-5:** Noise Assessment ▪ **Hab-8:** Worker Education Program ▪ **Wild-1:** Wildlife Timing Windows ▪ **Wild-18:** Wildlife-Specific Noise Mitigation ▪ **SE-1:** Communication Plan	Less than Significant	Adverse impacts on sensitive receptors from increased noise would be reduced to a less than significant level through the implementation of and compliance with general conditions, avoidance criteria, and mitigation measures.
	Operation and Maintenance	Increase intermittent noise at sensitive receptors could occur from the maintenance both overhead and underground transmission facilities. These impacts could result from vegetation management activities, heavy equipment used for repairs, or vehicles or helicopters used to transport crews. Overhead transmission lines could also produce intermittent noise from corona discharge, which frequently occurs during foul weather. Overhead transmission facilities could result in continuous operational noise from equipment such as substations, transformers, and cooling systems.	**Overhead:** negligible to moderate **Underground:** negligible to moderate			
	Upgrade or Modification	Noise and vibration impacts associated with the upgrade or modification of both overhead and underground transmission facilities could be similar to those expected for construction. However, these impacts could be less due to the minimized disturbance footprints and utilizing existing infrastructure.	**Overhead:** negligible to high **Underground:** low to high			
Vibration – Ground-borne Vibration at Off-site Structures	Construction	Ground-borne vibration could be generated by construction equipment operations for both overhead and underground transmission facilities. Impacts from ground-borne vibration could lead to structural damage, disruption of sensitive equipment, and decreased comfort for nearby occupants. The construction of underground transmission facilities are expected to have more severe impacts due to the likelihood for blasting, tunneling, and extensive earthwork activities.	**Overhead:** negligible to moderate **Underground:** negligible to moderate	▪ **AVOID-21:** Physical Impacts on Historic and Cultural Resources ▪ **AVOID-23:** Physical Impacts on Tribal Resources and TCPs ▪ **Noise-1:** Limit Construction Hours ▪ **Noise-6:** Vibration Assessment ▪ **Hab-8:** Worker Education Program ▪ **Wild-18:** Wildlife-Specific Noise Mitigation ▪ **Hist/Cultural-1:** WISAARD Database ▪ **Hist/Cultural-2:** Early Engagement ▪ **Hist/Cultural-3:** Survey Methodology Approval ▪ **SE-1:** Communication Plan	Less than Significant	Adverse impacts from ground-borne vibration on off-site structures can be effectively managed through the application of standard BMPs, general conditions, avoidance criteria, and mitigation measures. With the application of these measures, it is expected that impacts from ground-borne vibration on off-site structures would be less than significant.
	Operation and Maintenance	Ground-borne vibration at off-site structures is not expected under the normal operating conditions of overhead transmission facilities. During maintenance or repair activities, ground-borne vibration at nearby structures could occur. The impacts during these activities could be similar to those described for construction; however, effects would be less severe because fewer pieces of equipment would be required, and the duration of the activities would be shorter.	**Overhead:** negligible to low **Underground:** negligible to moderate			
	Upgrade or Modification	Ground-borne vibration impacts during the upgrade or modification of transmission facilities could be similar to those expected for construction. However, these impacts are anticipated to be less than those for constructing new transmission facilities due to minimized footprint disturbances and utilizing existing infrastructure.	**Overhead:** negligible to moderate **Underground:** negligible to moderate			
Noise – Hearing Loss	Construction	Both on-site and off-site hearing loss could be caused by high noise levels from various construction activities and equipment used for the construction of both overhead and underground transmission facilities. It is expected for compliance with regulatory requirements and implementation of BMPs to be effective.	**Overhead:** negligible to low **Underground:** negligible to low	▪ **Noise-1:** Limit Construction Hours ▪ **Noise-2:** Use Noise Barriers for Construction ▪ **Noise-3:** Use Operational Noise Mitigation	Less than Significant	The risk of hearing loss can be effectively managed through compliance with OSHA requirements and standard BMPs.

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
	Operation and Maintenance	Potential for hearing loss is not anticipated under the normal operating conditions of transmission facilities. However, the use of equipment during maintenance or repair activities could result in adverse impacts. It is expected for compliance with regulatory requirements and implementation of BMPs to be effective.	**Overhead:** negligible to low **Underground:** negligible to low	▪ **Noise-4:** Prevent hearing loss ▪ **Noise-5:** Noise Assessment ▪ **SE-1:** Communication Plan		
	Upgrade or Modification	Potential for hearing loss during upgrade or modification would be similar to construction; however, impacts are generally anticipated to be lower than those for constructing new transmission facilities due to minimized disturbance footprints and utilizing existing infrastructure.	**Overhead:** negligible to low **Underground:** negligible to low			

(a) Appendix 3.9-1 provides a detailed listing of each general condition, avoidance criteria, and mitigation measure. Having these details in an appendix serves as a comprehensive reference section that can be consulted independently of the main text. This is particularly useful for detailed guidance and technical specifications that may be referred to multiple times. Additionally, including this information in an appendix allows for easier updates and revisions. If mitigation measures or guidelines change, the appendix can be updated without altering the main content.

BMP = best management practice; dBA = A-weighted decibels

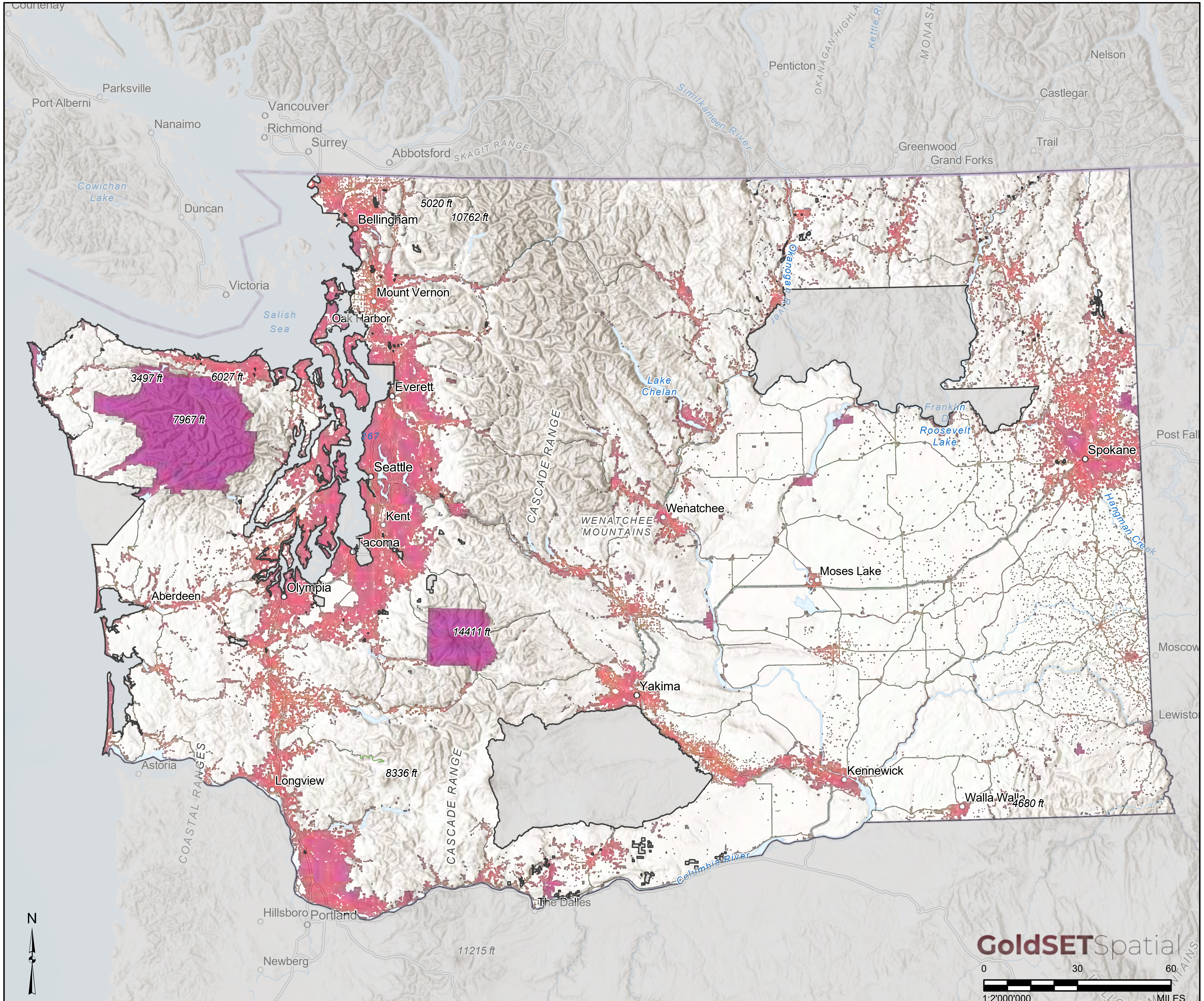
3.13.6 Suitability Map

Project-specific reviews would include a comprehensive review and analysis to identify the site-specific adverse impacts on resources to determine the suitability of this Draft Programmatic EIS. Environmental review may be phased by incorporating relevant information from this Draft Programmatic EIS by reference while evaluating site-specific adverse impacts of the individual project applications. For more information on phased reviews, please refer to Chapter 1, Introduction.

Project-specific applications would include details about the precise location and site-specific conditions. This Draft Programmatic EIS provides a suitability map that, when incorporated with project-specific applications, could be used to facilitate more informative and efficient environmental planning.

Figure 3.13-3 represents the suitability map for noise and vibration and identifies the appropriateness of areas using applicable laws and regulations, criteria specific to the siting of transmission facilities, and knowledge from subject matter experts.

This Page Intentionally Left Blank



LEGEND

Study Area

Conflict Indicator Key

- Opportunity
- Neutral
- Low
- Low-Medium
- Medium
- Medium-High
- High
- Very High

THE SEAL OF THE STATE OF WASHINGTON 1889

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES

1. WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS; ESRI, USGS
2. THE CONFLICT INDICATOR KEY CAN BE USED TO IDENTIFY AND HIGHLIGHT AREAS WHERE DIFFERENT PROJECT CONSTRAINTS MAY OVERLAP, POTENTIALLY LEADING TO CONFLICTS. THE KEY USES DIFFERENT COLORS TO REPRESENT THE INTENSITY OR LIKELIHOOD OF CONFLICT.

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

SUITABILITY MAP FOR NOISE AND VIBRATION

YYYY-MM-DD 2025-03-24

CONSULTANT wsp

FIGURE 3.13-3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

This Page Intentionally Left Blank

3.13.6.1 Suitability Map Methodology

The suitability map evaluates various criteria and assigns a suitability score to different areas based on how well those areas meet the desired conditions.

A number of individual siting decision criteria, referred to as indicators in GoldSET, were identified by subject matter experts for inclusion in this resource's suitability map. Subject matter experts assigned a weighting based on the degree of constraint (i.e., high, medium, or low), or potential difficulty for a transmission facility to traverse an area. Each of the GoldSET Indicator cards describing the criteria chosen and the source of the data layers used are provided in **Appendix 3.13-2.**

A summary of the criteria used to produce each GoldSET card is provided below.

Noise and Vibration GoldSET High Opportunity – High Noise Environments

High noise environments include areas within 800 feet from major roads. High noise environments are less susceptible to noise impacts from new or increased noise sources. These areas may provide an opportunity for the construction, operation and maintenance, and upgrade or modification of transmission facilities.

Noise and Vibration GoldSET Card Low Conflict – Less-Sensitive Noise Environments

Less-sensitive noise environments include areas between 500- to 800-feet from sensitive receptors, such as residential areas, parks and recreational areas, schools, hospitals, nursing homes, and hotels. Due to the increased distance from sensitive receptors, sensitive receptors are likely to be less susceptible to noise impacts from new or increased noise sources. Noise associated with the construction, operation and maintenance, and upgrade or modification in these areas is less likely to generate nuisance complaints to local authorities or exceed noise limits. The analysis assumes daytime construction only.

Note that a 500- to 800-foot buffer from sensitive receptors was provided in the dataset.

Noise and Vibration GoldSET Card Medium Conflict – Moderately-Sensitive Noise Environments

Compared to the highly-sensitive noise environment within the boundary of a sensitive receptor (i.e., residential areas, parks and recreation areas, schools, hospitals, nursing homes, and hotels), the noise environment up to 500-feet from the sensitive receptor boundary is considered moderately susceptible to noise impacts. Construction, operation and maintenance, and upgrade or modification of transmission facilities in these areas could generate nuisance complaints or exceed noise limits. The analysis assumes daytime construction only. Note that a 0- to 500-foot buffer from sensitive receptors was provided in the dataset. The dataset for moderately-sensitive noise environments excludes the sensitive receptor footprint.

Noise and Vibration GoldSET Card High Conflict – Highly-Sensitive Noise Environments

Highly-sensitive noise environments include the footprint of sensitive receptors (i.e., residential areas, parks and recreation areas, schools, hospitals, nursing homes, and hotels). Highly-sensitive noise environments are more susceptible to noise impacts when new sources of noise are introduced. Construction and operational noise impacts are more likely to create nuisance complaints to local authorities or exceed noise limits. The analysis assumes daytime construction only.

No setbacks were included in the dataset.

This Page Intentionally Left Blank

3.14 Recreation

This Draft Programmatic Environmental Impact Statement (EIS) considers impacts on recreation resulting from the types of facilities described in Chapter 2. This section addresses the following topics related to the construction, operation and maintenance, and upgrade or modification of high-voltage electric transmission facilities (transmission facilities) in the State of Washington.

- Section 3.14.1 identifies regulatory, siting, and design considerations.
- Section 3.14.2 describes the affected environment.
- Section 3.14.3 describes impacts.
- Section 3.14.4 describes potential mitigation measures.
- Section 3.14.5 identifies probable significant adverse environmental impacts on recreation.
- Section 3.14.6 provides a suitability map and scoring for the siting of transmission facilities as it relates to recreation, based on the identified considerations, potential impacts, and mitigation measures.

3.14.1 Regulatory, Siting, and Design Considerations

This Draft Programmatic EIS establishes a broad framework for compliance, outlining general laws, regulations, best management practices (BMPs), and design considerations. It is assumed that project-specific applications will be developed within this pre-established regulatory context and are expected to comply with existing laws and regulations. If the project does not comply with applicable laws and regulations or fails to adhere to design considerations or BMPs, additional project-specific environmental review and mitigation would be required. The applicable federal and state laws and regulations relevant to recreation are summarized in **Table 3.14-1**.

Table 3.14-1: Laws and Regulations for Recreation

Applicable Legislation	Agency	Summary Information
43 USC Chapter 55 - National Environmental Policy Act	Council on Environmental Quality	This act requires federal agencies to assess the environmental effects of their proposed actions prior to making decisions. This includes evaluating the impacts of the proposed actions on recreational uses.
43 USC Chapter 35 - Federal Land Policy and Management Act	Bureau of Land Management	This act governs the management of public lands by the Bureau of Land Management. It mandates multiple-use management, which includes recreation alongside other uses.
16 USC §528 - Multiple-Use, Sustained-Yield Act	U.S. Forest Service	This act directs the U.S. Forest Service to manage national forests for the multiple-use and sustained use of outdoor recreation, range, timber, watershed and fish, and wildlife.
54 USC Chapter 2003 – Land and Water Conservation Fund Act	U.S. Department of Interior	This legislation establishes a “Land and Water Conservation Fund” to assist states in planning, acquisition, and development of recreation resources and to finance new federal recreation lands. In doing so, this act promotes the coordination and development of effective outdoor recreation programs.
16 USC §1131 – Wilderness Act	U.S. Fish and Wildlife Service National Park Service	This act authorizes Congress to designate wilderness areas. It defines wilderness as an “area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is

Applicable Legislation	Agency	Summary Information
	Bureau of Land Management U.S. Forest Service	protected and managed so as to preserve its natural conditions…”
16 USC Chapter 28 - Wild and Scenic Rivers Act	Bureau of Land Management National Park Service U.S. Forest Service U.S. Fish and Wildlife Service	This act protects and enhances river values, including free-flow, water quality, and outstandingly remarkable values.
16 – USC Chapter 27 - National Trails System Act	National Park Service Bureau of Land Management U.S. Forest Service	This act designates national scenic trails to be continuous, extended routes of outdoor recreation within protected corridors. It promotes the enjoyment and appreciation of trails while encouraging greater public access. It establishes four classes of trails: national scenic trails, national historic trails, national recreation trails, and side and connecting trails.
43 CFR Subpart 8351, Designated National Area	Bureau of Land Management	Title 43 CFR regulates public land management areas. Subpart 8351 under this code mandates management consistent with the purposes of administered under provisions of the Wild and Scenic Rivers Act and the National Trails System Act.
Executive Order 12962, Recreational Fisheries	All federal agencies	This act promotes the conservation of aquatic systems, enhances aquatic resources, and supports recreational fisheries.
Washington State Environmental Policy Act	Washington Energy Facility Site Evaluation Council Washington State Department of Ecology Local governments	This act is a process that identifies and analyzes environmental impacts that can be related to issuing permits. SEPA helps permit applicants and decision-makers understand how a proposed project will impact the environment. Certain projects, as defined in the SEPA Rules (WAC 197-11-704) and that are not exempt, are required to go through the SEPA process.
Washington State Recreation and Conservation Plan	Recreation and Conservation Office[(a)]	This plan provides a strategic direction for how local, regional, state, and federal agencies; Tribal governments; and private and nonprofit partners can work together to make sure Washington residents’ outdoor recreation and conservation needs are met.
RCW 36.69.010, Park and recreation districts authorized—"Recreational facilities" defined	Local county governments	This legislation defines “recreational facilities” to mean “parks, playgrounds, gymnasiums, swimming pools, field houses, bathing beaches, stadiums, golf courses, automobile racetracks and drag strips, coliseums for the display of spectator sports, public campgrounds, boat ramps and launching sites, public hunting and fishing areas, arboretums, bicycle and bridle paths, senior citizen centers, community centers, and other recreational facilities.”
Washington Growth Management Act; RCW 36.70A.020(9), Open space and recreation	Washington State Department of Commerce Local county and city governments	This legislation guides the development and adoption of local comprehensive plans and development regulations with the goals of retaining open space and green space, enhancing recreational opportunities, enhancing fish and wildlife habitat, increasing access to natural resource lands and water, and developing parks and recreation facilities.

Applicable Legislation	Agency	Summary Information
RCW 77.04.012, Mandate of department and commission	Washington Department of Fish and Wildlife[(a)] Fish and Wildlife Commission[(a)]	This section of the RCW outlines the mandate of the WDFW and the Fish and Wildlife Commission to preserve, protect, perpetuate, and manage wildlife, food fish, game fish, and shellfish in state and offshore waters.
WAC 173-60-030	Washington State Department of Ecology[(a)]	This legislation establishes limits on sounds crossing property boundaries, based on EDNA. It includes Class A EDNA, where people reside and sleep, including "recreational and residential areas (e.g., camps, parks, camping facilities, and resorts)."
WAC 220	Washington Department of Fish Wildlife and the Fish and Wildlife Commission	This legislation introduces the WDFW and describes regulations promoting conservation of fish and wildlife, while providing fishing, hunting, fish and wildlife viewing, and other outdoor recreation opportunities compatible with healthy, diverse, and sustainable fish and wildlife populations (RCW 77.04.012, 77.04.020, 77.04.055).

Note:

(a) The agency responsible for administering most permits or authorizations for the identified regulation. However, if EFSEC is determined to be the agency responsible for approving a proposal, EFSEC can administer several types of permits at the state and local levels. EFSEC provides a streamlined process for siting and licensing major energy facilities, including transmission facilities in Washington State. EFSEC coordinates all evaluation and licensing steps, specifies the conditions for construction and operation, and issues a Site Certification Agreement, which assumes the responsibility for issuing individual state or local permits. By consolidating these permits into a single Site Certification Agreement, EFSEC can simplify the regulatory process for energy facility developers. While EFSEC itself does not directly administer federal permits, it works closely with federal agencies to ensure that all necessary federal requirements are met during the evaluation and licensing of energy facilities.

CFR = Code of Federal Regulations; EDNA = Environmental Designation for Noise Abatements; EFSEC = Washington Energy Facility Site Evaluation Council; RCW = Revised Code of Washington; SEPA = State Environmental Policy Act; WAC = Washington Administrative Code; WDFW = Washington Department of Fish and Wildlife

The siting of transmission facilities is determined by engineering, technical, environmental, and socioeconomic factors. **Table 3.14-2** summarizes guidance documents and management plans that outline the design considerations and BMPs generally used to avoid or minimize impacts on recreation.

Table 3.14-2: Siting and Design Considerations for Recreation

Siting and Design Consideration	Description
Recommended Siting Practices for Electric Transmission Developers (Americans for a Clean Energy Grid 2023)	This report by Americans for a Clean Energy Grid outlines practices for engaging with landowners, Tribal governments, and local communities. It emphasizes early and consistent engagement, transparent route selection, and respectful treatment of landowners.
Policy Guidance for Processing Right-of-Way Applications for High-Voltage Electric Transmission Lines (BLM 2016)	Issued by the Bureau of Land Management, this guidance includes best management practices for avoiding, minimizing, and compensating for resource impacts. It stresses the importance of using the full mitigation hierarchy and ensuring that mitigation measures are durable and timely.

Siting and Design Consideration	Description
Transmission Corridors Work Group Final Report (EFSEC 2022)	The final TCWG report concludes the following: ▪ **Regional and interregional planning:** Washington has long relied on out-of-state sources for its energy needs. Reliance on those sources is likely to increase in the state's clean energy future. It will be critical to have a strong state presence at the table for enhanced regional and interregional transmission planning. Timely engagement in clean energy transmission planning will ensure that the renewable energy the state needs can reach the homes and businesses that require it. ▪ **Staff resources in state agencies:** The state's critical role in transmission planning would be enhanced by the designation (and funding) of a team dedicated to incorporating state input into regional planning processes. Sufficient staff are also needed to perform the transmission siting work that will be required in the coming years, particularly in the realm of archaeology and historic preservation. ▪ **Enhanced resources for Tribes:** The burden of paying for siting-related archaeological and cultural review should not fall on the Tribes. It is critical to identify mechanisms for funding Tribal governments to carry out this vital work. ▪ **Pre-application planning and coordination:** Key stakeholders believe the state currently lacks sufficient transmission infrastructure to meet CETA's 2030 targets for renewable energy. Given that it can take over 10 years to properly site a major transmission project, the needed planning work is already overdue and should begin as soon as possible.
Energy Facility Siting in Washington: Projects, Strategies and Resources (Washington State Department of Commerce 2021)	The Washington State Department of Commerce provides example guidelines for siting energy projects. These guidelines emphasize minimizing disturbance to existing economies, habitats, wildlife, and quality of life.
Recommended Siting Practices for Electric Transmission Developers (Americans for a Clean Energy Grid 2023)	This document outlines best practices for siting electric transmission facilities. Recommended practices include: ▪ Early and transparent engagement ▪ Respect and fair dealing ▪ Environmental considerations ▪ Interagency coordination ▪ Use of existing infrastructure

CETA = Clean Energy Transformation Act; TCWG = Transmission Corridors Work Group

3.14.2 Affected Environment

This section describes recreation uses and facilities in the Study Area defined in Chapter 2. The Washington State Legislature (Revised Code of Washington [RCW] 79A.05.010) defines "Recreation" as "activities of a voluntary and leisure time nature that aid in promoting entertainment, pleasure, play, relaxation, or instruction." RCW 36.69.010 defines "recreational facilities" as "parks, playgrounds, gymnasiums, swimming pools, field houses, bathing beaches, stadiums, golf courses, automobile racetracks and drag strips, coliseums for the display of spectator sports, public campgrounds, boat ramps and launching sites, public hunting and fishing areas, arboretums, bicycle and bridle paths, senior citizen centers, community centers, and other recreational facilities." This section describes the following recreation resources in the Study Area:

- Parks and Recreational Facilities
- Cycling, Walking, and Hiking Trails
- Hunting and Fishing
- Other Recreation

3.14.2.1 Parks and Recreational Facilities

Washington's national and state parks and recreational facilities provide residents and tourists ample opportunities to enjoy year-round recreation in Washington. Recreationists in the state can enjoy activities such as the following:

- Scenic trails
- Climbing excursions
- Hiking and backpacking
- Trail-riding
- Camping
- Wildlife viewing (including bird watching)
- Hunting
- White-water rafting and swimming
- Fishing and boating
- Aerial sports (e.g., paragliding)
- Picnicking
- Snowmobiling
- Alpine skiing
- Snowshoeing
- Cross-country skiing
- Dogsledding

In 2019 the Washington State Recreation and Conservation Office (RCO) analyzed the significance of the recreational assets in Washington State (RCO 2019). The study aimed to identify key outdoor recreational assets, understand gaps in recreational facilities, and provide recommendations for future investments. The analysis helped highlight the economic, social, and health benefits of these assets, ensuring that they are preserved and enhanced for future generations.

The RCO's effort identified recreational assets of statewide significance through interviews with statewide user and advocacy groups, land managers, and others. These assets were then categorized as either "foundational assets" or "exceptional assets."

Foundational assets are areas that support the most popular recreational activities, ensuring the recreational satisfaction and well-being of residents. These assets are crucial for providing widespread access to outdoor activities and can be found across the state in different parks, forests, or other recreation management areas. Examples include biking trails, fishing areas, camping sites, sports facilities, and leisure parks.[300]

[300] A designated outdoor area designed for various recreational activities and relaxation. Leisure parks typically offer a range of amenities and facilities to cater to different interests and age groups.

Exceptional assets are unique or high-quality recreational sites that attract visitors from across the state and beyond. These assets are crucial for both their recreational value and their role in attracting tourism, which supports local economies. Examples include iconic destinations like Mount Rainier, the San Juan Islands, Columbia River Gorge, Olympic National Park, North Cascades National Park, and Lake Chelan.

Both foundational and exceptional recreation assets can be found in Washington's numerous federally and state-managed recreation facilities.

National Parks and Recreational Facilities

Washington is home to a variety of national parks and recreational facilities that offer diverse outdoor experiences. **Figure 3.14-1** shows the locations of national parks and facilities within Washington. The National Park Service (NPS) owns and manages officially designated NPS units, including national parks; national recreation areas; and national historic trails, parks, reserves, and sites (NPS n.d.). These areas offer the following benefits:

- **Conservation of Biodiversity:** National parks protect diverse ecosystems and wildlife, preserving habitats for countless species.
- **Environmental Protection:** National parks safeguard natural landscapes from development and exploitation, ensuring that pristine environments are preserved for future generations.
- **Recreation and Tourism:** National parks offer numerous recreational opportunities such as hiking, camping, and wildlife viewing. They attract millions of visitors each year, contributing significantly to local and national economies through tourism.
- **Cultural and Historical Preservation:** Many national parks protect sites of cultural, historical, and archaeological significance, allowing people to connect with the past and learn about the heritage of different regions.
- **Education and Research:** National parks serve as outdoor classrooms and laboratories, providing valuable opportunities for education and scientific research. They help raise awareness about environmental issues and the importance of conservation.
- **Health and Well-being:** Spending time in nature has been shown to improve mental and physical health. National parks provide spaces for people to relax, exercise, and enjoy the natural beauty, promoting overall well-being.

Washington is home to 24 National Historic Landmarks. These landmarks highlight the state's rich contributions to the national park movement and include the following:

- **Maritime Heritage:** Seven of the landmarks are individual boats, reflecting Washington's strong maritime history.
- **National Park Sites:** Three landmarks are located within Mount Rainier National Park, itself a National Historic Landmark.
- **Diverse Historical Sites:** The landmarks feature a variety of structures, districts, and objects of national significance.

Additionally, Washington has an abundance of sites listed on the National Register of Historic Places, showcasing a wide array of historically significant locations across the state (DAHP 2024). The affected environment and impacts from the construction, operation and maintenance, and upgrade or modification of transmission facilities on historic and cultural resources, including Tribal rights, interests, and resources, are analyzed in Section 3.15, Historic and Cultural Resources.

Washington has seven national forests, each offering unique landscapes and recreational opportunities (WTA 2024):

- Mt. Baker-Snoqualmie National Forest
- Gifford Pinchot National Forest
- Okanogan-Wenatchee National Forest
- Olympic National Forest
- Colville National Forest
- Umatilla National Forest
- Kaniksu National Forest

Washington has 31 designated wilderness areas, many of which are situated within the boundaries of national forests. These areas cover approximately 4.3 million acres and are protected to preserve their natural conditions and provide opportunities for solitude and primitive recreation[301] (Washington Wild 2024). Wilderness areas are given a higher level of protection than other parts of national forests. This means stricter regulations on activities like logging, mining, and motorized vehicle use to maintain their pristine condition.

Washington is also home to nine military campgrounds and recreational vehicle parks for eligible members (Army MWR 2024). The federal government manages these areas to balance conservation and recreational uses for the benefit of future generations. **Table 3.14-3** lists federal parks and recreational facilities found in Washington and their affiliated land ownership agencies. Additional analysis specific to historic and cultural resources can be found in Section 3.15, Historic and Cultural Resources.

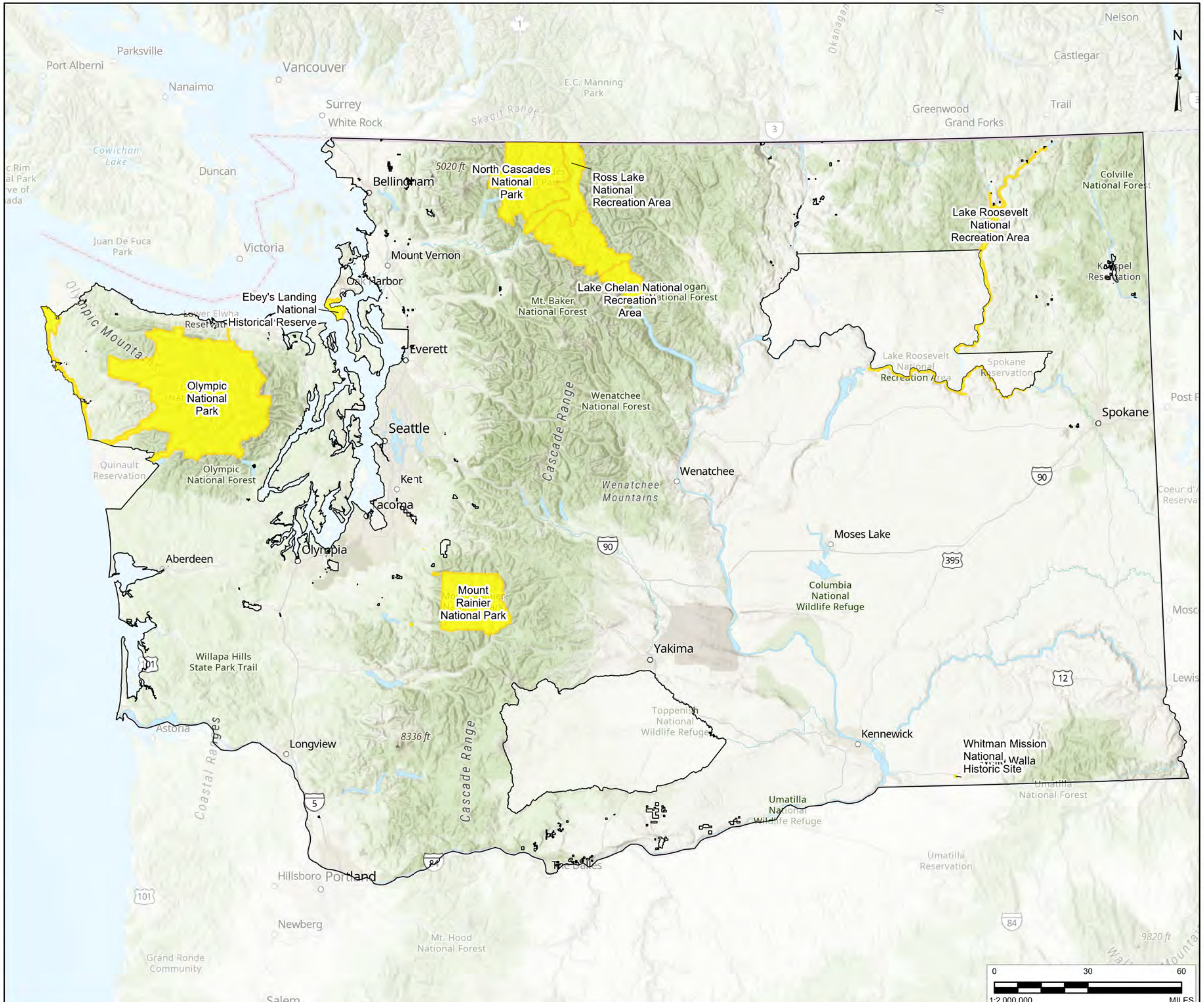
Table 3.14-3: Federally Designated Recreation Facilities

Land Ownership Agency	Type of Recreational Facility	Name of Recreational Facility
National Park Service	National Historic Site National Historic Reserve National Geologic Trail National Historic Trail National Historic Park National Recreation Area National Park Affiliated Areas	Daniel J. Evans Wilderness Area Ebey's Landing National Historic Reserve Fort Vancouver National Historic Site Ice Age Floods National Geologic Trail Klondike Gold Rush - Seattle Unit National Historic Park Lake Chelan National Recreation Area Lake Roosevelt National Recreation Area Lewis & Clark National Historic Trail Lewis and Clark National Historical Park Manhattan Project National Historical Park Minidoka National Historic Site Mount Rainier National Park Mount Rainier Wilderness Area Nez Perce National Historical Park North Cascades National Park Olympic National Park Oregon National Historic Trail[(a)]

[301] Outdoor activities that emphasize simplicity and a connection to nature, often involving non-motorized and non-mechanical means of travel. This type of recreation typically includes activities such as hiking, horseback riding, canoeing, and camping in wilderness areas.

Land Ownership Agency	Type of Recreational Facility	Name of Recreational Facility
		Ross Lake National Recreation Area San Juan Island National Historical Park Stephen Mather Wilderness Whitman Mission National Historic Site Wing Luke Museum Affiliated Area
U.S. Forest Service	National Forest National Scenic Area National Wilderness Area[(b)] National Volcanic Monument National Monument	Alpine Lakes Wilderness Boulder River Wilderness Buckhorn Wilderness Clearwater Wilderness Colonel Bob Wilderness Columbia River Gorge National Scenic Area Colville National Forest Gifford Pinchot National Forest Glacier Peak Wilderness Glacier View Wilderness Goat Rocks Wilderness Henry M. Jackson Wilderness Indian Heaven Wilderness Kaniksu National Forest Lake Chelan-Sawtooth Wilderness Mount Skokomish Wilderness Mount St. Helens National Volcanic Monument Mountain Adams Wilderness Mount Baker Wilderness Mt. Baker-Snoqualmie National Forest Noisy-Diobsud Wilderness Norse Peak Wilderness Okanogan-Wenatchee National Forest Olympic National Forest Passayten Wilderness Salmo-Priest Wilderness San Juan Wilderness Tatoosh Wilderness The Brothers Wilderness Trapper Creek Wilderness Umatilla National Forest Wenaha-Tucannon Wilderness Area Wild Sky Wilderness William O. Douglas Wilderness Wonder Mountain Wilderness
U.S. Fish and Wildlife Service	National Monument	Hanford Reach National Monument Washington Islands Wilderness Area
Bureau of Land Management	National Monument	Juniper Dunes Wilderness Area San Juan Islands National Monument

Notes:
(a) Portions of the trail that pass through lands managed by the BLM are administered by the BLM
(b) National Wilderness Areas in Washington also include lands managed by NPS, BLM and USFWS
BLM = Bureau of Land Management; NPS = National Park Service; USFWS = U.S. Fish and Wildlife Service



LEGEND

Study Area

National Park Service Lands (NPS, 2024)

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES
1. SERVICE LAYER CREDITS: SOURCES: ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY, ESRI, USGS
2. NATIONAL PARK SERVICE LANDS: NPS, 2024

PROJECT
DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE
NATIONAL PARKS AND FACILITIES

YYYY-MM-DD 2025-03-18

CONSULTANT wsp

FIGURE
3.14-1

This Page Intentionally Left Blank

State Parks and Recreation Facilities

Washington offers state-managed parks and recreation facilities, providing additional opportunities for outdoor activities and recreation through the following:

- State Parks
- State Forests
- State Resources Conservation Areas
- State Natural Area Preserves
- State Wildlife Areas

Each year, state parks and recreation facilities generate more than $1.4 billion in economic activity (Parks Commission 2020). The Washington State Parks and Recreation Commission (Parks Commission) is responsible for guiding the policies and management of the state's extensive park system. The Parks Commission is composed of seven citizen members appointed by the Governor. These commissioners do not hold elected or full-time appointive office during their service and receive no pay beyond travel expenses relating to their work on the commission. The Parks Commission also manages statewide programs, including over 400 miles of long-distance trails, recreational boating, and winter recreation (Parks Commission 2020). Its key responsibilities include:

- **Strategic Planning:** Developing long-term plans to enhance and preserve state parks
- **Public Input:** Engaging with the public to gather feedback and ensure the parks meet community needs
- **Budget Management:** Overseeing the budget requests and allocations for the state parks system
- **Rule Making:** Participating in the rulemaking process to establish and update regulations for state parks

Winter-based recreational facilities are managed by Washington State Parks' Winter Recreation Program in partnership with federal agencies, private landowners, and other state agencies. The Winter Recreation Program manages activities in national forests, in state forests, and on private forest land (Washington State Parks n.d.). Snowmobile Sno-Parks[302] are open to both motorized and non-motorized winter recreation. Non-motorized Sno-Parks are open to sports such as cross-country skiing, dogsledding, snowshoeing, and snow play (Washington State Parks n.d.). **Figure 3.14-2** shows the location of state parks, including winter recreational facilities, within Washington.

[302] Parking lots that have been cleared of snow that are close to groomed or other backcountry snow trails.

This Page Intentionally Left Blank

LEGEND

Study Area

State Parks and Properties (WSPRC, 2024)

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES
1. SERVICE LAYER CREDITS: SOURCES: ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY, ESRI, USGS
2. STATE PARKS AND PROPERTIES: WSPRC, 2024

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

STATE PARKS AND FACILITIES

YYYY-MM-DD 2025-03-18

CONSULTANT WSP

FIGURE
3.14-2

This Page Intentionally Left Blank

3.14.2.2 Cycling, Walking, and Hiking Trails

The RCO manages 259,009 miles of trails (RCO 2024). Statewide trails offer outdoor enthusiasts an array of opportunities to participate in backcountry hiking, leisurely strolls, trail runs, snowshoeing excursions, mountain biking, and more. Many of these trails are located on federally managed lands, across state parks, and throughout cities, towns, and local communities.

Recreational trails provide economic, environmental, and social benefits for residents and visitors. Washington residents are avid trail users, spending more than an estimated average of 30 days per person per year participating in non-motorized recreational trail use. Economically, the recreational use of trails contributes substantial value (ECONorthwest 2019).

In 2023, the RCO administered the Outdoor Recreation Experience Survey to collect data on outdoor recreation user experiences and the quality of the recreation experience. The survey found that road cycling, backpacking, running or jogging, and snowshoeing are among the top 20 activities that outdoor recreationists participate in statewide. For trail-based recreation, survey results found that the top three motorized trail uses were:

- Four-wheel-drive vehicles (22 percent)
- Motorcycles (16 percent)
- All-terrain vehicles (15 percent)

The top three non-motorized uses on trails were:

- Walking/day hiking (90 percent)
- Bicycling (40 percent)
- Trail running (31 percent)

Results also showed that 90 percent of Washington residents regularly walk on trails, making this the second-most popular (behind walking on roads or sidewalks) recreational activity for Washington residents (RCO 2023).

3.14.2.3 Hunting and Fishing

Habitat, wildlife, and fish are analyzed in Section 3.6; hunting and fishing also are vital to Washington for several reasons related to recreation, including the following:

- **Economic Impact:** These activities generate significant revenue for the state.
- **Conservation Funding:** The revenue from hunting and fishing licenses, permits, and related taxes helps fund conservation efforts and wildlife management programs. This ensures sustainable populations of fish and wildlife.
- **Cultural Heritage:** Hunting and fishing are deeply rooted in Washington’s cultural fabric. They offer opportunities for individuals to connect with nature, providing food security, self-sufficiency, and mental and physical health benefits.
- **Recreational Opportunities:** These activities provide recreational opportunities for residents and visitors, promoting outdoor activities and a healthy lifestyle.

- **Wildlife Management:** Regulated hunting and fishing help manage wildlife populations, preventing overpopulation and maintaining ecological balance.

The Washington State Legislature (RCW 77.04.012) sets the overall state policy and direction for managing wildlife resources in Washington, including hunted wildlife (WDFW n.d.). This mandate identifies the Washington Fish and Wildlife Commission and the Washington Department of Fish and Wildlife (WDFW) as the responsible parties for wildlife-based recreation inclusive of hunting and fishing across the state (WDFW n.d.). The WDFW administers a Game Management Plan (GMP) as a planning-level document to regulate recreational hunting opportunities and to minimize adverse impacts on residents, other wildlife, and the environment. The GMP also establishes the hunting seasons in Washington and guides the management of hunted game species (WDFW 2024a).

Tribal governments also play a vital role in wildlife-based recreation in Washington, including hunting and fishing. Tribal governments typically have Tribal hunting committees that meet to develop regulations and management strategies. The committees often work with the WDFW to better manage wildlife resources associated with key wildlife populations (WDFW n.d.). The affected environment and impacts from the construction, operation, and maintenance of transmission facilities on historic and cultural resources, including Tribal rights, interests, and resources, are analyzed in Section 3.15, Cultural and Historic Resources.

Hunters and hunting help to manage wildlife population levels and fund the conservation of Washington's wildlife (WDFW n.d.). Hunting and fishing also generate revenue for businesses and taxes to support the services provided by the WDFW and other public agencies. Hunters in Washington spent approximately $1.1 billion in 2022 on hunting-related expenses (Van Deynze 2024). State, federal, Tribal, military, and private lands have specified rules and restrictions about where and when hunting may be permitted (WDFW 2024b).

While hunting generally occurs on public land, hunting can occur on private land, too, with the appropriate permissions (WDFW 2022; Van Deynze 2024). Hunting seasons for big game vary throughout the calendar year depending on the species hunted. A combination of hunting and trapping seasons is provided for small game and furbearing animals. However, the trapping season for furbearers generally occurs during the winter months, and hunting seasons extend from September to early spring of the following year (WDFW 2024b).

Washington offers a rich variety of fishing opportunities, including freshwater and oceanic fishing, fly-fishing, salmon fishing, and crabbing (WDFW 2024c). Millions of people fish and crab recreationally in Washington each year, contributing significantly to the state's economy. Washington anglers spent approximately $2.1 billion in 2022 (Van Deynze 2024). Commercial fishing in Washington is distinct from recreational fishing and is not analyzed in this section.

3.14.2.4 Other Recreation

Washington offers a wide range of recreational activities beyond cycling, walking, hiking, hunting, and fishing including the following:

- **Mountaineering and Climbing:** Washington's volcanic peaks, like Mount Rainier and Mount Adams, provide excellent opportunities for mountaineering and climbing.
- **Water Sports:** The state is well-suited for a variety of water-based activities, including kayaking, canoeing, sailing, scuba diving, boating, and surfing. The numerous lakes and rivers, as well as the Pacific coastline, offer diverse recreational opportunities. The rugged coastline, especially around areas like La Push and Westport Light State Park, is ideal for beachcombing and surfing.

- **Skiing and Snowboarding:** During the winter months, Washington's mountain ranges, including the Cascades, are ideal for skiing and snowboarding.
- **Wildlife Viewing and Bird Watching:** Washington's diverse ecosystems, from rainforests to high deserts, provide excellent opportunities for wildlife viewing and bird watching.
- **Other Trail Use:** Many trails and parks in Washington are suitable for horseback riding or mountain biking, offering a unique way to explore the state's natural beauty.
- **Camping and Backpacking:** With numerous national and state parks, Washington is a popular destination for camping and backpacking enthusiasts.
- **Aerial Sports:** Washington offers a variety of aerial sports for enthusiasts of all levels including paragliding, hang gliding, ziplining, aerial arts, skydiving, and hot air ballooning.

3.14.3 Impacts

Transmission facilities may impact the economic, environmental, and social elements of recreational uses and facilities. The impacts of transmission facilities on recreational resources are expected to vary with the type of recreation at a particular site. Recreation use would be determined based on the current use of the site.

3.14.3.1 Method of Analysis

The Study Area for a project-specific application would typically encompass several key regions and features, such as the following:

- **Project Site and Immediate Vicinity:** This includes the specific location of the project and the surrounding area that might be directly affected by construction, operation and maintenance, and upgrade or modification activities.
- **Viewshed:** This includes conducting a visual assessment to determine what recreation facilities may be indirectly affected by construction, operation and maintenance, and upgrade or modification activities.

The Study Area for this Draft Programmatic EIS analyzes the affected environment and impacts on recreation within the Study Area defined in Chapter 2. Three project phases for each transmission facility type were considered: construction, operation and maintenance, and upgrade or modification. This evaluation considers overhead transmission facilities and underground transmission facilities for each phase. Overhead transmission facilities consist of transmission lines and substations and similar ancillary infrastructure. Overhead transmission facilities also incorporate aboveground infrastructure that may be associated with underground transmission facilities (e.g., clearing footprint required for launch and retrieval shafts for trenchless construction). Underground transmission facilities consist of underground transmission lines, underground access vaults, and other below-ground infrastructure. The construction of underground transmission facilities includes open trenches, trenchless, and underwater construction methods.

Laws and regulations used to determine the impacts of transmission facilities on recreation are summarized in **Table 3.14-1**. Information reviewed to identify impacts on recreation uses and areas in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping.

Impact Determination

The discussion of impacts is qualitative given the high-level nature of a Programmatic EIS; quantification would require project-specific details to analyze. **Table 3.14-4** describes the criteria used to evaluate impacts from the Action Alternative and No Action Alternative. Information reviewed to identify impacts on recreation in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping.

Table 3.14-4: Criteria for Assessing the Impact Determination on Recreation

Impact Determination	Description
Nil	A project would have no foreseeable impact on recreation during any phase (e.g., construction, operation and maintenance, and upgrade or modification).
Negligible	A project would have minor, adverse impacts on recreation, however best management practices and design considerations are expected to be effective. Temporary closures of recreational sites and facilities would have adverse effects on users who rely on consistent public access to remote, exceptional, or frequently used recreational destinations. This would include designated motorized and non-motorized trails. A project would not impact the use, integrity or increase the risk of wildfire hazards.
Low	A project would have adverse impacts on recreation even with the implementation of best management practices and design considerations. A project would result in short-term safety risks thereby requiring short-term detours and restricted access areas that would inconvenience users. Construction of transmission facilities may raise awareness about recreational facilities, attracting new users which would lead to an increase in use. A project would result in short-term visual impacts, increased levels of disturbance from noise and vibration, and alter the quality of the recreational resource. These impacts would discourage recreationists from visiting the facility. Impacts would be short-term and nonsignificant.
Moderate	A project would have adverse impacts on recreation even with the implementation of best management practices and design considerations. A project would require closures that extend for long-periods of time. A project would enhance a recreational resource such that it attracts new users, leading to an increase in use. Construction activities, including grading, vegetation clearing, blasting, and using trenchless construction methods have the potential to destabilize natural resources, disturb soils prone to sedimentation[303] and erosion, and alter the recreational resource. These impacts would affect the integrity of the recreational facility. A project would increase the risk of wildfire at recreational facilities. The construction and upgrade or modification of an overhead transmission facility would create a hazard to low-flying aircraft, helicopters, paragliders, hang gliders, and skydivers. Moderate impacts may be long-term, occurring over one or more project phases. Moderate impacts have the potential to be significant.
High	A project would adverse impacts that have significant and potentially severe effects on recreation even with the implementation of best management practices and design considerations. A project would result in permanent closure of all or portions of a recreational facility. A project would result in a substantial and long-term increase in the use of a recreational resource. A project would have adverse impacts on the environmental and natural landscape of a recreational facility which would result in a change to its integrity. A project would substantially increase the risk of wildfire at a recreational facility. The operation and maintenance of a project would create a permanent hazard to low-flying aircraft, helicopters, paragliders, hang gliders, and skydivers. High impacts may be permanent or continue for the duration of the project.

[303] The process where particles of soil, sand, and other materials are dislodged and transported by natural forces such as water, wind, or human activities like construction and deforestation.

To clearly understand the potential severity of impacts without any interventions, the following impact determinations exclude the use of avoidance criteria and mitigation measures. The ratings assume compliance with all federal, state, and local laws and regulations, as well as standardized BMPs and design considerations. Assessing impacts without avoidance criteria or mitigation measures offers a baseline understanding of potential environmental effects, helping to identify the true extent of these impacts. Environmental laws often require that initial impact assessments be conducted without considering mitigation to maintain the integrity of the environmental review process.

3.14.3.2 Action Alternative

Construction

Overhead Transmission Facilities

Activities for the construction phase of overhead transmission facilities would vary and depend on the scale of the facility and site characteristics. Construction could include a site preparation phase of relatively short duration (e.g., a few months), followed by a longer construction and start-up phase. It is assumed that the construction phase of overhead transmission, per mile, would have a shorter duration than underground construction. Overhead transmission facilities could have the following identified impacts during the construction phase:

- Temporary Closure or Restricted Access
- Permanent Closure
- Increase in Use
- Change in Integrity
- Increased Risk of Wildfire

Temporary Closure or Restricted Access

In areas where construction activities overlap with recreational facilities, users could be exposed to an increase in air pollution, fugitive dust, noise, and occupational safety risks (see Section 3.8, Public Health and Safety). To prevent public health and safety impacts, recreational facilities may need to be closed temporarily. Temporary closures of recreational sites and facilities would have short-term adverse effects on users who rely on consistent public access to remote, exceptional, or frequently used recreational destinations. This would include designated motorized and non-motorized trails.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact on recreation from temporary closures, without mitigation measures incorporated, is anticipated to vary and could be negligible to moderate.

Permanent Closure

In some cases, construction activities could result in permanent closures of recreational spaces if they are no longer deemed viable for public use or if continued access would compromise public safety or environmental integrity. Permanent closure would have a long-term adverse effect on recreational facilities and users by restricting access to public land or areas with a long history of recreational use.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact on recreation from permanent closures, without mitigation measures incorporated, is anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Increase in Use

Construction projects often have associated publicity that can raise awareness about recreational facilities, attracting new users who were previously unaware of them. Large construction projects can lead to more frequent use due to temporary construction workers. The development and urbanization of surrounding areas can bring more people closer to recreational facilities, leading to higher visitation and increased usage. As a result, these facilities may experience faster wear and tear, leading to higher maintenance costs, more frequent need for repairs, and greater environmental degradation. Additionally, permanent and temporary closures of recreational areas during construction may inadvertently expose nearby recreational sites to greater use and human disturbance, indirectly amplifying the strain on otherwise unaffected facilities.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact on recreation from increased use, without mitigation measures incorporated, is anticipated to vary and could be nil to low.

Change in Integrity

The construction and assembly of overhead transmission facilities could temporarily and permanently impact the environmental and natural landscape of a recreational facility, possibly leading to a change in integrity and decreased usage. Construction activities, including road grading, land and vegetation clearing, blasting,[304] and operating combustion engines, have the potential to destabilize natural resources, disturb soils prone to sedimentation and erosion, and alter the existing visual landscape. Wildlife viewers and photographers could also experience an impact from construction activities as noise associated with heavy machinery and construction crews could impact surrounding wildlife habitat and behaviors. Construction activities could have an adverse impact on people recreating in areas of undisturbed wilderness, including on mountains, in forests, near water, and within deserts and arid landscapes.

Wilderness areas have long been valued in the United States for their untouched natural beauty. The Wilderness Act mandates the preservation of the natural conditions of designated wilderness areas, limiting development in these areas.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact on recreation, without mitigation measures incorporated, is anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Increased Risk of Wildfire

Construction activities, including welding, vehicle ignition, blasting, and overland travel, may induce sparks and electrical currents that can ignite the surrounding vegetation and cause wildfires. Wildfires could impact recreation facilities in several ways, including damage to infrastructure, air quality issues, temporary and permanent closures, altering of landscapes, and increased maintenance needs (see Section 3.3, Air Quality). Wildfire near recreational facilities could temporarily or permanently terminate access and use. In some extreme cases, wildfire may destroy the integrity of the recreational facility and render it unusable in the future. In addition to recreational closures, wildfires can pose an extreme threat to public health and safety (see Section 3.8, Public Health and

[304] Refers to the process of the controlled detonation of explosives to break, excavate, or shape rock, concrete, or other materials.

Safety), including recreational users. Users of recreational areas, including backpackers, mountain bikers, hunters, campers, and others, may become stranded in remote locations during a wildfire.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact on recreation, without mitigation measures incorporated, is anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Activities for the construction phase of underground transmission facilities, including open trench, trenchless (including directional drilling), or underwater construction methods, would vary depending on the scale of the facility and site characteristics. Similar to overhead transmission facilities, construction underground could include a site preparation phase of relatively short duration, followed by a longer construction and start-up phase. It is assumed that the construction phase for underground transmission facilities, per mile, would have a longer duration than overhead projects. Underground transmission could have the following identified impacts during the construction phase:

- Temporary Closure or Restricted Access
- Permanent Closure
- Increase in Use
- Change in Integrity
- Increased Risk of Wildfire

Temporary Closure or Restricted Access

In areas where construction activities overlap with recreational facilities, users could be exposed to a wide variety of risks. Due to the increased groundwork associated with underground construction, nearby recreation users may be exposed to heightened levels of fugitive dust, air pollution, and other hazards associated with trenching activities. To prevent public health and safety impacts, recreational facilities may restrict access or close temporarily. As underground facilities typically take longer to construct than their overhead counterparts, temporary closures and access restrictions may extend over a longer period. Temporary closures of recreational sites and facilities would have short-term adverse effects on users who rely on consistent public access to remote, exceptional, or frequently used recreational destinations. This would include designated motorized and non-motorized trails. Construction of underwater facilities may temporarily restrict access to waterbodies, affecting activities like boating, fishing, and swimming.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact on recreation from temporary closures, without mitigation measures incorporated, is anticipated to vary and could be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Permanent Closure

In some cases, construction activities could result in permanent closures of recreational spaces if they are no longer deemed viable for public use or if continued access would compromise public safety or environmental integrity. Permanent closure would have a long-term adverse effect on recreational facilities and users by restricting access to public land or areas with a long history of recreational use.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact on recreation from permanent closures, without mitigation measures incorporated, is anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Increase in Use

Construction projects often have associated publicity that can raise awareness about recreational facilities, attracting new users who were previously unaware of them. Large construction projects can lead to increased user frequency due to the presence of temporary construction workers. The development and urbanization of surrounding areas can bring more people closer to recreational facilities, leading to increased usage. As a result, these facilities may experience faster wear and tear, leading to higher maintenance costs, more frequent need for repairs, and greater environmental degradation. Additionally, permanent and temporary closures of recreational areas during construction may inadvertently expose nearby recreational sites to greater use and human disturbance, indirectly amplifying the strain on otherwise unaffected facilities.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact on recreation, without mitigation measures incorporated, is anticipated to vary and could be nil to low.

Change in Integrity

The construction of underground transmission facilities could temporarily and permanently impact the environmental and natural landscape of a recreational facility, possibly leading to a change in integrity and decreased usage. Underground construction activities, including trenching, road grading, land and vegetation clearing, blasting, and operating combustion engines, have the potential to destabilize natural resources, disturb soils prone to sedimentation and erosion, and alter the existing visual landscape. Underground transmission construction often takes longer than overhead facilities, and requires permanent clearing of vegetation along the right-of-way (ROW), leading to permanent alteration of the landscape. Wildlife viewers and photographers could also experience an impact from prolonged construction activities as noise associated with heavy machinery and construction crews could impact surrounding wildlife habitat and behaviors. Construction activities could have an adverse permanent impact on people recreating in areas of undisturbed wilderness, including on mountains, in forests, near water, and within deserts and arid landscapes.

Wilderness areas have long been valued in the United States for their untouched natural beauty. The Wilderness Act mandates the preservation of the natural conditions of designated wilderness areas, limiting development in these areas.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact on recreation, without mitigation measures incorporated, is anticipated to vary and could be low to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Increased Risk of Wildfire

Construction activities, including welding, vehicle ignition, blasting[305] and overland travel, may induce sparks and electrical currents that can ignite the surrounding vegetation, resulting in wildfires. Wildfires could impact recreation facilities in several ways, including damage to infrastructure, air quality issues, temporary and permanent closures, altering of landscapes, and increased maintenance needs (see Section 3.3, Air Quality).

[305] Refers to the process of the controlled detonation of explosives to break, excavate, or shape rock, concrete, or other materials.

Wildfire near recreational facilities could temporarily or permanently terminate access and use. In some extreme cases, wildfire may destroy the integrity of the recreational facility and render it unusable in the future. In addition to recreational closures, wildfires can pose an extreme threat to public health and safety (see Section 3.8, Public Health and Safety), including recreational users. Users of recreational areas, including backpackers, mountain bikers, hunters, campers, and others, may become stranded in remote locations during a wildfire.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact on recreation, without mitigation measures incorporated, is anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Operation and Maintenance

Overhead Transmission Facilities

Activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs, similar to any other linear industrial facility. Overhead transmission facilities could have the following identified impacts during the operation and maintenance phase:

- Temporary Closure or Restricted Access
- Change in Integrity
- Increased Risk of Wildfire
- Physical Hazard to Aerial Recreation

Temporary Closure or Restricted Access

Similar to the construction phase, operation and maintenance activities, including vegetation management, repairs, and inspections, may require temporary closure or temporarily restrict access to recreational facilities. Temporary closures of recreational sites and facilities would have short-term adverse effects on users who rely on consistent public access to remote, exceptional, or frequently used recreational destinations. This would include designated motorized and non-motorized trails. Temporary and closures and restricted access could also indirectly affect recreational sites that are not impacted by the construction of transmission facilities by exposing those sites to greater use and overall human disturbance.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact on recreation from temporary closures, without mitigation measures incorporated, is anticipated to vary and could be nil to low.

Change in Integrity

In areas where facilities overlap with recreational facilities, overhead transmission facilities can impact recreational integrity in several ways. As permanent fixtures, overhead transmission facilities have the potential to visually alter landscapes, particularly in undisturbed, natural areas. Regular maintenance activities like vegetation clearing may also alter the visual landscape and integrity of recreational areas. Similarly, the operation and maintenance of overhead transmission facilities would require reliable and consistent access roads for maintenance crews to conduct repairs and routine inspections. Roads within and around recreational areas may have both positive and negative impacts on recreational facilities and users. In most cases, roads can serve as a multipurpose access point for various uses, including off-highway vehicles,[306] mountain biking, walking, snowshoeing and cross-country skiing, dogsledding, and hunting. However, in some areas, access roads fragment existing landscapes, causing impacts on the natural and aesthetic integrity of the environment. Further the presence of maintenance staff and vehicles, along with noise from potential repair activities, can disrupt the aesthetic quality of recreational areas and negatively affect the recreational experience for visitors.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact on recreation, without mitigation measures incorporated, is anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Increased Risk of Wildfire

Due to their height, overhead transmission facilities are vulnerable to unpredictable weather events and lightning, which can lead to wildfire. The presence of overhead transmission lines can increase overall wildfire potential in remote areas with unpredictable weather, frequent lightning strikes, or dense vegetation and underbrush, as electrical arcing[307] can ignite fires when in contact with surrounding vegetation and flammable materials. Wildfires could impact recreation facilities in several ways, including damage to infrastructure, air quality issues, temporary closures, altering of landscapes, and increased maintenance needs (see Section 3.3, Air Quality). Wildfire near recreational facilities could temporarily or permanently terminate access and use. In some extreme cases, wildfire may destroy the integrity of the recreational facility and render it unusable in the future. In addition to recreational closures, wildfires can pose an extreme threat to public health and safety (see Section 3.8, Public Health and Safety), including recreational users. Users of recreational areas, including backpackers, mountain bikers, hunters, campers, and others, may become stranded in remote locations during a wildfire.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact on recreation, without mitigation measures incorporated, is anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Physical Hazard to Aerial Recreation

Overhead transmission facilities could have an impact on aerial recreation activities, such as hang gliding, paragliding, and aerial sightseeing. Overhead transmission facilities pose a collision risk for aerial recreation enthusiasts. The presence of wires and towers can be hazardous, especially in low-visibility conditions. To ensure safety, certain areas around transmission facilities may be designated as restricted airspace, limiting where aerial activities can take place.

Impact Rating: Depending on the scale of the facility and site characteristics, the impact on aerial recreation, without mitigation measures incorporated, is anticipated to vary and could be nil to low.

Underground Transmission Facilities

Similar to overhead transmission facilities, activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance

---

[306] Any type of vehicle capable of driving off roads or on non-paved surfaces like trails.

[307] Occurs when an electric current jumps across a gap between two conductive points, creating a visible discharge of electricity. The arc generates significant heat, which can cause burns or ignite flammable materials. Sparks may fly from the point of discharge.

for equipment and ROWs, similar to any other linear industrial facility. Underground transmission could have the following identified impacts during the operation and maintenance phase:

- Temporary Closure or Restricted Access
- Change in Integrity

Temporary Closure or Restricted Access

Operation and maintenance activities, including vegetation management, repairs, and inspections, may require temporary closure or temporarily restrict access to recreational facilities. Underground cables are generally harder to access than aboveground cables and can take longer to pinpoint damaged areas, leading to prolonged maintenance time and potential closures. The extended closure of recreational facilities would have short-term adverse effects on users who rely on consistent public access to remote, exceptional, or frequently used recreational destinations and may indirectly increase foot and vehicle traffic in other recreational areas. Temporary closures could also indirectly affect recreational sites that are not impacted by the construction of transmission facilities by exposing those sites to greater use and overall human disturbance.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact on recreation from temporary closures, without mitigation measures incorporated, is anticipated to vary and could be nil to low.

Change in Integrity

Similar to overhead transmission facilities, underground facilities could alter recreational integrity in a number of ways. Although underground facilities are considered to have less visual impact than their overhead counterpart, they still require permanent vegetation clearing along the ROW, which could alter the visual landscape of recreational areas. Similar to overhead facilities, operation and maintenance activities for underground transmission facilities would require reliable and consistent access roads for maintenance crews to conduct repairs and routine inspections, which could impact the natural and aesthetic integrity of the environment. These impacts could have an adverse permanent impact on people recreating in these areas. For example, ongoing operation and maintenance activities could impact wildlife viewers and photographers as noise associated with heavy machinery and construction crews could affect surrounding wildlife habitat and behaviors. Due to the more complex nature of underground facility repair, adverse impacts associated with repair and maintenance may be prolonged, resulting in extended impacts to recreational users.

Impact Determination: Depending on the scale of the facility and site characteristics, the impact on recreation, without mitigation measures incorporated, is anticipated to vary and could be nil to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Upgrade or Modification

Overhead Transmission Facilities

Upgrading or modifying overhead transmission facilities would involve several steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Overhead transmission could have the following identified impacts during the upgrade or modification phase:

- Temporary Closure or Restricted Access
- Permanent Closure

- Increase in Use
- Change in Integrity
- Increased Risk of Wildfire

While adverse impacts would be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing structures and footprints, which minimizes the disturbance to surrounding recreational areas. New construction often requires clearing land, which can disrupt recreational spaces and prolong access disturbances.
- **Infrastructure Utilization:** Existing infrastructure can be reused or enhanced, reducing the need for extensive new development.

Certain areas may be temporarily inaccessible during the upgrade or modification process. Some facilities or sections might be permanently closed if they are no longer viable or safe. The setting, or integrity, of recreational facilities may be affected if upgrades or modifications increase the footprint or visual impact of the transmission facility. Additionally, wildfire remains a potential impact with modification of a facility, although some upgrades or modifications may decrease the potential for wildfire risk.

Underground Transmission Facilities

Upgrading or modifying underground transmission facilities would involve several steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Underground transmission could have the following identified impacts during the upgrade or modification phase:

- Temporary Closure or Restricted Access
- Permanent Closure
- Increase in Use
- Change in Integrity
- Increased Risk of Wildfire

While adverse impacts would be similar to construction, impacts from upgrading or modifying existing transmission facilities are generally anticipated to be lower than those for constructing new transmission facilities due to several factors, including those described below:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing structures and footprints, which minimizes the disturbance to surrounding recreational areas. New construction often requires clearing land, which can disrupt recreational spaces and prolong access disturbances.
- **Infrastructure Utilization:** Existing infrastructure can be reused or enhanced, reducing the need for extensive new development.

3.14.3.3 No Action Alternative

The No Action Alternative represents the scenario in which this Draft Programmatic EIS is not used and current management practices for siting and planning transmission facilities continue unchanged. Under this alternative, each project would continue to be evaluated on a case-by-case basis and reviewed for compliance with existing regulations, codes, and standard practices. While impact determinations would likely be similar to those outlined in this Draft Programmatic EIS, projects would not benefit from the **impact reductions associated with the avoidance criteria** developed and analyzed in this Draft Programmatic EIS. These criteria are anticipated to provide additional mitigation that further reduces potential environmental impacts.

3.14.4 Potential Mitigation Measures

This section describes measures that would eliminate, reduce the intensity of, or compensate for impacts from construction, operation and maintenance, and upgrade or modification of transmission facilities. All general conditions adopted for this Draft Programmatic EIS, identified in Section 3.1, are relevant to this resource section. Applicants would be responsible for providing information within their application materials documenting their attempts at implementing the general conditions.

Avoidance criteria adopted for this Draft Programmatic EIS have been identified in Section 3.1. Avoidance Criteria that are relevant to this resource section include:

AVOID-2 – Wetland Disturbance: Avoid impacts within 300 feet of all wetlands.

> **Rationale:** Protecting wetland vegetation would decrease the chances of wetland degradation during construction activities as these areas are important for sustained wetland function. Wetlands within the project footprint would be delineated following the U.S. Army Corps of Engineers wetland delineation methodology.

AVOID-3 – Sensitive Water Features: Avoid impacting areas sensitive to degradation, including adjusting the layout of new transmission facilities to steer clear of sensitive water features.

> **Rationale:** Avoiding sensitive water features that are susceptible to degradation from construction activities including changes to the water features’ physical characteristics (e.g., banks, bathymetry and substrate), as well as chemical properties. Avoiding these areas helps preserve their structure and function.

AVOID-6 – Old-Growth and Mature Forests: Avoid old-growth forests, which include forests older than 200 years in western Washington and greater than 150 years in eastern Washington, and mature forests, which include forests greater than 80 years.

> **Rationale:** This avoidance criterion would reduce direct loss of old-growth and mature forests, which have already lost the majority of their historical extent. Old-growth and mature forests are particularly susceptible to long-term impacts due to the time lag to reestablish current ecological functions if clearing occurs. In addition, linear features through old and mature forest stands increase the impacts from edge effects such as the spread of invasive plants.

AVOID-13 – Land Use and Zoning Incompatibility and Conflicts: Avoid incompatible land uses and zoning. Demonstrate that there are no indirect or adjacent land use conflicts with private property owners or public land administrators.

Rationale: This avoidance criterion aims to avoid conflicts with land use and zoning. Avoiding land use and zoning conflicts will also help to reduce adverse impacts on property owners, agricultural landowners, noise, visual, and socioeconomics.

AVOID-17 – Night Sky: Avoid impacts on areas managed for the protection of night sky.

Rationale: This avoidance criterion aims to protect designated night sky areas.

AVOID-18 – Exceptional Recreation Assets: Avoid impacts on, or within the viewshed of, exceptional recreation assets as defined by the Washington State Recreation and Conservation Office (RCO).

Rationale: This avoidance criterion aims to protect exceptional recreational assets. These places provide a unique experience or activity that may not be available in all areas of the state. Coordination with the RCO early in the project planning process is a crucial step to adequately avoid these areas.

AVOID-19 – Wilderness Areas: Avoid impacts on, or within the viewshed of, designated wilderness areas.

Rationale: This avoidance criterion aims to protect wilderness areas. Wilderness areas are valued for their untouched natural beauty. The Wilderness Act of 1964 mandates the preservation of the natural conditions of designated wilderness areas.

AVOID-20 – Limit Closure of Recreation Resources: Consider closure and restrictions only after other mitigation strategies and alternatives have been explored. Avoid long-term closure and restriction of recreation resources lasting more than 24 months.

Rationale: This avoidance criterion establishes the definition of “long-term closure” in relation to impacts on recreation resources from the construction, operation and maintenance, and upgrade or modification of transmission facilities.

Applicants would be responsible for providing information within their application materials documenting the project’s compliance with the above avoidance criteria.

Potential mitigation measures have been identified to minimize adverse impacts from transmission facility projects. These measures are intended to be broad so that they can be applied to most projects that would be covered under this Programmatic EIS. However, project-specific plans would be needed to adapt the measures for project-specific applications.

When impact determinations are identified as moderate or high, the applicant would either adopt applicable mitigation measures from this Programmatic EIS or the SEPA Lead Agency may require applicable mitigation measures to be implemented to reduce project-specific impacts. When impact determinations are low, applicable mitigation measures should still be considered by the applicant and the SEPA Lead Agency as these measures would help to further reduce project-specific impacts, including the project’s contribution to cumulative impacts. These measures would be implemented in addition to compliance with laws, regulations, environmental permits, plans, and design considerations required for transmission facilities.

The following mitigation measures could be adopted to mitigate adverse impacts:

Rec-1 – Stakeholder and Agency Coordination: Coordinate with potentially affected federal, state, and local agencies, communities, and recreation-based organizations to mitigate impacts on recreational facilities and during seasonal activities.

Rationale: This mitigation measure aims to reduce the impact of transmission facilities on recreation facilities and seasonal activities. Effectively engaging stakeholders is crucial in the planning and development of transmission facilities and for building community support.

Rec-2 – Public Notification of Temporary Closure: Notify appropriate stakeholders of temporary closures at least six months prior to the start of the closure.

Rationale: This mitigation measure aims to reduce the impact of transmission facilities on recreation users. Notifying the public of temporary closures of trails or sites through public outreach and media outlets provides transparency between the applicant and the local community. Public notifications are also necessary to ensure public awareness and safety within construction areas.

Rec-3 – Trail Detours: Consider phased closures or explore alternative solutions such as rerouting trails, creating temporary access points, or scheduling work during off-peak times to minimize disruption.

Rationale: This mitigation measure aims to alleviate the inconvenience of construction on recreationists.

Rec-4 – Informational Signage and Precautionary Safety Measures: Place informational signage, placards, safety fencing, and other precautionary indicators in areas where transmission facilities are within or adjacent to existing recreational facilities.

Rationale: This mitigation measure aims to alert recreational users to construction hazards or, in cases where transmission lines are operating within or near recreation sites, protect recreationists from accidental injury.

Rec-5 – Notice to Air Missions: Coordinate with the appropriate aviation authorities, such as the Federal Aviation Administration, to determine the necessity and content of a Notice to Air Missions (NOTAM).

Rationale: A NOTAM is a critical communication tool used in aviation to inform pilots and other flight personnel about potential hazards or changes in the National Airspace System that could affect flight operations. NOTAMs provide timely information about the abnormal status of a component of the National Airspace System, such as runway closures, airspace restrictions, or changes in navigation aids.

In addition to the above mitigation measures, the following mitigation measures[308] developed for other resources may be applicable:

Geo-1 – Minimize Soil Disturbance: Minimize soil disturbance, including footprints related to access roads and permanent structures, to the greatest extent practicable. Minimize the use of construction techniques that would be harmful to topsoil composition, where feasible.

Geo-8 – Minimize Impacts on Sensitive Soils: Design projects to minimize adverse impacts on high erodibility zones and areas sensitive to degradation.

W-2 – Clear Spanning or Trenchless Methods for Water Crossings: When feasible, use clear spanning for overhead transmission or trenchless construction for underground transmission to minimize disturbance to riparian areas, wetlands and wetland buffers, and surface waters.

[308] The rationales for the identified mitigation measures are provided in their respective resource sections.

W-4 – Store Chemicals, Operate Equipment, and Conduct Maintenance away from Water: Store fuel, oils, and lubricants away from watercourses. Maintain, repair, and/or service vehicles and equipment away from watercourses and at designated repair facilities whenever possible. Operate equipment and machinery from the top of the bank and outside of riparian areas, wetlands and wetland buffers, and surface waters.

W-5 – Implement Erosion and Sediment Control Measures: Implement effective and appropriate erosion control measures in construction and operation to mitigate runoff into streams.

W-6 – Minimize Hydrology Changes: Minimize water diversions or changes to natural hydrology, to the extent possible. Natural hydrology would be restored to the site following construction.

Veg-3 – Site Transmission Facilities in Existing ROW or Disturbed Areas: Site transmission facilities in existing right-of-way (ROW) or disturbed areas, to the greatest extent practicable.

Veg-6 – Revegetation Plan: Prepare a revegetation plan for areas of temporary disturbance from construction of the transmission facility.

Hab-3 – Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines: Minimize transmission line crossings of canyons and draws, along ridge lines, parallel to rivers, and within riparian habitat.

Hab-4 – Decommission Nonpermanent Roads: Decommission and restore any access roads not required for operation and maintenance.

Hab-9 – Retain Wildlife Trees where Practicable: Wildlife trees are trees with features that are especially beneficial to wildlife. These typically include living and dead trees that are decaying and those that have cavities or good conditions for cavity creation, sloughing bark that can provide roost sites for bats, branches for perching, basal cavities for denning, and foraging opportunities for woodpeckers and other wildlife. Wildlife trees will be retained where safe to do so.

Fish-13 – Reduce Number of Stream Crossings: Design transmission facilities to reduce the number of stream crossings. Access roads and utilities would share common rights-of-way.

Fish-14 – Use Bioengineering: Design stabilization structures to incorporate bioengineering principles; for example, use of living and nonliving plant materials in combination with natural and synthetic support material for slope stabilization, erosion reduction, and vegetation establishment.

H&S-1 – Fire Mitigation Plan: Develop a fire mitigation plan that includes both preventative and remedial measures for potential ignition source operations.

TR-2 – Coordination with Aviation Groups: Work closely with aviation groups and authorities to ensure that transmission facilities are marked on aviation maps and that pilots, both commercial and recreational, are aware of their locations.

PSU-2 – Law Enforcement and Emergency Management Coordination: Contact local law enforcement and emergency management departments to identify and address potential issues.

Vis-1 – Route Planning: Carefully select routes that minimize visual and ecological disruption. Route lines parallel to the contour line of slopes, where possible, and limit siting facilities to the following:

- On visually prominent ridgelines
- Near prominent landscape features and landmarks
- In proximity to visually sensitive viewpoints, including National Historic Trails and Sites

Vis-2 – Selection of Finishes: Use dull and/or dark painted surfaces, textured surfaces, and low-reflectivity finishes on transmission facilities. Finishes and colors should be appropriate to their location and context.

Vis-3 – Visual Appeal of ROWs: Create varied, feathered vegetation edges for cleared areas and linear rights-of-way (ROWs) that are sinuous horizontally and layered vertically. Strategically retain or plant native vegetation within the ROW where practicable in visually sensitive areas.

Vis-4 – Underground Construction: Use underground construction methods in areas with high scenic quality and/or open rural areas, depending on geologic conditions.

Vis-5 – Visual Screening: Use techniques such as berms, fencing, or vegetative screening to conceal or improve the appearance of distribution substations, above-ground vaults, and other facilities.

Vis-6 – Visual Impact Assessment: Conduct a visual impact assessment during project planning that defines the project’s viewshed and identifies an assessment zone large enough to capture all non-negligible visual impacts.

Vis-7 – Span Length: Maximize the span length when using overhead lines crossing highways and other linear viewing locations.

Noise-3 – Use of Operational Noise Mitigation: Provide vendor-supplied noise mitigation or acoustic barriers for substation transformers and equipment located near noise sensitive areas.

Noise-5 – Noise Assessment: Prepare a noise assessment that includes measuring existing baseline noise environments, predicting future noise levels from either construction and/or operation and maintenance, and evaluating the potential impacts on surrounding sensitive noise receptors.

SE-1 – Communication Plan: Prepare a communication plan that includes a mechanism for handling complaints.

3.14.5 Probable Significant Adverse Environmental Impacts

Determining the significance of an impact involves consideration of context and intensity, which, in turn, depend on the magnitude and duration of the impact. “Significant” in the Washington State Environmental Policy Act means a reasonable likelihood of more than a moderate adverse impact on environmental quality. An impact may also be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred (Washington Administrative Code 197-11-794).

Identification of environmental impacts and assignment of discipline-specific ratings is based on professional judgment and information available at the time of writing. A precautionary approach has been taken for the assessment where information is currently unknown or unavailable.

This Draft Programmatic EIS weighs the impacts on recreation resources that could result from transmission facilities after considering the application of laws and regulations; siting and design considerations, including agency guidance and BMPs; and mitigation and makes a resulting determination of significance for each impact. **Table 3.14-5** summarizes the impacts anticipated for the construction, operation and maintenance, and upgrade or modification of transmission facilities.

Table 3.14-5: Summary of Impacts, Mitigation Measures, and Significance Rating for Recreation

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Recreation – Temporary Closure or Restricted Access	Construction	Construction activities often require temporary closure of recreational areas, trails, and facilities to ensure safety and allow for the completion of work. Temporary closures of recreational sites and facilities would have short-term adverse effects on users who rely on consistent public access to remote, exceptional, or frequently used recreational destinations.	**Overhead:** negligible to moderate **Underground:** low to moderate	▪ **AVOID-18:** Exceptional Recreation Assets ▪ **AVOID-19:** Wilderness Areas ▪ **AVOID-20:** Limit Closure of Recreation Resources ▪ **Rec-1:** Stakeholder and Agency Coordination ▪ **Rec-2:** Public Notification of Temporary Closure ▪ **Rec-3:** Trail Detours ▪ **Rec-4:** Informational Signage and Precautionary Safety Measures ▪ **Rec-5:** Notice to Air Missions ▪ **SE-1:** Communication Plan	Less than Significant	By carefully planning, coordinating, and managing the phases of a transmission facility project, the impacts on recreation can be avoided or minimized.
	Operation and Maintenance	Similar to the construction phase, operation and maintenance activities may require temporary closure or temporarily restrict access to recreational facilities. Underground cables are generally harder to access than aboveground cables and can take longer to pinpoint damaged areas, leading to prolonged maintenance time and potential closures.	**Overhead:** nil to low **Underground:** nil to low			
	Upgrade or Modification	Similar to the construction phase, upgrade or modification activities may require temporary closure of recreational areas, trails, and facilities to ensure safety and allow for the completion of work. Temporary closures of recreational sites and facilities would have short-term adverse effects on users who rely on consistent public access to remote, exceptional, or frequently used recreational destinations.	**Overhead:** negligible to moderate **Underground:** low to moderate			
Recreation – Permanent Closure	Construction	Construction activities could result in permanent closures of recreational spaces if they are no longer deemed viable for public use or if continued access would compromise public safety or environmental integrity. Permanent closure would have a long-term adverse effect on recreational facilities and users by restricting access to public land or areas with a long history of recreational use.	**Overhead:** negligible to high **Underground:** negligible to high	▪ **AVOID-13:** Land Use and Zoning Incompatibility and Conflicts ▪ **AVOID-18:** Exceptional Recreation Assets ▪ **AVOID-19:** Wilderness Areas ▪ **AVOID-20:** Limit Closure of Recreation Resources ▪ **Rec-1:** Stakeholder and Agency Coordination ▪ **Rec-2:** Public Notification of Temporary Closure ▪ **Rec-3:** Trail Detours ▪ **Rec-4:** Informational Signage and Precautionary Safety Measures ▪ **Rec-5:** Notice to Air Missions	Less than Significant	Strict safety regulations ensure the safe installation of transmission facilities. Through compliance with these regulations, along with careful planning and coordination. Impacts on recreation can be avoided or minimized.
	Operation and Maintenance	This impact is not anticipated to occur during operation and maintenance of transmission facilities.	**Overhead:** N/A **Underground:** N/A			
	Upgrade or Modification	Upgrade or modification activities could result in permanent closures of recreational spaces if they are no longer deemed viable for public use or if continued access would compromise public safety or environmental integrity. Permanent closure would have a long-term adverse effect on recreational facilities and users by restricting access to public land or areas with a long history of recreational use.	**Overhead:** negligible to high **Underground:** negligible to high			
Recreation – Increase in Use	Construction	Construction activities in recreational areas can lead to restricted access and change in integrity, which may increase user frequency at nearby, unaffected recreational facilities. Increased visitation can strain these recreational areas and lead to environmental degradation and costly maintenance.	**Overhead:** nil to low **Underground:** nil to low	▪ **AVOID-13:** Land Use and Zoning Incompatibility and Conflicts ▪ **AVOID-18:** Exceptional Recreation Assets ▪ **AVOID-19:** Wilderness Areas	Less than Significant	By carefully planning, coordinating, and managing the phases of a transmission facility project, the impacts on recreation can be avoided or minimized.

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[a]	Significance after Applying Mitigation	Rationale for Significance Rating
	Operations and Maintenance	This impact is not anticipated to occur during operation and maintenance of transmission facilities.	**Overhead:** N/A **Underground:** N/A	▪ **Rec-1:** Stakeholder and Agency Coordination ▪ **Rec-4:** Informational Signage and Precautionary Safety Measures		
	Upgrade or Modification	Upgrade or modification activities in recreational areas can lead to restricted access and change in integrity, which may increase user frequency at nearby recreational facilities. Increased visitation can strain these recreational areas and lead to environmental degradation and costly maintenance.	**Overhead:** nil to low **Underground:** nil to low			
Recreation – Change in Integrity	Construction	Construction activities can disturb vegetation and soils prone to erosion, decrease water quality, alter the existing visual landscape, and create disturbances from noise and vibration. These actions could temporarily impact the environmental and natural landscape of a recreational facility, possibly leading to a change in integrity and decreased usage.	**Overhead:** nil to moderate **Underground:** low to moderate	▪ **AVOID-2:** Wetland Disturbance ▪ **AVOID-3:** Sensitive Water Features ▪ **AVOID-6:** Old-Growth and Mature Forests ▪ **AVOID-13:** Land Use and Zoning Incompatibility and Conflicts ▪ **AVOID-17:** Night Sky ▪ **AVOID-18:** Exceptional Recreation Assets ▪ **AVOID-19:** Wilderness Areas ▪ **AVOID-20:** Limit Closure of Recreation Resources ▪ **Rec-1:** Stakeholder and Agency Coordination ▪ **Rec-2:** Public Notification of Temporary Closure ▪ **Rec-3:** Trail Detours ▪ **Rec-4:** Informational Signage and Precautionary Safety Measures ▪ **Rec-5:** Notice to Air Missions ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Geo-8:** Minimize Impacts on Sensitive Soils ▪ **W-2:** Clear Spanning or Trenchless Methods for Water ▪ **W-4:** Store Chemicals, Operate Equipment, and Conduct Maintenance away from Water ▪ **W-5:** Implement Erosion and Sediment Control Measures ▪ **W-6:** Minimize Hydrology Changes ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas ▪ **Veg-6:** Revegetation Plan	Less than Significant	Mitigation strategies often include careful planning to avoid sensitive areas, or areas more susceptible to visual or environmental changes. Using less intrusive constructive methods and restoring affected areas after construction is completed help to avoid and alleviate long-term impacts.
	Operation and Maintenance	As permanent installations, overhead transmission facilities can change the visual landscape of recreational areas and alter recreational integrity. Vegetation management efforts, vehicles and access roads, as well as noisy repair activities can alter area aesthetics, particularly in undisturbed, natural areas, leading to a change in integrity. Underground transmission facilities may change the integrity of recreational areas through vegetation clearing, vehicles and access roads and noisy repair activities.	**Overhead:** nil to moderate **Underground:** nil to moderate			
	Upgrade or Modification	Operation and maintenance activities can disturb vegetation and soils prone to erosion, decrease water quality, alter the existing visual landscape, and create disturbances from noise and vibration. These actions could temporarily impact the environmental and natural landscape of a recreational facility, possibly leading to a change in integrity and decreased usage.	**Overhead:** nil to moderate **Underground:** low to moderate			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[a]	Significance after Applying Mitigation	Rationale for Significance Rating
				▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines ▪ **Hab-4:** Decommission Nonpermanent Roads ▪ **Hab-9:** Retain Wildlife Trees where Practicable ▪ **Fish-13:** Reduce Number of Stream Crossings ▪ **Fish-14:** Use Bioengineering ▪ **Vis-1:** Route Planning ▪ **Vis-2:** Selection of Finishes ▪ **Vis-3:** Visual Appeal of ROWs ▪ **Vis-4:** Underground Construction ▪ **Vis-5:** Visual Screening ▪ **Vis-6:** Visual Impact Assessment ▪ **Vis-7:** Span Length ▪ **Noise-3:** Use of Operational Noise Mitigation ▪ **Noise-5:** Noise Assessment ▪ **SE-1:** Communication Plan		
Recreation – Increased Risk of Wildfire	Construction	Wildfires can directly impact recreation through destruction of recreational areas and infrastructure, as well as indirectly impact users through decreased air quality in affected areas. Wildfires can alter the landscape of recreational areas, directly impact user safety, lead to temporary or permanent closures of recreational sites and increase maintenance needs.	**Overhead:** negligible to high **Underground:** negligible to high	▪ **AVOID-6:** Old-Growth and Mature Forests ▪ **AVOID-13:** Land Use and Zoning Incompatibility and Conflicts ▪ **AVOID-18:** Exceptional Recreation Assets ▪ **AVOID-19:** Wilderness Areas ▪ **H&S-1:** Fire Mitigation Plan ▪ **PSU-2:** Law Enforcement and Emergency Management Coordination	Less than Significant	Strict regulatory requirements and standard practices ensure the safe design, installation and operation of transmission facilities. Through compliance with these measures, as well as careful planning and emergency management coordination, impacts on recreation can be avoided or minimized.
	Operation and Maintenance	Wildfires can directly impact recreation through destruction of recreational areas and infrastructure, as well as indirectly impact users through decreased air quality in affected areas. Wildfires can alter the landscape of recreational areas, directly impact user safety, lead to temporary or permanent closures of recreational sites and increase maintenance needs. This impact is not anticipated to occur during operation and maintenance of underground transmission facilities.	**Overhead:** negligible to high **Underground:** N/A			
	Upgrade or Modification	Wildfires can directly impact recreation through destruction of recreational areas and infrastructure, as well as indirectly impact users through decreased air quality in affected areas. Wildfires can alter the landscape of recreational areas, directly impact user safety, lead to temporary or permanent closures of recreational sites, and increase maintenance needs,	**Overhead:** negligible to high **Underground:** negligible to high			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Recreation – Physical Hazard to Aerial Recreation Enthusiasts	Construction	This impact is not anticipated to occur during construction of transmission facilities.	**Overhead:** N/A **Underground:** N/A	▪ **AVOID-13:** Land Use and Zoning Incompatibility and Conflicts ▪ **AVOID-18:** Exceptional Recreation Assets ▪ **AVOID-19:** Wilderness Areas ▪ **Rec-1:** Stakeholder and Agency Coordination ▪ **Rec-5:** Notice to Air Missions ▪ **Vis-4:** Underground Construction ▪ **PSU-2:** Law Enforcement and Emergency Management Coordination ▪ **Hab-3:** Minimize Transmission Line Crossings at Canyons and Riparian Habitat and Parallel to Rivers and Ridge Lines	Less than Significant	Careful design and siting of transmission facilities can help minimize their impact on popular aerial recreation users. Informing the public and recreational users about the locations of transmission lines can help mitigate safety risks.
	Operation and Maintenance	Overhead transmission lines are a hazard to low-flying aircraft and helicopters, paragliders, hang gliders, and skydivers. This impact is not anticipated to occur during operation and maintenance of underground transmission facilities.	**Overhead:** nil to low **Underground:** N/A			
	Upgrade or Modification	This impact is not anticipated to occur during upgrade or modification of transmission facilities.	**Overhead:** N/A **Underground:** N/A			

(a) Appendix 3.9-1 provides a detailed listing of each general condition, avoidance criteria, and mitigation measure. Having these details in an appendix serves as a comprehensive reference section that can be consulted independently of the main text. This is particularly useful for detailed guidance and technical specifications that may be referred to multiple times. Additionally, including this information in an appendix allows for easier updates and revisions. If mitigation measures or guidelines change, the appendix can be updated without altering the main content.

BMP = best management practice; EMF = electromagnetic fields; N/A = not applicable; O&M = operation and maintenance; ROW = right-of-way

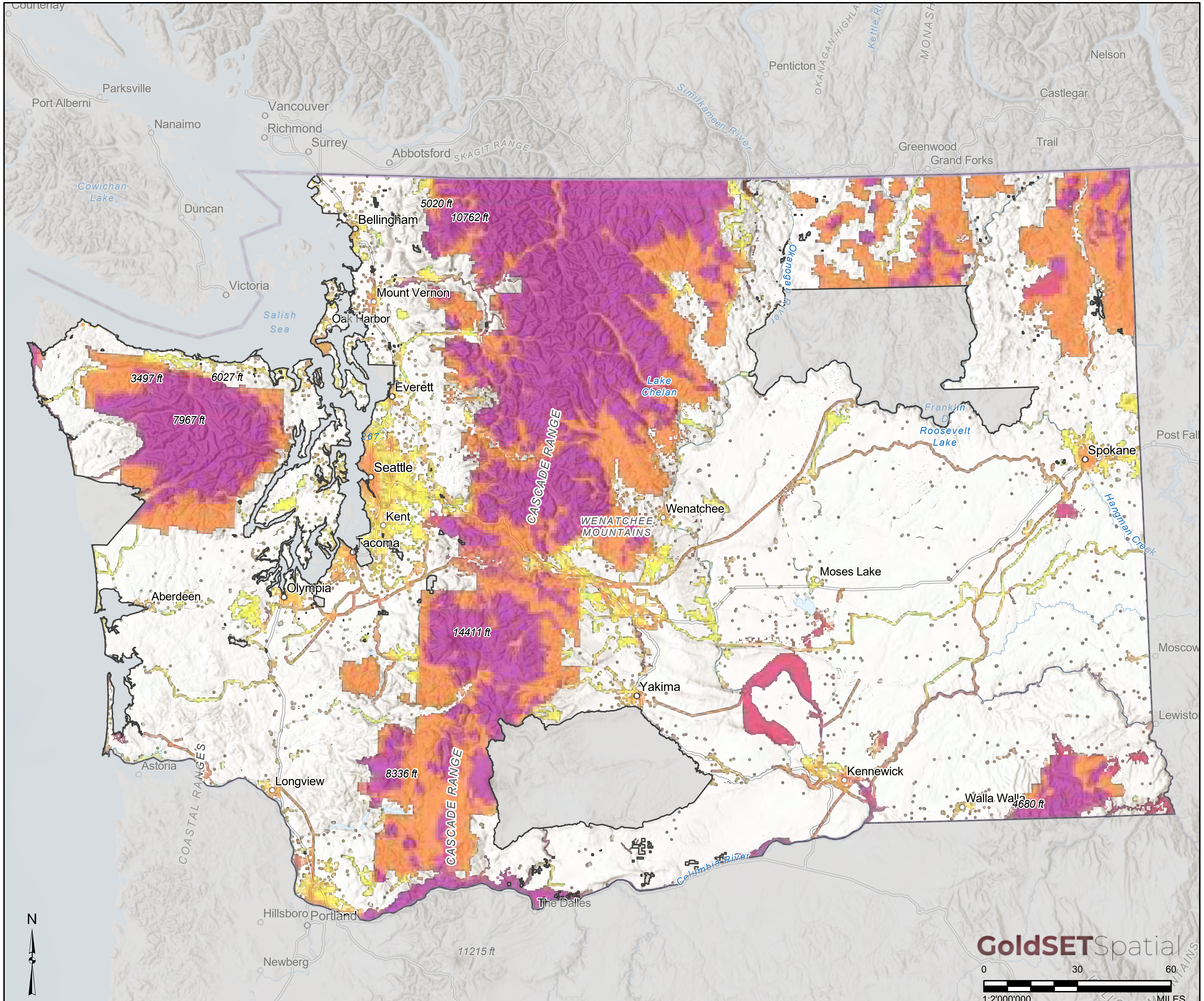
3.14.6 Suitability Map

Project-specific reviews would include a comprehensive review and analysis to identify the site-specific adverse impacts on resources to determine the suitability of this Draft Programmatic EIS. Environmental review may be phased by incorporating relevant information from this Draft Programmatic EIS by reference while evaluating site-specific adverse impacts of the individual project applications. For more information on phased reviews, please refer to Chapter 1, Introduction.

Project-specific applications would include details about the precise location and site-specific conditions. This Draft Programmatic EIS provides a suitability map that, when incorporated with project-specific applications, could be used to facilitate more informative and efficient environmental planning.

Figure 3.14-3 represents the suitability map for recreation and identifies the appropriateness of areas using applicable laws and regulations, criteria specific to the siting of transmission facilities, and knowledge from subject matter experts.

This Page Intentionally Left Blank



LEGEND

Study Area

Conflict Indicator Key

- Neutral
- Low
- Low-Medium
- Medium
- Medium-High
- High
- Very High

EFSEC
Energy Facility Site Evaluation Council

THE SEAL OF THE STATE OF WASHINGTON 1889

REFERENCES AND NOTES

1. ESRI, CGIAR, USGS; WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS
2. THE CONFLICT INDICATOR KEY CAN BE USED TO IDENTIFY AND HIGHLIGHT AREAS WHERE DIFFERENT PROJECT CONSTRAINTS MAY OVERLAP, POTENTIALLY LEADING TO CONFLICTS. THE KEY USES DIFFERENT COLORS TO REPRESENT THE INTENSITY OR LIKELIHOOD OF CONFLICT.

PROJECT

DRAFT PROGRAMMATIC EIS HIGH-VOLTAGE TRANSMISSION

TITLE

SUITABILITY MAP FOR RECREATION

YYYY-MM-DD 2024-12-18 | CONSULTANT wsp | FIGURE 3.14-3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

This Page Intentionally Left Blank

3.14.6.1 Suitability Map Methodology

The suitability map evaluates various criteria and assigns a suitability score to different areas based on how well those areas meet the desired conditions.

A number of individual siting decision criteria, referred to as indicators in GoldSET, were identified by subject matter experts for inclusion in this resource's suitability map. Subject matter experts assigned a weighting based on the degree of constraint (i.e., high, medium or low), or potential difficulty for a transmission facility to traverse an area. Each of the GoldSET Indicator cards describing the criteria chosen and the source of the data layers used are provided in **Appendix 3.14-1.**

A summary of the criteria used to produce each GoldSET card is provided below.

Recreation GoldSET Card – Low Conflict – State and Local Parks and Recreational Facilities

State park and recreation properties include marine parks, heritage sites, historic parks, interpretive centers, retreat centers, ocean beaches, trails, boating areas, and winter recreation areas. Recreational facilities include parks, playgrounds, gymnasiums, swimming pools, beaches, stadiums, golf courses, racetracks, coliseums, campgrounds, boat ramps, hunting and fishing areas, arboretums, paths, and community centers.

Note that a 0.5-mile buffer around recreational facilities was provided in the database.

Recreation GoldSET Card – Medium Conflict – National Parks and Recreational Facilities

Indirect impacts, including decreased visual and aesthetic quality and increased levels of disturbance, including noise and vibration, may alter the quality of recreation sites. Impacts may discourage users away from affected recreation areas. Recreational facilities identified on this GoldSET card include national parks, national historic landmarks, sites listed on the National Register of Historic Places, and national forests.

Note that a 0.5-mile buffer around sites listed on the National Register of Historic Places facilities was provided in the database.

Recreation GoldSET Card – High Conflict – Wilderness Areas

The Wilderness Act of 1964 mandates the preservation of the natural conditions of designated Wilderness Areas. Transmission facilities in these areas would violate the principles of this act. Transmission facilities could have an adverse permanent impact on the environment and the people recreating in areas of undisturbed wilderness, including on mountains, in forests, near water, and within deserts and arid landscapes.

This Page Intentionally Left Blank

3.15 Historic and Cultural Resources

This Draft Programmatic Environmental Impact Statement (EIS) considers impacts on historic and cultural resources resulting from the types of facilities described in Chapter 2. This section addresses the following topics related to the construction, operation and maintenance, and upgrade or modification of high-voltage electric transmission facilities (transmission facilities) in the State of Washington:

- Section 3.15.1 identifies regulatory, siting, and design considerations.
- Section 3.15.2 describes the affected environment.
- Section 3.15.3 describes impacts.
- Section 3.15.4 describes potential mitigation measures.
- Section 3.15.5 identifies probable significant adverse environmental impacts on historic and cultural resources.
- Section 3.15.6 provides a suitability map and scoring for the siting of transmission facilities as it relates to historic resources, based on the identified considerations, impacts, and mitigation measures.

3.15.1 Regulatory, Siting, and Design Considerations

As part of the Programmatic EIS process, the Washington Energy Facility Site Evaluation Commission (EFSEC) has a responsibility to offer early and meaningful consultation with consulting parties, such as the Washington State Department of Archaeology and Historic Preservation (DAHP), and government-to-government consultation with affected Tribes in Washington. The goal of consultation is to identify and mitigate probable, significant adverse effects on historic properties, cultural resources, and Tribal resources. As required under Revised Code of Washington (RCW) 43.21C.405, EFSEC must prepare a nonproject environmental review of transmission facilities and provide opportunities for engagement of Tribes that elect to participate in the process.

This Draft Programmatic EIS establishes a broad framework for compliance, outlining general laws, regulations, best management practices (BMPs), and design considerations. It is assumed that project-specific applications will be developed within this pre-established regulatory context and are expected to comply with existing laws and regulations. If the project does not comply with applicable laws and regulations or fails to adhere to design considerations or BMPs, additional project-specific environmental review and mitigation would be required. The applicable federal and state laws and regulations relevant to historic and cultural resources are summarized in **Table 3.15-1**.

Table 3.15-1: Laws and Regulations for Historic and Cultural Resources

Applicable Legislation	Agency	Summary
54 USC §306108 - Section 106 of National Historic Preservation Act	Federal agencies	Section 106 of the NHPA requires federal agencies to identify the effects of proposed federal undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places. See 36 CFR § 800.16(y) for a definition of a federal “undertaking” and 36 CFR § 800.1 for the applicability of the regulation. This act also requires that federal agencies consult with federally recognized Indian Tribes that attach traditional religious and cultural

Applicable Legislation	Agency	Summary
		significance to eligible or listed historic properties that may be affected by the agency's actions.
42 USC §4321 et seq. - National Environmental Policy Act	Federal agencies	This act requires agencies to prepare a "detailed statement" explaining the environmental impacts of any "major federal action significantly affecting the quality of the human environment," including impacts on historic, cultural, and scientific resources.
16 USC §§431-433 - Antiquities Act of 1906	Federal agencies	This act prohibits unpermitted excavation or destruction of "objects of antiquity." In addition, it requires permission to conduct archaeological investigations and remove objects from federal lands from the applicable federal agency with jurisdiction over the federal property (an antiquities permit).
25 USC Chapter 32 - Native American Graves Protection and Repatriation Act	Federal agencies	Since 1990, federal law has provided for the protection and return of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony. Updates to the Native American Graves Protection and Repatriation Act were finalized in early 2024 to require that protocols must be followed in the event of inadvertent discovery of cultural materials and human remains on federal lands during any ground-disturbing work.
16 USC Chapter 1B - Archaeological Resources Protection Act	Federal agencies	This act provides for the protection of archaeological resources[309] on federal and Native American lands. It prohibits the excavation, removal, damage, or alteration of such resources without a proper permit, as well as the sale, purchase, exchange, transport, or receipt of such resources if excavated or removed from lands in violation of this act or any other federal, state, or local law.
Executive Order 13007, Indian Sacred Sites	Federal agencies	In 1996, under Executive Order 13007, Indian Sacred Sites, the President ordered the protection and preservation of Native American sacred sites located on federal lands, as well as the accommodation of access to and use of these sites by Tribes facilitated by federal agencies.
Washington State Environmental Policy Act	Washington Energy Facility Site Evaluation Council Washington State Department of Ecology Local governments	This act is a process that identifies and analyzes environmental impacts that can be related to issuing permits. SEPA helps permit applicants and decision-makers understand how a proposed project will impact the environment. Certain projects, as defined in the SEPA Rules (WAC 197-11-704) and that are not exempt, are required to go through the SEPA process.
State of Washington Executive Order 21-02, Archaeological and Cultural Resources	State agencies[(a)]	This executive order requires agencies to consult with DAHP and affected Tribes on the potential effects of projects on cultural resources proposed in state-funded construction or acquisition projects that will not undergo Section 106 review under the NHPA. Agencies must also take all reasonable action to avoid, minimize, or mitigate adverse effects on cultural resources.

309 Material remains of human activities that can provide information on the behavioral traits and environmental and cultural adaptations of a people.

Applicable Legislation	Agency	Summary
RCW 27.44, Indian Graves and Records	DAHP[(a)]	This regulation provides for the protection of Indian burial sites, cairns,[310] glyptic[311] markings, and historic graves in Washington and requires that proper permits be acquired from DAHP ahead of the removal of archaeological material from such sites.
RCW 27.53, Archaeological Sites and Resources	DAHP[(a)]	Archaeological sites are protected in Washington State under RCW 27.44 and 27.53. This regulation makes it illegal to knowingly alter, disturb, or remove an archaeological site without the proper permits from DAHP.
RCW 68.60, Abandoned and Historic Cemeteries and Historic Graves	DAHP[(a)]	This regulation provides for the protection of abandoned cemeteries and historic graves in Washington and allows DAHP to grant authority to maintain and protect such resources to state or local government agencies, or preservation organizations. The regulation also prohibits the unlawful destruction or alteration of any component of a cemetery or historic grave.

Note:
(a) The agency responsible for administering most permits or authorizations for the identified regulation. However, if EFSEC is determined to be the agency responsible for approving a proposal, EFSEC can administer several types of permits at the state and local level. EFSEC provides a streamlined process for siting and licensing major energy facilities, including transmission facilities in Washington State. EFSEC coordinates all evaluation and licensing steps, specifies the conditions for construction and operation, and issues a Site Certification Agreement, which assumes the responsibility for issuing individual state or local permits. By consolidating these permits into a single Site Certification Agreement, EFSEC can simplify the regulatory process for energy facility developers. While EFSEC itself does not directly administer federal permits, it works closely with federal agencies to ensure that all necessary federal requirements are met during the evaluation and licensing of energy facilities.
CFR = Code of Federal Regulations; DAHP = Washington State Department of Archaeology and Historic Preservation; NHPA = National Historic Preservation Act; RCW = Revised Code of Washington; SEPA = State Environmental Policy Act; USC = United States Code; WAC = Washington Administrative Code

If federal funding, licensure, permitting, or approval will be required for a project-specific application, applicants must comply with Section 106 of National Historic Preservation Act (Section 106) (54 United States Code [USC] § 306108). Section 106 mandates that the Washington State Environmental Policy Act (SEPA) Lead Agency “prior to the approval of the expenditure of any Federal funds on the undertaking…take into account the effect of the undertaking on any historic property”. A historic property is defined as any “district, site, building, structure, or object that is included in or eligible for inclusion in the National Register” (36 Code of Federal Regulations [CFR] 800). **Figure 3.15-1** illustrates the four steps of the Section 106 process, the first of which is to initiate the process (36 CFR Part 800.3).

310 A human-made pile or stack of stones, often constructed for various purposes such as marking a trail, serving as a memorial, or designating a burial site.

311 Refers to the art or process of carving or engraving, especially on gems or precious stones.

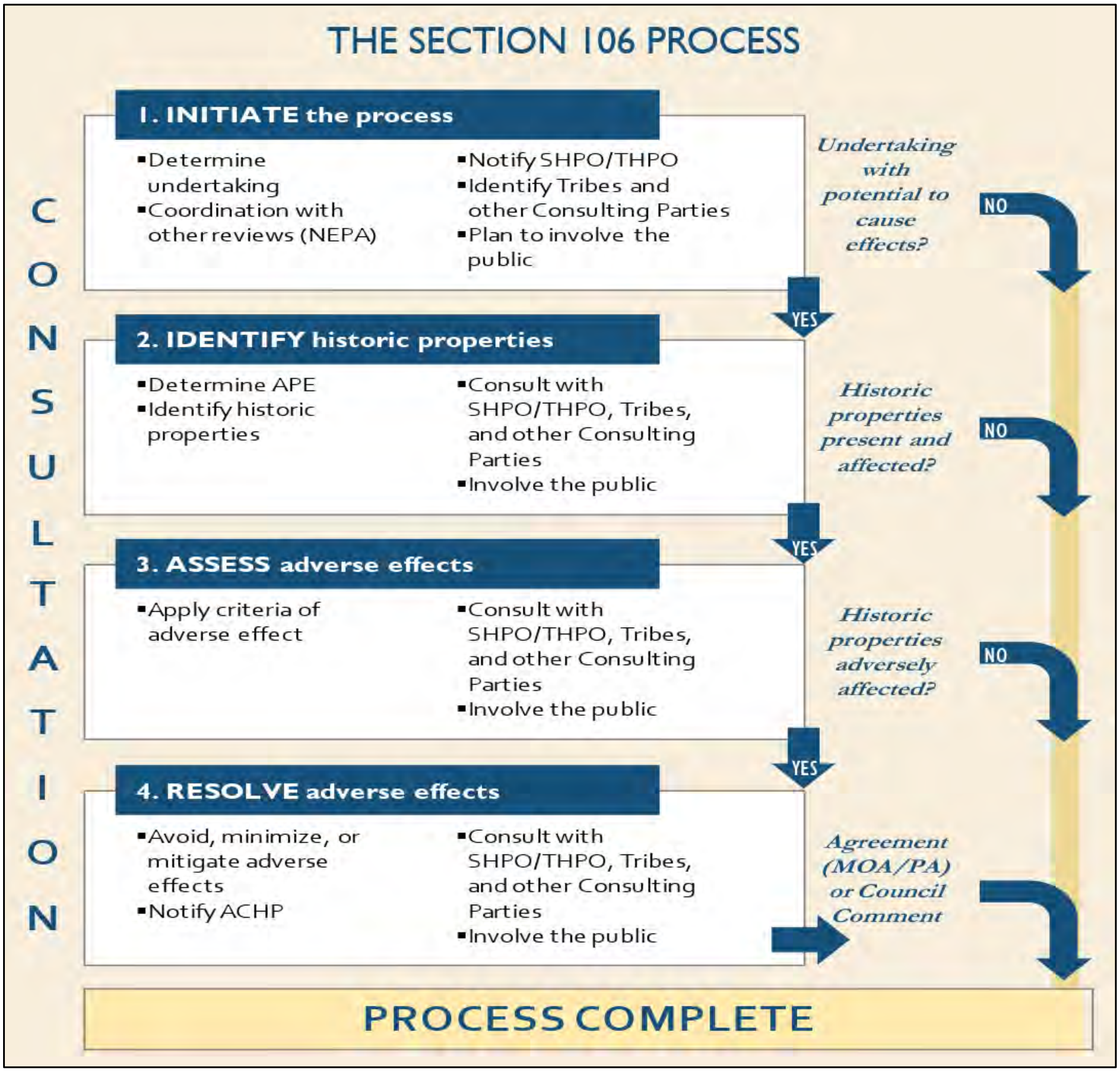


Figure 3.15-1: Steps of the Section 106 Process
Source: CEQ and ACHP 2013
MOA = Memorandum of Agreement;[312] PA = Programmatic Agreement;[313] SHPO = State Historic Preservation Office; THPO = Tribal Historic Preservation Office

[312] A formal document that outlines the specific responsibilities and actions each party will take to achieve a shared goal.

[313] A legal document that outlines how federal agencies will comply with Section 106 of the National Historic Preservation Act (NHPA). This section requires federal agencies to consider the effects of their undertakings on historic properties and to consult with various stakeholders, including State Historic Preservation Officers (SHPOs), Tribal Historic Preservation Officers (THPOs), and the Advisory Council on Historic Preservation (ACHP).

After initiating the Section 106 process, the next step is to identify historic properties (36 CFR Part 800.4). Historic and cultural resources that meet the eligibility criteria for listing on the National Register of Historic Places (NRHP) are termed "historic properties" under the National Historic Preservation Act (NHPA). This step in the process involves several key steps, including determining the area of potential effect (APE); consulting with State Historic Preservation Officers/Tribal Historic Preservation Officers, Tribes, and other consulting parties; and conducting archaeological and architectural surveys to identify historic properties within the APE. Types of historic properties defined in **Table 3.15-2** can be eligible for inclusion in the NRHP under the four criteria listed in **Table 3.15-3**. Each type of property depends on certain aspects of integrity more than others to evaluate its historic significance. Determining which aspect of integrity is most important to a particular property requires an understanding of the property's significance and its essential physical features.

Completion of the identification of historic properties step in the Section 106 process results in one of three findings: a finding of no historic properties affected, a finding of no adverse effects, or a finding of adverse effect (36 CFR Part 800.4(d); 36 CFR Part 800.5). A finding of no historic properties affected is made when no historic properties are present in an APE or when historic properties are present, but the undertaking will have no effect on these properties. A finding of "no adverse effect" is made when historic properties are present but the undertaking is modified, or conditions are imposed to avoid adverse effects. As defined in 36 CFR Part 800.16(i), an "effect" is an alteration to the characteristics of a historic property that qualify it for inclusion in or eligibility for inclusion in the NRHP.

Table 3.15-2: Definition of Historic Property Types

Property Type	Definition
District	*A district is a geographically definable area, urban or rural, possessing a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united by past events or aesthetically by plan or physical development. A district may also comprise individual elements separated geographically but linked by association or history.*
Site	*A site is the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself maintains historical or archeological value regardless of the value of any existing structure.*
Building	*A building is a structure created to shelter any form of human activity, such as a house, barn, church, hotel, or similar structure. Building may refer to a historically related complex such as a courthouse and jail or a house and barn.*
Structure	*A structure is a work made up of interdependent and interrelated parts in a definite pattern of organization. Constructed by man, it is often an engineering project large in scale.*
Object	*An object is a material thing of functional, aesthetic, cultural, historical or scientific value that may be, by nature or design, movable yet related to a specific setting or environment.*

Source: 36 CFR 60.3

Table 3.15-3: National Register of Historic Places Criteria and Relevant Aspects of Integrity

NRHP Criterion	Definition	Aspects of Integrity
A	Properties associated with events that have made a significant contribution to the broad patterns of U.S. history.	A property eligible under Criteria A and B ideally would retain some features of all seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association. Integrity of design and workmanship, however, are not as important as the other integrity factors in determining a property's significance, and are not relevant if the property is a site. A basic integrity test for a property associated with an important event or person is whether a historical contemporary would recognize the property as it exists today.
B	Properties associated with the lives of persons significant in U.S. history.	
C	Properties that embody the distinctive characteristics of a type, period, or method of construction; that represent the work of a master; that possess high artistic values; or that represent a significant and distinguishable entity whose components may lack individual distinction.	A property determined to be significant under Criterion C must retain the physical features that characterize the type, period, or method of construction that the property represents. Retention of integrity of design, workmanship, and materials is usually considered more important than location, setting, feeling, or association. Location and setting are important, however, for properties whose design is a reflection of their immediate environment (such as designed landscapes and bridges).
D	Properties that have yielded, or may be likely to yield, information important in prehistory[314] or history.	For properties eligible under Criterion D, setting and feeling may not have direct bearing on the property's ability to yield important information. Evaluation of integrity typically focuses primarily on the location, design, materials, and workmanship.

Source: 36 CFR 60.4
NRHP = National Register of Historic Places

Historic properties, which include districts, sites, buildings, structures, and objects, can be adversely affected by transmission facility projects if the project "may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association" (36 CFR 800.5). Examples of the types of adverse effects most commonly associated with transmission facility projects include the following, listed in 36 CFR 800.5:

- "Physical destruction of or damage to all or part of the property" (including archaeological sites)
- "Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance"

[314] Refers to the period of human history before the invention of writing systems and recorded history. This era encompasses the time from the earliest known use of stone tools by hominins, around 3.3 million years ago, up to the advent of writing, which occurred at different times in different parts of the world.

- "Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features"

Other, less common ways that transmission facility projects can adversely affect historic properties include the following, listed in 36 CFR 800.5:

- "Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR 68) and applicable guidelines"
- "Removal of the property from its historic location"
- "Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization"
- "Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance"

A finding of adverse effects requires resolution of the adverse effects via the development and implementation of a memorandum of agreement among participants in the Section 106 process. The parties agree on the appropriate treatment and mitigation measures per 36 CFR 800.6(c).

The siting of transmission facilities is determined by engineering, technical, environmental, and socioeconomic factors. **Table 3.15-4** summarizes guidance documents and management plans that outline the design considerations and BMPs generally used to avoid or minimize impacts on historic and cultural resources.

Table 3.15-4: Siting and Design Considerations for Historic and Cultural Resources

Siting and Design Consideration	Description
Transmission Corridors Work Group Final Report (EFSEC 2022)	The TCWG emphasizes the importance of protecting historic and cultural resources. Their final report highlights several key points: ▪ Collaboration with Tribes ▪ Environmental review[a] ▪ Best practices
American Planning Association Policy Guide on Historic and Cultural Resources (APA 1997)	This guide by the APA provides comprehensive policies and best management practices for integrating historic and cultural resource considerations into planning and development projects.
Recommended Siting Practices for Electric Transmission Developers (Americans for a Clean Energy Grid 2023)	This document outlines best practices for siting electric transmission facilities. Recommended practices include: ▪ Early and transparent engagement ▪ Respect and fair dealing ▪ Environmental considerations ▪ Interagency coordination ▪ Use of existing infrastructure

Notes:
[a] Applicants must coordinate with DAHP to protect information that is privileged or confidential under Tribal laws.
APA = American Planning Association; DAHP = Washington State Department of Archaeology and Historic Preservation; EFSEC = Washington Energy Facility Site Evaluation Council; TCWG = Transmission Corridors Work Group

3.15.2 Affected Environment

The types of historic and cultural resources listed or eligible for listing on the NRHP in the Study Area for this Draft Programmatic EIS may include sites, districts, buildings, structures, and objects that are attributed to a wide range of Washington historic contexts/themes, as summarized in **Table 3.15-5**. A historic context that outlines the prehistory, protohistory,[315] historic period[316] history, and ethnohistoric[317] context across Washington is provided in **Appendix 3.15-1**.

Archaeological sites are roughly divided into two categories: historic sites and precontact sites. Within those two categories, there are several site types that are unique but may have some overlapping qualities. It is important to note that sites may contain both precontact and historic-era cultural materials and may be considered multi-component. **Table 3.15-6** provides a brief overview of the many site types recognized by DAHP; a description of each site type that can be considered eligible for inclusion on the NRHP; and the number of currently recorded sites in each category.

[315] Refers to the period between prehistory and recorded history. During this time, a culture or civilization has not yet developed its own writing system, but other cultures with writing systems have documented their existence.

[316] Refers to the time in human history that begins with the advent of written records. This period follows prehistory, which is characterized by the absence of written documentation. The historic period varies by region, as different cultures developed writing systems at different times.

[317] Refers to the study of cultures and indigenous peoples by examining historical records and other sources of information about their lives and history. This field combines methods from both anthropology and history to understand the customs, social structures, and experiences of various ethnic groups, often focusing on those that may no longer exist.

Table 3.15-5: Historic Resource Types Listed/Eligible for National Register of Historic Places/Washington Heritage Register

Property Type	Description	In Washington	No. of Properties in Washington[a]
Domestic	Domestic properties can include single and multi-family residences, associated outbuildings, hotels, group housing, seasonal residences, and site of habitation.	Like most states, Washington exhibits a wide variety of domestic architectural styles, types, and historic themes; however, some are notable to the Pacific-Northwest: Greek Revival, Carpenter Gothic, Victorian, Craftsman, Tudor Revival, and Northwest Modern styles; houseboats and four-square types; and early settlements and rural development. Excellent examples of these properties can be found in designated historic districts and individual buildings throughout the state. (DAHP 1989, n.d.; Swope 2005)	923
Commercial	Commercial properties can include office buildings; professional services offices; banks; specialty stores, such as retail shops and grocery stores; restaurants; and commercial warehouses.	Typically, significant commercial properties are recorded in downtown areas and highlight periods of early settlement and development and subsequent periods of community planning and expansion. They facilitate a wide variety of uses and are constructed in many styles. In Washington, although less represented individually on the NRHP than domestic properties, they are well represented in historic districts.	253
Government	Government properties can include municipal buildings, public service buildings, capitol buildings, post offices, and courthouses.	Similar to commercial properties, government properties are most often linked to the local area served. Given their use, more government properties are designated individually for significant historic themes, as well as architectural merit, in comparison to commercial properties. Historic fire stations are highlighted among Washington's public buildings in association with firefighting technology in the state. National government themes are also represented in Washington's government buildings, such as border stations and military bases (also see "Defense" property type below). (DAHP n.d.[a])	477
Education	Educational properties can include schools, libraries, research facilities, and other education-related resources such as dormitories or other facilities.	Among the historic educational properties recognized in Washington are a collection of Carnegie Libraries, rural public schools, several community college campuses, and the University of Washington (Garfield and Griffith 1987).	138

Property Type	Description	In Washington	No. of Properties in Washington[(a)]
Religion	Religious properties can include religious facilities, ceremonial sites, and religious schools and residences.	Historic religious properties must meet criteria that recognizes the property significant for its architectural merit or historic themes judged in purely secular terms. In Washington, while most listed religious facilities are architecturally significant, several former mission sites established in the northeastern corner of the state are listed in the state register and significant for religious history.	112
Social/ Entertainment/ Recreational	Social/Entertainment/Recreational properties can include theatres, museums, music facilities, sports facilities, parks, hiking trails, fairgrounds, monuments, and sculptures.	A substantial number of Washington's recreational historic properties are located within National and State Parks and can also be attributed to significant historic landscapes. Social and entertainment properties recorded in Washington include early movie theatres across the state and a limited number of social meeting halls and clubs. (DAHP n.d.[a])	460
Agricultural/ Farmsteads	Agricultural properties can include both individual resources and groupings of resources. Agriculture-related properties can include processing facilities, storage facilities, fields, animal facilities, associated farmhouses, outbuildings, and irrigation systems.	Historic agricultural properties represent a highly significant grouping of property types in the State of Washington as farming was and remains a cornerstone of the state economy. Among the many individual agricultural properties and district farmsteads, some counties and regions are highlighted for containing important examples: Thurston County, Grain production in Eastern Washington, and Dairy Farms in Snoqualmie River Valley (King County). Washington also established a program to specifically recognize barns (see below).	348
Heritage Barns	A "Heritage Barn," as defined by the Washington State Legislature, is "any large agricultural outbuilding used to house animals, crops, or farm equipment, that is over fifty years old and has been determined by the department [DAHP] to be (a) eligible for listing on the [WHR] or [NRHP]; or (b) have been listed on a local historic register and approved by the advisor council" (State of Washington Legislature Substitute House Bill 2115, Chapter 333, Laws of 2007: Heritage Barn Preservation Program) (Artifacts Consulting, Inc. 2008)	The Washington Heritage Barn Register recognizes barns as a symbol of Washington's agricultural heritage and supports owners in the preservation and stabilization of registered barns. While registration is honorary, these historic resources are considered significant to Washingtonians and should be considered during project environmental reviews. (Artifacts Consulting Inc. and Past Forward Northwest Cultural Resources 2011)	700+ (barns on the Washington Heritage Barn Register)

Property Type	Description	In Washington	No. of Properties in Washington[(a)]
Industrial	Industrial properties can include manufacturing facilities, mining facilities, water and energy facilities, communication facilities, processing sites, and storage.	Among the many notable industrial achievements in Washington, hydroelectric power stands out. Owing to the state's mountainous topography and major waterways, innovations and advancements in electrification technology are historically well represented. Properties include the Bonneville Power Administration Pacific Northwest Transmission System and 12 other hydroelectric facilities (Soderberg 1988). Other industrial properties of note in Washington include shipbuilding locations and steel manufacturing facilities.	194
Defense	Defense properties can include armories, fortifications, battlefields, military facilities, and aircraft.	The history of defense in Washington is best represented by the naval facilities established along the shorelines. These include the Puget Sound Naval Shipyard National Historic Landmark District and Jim Creek Radio Station. The Fairchild Airforce Base also characterizes Washington's defense-related built environment.	226
Maritime	Maritime properties can include ships, shipwrecks, lighthouses, and other structures, buildings, and objects related to exploration, commerce, naval defense, recreation, navigation, and community development in association with waterways.	The State of Washington stewards a collection of more than 500 historic maritime properties, nearly 50% of which meet criteria for listing in the NRHP (Artifacts Consulting, Inc. 2011)	219
Transportation-Related	Transportation-related properties can include railroads, airports, waterways, roads, bridges, tunnels, and trails.	The State of Washington is noted for its unique collection of 20th-century bridges—in particular, cantilever truss bridges and the Seattle-area floating pontoon bridges. Tunnels are also some of the most notable transportation-related structures in the state (Soderberg 1982; Bruce et al. 1995). Additionally, more than 90 railroads and rail-related properties have been determined as significant historic resources in the state.	230
Funerary	Funerary properties can include cemeteries, other burial sites, and mortuaries.	Cemeteries dominate the significant historic funerary properties in Washington. Only one funeral home is recognized for the historic registers.	40

Property Type	Description	In Washington	No. of Properties in Washington[(a)]
Landscape	Historic landscapes can include parks, gardens, conservation areas, public square, and natural features.	State and National Parks and Forests are abundant in the state of Washington. They represent historic resources highly characteristic of and unique to the region. Within these landscapes, the history of recreation and conservation (among others) is represented through a variety of property types including hotels/lodges, bathhouses, and depression-era fire lookouts, bridges, trails, camps and administrative buildings (Beckham 1978; DAHP n.d.[a]).	34

Notes:
(a) Numbers are approximate and based on data from DAHP inventories of historic resources and registered properties.
DAHP = Washington State Department of Archaeology and Historic Preservation; NRHP = National Register of Historic Places; WHR = Washington Heritage Register

Table 3.15-6: Potentially National Register of Historic Places-eligible Archaeological Site Types in Washington State

Archaeological Site Types	Description	Number of Recorded Sites in Washington
Historic Bridges	This type includes historic bridges, bridge remnants, bridge footings, and other associated bridge components that are in a state of deterioration and are considered archaeological sites.	364
Historic Rock Cairn/Feature	Historic rock cairns can include stacked rock features, placed rocks, rock walls, rock ovens, rock retaining walls, rock trail markers, and other rock stacks or alignments that may be dated to the historic period.	1,114
Historic Camps	Historic Camps may be campsites with historic debris, camps that are associated with historic events, or camps that are associated with historic groups.	264
Historic Cemetery or Burial	This type includes historic cemeteries and burials that are no longer in use for modern interment or that contain historic burials. Historic Cemeteries or Burials may be individual headstone(s) without evidence of a burial(s).	223
Historic Culturally Modified Trees	Historic Culturally Modified Trees are trees that have been purposefully modified by scarification or by adding cultural objects that can be dated to the historic period. This may include the creation of scars with names associated with early historical figures, dates within the historic period, embedded historic wire, embedded historic nails, and other such historic objects and artifacts.	426
Historic Depression Era Properties	Historic Depression Era Properties include properties associated with the Civilian Conservation Corps (CCC) or the Works Progress Administration (WPA). Both the CCC and WPA were established as part of the New Deal program to address the Great Depression’s impacts on the United States. Buildings in a state of decay, disrepair, or demolition that are considered archaeological and have an association with the CCC and/or WPA would be considered Historic Depression Era Properties.	136

Archaeological Site Types	Description	Number of Recorded Sites in Washington
Historic Districts	Archaeological Historic Districts are districts that contain many historic sites. These may include mining districts, campgrounds, lumber operations, and other site types that might be grouped by associated historical events.	19
Historic Forts	Historic Forts are archaeological sites that are associated with a historic fort.	27
Historic Homestead	Historic Homestead sites contain one or several components of a homestead and may include foundations for homes, outbuildings, fence lines, historic agricultural components, and other indicators of long-term habitation at the site.	1,903
Historic Logging Properties	Historic Logging Properties could include buildings or structures, camps, and other types of archaeological evidence of logging activities.	1,033
Historic Lookouts	Historic lookouts are remnants of lookout structures dating to a historic period.	201
Historic Maritime Properties	Historic Maritime Properties include remnants of maritime-related or fisheries-industry-related buildings, structures, infrastructure, and communications.	140
Historic Military Properties	Historic Military Properties are structures, infrastructure, or other objects related to military activities.	239
Historic Mining Properties	Historic Mining Properties are structures, infrastructure, mines, and other objects related to military activities.	1,965
Historic Petroglyph	Historic Petroglyphs are petroglyphs[318] that have been created within the historic period. These often contain dates and/or names associated with the historic period or historic individuals.	27
Historic Pictograph	Historic Pictographs are pictographs[319] that have been created within the historic period. Some of the recorded historic pictographs do not have clear dates associated and may have ties to the precontact past. Most notable, 45KL00270 is recorded as a historic pictograph site, but descriptions of the site do not associate it with the historic period.	9
Historic Religious Properties	Historic Religious Properties are often churches, graveyards, or other religious built environments. Burial ground utilized by both early foreign settlers and Native Americans have been identified under the Historic Religious Properties category.	100
Historic Schools	Historic Schools are schoolhouses or sites associated with a school that dates to the historic period.	53

[318] Images created by removing part of a rock surface through methods such as incising, picking, carving, or abrading. These rock carvings are a form of rock art and are found worldwide, often associated with prehistoric peoples. Petroglyphs can depict a wide range of subjects, including animals, human figures, symbols, and abstract patterns.

[319] A visual representation that uses images, symbols, or drawings to convey information or data.

Archaeological Site Types	Description	Number of Recorded Sites in Washington
Historic Shell Midden	A shell midden is a collection of shell consumption remnants and a mix of other cultural material that has created a distinct layer in the sediment. A Historic Shell Midden has shell remnants, as well as historic artifacts associated with it.	30
Historic Townsites	Historic Townsites are located where towns were historically occupied but may not contain any current occupants. Notable examples include the Town of Hanford and Hanford Construction Camp (45BN00308).	91
Historic Transmission Lines	This type includes transmission lines that are no longer in use and date to the historic period, or evidence of past transmission lines that have been removed and are only identifiable by artifacts and maps.	43
Precontact Burial	Precontact Burials are known, or suspected burials used by Native Americans since time immemorial. These are one of the most sensitive site types and should be avoided at all costs.	884
Precontact Cairn	Precontact Cairns are stacked rock features that are associated with various activities. They can indicate markers for trails, burial sites, or other activities. They are considered highly sensitive sites as they have been shown to be associated with spiritual or religious activities and burials.	1,910
Precontact Camp	Precontact Camps are areas where intermittent use has been documented. Artifact types commonly associated with precontact camps include lithic debitage,[320] fire cracked rock,[321] projectile points[322] or fragments of projectile points, faunal remains,[323] housepit depressions,[324] beads, and shell midden.	4,393
Precontact Cave Site	Precontact Cave Sites are caves that have evidence of use in the precontact past.	124
Precontact Culturally Modified Trees	Precontact Culturally Modified Trees are trees that have been bent, scarred, peeled, or modified in some manner in the precontact past. These trees were used to mark certain areas or paths, were peeled for their bark for basketry or other crafts, and are present throughout Washington State.	682

[320] Refers to the waste material produced during the process of creating stone tools.

[321] An archaeological term that refers to rock that has been cracked or split as a result of deliberate heating.

[322] A term used in archaeology to describe the pointed end of a weapon that was designed to be thrown or projected, such as a spear, dart, or arrow. These points are typically made from materials like stone, bone, metal, or even glass.

[323] Refer to the physical evidence of animals that have been left in the archaeological record. These remains can include bones, teeth, shells, hair, scales, hides, and even proteins like DNA. They help understand past human-animal interactions and environmental conditions.

[324] Archaeological features that represent the remains of ancient dwellings, typically semi-subterranean houses. These depressions are often circular or oval in shape and are found in various regions around the world, including North America.

Archaeological Site Types	Description	Number of Recorded Sites in Washington
Precontact District	Precontact Districts are archaeological districts where a high density of precontact sites are recorded. Many of these districts are located along the Columbia River and its tributaries. These sites may or may not be connected through use type, chronology, or spatial patterning. This category also records individual sites associated with precontact districts.	26
Precontact Feature	Precontact Features are archaeological features on the landscape that may be grouped together into a single site. This might include a lithic scatter[325] with a fire-cracked rock feature and several cairns that are all spatially associated.	1,194
Precontact Fishing Station	Precontact fishing stations are known locations where fishing activities occurred in the precontact past. Archaeological materials associated with fishing stations include fish traps, fish weirs,[326] camps located at ideal fishing locations, housepit depressions, fishing implements and artifacts, and fish remains. These types of sites can be located along the coast, rivers, and creeks where fish populations could be supported.	113
Precontact Housepit	Precontact Housepits are semisubterranean homes where a circular depression was excavated and had several support poles and a roof over the depression. Housepits can be found throughout the Columbia Plateau region and may occur as an isolated housepit or multiple housepits in one area.	535
Precontact Petroglyphs	Precontact Petroglyphs are petroglyphs that were created in the precontact era. These are sometimes isolated occurrences or are found in association with larger site complexes. They may be found on rocks, columnar basalt,[327] or boulders throughout various areas of Washington.	349
Precontact Pictographs	Precontact Pictographs are pictographs that were created in the precontact era. They are sometimes isolated occurrences or are found in association with larger site complexes. They are found on rocks, columnar basalt, or boulders throughout various areas of Washington.	364
Precontact Rock Alignment	Precontact Rock Alignments are rocks that have been purposefully placed in a line, usually two or more courses high, and do not appear to be associated with any historic use. These rock alignments can be found alone or can be associated with larger archaeological sites or other precontact artifacts.	771
Precontact Rock Shelter	Precontact Rock Shelters are overhangs of rock that would have allowed people to either temporarily camp in these locations or stash supplies.	650

[325] An archaeological term referring to an area where there is a concentration of stone tools and debris from tool-making activities.

[326] A fence, dam, or other enclosure set in a stream or river for capturing fish.

[327] A type of rock that has standing vertical columns.

Archaeological Site Types	Description	Number of Recorded Sites in Washington
Precontact Shell Midden	Precontact Shell Middens are remnants of shell consumption that are concentrated within a discrete area and create a distinct lens in the stratigraphy.[328] On the coast, shell middens also contain charcoal, faunal remains, artifacts, and burials. Shell middens on the coast can range from small, single-consumption events to large features that are visible on the landscape. They are often seen as prominent displays of connection between the people and the land. In the Columbia Plateau, shell middens can range from small, single-consumption events to larger shell middens that have been collected over time. In the plateau we do not see burials in shell middens; however, it is always possible that looting activities and inundation from the dams have erased any evidence of burial practices in shell middens. These are highly sensitive sites that should be avoided at all costs.	2,319
Precontact Talus Pits	Precontact Talus Pits are depressions created in talus slopes that may indicate past activities, including, but not limited to, caching supplies, burials, and hunting blinds. Given their association with burials, avoidance is recommended.	1,288
Precontact Trail	Precontact Trails are trails that were used by indigenous people in the precontact and protohistoric past. These trails may be documented on early ethnographic accounts; however, they have often been used for generations prior to non-indigenous settlers' arrival. Trails may be marked by Culturally Modified Trees, rock alignments, rock features, or other archaeological site types.	42
Precontact Village	Precontact Villages are sites where evidence of larger populations of individuals were living throughout the year or seasonally. On the Columbia Plateau, several housepit depressions, lithic scatters, storage pits, talus pits, suspected burials, cairns, hearth features, and other archaeological features may be associated with villages. On the coast, one or more house depressions, large shell middens, burials, and other archaeological features are often associated with villages. Village sites may be ethnographically documented but have been important places on the landscape for generations.	382

[328] A branch of geology that classifies and interprets rock layers.

3.15.2.1 Historic Resources

As outlined in the previous section, there is a wide range of historic properties that could be physically and visually impacted by transmission facilities in Washington. While it is the responsibility of applicants to identify all historic properties within the APE of an undertaking as part of the Section 106 process, there are certain historic properties that are more likely to have adverse impacts that are unavoidable after standard mitigation, including National Historic Landmarks (NHLs), historic districts, farmsteads, and parks and historic districts within parks. These properties are more likely to have setting and feeling as important aspects of integrity that can be diminished by transmission facility projects in several ways. Construction or disturbance within the historic property boundary can physically impact features that contribute to the significance of a historic property such as trees, landscaping, fences, walls, and gates to name a few. Construction of new overhead and underground facilities within the boundary of a historic property can also be considered a visual intrusion in the immediate setting of a historic property. Construction of these facilities outside the property boundary but within the viewshed of historic properties can result in visual changes that may adversely affect the setting and feeling of a historic property even though these facilities may be far removed from the historic property.

There are also approximately 64 NRHP-eligible transmission facilities in the state that could be impacted if selected by an applicant for upgrade or modification (DAHP n.d.[b]).

All of these properties should be considered during the planning and siting stages of project-specific applications. The properties are presented below in order of most to least likelihood of setting and feeling being critical aspects of a historic property's integrity based on professional knowledge and experience.

National Historic Landmarks

NHLs are designated by the Secretary of the Interior under the authority of the Historic Sites Act of 1935, which authorizes the Secretary to identify historic and archaeological sites, buildings, and objects that "possess exceptional value as commemorating or illustrating the history of the United States." **Table 3.15-7** lists the NHLs in Washington. Section 110(f) of the NHPA requires that the SEPA Lead Agency, to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm to any NHL that may be directly and adversely affected by an undertaking. Special requirements for protecting NHLs as stated in 36 CFR § 800.10 must be followed, including participation of the Advisory Council on Historic Preservation to resolve adverse effects on NHLs. In addition, the SEPA Lead Agency should consider all prudent and feasible alternatives to avoid an adverse effect on an NHL. NHLs should be identified during the planning phase of project-specific applications to avoid constructing overhead and underground transmission facilities within the viewshed and/or boundary of NHLs.

Table 3.15-7: National Historic Landmarks in Washington

County	Landmark
Benton	Hanford B Reactor
Franklin	Marmes Rockshelter
Jefferson	Fort Worden, Port Townsend Historic District
King	*Adventuress* (Schooner); *Arthur Foss* (Tugboat); *Duwamish* (Fireboat); Lightship No. 83 "Relief"; Panama Hotel; Pioneer Building, Pergola, and Totem Pole; Seattle Electric Company, Georgetown Steam Plant; *Virginia V* (Steamboat)
Kitsap	Port Gamble Historic District; Puget Sound Naval Shipyard

County	Landmark
Pacific	Chinook Point
Pierce	*Fireboat No.1*; Fort Nisqually Granary; Longmire Buildings; Mount Rainier National Park; Paradise Inn; Yakima Park Stockade Group
San Juan	American and English Camps, San Juan Island
Skagit	*W. T. Preston* (Snagboat)
Skamania	Bonneville Dam Historic District

Source: NPS 2024

Transmission Facilities

At least 64 transmission facilities in Washington are eligible for or listed in the NRHP (**Table 3.15-8**) (DAHP n.d.[b]). Many of these facilities are associated with the Bonneville Power Administration (BPA), which has its own Cultural Resources Program to address operation and maintenance of historic properties within their transmission infrastructure. Transmission facilities are eligible/listed under a variety of different NRHP criteria. The impacts on this historic resource type should be carefully considered when direct impacts are anticipated, including upgrading of a historic transmission line or co-locating a new transmission facility within the same right-of-way (ROW). Because of the variability of NRHP eligibility criteria for transmission facilities, this programmatic assessment does not include guidance on upgrading historic transmission facilities or co-locating new facilities within the same ROW. These types of projects should be analyzed on a project-specific basis. The following resources were developed specifically for BPA historic properties and may be useful:

- *Programmatic Agreement among the Bonneville Power Administration, the Oregon State Historic Preservation Office, the Washington State Historic Preservation Office, the Idaho State Historic Preservation Office, the Montana Historic Preservation Office, and the Advisory Council on Historic Preservation to Address Effects to BPA Transmission Lines (DRAFT) Programmatic Agreement among the Bonneville Power Administration, the Oregon State Historic Preservation Office, the Washington State Historic Preservation Office, the Idaho State Historic Preservation Office, the Montana State Historic Preservation Office, and the Advisory Council on Historic Preservation to Address Effects to BPA Transmission Lines (DRAFT)* (BPA n.d.)
- *Bonneville Power Administration Manual for Built Resources, 2020* (BPA 2020)
- *National Register of Historic Places Multiple Property Documentation Form: Bonneville Power Administration (BPA) Pacific Northwest Transmission System* (Kramer 1992)
- *Corridors of Power, The Bonneville Power Administration Transmission Network, Historic Context Statement,* 2010 (BPA 2010)

Table 3.15-8. List of National Register of Historic Places/Washington Heritage Register Eligible Transmission Facilities in Washington

County	Transmission Facility
Multiple	McNary–Franklin No. 2 Transmission Line
Multiple	Olympia-Grand Coulee No 1 Transmission Line
Multiple	BPA Sickler-Shultz No. 1 Transmission Line

County	Transmission Facility
Adams	Pacific Power & Light/Washington Water & Power Benton-Othello No. 1 Transmission Line
Benton	Benton-Othello No. 1 Transmission Line
Benton and Franklin	Bonneville Power Benton-Scooteney No. 1 Transmission Line
Clallam	Port Angeles-Sappho No. 1 Transmission Line
Clark	BPA Vancouver-Covington Transmission Line; Ross-Lexington No. 1 Transmission Line; BPA Ross-Lexington Transmission Line; BPA Vancouver-Covington Transmission Line; Ross-Alcoa No. 2 Transmission Line; Ross-Vancouver Shipyard No. 1 Transmission Line; Ross-Carborundum No. 1 Transmission Line; Bonneville-Vancouver No. 5 and 6 Transmission Line; McNary-Ross No. 1 Transmission Line; Ross Vancouver Shipyard No. 1 Transmission Line
Douglas	CPUD Rocky Reach - Columbia No. 2 Transmission Line; PSE Rocky Reach - Cascade Transmission Line; BPA Rocky Reach-Maple Valley Transmission Line
Franklin	Benton-Franklin No. 2 Transmission Line; Pasco-Kennewick Transmission Line Columbia River
Grant	Vantage-Columbia #1 Transmission Line; Midway-Vantage #1 Transmission Line; Transmission Lines to Midway Station - Priest Rapids; Chelan - Stratford 115 kV Transmission Line
King, Pierce, and Thurston	Olympia-Grand Coulee No 1 Transmission Line
King, Thurston, and Lewis	Raver-Paul No 1 Transmission Line
Jefferson	Shelton-Fairmount Transmission Lines No. 1; Shelton-Fairmount Transmission Line No. 2
King	Chehalis-Covington No. 1 230 kV Transmission Line; Covington-Duwamish No. 1 230 kV Transmission Line; Covington-Maple Valley No. 2 230 kV Transmission Line; Covington-White River No. 1 230 kV Transmission Line; Raver-Covington No. 1 500 kV Transmission Line; Raver-Covington No. 2 500 kV Transmission Line; Raver-Echo Lake No. 1 500 kV Transmission Line; Schultz-Raver No. 1 500 kV Transmission Line; Schultz-Raver No. 3 500 kV Transmission Line; Tacoma-Raver 1&2 No. 1 500 kV Transmission Line; Tacoma-Raver 1&2 No. 2 500 kV Transmission Line; Tacoma-Covington Nos. 2–4 230 kV Transmission Line Sammamish-Lakeside-Talbot Hill Transmission Lines Nos. 1 and 2; Transmission Pole Dolphins
Klickitat	McNary-Ross No. 1 345kV Transmission Line; North Bonneville-Midway No. 1 230 kV Transmission Line; Harvalum-Big Eddy No. 1 230 kV Transmission Line; Chenoweth-Goldendale No. 1 155 kV Transmission Line; Big Eddy-Spring Creek BPA Transmission Line
Okanogan	Wells Dam Transmission lines to Douglas Switchyard; Winthrop Tap to Twisp Okanogan Transmission Line
Pacific	Holcomb – Naselle Transmission Line, BPA
Pend Oreille	Boundary-Cranbrook Transmission Line
Pierce	Cowlitz Tap 230-kV Transmission Line; St Clair-South Tacoma No 1 Transmission Line
Skamania	Underwood Tap Transmission Line
Stevens	BPA Bell-Boundary No. 3; Bell-Addy No. 2 Transmission Line
Spokane	Spokane-Trentwood No. 1 Transmission Line; Spokane-Trentwood No. 2 Transmission Line; Bell-Boundary No. 1 Transmission Line; Four Lakes Tap to Sunset - East Colfax No. 1 Transmission Line; Cheney Tap to Silver Lake - Sunset No. 1 Transmission Line

County	Transmission Facility
Snohomish	Bothell-Sno-King No. 1 Transmission Line
Walla Walla	Lower Monumental to McNary Transmission Line No. 1

Source: DAHP n.d.(b)
BPA = Bonneville Power Administration; CPUD = Clatskanie People's Utility District; kV = kilovolt; PSE = Puget Sound Energy

Historic Districts

There are at least 122 historic districts that are listed or eligible for listing in the NRHP/Washington Heritage Register (WHR) in Washington (**Table 3.15-9**) (DAHP n.d.[b]). A historic district is defined in 36 CFR 60.3 as “a geographically definable area, urban or rural, possessing a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united by past events or aesthetically by plan or physical development,” and can depend on the aspects of setting and feeling to convey or express its historic significance. Therefore, historic districts as a property type can be susceptible to adverse impacts from modern visual intrusions.

Table 3.15-9. Historic Districts in Washington Listed or Eligible for Listing on the National Register of Historic Places/Washington Heritage Register

County	Historic District
Adams	Ritzville Historic District
Benton	Gold Coast Historic District
Bern-Mittelland	Stevens Pass Historic District
Chelan	Buckner Homestead Historic District; Cottage Avenue Historic District; Downtown Wenatchee Historic District; Brown's First Addition Historic District; Leavenworth Ski Hill Historic District
Clallam	Roose, Peter, Homestead; Rosemary Inn; Singer's Lake Crescent Tavern; Port Angeles Civic Historic District
Clark	Washington School For the Blind; Officers Row, Fort Vancouver Barracks; Basalt Cobblestone Quarries District - Ridgefield National Wildlife Refuge; Hough Neighborhood Historic District;[(a)] Vancouver National Historic Reserve Historic District
Columbia	Downtown Dayton Historic District; South Side Historic District – Dayton; Washington Street Historic District - Dayton
Cowlitz	Longview Civic Center Historic District
Douglas	Downtown Waterville Historic District
Garfield	Downtown Pomeroy Historic District
Island	Central Whidbey Island Historic District; Cama Beach Resort
Jefferson	Irondale Historic District; Quilcene Ranger Station; Fort Flagler
King	Green River Gorge Historic District;[(a)] Columbia City Historic District; Pioneer Square--Skid Road Historic District (Including Boundary Increases); Pike Place Public Market Historic District; Harvard-Belmont District; Ballard Avenue Historic District; Mount Baker Park Historic District; Roanoke Park Historic District; Wellington Disaster Site;[(a)] Chittenden Locks and Lake Washington Ship Canal; Town of Bayne;[(a)] Seattle Chinatown Historic District; Covenant Beach Bible Camp; Tenas Chuck Houseboat Moorage Historic District;[(a)] Skykomish Historic Commercial District; Landsburg Headworks Historic District;[(a)] Snoqualmie Falls Hydroelectric Power Plant Historic District; Seattle Municipal Light and Power Plant; Naval Air Station Seattle; White Center Fieldhouse and Caretaker Cottage; Storey, Ellsworth, Cottages Historic District; Selleck Historic District; Camp North Bend; Saint Edward Seminary; Fort Lawton; Montlake Historic District; Covington Electrical Substation, BPA; Ravenna-Cowen North Historic District; Millionaire's Row Historic District

County	Historic District
Kitsap	Fort Ward Historic District and Expansion; Hospital Reservation Historic District - Puget Sound Naval Shipyard; Marine Reservation Historic District; Officers' Row Historic District - Puget Sound Naval Shipyard; Puget Sound Radio Station Historic District
Kittitas	Roslyn Historic District; Cabin Creek Historic District; Downtown Ellensburg Historic District; Liberty Historic District; Kittitas County Fairgrounds; Ellensburg First Railroad Addition Historic District; Chicago, Milwaukee, St. Paul, and Pacific Railroad: South Cle Elum Yard; The Mountaineers Snoqualmie Lodge[a]
Klickitat	Homesteads of the Dalles Mountain Ranch Historic District[a]
Lewis	Pennsylvania Avenue--West Side Historic District – Chehalis; Hillside Historic District; Chehalis Downtown Historic District; Centralia Downtown Historic District
Lincoln	Little Falls Hydroelectric Power Plant
Mason	Cushman Hydroelectric Project Historic District
Okanogan	Old Molson;[a] Salmon Meadows Ski Lodge District;[a] Early Winters Ranger Station Work Center; Tungsten Mine Historic District;[a] Tekoa Grain Company Elevator and Flathouse
Pacific	Oysterville Historic District; Cape Disappointment Historic District
Pend	Boundary Hydroelectric Project
Pierce	Salmon Beach Historic District;[a] Old City Hall Historic District – Tacoma; Upper Fairfax Historic District;[a] Stadium-Seminary Historic District; Steilacoom Historic District; Union Depot-Warehouse Historic District – Tacoma; College Park Historic District; Fort Steilacoom; South J Street Historic District – Tacoma; Dupont Village Historic District; Nisqually Entrance Historic District - Mount Rainier Historic District; North Slope Historic District; Fort Lewis Garrison Historic District;[a] McChord Field Historic District; Wedge Historic District; Buckley's Addition Historic District; Camp Six; American Lake Veterans Hospital
San Juan	San Juan Lime Company / Cowell's; Krumdiack Homestead; Tharald Homestead
Sibley	Lake Washington Boulevard
Skagit	La Conner Historic District; Northern State Hospital
Skamania	Condit Hydroelectric Power Plant
Snohomish	Snohomish Historic District; Hartford to Monte Cristo Railroad; Naval Auxiliary Air Station – Arlington; Rucker Hill Historic District; Hewitt Avenue Historic District; Verlot Ranger Station – Public Service Center; Darrington Ranger Station
Spokane	Riverside Avenue Historic District; Spokane River District;[a] Browne's Addition Historic District; Fort George Wright Historic District; Marycliff-Cliff Park Historic District; Corbin Park Historic District; Peaceful Valley Historic District; Mission Avenue Historic District; Nine Mile Hydroelectric Power Plant Historic District; Felts Field Historic District; Washington State Normal School at Cheney Historic District; Ninth Avenue Historic District – Spokane; Rockwood Historic District; Desmet Avenue Warehouse Historic District; West Downtown Historic Transportation Corridor; City of Cheney Historic District; Hillyard Historic Business District; Millwood Historic District; East Downtown Historic District – Spokane; Nettleton's Addition Historic District; Hutton Settlement District; Mount Saint Michael
Stevens	Meyers Falls Power Plant Historic District; Long Lake Hydroelectric Power Plant
Thurston	Washington State Capitol Historic District; Tumwater Historic District; South Capitol Neighborhood Historic District; Tenino Downtown Historic District; Olympia Downtown Historic District
Wahkiakum	Skamokawa Historic District
Walla Walla	Waitsburg Historic District; Walla Walla Downtown Historic District; Fort Walla Walla Historic District

County	Historic District
Whatcom	Eldridge Avenue Historic District; Fairhaven Historic District; Broadway Park Historic District; Skagit River and Newhalem Creek Hydroelectric Projects; Sehome Hill Historic District; Cissna Cottages Historic District; South Hill Historic District – Bellingham; York Historic District; Downtown Bellingham Historic District
Whitman	Palouse Main Street Historic District; Colfax Main Street Historic District;[(a)] College Hill Historic District
Yakima	Old North Yakima Historic District; Yakima Valley Transportation Company

Source: DAHP n.d.(b)
Notes:
[(a)] Only listed in Washington Heritage Register
[(b)] National Historic Landmark

Farmsteads

The rural setting of most farmsteads (**Table 3.15-10**) and the overall lack of modern intrusions make these types of historic properties susceptible to adverse visual impacts. Similar to historic districts, the severity of the impact would depend on whether the aspects of setting and feeling are important to convey or express the historic significance of the farmstead complex.

Table 3.15-10: Historic Farmsteads in Washington Listed or Eligible for Listing in the National Register of Historic Places/Washington Heritage Register

County	Farmstead
Adams	Donnell Farm; Daintys Farm; Harder Farm; Richter Homestead - Hulett Farm – Residence; Taylor and Sons Farm – Barn, Stable, and Windmill; Taylor and Sons Farm – Residence
Chelan	Gensinger, Edward and Okle, Farmstead[(a)]
Clallam	Emery Farmstead; Gierin Farmstead;[(a)] Hyer, John A., Farm
Clark	Clark County Poor Farm; Southwestern Washington Experiment Station; Heisen, Henry, Farm; Pomeroy Farm; Meyer, Heye H. and Eva, Farmstead; Kapus Farm (Granary and Barn); Farmhouse; Blair Farmstead; Thomas Farmstead; Morrow, Daniel & Margaret, Farmstead; Nielsen Farmstead - Machine Shop / Quonset Hut; Lechtenberg Farm
Island	Griffiths, Captain James, Farmstead; John P. and Annie Larson Farm: Hired Man's House; Whidbey Island Game Farm
King and Snohomish	Bates-Tanner Farm and Winningham Farm
King	Hollywood Farm; Allen, Horatio and Laura, Farm; Thomas-Nelson Farm; Merrilegs Farm; Kristian Stensland Farm; Tollgate Farm House; Anderson, Tolle, Farm; Northup Homestead/Dairy and Cherry Farm; Schmieg Farm; Sween's Poultry Farm Brooder House; Aldarra Farms Barn; Pickering Farm; Dougherty, John and Kate, Farmstead; Olson, Mary, Farm; Reard-Freed Farmstead; Hjertoos, Andrew and Bergette, Farm; Adair, William and Estella, Farm
Kitsap	Bucklin Farm[(a)]
Kittitas	Kittitas Division South Branch Canal Farm Bridge at Station No. 416+75; Kinkade, John W., Farmstead; Springfield Farm; Nelson, Albert, Farmstead
Klickitat	McNabb Farmstead and Overlook Farm[(a)]
Lewis	Glen and Edna Reid Farm
Lincoln	Folsom Farm Granary
Okanogan	Warren, Marion and Annie, Farmstead[(a)] and Morris, Jacob and Cynthia, Farmstead[(a)]
Pacific	Ernest Lilly Farm

County	Farmstead
Pierce	Farmer's Warehouse; Johnson Farm; Smith, Peter, Farm-Donation Land Claim
Skagit	Chris Knutzen Farm / Einer Knutzen Farm / Maple Court Dairy
Skamania	Underwood, Edward and Isabelle, Farm; Five Oaks Farm
Snohomish	Herbert S. Conner Farm – House and Meyer, Adolph, Farm
Spokane	East Farms Water Tank/Spokane Valley Project Water Tank No. 11; Farmers National Warehouse Corporation Grain Elevator; North Pacific Grain Growers Grain Terminal; Trolan, Daniel and Mary Ann, Farmhouse; Palmer, Eben and Cynthia, Farmstead
Stevens	Ham Farmstead[a] and Farm House
Thurston	Brown Farm; Harris/Ames Farmstead; Erickson, Jonas and Maria Lovisa, Farmstead
Walla Walla	Gardena Farms North Lateral
Whatcom	Woodstock Farm; Mitchell Farmstead; Loomer Family Farm; Harry Zettle Farm
Whitman	Masonic Hall – Farmington and Heilsberg, Gustav, Farm
Yakima	Roza Division Wasteway No. 3 Farm Bridges No. 1 & 2; Roza Division Wasteway No. 5/Sulphur Creek Wasteway Farm Bridges; Laframboise Farmstead; Cornell Farmstead

Source: DAHP n.d.(b)
Note:
(a) Only listed in Washington Heritage Register
(b) National Historic Landmark

Listed Parks and Historic Districts in Parks

Twenty-three parks in the Study Area that are listed in the NRHP/WHR are likely to have setting and/or feeling as an important aspect of integrity. There are 33 historic districts in the state that are located within local, state, and national parks and are also likely to have landscape features and elements that contribute to the setting and/or feeling of the district (**Table 3.15-11**) (DAHP n.d.[b]).

During the siting and planning phase of project-specific applications, the NRHP/WHR nominations for these resources should be consulted to ascertain under what NRHP criteria the districts are significant and what aspects of integrity are important to their significance.

Table 3.15-11: Parks and Historic Districts within Parks in Washington that are listed on the National Register of Historic Places/Washington Heritage Register

County	Historic District/Park
Chelan	Golden West Lodge Historic District - North Cascades National Park and High Bridge Ranger Station Historic District - North Cascades National Park
Clallam	Olympus Guard Station - Olympic National Park and Olympic National Park Headquarters Historic District
Clark	Lewisville Park
Cowlitz	Lake Sacajawea Park
Douglas	Douglas Park[a]
Franklin	Sacajawea State Park
Jefferson	Old Fort Townsend State Park[a]
King	Colman Park & Dose Terrace Stairs; Denny Park;[a] Frink Park; Freeway Park; Gas Works Park; Mount Baker Park and Boulevard; Redmond City Park; Si View Park; Volunteer Park - Seattle
Kittitas	Olmstead Place State Park

County	Historic District/Park
Grays	Schafer State Park
Mason	Twanoh State Park
Pacific	The Wreckage - Ocean Park
Pierce	Longmire Historic District - Mount Rainier National Park;[b] Paradise Historic District - Mount Rainier National Park; Sunrise Historic District - Mount Rainier National Park;[b] Wright Park and Seymour Conservatory; White River Entrance - Mount Rainier National Park [b]
Skagit	Causland Park
San Juan	Moran State Park
Snohomish	Bothell-Lake Forest Park Highway[a]
Spokane	Cowley Park; Coeur d'Alene Park; Manito Park and Boulevard[a]
Thurston	Millersylvania State Park and Sylvester Park - Olympia
Whatcom	Pioneer Park – Ferndale[a] and Park Butte Lookout - Mt. Baker - Snoqualmie National Forest
Whidbey Island	Deception Pass State Park: Rosario and Bowman Bay Bathing, Picnic and Caretaker's Areas Historic District; Cranberry Lake Caretaker's Area Historic District; North Beach Picnic Area Historic District and Cranberry Lake Bathing and Picnic Area Historic District

Source: DAHP n.d.(b)
Notes:
(a) Only listed in Washington Heritage Register
(b) National Historic Landmark

3.15.2.2 Cultural Resources

Cultural resources are locations of human activity, occupation, or use that are identifiable through field inventory (survey), historical documentation, or oral history. The term includes archaeological sites, Traditional Cultural Places (TCPs), and Tribal resources with associations with traditional, religious, and cultural importance to specified social and/or cultural groups (WAPA 2015). Cultural resources that can be adversely affected by project-specific applications are identified below. These resources should be considered during the planning and siting stages of project-specific applications. DAHP emphasizes the importance of early and meaningful engagement with Tribes during the planning stages of projects that may affect Tribal cultural resources. This process involves seeking, discussing, and considering the views of Tribes and, where feasible, seeking agreement with them.

Archaeological Sites

There are nearly 25,000 archaeological sites that are listed or eligible for listing in the NRHP/WHR in Washington (DAHP n.d.[b]). Archaeological sites are defined as “the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself maintains historical or archeological value regardless of the value of any existing structure” (36 CFR 60.3). These sites can be found in all types of places and landscapes in the state and are highly susceptible to adverse direct impacts from transmission facility development due to their fragile nature and often lack of aboveground presence.

Traditional Cultural Places

TCPs (alternatively referred to as Traditional Cultural Properties) is a term used by the National Park Service, and adopted by other agencies, to define a property that is listed in, or eligible for inclusion, in the NRHP “for its significance to a living community because of its association with cultural beliefs, customs, or practices that are rooted in the community’s history and that are important in maintaining the community’s cultural identity” (NPS

2023). TCPs are associated with intangible elements of cultural heritage, including the arts, skills, folklife, and folkways of communities of any cultural or ethnic background. Examples can include locations associated with the traditional beliefs of a Native American Tribe, a location where a community has traditionally carried out cultural practices that are important in maintaining its historical identity, or a neighborhood that is the traditional home of a particular cultural group that reflects its beliefs and practices. In Washington, information about TCPs identified in the state is kept secure by DAHP per RCW 42.56.300(3)(c) (DAHP 2017).

For federal undertakings, TCPs that are determined eligible for listing on the NRHP, and any effects on them, must be considered per the Section 106 process defined in the NHPA. In addition, TCPs are a cultural resource under the National Environmental Policy Act.

Tribal Resources

Tribal resources can include resources traditionally gathered for food, medicine, and other cultural practices; food forests; foraging landscapes; important habitats for migratory populations of game; plant resources; and locations where hunting, gathering, fishing, and other activities occur. The significant setting, feeling, and association of Tribal resources make them susceptible to adverse physical and visual impacts, particularly through the loss of vegetation and construction of access roads as related to transmission facility projects. The identification and evaluation of Tribal resources can require extensive engagement with stakeholders and systematic ethnographic research.

3.15.2.3 Tribal Rights, Interests, and Resources

Indigenous people have been in the Pacific Northwest since time immemorial. These communities continue to have close ties with the land in Washington, as well as close connections to their traditional territories, usual and accustomed places, ceded lands, and reservations. Though intended to provide background information on Tribal rights and protection of Tribal interests and resources, this section does not exhaustively cover the numerous pieces of state and federal legislation that exist for the protection of Tribal Resources and Treaty Rights.

In the mid-19th century, Governor Isaac Stevens, on behalf of the United States, negotiated with various Tribes throughout Washington to cede 64 million acres of land to the United States for non-Indian settlement. These negotiations took place under 10 treaties: the Treaty of Medicine Creek (1854), Treaty of Point Elliott (1855), Walla Walla Treaty (1855), Treaty of Hell Gate (1855), Treaty of Point No Point (1855), Treaty of Neah Bay (1855), Treaty with the Yakama (1855), Chehalis River Treaty Council (1855), Treaty with the Nez Perce (1855), and the Quinault Treaty (also known as the Treaty of Olympia, 1856).

Several of these treaties created reservations for signatory Tribes. Tribes were relocated from their homelands to reservations outside of their traditional territories. In many cases, several Tribes were grouped together onto reservations, regardless of their previous ties to the land or historical relationships with people they would be sharing the land with. As part of the treaties, Tribes were able to maintain their rights to fish and harvest resources in their usual and accustomed territories. However, settler encroachment led to the destruction and reduction of access to these territories' usual and accustomed places where Tribal members could enact their treaty rights.

Since the establishment of Washington State, Indigenous communities have fought to secure access to their Tribal resources as established by the treaties. In 1942, the case of *Tulee v. Washington* resulted in a ruling that the State of Washington could not charge Native Americans a fee to fish at usual and accustomed places (Dougherty 2020). *United States v. State of Washington* concluded in February 1974, that Tribes had a right to 50 percent of the fish that are harvested in their recognized fishing grounds (Dougherty 2020). As part of the ruling, Tribes were made co-managers of the state's fisheries (Dougherty 2020). As of 1996, the President's Executive Order 13007 requires that federal agencies accommodate access to and use of Indigenous sacred sites, avoid physical impacts to sacred sites, and maintain the confidentiality of said sacred sites. In 2003, Senate House Bill 1057 was passed and the RCW 77.15.570 was established to help protect Tribal fisheries resources.

Tribal Consultation

As part of RCW 43.21C.405, EFSEC must offer early and meaningful consultation with any potentially affected Indian Tribe for the purpose of understanding impacts on Tribal rights and resources, including Tribal cultural resources, archaeological sites, sacred sites, fisheries, or other rights and interests in Tribal lands and lands within which an Indian Tribe or Tribes possess rights reserved or protected by federal treaty, statute, or executive order. The goal of the consultation process is to support the preparation of this Draft Programmatic EIS by early identification of Tribal rights, interests, cultural resources, or other Tribal resources potentially affected by the project type, and identifying solutions, when possible, to avoid, minimize, or mitigate any adverse effects on Tribal rights, interests, cultural resources, or other Tribal resources, based on environmental or permit review. This consultation is independent of, and in addition to, any public participation process required by state law, or by a state agency.

3.15.3 Impacts

An assessment of impacts was completed for the construction, operation and maintenance, and upgrade or modification of transmission facilities within the Study Area.

3.15.3.1 Method of Analysis

The Study Area for a project-specific application would typically encompass several key regions and features, such as the following:

- **Project Site and Immediate Vicinity:** This includes the specific location of the project and the surrounding area that might be directly affected by construction, operation and maintenance, and upgrade or modification activities.
- **Viewshed:** This includes the viewshed of the project site that might be affected by construction, operation and maintenance, and upgrade or modification activities.

This Draft Programmatic EIS analyzes the affected environment and impacts on historic and cultural resources within the Study Area defined in Chapter 2. Three project phases for each transmission facility type were considered: construction, operation and maintenance, and upgrade or modification. This evaluation considers overhead transmission facilities and underground transmission facilities for each phase. Overhead transmission facilities consist of transmission lines and substations and similar ancillary infrastructure. Overhead transmission facilities also incorporate aboveground infrastructure that may be associated with underground transmission facilities (e.g., clearing footprint required for launch and retrieval shafts for trenchless construction). Underground transmission facilities consist of underground transmission lines, underground access vaults, and other below-ground infrastructure. The construction of underground transmission facilities includes open trench, trenchless, and underwater construction methods.

Impact Determination

The discussion of impacts is qualitative given the high-level nature of a Programmatic EIS; quantification would require project-specific details to analyze. **Table 3.15-12** describes the criteria used to evaluate impacts from the Action Alternative and No Action Alternative. Information reviewed to identify impacts on historic and cultural resources in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping.

Table 3.15-12: Criteria for Assessing the Impact Determination on Historic and Cultural Resources

Impact Determination	Description
Nil	A project would have no foreseeable impact on historic or cultural resources during any phase (i.e., construction, operation and maintenance, and upgrade or modification). No historic or cultural resources determined eligible for listing in the NRHP or WHR are located within the project footprint, and therefore no historic or cultural resources would be impacted.
Negligible	A project would have minor, adverse impacts on historic and cultural resources. Impacts would have slight alterations to the characteristics of a historic or cultural resource that qualify it for NRHP or WHR eligibility. The project would cause only minor and temporary physical, visual, or atmospheric impacts. There would be no noticeable changes to the character of the property’s use or of physical features within the property’s setting that contribute to its historic significance, or introduce visual, atmospheric, or audible elements that diminish the integrity of the property’s significant historic features. Best management practices and design considerations are expected to be effective.
Low	A project would have adverse impacts on historic and cultural resources even with the implementation of best management practices and design considerations. A project would cause some ground disturbance, vegetation removal, physical destruction, modern intrusions, or damage to all or part of a property, but it would be limited in extent and duration. There would be minor changes to historic and cultural resources, but these would not result in alterations to the characteristics of a property that qualify it for historic significance or in a manner that would diminish the historic integrity of the property. Impacts would be short term and nonsignificant.
Moderate	A project would have adverse impacts on historic and cultural resources even with the implementation of best management practices and design considerations. A project would cause ground disturbance, vegetation removal, physical destruction, modern intrusions, or damage to all or part of a property. There may be ground disturbance that would directly affect archaeological resources, changes to the character of the property’s use or of physical features within the property’s setting that contribute to its historic significance, introduction of visual, atmospheric, or audible elements that diminish the integrity of the property’s significant historic features. Moderate impacts may be long-term, occurring over one or more project phases. Moderate impacts have the potential to be significant.
High	A project would have adverse impacts on historic and cultural resources that are significant and potentially severe, even with the implementation of best management practices and design considerations. A project would cause extensive ground disturbance, vegetation removal, physical destruction, modern intrusions, or damage to all or part of a property, and these impacts would be unavoidable. There would be physical or visual impacts on National Historic Landmarks, Tribal Resources, or Traditional Cultural Places that result in changes to the character of the property’s use or of physical features within the property’s setting that contribute to its historic significance, introduction of visual, atmospheric, or audible elements that diminish the integrity of the property’s significant historic features. High impacts may be permanent or continue for the duration of the project.

EIS = Environmental Impact Statement; NRHP = National Register of Historic Places; WHR = Washington Heritage Register

To clearly understand the potential severity of impacts without any interventions, the following impact determinations exclude the use of avoidance criteria and mitigation measures. The ratings assume compliance with all federal, state, and local laws and regulations, as well as standardized BMPs and design considerations. Assessing impacts without avoidance criteria or mitigation measures offers a baseline understanding of potential environmental effects, helping to identify the true extent of these impacts. Environmental laws often require that initial impact assessments be conducted without considering mitigation to maintain the integrity of the environmental review process.

For the Section 106 process, the types of effects that may result from impacts to historic and cultural resources are categorized as direct (i.e., physical destruction of, or damage to, all or part of a historic property; alteration of a historic property in a way that is not consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties and applicable guidelines; or the removal of the property from its historic location) and indirect (change the character of the property's use or of physical features within the property's setting that contribute to its historic significance, or introduce visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features). For this Draft Programmatic EIS analysis, impacts are defined as either physical or visual, the most common impacts associated with transmission/pipeline projects. Though there may be other types of impacts such as atmospheric, noise, or vibration, those would likely be temporary (during construction) and localized and not appropriate for analysis at the programmatic level for historic and cultural resources. Noise and vibration impacts are discussed in Section 3.13, and are applicable to cultural and historic resources. Atmospheric impacts are discussed in Section 3.3, and are also applicable to cultural and historic resources.

The analysis of impacts and characterization of significant adverse impacts are organized under construction, operation and maintenance, and upgrade or modification by impact category as follows:

- Physical Impacts. Physical impacts on historic and cultural resources during any phase (e.g., construction, operation and maintenance, or upgrade or modification) may include ground disturbance, loss of vegetation, replacement of gates and fencing, or modern intrusion. Resource types impacted may include NHLs, historic districts/landscapes, historic trails/scenic byways, farmsteads, parks and historic districts in parks, archaeological sites, Tribal resources, and TCPs.
- Visual Impacts. Visual impacts on historic and cultural resources during any phase may include modern intrusion and loss of vegetation. Resource types impacted may include NHLs, historic districts/landscapes, historic trails/scenic byways, farmsteads, parks and historic districts in parks, archaeological sites, Tribal resources, and TCPs.

The analysis of historic resources used in this Draft Programmatic EIS attempts to identify and characterize the broad categories of historic properties that could be adversely impacted by the development of transmission facilities and the nature and scale of impacts associated with these projects. Section 3.15.2 provides an overview of the types of historic resources that could be encountered in the development of transmission facilities.

For historic resources, the factors for determining the nature and scale of impacts for this Draft Programmatic EIS include the type of historic resource, the aspects of integrity significant to these resource types, and the distance from the resource to the transmission facility. Given that the Study Area includes the entire State of Washington, it was not feasible to conduct an analysis of every historic resource type. Instead, the analysis focuses on NHLs and property types that are more likely to be adversely impacted by the development of transmission facilities: historic districts, farmsteads, and landscapes.

For cultural resources, the factors for determining the nature and scale of impacts for this Draft Programmatic EIS include the cultural resource type, the ability to mitigate adverse effects, and the distance of the known resource from the proposed transmission facilities. There are approximately 39,992 currently known cultural resources in the Study Area (DAHP n.d.[b]). This does not account for cultural resources that may be currently identified but in process of being recorded. An analysis of every recorded resource in the state was not feasible as part of this Draft Programmatic EIS; therefore, analysis should be conducted during project-specific review periods in consultation with the affected Tribes.

Statewide information in the DAHP Washington Information System for Architectural and Archaeological Records Data (WISAARD) database regarding the specific criteria for NRHP-eligible and listed properties was not available for analysis in this Draft Programmatic EIS, which limited the understanding of the scale of impacts that transmission facilities may have on historic properties. Furthermore, the lack of a specific Study Area makes it difficult to ascertain the level of impact that potential transmission facility projects may have on cultural resources. As applicants consider specific projects, more detailed information for previously surveyed properties can be obtained by DAHP to inform planning and siting efforts. Applicants are required to complete historic and cultural resource surveys to identify and evaluate historic properties and cultural resources that have not yet been identified to comply with Section 106 of the NHPA and SEPA.

3.15.3.2 Action Alternative

Construction

Overhead Transmission Facilities

Activities for the construction phase of overhead transmission facilities would vary and depend on the scale of the facility and site characteristics. Construction could include a site preparation phase of relatively short duration (e.g., a few months), followed by a longer construction and start-up phase. It is assumed that the construction phase of overhead transmission, per mile, would have a shorter duration than underground construction.

Overhead transmission facility infrastructure could have the following impacts during the construction phase:

- Physical Impacts
- Visual Impacts
- Physical Impacts on Tribal Resources and TCPs
- Visual Impacts on Tribal Resources and TCPs

Physical Impacts

Construction of towers, substations, access roads, staging areas, and tensioning and pulling areas has the potential to physically impact historic and cultural resources through the damage or destruction of resources or elements that contribute to historic properties, including historic districts, NHLs, farmsteads, landscapes, historic trails/byways, and archaeological sites (**Table 3.15-13**). Loss of vegetation and construction of transmission facility structures within NRHP/NHL boundaries can physically impact these resources if these actions directly impact features or resources that contribute to the historic property's significance. Loss of vegetation and construction of transmission facility structures may impact landscaping or landscape design that might contribute to the historic property. Additionally, transmission facility components that are located outside of a known precontact site boundary, but may destabilize the landscape (e.g., installation of transmission lines within a talus slope), could lead to destabilized conditions for a known archaeological site thereby resulting in physical impacts.

Table 3.15-13: Physical Impacts on Historic and Cultural Properties during Construction (Overhead Transmission Facilities)

Component	Type of Physical Impact	Resource Type Impacted	Comments
New ROW	Loss of vegetation	NHLs Historic districts Historic trails/scenic byways[a] Farmsteads Parks and historic districts in parks	Loss of vegetation within NRHP/ NHL boundaries could result in a negligible to high impact, depending on the location and extent of vegetation removal and whether that vegetation contributes to setting of the historic property. If the vegetation does not contribute to the setting, the impact would be negligible.
		Archaeological sites	Loss of vegetation could result in a negligible to high impact if ground-disturbing impacts from removing vegetation intersects with archaeological sites. Loss of vegetation could result in a high impact on archaeological sites if the disturbance impacts physical features that contribute to its significance.
Transmission towers	Modern intrusion	Historic districts NHL Historic trails/scenic byways[a] Farmsteads Parks and historic districts in parks	Introduction of a modern structure into the boundary of NRHP/NHL property could result in a negligible to high impact on these resources if setting is a significant aspect of integrity for the historic property. The magnitude of the impact would depend on whether the intrusion would alter the characteristics of the historic or cultural resource that qualify it for NRHP or WHR eligibility.
Transmission towers Substations Access roads and fencing Staging areas Pulling and tensioning areas	Ground disturbance	Archaeological sites	Ground disturbance associated with the construction of new transmission towers, substations, access roads, and fencing and creation of staging areas and pulling and tensioning areas within the boundaries of a known archaeological site could result in moderate to high impacts. Staging of equipment could lead to compaction of sediments, which could physically impact subsurface archaeological sites, resulting in moderate to high impacts.
Access roads and fencing	Replacement of gates/fences	Historic districts/landscapes Farmsteads	Loss or replacement of contributing gates/fences within historic districts/landscapes and farmsteads could impact the integrity of the resource, resulting in negligible to high impacts depending on whether the gates/fences contribute to the significance of the historic property.

Note:
[a] Historic trails/scenic byways are defined and analyzed in Section 3.12, Visual Quality.
NHL = National Historic Landmark; NRHP = National Register of Historic places; ROW = right-of-way; WHR = Washington Heritage Register

Impact Determination: Depending on the scale of the facility and site characteristics, physical impacts on historic and cultural resources, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Visual Impacts

Construction of transmission towers, substations, access roads, and clearing of vegetation for the new ROW can have adverse visual impacts on the same types of resources that can be physically impacted (**Table 3.15-14**). The introduction of these components can be a modern intrusion within the setting of these resources. The impacts become adverse when the setting of these historic properties is an important aspect of their integrity. Visual impacts on historic and precontact archaeological sites may include installation of new transmission facilities within the viewshed of a historic/precontact site, and any new installations that are located within the viewshed of a historic/precontact site.

Table 3.15-14: Visual Impacts on Historic and Cultural Properties during Construction (Overhead Transmission Facilities)

Component	Type of Visual Impact	Resource Type Impacted	Comments
New ROW	Loss of vegetation	Historic districts	Change in setting from loss of vegetation could result in a negligible to high impact on the resource, depending on the location and extent of vegetation removal and whether vegetation contributes to setting of the historic property. If the vegetation does not contribute to the setting, the impact would be negligible.
		NHLs	
		Historic trails/scenic byways[a]	
		Farmsteads	
		Parks and historic districts in parks	
		Archaeological sites	New ROW within the viewshed of an NRHP-eligible or listed archaeological site could result in negligible to high impacts. Specifically, new ROW could remove vegetation that specifically impacts the setting of the archaeological site. The magnitude of the impact would depend on how important setting is to the archaeological site.
Transmission towers Substations	Modern intrusion	Historic districts	Introduction of modern structures into the viewshed of these historic resources could have a negligible to high impact on these resources if setting is a significant aspect of integrity for the historic property. The magnitude of the impact would depend on whether the intrusion would alter the characteristics of the historic or cultural resource that qualify it for NRHP or WHR eligibility.
		NHLs	
		Historic trails/scenic byways[a]	
		Farmsteads	
		Parks and historic districts in parks	
		Archaeological sites	Introduction of modern structures into the viewshed of NRHP-eligible archaeological sites could result in negligible to high impacts depending

Component	Type of Visual Impact	Resource Type Impacted	Comments
			on whether setting is a significant aspect of integrity for the archaeological site. The magnitude of the impact would depend on whether the intrusion would alter the characteristics of the historic or cultural resource that qualify it for NRHP or WHR eligibility.
Access roads and fencing	Modern intrusion	Districts, parks, and historic districts in parks	Introduction of modern gates and fencing could have negligible to high impacts on the historic resource, depending on whether the gates or fences contribute to the significance of the historic property.
		Farmsteads	

Note:
[a] Historic trails/scenic byways are defined and analyzed in Section 3.12, Visual Quality.
NHL = National Historic Landmark; NRHP = National Register of Historic places; ROW = right-of-way; WHR = Washington Heritage Register

Impact Determination: Depending on the scale of the facility and site characteristics, visual impacts on historic and cultural resources, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Physical Impacts on Tribal Resources and TCPs

Construction of overhead transmission towers, substations, access roads, and the creation of staging areas and tensioning and pulling areas have the potential to physically impact Tribal resources and TCPs through the damage or destruction of resources or elements that contribute to Tribal resources and TCPs (**Table 3.15-15**).

TCPs are associated with traditional beliefs of Native American Tribes; a TCP may be a location where a community has traditionally carried out cultural practices that are important in maintaining its historical identity, or a neighborhood that is the traditional home of a particular cultural group that reflects its beliefs and practices. Because of the intangible nature of TCPs, these resources are particularly susceptible to adverse physical impacts due to loss of vegetation and construction of overhead transmission facilities. TCPs may or not be identified by DAHP and may only be known by the Tribe associated with them. Consequently, early engagement with Tribes is critical to identifying these resources.

Similarly, Tribal resources are susceptible to adverse physical and visual impacts, particularly through the loss of vegetation and construction of access roads as related to transmission facility development. The identification and evaluation of Tribal resources can require extensive engagement with stakeholders and systematic ethnographic research.

Table 3.15-15: Physical Impacts on Tribal Resources and Traditional Cultural Places during Construction (Overhead Transmission Facilities)

Component	Type of Physical Impact	Resource Type Impacted	Comments
New ROW	Loss of vegetation	Tribal resources	Loss of vegetation in habitats where Tribal fishing, hunting, and gathering activities take place could result in a moderate to high impact on Tribal resources. These could include food forests and foraging landscapes, and important foraging grounds for migratory populations of game
		TCPs	Loss of vegetation could result in a moderate to high impact on TCPs. If the TCP has been identified due to the presence of certain species, the removal or loss of that vegetation would be seen as a high impact. One example would be the removal of western red cedar (*Thuja plicata*), an important tree species to Tribes throughout the Northwest.
Transmission towers Substations Access roads and fencing Staging areas Pulling and tensioning areas	Ground disturbance	Tribal resources	Impacts on Tribal resources could be moderate high through habitat loss for migratory game and/or fish and loss of important foraging grounds for important food resources by the construction of new transmission towers, substations, access roads, and fencing and the creation of staging areas and pulling and tensioning areas within the boundaries where hunting, gathering, fishing, and other activities could take place.
		TCPs	Impacts on TCPs could be moderate to high through the construction of new transmission towers, substations, access roads, and fencing and the creation of staging areas and pulling and tensioning areas within the boundaries of known and unknown TCPs.

ROW = right-of-way; TCP = Traditional Cultural Place

Impact Determination: Depending on the scale of the facility and site characteristics, physical impacts on Tribal resources and TCPs, without mitigation measures incorporated, are anticipated to vary and could be moderate to high. Avoidance criteria or mitigation measures would be required to reduce the rating to a less than significant impact.

Visual Impacts on Tribal Resources and TCPs

Construction of transmission towers, substations, access roads, and clearing of vegetation for the new ROW could have adverse visual impacts on TCPs and Tribal resources, which are strongly associated with traditional beliefs of Native American Tribes (**Table 3.15-16**). The introduction of these structures can be a modern intrusion within the setting and feeling of these resources, which are usually important aspects of integrity and significance for a TCP or Tribal resource. Visual impacts may include installation of new transmission facilities within the viewshed of these resources.

Table 3.15-16: Visual Impacts on TCPs and Tribal Resources during Construction (Overhead Transmission Facilities)

Component	Type of Visual Impact	Resource Type Impacted	Comments
New ROW	Loss of vegetation	Tribal resources	Loss of vegetation for new ROW that is within a viewshed or location where Tribal resources are hunted, gathered, or fished could have a moderate to high impact on the resources if setting is a significant aspect of the resource's integrity.
		TCPs	New ROW that results in vegetation loss within the viewshed of a TCP could result in a moderate to high impact on the TCP if setting and feeling are significant aspects of the integrity's resource.
Transmission towers Substations	Modern intrusion	Tribal resources	Introduction of modern structures into the viewshed of locations where hunting, gathering, fishing, and other activities could result in moderate to high impacts to Tribal resources if setting and feeling are significant aspects of the resource's integrity.
		TCPs	Introduction of modern structures into the viewshed of TCPs could result in moderate to high impacts on TCPs if setting and feeling are significant aspects of the resource's integrity.
Access roads and fencing	Modern intrusion	TCPs	Installation of access roads or fencing within viewshed of a TCP could result in moderate to high impacts if setting and feeling are significant aspects of the resource's integrity.

ROW = right-of-way; TCP = Traditional Cultural Place

Impact Determination: Depending on the scale of the facility and site characteristics, visual impacts on Tribal resources and TCPs, without mitigation measures incorporated, are anticipated to vary and could be moderate to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Activities for the construction phase of underground transmission facilities, including open trench, trenchless (including horizontal directional drilling), or underwater construction methods, would vary depending on the scale of the facility and site characteristics. Similar to overhead transmission facilities, construction underground could include a site preparation phase of relatively short duration, followed by a longer construction and start-up phase. It is assumed that the construction phase for underground transmission facilities, per mile, would have a longer duration than overhead projects.

Underground transmission could have the following impacts during the construction phase:

- Physical Impacts
- Visual Impacts
- Physical Impacts on Tribal resources and TCPs
- Visual Impacts on Tribal resources and TCPs

<u>*Physical Impacts*</u>

Physical impacts on historic and cultural resources from ground disturbance for construction of conduits and vaults would be greater than for overhead transmission facilities as the area excavated for the conduit and vaults is much greater (**Table 3.15-17**). Physical impacts from secondary ground-disturbing activities, including those associated with construction of access roads and staging areas, would be similar to impacts for overhead transmission facilities, assuming the extent of roads and staging areas are similar for both facility types.

Table 3.15-17: Physical Impacts on Historic and Cultural Properties during Construction (Underground Transmission Facilities)

Component	Type of Physical Impact	Resource Type Impacted	Comments
Conduit	Ground disturbance	Archaeological sites	Utilizing open trenching construction methods to install new conduit within the boundaries of a known archaeological site could result in moderate to high impacts if they were within the path of the trench.
	Collocation on bridges	Historic bridges	Installation of conduits on historic bridges could result in negligible to moderate impacts, depending on whether the installation would alter the characteristics of the historic bridge that qualify it for NRHP or WHR eligibility.
Vaults Access roads and fencing	Ground disturbance	Archaeological sites	Vaults require an expanded area of ground disturbance. If ground-disturbing impacts from vault, access road, and fence installations are proposed within the boundaries of a known archaeological site, the action could result in moderate to high impacts.

Component	Type of Physical Impact	Resource Type Impacted	Comments
Access roads and fencing	Replacement of gates/fences	Historic districts / parks and historic districts in parks	Loss of contributing gates or fences within historic districts and landscapes and farmsteads could impact the integrity of the resource, resulting in negligible to high impacts, depending on whether the gates or fences contribute to the significance of the historic property.
Staging areas	Ground disturbance and compaction	Archaeological sites	Ground disturbance associated with staging areas within the boundaries of a known archaeological site could result in moderate to high impacts. Staging of equipment could lead to compaction of sediments, which could physically impact subsurface archaeological sites, resulting in moderate to high impacts.
Underwater cable installation	Ground disturbance and compaction	Archaeological sites	Underwater cable installation could intersect underwater archaeological sites and result in negligible to high impacts, depending on whether the installation would alter the characteristics of the historic or cultural resource that qualify it for NRHP or WHR eligibility.

NRHP = National Register of Historic Places; WHR = Washington Heritage Register

Impact Determination: Depending on the scale of the facility and site characteristics, physical impacts on historic and cultural resources, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Visual Impacts

Overall, visual impacts on historic and cultural resources during construction would be less for underground facilities than for overhead transmission facilities since conduits are buried and the viewshed would be smaller with the lack of overhead structures (**Table 3.15-18**). Though the vegetation clearing for the ROW would likely be greater, the overall visual impacts would still result in fewer modern intrusions into the landscape within the viewshed of historic and cultural resources.

Table 3.15-18: Visual Impacts on Historic and Cultural Properties during Construction (Underground Transmission Facilities)

Component	Type of Visual Impact	Resource Type Impacted	Comments
New ROW	Loss of vegetation	Historic districts	Change in setting from loss of vegetation could result in a negligible to high impact on the resource, depending on the location and extent of vegetation removal and whether
		NHL	
		Historic trails/scenic byways[(a)]	
		Farmsteads	

Component	Type of Visual Impact	Resource Type Impacted	Comments
		Parks and historic districts in parks	that vegetation contributes to setting of the historic property. If the vegetation does not contribute to the setting, the impact could be negligible.
		Archaeological sites	New ROW within the viewshed of an NRHP-eligible or listed archaeological site could result in negligible to high impacts. Specifically, new ROW could remove vegetation that specifically impacts the setting of the archaeological site. The magnitude of the impact would depend on how important setting is to the archaeological site.
Vaults Substations	Modern intrusion	Historic districts	Introduction of vaults and substations into the viewshed of these historic resources could have a negligible to high impact on these resources if setting is a significant aspect of integrity for the historic property. The magnitude of the impact would depend on whether the intrusion would alter the characteristics of the historic or cultural resource that qualify it for NRHP or WHR eligibility.
		NHL	
		Historic trails/scenic byways[a]	
		Farmsteads	
		Parks and historic districts in parks	
		Archaeological sites	Introduction of vaults and substations into the viewshed of NRHP-eligible archaeological sites could result in negligible to high impacts, depending on whether setting is a significant aspect of integrity for the archaeological site. The magnitude of the impact would depend on whether the intrusion would alter the characteristics of the historic or cultural resource that qualify it for NRHP or WHR eligibility.
Access roads and fencing	Modern intrusion	Districts/parks and historic districts in parks	Introduction of modern gates and fencing could have a negligible to high impact on the historic resource, depending on whether the gates or fences contribute to the significance of the historic property.
		Farmsteads	

Note:
[a] Historic trails/scenic byways are defined and analyzed in Section 3.12, Visual Quality.
NHL = National Historic Landmark; NRHP = National Register of Historic places; ROW = right-of-way

Impact Determination: Depending on the scale of the facility and site characteristics, visual impacts on historic and cultural resources, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Physical Impacts on Tribal Resources and TCPs

Physical impacts on Tribal resources and TCPs from ground disturbance for construction of conduits and vaults would be greater than for overhead transmission facilities as the area needed to excavate for conduits and vaults are much larger (**Table 3.15-19**). Physical impacts from secondary ground-disturbing activities, including those associated with construction of access roads and staging areas, would be similar to impacts for overhead transmission facilities, assuming the extent of roads and staging areas are similar for both facility types.

Table 3.15-19: Physical Impacts on Tribal Resources and Traditional Cultural Places during Construction (Underground Transmission Facilities)

Component	Type of Physical Impact	Resource Type Impacted	Comments
Conduit	Ground disturbance	TCPs	Depending on the type of TCP, subsurface conduit installation could result in negligible to high impacts. Utilizing subsurface conduit could present an option to reduce physical impacts within a known TCP, which could result in negligible impacts. TCPs with significant subsurface deposits could be impacted if the installation disturbs those deposits.
Vaults Access roads	Ground disturbance	Tribal resources	Impacts on Tribal resources could be moderate to high through habitat loss for migratory game and/or fish and loss of important foraging grounds for important food resources by the construction of vaults or access roads within the boundaries where hunting, gathering, fishing, and other activities may take place.
		TCPs	Impacts on TCPs could be moderate to high through the construction of vaults or access roads within the boundaries of known and unknown TCPs.

TCP = Traditional Cultural Place

Impact Determination: Depending on the scale of the facility and site characteristics, physical impacts on Tribal resources and TCPs, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Visual Impacts on Tribal Resources and TCPs

Overall, visual impacts on Tribal resources and TCPs during construction would likely be less for underground transmission facilities than for overhead since conduits are buried and the viewshed would be smaller with the lack of overhead structures (**Table 3.15-20**). Though the vegetation clearing associated with underground transmission facilities would be greater, the overall visual impacts would still result in fewer modern intrusions into the landscape within the viewshed of Tribal resources and TCPs.

Table 3.15-20: Visual Impacts on Traditional Cultural Places and Tribal Resources during Construction (Underground Transmission Facilities)

Component	Type of Visual Impact	Resource Type Impacted	Comments
New ROW	Loss of vegetation	Tribal resources	Loss of vegetation for new ROW that is within a viewshed or location where Tribal resources are hunted, gathered, or fished could have a moderate to high impact on the resources if setting is a significant aspect of the resource's integrity.
		TCPs	New ROW that results in vegetation loss within the viewshed of a TCP could result in a moderate to high impact if setting and feeling are significant aspects of the resource's integrity.
Vaults Substations	Modern intrusion	Tribal resources	Introduction of vaults and substations into the viewshed of locations where hunting, gathering, fishing, and other activities could result in moderate to high impacts to Tribal resources if setting and feeling are significant aspects of the resource's integrity.
		TCPs	Introduction of vaults and substations into the viewshed of TCPs could result in moderate to high impacts on TCPs if setting and feeling are significant aspects of the resource's integrity.
Access roads and fencing	Modern intrusion	TCPs	Installation of access roads or fencing within viewshed of a TCP could result in a moderate to high impact if setting and feeling are significant aspects of the resource's integrity.

ROW = right-of-way; TCP = Traditional Cultural Place

Impact Determination: Depending on the scale of the facility and site characteristics, visual impacts on Tribal resources and TCPs, without mitigation measures incorporated, are anticipated to vary and could be moderate to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Operation and Maintenance

Overhead Transmission Facilities

Activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs, similar to any other linear industrial facility. Overhead transmission facilities could have the following identified impacts during the operation and maintenance phase:

- Physical Impacts
- Physical Impacts on Tribal Resources and TCPs

Physical Impacts

The only impacts on historic and cultural resources during the operation and maintenance of overhead transmission facilities would result from using access roads to gain access to transmission structures or maintaining the ROW, including vegetation trimming or clearing. Loss of vegetation within the boundaries of historic and cultural resources could result in a nil to low impact, assuming the extent of vegetation removal would be minimal for maintenance and assuming that vegetation contributes to setting of the historic property. If the vegetation does not contribute to the setting, the impact would be nil.

Impact Determination: Depending on the scale of the facility and site characteristics, physical impacts on historic and cultural resources, without mitigation measures incorporated, are anticipated to vary and could be nil to low.

Physical Impacts on Tribal Resources and TCPs

The only impacts on Tribal resources and TCPs during the operation and maintenance of overhead transmission facilities could result from using access roads to gain access to overhead transmission facilities or maintaining the ROW, including vegetation trimming or clearing. High impacts on Tribal resources and TCPs could result if the vegetation intersects locations where Tribal resources are hunted, gathered, or fished. High impacts on TCPs could result if the loss of vegetation diminishes the setting and feeling of the TCP.

Impact Determination: Depending on the scale of the facility and site characteristics, physical impacts on Tribal resources and TCPs, without mitigation measures incorporated, are anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Similar to overhead transmission facilities, activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs, similar to any other linear industrial facility. Underground transmission could have the following impacts during the operation and maintenance phase:

- Physical Impacts
- Physical Impacts on Tribal Resources and TCPs

Physical Impacts

The only impacts on historic and cultural resources during the operation and maintenance of underground transmission facilities would result from using access roads to reach underground transmission facilities or maintaining the ROW. The impacts from this action would be relatively minimal assuming most access roads have already been disturbed.

Impact Determination: Depending on the scale of the facility and site characteristics, physical impacts on historic and cultural resources, without mitigation measures incorporated, are anticipated to vary and could be nil to low.

Physical Impacts on Tribal Resources and TCPs

The impacts on Tribal resources and TCPs during operation and maintenance could result from the use of access roads to access ROW and underground transmission vaults or from maintenance of the ROW that would involve trimming and clearing of vegetation. Maintaining the ROW could involve trimming and clearing of vegetation could result in high impacts on Tribal resources if that vegetation intersects locations where Tribal resources are hunted, gathered, or fished. It may result in adverse impacts on TCPs if the vegetation loss diminishes the setting and feeling of the TCP.

Impact Determination: Depending on the scale of the facility and site characteristics, physical impacts on Tribal resources and TCPs, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Upgrade or Modification

Overhead Transmission Facilities

Upgrading or modifying overhead transmission facilities would involve several key steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the proposed action. However, these impacts are expected to be similar to those described for construction of new transmission facilities. Overhead transmission could have the following impacts during the upgrade or modification phase:

- Physical Impacts
- Visual Impacts
- Physical Impacts on Tribal resources and TCPs
- Visual Impacts on Tribal resources and TCPs

Physical Impacts

Earthmoving activities associated with upgrades or modifications to existing overhead transmission structures, substations, access roads, ROW or other infrastructure have the greatest potential to directly impact cultural resources. Expansion of substations and other structures could also physically impact historic resources, though only if the action results in the damage or destruction of contributing resources or elements to historic properties. **Table 3.15-21** lists the common types of impacts and the resource types potentially impacted by upgrading or modifying existing overhead transmission facilities.

Table 3.15-21: Physical Impacts on Historic and Cultural Properties during Upgrade or Modification (Overhead Transmission Facilities)

Component	Type of Physical Impact	Resource Type Impacted	Comments
Removal of existing overhead transmission structures and rebuilding some structures	Ground disturbance	Archaeological sites	Removal or rebuilding of existing overhead transmission structures within an archaeological site could result in negligible to high impacts. Removal of structures could result in a high impact on the archaeological site if the disturbance impacts physical features that contribute to its significance.
Development/expansion of existing substations/ access roads	Ground disturbance	Archaeological sites	Construction of new access routes or expansion of existing substations within an archaeological site could result in negligible to high impacts. Removal of structures could result in a high impact on the archaeological site if the disturbance impacts physical features that contribute to its significance.
Clearing of vegetation with deep roots	Ground disturbance	Archaeological sites	Clearing of vegetation with deep roots could result in negligible to high impacts if ground-disturbing impacts from vegetation removal intersect with archaeological sites. Loss of vegetation could result in a high impact on archaeological sites if the disturbance impacts physical features that contribute to its significance. If the area of proposed ground disturbance has not been previously surveyed, or if the survey is more than 10 years old, there may be an impact on unidentified cultural resources.

Impact Determination: Depending on the scale of the facility and site characteristics, physical impacts on historic and cultural resources, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Visual Impacts

Upgrades or modifications to existing overhead transmission facilities could result in visual impacts on historic and cultural resources, particularly if the ROW is widened or structures, such as substations are greatly expanded (**Table 3.15-22**). A change in the type or height of existing overhead transmission structures can also make them more visible and thus cause visual impacts on surrounding historic resources. Expanded ROW or the loss of vegetation for upgrade or modification is not likely to change the setting of historic or cultural resources in a way that would diminish their integrity. Impacts in these instances would be negligible. However, if the location of the upgrade is in close proximity to the historic or cultural resource, extent of impacts is large, and assuming that vegetation contributes to setting of the historic property, the impacts could be low to moderate. If the vegetation does not contribute to the setting, the impact could be negligible.

Table 3.15-22: Visual Impacts on Historic and Cultural Properties during Upgrade or Modification (Overhead Transmission Facilities)

Component	Type of Visual Impact	Resource Type Impacted	Comments
Replacement of existing overhead transmission structures	Modern intrusion	NHLs	A change in the height of existing overhead transmission structures could expand the viewshed and include additional historic properties. Introduction of modern structures into the viewshed of these historic resources could have a negligible to high impact on these resources if setting is a significant aspect of integrity for the historic property. The magnitude of the impact would depend on whether the intrusion would alter the characteristics of the historic or cultural resource that qualify it for NRHP or WHR eligibility.
		Historic districts	
		Historic trails/ scenic byways[a]	
		Farmsteads	
		Parks and historic districts in parks	
		Archaeological sites	
Change in type of existing overhead transmission structure from monopole to lattice	Modern intrusion	Historic districts	The change in overhead transmission structure type from less intrusive to more intrusive could result in a negligible to high impact on these historic properties if their setting is critical to their significance.
		NHL	
		Historic trails/ scenic byways[a]	
		Farmsteads	
		Parks and historic districts in parks	

Note:
(a) Historic trails/scenic byways are defined and analyzed in Section 3.12, Visual Quality.
NHL = National Historic Landmark; NRHP = National Register of Historic Places; WHR = Washington Heritage Register

Impact Determination: Depending on the scale of the facility and site characteristics, visual impacts on historic and cultural resources, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Physical Impacts on Tribal Resources and TCPs

Earthmoving activities associated with upgrades or modifications to existing towers, substations, access roads, ROW or other infrastructure have the greatest potential to directly impact Tribal resources and TCPs. Expanding substations and other structures can also physically impact Tribal resources and TCPs, though only if the action results in the damage or destruction of resources or elements within the boundary of the TCP or Tribal resource. Clearing of vegetation with deep roots can have the same impacts to TCPs and Tribal resources as earthmoving activities if the area being disturbed contributes to the significance of these resources. **Table 3.15-23** lists the common types of impacts to Tribal resources and TCPs by upgrades or modifications to existing facilities.

Table 3.15-23: Physical Impacts on Tribal Resources and TCPs during Upgrade or Modification (Overhead Transmission Facilities)

Component	Type of Physical Impact	Resource Type Impacted	Comments
Removal of existing overhead transmission structures and rebuilding some structures	Ground disturbance	TCPs Tribal resources	Removal or rebuilding of existing overhead transmission structures within a TCP or Tribal resource could result in negligible to high impacts depending on whether activities are within previously undisturbed ground and whether the disturbance impacts features that contribute to the significance of TCPs and Tribal resources.
Development/expansion of existing substations/ access roads	Ground disturbance	TCPs Tribal resources	Construction of new access routes or expansion of existing substations within a TCP or Tribal resource could result in negligible to high impacts depending on whether activities are within previously undisturbed ground and whether the disturbance impacts physical features that contribute to its significance.
Clearing of vegetation with deep roots	Ground disturbance	TCPs	Clearing of vegetation could result in a negligible to high impact on TCPs. If a TCP has been nominated due to the presence of certain species, the removal or loss of that vegetation would be seen as an adverse physical impact.
		Tribal resources	Clearing of vegetation in habitats where Tribal fishing, hunting, and gathering activities take place for food, medicine, and other cultural practices could result in a negligible to high impact on Tribal resources.

TCP = Traditional Cultural Place

Impact Determination: Depending on the scale of the facility and site characteristics, physical impacts on Tribal resources and TCPs, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Visual Impacts on Tribal Resources and TCPs

Upgrades or modifications to existing overhead transmission facilities can result in visual impacts on Tribal resources and TCPs, particularly if the ROW is widened or structures such as substations are greatly expanded (**Table 3.15-24**). A change in the type or height of existing overhead transmission structures could make them more visible and thus cause visual impacts on surrounding Tribal resources and TCPs.

Table 3.15-24: Visual Impacts on Tribal Resources and Traditional Cultural Places during Upgrade or Modification (Overhead Transmission Facilities)

Component	Type of Visual Impact	Resource Type Impacted	Comments
Replacement of existing overhead transmission structures	Modern intrusion	Tribal resources TCPs	Potentially taller transmission structures could expand the viewshed impacts and include additional Tribal resources and TCPs. Introduction of modern structures into the viewshed of these resources could have a negligible to high impact on these resources if setting is a significant aspect of integrity for the Tribal resource or TCP.
Change in type of existing overhead transmission structure from monopole to lattice	Modern intrusion	Tribal resources TCPs	The change in overhead transmission structure type from less intrusive to more intrusive could result in a disruption to the viewshed of a Tribal resource or TCP, which could result in a moderate to high impact, depending on whether setting is a significant aspect of integrity for the Tribal resource or TCP.

TCP = Traditional Cultural Place

Impact Determination: Depending on the scale of the facility and site characteristics, visual impacts on Tribal resources and TCPs, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Upgrading or modifying underground transmission facilities would involve several key steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Underground transmission could have the following impacts during the upgrade or modification phase:

- Physical Impacts
- Visual Impacts
- Physical Impacts on Tribal resources and TCPs
- Visual Impacts on Tribal resources and TCPs

Physical Impacts

Similar to overhead transmission facilities, earthmoving activities associated with upgrades or modifications to underground transmission facilities have the greatest potential to directly impact cultural resources. Expansion of infrastructure could also physically impact historic resources, though only if the action results in the damage or destruction of contributing resources or elements to historic properties.

Impact Determination: Depending on the scale of the facility and site characteristics, physical impacts on historic and cultural resources, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Visual Impacts

Upgrades or modifications to existing underground transmission facilities could result in visual impacts on historic and cultural resources, particularly if the ROW is widened and additional vegetation is removed. Expanded ROW or the loss of vegetation for upgrade or modification is not likely to change the setting of historic or cultural resources in a way that would diminish their integrity. Impacts in these instances would be negligible. However, if the location of the upgrade or modification is in close proximity to the historic or cultural resource, the extent of impacts is large, and assuming that vegetation contributes to setting of the historic property, the impacts could be low to moderate. If the vegetation does not contribute to the setting, the impact could be negligible.

Impact Determination: Depending on the scale of the facility and site characteristics, visual impacts on historic and cultural resources, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Physical Impacts on Tribal Resources and TCPs

Similar to overhead transmission facilities, earthmoving activities associated with upgrades or modifications to underground transmission facilities have the greatest potential to directly impact Tribal resources and TCPs.

Impact Determination: Depending on the scale of the facility and site characteristics, physical impacts on Tribal resources and TCPs, without mitigation measures incorporated, are anticipated to vary and could be moderate to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Visual Impacts on Tribal Resources and TCPs

Upgrades or modifications to existing underground facilities can result in visual impacts on Tribal resources and TCPs, particularly if the ROW is widened and additional vegetation is removed.

Impact Determination: Depending on the scale of the facility and site characteristics, visual impacts on Tribal resources and TCPs, without mitigation measures incorporated, are anticipated to vary and could be moderate to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

3.15.3.3 No Action Alternative

The No Action Alternative represents the scenario in which this Draft Programmatic EIS is not used and current management practices for siting and planning transmission facilities continue unchanged. Under this alternative, each project would continue to be evaluated on a case-by-case basis and reviewed for compliance with existing regulations, codes, and standard practices. While impact determinations would likely be similar to those outlined in this Draft Programmatic EIS, projects would not benefit from the impact reductions associated with the avoidance criteria developed and analyzed in this Draft Programmatic EIS. These criteria are anticipated to provide additional mitigation that further reduces potential environmental impacts.

3.15.4 Potential Mitigation Measures

This section describes measures that would eliminate, reduce the intensity of, or compensate for adverse impacts from construction, operation and maintenance, and upgrade or modification of transmission facilities. All general conditions adopted for this Draft Programmatic EIS, identified in Section 3.1, are relevant to this resource section. Applicants would be responsible for providing information within their application materials documenting the implementation of the general conditions.

Avoidance criteria adopted for this Draft Programmatic EIS are identified in Section 3.1. Avoidance Criteria that are relevant to this resource are described below:

AVOID-21 – Physical Impacts on Historic and Cultural Resources: Avoid physical impacts on historic and cultural resources.

Rationale: This criterion aims to avoid adverse physical impacts on historic and cultural resources (identified through survey for the project-specific application within 5 years of the project). Physical impacts within the boundaries of cultural and historic properties (i.e. buildings, archaeological sites, etc.) may be considered an adverse effect if the feature impacted contributes to the significance of the property.

AVOID-22 – Visual Impacts on Historic and Cultural Resources: Avoid visual impacts on historic and cultural resources.

Rationale: Visual impacts may be considered an adverse effect if the integrity of the historic property's setting and feeling are important to its significance. This avoidance criterion aims to avoid adverse visual impacts on historic and cultural resources.

AVOID-23 – Physical Impacts on Tribal Resources and TCPs: Avoid physical impacts on Tribal resources and Tribal Cultural Places (TCPs).

Rationale: This avoidance criterion aims to avoid adverse physical impacts on Tribal resources and TCPs.

AVOID-24 – Visual Impacts on Tribal Resources and TCPs: Avoid visual impacts on Tribal resources and Tribal Cultural Places (TCPs).

Rationale: This avoidance criterion aims to avoid adverse visual impacts on Tribal resources and TCPs.

Applicants would be responsible for providing information within their application materials documenting the project's compliance with the above avoidance criteria.

Potential mitigation measures have been identified to minimize adverse impacts from transmission facility projects. These measures are intended to be broad so that they can be applied to most projects that would be covered under this Programmatic EIS. However, project-specific plans would be needed to adapt the measures for project-specific applications.

When impact determinations are identified as moderate or high, the applicant would either adopt applicable mitigation measures from this Programmatic EIS or the SEPA Lead Agency may require applicable mitigation measures to be implemented to reduce project-specific impacts. When impact determinations are low, applicable mitigation measures should still be considered by the applicant and the SEPA Lead Agency as these measures would help to further reduce project-specific impacts, including the project's contribution to cumulative impacts. These measures would be implemented in addition to compliance with laws, regulations, environmental permits, plans, and design considerations required for transmission facilities.

The following mitigation measures could be adopted to mitigate adverse impacts:

Hist/Cultural-1 – WISAARD Database: While planning transmission facilities, gather information on previously surveyed historic and cultural resources.

Rationale: This mitigation measure aims to gather information on previously surveyed historic and cultural resources on the Washington State Department of Archaeology and Historic Preservation online Washington Information System for Architectural and Archaeological Records Data database for National Register of Historic Places-listed and eligible historic properties (https://wisaard.dahp.wa.gov/) to help applicants plan project area corridors.

Hist/Cultural-2 – Early Engagement: Conduct early engagement with interested parties, including Tribes.

Rationale: This mitigation measure aims to engage interested parties, particularly Tribes and the Washington State Department of Archaeology and Historic Preservation, in advance of application to get information and input from these groups on historic and cultural properties that may not be identified through publicly available background research and surveys.

Hist/Cultural-3 – Survey Methodology Approval: Obtain concurrence from the Washington State Department of Archaeology and Historic Preservation (DAHP) and Tribes on historic and cultural resource survey methodologies prior to conducting the surveys.

Rationale: This mitigation measure aims to consult and obtain concurrence from DAHP and Tribes on historic and cultural resource survey methodology, which would include the project area and anticipated viewshed of the project. Interested parties, particularly DAHP and the Tribes, should be included in development of the area to be surveyed (the APE) and survey methodology.

Hist/Cultural-4 – Cultural Resources Awareness Training. Provide cultural resources awareness training to construction, operation and maintenance, and upgrade or modification personnel.

Rationale: This mitigation measure ensures that project personnel are aware of regulations, protections, consequences, and procedures for an inadvertent discovery of cultural materials during construction, operation and maintenance, and upgrade or modification.

Hist/Cultural-5 – Trenchless Construction for Known Archaeological Resources: Use trenchless construction methods where feasible to minimize physical and visual impacts on known archaeological resources.

Rationale: Trenchless construction methods can be used to install subsurface cable where entry and exit pits are located outside of boundaries of cultural resources, Tribal resources, or Tribal Cultural Properties.

Trenchless construction reduces surface disruption as well as the visual presence of hanging cables, therefore minimizing potential impacts to resources.

Hist/Cultural-6 – Develop Avoidance, Monitoring, and Discovery Plan: Following a cultural resources survey or desktop search, develop and adhere to an archaeological monitoring plan and discovery plan.

Rationale: This mitigation measure aims to minimize impacts to cultural resources within or near the right-of-way (ROW) during construction, operation and maintenance, and upgrade or modification.

In addition to the above mitigation measures, the following mitigation measures[329] developed for other resources may be applicable:

Geo-1 – Minimize Soil Disturbance: Minimize soil disturbance, including footprints related to access roads and permanent structures, to the greatest extent practicable. Minimize the use of construction techniques that would be harmful to topsoil composition, where feasible.

Veg-3 – Site Transmission Facilities in Existing ROW or Disturbed Areas: Site transmission facilities in existing right-of-way (ROW) or disturbed areas, to the greatest extent practicable.

Vis-1 – Route Planning: Carefully select routes that minimize visual and ecological disruption. Route lines parallel to the contour line of slopes, where possible, and limit siting facilities to the following:

- On visually prominent ridgelines
- Near prominent landscape features and landmarks
- In proximity to visually sensitive viewpoints including National Historic Trails and Sites

Vis-2 – Selection of Finishes: Use dull and/or dark painted surfaces, textured surfaces, and low-reflectivity finishes on facilities. Finishes and colors should be appropriate to their location and context.

Vis-5 – Visual Screening: Use techniques such as berms, fencing, or vegetative screening to conceal or improve the appearance of distribution substations, above-ground vaults, and other facilities.

Vis-6 – Visual Impact Assessment: Conduct a visual impact assessment during project planning that defines the project’s viewshed and identifies an assessment zone large enough to capture all non-negligible visual impacts.

Vis-7 – Span Length: Maximize the span length when using overhead lines crossing highways and other linear viewing locations.

Vis-8 – Selection of Structure Type: Use the type of proposed transmission structure (i.e., H-frame or monopole) that best matches any adjacent transmission facilities.

3.15.5 Probable Significant Adverse Environmental Impacts

Determining the significance of an impact involves context and intensity, which, in turn, depend on the magnitude and duration of the impact. “Significant” in SEPA means a reasonable likelihood of more than a moderate adverse

[329] The rationales for the identified mitigation measures are provided in their respective resource sections.

impact on environmental quality. An impact may also be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred (Washington Administrative Code 197-11-794).

Identification of environmental impacts and assignment of discipline-specific ratings is based on professional judgment and information available at the time of writing. A precautionary approach has been taken for the assessment where information is currently unknown or unavailable.

This Draft Programmatic EIS weighs the impacts on historic and cultural resources that could result from transmission facilities after considering the application of laws and regulations; siting and design considerations, including agency guidance and BMPs; and mitigation and makes a resulting determination of significance for each impact. **Table 3.15-25** summarizes the impacts anticipated for the construction, operation and maintenance, and upgrade or modification of transmission facilities.

Table 3.15-25: Summary of Impacts, Mitigation Measures, and Significance Rating for Historic and Cultural Resources

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Historic and Cultural – Physical Impacts	Construction	Physical impacts on historic resources could result if the construction of overhead or underground transmission facilities disturb or remove contributing features, including trees, shrubs, and landscaping, within the NRHP boundary of NHLs, historic districts, farmsteads, listed parks, or historic districts. Physical impacts on cultural resources could result if construction activities disturb a known or unknown archaeological site. Disturbance during construction could include earthwork activities associated with creating new ROWs and installing transmission facility components, such as towers, substations, and access roads.	**Overhead:** negligible to high **Underground:** negligible to high	▪ **AVOID-21:** Physical Impacts on Historic and Cultural Resources ▪ **Hist/Cultural-1:** WISAARD Database ▪ **Hist/Cultural-2:** Early Engagement ▪ **Hist/Cultural-3:** Survey Methodology Approval ▪ **Hist/Cultural-4:** Cultural Resources Awareness Training ▪ **Hist/Cultural-5:** Trenchless Construction for Known Archaeological Resources ▪ **Hist/Cultural-6:** Develop Avoidance, Monitoring, and Discovery Plan ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas	Less than Significant	Impacts are unlikely to occur with regulatory compliance and implementation of the identified regulatory requirements, avoidance criteria, and mitigation measures. It is assumed that to reach a less than significant impact rating, all mitigation measures have been successfully applied and the SEPA and Section 106 Process have been completed with a No Adverse Effect Finding.
	Operation and Maintenance	Physical impacts on historic resources could result if the operation and maintenance of overhead and underground transmission facilities disturb or remove contributing features, including trees, shrubs, and landscaping within the NRHP boundary of NHLs, historic districts, farmstead, listed parks, or historic districts. Physical impacts on cultural resources from the operation and maintenance of overhead and underground transmission facilities could result if there are disturbances within the boundaries of a known archaeological site. Disturbances during operation and maintenance could include activities such as vegetation removal for ROW maintenance.	**Overhead:** nil to low **Underground:** nil to low			
	Upgrade or Modification	Physical Impacts on historic resources could result if the upgrade or modification of transmission facilities disturb or remove contributing features within the NRHP boundary of NHLs, historic districts, farmsteads, listed parks, or historic districts. Physical impacts on cultural resources could result from the upgrade or modification of transmission facilities if there are disturbances within the boundaries of a known archaeological site. Disturbances could include earthwork activities associated with upgrading existing transmission facilities, expanding the ROW, or clearing vegetation.	**Overhead:** negligible to high **Underground:** negligible to high			
	Construction	Visual impacts on historic resources during construction could result from the loss of vegetation or installation of new transmission facilities, such as overhead transmission structures, substations, access roads, and fencing that are located within the viewshed of NHLs, historic districts, farmstead, listed parks, or historic districts. Visual impacts on archaeological sites during construction could result from the installation of new transmission facilities within the viewshed of a historic/precontact site. Changes in the visual setting of these resources have the potential to diminish the integrity of setting, feeling, and association of the historic property, which may be important to its significance.	**Overhead:** negligible to high **Underground:** negligible to high	▪ **AVOID-22:** Visual Impacts on Historic and Cultural Resources ▪ **Hist/Cultural-1:** WISAARD Database ▪ **Hist/Cultural-2:** Early Engagement ▪ **Hist/Cultural-3:** Survey Methodology Approval ▪ **Hist/Cultural-4:** Cultural Resources Awareness Training ▪ **Hist/Cultural-5:** Trenchless Construction for Known Archaeological Resources	Less than Significant	Adverse visual impacts on historic and cultural resources can be addressed through the application of regulatory requirements, avoidance criteria, and mitigation measures. With the application of these requirements and measures, it is expected that impacts on historic and cultural resources would be less than significant.
	Operation and Maintenance	Changes in the visual setting of historic resources and archaeological sites are not expected to occur during operation and maintenance of overhead and underground facilities.	**Overhead:** N/A **Underground:** N/A			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[a]	Significance after Applying Mitigation	Rationale for Significance Rating
	Upgrade or Modification	Visual impacts on historic resources could result from the upgrade or modification of existing transmission facilities if the removal of vegetation and/or the installation of transmission towers, substations, and ROW corridors occur are located within the viewshed of NHLs, historic districts, farmstead, listed parks, and historic districts. Visual impacts on archaeological sites could result from the upgrade or modification of existing transmission facilities if the upgrade or modification occurs within the viewshed of a historic/precontact site. Changes in the visual setting of these resources have the potential to diminish the integrity of setting, feeling, and association of the historic property, which may be important to its significance.	**Overhead:** negligible to high **Underground:** negligible to high	▪ **Hist/Cultural-6:** Develop Avoidance, Monitoring, and Discovery Plan ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas ▪ **Vis-1:** Route Planning ▪ **Vis-2:** Selection of Finishes ▪ **Vis-5:** Visual Screening ▪ **Vis-6:** Visual Impact Assessment ▪ **Vis-7:** Span Length ▪ **Vis-8:** Selection of Structure Type		
Cultural – Physical Impacts on Tribal Resources and TCPs	Construction	Construction of new transmission facilities could result in the loss of vegetation in areas where Tribal fishing, hunting, and gathering activities take place, thereby having the potential impact on Tribal resources. Construction activities could also impact food forests and foraging landscapes, and important foraging grounds for migratory populations of game. Construction of new transmission facilities could impact TCPs if the new transmission facilities occur within the boundary of a known or unknown TCP. The loss of vegetation could impact TCPs if the TCP has been nominated due to the presence of certain species. Underground transmission facility construction could impact TCPs should TCPs with significant subsurface deposits be disturbed.	**Overhead:** moderate to high **Underground:** negligible to high	▪ **AVOID-23:** Physical Impacts on Tribal Resources and TCPs ▪ **Hist/Cultural-1:** WISAARD Database ▪ **Hist/Cultural-2:** Early Engagement ▪ **Hist/Cultural-3:** Survey Methodology Approval ▪ **Hist/Cultural-4:** Cultural Resources Awareness Training ▪ **Hist/Cultural-5:** Trenchless Construction for Known Archaeological Resources ▪ **Hist/Cultural-6:** Develop Avoidance, Monitoring, and Discovery Plan ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas	Less than Significant	Adverse impacts on Tribal resources and TCPs associated with the construction, operation, and upgrade or modification of transmission facilities can be addressed through the application of regulatory requirements, avoidance criteria, and mitigation measures. It is expected for impacts on Tribal resources and TCPs to be less than significant only when project-specific applications comply with all applicable regulatory, avoidance, and mitigation requirements.
	Operation and Maintenance	The only physical impact on Tribal resources and TCPs that could occur during operation and maintenance of transmission facilities would result from using access roads to access ROW and underground transmission vaults or from maintaining the ROW, including trimming and clearing of vegetation. Impacts on Tribal resources and TCPs could result if the vegetation intersects locations where Tribal resources are hunted, gathered, or fished. Impacts on TCPs could result if the loss of vegetation diminishes the setting and feeling of the TCP.	**Overhead:** low to high **Underground:** negligible to high			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
	Upgrade or Modification	Upgrade or modification to existing transmission facilities could impact Tribal resources or TCPs if the disturbance impacts physical features that contribute to its significance. Vegetation removal or habitat loss could also impact food forests and foraging landscapes, and important foraging grounds for migratory populations of game. Upgrade or modification to existing transmission facilities could physically impact Tribal resources and TCPs if the action results in the damage or destruction of resources or elements within the boundary of the TCP or Tribal resource.	**Overhead:** negligible to high **Underground:** moderate to high			
Cultural – Visual Impacts on Tribal resources and TCPs	Construction	Introduction of new transmission facilities, including towers, substations, and access roads within the viewshed of Tribal resources and TCPs could result in adverse visual impacts on Tribal resources and TCPs. Loss of vegetation for new ROW or transmission facilities that are within a viewshed of or intersects locations where Tribal resources are hunted, gathered, or fished could impact the resource. Changes in the visual setting of Tribal resources and TCPs may have the potential to diminish the resource's integrity of setting, feeling, and association, which may be important to its significance.	**Overhead:** moderate to high **Underground:** moderate to high	▪ **AVOID-24:** Visual Impacts on Tribal Resources and TCPs ▪ **Hist/Cultural-1:** WISAARD Database ▪ **Hist/Cultural-2:** Early Engagement ▪ **Hist/Cultural-3:** Survey Methodology Approval ▪ **Hist/Cultural-4:** Cultural Resources Awareness Training ▪ **Hist/Cultural-5:** Trenchless Construction for Known Archaeological Resources ▪ **Hist/Cultural-6:** Develop Avoidance, Monitoring, and Discovery Plan ▪ **Geo-1:** Minimize Soil Disturbance ▪ **Veg-3:** Site Transmission Facilities in Existing ROW or Disturbed Areas ▪ **Vis-1:** Route Planning ▪ **Vis-2:** Selection of Finishes ▪ **Vis-5:** Visual Screening ▪ **Vis-6:** Visual Impact Assessment ▪ **Vis-7:** Span Length ▪ **Vis-8:** Selection of Structure Type	Less than Significant	Adverse impacts on Tribal resources and TCPs associated with the construction, operation, and upgrade or modification of transmission facilities can be addressed through the application of regulatory requirements, avoidance criteria, and mitigation measures. With the application of these requirements and measures, it is expected that impacts on Tribal resources and TCPs would be less than significant.
	Operation and Maintenance	Changes in the visual setting of Tribal resources and TCPs are not expected to occur during the operation and maintenance of overhead and underground facilities.	**Overhead:** N/A **Underground:** N/A			
	Upgrade or Modification	Potentially taller or different types of transmission structures could expand or disrupt the viewshed and include additional Tribal resources and TCPs. Introduction of modern structures into the viewshed of these resources could impact these resources if setting is a significant aspect of integrity for the Tribal resource or TCP. Changes in the visual setting of Tribal resources and TCPs may have the potential to diminish a site's integrity of setting, feeling, and association, which may be important to its significance.	**Overhead:** negligible to high **Underground:** moderate to high			

[(a)] Appendix 3.1-1 provides a detailed listing of each general condition, avoidance criteria, and mitigation measure. Having these details in an appendix serves as a comprehensive reference section that can be consulted independently of the main text. This is particularly useful for detailed guidance and technical specifications that may be referred to multiple times. Additionally, including this information in an appendix allows for easier updates and revisions. If mitigation measures or guidelines change, the appendix can be updated without altering the main content.

NHL = National Historic Landmark; N/A = not applicable; NRHP = National Register of Historic Places; ROW = right-of-way; SEPA = Washington State Environmental Policy Act; TCP = Traditional Cultural Place; WISAARD = Washington Information System for Architectural and Archaeological Records Data

This Page Intentionally Left Blank

3.15.6 Suitability Map

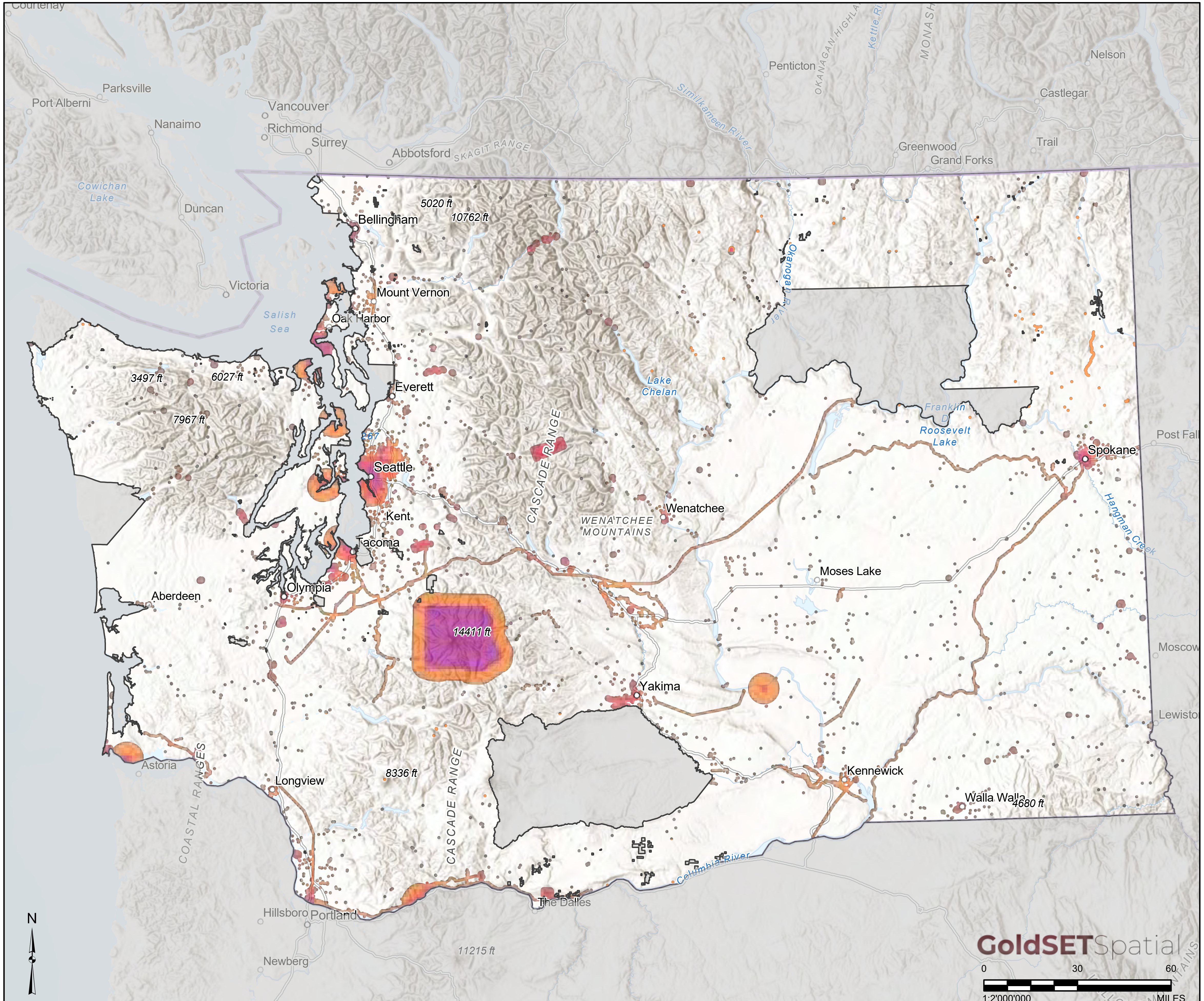
Project-specific reviews would include a comprehensive review and analysis to identify the site-specific adverse impacts on resources to determine the suitability of this Draft Programmatic EIS. Environmental review may be phased by incorporating relevant information from this Draft Programmatic EIS by reference while evaluating site-specific adverse impacts of the individual project applications. For more information on phased reviews, please refer to Chapter 1, Introduction.

Project-specific applications would include details about the precise location and site-specific conditions. This Draft Programmatic EIS provides a suitability map that, when incorporated with project-specific applications, could be used to facilitate more informative and efficient environmental planning.

Due to the confidential nature of archaeological resources, a suitability map has not been prepared for this Draft Programmatic EIS. Applicants, in coordination with the SEPA Lead Agency, should work directly with the DAHP to determine what cultural resource surveys are required for a project-specific application. Early and meaningful stakeholder and Tribal engagement should be conducted in coordination with the DAHP.

Although a suitability map for archaeological resources was not prepared, this Draft Programmatic EIS prepared a suitability map for historic resources. **Figure 3.15-2** represents the suitability map for historic resources and identifies the appropriateness of areas using applicable laws and regulations, criteria specific to the siting of transmission facilities, and knowledge from subject matter experts.

This Page Intentionally Left Blank



LEGEND

Study Area

Conflict Indicator Key

- Neutral
- Low
- Low-Medium
- Medium
- Medium-High
- High
- Very High

THE SEAL OF THE STATE OF WASHINGTON 1889

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES

1. WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS; ESRI, USGS
2. THE CONFLICT INDICATOR KEY CAN BE USED TO IDENTIFY AND HIGHLIGHT AREAS WHERE DIFFERENT PROJECT CONSTRAINTS MAY OVERLAP, POTENTIALLY LEADING TO CONFLICTS. THE KEY USES DIFFERENT COLORS TO REPRESENT THE INTENSITY OR LIKELIHOOD OF CONFLICT.

PROJECT
DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE
SUITABILITY MAP FOR HISTORIC

YYYY-MM-DD 2024-12-18 CONSULTANT wsp FIGURE 3.15-2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

This Page Intentionally Left Blank

3.15.6.1 Suitability Map Methodology

The suitability map evaluates various criteria and assigns a suitability score to different areas based on how well those areas meet the desired conditions.

A number of individual siting decision criteria, referred to as indicators in GoldSET, were identified by subject matter experts for inclusion in this resource's suitability map. Subject matter experts assigned a weighting based on the degree of constraint (i.e., high, medium or low), or potential difficulty for a transmission facility to traverse an area. Each of the GoldSET Indicator cards describing the criteria chosen and the source of the data layers used are provided in **Appendix 3.15-2.**

A summary of the criteria used to produce each GoldSET card is provided below.

Historic and Cultural Resources GoldSET Card – Medium Impact – Historic Districts

Historic districts registered within the State of Washington. The immediate vicinity around historic districts would be slightly impacted by transmission facility construction, upgrade or modification, and could also be impacted to a lesser extent by operation and maintenance if the setting and feeling are important to the significance of the district.

Note that a buffer greater than 0.5 mile and less than 1 mile around each historic district is provided in the dataset.

Historic and Cultural Resources GoldSET Card – Medium Impact – Historical Landmarks

National Historic Landmarks registered within the State of Washington. Historic landmarks would be moderately impacted by transmission facility construction, upgrade or modification, and could also be impacted to a lesser extent by operation and maintenance if the setting and feeling are important to the significance of the district.

Note that a buffer greater than 1 mile and less than 5 miles around each historic landmark is provided in the dataset.

Historic and Cultural Resources GoldSET Card – Medium Conflict – Nationally Registered Historic Sites and Washington Heritage Sites

Historic and heritage sites registered within the State of Washington from the Historic Property Inventory. Resources listed/eligible in the NRHP/WHR could be impacted to a moderate degree by transmission facility construction, upgrade or modification, and could also be impacted to a lesser extent by operation and maintenance if the setting and feeling are important to the significance of the resource.

Note that a 0.5-mile buffer around each historic site is provided in the dataset.

Historic and Cultural Resources GoldSET Card – High Impact – Historic Districts

Historic districts registered within the State of Washington. Historic districts would be highly impacted by transmission facility construction, upgrade or modification, and could also be impacted to a lesser extent by operation and maintenance if the setting and feeling are important to the significance of the district.

Note that a 0.5-mile buffer around each historic district was provided in the dataset.

Historic and Cultural Resources GoldSET Card – High Impact – Historical Landmarks

National historic landmarks registered within the State of Washington. Historic landmarks would be highly impacted by transmission facility construction, upgrade or modification, and could also be impacted to a lesser extent by operation and maintenance if the setting and feeling are important to the significance of the district.

Note that a 1-mile buffer from each historic landmark is provided in the dataset.

3.16 Socioeconomics

This Draft Programmatic Environmental Impact Statement (EIS) considers impacts on socioeconomics resulting from the construction, operation and maintenance, and upgrade or modification of transmission facilities described in Chapter 2. This section addresses the following topics related to the construction, operation and maintenance, and upgrade or modification of high-voltage electric transmission facilities (transmission facilities) in the State of Washington:

- Section 3.16.1 identifies regulatory, siting, and design considerations.
- Section 3.16.2 describes the affected environment.
- Section 3.16.3 describes impacts.
- Section 3.16.4 describes potential mitigation measures.
- Section 3.16.5 identifies probable significant adverse environmental impacts on socioeconomics.
- Section 3.16.6 provides a suitability map and scoring for the siting of transmission facilities as it relates to socioeconomics based on the identified considerations, impacts, and mitigation measures.

3.16.1 Regulatory, Siting, and Design Considerations

This Draft Programmatic EIS establishes a broad framework for compliance, outlining general laws, regulations, best management practices (BMPs), and design considerations. It is assumed that project-specific applications will be developed within this pre-established regulatory context and are expected to comply with existing laws and regulations. If the project does not comply with applicable laws and regulations or fails to adhere to design considerations or BMPs, additional project-specific environmental review and mitigation would be required. The applicable federal and state laws and regulations relevant to socioeconomics and environmental justice are summarized in **Table 3.16-1**.

Table 3.16-1: Laws and Regulations for Socioeconomics

Applicable Legislation	Agency	Summary Information
42 USC 2000d, Title VI of the Civil Rights Act of 1964, as amended by the Civil Rights Restoration Act of 1987	U.S. Department of Justice	This law prohibits discrimination based on race, color, and national origin in programs and activities that receive federal financial assistance.
EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	U.S. Environmental Protection Agency	This Executive Order states that each federal agency: *shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.* The EPA defines environmental justice as: *fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.*

Applicable Legislation	Agency	Summary Information
EO 13166, Improving Access to Services for Persons with Limited English Proficiency	U.S. Department of Justice, Civil Rights Division	This EO: *requires Federal agencies to examine the services they provide, identify any need for services to those with limited English proficiency, and develop and implement a system to provide those services so limited English proficiency persons can have meaningful access to them*.
EO 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All	Council on Environmental Quality and the White House Environmental Justice Interagency Council	This EO states: *To fulfill our Nation's promises of justice, liberty, and equality, every person must have clean air to breathe; clean water to drink; safe and healthy foods to eat; and an environment that is healthy, sustainable, climate-resilient, and free from harmful pollution and chemical exposure* (EO 14096).
Washington State Environmental Policy Act	Washington Energy Facility Site Evaluation Council Washington State Department of Ecology Local governments	This act is a process that identifies and analyzes environmental impacts that can be related to issuing permits. SEPA helps permit applicants and decision-makers understand how a proposed project will impact the environment. Certain projects, as defined in the SEPA Rules (WAC 197-11-704) and that are not exempt, are required to go through the SEPA process.
RCW 19.405, Washington Clean Energy Transformation Act	Washington State Department of Commerce[a]	This act sets targets for reducing greenhouse gas emissions and establishes energy efficiency standards for buildings and appliances. The act states: *It is the policy of the state to eliminate coal-fired electricity, transition the state's electricity supply to one hundred percent carbon-neutral by 2030, and one-hundred percent carbon-free by 2045.*
RCW 36.70A, Growth Management – Planning by Selected Counties and Cities	Washington State Department of Commerce[a]	Known as the Growth Management Act, this series of state statutes requires counties and cities whose population growth exceeds stated thresholds to develop a comprehensive plan that assists in managing their population growth.
RCW 70A.02, Environmental Justice	Environmental Justice Council[a]	This regulation codifies Washington's approach to environmental justice into law through implementation of Environmental Justice Task Force recommendations. It outlines environmental justice obligations for agencies and requirements for environmental justice assessments and accurate reporting in order to reduce environmental and health disparities in Washington.
RCW 80.28, Gas, Electrical and Water Companies	Washington Utilities and Transportation Commission	This regulation governs gas, electrical, wastewater, and water companies in Washington. It requires that companies provide safe and efficient services at just and reasonable costs and covers utility tariff regulations. It also allows gas and electric companies to offer discounted rates, grants, and other assistance programs for low-income customers.

Applicable Legislation	Agency	Summary Information
Washington State Office of the Chief Information Officer Policy 188	The Washington State Office of the Chief Information Officer[(a)]	This policy outlines the obligations for state agencies to ensure that individuals with disabilities have equal access to information, data, and services as those without disabilities, at the minimum levels of compliance (DOC n.d.).
WAC 197-11-448, Relationship of EIS to other considerations	Washington State Department of Ecology[(a)]	This regulation identifies that, while SEPA considers general welfare, social, and economic standing in decision making, such socioeconomic impacts are not specifically required to be discussed in an EIS. However, this code identifies that agencies have the option to combine an EIS with additional analyses being used by each agency with jurisdiction, including socioeconomic analyses required for projects regulated by EFSEC.
WAC 463-60-535, Socioeconomic impact	Washington Energy Facility Site Evaluation Council	This requirement identifies the importance of including socioeconomic impact analysis in applications for site certification under consideration by EFSEC.
WAC 480-80, Utilities General – Tariffs and Contracts	Washington Utilities and Transportation Commission	This regulation outlines tariff regulations for including requirements, content and formatting among others for any public service company that is subject to the jurisdiction of the commission as to rates and services under the provisions of Title 80 RCW.

Note:

(a) The agency responsible for administering most permits or authorizations for the identified regulation. However, if EFSEC is determined to be the agency responsible for approving a proposal, EFSEC can administer several types of permits at the state and local level. EFSEC provides a streamlined process for siting and licensing major energy facilities, including transmission facilities in Washington State. EFSEC coordinates all evaluation and licensing steps, specifies the conditions for construction and operation, and issues a Site Certification Agreement, which assumes the responsibility for issuing individual state or local permits. By consolidating these permits into a single Site Certification Agreement, EFSEC can simplify the regulatory process for energy facility developers. While EFSEC itself does not directly administer federal permits, it works closely with federal agencies to ensure that all necessary federal requirements are met during the evaluation and licensing of energy facilities.

EFSEC = Washington Energy Facility Site Evaluation Council; EIS = environmental impact statement; EO = Executive Order; EPA = U.S. Environmental Protection Agency; RCW = Revised Code of Washington; SEPA = State Environmental Policy Act; USC = United States Code; WAC = Washington Administrative Code

The siting of transmission facilities is determined by engineering, technical, environmental, and socioeconomic factors. **Table 3.16-2** summarizes guidance documents and management plans that outline the design considerations and BMPs generally used to avoid or minimize impacts on socioeconomics, vulnerable populations[330] and overburdened communities.

[330] Population groups that are more likely to be at higher risk for poor health outcomes in response to environmental harms, due to: (i) Adverse socioeconomic factors, such as unemployment, high housing and transportation costs relative to income, limited access to nutritious food and adequate health care, linguistic isolation, and other factors that negatively affect health outcomes and increase vulnerability to the effects of environmental harms; and (ii) sensitivity factors, such as low birth weight and higher rates of hospitalization.

Vulnerable populations include, but are not limited to: (i) Racial or ethnic minorities; (ii) Low-income populations; (iii) Populations disproportionately impacted by environmental harms; and (iv) Populations of workers experiencing environmental harms.

Table 3.16-2: Siting and Design Considerations for Socioeconomics

Siting and Design Consideration	Description
Transmission Corridors Work Group: Final Report (EFSEC 2022)	This report outlines principles and best management practices for siting and constructing new or upgraded transmission facilities, emphasizing the transmission impacts and needs of overburdened communities, background findings, geographic needs and considerations, and transmission-related challenges. This report outlines the following necessities: ▪ Public engagement ▪ Support programs to develop skilled labor ▪ Utilization of screening tools ▪ Identification of participating agencies and jurisdictions
Recommendations for prioritizing Environmental Justice in Washington State Government (Environmental Justice Task Force 2020)	This report outlines recommendations for addressing environmental health disparities in Washington. It includes goals to reduce these disparities, model policies to prioritize vulnerable communities, and guidance for using the Environmental Health Disparity Map to identify impacted areas. This report also offers best practices for meaningful community engagement and emphasizes state agencies' roles in environmental justice issues and developing inclusive strategies to ensure equitable health outcomes for all residents.
Guide to Advancing Opportunities for Community Benefits through Energy Project Development (DOE 2017)	This guide outlines strategies for integrating community benefits into energy projects, emphasizing the importance of engaging local communities in the planning and development processes to ensure that projects not only meet energy needs but also enhance local economies, provide job opportunities, and address social equity.
Transmission Planning for the 21st Century: Proven Practices that Increase Value and Reduce Costs (Brattle Group and Grid Strategies 2021)	This report outlines effective strategies for transmission planning to improve infrastructure, enhance grid reliability, and ensure that customers pay just and reasonable rates.
The National Transmission Planning Study (DOE 2024a)	This report examines the current state and future needs of the U.S. transmission system to ensure it can support a reliable and sustainable energy supply. This report provides recommendations for improving planning processes, including public and stakeholder engagement, and highlights the necessity for careful consideration of environmental, health, and community impacts.
Federal Energy Regulatory Commission guidelines	FERC revises and approves guidelines for the siting and permitting of interstate electric transmission facilities, including environmental impact assessments and public engagement processes.

Siting and Design Consideration	Description
Guidelines and Principles for Social Impact Assessment (SIA 1994)	This guideline outlines a framework for evaluating the social implications of proposed projects and policies to ensure that social factors are integrated into the decision-making process. It emphasizes the following principles: ▪ Stakeholder engagement ▪ Comprehensive data collection ▪ Social analysis throughout project lifecycle

FERC = Federal Energy Regulatory Commission

3.16.2 Affected Environment

This section discusses the existing socioeconomic and environmental justice conditions throughout Washington.

3.16.2.1 Socioeconomics

The U.S. Centers for Disease Control and Prevention defines socioeconomic status as a multidimensional concept encompassing the absolute or relative economic resources, power, and prestige associated with the wealth of individuals, communities, or countries, including factors like income, education, and employment, among others (CDC 2023).

While the Washington Administrative Code (WAC) does not provide a specific definition for socioeconomics, WAC 463-60-535 details the conditions that should be evaluated in a socioeconomic impact analysis for a project submitted to the Washington Energy Facility Site Evaluation Council (EFSEC) for review. The regulation states that a detailed socioeconomic impact analysis should identify primary, secondary, and positive as well as negative impacts on the socioeconomic environment in the area potentially affected by the project. The analysis should pay particular attention to the impact of the proposed facility on population, work force, property values, housing, health facilities and services, education facilities, governmental services, and local economy.

This socioeconomic analysis utilizes data from the State of Washington and its individual counties to describe the affected environment for the nonproject Programmatic EIS review, including the following key components:

- Population and Growth Rate
- Population Projections
- Housing Conditions
- Workforce Conditions
- Economic Conditions
- Fiscal Conditions
- Taxation and Tariff
- Environmental Justice, including vulnerable populations and overburdened communities

Population and Growth Rate

About 7.7 million people live in Washington, in communities ranging from concentrated urbanized areas to sparsely populated rural areas. The populations of Washington's counties range from about 2,300 in Garfield County to approximately 2.27 million in King County. **Table 3.16-3** presents population data in Washington, by county.

Table 3.16-3: 2020 Population Data

Geographic Area	Population	Percentage of State Population
Adams County	20,613	0.3
Asotin County	22,285	0.3
Benton County	206,873	2.7
Chelan County	79,074	1.0
Clallam County	77,155	1.0
Clark County	503,311	6.5
Columbia County	3,952	0.1
Cowlitz County	110,730	1.4
Douglas County	42,938	0.6
Ferry County	7,178	0.1
Franklin County	96,749	1.3
Garfield County	2,286	0.0
Grant County	99,123	1.3
Grays Harbor County	75,636	1.0
Island County	86,857	1.1
Jefferson County	32,977	0.4
King County	2,269,675	29.5
Kitsap County	275,611	3.6
Kittitas County	44,337	0.6
Klickitat County	22,735	0.3
Lewis County	82,149	1.1
Lincoln County	10,876	0.1
Mason County	65,726	0.9
Okanogan County	42,104	0.5
Pacific County	23,365	0.3
Pend Oreille County	13,401	0.2
Pierce County	921,130	12.0
San Juan County	17,788	0.2
Skagit County	129,523	1.7
Skamania County	12,036	0.2
Snohomish County	827,957	10.7
Spokane County	539,339	7.0
Stevens County	46,445	0.6
Thurston County	294,793	3.8
Wahkiakum County	4,422	0.1

Geographic Area	Population	Percentage of State Population
Walla Walla County	62,584	0.8
Whatcom County	226,847	2.9
Whitman County	47,973	0.6
Yakima County	256,728	3.3
Total Population	7,705,281	n/a

Source: 2020 Decennial Census, Table P1 Race (U.S. Census Bureau 2020a)

According to the 2020 U.S. Census Bureau decennial census, approximately 52 percent of Washington's population live in just three counties: King, Pierce, and Snohomish. The populations of these counties range from about 2.27 million in King County to approximately 827,957 in Snohomish County (see **Table 3.16-3**).

The population distribution in Washington's counties generally aligns with its major urban centers. For example, King County includes Seattle, the state's most populous city, and Bellevue, the state's fifth largest city. Pierce County, with a population of 921,130, is the second most populous county and includes Tacoma, the third largest city in the state (U.S. Census Bureau 2020a).

Population Projections

Population growth can result from either net in-migration or natural increase. Net in-migration occurs when more people move to an area than leave. Natural increase occurs when there are more births than deaths. Since 2010, Washington's population has been growing at an average of over 100,000 persons per year. Between 2011 and 2023, in-migration accounted for 68.7 percent of Washington's population growth, with natural increase accounting for the remaining 31.3 percent (OFM 2024a).

The Washington Office of Financial Management (OFM) is responsible for preparing county population projections to support planning under Washington's Growth Management Act (GMA). The OFM develops three sets of growth projections for each county: high, medium, and low. The medium-growth projection is considered the most likely scenario, as it is based on assumptions validated by historical and current data. These projections are crucial for long-term planning and resource allocation. The current projections, developed to support the GMA, extend through the year 2050 and provide a comprehensive outlook for future population trends. **Table 3.16-4** presents projection data based on the OFM's medium-growth scenario.

Table 3.16-4: Growth Management Act Mid-Level Growth Rate Projections

Geographic Area	2010 Population	2020 Population	Percentage Increase (2010–2020)	2030 Projection	Percentage Increase (2020–2030)	2040 Projection	2050 Projection
Adams	18,728	20,613	10.1%	22,565	9.47%	24,387	26,100
Asotin	21,623	22,285	3.1%	23,214	4.17%	23,815	24,111
Benton	175,177	206,873	18.1%	235,177	13.68%	262,587	288,887
Chelan	72,453	79,141	9.2%	85,889	8.53%	91,914	97,195
Clallam	71,404	77,155	8.1%	81,791	6.01%	85,374	87,800
Clark	425,363	503,311	18.3%	583,307	15.89%	660,653	735,724
Columbia	4,078	3,952	-3.1%	3,806	-3.69%	3,625	3,366
Cowlitz	102,410	110,730	8.1%	118,309	6.84%	125,320	130,993

Geographic Area	2010 Population	2020 Population	Percentage Increase (2010–2020)	2030 Projection	Percentage Increase (2020–2030)	2040 Projection	2050 Projection
Douglas	38,431	42,938	11.7%	47,750	11.21%	52,256	56,461
Ferry	7,551	7,178	-4.9%	7,239	0.85%	7,169	6,986
Franklin	78,163	96,749	23.8%	114,907	18.77%	132,930	150,970
Garfield	2,266	2,286	0.9%	2,247	-1.71%	2,172	2,061
Grant	89,120	99,123	11.2%	111,367	12.35%	123,116	134,321
Grays Harbor	72,797	75,636	3.9%	77,203	2.07%	77,614	76,892
Island	78,506	86,857	10.6%	93,670	7.84%	99,870	105,250
Jefferson	29,872	32,977	10.4%	36,226	9.85%	39,170	41,719
King	1,931,249	2,269,675	17.5%	2,487,380	9.59%	2,690,851	2,879,176
Kitsap	251,133	275,611	9.7%	297,608	7.98%	317,694	335,268
Kittitas	40,915	46,468	13.6%	52,091	12.10%	57,521	62,643
Klickitat	20,318	22,735	11.9%	24,511	7.81%	26,059	27,376
Lewis	75,455	82,149	8.9%	87,746	6.81%	92,313	95,871
Lincoln	10,570	10,876	2.9%	11,270	3.62%	11,459	11,496
Mason	60,699	65,726	8.3%	72,981	11.04%	79,792	85,947
Okanogan	41,120	42,104	2.4%	43,676	3.73%	44,660	45,101
Pacific	20,920	23,365	11.7%	24,475	4.75%	25,033	25,183
Pend Oreille	13,001	13,401	3.1%	14,442	7.77%	15,311	16,009
Pierce	795,225	920,393	15.7%	1,015,395	10.32%	1,104,062	1,186,146
San Juan	15,769	17,788	12.8%	19,986	12.36%	22,046	23,957
Skagit	116,901	129,523	10.8%	142,805	10.25%	155,142	166,281
Skamania	11,066	11,604	4.9%	12,529	7.97%	13,322	14,006
Snohomish	713,335	827,957	16.1%	935,370	12.97%	1,039,254	1,138,649
Spokane	471,221	539,339	14.5%	587,377	8.91%	630,994	669,671
Stevens	43,531	46,445	6.7%	50,215	8.12%	53,502	56,278
Thurston	252,264	294,793	16.9%	333,783	13.23%	371,542	407,392
Wahkiakum	3,978	4,422	11.2%	4,713	6.58%	4,925	5,070
Walla Walla	58,781	62,584	6.5%	64,977	3.82%	66,695	67,645
Whatcom	201,140	226,847	12.8%	254,158	12.04%	280,275	304,836
Whitman	44,776	47,973	7.1%	49,489	3.16%	50,698	51,459
Yakima	243,231	256,728	5.5%	271,120	5.61%	283,351	293,279
State	6,724,540	7,706,310	14.6%	8,502,764	10.34%	9,248,473	9,937,575

Source: 2022 Growth Management Act Projections (OFM 2024b) and 2017 Growth Management Act projections (OFM 2017).

Washington's population grew by 14.6 percent between 2010 and 2020. Franklin County saw the highest growth rate at 23.8 percent, followed by Clark County at 18.3 percent and Benton County at 18.1 percent. Conversely, Ferry County experienced the largest population decline, with a 4.9 percent decrease, and Columbia County saw a 3.1 percent decrease during the same period.

Between 2020 and 2030, it is projected that the population of Washington will increase by over 10 percent, or more than 796,000 people (OFM 2024b). This percentage suggests that Washington's population growth rate would exceed the national average of 5.5 percent over the same 10-year period. According to the OFM's 2030 projections, Franklin County's population is expected to increase by 18.77 percent, Clark County's population by 15.89 percent, and Benton County's population by 13.68 percent. In comparison, by 2030, Columbia County is expected to experience a decrease in population of 3.69 percent and Garfield County by 1.71 percent. These two counties are expected to experience the only declines in population on a percentage basis.

Housing Conditions

The U.S. Census Bureau defines a housing unit as a house, apartment, mobile home or trailer, group of rooms, or single room occupied or intended to be occupied as separate living quarters (U.S. Census Bureau 2021). **Table 3.16-5** summarizes housing resources in Washington. The data presented in this table are annual estimates prepared by the U.S. Census Bureau Decennial Census and American Community Survey (ACS) 5-Year Estimate.

Table 3.16-5: Housing Characteristics

County	Total Housing Units	Occupied Housing Units	Vacant Housing	Renter Occupied	Rental Vacancy Rates	Median Home Value	Median Rent Cost
Adams	6,774	6,304	470	2,212	4.4%	$216,900	$902
Asotin	10,109	9,499	610	2,640	0.2%	$266,400	$941
Benton	80,421	75,509	4,912	24,125	5.0%	$338,700	$1,166
Chelan	37,581	30,414	7,167	11,116	4.0%	$412,300	$1,142
Clallam	37,994	34,128	3,866	9,234	2.2%	$353,600	$1,093
Clark	196,557	188,863	7,694	62,839	2.9%	$453,200	$1,572
Columbia	2,196	1,804	392	450	0.0%	$229,600	$847
Cowlitz	45,540	43,167	2,373	14,503	2.2%	$332,200	$1,090
Douglas	17,438	15,474	1,964	4,654	3.2%	$366,800	$1,181
Ferry	4,100	3,025	1,075	721	1.2%	$252,700	$690
Franklin	29,806	28,350	1,456	8,526	3.3%	$308,700	$1,124
Garfield	1,202	1,009	193	227	9.2%	$190,000	$725
Grant	38,851	33,666	5,185	11,861	4.8%	$244,500	$979
Grays Harbor	36,204	29,542	6,662	8,497	3.3%	$249,900	$943
Island	42,098	35,498	6,600	9,291	7.5%	$480,800	$1,517
Jefferson	19,148	15,859	3,289	3,112	3.2%	$449,300	$1,169
King	972,821	916,270	56,551	401,313	4.5%	$761,500	$1,950
Kitsap	113,930	106,031	7,899	31,981	3.5%	$463,000	$1,635
Kittitas	23,918	19,250	4,668	7,402	5.4%	$417,600	$1,152
Klickitat	10,602	9,618	984	2,405	1.5%	$352,500	$986
Lewis	35,604	31,511	4,093	8,525	4.9%	$306,600	$1,016
Lincoln	5,785	4,532	1,253	1,004	2.2%	$232,500	$839
Mason	33,461	25,488	7,973	5,305	4.8%	$340,300	$1,137
Okanogan	21,917	17,005	4,912	5,138	4.2%	$251,100	$862
Pacific	16,085	10,689	5,396	1,910	4.1%	$252,100	$955

County	Total Housing Units	Occupied Housing Units	Vacant Housing	Renter Occupied	Rental Vacancy Rates	Median Home Value	Median Rent Cost
Pend Oreille	7,993	5,737	2,256	1,374	4.1%	$288,200	$793
Pierce	360,816	341,783	19,033	121,139	3.9%	$444,600	$1,604
San Juan	13,851	8,654	5,197	1,945	4.9%	$673,700	$1,279
Skagit	55,875	50,824	5,051	15,078	1.1%	$444,300	$1,350
Skamania	5,830	4,812	1,018	903	7.4%	$443,000	$1,019
Snohomish	323,438	307,643	15,795	96,712	4.5%	$592,800	$1,794
Spokane	225,044	213,524	11,520	77,399	2.9%	$331,600	$1,123
Stevens	22,312	18,471	3,841	3,745	1.9%	$277,300	$ 827
Thurston	121,682	115,695	5,987	37,865	3.8%	$411,700	$1,499
Wahkiakum	2,200	1,954	246	288	2.0%	$319,100	$1,110
Walla Walla	25,032	22,978	2,054	7,778	7.6%	$331,600	$1,044
Whatcom	100,394	91,171	9,223	33,729	2.9%	$475,000	$1,370
Whitman	20,974	17,963	3,011	9,840	11.0%	$298,500	$959
Yakima	90,660	85,558	5,102	32,234	2.9%	$254,700	$1,010
Washington State Total	3,216,243	2,979,272	236,971	1,079,020	4.0%	$473,400	$1,592

Source: American Community Survey (2022) 5-Year Estimate Data (U.S. Census Bureau 2022a)

The median home value reported by the U.S. Census Bureau for 2022 in Washington was $437,400, and the median rent was $1,592. Median home values ranged from $190,000 in Garfield County to over $760,000 in King County. Median rent for renter-occupied units ranged from $690 in Ferry County to $1,950 in King County (U.S. Census Bureau 2022a).

The 2022 ACS five-year estimate suggests that rental housing is available statewide. An estimated 236,971 units, or over 7 percent of total housing units, were vacant in Washington for the reported year of 2022. The two counties with the highest vacancy rates on a percentage basis for the reported year of 2022 were San Juan County, with over 37 percent, and Pacific County, with over 33 percent. Conversely, Clark County, with 3.9 percent, Franklin County, with 4.8 percent, and Snohomish County, with 4.8 percent, had the lowest countywide vacancy rates in the state on a percentage basis for the reported year of 2022.

Rental vacancy rate is the percentage of unoccupied rental units. Generally, rental vacancy rates ranged from 0.2 percent in Asotin County to 11 percent in Whitman County (U.S. Census Bureau 2022a). Columbia County was the only county with a 0 percent rental vacancy rate. This indicates that there were no unoccupied rental units in this county at the time of the 2022 ACS five-year estimate. In all counties across Washington, aside from rental units, temporary housing is available in the form of hotel and motel rooms and recreational vehicle parks and campsites.

Workforce Conditions

Transmission facility development can have wide-ranging effects on workforce and employment in local communities. For areas with highly skilled workforces but lower levels of employment, the construction of transmission facilities can be a benefit that is felt throughout the local economy. For communities that lack highly skilled laborers, transmission facility projects are an opportunity to develop a more highly skilled workforce. For areas where the workforce lacks the skills necessary to participate in the construction of a transmission facility, importation of temporary skilled workers can adversely impact the social cohesion[331] of a community. This section examines the existing labor pool in Washington and the opportunities for enhancing the local and regional workforce.

Washington State's Unemployment Rate by County

The Washington State Employment Security Department publishes a monthly employment report that provides a detailed overview of Washington's job market. It includes the statewide and national unemployment rates, the size of Washington's workforce, and the number of jobs across various industries. **Table 3.16-6** shows unemployment rates by county for September 2024.

Table 3.16-6: Unemployment Rate by County

County	**Unemployment Rate** (%)
Adams	4.3
Asotin	3.6
Benton	4.6
Chelan	4.5
Clallam	5.8
Clark	5.0
Columbia	4.8
Cowlitz	5.4
Douglas	4.9
Ferry	8.0
Franklin	5.5
Garfield	4.7
Grant	4.9
Grays Harbor	6.4
Island	4.8
Jefferson	4.9
King	4.6
Kitsap	4.6
Kittitas	5.3
Klickitat	4.6
Lewis	5.7
Lincoln	5.0
Mason	6.0
Okanogan	4.5
Pacific	5.8

[331] Social cohesion refers to the strength of relationships and the sense of solidarity among members of a community (U.S. Department of Health and Human Services n.d.[a]).

County	Unemployment Rate (%)
Pend-Orielle	5.7
Pierce	5.4
San Juan	3.6
Skagit	5.0
Skamania	4.7
Snohomish	4.6
Spokane	4.7
Stevens	5.6
Thurston	4.6
Wahkiakum	6.5
Walla Walla	4.5
Whatcom	5.0
Whitman	5.3
Yakima	6.2

Source: August 2024 data, ESD n.d.(a)

The unemployment rate in the United States for September 2024 was 4.1 percent (U.S. Department of Labor 2024). San Juan County (3.6 percent) and Adams County (3.6 percent) were the only counties in Washington with unemployment below the national average.

Workforce Development

Governor Inslee signed, and the Washington State Legislature passed, the Climate and Clean Energy Service Workforce Programs bill, House Bill 1176, in the spring of 2023. This legislation is intended to ensure that workers have access to quality jobs in the clean energy sector. It contains funding for education and training programs that will assist in transitioning employees from the fossil fuel industry to the clean energy sector. The legislation also provides funding to train future employees for a career in the clean energy economy.

Washington's Job Skills Program (JSP) was developed to bridge the skills gap between employers and workers in a rapidly changing economy. The JSP offers customized training for current Washington workers, helping them adapt to new technologies and economic shifts. The program prioritizes projects that support strategic industry clusters and upgrade employee skills to avoid layoffs and works collaboratively with businesses and educational institutions. The JSP reflects the state's commitment to:

- Fostering collaboration between businesses/industries and educational institutions
- Expanding skills training programs aligned with current employment needs
- Ensuring that skill training programs are regionally accessible and benefit diverse business sectors

Washington has a competitive advantage in the information, forestry, fishing, company and enterprise management, and farming sectors, as well as construction and professional or technical services. Competitiveness is measured by location quotients,[332] which compare a state's concentration of employment in a specific industry to the national average (BLS 2024a).

According to the state's Economic and Revenue Forecast Council economic forecast, construction employment is predicted to grow at an annual rate of 3 percent or greater between 2025 and 2029. The National Renewable Energy Laboratory estimates that a 20-mile transmission line would generally create 114 construction jobs and two maintenance jobs (NREL 2013). **Figure 3.16-1** illustrates changes in construction employment in Washington over the last 20 years.

The outlook for construction jobs in Washington may be described as follows:

- In 2024, the Bureau of Labor Statistics estimated that for the first half of the year, the construction industry in Washington added 8,500 jobs (BLS 2024b).
- The Washington Employment Security Department estimates that construction employment will continue growing at a forecast of 1.57 percent annually till 2027 (ESD n.d.[b]).
- The Associated General Contractors of America's 2024 Construction Outlook for Washington expressed optimism for federal construction and infrastructure projects (Associated General Contractors of America 2024).
  - Most contractors reported having difficulty filling positions and anticipate adding workers in 2024 to accommodate increased demand.
  - The surveyed contactors expect the highest growth in the value of projects to be in transportation, bridges and highways, other federal actions, data centers, and hospitals (Associated General Contractors of America 2024).

The steady increase in construction employment in Washington represents an opportunity for those not currently working in the industry to find employment. It also supports the need for additional skilled laborers who require training and apprenticeships.

[332] An analytical statistic used to measure a region's industrial specialization relative to a larger geographic unit.

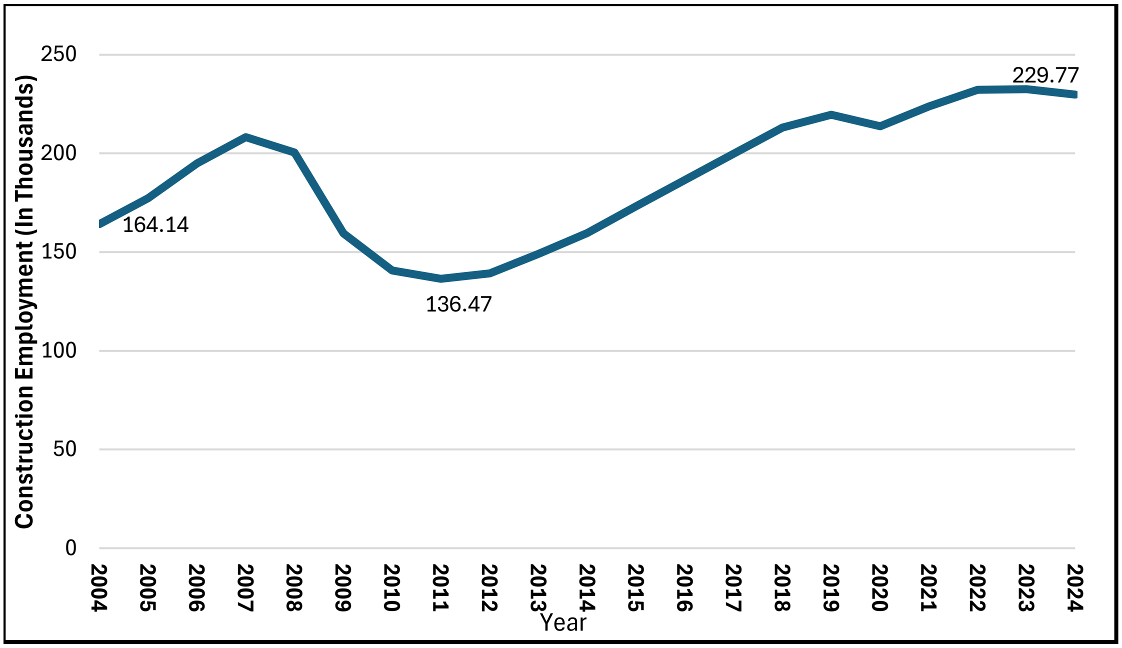


Figure 3.16-1: Average Annual Construction Employment in Washington

Source: BLS 2024b

Economic Conditions

Research has shown that well-designed infrastructure investments can spur economic growth, productivity, and land values, while also providing positive spillovers to areas such as economic development, energy efficiency, public health, and manufacturing (U.S. Treasury 2010).

Existing Economic Conditions

On a national scale, Washington's economy ranks 20th in size (BEA 2024a). In the first quarter of 2024, the state's real gross domestic product (GDP) was $829.9 billion, with a real GDP growth rate of 4.9 percent per year (BEA 2024a). Economists use GDP to estimate the size of an area's economy by calculating the total value of all goods and services produced within that area. The total GDP comprises four main components:

- **Personal Consumption Expenditures (Consumption):** This includes all private expenditures by households on goods and services, such as food, clothing, healthcare, and entertainment.
- **Business Investment:** This encompasses spending by businesses on capital goods like machinery, buildings, and technology, as well as investments in inventories.
- **Government Spending:** This includes all government expenditures on goods and services, such as infrastructure projects, defense, education, and public safety.
- **Net Exports:** This is calculated as the value of a country's exports minus its imports. A positive net export indicates that a country exports more than it imports, contributing positively to GDP.

During the first quarter of 2024, retail and wholesale trade, information technologies, agriculture, and government were the industries that recorded the highest GDP growth rates in Washington (BEA 2024a). Adams, Garfield, and Lincoln Counties displayed the highest GDP growth rates between 2019 and 2022 with 17.1 percent, 12.3 percent, and 7.6 percent, respectively (BEA 2024b). Economic data from 2019 to 2022 show that King County, Snohomish County, and Pierce County had the highest GDP of the state's counties, with $367.2 billion, $48.3 billion, and $47.1 billion, respectively.

Anticipated Economic Value of Transmission Facility Projects

As new transmission facilities bring reliable power to local communities and regions, the potential exists within Washington communities for an expansion of economic growth that could impact the livelihoods of their residents. While economic benefits from infrastructure construction are often considered positive, the effect of the associated growth might not be experienced by everyone within a community or region as fiscal conditions change.

The following are general economic assumptions related to implementing a high-voltage transmission facility project:

- A transmission facility project would generate expenditures that potentially benefit the local, regional, and state economies.
- A transmission facility project would impact a local economy in the following ways:
    - Increases in employment and income generation
    - Changes in local infrastructure
    - Increased tax revenue for local governments
    - Local businesses would be expected to experience an increase in growth and operations related to the project.
- Regional impacts would encompass broader economic effects such as changes in labor markets, worker migration between counties, and modifications to regional transportation systems or utilities.
- Economic effects at the state level would include changes in the state's GDP, economic growth rates, industry expansion, state tax revenue, and statewide employment.

Economic Impacts Analysis

Economic impacts generated from the construction and operation of a transmission facility project and related substations would need to be assessed on a case-by-case basis through a project-specific economic impact analysis (EIA). An EIA would estimate the total impact of the project on regional output, value added, employment earnings, and jobs. The types of expenditures generated by a specific project would need to be considered when analyzing a project's impact on the local economy. The following types of expenditures should be considered in a project-specific EIA:

- **Local direct expenditures:** These are expenditures that are spent locally to implement a project during its construction and operational phases (e.g., materials and supplies purchased to construct the project, payrolls for a project's construction and operation).
- **Indirect expenditures:** These expenditures represent the additional economic impact of increases in the demand for goods and services (e.g., material manufacturers, excavation companies).

- **Induced expenditures:** These expenditures represent the additional economic impact of increased demand of consumer goods and services attributable to labor earnings. Induced expenditures would cause a temporary beneficial impact by creating the potential for employment opportunities for local workers in other service areas besides construction, such as transportation and retail.

Project-specific EIAs analyze the following criteria to determine the impact of a project on the local economy:

- **Job creation:** Full-time and part-time jobs that would be generated during all project stages.
- **Labor income:** Wages, salaries, and the net earnings of sole proprietors and partnerships, generated throughout all stages of the project.
- **Fiscal and taxation:** Direct and indirect project expenditures would be subject to applicable sales taxes. Landowners would be subject to property taxes, and local communities could benefit from increased tax revenue.
- **Output and value added:** The value of goods and services produced, serving as a broad measure of economic activity. Value added, often referred to as GDP, represents the net additional economic activity (the value of output minus the value of purchased goods and services used in production).

Climate Commitment Act and Clean Energy Transformation Act

Washington State's implementation of the Climate Commitment Act and Clean Energy Transformation Act (CETA) is anticipated to have a major impact on the state's economy. The goal of CETA is to develop an electricity supply free of greenhouse gas emissions. The law provides safeguards to maintain affordable rates and reliable service. It also requires an equitable distribution of the benefits from the transition to clean energy for all utility customers and adds and expands energy assistance programs for low-income customers. CETA also supports Washington workers and businesses by providing tax incentives for clean energy projects that employ women, minorities, or veteran-owned businesses, as well as businesses that have a long history of complying with federal and state wage and hour laws and regulations, and employers who hire local workers or offer apprenticeship programs. The incentives are available through 2029 to encourage early investments in the electric grid (DOC 2025).

CETA requires electric utilities to improve energy assistance programs for low-income households by designing programs that lower the energy burden. A household's energy burden is defined as the percentage of its income that is required to cover its energy use. Low-income households qualify to receive energy assistance to bring their energy burden down to 6 percent. The amount of assistance required to bring a household's energy burden down to 6 percent is the household's "energy assistance need." Under CETA, utilities are required to meet 90 percent of low-income customers' energy assistance need by 2050 (Thuraisingham 2021).

The State Energy Strategy (SES), submitted by the Washington State Department of Commerce (DOC) to the Washington State Legislature, provides guidance for state agencies to meet the state's energy and climate goals. The guidance includes recommendations for transitioning to 100 percent carbon-free emissions by 2045 and identifies the following policies and expenditures:

- Allocation of nearly $60 million to the Clean Energy Fund within the DOC's Energy Office with the directive to use the 2021 SES to guide the design of clean energy programs.
- New funding that will support grid modernization, strategic research and development of emerging clean energy technologies, innovative approaches to the electrification of transportation systems, building

electrification, maritime electrification, bioenergy projects, and further development of a rural clean energy strategy.

- Allocation of an additional $1,175,000 to support the implementation of the strategy as it relates to emissions from energy use in new and existing buildings (Donalds 2022).

The Climate Commitment Act (CCA) establishes a comprehensive, market-based program to reduce carbon pollution and achieve its commitment to reducing greenhouse gas emissions by 95 percent by 2050. The CCA established a cap-and-invest program that sets a limit, or cap, on overall carbon emissions in the state and requires businesses to obtain allowances equal to their covered greenhouse gas emissions. These allowances can be obtained through quarterly auctions hosted by the Washington State Department of Ecology (Ecology), or bought and sold on a secondary market. The greenhouse gas emission cap is reduced over time to ensure that the state reaches its emission reduction goals. The CCA requires that at least 35 percent of the funds from the CCA allowance auctions be invested in projects that benefit overburdened communities, and a minimum of 10 percent go to projects with Tribal support (Ecology n.d.).

Electricity Demand and Burden

According to the U.S. Energy Information Administration's profile analysis, Washington had the ninth-lowest average electricity prices in the United States. The residential sector accounted for 44 percent of Washington's electricity usage, the commercial sector used 33 percent of the state's electricity, and the industrial sector accounted for 23 percent of the state's electricity use. Small amounts of electricity are also used for light rail and electric buses (EIA 2024a).

Figure 3.16-2 highlights the growth in retail electricity prices across the residential, commercial, industrial, and transportation sectors.

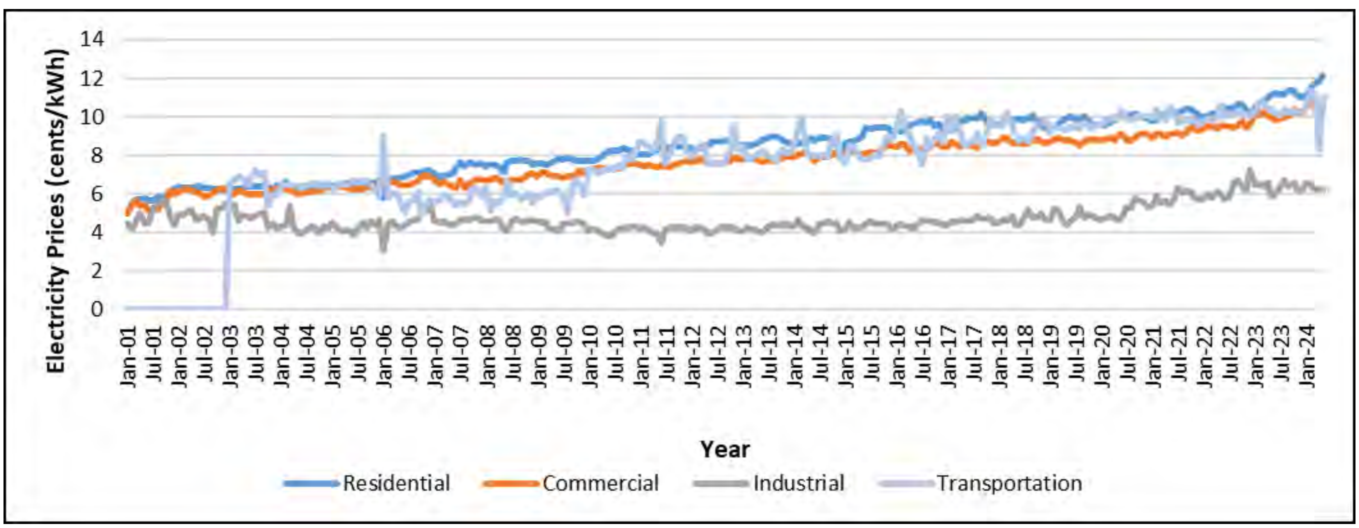


Figure 3.16-2: Average Retail Price of Electricity, Washington, Monthly
Source: EIA 2024a.

Over the next 10 years, the Pacific Northwest Utilities Conference Committee has projected an increase in electricity demand of over 30 percent (PNUCC 2024). One factor contributing to this demand surge is the expansion of data centers, which are becoming increasingly important to Washington's economy. Data centers serve as the physical infrastructure of the digital world. They are large facilities that house a vast network of interconnected computer servers, storage devices, and networking equipment. Additionally, advances in artificial intelligence and the rapid increase in power usage to train and deploy these systems are increasing electricity demand estimates (Bank of America Global Research 2024).

According to the global data center research firm, Data Center Map, Inc., there are currently 92 data centers in Washington. Of these, 66 are in the Seattle-Tacoma-Bellevue metropolitan area. **Table 3.16-7** shows the breakdown of data centers in Washington by county. Washington has an estimated electricity demand of 509 megawatts (MW) in existing data centers, with another 402 MW in the pipeline.

Table 3.16-7: Number of Data Centers per County

County in Washington	Location	Number of Data Centers
King	Seattle – 55 Bellevue – 2	57
Pierce	Tacoma	9
Spokane	Spokane	7
Grant	Quincy – 4 Moses Lake – 2	6
Chelan	Wenatchee	5
Walla Walla	Walla Walla	5
Whatcom	Bellingham	2
Franklin	Pasco	1
Total		**92**

Source: Data Center Map n.d.

Table 3.16-8 compares electricity demand for different data center sizes. Investment in grid modernization or upgrades will support the growth of data centers in Washington.

Table 3.16-8: Data Centers

Data Center Size	Small	Medium	Large
Building Size	5,000–20,000 square feet	20,000–100,000 square feet	100,000 to millions of square feet
Server Count	500–2,000 servers	2,000–10,000 servers	10,000–100,000 servers
Power Capacity	1–5 MW	5–20 MW	20–100+ MW
Design/Efficiency	Basic power management and cooling	Robust power management, partial efficiency	High efficiency, renewable energy use
Example Company	Equinix	Digital Realty	Amazon Web Services

Source: Dgtl Infra 2024
MW = megawatts

Energy Burden

Nationally, low-income households spend a larger portion of their incomes on home energy costs (e.g., electricity, natural gas) than higher-income households. A higher energy burden can cause a household to have to decide between paying energy bills and buying food, medicine, or other essentials (DOE 2018).

Based on data from the DOE's Low-Income Energy Affordability Data (LEAD) Tool, the average annual energy burden in Washington is 2 percent. However, for low-income households, the average energy burden in Washington is 8.6 percent. **Figure 3.16-3** shows that households in Washington in areas with lower median incomes (0 to 30 percent) have higher energy burdens than areas with higher median incomes.

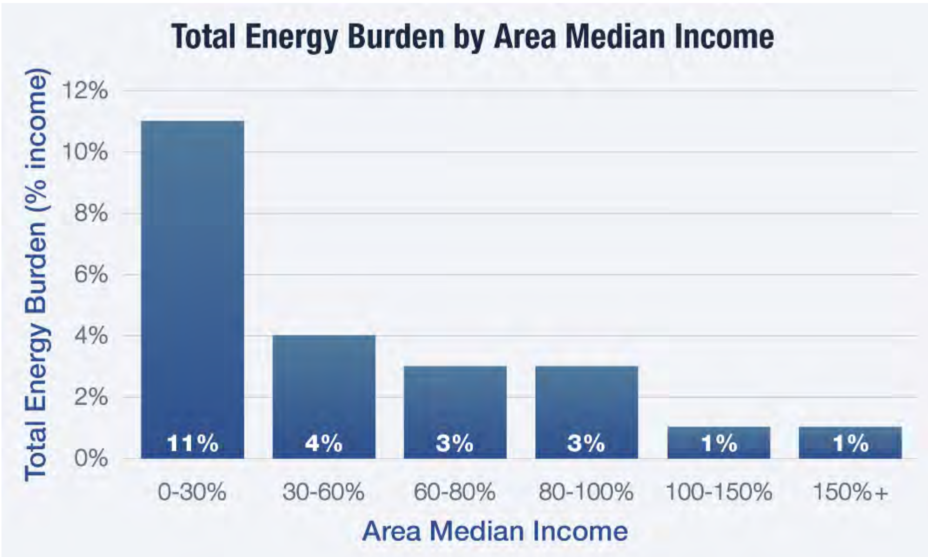


Figure 3.16-3: Total Energy Burden by Area Median Income
Source: DOE 2024b

Fiscal Conditions

According to Washington's Annual Comprehensive Financial Report for 2023, governmental activities increased by $5.79 billion in 2023 (OFM 2024c). This can be attributed to a $1.82 billion increase in tax revenues, of which $779.1 million came from sales and use tax, and $504.5 million from business and occupation tax. In June 2023, the state unemployment rate was 3.8 percent. This was slightly lower than the 3.9 percent in June 2022 (OFM 2024c). Governmental funds as of June 30, 2023, were reported as $32.74 billion, with $4.15 billion of the total fund balance being unassigned and available for use at the state's discretion. Capital assets, which include infrastructure, land, buildings, and construction in progress, among other categories, totaled $51.13 billion. Construction in progress increased from $1.83 billion in 2022 to $2.19 billion in 2023 (OFM 2024c).

Taxation and Tariff

Taxation

Washington's sales and use tax is 6.5 percent, with local rates ranging from 1 to 4.1 percent. Total sales and use tax rates range from 7.5 to 10.6 percent (Revenue 2022a). Washington uses a business and occupation (B&O) tax. There are no deductions for labor, materials, taxes, or other costs of doing business; however, there are different B&O tax classifications for extracting, manufacturing, wholesaling, government contracting, public road construction, service and other activities, retailing and others, all with their own tax rates (Revenue 2022b). Each business owes the B&O tax on its gross income. **Table 3.16-9** shows tax rates for major B&O tax classifications.

Table 3.16-9: Business and Occupation Tax Rates

Retailing	0.47%
Wholesaling	0.48%
Manufacturing	0.48%
Service and Other Activities	1.50%
Service and Other Activities ($1 million or greater in prior year)	1.75%

Source: Revenue 2022a

Tariff

A tariff is a document that sets forth terms and conditions of regulated service, including rates, charges, tolls, rentals, rules, and equipment and facilities. This document can include the manner in which rates and charges are assessed for regulated services provided to customers and rules and conditions associated with offering service.

As detailed in Section 3.11, Public Services and Utilities, three out of the 60 electric utility entities in Washington are investor-owned companies. Investor-owned utilities are for-profit companies that are regulated by the Utilities and Transportation Commission (UTC). Most public utility entities purchase electricity from investor-owned utility companies. Investor-owned utility providers do not receive appropriations or tax dollars for their operation and maintenance; rather they pay their expenses through the sale of electricity and transmission services. These costs are ultimately passed on to the customer through rates or tariffs included as part of their electric power bills from local utilities.

The tariff or rate that is set for electricity and transmission services is assessed, reviewed, and approved through a multi-step process. Rates typically ensure that a utility company will be able to recover its total costs, including project construction, operation and maintenance costs, and fish and wildlife protection activities. The UTC is ultimately responsible for approving any requests for rate increases for electricity in Washington. This ensures that private or investor-owned natural gas and electric companies are providing services that are priced fairly and reliably. The increase in retail electricity cost in Washington over the past few years has been attributed to the following factors:

- Increased energy demand due to more customers. Washington’s population increased 14.1 percent over the past 10 years, leading to additional energy use and higher demand.
- Inflation adjustments
- Utility companies’ investments to comply with environmental and renewable energy state laws
- Growing investment in transmission or distribution, higher costs for investment in new-generation technologies, and upgrades and replacement of aging equipment
- Increased global demand, which has caused a rise in the cost for raw materials (i.e., concrete, steel, copper). Prices have risen 10 to 15 times the rate of general inflation over the last decade, making building or replacing infrastructure more expensive (UTC 2018; EIA 2024b)

For facilities or portions of facilities that are analyzed and/or constructed for the sole benefit of a particular customer or customer group, utility companies may require that the customer or customer group pay for the requested service through a tariff. For instance, a community or service area requesting underground transmission facilities instead of overhead facilities would be responsible to pay the difference. The tariff would be imposed only on the customers benefiting from this modified service (PSE n.d.).

3.16.2.2 Environmental Justice

President Clinton's Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," was signed on February 11, 1994.[333] This order directs agencies to identify and address whether a project may result in disproportionately high and adverse human health or environmental effects on minority and low-income populations. It further directs agencies to propose mitigation should the demographic analysis reveal that disproportionately high and adverse impacts would occur.

With the passage of the Healthy Environment for All (HEAL) Act in 2021, the State of Washington took a historic step toward eliminating environmental and health disparities among communities of color and low-income households. The HEAL Act was the first statewide law in Washington to create a coordinated state agency approach to environmental justice, making it a priority and part of the mission of key state agencies. The law requires the Washington State Departments of Ecology, Agriculture, Commerce, Health, Natural Resources, Transportation, and the Puget Sound Partnership (Covered Agencies) to identify and address environmental health disparities in overburdened communities and for vulnerable populations.

Although EFSEC is not a Covered Agency, Revised Code of Washington (RCW) 43.21C.405 mandates that this nonproject EIS evaluate potential impacts on environmental justice and overburdened communities as defined in RCW 70A.02.010. The HEAL Act, as codified in RCW 70A.02, defines environmental justice as:

> *The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, rules, and policies. Environmental justice includes addressing disproportionate environmental and health impacts in all laws, rules, and policies with environmental impacts by prioritizing vulnerable populations and overburdened communities, the equitable distribution[334] of resources and benefits, and eliminating harm.*

The Washington Department of Health's "Environmental Justice Assessment Template" was used to support the analysis in this Draft Programmatic EIS (DOH 2024). The Environmental Justice Assessment Template suggests that Covered Agencies incorporate the following sections into their environmental justice assessments:

h. Analysis of environmental benefits[335] and harms[336]

---

[333] At the time of completing this Draft Programmatic EIS, several of President Trump's executive orders from January 2025 are facing legal challenges. These orders, which include measures to rescind previous Executive Orders or other policy changes, have prompted a series of lawsuits. The legal opposition is primarily focused on the environmental, regulatory, and administrative impacts of these orders. Despite facing legal challenges, these orders remain in effect unless they are overturned by a court or rescinded by a subsequent executive order.

[334] Equitable distribution means a fair and just, but not necessarily equal, allocation intended to mitigate disparities in benefits and burdens that are based on current conditions, including existing legacy and cumulative impacts, that are informed by cumulative environmental health impact analysis (RCW 70A.02.020).

[335] Activities that: (a) Prevent or reduce existing environmental harms or associated risks that contribute significantly to cumulative environmental health impacts; (b) Prevent or mitigate impacts to overburdened communities or vulnerable populations from, or support community response to, the impacts of environmental harm; or (c)meet a community need formally identified to a covered agency by an overburdened community or vulnerable population that is consistent with the intent of chapter 70A.02 RCW (RCW 70A.02.020).

[336] The individual or cumulative environmental health impacts and risks to communities caused by historic, current, or projected: (a) Exposure to pollution, conventional or toxic pollutants, environmental hazards, or other contamination in the air, water, and land; (b) Adverse environmental effects, including exposure to contamination, hazardous substances, or pollution that increase the risk of adverse environmental health outcomes or create vulnerabilities to the impacts of climate change;(c) Loss or impairment of ecosystem functions or traditional food resources or loss of access to gather cultural resources or harvest traditional foods; or (d) Health and economic impacts from climate change (RCW 70A.02.020).

i. Identification of overburdened communities and vulnerable populations

j. Tribal engagement and consultation

k. Community engagement summary

l. Strategies to address environmental harms and equitably distribute environmental benefits.

The analysis provided in this section encompasses the first, second, and fifth section of the Environmental Justice Assessment Template. Chapter 5, Consultation and Public Engagement, describes the public scoping; government-to-government consultation; and agency cooperation, consultation, and coordination that helped support the development of this Draft Programmatic EIS.

Vulnerable Populations and Overburdened Communities

The Washington State Legislature defines “vulnerable populations” as follows:

(a) Population groups that are more likely to be at higher risk for poor health outcomes in response to environmental harms, due to:

i) *Adverse socioeconomic factors, such as unemployment, high housing and transportation costs relative to income, limited access to food and health care, and linguistic isolation; and*

ii) *Sensitivity factors, including low birth weight and higher rates of hospitalization*.

(b) “Vulnerable populations” includes, but is not limited to:

i) Racial or ethnic minorities;

ii) Low-income populations;

iii) Populations disproportionately impacted by environmental harms; and

iv) Populations of workers experiencing environmental harms.

An “overburdened community” is defined as a geographic area where vulnerable populations face combined, multiple environmental harms and health impacts. This includes, but is not limited to, highly impacted communities as defined in RCW 19.405.020. RCW 19.405.020 and RCW 19.405.140 define a “highly impacted community” as one that is highly impacted by fossil fuel pollution and climate change as designated in the cumulative impact analysis prepared by the Washington State Department of Health. Overburdened communities also include communities located in census tracts[337] that are fully or partially on “Indian country,” as defined in 18 United States Code Section 1151.[338]

The following sections describe the affected environment for vulnerable populations and overburdened communities throughout Washington. The analysis encompasses the different aspects of vulnerable populations and overburdened communities, including racial or ethnic minorities and low-income populations, and uses

[337] A small geographical unit used by the U.S. Census Bureau for collecting demographic data.

[338] 18 United States Code Section 1151 defines Indian country as: (a) all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation, (b) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a state, and (c) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same.

different databases to understand existing environmental harms, including harms related to climate change. The following data sources were used to identify counties with vulnerable populations and overburdened communities:

- U.S. Census Bureau
- The U.S. Environmental Protection Agency's Environmental Justice Screen (EJScreen) Tool
- The Council on Environmental Quality (CEQ) Climate and Economic Justice Screening Tool (CEJST)
- Local, state, and federal databases and industry publications related to employment, education, housing availability, and economics

Racial or Ethnic Minorities

The CEQ states that "minority populations" should be identified where either:

a) *the minority population of the affected area exceeds 50 percent, or*

b) *the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis* (CEQ 1997).

The selection of the appropriate unit of geographic analysis may be a governing body's jurisdiction, a neighborhood, a census tract, or other similar unit chosen to not artificially dilute or inflate the affected minority population (CEQ 1997).

Table 3.16-10 presents race and ethnicity data from the U.S. Census Bureau's 2020 Decennial Census of Population and Housing for all counties in Washington.

This Page Intentionally Left Blank

Table 3.16-10: Population Breakdown by Race and Ethnicity by County (2020 Decennial Census)

County	Total Population for Whom Race Status Is Determined	White Alone	Hispanic or Latino	Black or African American Alone	American Indian and Alaska Native Alone	Asian Alone	Native Hawaiian and Other Pacific Islander Alone	Some Other Race Alone	Combined Percentage of Racial or Ethnic Populations Who Identify as One Race or Ethnicity Alone
Adams	20,613	33.13%	63.65%	0.12%	0.31%	0.63%	0.01%	0.42%	64.71% [a]
Asotin	22,285	87.38%	4.11%	0.51%	1.18%	0.92%	0.15%	0.39%	6.87%
Benton	206,873	65.60%	23.85%	1.27%	0.58%	3.02%	0.26%	0.51%	28.97%
Chelan	79,074	65.88%	27.95%	0.32%	0.52%	1.00%	0.14%	0.48%	29.92% [a]
Clallam	77,155	79.27%	6.13%	0.74%	5.09%	1.60%	0.15%	0.56%	13.71%
Clark	503,311	72.86%	11.68%	2.16%	0.61%	4.75%	1.02%	0.50%	20.21%
Columbia	3,952	84.69%	7.69%	0.15%	1.04%	0.53%	0.00%	0.46%	9.41%
Cowlitz	110,730	79.53%	9.76%	0.67%	1.27%	1.55%	0.58%	0.44%	13.84%
Douglas	42,938	59.26%	34.09%	0.27%	0.79%	0.95%	0.13%	0.47%	36.22% [a]
Ferry	7,178	70.44%	2.93%	0.29%	18.01%	0.60%	0.15%	0.50%	21.98%
Franklin	96,749	38.48%	54.21%	1.66%	0.45%	1.86%	0.20%	0.35%	58.37% [a]
Garfield	2,286	89.90%	4.81%	0.13%	0.79%	0.39%	0.00%	0.22%	6.12%
Grant	99,123	50.69%	42.78%	0.66%	0.84%	1.16%	0.10%	0.40%	45.53% [a]
Grays Harbor	75,636	75.45%	10.36%	1.29%	4.62%	1.35%	0.17%	0.54%	17.79%
Island	86,857	75.82%	8.20%	2.61%	0.63%	4.51%	0.48%	0.65%	16.41%
Jefferson	32,977	85.56%	3.96%	0.63%	1.58%	1.48%	0.15%	0.69%	7.79%
King	2,269,675	54.22%	10.71%	6.51%	0.52%	19.81%	0.85%	0.60%	38.41% [a]
Kitsap	275,611	72.21%	8.77%	2.66%	1.27%	5.09%	1.02%	0.65%	18.81%
Kittitas	44,337	79.67%	10.36%	0.86%	0.92%	2.05%	0.20%	0.55%	14.38%
Klickitat	22,735	77.99%	12.81%	0.28%	2.21%	0.59%	0.15%	0.50%	16.05%
Lewis	82,149	79.73%	10.75%	0.65%	1.19%	0.97%	0.19%	0.49%	13.74%
Lincoln	10,876	88.05%	3.54%	0.14%	1.88%	0.62%	0.13%	0.52%	6.30%
Mason	65,726	75.45%	11.56%	1.05%	2.98%	1.15%	0.33%	0.64%	17.06%
Okanogan	42,104	62.99%	19.47%	0.38%	10.90%	0.64%	0.10%	0.64%	31.47% [a]
Pacific	23,365	79.64%	9.40%	0.43%	2.14%	1.97%	0.17%	0.51%	14.11%
Pend Oreille	13,401	87.19%	3.34%	0.40%	2.78%	0.51%	0.07%	0.49%	7.11%
Pierce	921,130	61.86%	12.14%	6.85%	1.05%	6.74%	1.97%	0.60%	28.75%

County	Total Population for Whom Race Status Is Determined	White Alone	Hispanic or Latino	Black or African American Alone	American Indian and Alaska Native Alone	Asian Alone	Native Hawaiian and Other Pacific Islander Alone	Some Other Race Alone	Combined Percentage of Racial or Ethnic Populations Who Identify as One Race or Ethnicity Alone
San Juan	17,788	84.46%	7.30%	0.27%	0.52%	1.26%	0.13%	0.69%	9.47%
Skagit	129,523	71.30%	18.37%	0.61%	1.58%	2.14%	0.30%	0.56%	23.00%
Skamania	12,036	83.58%	6.36%	0.60%	1.41%	1.00%	0.24%	0.66%	9.60%
Snohomish	827,957	63.82%	11.55%	3.43%	0.97%	12.16%	0.59%	0.58%	28.69%
Spokane	539,339	80.06%	6.55%	1.94%	1.27%	2.30%	0.78%	0.49%	12.85%
Stevens	46,445	83.37%	3.63%	0.30%	5.51%	0.60%	0.18%	0.62%	10.22%
Thurston	294,793	70.55%	9.85%	3.02%	1.23%	5.73%	1.10%	0.60%	20.92%
Wahkiakum	4,422	86.32%	4.14%	0.47%	1.24%	0.97%	0.05%	0.54%	6.87%
Walla Walla	62,584	68.04%	22.70%	1.57%	0.67%	1.47%	0.21%	0.45%	26.62%
Whatcom	226,847	75.11%	10.06%	0.98%	2.41%	4.39%	0.30%	0.59%	18.13%
Whitman	47,973	74.12%	8.45%	2.42%	0.55%	7.54%	0.29%	0.54%	19.25%
Yakima	256,728	40.35%	50.66%	0.67%	3.64%	1.08%	0.09%	0.41%	56.14% [a]
Washington State	7,705,281	63.84%	13.75%	3.84%	1.18%	9.38%	0.81%	0.56%	28.97% [b]

Source: 2020 Decennial Census, Table P9 (U.S. Census Bureau 2020b)
Notes:
Total population percentage may not equal 100 percent due to rounding.
(a) Percentage of racial or ethnic populations that are greater than reference threshold.[339]
(b) Reference threshold for the analysis of racial or ethnic populations.

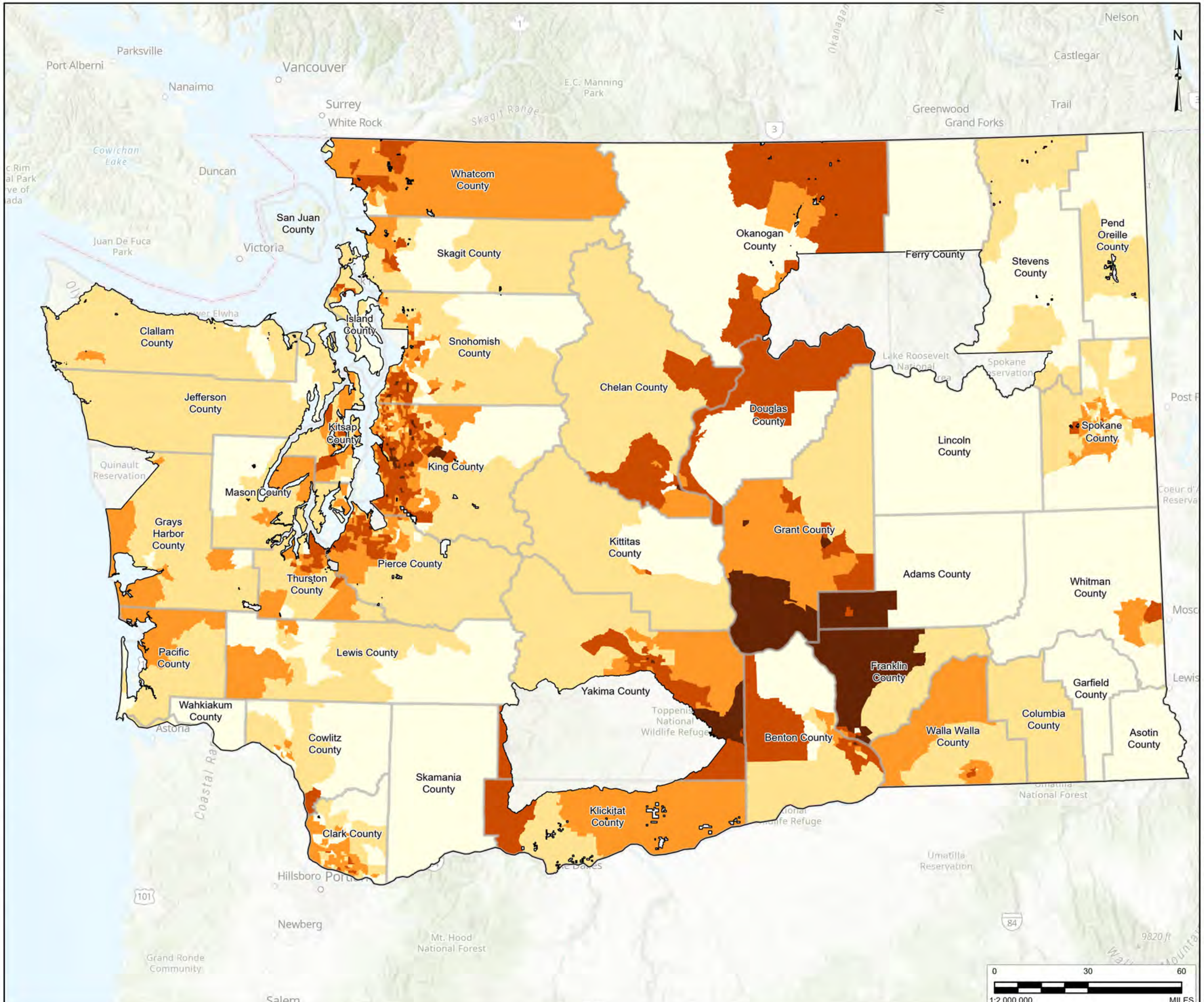
[339] A reference threshold can be used as a standard or benchmark for a comparative analysis. For example, an environmental justice assessment could find that nine of 12 census blocks in the affected area have more than 20 percent low-income residents (and some as many as 90 percent), while the reference county has 16 percent low-income residents county-wide. The difference indicates that a low-income population is present for purposes of conducting an environmental justice assessment (EPA 2019).

According to the U.S. Census Bureau’s 2020 Decennial Census, approximately 64 percent of Washington’s population is white. White alone represents the majority population in all counties in the state except Adams County (33 percent white) and Yakima County (40 percent white) (U.S. Census Bureau 2020a).

Persons of Hispanic or Latino origin were identified as the single largest minority population in Washington. Hispanic or Latino people account for about 14 percent of Washington’s total population. Hispanic or Latino populations make up the largest minority group in all counties in Washington, with the exception of Ferry County. In Ferry County, the largest racial or ethnic minority group is American Indian and Alaska Native. This ethnic group makes up approximately 18 percent of Ferry County’s population. The next most common ethnicity in Ferry County is Hispanic or Latino, which makes up 3 percent of the county’s population. Adams County has the highest percentage of Hispanic or Latino residents, who make up 64 percent of the overall population.

Racial and ethnic populations make up 28.97 percent of Washington’s population. This number serves as a conservative baseline for comparing the percentage of minority populations in individual counties with the statewide percentage (**Figure 3.16-4**). Eight counties were identified as exceeding this threshold, indicating they have sizeable minority populations.

This Page Intentionally Left Blank



LEGEND

- Study Area
- County Boundary

People of Color (WaDOH, 2022)

- < 500
- 500 - 1000
- 1000 - 2000
- 2000 - 5000
- > 5000

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES

1. SERVICE LAYER CREDITS: SOURCES: ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY, ESRI, USGS
2. PEOPLE OF COLOR: WADOH, 2022

PROJECT

DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE

RACE AND ETHNICITY STATUS

YYYY-MM-DD 2025-03-18

CONSULTANT wsp

FIGURE 3.16-1

This Page Intentionally Left Blank

Low-Income Population

The Washington State Legislature defines low-income as follows:

> *Household incomes as defined by the department or commission, provided that the definition may not exceed the higher of eighty percent of area median household income or two hundred percent of the federal poverty level, adjusted for household size* (RCW 19.405.020).

In accordance with RCW 19.405.020, the analysis conducted for this Draft EIS defines low-income individuals as those who make up less than 200 percent of the federal poverty level, adjusted for household size. This methodology is used herein to set forth a threshold for identifying a potential low-income population for the purpose of studying environmental justice. **Table 3.16-11** presents the low-income data for all counties in Washington.

Table 3.16-11: Low-income Status within Washington State (by County)

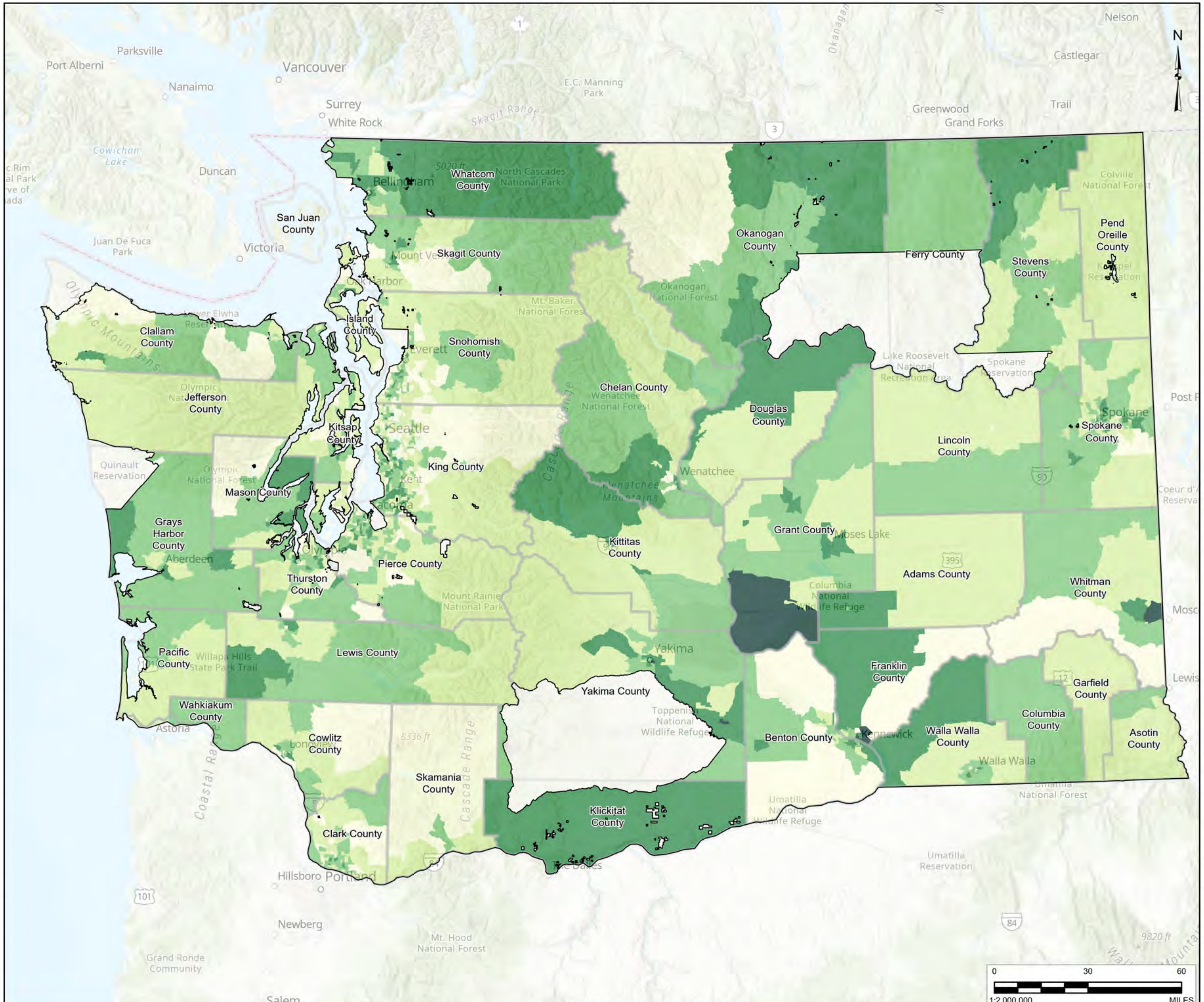
County	Total Population for Whom Income Status Is Determined	Individuals with Income below 200% of the Federal Poverty Level	Percentage of County Population with Income below 200 Percent of the Federal Poverty Level	Percentage of the State's Total Low-Income Population
Adams	20,313	9,013	44.37% [a]	0.52%
Asotin	22,154	8,169	36.87% [a]	0.47%
Benton	205,548	51,017	24.82% [a]	2.93%
Chelan	78,213	22,729	29.06% [a]	1.31%
Clallam	76,215	21,626	28.37% [a]	1.24%
Clark	499,749	108,803	21.77%	6.26%
Columbia	3,941	1,023	25.96% [a]	0.06%
Cowlitz	109,144	32,333	29.62% [a]	1.86%
Douglas	42,996	11,523	26.80% [a]	0.66%
Ferry	7,174	2,955	41.19% [a]	0.17%
Franklin	94,022	32,552	34.62% [a]	1.87%
Garfield	2,280	642	28.16% [a]	0.04%
Grant	98,304	34,982	35.59% [a]	2.01%
Grays Harbor	72,532	24,764	34.14% [a]	1.42%
Island	83,743	16,585	19.80%	0.95%
Jefferson	32,353	9,333	28.85% [a]	0.54%
King	2,223,603	392,944	17.67%	22.60%
Kitsap	267,221	52,928	19.81%	3.04%
Kittitas	42,247	12,455	29.48% [a]	0.72%
Klickitat	22,741	7,024	30.89% [a]	0.40%
Lewis	81,586	24,694	30.27% [a]	1.42%
Lincoln	10,905	3,116	28.57% [a]	0.18%
Mason	64,766	17,887	27.62% [a]	1.03%
Okanogan	41,656	17,118	41.09% [a]	0.98%
Pacific	22,954	7,783	33.91% [a]	0.45%
Pend Oreille	13,381	4,570	34.15% [a]	0.26%
Pierce	899,960	192,410	21.38%	11.06%

County	Total Population for Whom Income Status Is Determined	Individuals with Income below 200% of the Federal Poverty Level	Percentage of County Population with Income below 200 Percent of the Federal Poverty Level	Percentage of the State's Total Low-Income Population
San Juan	17,778	4,467	25.13% [(a)]	0.26%
Skagit	127,780	31,772	24.86% [(a)]	1.83%
Skamania	12,005	2,747	22.88%	0.16%
Snohomish	817,973	146,294	17.88%	8.41%
Spokane	524,665	150,911	28.76% [(a)]	8.68%
Stevens	46,337	14,684	31.69% [(a)]	0.84%
Thurston	290,396	64,497	22.21%	3.71%
Wahkiakum	4,436	1,731	39.02% [(a)]	0.10%
Walla Walla	57,648	17,852	30.97% [(a)]	1.03%
Whatcom	221,226	60,524	27.36% [(a)]	3.48%
Whitman	41,060	17,342	42.24% [(a)]	1.00%
Yakima	252,637	105,276	41.67% [(a)]	6.05%
Washinton State Total	7,553,642	1,739,075	23.02% [(b)]	n/a

Source: U.S. Census Bureau, American Community Survey, Table S1701, Poverty Status in the past 12 months, 2022 (U.S. Census Bureau 2022b).
Notes:
(a) Percentage of low-income populations that are greater than reference threshold.
(b) Reference threshold for the analysis of low-income populations.

According to the 2022 ACS, the Washington counties of Adams, Whitman, Yakima, Ferry, and Okanogan maintain the highest levels of people living 200 percent below the federal poverty level. In each of these counties, the percentage of their population that meets the state's definition for low-income individuals exceeds 40 percent. The counties with the lowest percentage of low-income individuals are King (17.67 percent), Snohomish (17.88 percent), and Island (19.8 percent).

In Washington, 23.02 percent of the population meets the state's definition for low-income individuals. This percentage is considered a conservative reference threshold for the analysis of low-income status across counties and is surpassed in 31 of Washington's 39 counties (**Figure 3.16-5**).



LEGEND

- Study Area
- County Boundary

People Living in Poverty (WaDOH, 2022)

- < 500
- 500 - 1000
- 1000 - 2000
- 2000 - 5000
- > 5000

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES
1. SERVICE LAYER CREDITS: SOURCES: ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY, ESRI, USGS
2. PEOPLE LIVING IN POVERTY: WADOH, 2022

PROJECT
DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE
LOW-INCOME STATUS

YYYY-MM-DD 2025-03-18
CONSULTANT wsp
FIGURE
3.16-2

This Page Intentionally Left Blank

Environmental Harms

Climate and Economic Justice Screening

In January 2021, President Biden issued Executive Order 14008, with the intent of investing and building a clean energy economy that secures environmental justice and spurs economic opportunity for disadvantaged[340] communities that have historically been marginalized and overburdened by pollution and underinvested in as it relates to housing, transportation, water and wastewater infrastructure, and health care.

In response to this executive order, the CEJST was developed. This tool uses comprehensive datasets to provide a uniform definition of disadvantaged communities to target investment benefits. A community is considered "disadvantaged" if (1) it is located in a census tract that meets the threshold for at least one of the tool's eight identified burdens, or (2) it is located on land within the boundaries of a Federally Recognized Tribe (CEQ 2024).

The CEJST considers communities disadvantaged if they are located in census tracts that, or if they are on land within the boundaries of Federally Recognized Tribes. The tool includes an interactive map that utilizes the census tract boundaries from 2010, and ranks most of the identified burdens using percentiles for comparison among tracts. The CEJST's eight identified burdens are characterized as follows:

- **Climate change:** The burdens in the climate change category aim to measure expected agriculture value, building value, and population loss due to climate-related natural hazards, as well as projected wildfire risk and projected flood risk due to climate change. Populations at or above the 90th percentile for expected agriculture loss rate, expected building loss rate, expected population loss rate, projected future flood risk, or projected future wildfire risk—and at or above the 65th percentile for low income—are considered burdened by extreme weather events, sea level rise, or other climate-related impacts.
- **Energy:** The burdens in the energy category aim to measure the energy cost as well as energy-related pollution within a census tract. Populations at or above the 90th percentile for energy cost or particulate matter up to 2.5 microns in diameter ($PM_{2.5}$) in the air—and at or above the 65th percentile for low income—are considered burdened by utility expenses and exposure to environmental pollutants.
- **Health:** The burdens in the health category aim to identify areas facing high rates of asthma, diabetes, heart disease, and low life expectancy within a census tract. Populations at or above the 90th percentile for asthma, diabetes, heart disease, or low life expectancy—and at or above the 65th percentile for low income—are considered burdened by chronic health conditions and limited access to healthcare resources.
- **Housing:** Populations that have historically experienced underinvestment or are at or above the 90th percentile for housing cost, lack of green space, lack of indoor plumbing, or lead paint exposure—and that are at or above the 65th percentile for low income—are considered burdened by inadequate housing conditions and associated hazards.
- **Legacy pollution:** The burdens in the legacy pollution category aim to measure how much legacy, current, and potential pollution a census tract has through proximity to hazardous waste, Superfund sites (otherwise known as National Priorities List), Risk Management Plan facilities, abandoned mine land, and Formerly

[340] A community is identified as disadvantaged (i.e., overburdened and underserved) on the CEJS Tool map if it is in a census tract that is 1) at or above the threshold for one or more environmental, climate, or other burdens, and 2) at or above the threshold for an associated socioeconomic burden. In addition, a census tract that is completely surrounded by disadvantaged communities and is at or above the 50th percentile for low income is also considered disadvantaged (CEQ 2022).

Used Defense Sites. Populations that have at least one abandoned mine land, Formerly Used Defense Site or are at or above the 90th percentile for proximity to hazardous waste facilities, Superfund sites or Risk Management Plan facilities—and are at or above the 65th percentile for low income—are considered burdened by exposure to hazardous pollutants and environmental contamination.

- **Transportation:** The burdens in the transportation category aim to measure the transportation-related pollution, transportation barriers, traffic related noise and proximity within a census tract. Populations at or above the 90th percentile for diesel particulate matter exposure, transportation barriers or traffic proximity and volume—and are at or above the 65th percentile for low income—are considered impacted by transportation-related health risks and limited mobility.
- **Water and wastewater:** The burdens in the waste and wastewater category aim to measure the census tract's proximity to toxicity-weighted wastewater discharges and underground storage tanks that may leak. Populations at or above the 90th percentile for underground storage tanks and releases or wastewater discharge—and at or above the 65th percentile for low-income—are considered burdened by contaminated water sources and inadequate wastewater management.
- **Workforce development:** The burdens in the workforce development category aim to identify census tracts that would benefit from greater workforce development. Populations that are at or above the 90th percentile for linguistic isolation,[341] low median income, poverty, or unemployment—and have less than 10 percent of people aged 25 or older that have graduated from high school—are considered burdened by workforce development (CEQ 2024).

The CEJST was used to identify counties in Washington that may have disadvantaged communities. For this analysis, a county was considered to have overburdened communities if 50 percent or more of its census tracts were classified by the CEJST as disadvantaged based on the identified burden criteria above. The following 10 Washington counties were identified as having vulnerable populations and overburdened communities: Adams, Asotin, Ferry, Grant, Klickitat, Okanogan, Pacific, Pend Oreille, Stevens, and Yakima.

Of these counties, Adams, Grant, Okanogan, and Yakima Counties were also identified as having racial or ethnic minorities and low-income populations that exceed the statewide threshold and communities that meet the criteria for vulnerable and overburdened. This suggests that these four counties have particularly more vulnerable populations and disproportionate socioeconomic challenges than the other 35 counties in Washington.

Environmental Justice Screening and Mapping Tool

The U.S. Environmental Protection Agency's (EPA's) EJScreen is an environmental justice mapping and screening tool that provides a nationally consistent database and approach for combining environmental and demographic indicators. The EJScreen tool complements the CEJST, in that federal agencies and other partners, such as state and local governments, can use both tools for a broad array of screening, outreach, and analytical purposes. EJScreen provides a tool to screen for potential disproportionality at the community level, while CEJST defines and maps disadvantaged communities for the purpose of informing how federal agencies guide the benefits of certain programs (CEQ 2022).

341 Linguistic Isolation refers to the share of households where no one over age 14 speaks English very well, based on data obtained from the U.S. Census Bureau's American Community Survey from 2015 to 2019.

EJScreen uses maps and reports to present a variety of data and information, including, but not limited to, indicators related to environmental burden, socioeconomic factors, climate change, health disparities, and gaps in critical services (EPA 2024a). EJScreen consists of environmental justice indices that examine a suite of criteria for potential environmental justice concerns. The following describes the environmental indicators included in the EJScreen indices:

- **Percentile for $PM_{2.5}$:** $PM_{2.5}$ levels in air measured using an annual average
- **Percentile for ozone:** Ozone annual mean top 10 of daily maximum 8-hour concentration in air
- **Percentile for diesel particulate matter:** Diesel particulate level in air
- **Percentile for toxic releases to air**: Risk-Screening Environmental Indicators (RSEI) modeled toxicity-weighted concentrations in air of Toxic Release Inventory (TRI) listed chemicals
- **Percentile for traffic proximity:** Number of vehicles (annual average daily traffic) at major roads within 10 kilometers (km), divided by distance in km
- **Percentile for lead paint:** Percentage of housing units built before 1960
- **Percentile for Superfund proximity:** Number of Superfund sites (proposed and final National Priority List sites and Superfund Alternative Approach sites) within 10 km, each divided by distance in km
- **Percentile for Risk Management Plan (RMP) facility proximity:** Number of facilities with RMPs (potential chemical accident management plans) within 10 km, each divided by distance in km
- **Percentile for hazardous waste proximity:** Number of hazardous waste management facilities within 10 km, each divided by distance in km
- **Percentile for underground storage tanks:** Number of leaking underground storage tanks (USTs) (multiplied by a factor of 7.7) and the number of USTs within a 1,500-foot buffered block group[342]
- **Percentile for wastewater discharge:** RSEI-modeled toxicity-weighted concentrations of TRI-listed chemicals in water stream segments within 500 meters, divided by distance in km
- **Percentile for nitrogen dioxide (NO_2)**: Average annual NO_2 levels expressed as parts per billion (by volume)
- **Percentile for drinking water non-compliance:** Score based on number of Safe Drinking Water Act violations not returned to compliance that community water systems have received over the past five years

EJScreen contextualizes each indicator or index value by reporting it as a percentile. A percentile in EJScreen indicates the percentage of other counties with a lower (or sometimes tied) value. Therefore, 100 minus the percentile reveals the approximate percentage of counties with a higher value (EPA 2024a).

[342] Cluster of blocks within the same census tract. Each census tract contains at least one block group, and block groups are uniquely numbered within census tracts. A block group usually covers a contiguous area but never crosses county or census tract boundaries. Block groups may, however, cross the boundaries of other geographic entities like county subdivisions, places, urban areas, voting districts, congressional districts, and American Indian / Alaska Native / Native Hawaiian areas.

As a result of completing this screening exercise, five counties in Washington are considered to be experiencing disproportionate exposure to environmental hazards and impacts (EPA 2024b, 2024c, 2024d, 2024e, 2024f). These counties exceed the 50th percentile for the following environmental indicators (see also **Table 3.6-12**):

- **Adams County**: $PM_{2.5}$, ozone, NO_2, toxic releases in air, lead paint, RMP facility proximity, USTs, wastewater discharge, and drinking water non-compliance
- **Chelan County**: $PM_{2.5}$, NO_2, lead paint, RMP facility proximity, USTs, and drinking water non-compliance
- **Grant County:** $PM_{2.5}$, ozone, NO_2, toxic releases in air, lead paint, Superfund proximity, RMP facility proximity, USTs, wastewater discharge, and drinking water non-compliance
- **Okanogan County**: $PM_{2.5}$, NO_2, lead paint, RMP facility proximity, USTs, and drinking water non-compliance
- **Yakima County**: $PM_{2.5}$, Ozone, NO_2, diesel particulate matter, traffic proximity, lead paint, Superfund site proximity, RMP facility proximity, USTs, wastewater discharge, and drinking water non-compliance

Table 3.16-12: Counties with Indicators of Environmental Stressors Above the 50th Percentile for Washington State

$PM_{2.5}$	Ozone	NO_2	Diesel Particulate Matter	Toxic Releases to Air	Traffic Proximity	Lead Paint	Superfund Proximity	RMP Facility Proximity	Hazardous Waste Proximity	Underground Storage Tanks	Wastewater Discharge	Drinking Water Non-Compliance
Adams County												
Y	Y	Y	N	Y	N	Y	N	Y	N	Y	Y	Y
Chelan County												
Y	N	Y	N	N	N	Y	N	Y	N	Y	N	Y
Grant County												
Y	Y	Y	N	Y	N	Y	Y	Y	N	Y	Y	Y
Okanogan County												
Y	N	Y	N	N	N	Y	N	Y	N	Y	N	Y
Yakima County												
Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y

N = no; NO_2 = nitrogen dioxide; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; RMP = risk management plan; Y = yes

This Page Intentionally Left Blank

Washington Environmental Health Disparities Map

In addition to the national tools described above, Washington State developed the Washington Tracking Network's Environmental Health Disparities (EHD) Map. The EHD Map is an interactive tool that combines state and national data to map 19 indicators of community and environmental health, including traffic density, proximity to hazardous waste facilities, income, and race. The data are combined into a cumulative score reflecting environmental and socioeconomic risk factors that allows for a comparison across Washington's 1,458 U.S. census tracts (DOH 2022). The tool helps visualize how the cumulative risks affect each neighborhood in Washington and the environmental burdens that contribute to inequitable health outcomes and unequal access to healthy communities. It was developed in response to community interest by an innovative, cross-sector collaboration among academic researchers, government agencies, and community-based organizations representing disadvantaged and underrepresented populations seeking to use data to advance environmental health equity (DOH 2022).

Overburdened Communities of Washington State

Washington State also provides a geospatial dataset for overburdened communities in the state. The dataset merges several critical and currently available data sources to identify where vulnerable populations face cumulative environmental and health impacts. This dataset integrates 2010 census tracts ranked 9 or 10 by the Washington EHD Map, tracts identified as "disadvantaged" by the federal CEJST, and tracts overlapping with Tribal reservations (as recognized by the Bureau of Indian Affairs). The data support the identification of fund allocation under the CCA and HEAL Act, aiming to ensure equitable expenditures of funds towards environmental benefits and reduction of burdens in these critical areas. The dataset is updated annually, with the last update occurring in May 2024 (Ecology 2024).

3.16.3 Impacts

As outlined in RCW 43.21C.405, this Draft Programmatic EIS is required to evaluate potential impacts on environmental justice and overburdened communities as defined in RCW 70A.02.010. In accordance with this requirement, this Draft Programmatic EIS assesses potential impacts from the construction, operation and maintenance, and upgrade or modification of transmission facilities within the Study Area on the following:

- Socioeconomics, including housing availability, home values, fiscal conditions, and employment
- Vulnerable populations and overburdened communities, including racial and ethnic minority populations and low-income populations

This analysis includes an evaluation of potential impacts related to environmental justice on vulnerable populations and overburdened communities.

3.16.3.1 Method of Analysis

The Study Area for a project-specific application would typically encompass several key regions and features, such as the following:

- **Project Site and Immediate Vicinity:** This includes the specific location of the project and the surrounding area that might be directly affected by construction, operation and maintenance, and upgrade or modification activities. The project site would include the transmission facility rights-of-way (ROWs), substation locations, transmission towers, access roads, and construction yards and associated laydown areas. The immediate vicinity would be based on setback requirements within local land use codes and transmission facility voltages.

- **Vulnerable Populations and Overburdened Communities:** Applicants would work closely with the State Environmental Policy Act (SEPA) Lead Agency to identify which screening tool to use to ensure the project does not result in an adverse disproportionate impact on vulnerable populations or overburdened communities. On a case-by-case basis, this evaluation would likely be presented in relationship to U.S. Census Bureau census tracts and block groups.

This Draft Programmatic EIS analyzes the affected environment and impacts on socioeconomics within the Study Area defined in Chapter 2, Overview of Transmission Facilities, Development Considerations, and Regulations. Three project phases for each transmission facility were considered: construction, operation and maintenance, and upgrade or modification. This evaluation considers overhead transmission facilities and underground transmission facilities for each phase. Overhead transmission facilities consist of transmission lines and substations and similar ancillary infrastructure. They also incorporate above-ground infrastructure that may be associated with underground transmission facilities (e.g., clearing footprint required for launch and retrieval shafts for trenchless construction). Underground transmission facilities consist of underground transmission lines, underground access vaults, and other below-ground infrastructure. The construction of underground transmission facilities includes open-trench, trenchless, and underwater construction methods.

The impact analysis uses urban and rural areas[343] as proxies for how the Action Alternative could impact communities, including vulnerable populations and overburdened communities. Urban and rural areas were selected as proxies as their geographies and baseline conditions could potentially dictate whether an impact is a nuisance or severe enough that it causes a measurable change to its residents' general welfare, social conditions, and economic environment.

Impact Determination

The discussion of impacts is qualitative given the high-level nature of this Draft Programmatic EIS; quantification would require project-specific details to analyze. The analysis of impacts focuses on assessing its effects on the general welfare, social conditions, and economic environment of communities, including vulnerable populations and overburdened communities. **Table 3.16-13** describes the criteria used to evaluate impacts from the Action Alternative and No Action Alternative.

[343] The Census Bureau's urban areas represent densely developed territory, and encompass residential, commercial, and other non-residential urban land uses. Rural encompasses all population, housing, and territory not included within an urban area. An urban area must comprise a densely settled core of census blocks that meet minimum housing unit density and/or population density requirements. This includes adjacent territory containing non-residential urban land uses. To qualify as an urban area, the territory identified according to criteria must encompass at least 2,000 housing units or have a population of at least 5,000 (U.S. Census Bureau 2023).

Table 3.16-13: Criteria for Assessing the Impact Determination on Socioeconomics

Impact Determination	Description
Nil	▪ **General Welfare:**[a] No foreseeable change in the health, well-being, or safety of the Study Area's residents would occur. ▪ **Social Conditions:**[b] No foreseeable change in healthcare, lifestyles, sense of belonging, housing, education, or assistance programs. ▪ **Economic Environment:** No foreseeable change in local employment, labor demand, employment accessibility, demand for local goods and services, or fiscal revenue would occur. ▪ **Environmental Justice:** No foreseeable impact on the general welfare, social conditions, or economic environment of vulnerable populations or overburdened communities would occur.
Negligible	Best management practices and design considerations are expected to be effective for impacts determined to be negligible. ▪ **General Welfare:** Minor, adverse changes would occur in the health, well-being, or safety of the Study Area's residents. ▪ **Social Conditions:** Minor, adverse changes would occur in healthcare, lifestyles, sense of belonging, housing, education, or assistance programs. ▪ **Economic Environment:** Minor, adverse changes would occur in local employment, labor demand, employment accessibility, demand for local goods and services, or fiscal revenue. ▪ **Environmental Justice:** Minor, adverse impacts would occur on vulnerable populations overburdened communities. However, the impact would not be disproportionate in comparison to the same impact on other populations.
Low	For the following, adverse changes are likely to occur even with the implementation of best management practices and design considerations. Impacts would be short term and nonsignificant. ▪ **General Welfare:** Adverse changes would occur in the health, well-being, or safety of the Study Area's residents. Changes would be small and within applicable regulatory standards. Changes would not require community- or government-level support to be improved. ▪ **Social Conditions:** Adverse changes would occur in healthcare, lifestyles, sense of belonging, housing, education, or assistance programs. For changes not to become long-term, communities may implement readily available assistance programs. ▪ **Economic Environment:** Adverse changes would occur in local employment, labor demand, employment accessibility, demand for local goods and services, or fiscal revenue. The action would not lead to a recession in business or housing. For changes not to become long-term, communities may implement readily available programs to revitalize economic growth. ▪ **Environmental Justice:** Adverse impacts would occur on the general welfare, social conditions, or economic environment of vulnerable populations or overburdened communities. However, the impact would not be disproportionate in comparison to the same impact on other populations.

Impact Determination	Description
Moderate	For the following, adverse impacts would occur even with the implementation of best management practices and design considerations. Moderate impacts may be long-term, occurring over one or more project phases. Moderate impacts have the potential to be significant. ▪ **General Welfare:** Adverse changes would occur in the health, well-being, or safety of the Study Area's residents. Changes would not be improved without community-level support. ▪ **Social Conditions:** Adverse changes would occur in healthcare, lifestyles, sense of belonging, housing, education, or assistance programs. For changes not to become permanent, communities would need to implement structural changes or assistance programs. ▪ **Economic Environment:** Adverse changes would occur in local employment, labor demand, employment accessibility, demand for local goods and services, or fiscal revenue. Communities would experience a recession in housing or businesses. For changes not to become permanent, communities would need to make structural changes that revitalize economic growth. ▪ **Environmental Justice:** Adverse impacts would occur on the general welfare, social conditions, and economic environment of vulnerable populations or overburdened communities. Although the impacts would not be permanent, they would disproportionately affect vulnerable populations or overburdened communities.
High	For the following, adverse impacts would have significant and potentially severe effects even after implementation of best management practices and design considerations. Impacts may be permanent or continue for the duration of the project. ▪ **General Welfare:** Permanent adverse changes in the health, well-being, or safety of the Study Area's residents. Improvements in general welfare would not be possible without government-level support. ▪ **Social Conditions:** Permanent adverse changes would occur in healthcare, lifestyles, sense of belonging, housing, education, or assistance programs. Communities would experience a permanent change in social conditions. Improvements to social conditions would be outside a community's control. ▪ **Economic Environment:** Permanent adverse changes would occur in local employment, labor demand, employment accessibility, demand for local goods and services, or fiscal revenue would occur. Communities would experience a permanent recession in housing or businesses. Improvements in economic conditions would be outside a community's control. ▪ **Environmental Justice:** Permanent adverse impacts would occur on the general welfare, social conditions, and economic environment of vulnerable populations or overburdened communities. These impacts would result in a permanent, disproportionate impact on vulnerable populations and overburdened communities.

Notes:
[a] Raphael et al. 2020
[b] U.S. Department of Health and Human Services n.d.(b)
EIS = Environmental Impact Statement

To clearly understand the potential severity of impacts without any interventions, the following impact determinations exclude the use of avoidance criteria and mitigation measures. The ratings assume compliance with all federal, state, and local laws and regulations, as well as standardized BMPs and design considerations. Assessing impacts without avoidance criteria or mitigation measures offers a baseline understanding of potential environmental effects, helping to identify the true extent of these impacts. Environmental laws often require that initial impact assessments be conducted without considering mitigation to maintain the integrity of the environmental review process.

3.16.3.2 Action Alternative

Construction

Overhead Transmission Facilities

Activities for the construction phase of overhead transmission facilities would vary and depend on the scale of the facility and site characteristics. Construction could include a site preparation phase of relatively short duration (e.g., a few months), followed by a longer construction and start-up phase. It is assumed that the construction phase of overhead transmission, per mile, would have a shorter duration than underground construction.

Overhead transmission facilities could have the following identified impacts during the construction phase:

- Degradation of the Natural and Built Environment
- Changes in Housing Availability
- Changes in Home Values
- Changes in Fiscal Conditions and Employment

Degradation of the Natural and Built Environment

This section of the analysis is organized based on elements of the environment, as defined in WAC Section 197-11-444 and discussed throughout Chapter 3. The natural environment includes elements such as air quality, water resources, plants and animals. The built environment includes noise, land and shoreline use, aesthetics, recreation, and transportation. This analysis evaluates how the degradation of noise, air quality, visual quality, recreation, and land and shoreline use resulting from the development of transmission facilities could impact socioeconomics and environmental justice.

Noise and Vibration

Noise and vibration could be generated during the construction of overhead transmission facilities from transporting and staging materials, using heavy machinery, drilling and blasting, constructing access roads, and assembling transmission structures. Section 3.13, Noise and Vibration, analyzes noise and vibration impacts from transmission facilities on sensitive receptors, such as residential areas, parks and recreational areas, schools, hospitals, nursing homes, and hotels. Table 3.13-1 includes applicable regulations that are intended to protect workers and the public from hearing loss. Table 3.13-2 provides a list of guidelines that are intended to prevent noise pollution and protect workers and the public from noise pollution. The following analysis evaluates potential noise impacts on urban and rural communities, including vulnerable populations and overburdened communities.

Urban communities may experience elevated ambient noise levels from nearby airports or transportation corridors or higher population densities. Urban areas with a change in noise can either go unnoticed or exacerbate an already noisy environment. Rural areas may experience lower ambient noise levels but still experience noise from agricultural activities or natural sounds from birds, insects, and vegetation rustling.

Noise and vibration in urban areas may not be noticeable because of the existing baseline conditions. Homes may also be constructed in a way that minimizes exterior noises or enhances their structural integrity. However, health impacts could occur in certain urban locations, particularly those where a change in noise levels exacerbate existing conditions and lead to increased and prolonged stress. Since rural areas have a lower baseline of ambient noise levels, a change in noise could be more noticeable and result in a greater impact than in urban areas. In both urban and rural areas, noise from construction could cause disruption to education for neighboring students and schools. Noise and vibration impacts would occur on a temporary basis during construction activities and would cease once construction is completed.

Noise impacts from the construction of overhead transmission facilities could impact vulnerable populations and overburdened communities in the same ways described above. However, these groups may experience greater impacts from construction noise due to their vulnerability and being impacted by existing environmental harms, as described in **Section 3.16.2**. Additionally, it is possible that these groups could experience greater impacts from construction noise and vibration for the following reasons:

- Structures such as houses may not be constructed with the same noise-attenuating materials or have the same structural integrity as houses in other communities. This can make these structures, and the individuals within them, more susceptible to audible and vibratory impacts.
- Financial constraints may prevent individuals from seeking refuge from noisy conditions, further increasing levels of stress and affecting their overall health and wellbeing.

Noise from the construction of overhead transmission facilities could have temporary adverse impacts on the social conditions and general welfare of both urban and rural communities. The siting of transmission facilities is anticipated to be influenced by their long linear design and the locations of higher energy demand. However, if transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the noise and vibration impacts resulting from their construction could have temporary, disproportionate effects on vulnerable populations and/or overburdened communities.

<u>Air Quality</u>

Construction of overhead transmission facilities could impact air quality as a result of increased fugitive dust emissions, emissions from fuel-burning equipment, and sulfur hexafluoride emissions. As described in Section 3.3, Air Quality, impacts on air quality can adversely impact sensitive receptors. The following analysis evaluates potential impacts on urban and rural communities, including vulnerable populations and overburdened communities.

Urban communities often experience high levels of air pollution from sources such as land development, transportation, and industrial activities. While air pollution levels may be generally lower in rural areas, these communities can still be affected by air pollution from transportation and agricultural activities. Changes in baseline air quality conditions may be more noticeable in rural areas than in urban ones. However, depending on the construction activity type, distance, and duration of construction activities, fugitive emissions can affect the social conditions and overall well-being of both urban and rural communities.

Increased fugitive emissions may be perceived as a nuisance, leading residents to temporarily change their lifestyles. For example, dust from construction may cause people to stay indoors for longer periods, force them to close their windows, or lead them to install air purifying systems. Temporary lifestyle changes could increase stress levels among residents, thereby impacting their overall well-being. Additionally, increased construction emissions could temporarily affect the health and well-being of individuals with respiratory conditions, such as asthma.

Air quality impacts from the construction of overhead transmission facilities could impact vulnerable populations and overburdened communities in the same ways. However, these groups may experience even greater impacts due to their vulnerability, limited financial opportunities to implement air purifying systems or air conditioners, and being impacted by existing environmental harms, as described in **Section 3.16.2**. Additionally, impacts related to social conditions could increase if access to healthcare or assistance programs is limited or changes.

The siting of transmission facilities is anticipated to be influenced by their long linear design and the locations of higher energy demand. However, if transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the air quality impacts resulting from their construction could have temporary, disproportionate effects on vulnerable populations and/or overburdened communities.

Visual Quality

As described in Section 3.12, Visual Quality, construction activities associated with overhead transmission facilities could result in adverse impacts on visual quality and the aesthetics of surrounding areas. The following analysis evaluates potential impacts on urban and rural communities, including vulnerable populations and overburdened communities.

Urban communities may currently experience a visually crowded environment due to prominent features such as tall buildings, telephone poles, and nighttime lights. In contrast, rural areas tend to have less visual clutter and fewer nighttime lights than urban settings. Rural areas are more likely than urban areas to offer open vistas and scenic natural resources. However, highways and agricultural support structures can still impact the visual landscape in rural areas.

Construction activities such as vegetation clearing, grading, and earthworks could temporarily degrade the aesthetics of both urban and rural communities. Impacts on the visual quality or aesthetics of an area may be perceived as a nuisance, thereby increasing stress levels for residents in both urban and rural communities.

Clearing ROWs or constructing permanent access roads can create contrasting visual landscapes, especially in rural areas. Furthermore, scenic views in rural areas can be disrupted from the installation of overhead transmission structures. Rural communities may experience heightened levels of stress and a decreased sense of belonging due to the rapidly changing landscape. Ongoing levels of increased stress and a change in an individual’s sense of belonging could affect their overall well-being. Visual disruptions to scenic views or visual landscapes can also reduce tourism and agri-tourism appeal, thereby affecting the economic environment for populations that rely on these industries.

Visual impacts from the construction of overhead transmission facilities could have permanent, adverse impacts on the social conditions, economic environment, and general welfare of urban and rural communities. These impacts could also affect vulnerable populations and overburdened communities. However, these groups may experience even greater effects due to their vulnerability and being impacted by existing environmental harms, as described in **Section 3.16.2**. For instance, if the construction of overhead transmission facilities has adverse effects on tourism or agri-tourism, it could decrease labor demand and fiscal revenue. If low-income populations that rely on this industry are let go due to budget cuts, then their lifestyle, health, and overall wellbeing could be adversely impacted at a greater magnitude or more severely than other populations.

Overhead transmission facilities could result in adverse visual impacts that begin during construction and continue through the life of the project. These permanent adverse impacts would affect the social conditions and general welfare of both urban and rural communities. The siting of transmission facilities is anticipated to be influenced by their long linear design and the locations of higher energy demand. However, if transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the visual impacts resulting from their construction could have permanent, disproportionate effects on vulnerable populations and/or overburdened communities.

Land and Shoreline Use, and Recreation

As discussed in Sections 3.9, Land and Shoreline Use, and 3.14, Recreation, the construction of overhead transmission facilities could result in an incompatible land and shoreline use and decrease the function and value of recreational facilities, shorelines, agricultural lands, and rangelands. The following analysis evaluates how these potential impacts may affect urban and rural communities, including vulnerable populations and overburdened communities.

Rural areas generally experience fewer changes or conflicts to land use than urban areas because they have less development. Therefore, changes to the baseline conditions are expected to be more noticeable. Conflicting or incompatible land uses with residential, commercial, or public service and education facilities, in both urban and rural areas, could influence a community's sense of belonging and impact an individual's health and safety (see Section 3.8, Public Health and Safety). These changes could result in permanent adverse impacts on the social conditions and general welfare of rural communities.

Since rural areas have more land designated for agriculture and farming activities, temporary adverse impacts on their operations could affect the economic environment. Damage to crops, decreased productivity, and the presence of heavy equipment that pose an obstacle to agricultural activities could decrease labor demand and fiscal revenue, thereby resulting in permanent adverse impacts on the economic environment. Similarly, impacts on shorelines in either rural or urban communities could affect livelihoods that depend on fishing or tourism.

Impacts on shoreline uses and recreational resources could impact both urban and rural communities. Construction activities have the potential to limit public access and recreational opportunities. Construction activities can also temporarily change the integrity of the shoreline or recreational resource. Construction activities could destabilize natural resources, disturb soils prone to sedimentation and erosion, and alter the existing visual landscape, leading to a change in the resource's integrity. Urban and rural communities may be deterred from going to these areas and already experience a lack of recreational opportunities. Therefore, temporary changes to the integrity and accessibility of shorelines and recreational facilities could affect an individual's lifestyle, well-being, and health. These changes could result in temporary adverse impacts on the social conditions and general welfare of urban and rural communities.

These impacts could also affect vulnerable populations and overburdened communities. However, these groups may experience greater impacts due to their vulnerability and the historical burden of environmental stressors, as described in **Section 3.16.2.** Additionally, these groups may experience increased impacts for the following reasons:

- They may already experience impacts from incompatible land uses caused by land or transportation developments, such as major roads or highways. Additional incompatible developments could increasingly have an adverse impact on the social conditions and general welfare of a vulnerable population and overburdened community.
- Financial constraints may limit a vulnerable population and overburdened community to access unaffected shorelines or recreational resources, thereby having a more noticeable effect on their lifestyle, health, and well-being.

Overhead transmission facilities could result in adverse land and shoreline use, and recreation impacts that begin in construction and continue through the life of the project. These permanent adverse impacts would affect the social conditions, economic environment, and general welfare of both urban and rural communities. The impacts may also affect vulnerable populations and overburdened communities. However, these groups may experience greater effects due to their vulnerability and being impacted by existing environmental harms, as described in **Section 3.16.2**.

The siting of transmission facilities is anticipated to be influenced by their long linear design and the locations of higher energy demand. However, if transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the impacts resulting from their construction could have permanent, disproportionate effects on vulnerable populations and/or overburdened communities.

Impact determination: Depending on the scale of the facility and site characteristics, the impacts on the natural and built environment in relation to socioeconomics and environmental justice, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Changes in Housing Availability

As discussed in Chapter 2, Overview of Transmission Facilities, Development Considerations, and Regulations, the number of workers employed during the construction of transmission facilities would vary greatly depending on the size and scale of the facility. It is generally anticipated that construction of a transmission facility could require between 60 and 220 employees at any given time. However, construction activities are expected to occur in sequences; therefore, employees would not be in one location at the same time. The workers traveling to the construction area could affect the availability of local hotels or short-term places of stay rather than long-term housing options.

Long-term housing availability could be impacted if the construction of overhead transmission facilities requires land acquisitions that result in displacing residents or housing units. Additionally, some project employees may look for more permanent residences based on their role on the project (e.g., project managers, superintendents). Changes in housing availability could lead to adverse impacts on the economic environment, social conditions, and general welfare of communities.

Furthermore, as shown in **Table 3.16-5**, housing availability is low statewide and affordability depends on the location. In densely populated urban areas where affordable housing options are often limited, a change in housing availability could result in an increased demand. If affordable housing demands increase, prices may increase to reflect the demand, thereby leading to higher costs of living. Rural areas generally have fewer housing options than urban areas; therefore, a change from baseline conditions may result in a more severe impact on these communities than those in urban areas.

Decreased short- and long-term housing availability from the construction of overhead transmission facilities could have permanent adverse impacts on the economic environment, social conditions, and general welfare of urban and rural communities. These impacts could also affect vulnerable populations and overburdened communities. However, these groups may experience a greater effect due to their limited financial resources that may be required to adapt to a changing economic environment. Additionally, they may face greater impacts due to their vulnerability and being impacted by existing environmental harms, as described in **Section 3.16.2**.

The siting of transmission facilities is anticipated to be influenced by their long linear design and the locations of higher energy demand. However, if transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the adverse impacts on housing availability resulting from their construction could have permanent, disproportionate effects on vulnerable populations and/or overburdened communities.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on housing availability, without mitigation measures incorporated, are anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Changes in Home Values

As shown in **Table 3.16-5,** median home values can be closely associated with whether the home is in an urban or rural county. The exception to this is when a rural county has land use restrictions that limit future development, such as housing. In these areas, limited housing availability may have a greater influence on home values than the addition of new transmission facilities. For instance, in a rural county like Adams County, the median home value is $216,900, while in San Juan County the median home value is $673,700. The higher home values in San Juan County are likely associated with the island's restrictions on development and its remote location. The median home value in an urban county, such as King County, is $761,500. The home values in King County are likely supported by the larger population and higher personal incomes.

Additional overhead infrastructure in urban viewsheds is likely to have a lower impact on home values than in rural areas, where there are more scenic natural resources. Once construction begins, potential homebuyers would likely factor the permanent changes to the viewshed or potential health and safety concerns described in Section 3.8, Public Health and Safety, into their decision-making process. These factors could influence and decrease home values beginning in the construction phase and continuing through the life of a project.

Vacancy rates, shown in **Table 3.16-5**, suggest that there may be more competition for housing in urban areas than in rural communities, where fewer people reside. The increased population of urban areas may support higher home values even in areas where new transmission facilities are being constructed. However, adverse changes to the economic environment could still occur.

Homebuyers with greater financial resources may prefer neighborhoods farther away from overhead transmission facilities for various reasons, including reduced visual obstructions and potential health and safety concerns. In contrast, vulnerable populations and overburdened communities often lack the financial resources to make similar choice. As a result, these groups may have to adjust their lifestyle to adapt to rising home values in areas farther away from overhead transmission facilities. In contrast, this situation could force these groups to choose homes closer to such facilities, which could result in adverse changes to lifestyles, sense of belonging, and overall wellbeing.

Overhead transmission facilities could result in adverse impacts on home values that begin in construction and continue through the life of the project. These permanent adverse impacts would affect the social conditions, economic environment, and general welfare of both urban and rural communities. The siting of transmission facilities is anticipated to be influenced by their long linear design and the locations of higher energy demand. However, if transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the impacts on home values resulting from their construction could have permanent, disproportionate effects on vulnerable populations and/or overburdened communities.

Impact Determination: Depending on the scale of the transmission facility and site characteristics, the impacts on home values without mitigation incorporated, are anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Changes in Fiscal Conditions and Employment

As discussed in Section 3.10, Transportation, construction of overhead transmission facilities could require road closures and diversion. These closures and diversions could temporarily disrupt access to local businesses or employment centers. A change in access to local businesses could have adverse impacts on their fiscal revenue while a change in access to employment centers may require employees to alter their lifestyle to accommodate changes in accessibility. These impacts are not expected to be permanent as access to local businesses would return to pre-project conditions once construction is complete.

The construction of overhead transmission facilities could beneficially impact the economic environment for both urban and rural communities, as well as vulnerable populations and overburdened communities. The construction activities could temporarily improve labor income through increased employment opportunities and increasing the earnings of workers and sole proprietors. Additionally, the demand for materials and services could temporarily stimulate local businesses, thereby boosting economic activity. Communities may benefit from increased tax revenue through sales taxes on construction materials, income taxes from wages earned by workers employed during the construction process, and property taxes paid by landowners.

If a transmission facility is constructed in an area that is predominantly vulnerable or overburdened, and the benefits of the project are not equally distributed, the project could have a temporary, disproportionate impact on vulnerable populations and/or overburdened communities.

Impact determination: Depending on the scale of the transmission facility and site characteristics, the impacts on fiscal conditions and employment, without mitigation measures incorporated, are anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Activities for the construction phase of underground transmission facilities, including open trench, trenchless (including directional drilling), or underwater construction methods, would vary depending on the scale of the facility and site characteristics. Similar to overhead transmission facilities, underground construction could include a site preparation phase of relatively short duration, followed by a longer construction and start-up phase. It is assumed that the construction phase for underground transmission facilities, per mile, would have a longer duration than overhead projects.

Underground transmission facilities could have the following identified impacts during the construction phase:

- Degradation of the Natural and Built Environment
- Changes Housing Availability
- Changes in Home Values
- Changes in Fiscal Conditions and Employment

Degradation of the Natural and Built Environment

Noise and Vibration

The construction of underground transmission facilities is expected to result in similar noise and vibration impacts to those associated with the construction of overhead transmission facilities. However, construction of underground transmission facilities is likely to result in increased vibration due to the extensive earthwork, tunneling, and the use of heavy equipment. Additionally, the construction of underground transmission facilities typically takes longer than that of overhead facilities, which would result in a longer duration of noise and vibration impacts. Noise and vibration impacts would occur on a temporary basis during construction activities and would cease once construction is completed.

Noise from the construction of underground transmission facilities could have temporary adverse impacts on the social conditions and general welfare of both urban and rural communities. The siting of transmission facilities is anticipated to be influenced by their long linear design and the locations of higher energy demand. However, if transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the noise and vibration impacts resulting from their construction could have temporary, disproportionate effects on vulnerable populations and/or overburdened communities.

Air Quality

Emissions associated with the construction of underground transmission facilities could temporarily affect air quality. Impacts on air quality from the construction of underground transmission facilities would be similar to those associated with the construction of overhead transmission facilities. However, the construction of underground transmission facilities could require extensive and long durations of trenching, which disturbs soil and can result in fugitive dust emissions. Extensive trenching over a long duration would increase air quality impacts in comparison to overhead transmission facilities.

The construction of underground transmission facilities could have temporary adverse air quality impacts that affect the social conditions and general welfare of both urban and rural communities. The siting of transmission facilities is anticipated to be influenced by their long linear design and the locations of higher energy demand. However, if transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the air quality impacts resulting from their construction could have temporary, disproportionate effects on vulnerable populations and/or overburdened communities.

Land and Shoreline Use, and Recreation

Similar to overhead construction, underground transmission construction could result in an incompatible land and shoreline use, and decrease the function and value of recreational facilities, shorelines, agricultural lands, and rangelands. The prolonged nature of underground transmission facility construction could lead to extended impacts, thereby having a greater impact on communities in both urban and rural areas.

The effects on urban and rural communities resulting from changes in land and shoreline use, as well as recreation, could be minimized by installing underground transmission facilities using trenchless techniques such as tunneling or horizontal directional drilling.

The construction of overhead transmission facilities could adversely impact land and shoreline uses, and recreation, leading to temporary adverse changes in the social conditions, economic environment, and general welfare of both urban and rural communities. The siting of transmission facilities is anticipated to be influenced by their long linear design and the locations of higher energy demand. However, if transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the impacts resulting from their construction could have permanent, disproportionate effects on vulnerable populations and/or overburdened communities.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on the natural and built environment in relation to socioeconomics and environmental justice, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Changes in Housing Availability

The construction of underground transmission facilities could result in impacts on housing availability similar to those described for overhead transmission facilities. Because the construction of underground transmission facilities generally take longer to complete, the availability of local hotels or short-term rentals could be affected for a longer duration.

As with overhead transmission facilities, if underground transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the adverse impacts on housing availability resulting from their construction could have permanent, disproportionate effects on vulnerable populations and/or overburdened communities.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on housing availability, without mitigation measures incorporated, are anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Changes in Home Values

While individuals or communities may prefer underground transmission facilities, this construction method could still have impacts on homeowners and home buyers.

Development of underground transmission facilities would have restrictions within or directly adjacent to the ROW, such as planting deep-rooted shrubs or trees to prevent interference with underground lines. Utility operators would also require access to the transmission facility for periodic inspections, maintenance, and potential repairs. These vegetation, development, and access requirements could deter potential homebuyers from the purchase of a home, potentially leading to changes in home values.

The recurring fee from an imposed tariff to a service area for the additional cost of undergrounding the transmission facility, in comparison to the cost of constructing overhead transmission facilities, could outweigh the benefit of increased home values. The additional cost resulting from the imposed tariff could deter a potential homebuyer from the purchase of the home. Additionally, the health and safety concerns described in Section 3.8, Public Health and Safety, regarding the operation and maintenance of underground transmission facilities may further influence potential homebuyers and home values.

Once construction begins, potential homebuyers would likely factor access requirements, development restrictions, changes to the cost of living, and health and safety concerns, into their decision-making process. This could result in a decrease in home values that begins in construction and continues through the life of a project. These permanent adverse impacts would affect the social conditions, economic environment, and general welfare of both urban and rural communities. The siting of transmission facilities is anticipated to be influenced by their long linear design and the locations of higher energy demand. However, if transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the impacts on home values resulting from their construction could have permanent, disproportionate effects on vulnerable populations and/or overburdened communities.

Impact Determination: Depending on the scale of the transmission facility and site characteristics, the impacts on home values, without mitigation incorporated, are anticipated to vary and could be low to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Changes in Fiscal Conditions and Employment

The construction of underground transmission facilities could have temporary adverse impacts on the economic environment of local businesses, similar to the effects described for overhead transmission facilities. However, the duration of these impacts may be longer for underground transmission facilities since they typically take longer to construct.

The construction of underground transmission facilities could also have a temporary, beneficial impact on economic conditions, much like with overhead transmission facilities. The extended construction timeframes associated with underground transmission facilities could further stimulate economic activity.

If a transmission facility is constructed in an area that is predominantly vulnerable or overburdened, and the benefits or impacts of the project are not equally distributed, the project could have a temporary, disproportionate impact on vulnerable populations and/or overburdened communities.

Impact determination: Depending on the scale of the transmission facility and site characteristics, the impacts on fiscal conditions and employment, without mitigation measures incorporated, are anticipated to vary and could be negligible to moderate. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Operation and Maintenance

Overhead Transmission Facilities

Activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs, similar to any other linear industrial facility. Overhead transmission facilities could have the following identified adverse impacts during the operation and maintenance phase:

- Degradation of the Natural and Built Environment
- Changes in Fiscal Conditions and Employment

Degradation of the Natural and Built Environment

Noise and Vibration

Noise impacts can result from both operational and temporary sources noise during the operation and maintenance of overhead transmission facilities. Operational noise can include corona discharge, especially during foul weather. It can also result from typical transmission facility equipment, including, but not limited to, substations, transformers, and cooling systems. Temporary noise and vibration could be generated from routine inspections, maintenance, and repair of overhead transmission facilities.

Noise and vibration from the operation and maintenance of overhead transmission facilities may be noticeable to communities in urban and rural areas, depending on the existing noise environment, the specific equipment used, and any natural noise buffers such as vegetation or topography. Additionally, while noise levels could be similar to those experienced during construction, they would occur intermittently and be shorter in duration.

Noise and vibration in urban areas may not be noticeable because of the existing baseline conditions. Additionally, urban homes may have been constructed in a way that minimizes exterior noises or enhances their structural integrity. However, health impacts could occur in certain urban locations, particularly those where a change in noise levels exacerbates existing conditions and leads to increased and prolonged stress. Since rural areas have a lower baseline of ambient noise levels, a permanent change in noise could be more noticeable and result in a greater impact in rural than in urban areas. In both urban and rural areas, noise from operation and maintenance could cause disruption to education for neighboring students and schools.

These adverse impacts could affect vulnerable populations and overburdened communities in similar ways. However, these groups may experience greater impacts due to their vulnerability and the historical burden of environmental stressors, as described in Section 3.16.2, as well as for the following reasons:

- Structures such as houses may not be constructed with the same noise-attenuating materials or have the same structural integrity as houses in other communities. This can make these structures, and the individuals within them, more susceptible to audible and vibratory impacts.
- Financial constraints may prevent individuals from seeking refuge from noisy conditions, further increasing levels of stress and affecting their overall health and wellbeing.

Noise from the operation and maintenance of overhead transmission facilities could have an adverse impact on the social conditions and the general welfare of both urban and rural communities, including vulnerable populations and overburdened communities. As previously discussed, the siting of transmission facilities is expected to depend on energy demand and may span several miles across various communities with differing socioeconomic conditions and demographics. However, if transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the noise impacts resulting from their operation and maintenance could have disproportionate effects on vulnerable populations and/or overburdened communities.

Air Quality

During the operation and maintenance phase, routine maintenance and inspections of overhead transmission facilities may require the use of maintenance vehicles, heavy equipment, and portable generators. This can lead to increased fugitive emissions, resulting in impacts on the social conditions and overall well-being of both urban and rural communities similar to those described for the construction phase. However, these impacts would likely be shorter in duration and less severe.

Air quality impacts from the operation and maintenance of overhead transmission facilities could have an adverse impact on the social conditions and the general welfare of urban and rural communities, including vulnerable populations and overburdened communities. As previously discussed, the siting of transmission facilities is expected to depend on energy demand and may span several miles across various communities with differing socioeconomic conditions and demographics. However, if transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the air quality impacts resulting from their operation and maintenance could have disproportionate effects on vulnerable populations and/or overburdened communities.

Visual Quality

Overhead transmission facilities would continue to adversely impact the visual quality and aesthetics of urban and rural areas due to the large size of transmission towers and cleared corridors. The permanent presence of overhead transmission facilities and wide, open corridors could cause adverse changes in a population's overall well-being and social conditions.

In urban areas, the presence of additional infrastructure in the viewshed could cause a noticeable impact on the feeling of neighborhoods and individuals' sense of belonging. Their added presence could cause an increase in stress related to affected residents' concerns about safety and well-being from living near overhead transmission facilities. In rural areas, the presence of overhead transmission facilities could affect residents' well-being and sense of belonging, as feelings of urbanization filter into a rural community.

Visual impacts from the operation and maintenance of overhead transmission facilities could have an adverse impact on the social conditions and the general welfare of urban and rural communities, including vulnerable populations and overburdened communities. If overhead transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the visual impacts resulting from their operation and maintenance could have permanent, disproportionate effects on vulnerable populations and/or overburdened communities.

Land and Shoreline Use, and Recreation

As discussed in Sections 3.9, Land and Shoreline Use, and 3.14, Recreation, overhead transmission facilities could continue to impact land and shoreline use, and recreation, through the operation and maintenance phase.

The operation of overhead transmission facilities in urban areas would restrict future residential, commercial, and industrial development, potentially leading to adverse changes to that area's economic condition. Additionally, the operation of overhead transmission facilities could restrict allowable crop types, such as orchards, hops, and tree farms. Certain farming equipment, activities, and irrigation systems, and their maneuverability, could be restricted due to conflicts with overhead transmission facilities. Maintenance activities associated with overhead transmission facilities could also continue to impact rural agriculture and farming activities. ROW or access road maintenance activities would require vegetation removal using a variety of methods, including mechanical removal, hand cutting, and herbicide application. These maintenance activities can interfere with farming operations or activities and livestock grazing. Furthermore, the use of herbicides to control vegetation along the ROW could impact nearby crop production and interfere with organic farms or other herbicides used by farm workers. These impacts could decrease fiscal revenue and labor demand, thereby adversely impacting the economic environment. Similarly, impacts on shorelines, in either rural or urban communities, could affect livelihoods that depend on fishing or tourism.

Operation and maintenance of overhead transmission facilities, including their associated ROW corridors and access roads, may require permanent or temporary closure of shoreline and recreational resources. These permanent features can fragment the existing landscape, adversely impacting the natural and aesthetic quality of the area. Further, the presence of maintenance vehicles and staff, along with noise from potential repair activities, can adversely impact the experience for visitors. These impacts could result in adverse effects on the lifestyle, health, and wellbeing for those who rely on consistent public access to shoreline or recreational facilities.

These impacts could also affect vulnerable populations and overburdened communities. However, these groups may experience greater impacts due to their vulnerability and the historical burden of environmental stressors, as described in Section 3.16.2. Additionally, financial constraints may limit the ability for vulnerable populations and overburdened communities to access unaffected shorelines or recreational resources, thereby having a more noticeable effect on their lifestyle, health, and well-being.

The operation and maintenance of overhead transmission facilities could adversely impact land and shoreline uses, and recreation, leading to permanent changes in the social conditions, economic environment, and general welfare of both urban and rural communities. If transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the impacts resulting from their operation and maintenance could have permanent, disproportionate effects on vulnerable populations and/or overburdened communities.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on the natural and built environment in relation to socioeconomics and environmental justice, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Changes in Fiscal Conditions and Employment

Maintenance activities associated with overhead transmission facilities could require road closures and diversions. Impacts on the economic environment and social conditions for communities in both rural and urban areas would be similar to those during construction. However, impacts are expected to occur for shorter periods of time.

Operation and maintenance of overhead transmission facilities may create increased job opportunities, particularly opportunities such as vegetation management services and skilled positions associated with transmission facility repairs. Additionally, though to a lesser extent than for construction, demand for maintenance and repair-related materials could stimulate local economies. Communities may also notice improvements from increased tax revenue through sales taxes on construction materials, income taxes from wages earned by workers employed during the construction process, and property taxes paid by landowners. For example, communities could see enhanced education, public service, and transportation facilities or programs implemented or constructed. It is anticipated that local governments would equitably distribute the benefits of an increased tax base to all communities, including vulnerable populations and overburdened communities.

The construction of overhead transmission facilities would be required to comply with the latest design standards and may be equipped with advanced transmission technologies. As discussed in Chapter 2, Overview of Transmission Facilities, Development Considerations, and Regulations, advanced technologies can include solutions such as dynamic line rating that focus on improvements in the control systems and decision-making processes. There are also physical asset and infrastructure solutions, such as power flow controllers and advanced conductors and cables that focus on carrying, converting, or controlling electricity. By using the latest advancements or innovations in materials and technologies, residents, businesses, and schools could experience more reliable electricity even during weather events, such as heat waves. These improvements could have a beneficial impact on the social conditions, economic environment, and general welfare of urban and rural communities.

If a transmission facility is constructed in an area that is predominantly vulnerable or overburdened, and the benefits and adverse impacts of the project are not equally distributed, the project could have a permanent, disproportionate impact on vulnerable populations and/or overburdened communities.

Impact determination: Depending on the scale of the transmission facility and site characteristics, the impacts on fiscal conditions and employment, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Underground Transmission Facilities

Similar to overhead transmission facilities, activities for the operation and maintenance phase would vary based on type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs, similar to any other linear industrial facility. Underground transmission facilities could have the following identified adverse impacts during the operation and maintenance phase:

- Degradation of the Natural and Built Environment
- Changes in Fiscal Conditions and Employment

Degradation of the Natural and Built Environment

Noise and Vibration

Adverse impacts from noise and vibration are not expected to occur during normal operations of underground transmission facilities. However, if repairs are required, temporary noise impacts could occur due to the use of heavy machinery needed to access the underground facilities. Temporary noise impacts would be similar to those expected during construction, although they would be shorter in duration.

If transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the noise impacts resulting from their operation and maintenance could have temporary, disproportionate effects on vulnerable populations and/or overburdened communities.

Air Quality

Similar to noise and vibration, air quality would likely be impacted by underground transmission facilities only when repairs are needed. The use of heavy machinery and fuel-burning equipment could create fugitive dust and emissions that temporarily impact the surrounding area. Temporary air quality impacts would be similar to those expected during construction, although they would be shorter in duration.

If transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the air quality impacts resulting from their operation and maintenance could have temporary, disproportionate effects on vulnerable populations and/or overburdened communities.

Land and Shoreline Use, and Recreation

As discussed in Sections 3.9, Land and Shoreline Use, and 3.14, Recreation, underground transmission facilities could continue to impact land and shoreline use, and recreation through the operation and maintenance phase.

The presence of underground transmission facilities in urban areas would restrict future residential, commercial, and industrial development potentially leading to adverse changes to that area's the economic condition. Additionally, planting deep-rooted shrubs or trees would not be allowed within the ROW of underground transmission facilities. As with overhead transmission facilities, maintenance activities for underground transmission facilities would include vegetation removal. These maintenance activities can interfere with farming operations or activities and livestock grazing. Furthermore, the use of herbicides to control vegetation along the ROW could impact nearby crop production and interfere with organic farms or other herbicides used by farm workers. These impacts could decrease fiscal revenue and labor demand, thereby adversely impacting the economic environment.

Although underground transmission facilities are considered to have less visual impact than their overhead counterparts, they still require permanent vegetation clearing along the ROW and access roads, which could permanently alter the visual landscape of shorelines and recreational areas. Additionally, repairs could require temporary closure or restricted access to these resources. These impacts could result in adverse effects on the lifestyle, health, and wellbeing for those who rely on consistent public access to shoreline or recreational facilities.

These impacts could also affect vulnerable populations and overburdened communities. However, these groups may experience greater impacts due to their vulnerability and the historical burden of environmental stressors, as described in Section 3.16.2. Additionally, financial constraints may limit the ability for vulnerable populations and overburdened communities to access unaffected shorelines or recreational resources, thereby having a more noticeable effect on their lifestyle, health, and well-being.

The operation and maintenance of overhead transmission facilities could adversely impact land and shoreline uses, and recreation, leading to permanent changes in the social conditions, economic environment, and general welfare of both urban and rural communities. If transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the impacts resulting from their operation and maintenance could have permanent, disproportionate effects on vulnerable populations and/or overburdened communities.

Impact Determination: Depending on the scale of the facility and site characteristics, the impacts on the natural and built environment in relation to socioeconomics and environmental justice, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Changes in Fiscal Conditions and Employment

Changes in fiscal conditions and employment during the operation and maintenance of underground transmission facilities would be similar to those described for overhead transmission facilities. However, underground transmission facilities may have slightly greater adverse impacts since repairs would take longer to complete and more technically skilled employees.

Additionally, as discussed in Chapter 2, Overview of Transmission Facilities, Development Considerations, and Regulations, underground transmission facilities are less vulnerable to external threats, such as high winds, falling branches, and wildfires. This reduces the risk of power outages and enhances the overall reliability and resiliency of the power grid. Residents, businesses, and schools could experience more reliable electricity. These improvements could have a beneficial impact on the social conditions, economic environment, and general welfare of urban and rural communities.

If a transmission facility is constructed in an area that is predominantly vulnerable or overburdened, and the benefits and adverse impacts of the project are not equally distributed, the project could have a permanent, disproportionate impact on vulnerable populations and/or overburdened communities.

Impact determination: Depending on the scale of the transmission facility and site characteristics, the impacts on fiscal conditions and employment, without mitigation measures incorporated, are anticipated to vary and could be negligible to high. Avoidance criteria or mitigation measures may be required to reduce the rating to a less than significant impact.

Upgrade or Modification

Overhead Transmission Facilities

Upgrading or modifying overhead transmission facilities could involve several steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2, Overview of Transmission Facilities, Development

Considerations, and Regulations. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application.

Overhead transmission facilities could have the following adverse impacts during their upgrade or modification phase:

- Degradation of the Natural and Built Environment
- Changes in Housing Availability
- Changes in Home Values
- Changes in Fiscal Conditions and Employment

These impacts are expected to be similar to those described for construction of new transmission facilities; however, the rating of impacts on socioeconomics and environmental justice could be lower than during construction due to the following factors:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing structures and disturbance footprints, causing less disruption to the surrounding environment than the construction of a new facility.
- **Infrastructure Utilization:** The local community is familiar with and has adapted to the existing transmission facilities and operations. This familiarity can lead to fewer socioeconomic concerns than a new construction project.

Underground Transmission Facilities

Upgrading or modifying underground transmission facilities would involve several steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2, Overview of Transmission Facilities, Development Considerations, and Regulations. Impacts during the upgrade or modification of existing transmission facilities would vary depending on the scale of the project-specific application. Underground transmission could have the following impacts during the upgrade or modification phase:

- Degradation of the Natural and Built Environment
- Changes in Housing Availability
- Changes in Home Values
- Changes in Fiscal Conditions and Employment

These impacts are expected to be similar to those described for construction of new transmission facilities; however, the rating of impacts on socioeconomics and environmental justice could be less than construction due to the following factors:

- **Disturbance Minimization:** Upgrades or modifications typically involve working within existing structures and ROWs, causing similar or less disruption to the surrounding environment than the construction of a new facility, which requires site preparation, land clearing, and installation of support structures.

- **Infrastructure Utilization:** The local community is familiar with and has adapted to the existing transmission facilities and operations. This familiarity can lead to fewer socioeconomic concerns than a new construction project.

3.16.3.3 No Action Alternative

The No Action Alternative represents the scenario in which this Draft Programmatic EIS is not used and current management practices for siting and planning transmission facilities continue unchanged. Under this alternative, each project would continue to be evaluated on a case-by-case basis and reviewed for compliance with existing regulations, codes, and standard practices. While impact determinations would likely be similar to those outlined in this Draft Programmatic EIS, projects would not benefit from the **impact reductions associated with the avoidance criteria** developed and analyzed in this Draft Programmatic EIS. These criteria are anticipated to provide additional mitigation that further reduces potential environmental impacts.

3.16.4 Potential Mitigation Measures

This section describes measures that would eliminate, reduce the intensity of, or compensate for adverse impacts from construction, operation and maintenance, and upgrade or modification of transmission facilities.

All general conditions adopted for this Draft Programmatic EIS, identified in Section 3.1, are relevant to this resource section. Applicants would be responsible for providing information within their application materials documenting the implementation of the general conditions.

Avoidance criteria adopted for this Draft Programmatic EIS are identified in Section 3.1. Avoidance criteria that are relevant to this resource section are described below:

AVOID-13 – Land Use and Zoning Incompatibility and Conflicts: Avoid incompatible land uses and zoning. Demonstrate that there are no indirect or adjacent land use conflicts with private property owners or public land administrators.

Rationale: This avoidance criterion aims to avoid conflicts with land use and zoning. Avoiding land use and zoning conflicts would also help to reduce adverse impacts on property owners, agricultural landowners, noise, visual, and socioeconomics.

AVOID-16 – Decrease in LOS below Acceptable Levels: Avoid a decrease in level of service (LOS) below level C on roads used during construction and avoid additional LOS reductions during construction on roads already below level C.

Rationale: This avoidance criterion aims to maintain LOS. LOS can be directly related to safety issues related to traffic density and flow. For example, higher traffic volumes and lower LOS can increase the risk of accidents.

AVOID-18 – Exceptional Recreation Assets: Avoid impacts on, or within the viewshed of, exceptional recreation assets as defined by the Washington State Recreation and Conservation Office (RCO).

Rationale: This avoidance criterion aims to protect exceptional recreational assets. These places provide a unique experience or activity that may not be available in all areas of the state. Coordination with the RCO early in the project planning process is a crucial step to adequately avoid these areas.

AVOID-19 – Wilderness Areas: Avoid impacts on, or within the viewshed of, designated wilderness areas.

Rationale: This avoidance criterion aims to protect wilderness areas. Wilderness areas are valued for their untouched natural beauty. The Wilderness Act of 1964 mandates the preservation of the natural conditions of designated wilderness areas.

AVOID-20 – Limit Closure of Recreation Resources: Consider closure and restrictions only after other mitigation strategies and alternatives have been explored. Avoid long-term closure and restriction of recreation resources lasting more than 24 months.

Rationale: This avoidance criterion establishes the definition of “long-term closure” in relation to impacts on recreation resources from the construction, operation and maintenance, and upgrade or modification of transmission facilities.

AVOID-25 – Disproportionate Impacts on Environmental Justice Communities: Avoid disproportionate impacts on vulnerable populations or overburdened communities.

Rationale: This avoidance criterion aims to avoid a disproportionate impact on vulnerable populations or overburdened communities.

AVOID-26 – Displacing Residents or Housing Units: Avoid land acquisitions domain that result in displacing residents or housing units.

Rationale: Long-term housing availability could be impacted if the construction of transmission facilities requires land acquisitions that results in displacing residents or housing units. Changes in housing availability could lead to adverse impacts on the economic environment, social conditions, and general welfare of communities, including vulnerable populations and overburdened communities. This avoidance criterion aims to avoid impacts on long-term housing availability.

Applicants would be responsible for providing information within their application materials documenting the project’s compliance with the above avoidance criteria.

Potential mitigation measures have been identified to minimize adverse impacts from transmission facility projects. These measures are intended to be broad so that they can be applied to most projects that would be covered under this Programmatic EIS. However, project-specific plans would be needed to adapt the measures for project-specific applications.

When impact determinations are identified as moderate or high, the applicant would either adopt applicable mitigation measures from this Programmatic EIS or the SEPA Lead Agency may require applicable mitigation measures to be implemented to reduce project-specific impacts. When impact determinations are low, applicable mitigation measures should still be considered by the applicant and the SEPA Lead Agency as these measures would help to further reduce project-specific impacts, including the project’s contribution to cumulative impacts. These measures would be implemented in addition to compliance with laws, regulations, environmental permits, plans, and design considerations required for transmission facilities.

The following mitigation measures could be adopted to mitigate adverse impacts:

SE-1 – Communication Plan: Prepare a communication plan that includes a mechanism for handling complaints.

Rationale: This mitigation measure aims to address the potential impacts of stress and annoyance caused by changes in nuisance noise, dust, odor, and visual landscape by providing affected residents with a structured means of providing feedback.

SE-2 – Analysis of Housing Market: Complete an analysis of the temporary housing market.

Rationale: This mitigation measure aims to address potential impacts on temporary housing and property values. It assesses the potential impacts on temporary housing, identifying when and what type of mitigation would be necessary.

SE-3 – Engage Environmental Justice and At-Risk Communities: Identify and engage community leaders and organizations from within vulnerable populations and overburdened communities. These community organizers should be listed within a community engagement plan. This plan should also include a community worker training initiative in which education and job training programs are made accessible to vulnerable populations and overburdened communities.

Rationale: This mitigation measure aims to ensure vulnerable populations and overburdened communities can participate in the energy transition through active engagement and equal access to employment opportunities. This measure promotes stimulation and diversification of the local economy, prepares workers for a variety of industries, and offers local employment opportunities, thereby minimizing the need for worker relocation. Community engagement and worker training programs can greatly contribute to the revitalization of overburdened communities by addressing socioeconomic disparities and promoting environmental justice.

In addition to the above mitigation measures, the following mitigation measures[344] developed for other resources may be applicable:

Air-2 – Use Low-Emission Construction Equipment and Vehicles: Use low-emission construction equipment and vehicles, such as those meeting the latest emission standards.

Air-4 – Counties with Exceedances: Minimize emissions in counties with air quality exceedances during the construction and upgrade or modification of transmission facilities.

ENR-5 – Source Locally: Locally source raw materials, components, and fuel to the extent practicable.

H&S-1 – Fire Mitigation Plan: Develop a fire mitigation plan that includes both preventative and remedial measures for potential ignition source operations.

H&S-2 – Early Fault Detection: Install early fault detection sensors that detect the radio frequency signal generated by partial discharge arcing on alternating current circuits and use precise time measurements of events to locate the source along the conductors.

H&S-3 – Hazardous Material Management Plan: Develop and implement a project-specific Hazardous Material Management Plan that outlines procedures for air contaminants, contaminated soil, or groundwater encountered incidentally during construction, including emergency notification and suspension of construction activities in the suspected area until the type and extent of contamination are determined.

[344] The rationales for the identified mitigation measures are provided in their respective resource sections.

H&S-4 – Risk Management Strategy: Develop and apply an electromagnetic field (EMF) and electromagnetic interference (EMI) risk management strategy that regularly considers the consequence, likelihood, and significance of EMF and EMI on public health and existing infrastructure, such as transportation systems, based on emerging research studies and guidelines.

H&S-6 – Emergency Management Plan: Develop and implement a project-specific emergency management plan in coordination with local emergency service providers that addresses safety-related standards and procedures for potential emergency-related incidents during facility construction and operation.

LSU-1 – Construction Schedule: Develop and distribute a schedule of construction activities to potentially affected farm operators at least three months in advance of ground disturbance.

LSU-2 – Remove Livestock: Coordinate with property owners to keep livestock out of construction areas.

LSU-3 – Reseed Disturbed Rangelands: Coordinate with rangeland property owners to determine the appropriate seed mix used in revegetation actions.

TR-1 – Complete a TIA: Complete a Traffic Impact Assessment (TIA) to ensure public safety and identify any negative effects.

TR-3 – Transportation Plan: Prepare a comprehensive transportation plan for the transport of transmission component materials and large construction equipment.

PSU-1 – Utility Coordination: Contact impacted or potentially impacted utility service providers as early as possible in the planning process to identify conflicts or issues.

PSU-2 – Law Enforcement and Emergency Management Coordination: Contact local law enforcement and emergency management departments to identify and address potential issues.

PSU-4 – Waste Management Plan: Develop and implement a waste management plan to identify the type, amount, and disposal location of solid waste that is to be expected during construction, operation and maintenance, and upgrade or modification.

Vis-1 – Route Planning: Carefully select routes that minimize visual and ecological disruption. Route lines parallel to the contour line of slopes, where possible, and limit siting facilities to the following:

- On visually prominent ridgelines
- Near prominent landscape features and landmarks
- In proximity to visually sensitive viewpoints including National Historic Trails and Sites

Vis-2 – Selection of Finishes: Use dull and/or dark painted surfaces, textured surfaces, and low-reflectivity finishes on transmission facilities. Finishes and colors should be appropriate to their location and context.

Vis-3 – Visual Appeal of ROWs: Create varied, feathered vegetation edges for cleared areas and linear rights-of-way (ROWs) that are sinuous horizontally and layered vertically. Strategically retain or plant native vegetation within the ROW where practicable in visually sensitive areas.

Vis-4 – Underground Construction: Use underground construction methods in areas with high scenic quality and/or open rural areas, depending on geologic conditions.

Vis-5 – Visual Screening: Use techniques such as berms, fencing, or vegetative screening to conceal or improve the appearance of distribution substations, above-ground vaults, and other facilities.

Vis-6 – Visual Impact Assessment: Conduct a visual impact assessment during project planning that defines the project's viewshed and identifies an assessment zone large enough to capture all non-negligible visual impacts.

Vis-7 – Span Length: Maximize the span length when using overhead lines crossing highways and other linear viewing locations.

Vis-8 – Selection of Structure Type: Use the type of proposed transmission structure (i.e., H-frame or monopole) that best matches any adjacent transmission facilities.

Noise-1 – Limit Construction Hours: With the exception of trenchless crossings that require continuous day/night operations, limit noise-generating equipment used in construction, maintenance, upgrades, and modifications that would impact sensitive receptors to weekdays and daytime hours.

Noise-2 – Use Noise Barriers for Construction: Use noise barriers or other mitigation measures for construction activities, like trenchless crossings, that require continuous day/night operations or during upgrades and maintenance where the potential exists to exceed state and/or local noise standards to mitigate the impact on noise-sensitive receptors.

Noise-3 – Use of Operational Noise Mitigation: Provide vendor-supplied noise mitigation or acoustic barriers for substation transformers and equipment located near noise sensitive areas.

Noise-4 – Prevent Hearing Loss: Identify when construction activities may produce on-site and off-site noise levels that exceed 85 A-weighted decibels (dBA) as an equivalent noise level over 8 hours ($L_{eq[8Hr]}$) and the associated engineering or administrative controls in place to reduce the potential for hearing loss.

Noise-5 – Noise Assessment: Prepare a noise assessment that includes measuring existing baseline noise environments, predicting future noise levels from either construction and/or operation and maintenance, and evaluating the potential impacts on surrounding sensitive noise receptors.

Noise-6 – Vibration Assessment: Prepare a vibration assessment when project activities could create vibration leading to building damage or prolonged annoyance.

Rec-1 – Stakeholder and Agency Coordination: Coordinate with potentially affected federal, state, and local agencies, communities, and recreation-based organizations to mitigate impacts on recreational facilities and during seasonal activities.

Rec-2 – Public Notification of Temporary Closure: Notify appropriate stakeholders of temporary closures at least six months prior to the start of the closure.

Rec-3 – Trail Detours: Consider phased closures or explore alternative solutions such as rerouting trails, creating temporary access points, or scheduling work during off-peak times to minimize disruption.

Rec-4 – Informational Signage and Precautionary Safety Measures: Place informational signage, placards, safety fencing, and other precautionary indicators in areas where transmission facilities are within or adjacent to existing recreational facilities.

3.16.5 Probable Significant Adverse Environmental Impacts

Determining the significance of an impact involves context and intensity, which, in turn, depend on the magnitude and duration of the impact. “Significant” in SEPA means a reasonable likelihood of more than a moderate adverse impact on environmental quality. An impact may also be significant if its chance of occurrence is not great, but the resulting environmental impact would be severe if it occurred (WAC 197-11-794).

Identification of environmental impacts and assignment of significance ratings are based on professional judgment and information available at the time of writing. A precautionary approach has been taken for the assessment where information is currently unknown or unavailable.

This Draft Programmatic EIS weighs the potential impacts on socioeconomics that could result from transmission facilities after considering the application of laws and regulations; siting and design considerations, including agency guidance and BMPs; and mitigation measures and makes a resulting determination of significance for each impact. **Table 3.16-14** summarizes the impacts anticipated for the construction, operation and maintenance, and upgrade or modification of transmission facilities.

Table 3.16-14: Summary of Impacts, Mitigation Measures, and Significance Rating for Socioeconomics

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
Socioeconomics – Degradation of the Natural and Built Environment	Construction	**Noise:** Construction activities could create noise and vibration impacts leading to temporary adverse changes on the social conditions and general welfare of communities, including schools. Impacts could occur over a longer duration with the construction of underground transmission facilities. **Air Quality:** Construction activities could create air quality impacts leading to adverse changes on the social conditions and general welfare of communities. Impacts could occur over a longer duration with the construction of underground transmission facilities. **Visual Quality and Aesthetics:** Construction equipment and materials and clearing for ROW and access roads can reduce the visual quality of natural and built environments. The installation of overhead transmission structures can result in permanent visual impacts. Impacts from visual quality and aesthetics can lead to permanent adverse changes on the social conditions, economic environment, and general welfare of communities. **Land and Shoreline Use, and Recreation:** Conflicting or incompatible land uses can result in adverse changes in the social conditions and general welfare of communities. Construction activities can damage crops, create obstacles for agricultural activities, and decrease productivity leading to adverse changes in the economic environment. Additionally, construction activities can restrict public access to shorelines and recreational resources or change the resource's integrity. Impacts on land and shoreline use, and recreation can result in adverse changes on the social conditions, economic environment, and general welfare of communities. If transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the impacts resulting from their construction could have temporary and/or permanent, disproportionate effects on vulnerable populations and/or overburdened communities.	**Overhead:** negligible to high **Underground:** negligible to high	▪ **AVOID-13:** Land Use and Zoning Incompatibility and Conflicts ▪ **AVOID-18:** Exceptional Recreation Assets ▪ **AVOID-19:** Wilderness Areas ▪ **AVOID-20:** Limit Closure of Recreation Resources ▪ **AVOID-25:** Disproportionate Impacts on Environmental Justice Communities ▪ **SE-1:** Communication Plan ▪ **SE-3:** Engage Environmental Justice and At-Risk Communities ▪ **Air-2:** Use Low-Emission Construction Equipment and Vehicles ▪ **Air-4:** Counties with Exceedances ▪ **H&S-1:** Fire Mitigation Plan ▪ **H&S-2:** Early Fault Detection ▪ **H&S-3:** Hazardous Material Management Plan ▪ **H&S-4:** Risk Management Strategy ▪ **H&S-6:** Emergency Management Plan ▪ **LSU-1:** Construction Schedule ▪ **LSU-2:** Remove Livestock ▪ **LSU-3:** Reseed Disturbed Rangelands ▪ **Noise-1:** Limit Construction Hours ▪ **Noise-2:** Use Noise Barriers for Construction ▪ **Noise-3:** Use of Operational Noise Mitigation ▪ **Noise-4:** Prevent Hearing Loss ▪ **Noise-5:** Noise Assessment ▪ **Noise-6:** Vibration Assessment ▪ **PSU-1:** Utility Coordination ▪ **PSU-2:** Law Enforcement and Emergency Management Coordination	Less than Significant	Adverse impacts on communities, including vulnerable populations and overburdened communities, due to the degradation of the natural and built environments would be reduced to a less than significant level through the implementation of and compliance with general conditions, avoidance criteria, and mitigation measures.
	Operation and Maintenance	**Noise:** Overhead transmission lines can create corona discharge, particularly during foul weather. Additionally, overhead transmission facility infrastructure, such as substations, transformers, and cooling systems can create permanent noise impacts. Maintenance and repair activities associated with overhead and underground transmission facilities can create temporary noise and vibration impacts. Noise and vibration impacts can lead to long-term changes on the social conditions and general welfare of communities. **Air Quality:** Maintenance activities can require the use of heavy equipment, maintenance vehicles, and portable generators that can result in fugitive emissions leading to changes on the social conditions and general welfare of communities. Impacts would be similar to those associated with construction activities, however, they would be less severe and shorter in duration. **Visual Quality and Aesthetics:** Both overhead and underground transmission facilities would require cleared ROWs, which can result in impacts on the social conditions and general welfare of communities. **Land and Shoreline Use, and Recreation:** The operation of transmission facilities would restrict future development and allowable crop types resulting in adverse changes to the economic environment. Operation and maintenance of transmission facilities may require temporary or permanent	**Overhead:** negligible to high **Underground:** negligible to high			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
		closure of shoreline and recreational resources. It can also change the integrity or permanent condition of the area. These impacts could result in adverse changes on the social conditions and general welfare of those who rely on these resources. If transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the impacts resulting from their operation and maintenance could have temporary and/or permanent, disproportionate effects on vulnerable populations and/or overburdened communities.		▪ **PSU-4:** Waste Management Plan ▪ **Rec-1:** Stakeholder and Agency Coordination ▪ **Rec-2:** Public Notification of Temporary Closure ▪ **Rec-3:** Trail Detours ▪ **Rec-4:** Informational Signage and Precautionary Safety Measures ▪ **Vis-1:** Route Planning ▪ **Vis-2:** Selection of Finishes ▪ **Vis-3:** Visual Appeal of ROWs ▪ **Vis-4:** Underground Construction ▪ **Vis-5:** Visual Screening ▪ **Vis-6:** Visual Impact Assessment ▪ **Vis-7:** Span Length ▪ **Vis-8:** Selection of Structure Type		
	Upgrade or Modification	Impacts associated with the upgrade or modification of both overhead and underground transmission facilities could be similar to those expected for construction. However, these impacts could be less due to minimized disturbance footprints and utilizing existing infrastructure. Upgrade or modification would be expected to cause less disruption on the surrounding environment and communities.	**Overhead:** negligible to high **Underground:** negligible to high			
Socioeconomics – Changes in Housing Availability	Construction	An influx of construction workers could affect the availability of local hotels or short-term rentals. Long-term housing availability could be impacted if the construction of transmission facilities require land acquisitions that results in displacing residents or housing units. Should this occur, changes in housing availability could result in permanent, adverse impacts on the economic environment, social conditions, and general welfare of communities. If transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the adverse impacts on housing availability resulting from their construction could have permanent, disproportionate effects on vulnerable populations and/or overburdened communities.	**Overhead:** low to high **Underground:** low to high	▪ **AVOID-13:** Land Use and Zoning Incompatibility and Conflicts ▪ **AVOID-25:** Disproportionate Impacts on Environmental Justice Communities ▪ **AVOID-26:** Displacing Residents or Housing Units ▪ **SE-1:** Communication Plan ▪ **SE-2:** Analysis of Housing Market ▪ **SE-3:** Engage Environmental Justice and At-Risk Communities	Less than Significant	Adverse impacts on communities, including vulnerable populations and overburdened communities, due to changes in housing availability would be reduced to a less than significant level through the implementation of and compliance with general conditions, avoidance criteria, and mitigation measures.
	Operation and Maintenance	This impact is not anticipated to occur during operation and maintenance of overhead or underground transmission facilities.	**Overhead:** N/A **Underground:** N/A			
	Upgrade or Modification	Impacts associated with the upgrade or modification of both overhead and underground transmission facilities could be similar to those expected for construction. However, these impacts could be less due to minimized disturbance footprints and utilizing existing infrastructure.	**Overhead:** low to high **Underground:** low to high			
Socioeconomics – Changes in Home Values	Construction	The construction of overhead transmission facilities could affect the visual landscape due to permanently cleared ROWs and the introduction of new overhead infrastructure. Similarly, the construction of underground transmission facilities may also adversely impact the visual landscape because of the need for permanently cleared ROWs. Additionally, underground transmission facilities would require access for repairs and a tariff would be imposed on the community to pay for the additional cost associated with undergrounding the facility. For these reasons, construction of both overhead and underground transmission facilities could influence home values leading to adverse	**Overhead:** low to high **Underground:** low to high	▪ **AVOID-13:** Land Use and Zoning Incompatibility and Conflicts ▪ **AVOID-25:** Disproportionate Impacts on Environmental Justice Communities ▪ **AVOID-26:** Displacing Residents or Housing Units ▪ **SE-2:** Analysis of Housing Market	Less than Significant	Adverse and potentially permanent impacts on communities, including vulnerable populations and overburdened communities, due to changes in home values, would be reduced to a less than significant level through the implementation of and compliance with general conditions, avoidance criteria, and mitigation measures.

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[(a)]	Significance after Applying Mitigation	Rationale for Significance Rating
		changes on the economic environment, social conditions, and general welfare of communities. If transmission facilities are constructed in areas that are predominantly vulnerable or overburdened, the impacts on home values resulting from their construction could have permanent, disproportionate effects on vulnerable populations and/or overburdened communities.		▪ **SE-3:** Engage Environmental Justice and At-Risk Communities ▪ **H&S-1:** Fire Mitigation Plan ▪ **H&S-2:** Early Fault Detection ▪ **H&S-3:** Hazardous Material Management Plan ▪ **H&S-4:** Risk Management Strategy ▪ **H&S-6:** Emergency Management Plan ▪ **Noise-5:** Noise Assessment ▪ **Vis-1:** Route Planning ▪ **Vis-2:** Selection of Finishes ▪ **Vis-3:** Visual Appeal of ROWs ▪ **Vis-4:** Underground Construction ▪ **Vis-5:** Visual Screening ▪ **Vis-6:** Visual Impact Assessment ▪ **Vis-7:** Span Length ▪ **Vis-8:** Selection of Structure Type		
	Operation and Maintenance	This impact is not anticipated to occur during operation and maintenance of overhead or underground transmission facilities.	**Overhead:** N/A **Underground:** N/A			
	Upgrade or Modification	Impacts associated with the upgrade or modification of both overhead and underground transmission facilities could be similar to those expected for construction. However, these impacts could be less due to minimized disturbance footprints and utilizing existing infrastructure.	**Overhead:** low to high **Underground:** low to high			
Socioeconomics – Changes in Fiscal Conditions and Employment	Construction	The construction of transmission facilities could result in road closures and diversions leading to temporary disruptions access to local businesses or employment centers. A change in access to local businesses could have temporary adverse impacts on their fiscal revenue while a change in access to employment centers may require employees to alter their lifestyle to accommodate changes in accessibility. The construction activities for transmission facilities could temporarily improve labor income through increased employment opportunities and increasing the earnings of workers and sole proprietors. The demand for materials and services could temporarily stimulate local businesses, thereby boosting economic activity. Communities may temporarily benefit from increased tax revenue through sales taxes on construction materials, income taxes from wages earned by workers employed during the construction process, and property taxes paid by landowners. If a transmission facility is constructed in an area that is predominantly vulnerable or overburdened, and the benefits of the project are not equally distributed, the project could have a temporary, disproportionate impact on vulnerable populations and/or overburdened communities.	**Overhead:** negligible to moderate **Underground:** negligible to moderate	▪ **AVOID-16:** Decrease in LOS Below Acceptable Levels ▪ **AVOID-25:** Disproportionate Impacts on Environmental Justice Communities ▪ **SE-1:** Communication Plan ▪ **SE-3:** Engage Environmental Justice and At-Risk Communities ▪ **ENR-5:** Source Locally ▪ **TR-1:** Complete a TIA ▪ **TR-3**: Transportation Plan	Less than Significant	Adverse impacts on communities, including vulnerable populations and overburdened communities, due to changes in fiscal conditions and employment, would be reduced to a less than significant level through the implementation of and compliance with general conditions, avoidance criteria, and mitigation measures.
	Operation and Maintenance	Operation and maintenance of transmission facilities may create increased job opportunities, and although to a lesser extent than for construction, demand for maintenance and repair-related materials could stimulate local economies. Communities could see enhanced education, public service, and transportation facilities or programs implemented or constructed as a result of improved local economic conditions.	**Overhead:** negligible to high **Underground:** negligible to high			

Impact	Project Phase	Description of Impact	Impact Determination before Applying Mitigation	Mitigation Applied[a]	Significance after Applying Mitigation	Rationale for Significance Rating
		Residents, businesses, and schools could experience improve electricity reliability as new transmission facilities are required to comply with the latest design standards and may be equipped with advanced transmission technologies. Additionally, underground transmission facilities are less prone to external threats, such as high winds, falling branches and wildfires, which reduces the risk of power outages. If a transmission facility is constructed in an area that is predominantly vulnerable or overburdened, and the benefits and adverse impacts of the project are not equally distributed, the project could have a permanent, disproportionate impact on vulnerable populations and/or overburdened communities.				
	Upgrade or Modification	Impacts associated with the upgrade or modification of both overhead and underground transmission facilities could be similar to those expected for construction. However, these impacts could be less due to minimized disturbance footprints and utilizing existing infrastructure.	**Overhead:** negligible to moderate **Underground:** negligible to moderate			

[a] Appendix 3.1-1 provides a detailed listing of each general condition, avoidance criteria, and mitigation measure. Having these details in an appendix serves as a comprehensive reference section that can be consulted independently of the main text. This is particularly useful for detailed guidance and technical specifications that may be referred to multiple times. Additionally, including this information in an appendix allows for easier updates and revisions. If mitigation measures or guidelines change, the appendix can be updated without altering the main content.

ROW = right-of-way

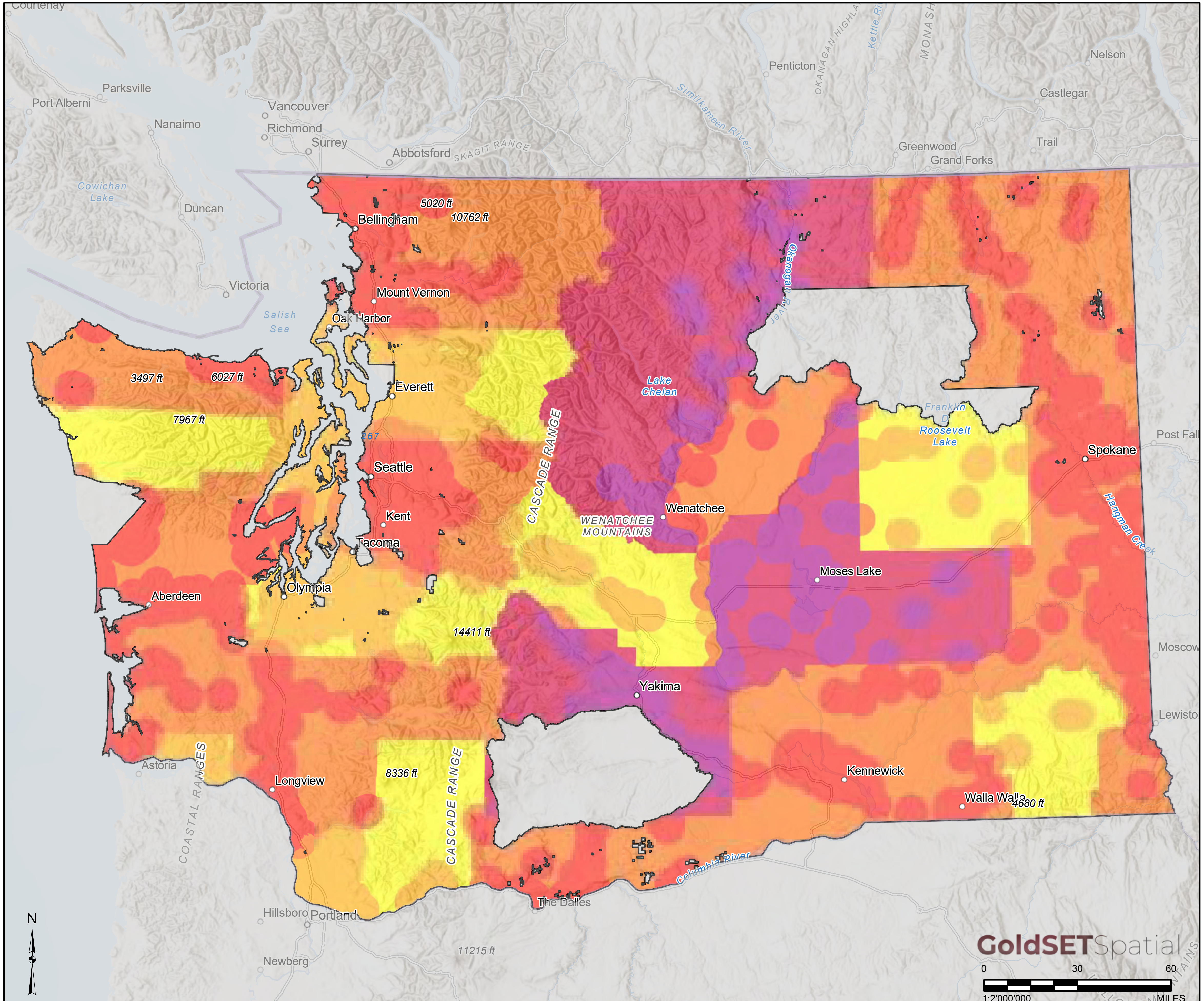
3.16.6 Suitability Map

Project-specific reviews would include a comprehensive review and analysis to identify the potential site-specific adverse impacts on resources to determine the suitability of this Draft Programmatic EIS. Environmental review may be phased by incorporating relevant information from this Draft Programmatic EIS by reference while evaluating site-specific adverse impacts of the individual project applications. For more information on phased reviews, please refer to Chapter 1, Introduction.

Project-specific applications would include details about the precise location and site-specific conditions. This Draft Programmatic EIS provides a suitability map that, when incorporated with project-specific applications, could be used to facilitate more informative and efficient environmental planning.

Figure 3.16-6 represents the suitability map for socioeconomics and environmental justice and identifies the appropriateness of areas using laws and regulations, criteria specific to the siting of transmission, and knowledge from subject matter experts.

This Page Intentionally Left Blank



LEGEND

Study Area

Conflict Indicator Key

- Neutral
- Low
- Low-Medium
- Medium
- Medium-High
- High
- Very High

EFSEC
Energy Facility Site Evaluation Council

THE SEAL OF THE STATE OF WASHINGTON 1889

REFERENCES AND NOTES

1. ESRI, CGIAR, USGS; WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS
2. THE CONFLICT INDICATOR KEY CAN BE USED TO IDENTIFY AND HIGHLIGHT AREAS WHERE DIFFERENT PROJECT CONSTRAINTS MAY OVERLAP, POTENTIALLY LEADING TO CONFLICTS. THE KEY USES DIFFERENT COLORS TO REPRESENT THE INTENSITY OR LIKELIHOOD OF CONFLICT.

PROJECT
DRAFT PROGRAMMATIC EIS HIGH-VOLTAGE TRANSMISSION

TITLE
SUITABILITY MAP FOR SOCIOECONOMICS

YYYY-MM-DD 2024-12-18
CONSULTANT wsp
FIGURE
3.16-6

This Page Intentionally Left Blank

3.16.6.1 Suitability Map Methodology

The suitability map evaluates various criteria and assigns a suitability score to different areas based on how well those areas meet the desired conditions.

A number of individual siting decision criteria, referred to as indicators in GoldSET, were identified by subject matter experts for inclusion in this resource’s suitability map. Subject matter experts assigned a weighting based on the degree of constraint (i.e., high, medium, or low), or potential difficulty for a transmission facility to traverse an area. Each of the GoldSET Indicator cards describing the criteria chosen and the source of the data layers used are provided in **Appendix 3.16-1.**

A summary of the criteria used to produce each GoldSET card is provided below.

Socioeconomics GoldSET Card – Low Conflict Economic Impact

The low conflict economic impact criterion includes population centers where transmission facilities would have economic impacts on property values. Property values in communities with a view of transmission facilities often appreciate at a slower rate or, in some cases, may even depreciate, which can reduce the wealth accumulation potential for homeowners.

Note that a 5-mile buffer around population centers was provided in the dataset. Population centers are defined as incorporated cities and towns, including their urban growth areas, and census-designated places in Washington, per RCW 47.04.010 and were retrieved from WSDOT.

Additionally, reference thresholds for racial and ethnic minorities in Washington is 28.97 percent, and 23.02 percent for low-income populations (percentage of county population with income below 200 percent of the federal poverty level).

Socioeconomics GoldSET Card – Low Conflict General Welfare, Social Conditions, and Economic Environment

These low-conflict areas include counties that are not considered vulnerable populations or overburdened communities, are below designated thresholds, and have a higher rate of unoccupied housing units than the state average (7.1 percent). These counties are expected to experience low socioeconomic impacts. They generally have better access to resources, stronger economic foundations, and robust social services.

Reference thresholds for racial and ethnic minorities in Washington are 28.97 percent, and 23.02 percent for low-income populations (percentage of county population with income below 200 percent of the federal poverty level).

Socioeconomics GoldSET Card – Medium Conflict Economic Impact

The medium conflict economic impact criterion includes population centers where transmission facilities would have economic impacts on home values in areas with vulnerable populations and overburdened communities. Home values in communities with a view of transmission facilities often appreciate at a slower rate or, in some cases, may even depreciate, which can reduce the wealth accumulation potential for homeowners. This adverse impact can disproportionately affect vulnerable populations and overburdened communities.

Note that a 5-mile buffer around urban and rural population centers identified as vulnerable populations and overburdened communities was provided in the dataset.

Socioeconomics GoldSET Card – Medium Conflict General Welfare, Social Conditions, and Economic Environment

These medium-conflict areas include counties where populations of vulnerable populations or overburdened communities are above designated thresholds or where the percentage of unoccupied housing units is lower than the state average percentage (7.1 percent). Counties with vulnerable populations, overburdened communities, or insufficient unoccupied housing units, are expected to experience moderate socioeconomic impacts. These counties generally have less access to resources, weaker economic foundations, and/or a lack of sufficient social services, making them less equipped to handle socioeconomic fluctuations and environmental changes.

Reference thresholds for racial and ethnic minorities in Washington are 28.97 percent, and 23.02 percent for low-income populations (percentage of county population with income below 200 percent of the federal poverty level).

Socioeconomics GoldSET Card – High Conflict General Welfare, Social Conditions, and Economic Environment

High-conflict areas include counties where vulnerable populations or overburdened communities are above the identified threshold, where more than 50 percent of census tracts are identified as disadvantaged according to the CEJST, and where the percentage of unoccupied housing units is lower than the state-level percentage (7.1 percent). Communities facing severe environmental justice issues often encounter a wide range of environmental and socioeconomic burdens, leading to disproportionately significant socioeconomic impacts on these populations.

Reference thresholds for racial and ethnic minorities in Washington are 28.97 percent, and 23.02 percent for low-income populations (percentage of county population with income below 200 percent of the federal poverty level).

4.0 CHAPTER 4 – CUMULATIVE IMPACTS

The Washington State Environmental Policy Act (SEPA) requires consideration of how a project or projects could contribute to cumulative impacts when combined with impacts caused by other developments in the region over time. Although the adverse environmental effects of an individual project may not be significant when considered separately, the combined effects of several projects may be significant when considered collectively. Under the Revised Code of Washington (RCW) 43.21C.405, the nonproject environmental review must include a cumulative impact analysis. This cumulative impact analysis was prepared pursuant to Washington Administrative Code 197-11-060 in response to RCW 43.21C.405.

Cumulative impacts could result from development associated with transmission facilities combined with effects of many different types of development or other activities occurring on land within the state. The geographic scope for this cumulative analysis is the Study Area, which includes all lands across Washington except for Tribal Reservations and areas requiring oceanic or undersea transmission. The analysis of cumulative impacts was accomplished using the following general methodology:

1) Identify environmental resources that could be cumulatively affected by transmission facility development in combination with other actions.

2) Identify other present projects and reasonably foreseeable actions (collectively referred to herein as RFAs) that could contribute to cumulative impacts on the environmental resources identified in Step 1.

3) Analyze each environmental resource identified in Step 1 in combination with transmission facility development and RFAs identified in Step 2. At this broad scale of analysis, most cumulative impacts cannot be accurately quantified and are therefore discussed in more general qualitative terms. Some environmental resource areas may be discussed by region to better evaluate potential cumulative impacts if such an analysis is deemed possible.

4.1 Potentially Affected Resources

Although cumulative impacts could originate from actions beyond the Washington State boundary, the geographic scope for this cumulative impact analysis is the same as the geographic scope, or Study Area, for the Action Alternative identified in this Draft Programmatic Environmental Impact Statement (EIS). As described in Chapter 1, the Study Area encompasses all lands within the State of Washington, excluding Tribal lands[1] and areas requiring oceanic or undersea transmission.[2] Within the Study Area, numerous and diverse actions are ongoing or may occur in the future, potentially contributing to cumulative impacts on the same resources as transmission facility development. Therefore, this cumulative impact analysis incorporates all direct and indirect effects on the environmental resource areas analyzed in Chapter 3 and expands upon the analysis by evaluating

[1] For the purposes of this scoping document, Tribal lands are not included in the proposed Study Area. Tribal lands are sovereign territories, and decisions regarding their use typically fall under the jurisdiction of the respective Tribal Government. Tribal lands often have their own regulatory processes and environmental review requirements, which may differ from state or federal processes. Federal agencies are required to engage in government-to-government consultation with Tribes. This process ensures that Tribal concerns and perspectives are adequately addressed.

[2] Programmatic EIS documents address broad, overarching policies, plans, or programs rather than specific projects. Sea cables are considered to be too specific or detailed for the broad focus of this nonproject review. Additionally, sea cables, especially those that cross international water or state boundaries, may fall under different regulatory frameworks or jurisdictions, requiring separate, more specific environmental reviews. Lastly, the environmental impacts and technical considerations of sea cables can be significantly different from those of land-based transmission facilities. These differences might necessitate a distinct, focused EIS to adequately address the unique challenges and impacts.

the combined direct and indirect effects of present and reasonably foreseeable future actions on each resource area.

4.2 Cumulative Reasonably Foreseeable Actions

The cumulative effects of past projects and actions are not individually identified and considered in this chapter, as they are addressed in the affected environment for each resource discussed in Chapter 3. RFAs are those that are formally being proposed or planned, those about which a formal decision has been made, and developments currently under construction. RFAs that are formally being proposed or planned have readily available published planning documents or public notifications. RFAs for which a formal decision has been made include those that have undergone a federal, state, and/or local approval or application process(es), such as environmental clearance, application review, and/or permitting process(es). This analysis does not include speculative future projects or actions, such as those that are not formally proposed or do not have adequate detail to be sufficiently analyzed in this chapter and thus are not reasonably foreseeable.

Because the Study Area encompasses a majority of the state, it is not possible to identify and evaluate all cumulative actions in the Study Area, nor would that be meaningful at a programmatic level. A desktop review of federal, state, and local websites was conducted to identify a broad list of RFAs that have the potential to impact the same resources analyzed in this Draft Programmatic EIS. RFAs were considered for inclusion in this cumulative impact analysis if they met the following general criteria:

- They are or would be located in the State of Washington.
- Their construction and operation have or would have a potentially adverse impact on the same or similar resources as those affected by transmission facility development.
- They are currently undergoing, or have undergone, a federal, state, or local agency permitting or approval process, or the agency has publicly noticed the proposed action.

Common themes were then developed to further refine and organize the list of RFAs to be incorporated into this cumulative impact analysis. Themes are categories of RFAs based on industry, trend, or type and are made up of individual actions that are resulting, or could result, in the greatest cumulative impact in combination with the development of transmission facilities. Each theme has criteria for the RFAs that were identified and used in this cumulative impact analysis. Natural breaks[3] in data—specifically, the size or scale of an RFA—were used to determine the criteria of each theme. By focusing on RFAs with a higher degree of certainty and impact, this Draft Programmatic EIS can provide a more accurate and reliable assessment of cumulative impacts. The themes and their associated criteria are discussed in more detail below.

- **Energy Transmission** – This theme includes RFAs related to transmission facility development, upgrade, and/or modification. Only transmission facility RFAs 15 miles long or greater are included in this cumulative impact analysis.

[3] A natural break is a method used in data classification to divide data into distinct classes based on natural groupings inherent in the data. This technique, also known as the Jenks Natural Breaks method, identifies gaps or breaks in the data distribution to create class intervals. These breaks occur at points where there are relatively large differences in data values, effectively grouping similar values together and maximizing the differences between classes.

- **Energy Generation** – This theme includes new energy-generating facilities. Only energy-generating RFAs that produce 400 megawatts (MW) of electricity or more, or are 1,000 acres or greater, are included in this cumulative impact analysis.
- **Community Growth** – This theme includes RFAs related to residential, commercial, and/or industrial development. Only development RFAs 200 acres or greater are included in this cumulative impact analysis.
- **Land-Based Transportation** – This theme includes RFAs that propose new, expanded, and/or modified linear transportation improvements. Only linear transportation improvement RFAs 10 miles or greater are included in this cumulative impact analysis. Water-based transportation RFAs are considered in a separate theme.
- **Water-Based Transportation** – This theme includes a variety of RFAs where water resources overlap with transportation improvements, such as water crossings and marine transportation. The criteria for an RFA to be included are based on cost.[4] Water-based transportation RFAs that are over $10 million are included in this cumulative impact analysis.
- **Agriculture** – This theme represents the agricultural industry and includes RFAs that propose new or modified agricultural land use designations, activities, and/or the development of supporting facilities. Only agricultural-related RFAs that impact or modify 40 acres or greater are used in this analysis.
- **Forestry** – This theme includes RFAs related to timber harvesting, associated construction or maintenance activities, and forest conservation actions. Only timber harvesting and forest conservation RFAs that are 300 acres or greater were included in this cumulative impact analysis.
- **Mining** – This theme includes RFAs that propose new or expanded mining operations. Only mining RFAs that involve 150 acres or greater for new or expanded mining operations are used in this cumulative impact analysis.
- **Recreation** – This theme includes RFAs that propose new or expanded recreational areas or facilities and conversion from non-recreation to recreation land use designations. The criteria for an RFA to be included are based on the total acreage to be designated as a recreational area or recreational facilities to be developed. Recreation-related RFAs that total 50 acres or greater are used in this cumulative impact analysis.
- **Wildlife and Habitat Conservation** – This theme includes RFAs that propose new or expanded conservation areas and restoration or management projects. Only wildlife and habitat conservation RFAs totaling 400 acres and greater are used in this cumulative impact analysis.
- **Water Resources** – This theme includes RFAs related to improving water supply, quality, and wildlife habitats. Specifically, these RFAs include floodplain and aquifer recharge, fish passages, agriculture irrigation improvements, and dams. Water resource RFAs totaling 200 acres and greater, and fish passage RFAs are used in this cumulative impact analysis.

[4] While it would be beneficial to conduct this analysis based on length, this information could not be obtained for every project.

Providing a comprehensive review of probable cumulative impacts, both adverse and beneficial, helps stakeholders understand the full range of effects on the environment. While beneficial RFAs are not considered when determining whether there is a probable cumulative impact on a specific element of the environment, understanding the potential benefits of RFAs may help decision-makers better evaluate project-specific mitigation for probable significant cumulative adverse impacts.

RFAs based on the criteria described previously in this section that could contribute to a cumulative impact are discussed in **Table 4.2-1** and presented in **Figure 4.2-1**. As previously stated, projects or actions that have been completed and constructed are considered part of the baseline conditions used to describe the affected environment throughout Chapter 3. Therefore, past projects and actions are not included in **Table 4.2-1** and **Figure 4.2-1**.

Table 4.2-1: Reasonably Foreseeable Actions

Theme	Theme Description	Proposed ID	Project Name	Project Description	Project Location (County)	Project Size	Current Project Phase (Planning/Development or Under Construction)
Energy Transmission	Development and/or modification of transmission facilities and systems.	N/A	Replacement Program - Various Operators	Operators proactively monitor the performance of underground distribution (low-voltage) cables approaching the end of their useful lives, typically 20 years, and often replace them. Annually, operators could replace upwards of 100 miles of electric cable across their service areas. Due to varying need of replacement based on monitoring, locations have not been identified in **Figure 4.2-1**.	Multi-County	100 miles	Under Construction
		1	Cascade Renewable Transmission Project	The Cascade Renewable Transmission Project proposes to transport 1,100 MW of renewable energy approximately 79 miles east of the Cascades to customers west of the Cascades via a high-voltage direct current transmission line.	Multi-County: Clark, Skamania, and Klickitat	79 miles	Planning/Development
		2	Shelton-Fairmount No. 1 Transmission Line Rebuild Project	BPA is planning to rebuild the 60-mile-long Shelton-Fairmount No. 1 115-kV wood pole transmission line from BPA's Shelton Substation in Mason County, Washington, to BPA's Fairmount Substation in Jefferson County, Washington. Construction is expected to begin in spring 2025, with energization slated for late 2028.	Multi-County: Clallam, Jefferson, Mason, and Thurston	60 miles	Planning/Development
		3	Wanapum to Mountain View	The Grant County Public Utility District plans to build a new 31-mile, 230 kV transmission line from the Wanapum Dam to the Mountain View Substation near Quincy. The new transmission line will be aligned along existing roadways and utility corridors.	Grant County	31 miles	Planning/Development
Energy Generation	Development and/or modification of energy facilities and systems.	4	Goldendale Energy Project	The Goldendale Energy Project proposes to build an off-channel energy storage system 8 miles south of Goldendale next to the Columbia River. The system would release water from an upper reservoir downhill to a lower reservoir to generate energy. The project is expected to generate up to 1,200 MW of electricity.	Klickitat County	1,200 MW; 682 acres	Planning/Development
		5	Horse Heaven Wind Farm	The Horse Heaven Wind Farm project proposes to construct a renewable energy generation facility that will utilize both wind turbines and solar photovoltaic panels for generating capacity of up to 1,150 MW.	Benton County	1,150 MW; 11,850 acres	Planning/Development
		6	Hop Hills Solar Energy Project	The Hop Hills Solar Energy Project proposes to develop a utility-scale photovoltaic solar power plant on approximately 11,000 acres. The project could consist of up to 500 MW of solar power interconnected to the BPA system at the Midway Substation with an alternative potential interconnect at the BPA Wautoma Substation. The project would also include up to 500 MW of battery storage.	Benton County	500 MW; 11,000 acres	Planning/Development
		7	Wautoma Solar Energy Project	The Wautoma Solar Energy Project proposes a 470 MW solar photovoltaic facility, including a BESS.	Benton County	470 MW; 2,974 acres	Planning/Development
		8	Dry Falls Solar Project	The Dry Falls Solar Project proposes a 400 MW solar photovoltaic array, BESS (anticipated 100 MW), and supporting facilities, located in unincorporated Grant County, Washington.	Grant County	400 MW; 2,515 acres	Planning/Development
		9	Appledale Energy Center	The Appledale Energy Center proposes to build and operate a 300 MW solar photovoltaic energy generation facility and associated 300 MW BESS. The project would be located on 3,000 acres in Grant County.	Grant County	300 MW; 3,000 acres	Planning/Development
		10	Badger Mountain Solar Energy Project	The Badger Mountain Solar Energy Project proposes a 200 MW solar photovoltaic generation facility with an optional 200 MW BESS located in unincorporated Douglas County, Washington.	Douglas County	200 MW; 2,390-acres	Planning/Development
		11	Carriger Solar Project	The Carriger Solar Project is a proposed solar photovoltaic electric generating facility with a capacity of 160 MW of alternating current solar energy and 63 MW of battery energy storage.	Klickitat County	160 MW; 1,323-acres	Planning/Development
		12	Quincy Valley Solar Photovoltaic and BESS Project	The Quincy Valley Solar Photovoltaic and BESS Project is a proposed solar facility capable of generating up to 130 alternating current MW of	Grant County	130 MW; 1,773-acres	Planning/Development

Theme	Theme Description	Proposed ID	Project Name	Project Description	Project Location (County)	Project Size	Current Project Phase (Planning/Development or Under Construction)
				photovoltaic solar energy. The project's proposed boundary encompasses 1,773 acres.			
		13	Desert Claim Wind Power Project	The Desert Claim Wind Power Project proposes a 100 MW total maximum capacity wind power facility located on approximately 4,400 acres. The project would consist of a maximum of 31 turbines and associated electrical collection system that would connect the project to the regional high-voltage transmission grid.	Kittitas County	100 MW; 4,400 acres	Planning/Development
		N/A – See Figure Legend	Programmatic Environmental Impact Statement on Utility-Scale Onshore Wind Energy Facilities in Washington State	This Washington State Environmental Policy Act (SEPA) Programmatic Environmental Impact Statement (PEIS) was prepared to evaluate utility-scale onshore wind energy facilities in Washington state. A PEIS is a type of nonproject environmental review used for planning; it is not an evaluation of a specific project. This PEIS considers potentially significant adverse environmental impacts at a broad level. It analyzes general types of facilities—but not individual projects—to identify probable significant adverse environmental impacts and possible ways to avoid, minimize, or mitigate those impacts.	The geographic scope for the wind PEIS includes areas throughout the State of Washington where utility-scale onshore wind facilities are likely to be developed based on available wind energy and proximity to transmission lines.	N/A	Preliminary Evaluation
		N/A - See Figure Legend	Programmatic Environmental Impact Statement on Utility-Scale Solar Energy Facilities in Washington State	This Washington SEPA PEIS was prepared to evaluate utility-scale solar energy facilities in Washington state. A PEIS is a type of nonproject environmental review used for planning; it is not an evaluation of a specific project. This PEIS considers potentially significant adverse environmental impacts at a broad level. It analyzes general types of facilities—but not individual projects—to identify probable significant adverse environmental impacts and possible ways to avoid, minimize, or mitigate those impacts.	The geographic scope for the solar PEIS includes areas throughout the State of Washington where utility-scale solar facilities are likely to be developed based on available solar energy, the topographic slope, and proximity to transmission lines.	N/A	Preliminary Evaluation
		N/A - See Figure Legend	Programmatic Environmental Impact Statement on Green Hydrogen Energy Facilities in Washington State	This Washington SEPA PEIS was prepared to evaluate green electrolytic and renewable hydrogen facilities (referred to as "green hydrogen facilities") in Washington state. This PEIS considers potential significant adverse environmental impacts at a broad level. It analyzes general types of facilities—but not individual projects—to identify probable significant adverse environmental impacts and possible ways to avoid, minimize, or mitigate those impacts.	The geographic scope for the green hydrogen PEIS includes areas throughout the state of Washington where green hydrogen facilities are likely to be developed based on proximity to transmission lines, proximity to freight highway routes, and industrial or industrial-use supporting zoning.	N/A	Preliminary Evaluation
Community Growth	Land use development, including residential, commercial, and industrial uses.	14	Wallula Gap Business Park	The Wallula Gap Business Park project proposes a 1,900-acre heavy industrial site in the western portion of Walla Walla County.	Walla Walla County	1,900 acres	Planning/Development
		15	Bullfrog Flats Development	The Bullfrog Flats Development project proposes a mixed-use phased development in the western portion of the City of Cle Elum between Bullfrog Road and SR 903. The project consists of multiple parcels to be developed in multiple phases, including 1,100 acres to be subdivided into 1,334 residential dwellings, a business park, and land set aside for various public uses. Portions of the Development Agreement have been executed since it was originally approved on October 30, 2002, with the construction of utility infrastructure including a power substation and water treatment plant, dedication of land to the Cle Elum/Roslyn School District and City of Cle Elum and recording of a subdivision in the proposed business park. The remaining parcels, 918.90 acres, are the subject of the current project submittal package.	Kittitas County	919 acres	Planning/Development

Theme	Theme Description	Proposed ID	Project Name	Project Description	Project Location (County)	Project Size	Current Project Phase (Planning/Development or Under Construction)
		16	Mission Ridge Expansion	The Mission Ridge Expansion Project proposes a Master Planned Resorts Overlay District on approximately 502 acres of land that is directly adjacent to the existing Mission Ridge Ski and Board Resort. A Development Agreement has been applied to guide the development process. The Master Planned Resort would provide a mixture of commercial, residential (single-family, condo, town homes), and recreational opportunities. It would consist of five phases and is expected to be built out over a 20-year timeframe.	Chelan County	502 acres	Planning/Development
		17	Aerospace Innovation and Manufacturing (AIM) Center	The AIM Center project proposes a Master Plan development at the Tri-Cities Airport. The Port of Pasco released the AIM Center Master Plan in June 2023, which encompasses a total of approximately 460 acres. The plan outlines goals to build the AIM Center within the existing Tri-Cities Airport boundary, adjacent to the current runway system.	Franklin County	460 acres	Planning/Development
		18	FRED310 Industrial Development	The proposed FRED310 Industrial Development project would surround the current Boeing fabrication facility on two parcels consisting of approximately 310 acres. The development proposes seven buildings, totaling approximately 4 million square feet. The proposed buildings would be used for industrial, warehouse, distribution, and office.	Pierce County	310 acres	Planning/Development
		19	Copperstone Planned Development	The Copperstone Planned Development project is a proposed planned development subdivision in rural Okanogan County along the Methow River. The proposal is to develop the site into 56 detached single-family homes, open spaces, recreational facilities, and a storage facility.	Okanagan County	277 acres	Planning/Development
		20	Project Sequoia: Mineral Wool Insulation Manufacturing Facility	Roxul USA Inc. dba Rockwool plans to construct and operate a mineral wool insulation and products manufacturing facility in the Wallula area in unincorporated Walla Walla County.	Walla Walla County	250 acres	Planning/Development
		21	Rocky Pond Master Planned Resort Comprehensive Plan Amendment	This is a proposed amendment to the comprehensive plan and development regulation to designate approximately 215 acres of land in unincorporated Douglas County as a Master Planned Resort. The site is currently a mix of vineyards, pear orchards, undeveloped open space and an event center.	Douglas County	215 acres	Planning/Development
Land-Based Transportation	New, expanded, modified, or reconstructed land-based transportation facilities and infrastructure.	22	I-405/SR 167 Corridor Program	The I-405/SR 167 Corridor Program stems from the I-405 Master Plan and SR 167 Master Plan, foundational documents that guide project development, funding, and delivery. The I-405 Master Plan alone includes more than 150 projects designed to improve travel between Lynnwood and the Renton/Tukwila area. When combined with SR 167, this north-south corridor forms a 50+-mile transportation system providing travelers with a reliable trip in the express toll lanes, regular lanes, and high-capacity transit (bus rapid transit).	King County, Snohomish County	50 miles	Under Construction
		23	I-405/Renton to Bellevue Widening and Express Toll Lanes Project	The I-405/Renton to Bellevue Widening and Express Toll Lanes (ETLs) project includes multimodal transportation and safety improvements to offer more reliable travel choices and keep drivers, transit riders, and freight moving. The new ETLs will connect to the existing express toll lane system between Bellevue and Lynnwood, as well as the SR 167 High-Occupancy Toll lanes via the I-405/SR 167 Interchange Direct Connector, to create a 40-mile ETL system.	King County	40 miles	Under Construction
		24	East Link Extension	The East Link Project is an extension of the Link light rail system providing urban transportation improvements in the Central Puget Sound metropolitan region. The East Link project will connect to the existing light rail system in downtown Seattle and extend the system east to Mercer Island, Bellevue, and Redmond. The East Link Extension is 14 miles long and includes 10 stations from Seattle's International District to Judkins Park.	King County	14 miles	Under Construction

Theme	Theme Description	Proposed ID	Project Name	Project Description	Project Location (County)	Project Size	Current Project Phase (Planning/Development or Under Construction)
		25A; 25B	Puget Sound Gateway Program	The Puget Sound Gateway Program combines the SR 509 Completion Project in King County and the SR 167 Completion Project in Pierce County to complete critical missing links in Washington State's highway and freight network. The SR 509 Completion Project is building 3 new miles of SR 509, which includes a four-lane expressway between I-5 and SR 509's current end near Sea-Tac Airport, new I-5 ramps, improved I-5 interchanges in south King County, and construction of new bridges. The SR 167 Completion Project constructs 6 new miles of tolled highway between Puyallup and the Port of Tacoma and builds sidewalks and shared-use paths for non-motorized travelers.	King County, Pierce County	9 miles of freeway, 14 miles of new bike/ pedestrian paths, and 4.5 miles of new sidewalks	Under Construction
		26	North Spokane Corridor	The NSC is a 10.5-mile multi-modal corridor. When complete, the NSC will be a 60-mile-per-hour, north/south limited-access facility that connects to I-90 at the south (just west of the existing Thor/Freya interchange) and US 2 (at Farwell Road) and US 395 (at Wandermere) on the north end. Various stages of construction remain to complete the project.	Spokane County	11 miles	Under Construction
Water-Based Transportation	Water-based transportation improvement or maintenance projects.	27	Interstate Bridge Replacement Program	The Interstate Bridge Replacement Program is a joint effort between Oregon and Washington to replace the aging Interstate Bridge across the Columbia River and related interchange improvements within the 5-mile corridor. Improvements include: ▪ Replacing the Columbia River and North Portland Habor bridges ▪ Providing three through lanes on the bridge and at least one auxiliary lane in each direction ▪ Creating a safer shared-use path ▪ Extending light rail from the Portland Expo Center to Vancouver's Evergreen Boulevard and adding three new transit stations ▪ Implementing bus-on-shoulder service ▪ Providing a new arterial bridge from Hayden Island to Marine Drive for local traffic ▪ Modifying seven interchanges within 5 miles ▪ Implementing variable rate tolling	Snohomish County	$6 billion	Planning/Development
		28	Lower Columbia River Channel Dredged Material Maintenance Plan	The U.S. Army Corps of Engineers, in partnership with the Ports of Portland, Vancouver, Woodland, Kalama, and Longview, is developing a joint environmental impact statement and a long-term maintenance plan for the Lower Columbia River. This portion of the river is a 102-mile-long section from Vancouver, Washington, to Astoria, Oregon, and is a critical connection for international commerce. The Lower Columbia River Channel Maintenance Plan, Dredged Material Management Plan is a coordinated, long-term plan for managing dredged material generated by the continued operation and maintenance of the Lower Columbia River Federal Navigation Channel for a minimum of 20 years to continue to provide a 43-foot-deep, 600-foot-wide channel.	Multi-Jurisdictional, Lower Columbia River	102 miles	Planning/Development
		29	SR 520 Portage Bay Bridge and Roanoke Lid Project	The Portage Bay Bridge and Roanoke Lid Project would replace the aging Portage Bay Bridge with a seismically resilient structure that includes improved bus/carpool travel and an extension of the SR 520 Trail. This project also would build a landscaped lid between Seattle's Roanoke Park and North Capitol Hill neighborhoods.	King County	$1.375 billion	Planning/Development
		30	SR 520 Montlake Project	The Montlake Project will improve transportation for both motorized and nonmotorized travel along the corridor with a new SR 520 eastbound	King County	$455 million	Under Construction

Theme	Theme Description	Proposed ID	Project Name	Project Description	Project Location (County)	Project Size	Current Project Phase (Planning/Development or Under Construction)
				bridge over Union Bay. This project also will build a new, 3-acre lid covering the highway in Montlake that will include regional transit stops and open green space. East of the lid, a bicycle and pedestrian bridge will be constructed over SR 520.			
		31	SR 9 – Marsh Road to 2nd Street Vicinity – Widening & Bridge Painting	This project would widen SR 9 between Marsh Road and 2nd Street near the City of Snohomish, build southbound bridges directly to the west of the existing bridges—which would become northbound lanes—over the Snohomish River; and rebuild the on-ramp from 2nd Street to southbound SR 9. It also includes repainting the existing bridge.	Snohomish County	$142 million	Planning/Development
		32	I-5 East Fork Lewis River NB Bridge Replacement	The I-5 East Fork Lewis River NB Bridge Replacement project is a preservation project that would remove and replace the northbound I-5 East Fork Lewis River Bridge, located south of Woodland in Clark County. This bridge crosses over the East Fork of the Lewis River, Paradise Point State Park, and Northwest Toenjes Road, near milepost 18.21.	Clark County	$100 million	Planning/Development
		33	US 395 – NSC Spokane River Crossing	The US 395 – NSC Spokane River Crossing project will construct the North Spokane Corridor bridge that will cross the Spokane River and connect the skyway portion near Spokane Community College to the south and at Carslie Avenue to the north of the river.	Spokane County	$91 million	Under Construction
		34	SR 155 Spur/Okanogan River Bridge Replacement	The SR 155 Spur/Okanogan River Bridge Replacement project would demolish the existing concrete arch bridge over the Okanogan River and replace it with a new, 422-foot-long curved bridge slightly north. The new bridge deck would accommodate two 12-foot vehicle lanes with 4-foot shoulders and a 14-foot-wide shared-use path. Utilities would also be relocated onto the new bridge. New stormwater facilities would be added to treat roadway runoff before it enters the Okanogan River.	Okanogan County	$29.3 million	Planning/Development
		35	Replacement of Granite Falls Bridge #102	The Granite Falls Bridge #102 spans the Stillguamish River and is part of the 52-mile Mountain Loop Scenic Byway between Granite Falls and Darrington. This project proposes to replace the existing bridge, which is 340 feet long and 20 feet wide, with a new bridge that would be 350 feet long and 47 feet wide with bike lanes and sidewalks. The wider and longer design would meet current bridge standards and allow motorists, bicycles, and pedestrians a safer route of travel.	Snohomish County	$28.7 million	Planning/Development
		36	Ames Lake Trestle Bridge Replacement Project	This project will replace the 100-year-old Ames Lake Trestle Bridge with a wider structure and straighter bridge approaches. The improvements are designed to increase sight distance for drivers and provide a safe, unrestricted crossing for trucks and vehicles of all sizes.	King County	$10.8 million	Under Construction
Agriculture	New or modified agricultural land use designations, activities, and/or the development of supporting facilities.	37	Flying A Land Rezone	The Flying A Land Rezone is proposing to rezone its 47 parcels, equaling 197.4 acres, currently zoned Agriculture 5, to Planned Unit Development. The rezone would allow the current use of the property to be consistent and compatible with the zoning code, as well as allow future expansion of existing uses.	Kittitas County	198 acres	Planning/Development
		38	US Golden Farm Irrigation Pond	The US Golden Farm Irrigation Pond project proposes the creation of an “Irrigation Pond” at the site of a decommissioned manure lagoon to support agricultural needs during the growing season. The project also proposes the installation of approximately 850 feet of buried 8-inch-diameter HDPE or PVC pipe between the irrigation pond and the temporary floating pump placed in the Skagit River during in-water work window times. The proposed pond would be approximately 350 feet wide and 350 feet long, on three parcels totaling 81.63 acres in Skagit County.	Skagit County	82 acres	Planning/Development
		39	Swift Creek Poultry Farm	This proposed project would construct a poultry farm on a 59.52-acre parcel adjacent to Swift Creek (the former Ostrom Mushroom Farm site). The proposed development includes the construction of four breeder/	Whatcom County	60 acres	Planning/Development

Theme	Theme Description	Proposed ID	Project Name	Project Description	Project Location (County)	Project Size	Current Project Phase (Planning/Development or Under Construction)
				broiler barns, three rearing barns, a spiker barn, an attached office building, and a manure bunker. The project would result in the construction of approximately 151,225 square feet of new buildings. The proposed buildings and site would be used for raising young chicks and roosters.			
		40	Jungquist Farms Depth of Cover	Trans Mountain has identified two areas where the amount of soil cover over the 16-inch-diameter, welded steel, crude oil conveyance pipeline is low in agricultural fields in Skagit County. The goal of the Jungquist Farms Depth of Cover project is to increase the depth of soil over the pipeline in both areas.	Skagit County	57 acres	Planning/Development
		41	Kang/Nazarene Church/Lange Rezone	The City of Grandview has received applications from PLSA Engineering & Surveying, First Church of the Nazarene, and Gretchen Lange for a proposed rezone from Agriculture to R-2 Medium Density Residential District. The proposed rezone would change approximately 46.78 acres of land in the City of Grandview.	Yakima County	47 acres	Planning/Development
		42	Gibson Rezone	The Gibson Rezone proposes to rezone one parcel equaling 42 acres, currently zoned Agriculture 20 to Forest and Range, due to the lack of capacity on the subject site to carry out agricultural uses. The subject site lacks water sources and suitable soils for agricultural uses. The rezone would allow the current use of the property to be consistent and compatible with the zoning code; a comprehensive plan amendment is not required to complete the rezone.	Kittitas County	42 acres	Planning/Development
		43	Walton Rezone	The Walton Rezone proposed to rezone a 40-acre tract from Extensive Agriculture to Rural Center, located within the community of Trout Lake.	Klickitat County	40 acres	Planning/Development
		44	New Hatton Rezone	The project proposes to change the zoning of approximately 99.41 acres from Prime Agriculture to Rural Residential.	Adams County	99 acres	Planning/Development
Forestry	New or modified timber harvesting projects and associated construction or maintenance activities.	45	Fly By Night Timber Sale	The Fly By Night Timber Sale proposal is for a 629 gross acre timber sale consisting of 13 harvest units, removing approximately 3,265 MBF of commercial timber utilizing a variable retention harvest prescription.	Chelan County, Kittitas County	629 acres	Under Construction
		46	Conk Timber Sale	Forest Practice Application #3026927 and Conk Timber Sale #106237 is a sale of approximately 5,500 MBF of timber on 592 acres. The proposal also includes 2,026 feet of road construction, 2,477 feet of road abandonment, and 53,050 feet of road maintenance.	Okanogan County	592 acres	Planning/Development
		47	Portrait Timber Sale	Portrait Timber Sale #106261 and Forest Practice Application #3026986 is a sale of approximately 3,000 MBF of timber on 351 acres. The proposal includes 7,322 feet of road construction, 1,839 feet of road abandonment, and 31,247 feet of road maintenance.	Okanogan County	351 acres	Planning/Development
		48	Klondike Timber Sale	Klondike Timber Sale #106084 and Forest Practice Application #3026866 is a sale of approximately 2,800 MBF of timber on 348 acres. The proposal includes 19,856 feet of road construction and 31,358 feet of road maintenance.	Ferry County	348 acres	Planning/Development
		49	Forest Practice Application #3027124	The Forest Practice Application #3027124 proposal consists of 341.6 acres of uneven-aged harvest, removing 1,045 MBF of timber in Riverside State Park.	Spokane County	341 acres	Planning/Development
		50	Arden Tree Farms	The Forest Practice Application #3027198 proposal consists of 327 acres, with a harvest of 1,400 MBF of timber.	Pend Oreille County	327 acres	Planning/Development
		51	Syndrome SWT Timber Sale	The Syndrome SWT Timber Sale #106448 and Forest Practice Application #2819440 proposal is a variable-density thinning of 3,453 MBF of timber from 310 acres. The proposal includes 1,858 feet of road construction, 12,754 feet of road reconstruction, and 46,952 feet of pre-haul maintenance.	Snohomish County	310 acres	Planning/Development

Theme	Theme Description	Proposed ID	Project Name	Project Description	Project Location (County)	Project Size	Current Project Phase (Planning/Development or Under Construction)
Mining	New or expanded mining operations.	52	JUB Engineering Quarry	The JUB Engineering Quarry Conditional Use Permit Application proposes to expand an existing mining operation in the Growth Management Act Agricultural District to include the excavation and crushing of approximately 18 million cubic yards of basalt. The property is approximately 360 acres in size and is located in the Kennewick area of unincorporated Benton County.	Benton County	360 acres	Planning/Development
		53	Chelatchie Bluff Surface Mine Overlay Annual Review	The Chelatchie Bluff Surface Mine Overlay Annual Review project proposes to amend the comprehensive and zoning maps to add a surface mining overlay on four parcels totaling 330 acres with a current zoning designation of FR-80 and comprehensive plan designation of Forest Tier - 1. The addition of the SMO designation to these parcels would be followed by an application for a mining permit with the county, upon approval of the proposal.	Clark County	330 acres	Planning/Development
		54	Pioneer Aggregates South Parcel Mine Expansion	The proposed Pioneer Aggregates South Parcel Project would be developed on an approximately 313-acre site located on and to the southeast of the existing Pioneer Aggregates Mine in the City of DuPont, Pierce County. The site includes areas previously undisturbed by mining (termed the “Expansion Area”) and mining deeper within a portion of the existing mine, referred to as the “Re-Mine Area.” The Expansion Area is approximately 188 acres and consists of three subareas. The Re-Mine Area consists of 125 acres in the southeastern portion of the existing mine where current mining activities are permitted above current groundwater levels.	Pierce County	313 acres	Planning/Development
		55	Pasco Gravel Pit Mine	The Pasco Gravel Pit Mine project proposes to develop a mining operation that would extract available sand, gravel, and rock for commercial use. Initial mining, or phase 1, would take place based on the sample results and include the first 25 acres. Future phases would progress in 25-acre increments over the lifetime of the mine.	Franklin County	200 acres	Planning/Development
		56	Proghorn LLC zone change	The project proposes a zone change of approximately 168 acres of Rural Traditional-zoned land to Mineral Land designation. The future use of this project would be determined by market conditions but is anticipated to become a basalt and granite open-pit mine for the purpose of extracting aggregate and producing basalt-aggregate asphalt and granite-aggregate concrete.	Spokane County	168 acres	Planning/Development
		57	Lewisville Mine Expansion	The Lewisville Mine Expansion project proposes to allow the expansion of the existing mining operation to a new area (Phase 3).	Clark County	150 acres	Planning/Development
Recreation	New, expanded, or modified recreational areas or facilities.	58	Miller Peninsula State Park Property Planning	The Washington State Parks and Recreation Commission is developing a long-range plan for its property on Miller Peninsula. This 2,800-acre undeveloped park is located in the north Olympic Peninsula, just east of Sequim and north of Highway 101 in Clallam County. The property includes a trail system for hikers, mountain bikers, and equestrians through a beautiful second-growth forest. It also includes 3 miles of saltwater shoreline on the Strait of Juan de Fuca and Discovery Bay, but most of the shore is high-bank, so shore access is limited.	Clallam County	2,800 acres	Planning/Development
		59	Amendment to Riverside State Park Classification and Management Plan to include Glen Tana Property	The Washington State Parks and Recreation Commission proposes to amend the Classification and Management Plan at Riverside State Park in Spokane, Washington, and purchase adjacent lands to expand the existing park area by 1,068 acres. The plan is a comprehensive planning document that the commission develops to plan and manage future development.	Spokane County	1,068 acres	Planning/Development
		60	Sky Valley Sportsman's Park	The Sky Valley Sportsman's Park project is an undeveloped property in east Snohomish County, owned by the DNR. The property is approximately 640 acres fronting the Sultan Basin Road and is	Spokane County	640 acres	Planning/Development

Theme	Theme Description	Proposed ID	Project Name	Project Description	Project Location (County)	Project Size	Current Project Phase (Planning/Development or Under Construction)
				surrounded by other DNR land. This park is intended to be developed into a multi-purpose shooting range and would be managed through a public-private or public-nonprofit partnership.			
		61	Make Beacon Hill Public – Phase 2	The Make Beacon Hill Public Phase 2 project is proposing improvements to the existing trailheads at John H. Shields Park (Minnehaha Rocks) and Camp Sekani Park. Improvements would include increased and improved parking lots, landscape restoration, pedestrian pathways, and safe access points, play area, adaptive trail, wayfinding, and site amenities.	Spokane County	200 acres	Planning/Development
		62	Deception Pass State Park Zoning Amendment	The Washington State Parks and Recreation Commission acquired 77.85 acres and incorporated it into Deception Pass State Park. The commission is submitting a Comprehensive Plan/Zoning Map Amendment Request to Skagit County to request that the entirety of parcel number P19610 be zoned as Public Open Space of Regional/Statewide Importance.	Skagit County	78 acres	Planning/Development
		63	Flora Park and Cross Country Course (Phase 2)	The proposed Flora Park and Cross Country Course (Phase 2) project intends to increase public access and usability of the nearby shoreline of the Spokane River, improve visibility and water enjoyment, and develop a cross-country running track.	Spokane County	60 acres	Under Construction
Wildlife and Habitat Conservation	New or modified habitat conservation plan areas or habitat restoration.	64	Buckhorn Project	The Buckhorn Project is proposed by the Colville National Forest located east of Oroville, north of Wauconda, and north of Bonaparte Lake, and includes U.S. Forest Service, Bureau of Land Management, DNR, and privately held lands. The purpose of the project is to improve current and future distribution of forest vegetation structure classes and reduce hazardous fuel conditions. Other project activities would focus on improving the health and resilience of forest habitat and local communities while providing renewable forest products, enhancing fish and wildlife habitat, reducing impacts to water quality, supporting Tribal treaty rights, and managing sustainable recreation opportunities across the project area.	Okanogan County	66,115 acres	Planning/Development
		65	Tonata-Trout Project	The Colville National Forest proposes managing forest vegetation in the Tonata-Trout Project Area. The proposed activities include treatments to manage forest health, reduce hazardous fuels, restore and protect water quality, create new recreational opportunities, and establish and improve range developments. The project also includes commercial treatment on about 24,726 acres. Non-commercial treatments (pre-commercial thinning, prescribed burning, pile burning, and/or ladder fuel reduction) would occur on about 12,102 acres. About 20 miles of roads would be reconstructed, and 4.2 miles decommissioned. About 23 miles of new temporary road would be constructed. All open roads within the project area would be designated as open to all vehicles. Associated fish and wildlife habitat improvements would be completed.	Ferry County	48,405 acres	Planning/Development
		66	Little White Salmon Forest Resiliency and Fire Risk Mitigation Project	The Little White Salmon Forest Resiliency and Fire Risk Mitigation Project proposes to increase forest resiliency from climate-related stressors and mitigate fire risk to highly valued resources by treating approximately 12,000 acres of National Forest System lands.	Klickitat and Skamania Counties	12,000 acres	Planning/Development
		67	Cle Elum Ridge Large Landscape Project	The Cle Elum Ridge Large Landscape Project includes the transition of 9,700 acres on Cle Elum Ridge from Central Cascades Forest LLC into public ownership, through purchase by DNR. DNR has indicated that the land would be used for a mix of recreation, conservation, and logging, with a key priority of reducing forest fire risks. The purchase is also meant as a bulwark against "checkerboarding," whereby land becomes	Kittitas County	9,700 acres	Planning/Development

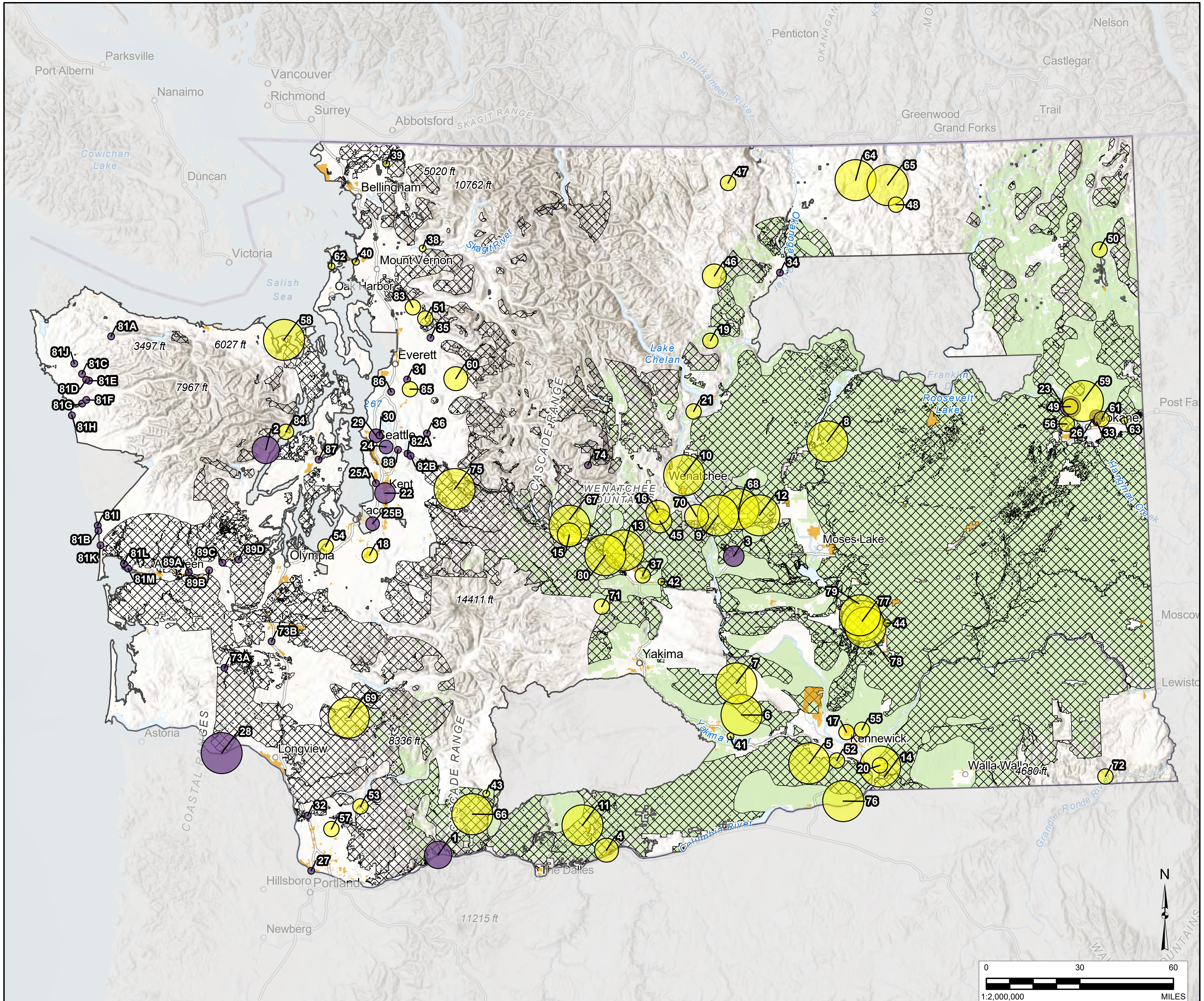
Theme	Theme Description	Proposed ID	Project Name	Project Description	Project Location (County)	Project Size	Current Project Phase (Planning/Development or Under Construction)
				fragmented among different public and private owners and, as a result, more difficult to manage.			
		68	Beezley Hills	The Beezley Hills project is the proposed acquisition of up to 9,297 acres in the Beezley Hills Unit of the Columbia Basin Wildlife Area. This project would provide habitat on a large tract of shrub-steppe with suitable habitat for pygmy rabbit, greater sage-grouse, and Washington ground squirrel with current occupation or near occupation of these species.	Grant County	9,297 acres	Planning/Development
		69	Hoffstadt Hills	The Hoffstadt Hills project is the proposed acquisition of up to 7,300 acres adjacent to the Hoffstadt Unit of the Mt. St. Helens Wildlife Area and Mt. St. Helens National Monument in Cowlitz County. The primary focus of this acquisition is to protect and enhance elk winter range habitat, as well as steelhead and coho spawning and rearing areas. This protection is essential for landscape-level conservation of the elk herd in the face of continual habitat inundation resulting from efforts to hold back sediment from the Mt. St. Helen’s eruption.	Cowlitz County	7,300 acres	Planning/Development
		70	Scroggie Canyon	The Scroggie Canyon project is the proposed acquisition of 742 acres that is bordered on three sides by the Colockum Unit of the Colockum Wildlife Area. This project would conserve shrub-steppe habitat, improve habitat connectivity, and provide opportunity for restoration of this critical ecosystem. Species include elk, mule deer, and bighorn sheep, as well as trout in perennial streams.	Chelan County	742 acres	Planning/Development
		71	Wenas Watershed/Miracle Mile	The Wenas Watershed/Miracle Mile project is the proposed acquisition of 440.17 acres adjacent to the Wenas Wildlife Area in Yakima County. This acquisition would conserve mixed shrub-steppe, riparian, and coniferous forest habitat primarily for elk winter range. The property is utilized by a quarter of all bird species found in the continental United States, making it an excellent area for recreational bird watching.	Yakima County	440 acres	Planning/Development
		72	4-0 Ranch Forest Restoration - Chief Joseph Wildlife Area	The 4-0 Ranch Forest Restoration project is intended to improve ecological integrity ratings, habitat for multiple wildlife species, and forest health in the Chief Joseph Wildlife Area. This project places special emphasis on improving the fire-resiliency for mule deer habitat.	Asotin County	422 acres	Planning/Development
Water Resources	Water resource-related projects intended to improve water supply and quality.	73A; 73B	Chehalis River Basin Flood Damage Reduction Project and Airport Levee Improvements	The Chehalis River Basin Flood Control Zone District is proposing to construct a flood-retention dam and associated temporary reservoir on the Chehalis River near Pe Ell and make changes to the Chehalis-Centralia Airport levee. The district’s objective for the project is to reduce damages from major floods from Pe Ell to Centralia triggered by rainfall in the Willapa Hills. The project would raise and widen the Chehalis-Centralia Airport levee and nearby roads to improve the levee protection level during catastrophic floods. The project is not intended to address flooding in all parts of the Chehalis River basin and would not stop regular annual flooding.	Lewis County	$628 million	Planning/Development
		74	Eight-Mile Dam Rebuild and Restoration	The Eight-Mile Dam Rebuild and Restoration project is in response to a state of emergency that was declared in the watershed, after flood damage and erosion at the dam caused by impacts of the Jack Creek Fire in 2017. Emergency repairs made in the summer of 2018 stabilized the dam, but these repairs do not meet current dam safety standards.	Chelan County	180 feet	Planning/Development
		75	Cedar River Municipal Watershed Forest Management Plan	SPU plans to begin implementing the Cedar River Municipal Watershed Forest Management Plan in January 2024 and expects to use the plan to guide development and implementation of specific project actions over the subsequent 27 years. SPU owns and operates the Cedar River Municipal Watershed as a major asset in the City of Seattle’s municipal drinking water supply system. This 92,000-acre watershed is near the City of North Bend in	King County	92,000 acres	Planning/Development

Theme	Theme Description	Proposed ID	Project Name	Project Description	Project Location (County)	Project Size	Current Project Phase (Planning/Development or Under Construction)
				King County, Washington, approximately 40 miles east of Seattle. It provides about two-thirds of the supply, serving more than 1.5 million people in the central Puget Sound region.			
		76	Farmland Reserve Water Bank	Farmland Reserves, Inc. proposes to create a water bank in coordination with the Office of Columbia River. Farmland's Bank is intended to serve its own agricultural needs and make water it conserves available to mitigate a variety of others' water needs, including agricultural irrigation, dust control, instream flow, drought relief, and more.	Benton County	10,012 acres	Planning/Development
		77	Odessa Groundwater Replacement Program EL 84.7 Landowner Extension Mainline	This project would complete one of the nine lateral systems in the Odessa Groundwater Replacement Program located in central Washington. The finished EL 84.7 lateral would replace groundwater irrigation with Columbia River surface water for a total of 7,138 acres of land that currently relies on rapidly declining groundwater wells, thereby helping to prevent source water depletion.	Grant County	7,138 acres	Planning/Development
		78	Odessa Groundwater Replacement Program EL 86.4 On-Farm Project	This project is part of the Odessa Groundwater Replacement Program located in the heart of the Columbia River Basin in central Washington. The goal of the Grant County Conservation District's project is to replace groundwater irrigation with Columbia River surface water for 5,426 acres of high-value irrigated farmland currently relying on the rapidly declining Odessa Subarea Aquifer, thereby helping to prevent source water depletion. Without more reliable surface water, farmers will continue to be impacted by declining groundwater levels.	Grant County	5,426 acres	Under Construction
		79	Odessa Groundwater Replacement Program EL 80.6 Landowner Extension Mainline	This project is part of the Odessa Groundwater Replacement Program located in the heart of the Columbia River Basin in central Washington, with the goal to replace groundwater irrigation with Columbia River surface water for 5,222 acres of high-value irrigated farmland currently relying on the rapidly declining Odessa Subarea Aquifer, thereby helping to prevent source water depletion. Once constructed, this project will deliver Columbia Basin Project water from the East Columbia Basin Irrigation District's canal to a total of 10 farms effectively removing 11 wells from pumping groundwater and conserving 15,888 acre-feet (5.1 billion gallons) of water in the aquifer each year.	Grant County	5,222 acres	Under Construction
		80	Springwood Ranch - Yakima Basin Integrated Plan	The Springwood Ranch property totals approximately 3,600 acres with a significant portion intended to be managed by the Kittitas Reclamation District as an off-channel reservoir to capture and hold water early in the year and strategically release it in spring to coincide with juvenile salmon and steelhead migration to improve their survival.	Yakima County	3,600 acres	Planning/Development
		81A through 81M	US 101 - SR 109 Grays Harbor, Jefferson, and Clallam Counties - Remove Fish Barriers	This project will improve fish passages at 29 identified streams and culverts that cross under US 101 and SR 109 in Grays Harbor, Jefferson, and Clallam Counties. Once complete, this project will restore nearly 37 miles of potential habitat across the Olympic Peninsula.	Grays Harbor County; Jefferson County; and Clallam County	$481 million	Under Construction
		82A; 82B	I-90 – Lewis, W. Village Park, Schneider Creeks – fish passage projects	This project proposes to build multiple structures that may include new bridges on I-90 and local roads near Issaquah to restore natural stream conditions in Lewis, West Village Park, and Schneider Creeks. Improvements along Lewis Creek would result in a potential habitat gain of 4,350 meters, West Village Park Creek would result in a potential habitat gain of 820 meters, and Schneider Creek would result in a potential habitat gain of 1,077 meters.	King County	$289 million	Planning/Development
		83	Trafton Floodplain Restoration	Snohomish County Department of Conservation and Natural Resources and the Stillaguamish Tribe are partnering on a floodplain restoration project at Trafton. This project is connected to a larger effort by the Tribe to restore reach-scale river processes and salmon habitat on the lands they own at Trafton. The project footprint would include work on both the	Snohomish County	250 acres	Planning/Development

Theme	Theme Description	Proposed ID	Project Name	Project Description	Project Location (County)	Project Size	Current Project Phase (Planning/Development or Under Construction)
				Tribe's and county's property and would prioritize floodplain restoration and protecting the Whitehorse Trail, which runs adjacent to the project area, from future erosion and avulsion impacts.			
		84	Duckabush Estuary Restoration Project	The Duckabush Estuary is the focus of a coordinated effort to restore scarce estuarine habitat. The Duckabush Estuary Restoration Project would reconnect the Duckabush River to neighboring floodplains and wetlands by modifying local roads, elevating Highway 101 onto an estuary-spanning bridge, and reconnecting historical channels. Estuary channels will be reconnected, restoring natural water and sediment movement and improving habitat for native fish and wildlife, including salmon listed under the Endangered Species Act.	Jefferson County	232 acres	Planning/Development
		85	Thomas' Eddy Restoration Project	The County's restoration work at Thomas' Eddy will reconnect the Snohomish River to its floodplain at Bob Heirman Wildlife Park, and improve opportunities for fishing, hiking and wildlife viewing while restoring critical habitat for wildlife and threatened salmon species. To ensure these goals are met, Snohomish County solicited early input on project design from the public and park users.	Snohomish County	228 acres	Planning/Development
		86	SR 527 - Penny Creek - Fish Passage	The project proposes to build a 26-foot fish-passable structure under SR 527 just south of 164th Street Southeast in Mill Creek. The current 9-foot culvert causes water to flow too fast for fish to continue upstream. The new bridge span will open more than 8 miles of habitat.	Snohomish County	$8 million	Planning/Development
		87	SR 3, SR 16, and SR 166, Gorst Vicinity - Remove Fish Barriers	This proposed project would remove barriers to fish migration under SR3, SR 16, and SR 166 in Kitsap County. New bridges or larger culverts will replace five outdated culverts. Work includes construction of a roundabout at the SR 3, SR 16, and West Sam Christopherson Avenue intersection.	Kitsap County	$192.6 million	Planning/Development
		88	I-90 - Sunset Creek - Fish Passage	WSDOT is currently building bridges over Sunset Creek along both directions of I-90, Southeast Eastgate Way, and Southeast 36th Street in Bellevue. These bridges will replace culverts that block fish passage and allow natural stream conditions to return in Sunset Creek.	King County	$109.5 million	Under Construction
		89A through 89D	Grays Harbor County Fish Passage Barriers - Camp Creek	This project is replacing five outdated culverts under US 12 and SR 8 in Grays Harbor County between Montesano and the Thurston County line for improved fish migration.	Grays Harbor County	$109 million	Under Construction

AIM = Aerospace Innovation Manufacturing; BPA = Bonneville Power Administration; BESS = battery energy storage system; dba = doing business as; DNR = Washington State Department of Natural Resources; ETL = Express Toll Lane; HDPE = high-density polyethylene; I = Interstate; kV = kilovolts; MBF = thousand board feet; MW = megawatts; NSC = North Spokane Corridor; PVC = polyvinyl chloride; SMO = Surface Mining Overlay; SPU = Seattle Public Utilities; SR = State Route; US = US Highway; WSDOT = Washington State Department of Transportation

This Page Intentionally Left Blank



LEGEND

Linear Based RFAs - Miles
- Less than 10 miles
- 10 - 20 miles
- 20 - 50 miles
- 50 - 100 miles
- Greater than 100 miles

Site Based RFAs - US Acres
- 40 - 100 acres
- 100 - 500 acres
- 500 - 1,000 acres
- Greater than 1,000 acres

- Green Hydrogen Energy Facilities Programmatic EIS Study Area
- Solar Energy Facilities Programmatic EIS Study Area
- Wind Energy Facilities Programmatic EIS Study Area

THE SEAL OF THE STATE OF WASHINGTON 1889

EFSEC
Energy Facility Site Evaluation Council

REFERENCES AND NOTES
1. THE RFAS WERE SELECTED BASED ON THE STUDY AREA FOR THIS DRAFT PROGRAMMATIC EIS.
2. APPROXIMATE PROJECT LOCATIONS LIE AT THE CENTROID OF EACH PROJECT SYMBOL
3. LINEAR PROJECTS INCLUDE: DAM CONSTRUCTION AND IMPROVEMENTS, FISH PASSAGEWAY IMPROVEMENTS AND BARRIER REMOVAL, TRANSPORTATION, MULTIMODAL TRANSPORTATION PROJECTS, BRIDGE CONSTRUCTION AND IMPROVEMENTS, AND TRANSMISSION LINE PROJECTS
4. SITE BASED PROJECTS INCLUDE: AGRICULTURE, COMMUNITY GROWTH AND LAND DEVELOPMENT, ENERGY GENERATION, WILDLIFE AND HABITAT RESTORATION, FORESTRY, MINING, AND RECREATION.
5. GREEN HYDROGEN, SOLAR, AND WIND STUDY AREAS ARE NOT SPECIFIC PROJECTS. THESE STUDY AREAS ARE FOR A PROGRAMMATIC EIS WHERE PROJECTS ARE MORE LIKELY TO BE DEVELOPED.
6. REFERENCE LAYER CREDITS: WA STATE PARKS GIS, ESRI, TOMTOM, GARMIN, FAO, NOAA, USGS, BUREAU OF LAND MANAGEMENT, EPA, NPS, USFWS, ESRI, USGS
7. REFER TO TABLE 4-1, PRESENT AND REASONABLY FORESEEABLE ACTIONS, FOR PROJECT DETAILS.

PROJECT
DRAFT PROGRAMMATIC EIS
HIGH-VOLTAGE TRANSMISSION

TITLE
REASONABLY FORESEEABLE ACTIONS (RFAS)

YYYY-MM-DD 2025-03-24 CONSULTANT wsp

FIGURE
4.2-1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

This Page Intentionally Left Blank

4.3 Analysis of Cumulative Impacts

Cumulative impacts for this Draft Programmatic EIS are not quantifiable given the broad size and scale of the Study Area and are, therefore, discussed in general qualitative terms. This cumulative impact analysis assumes that all laws, regulations, siting and design considerations, best management practices (BMPs), general conditions, and avoidance criteria identified throughout this Draft Programmatic EIS would be met. When impact determinations are identified as moderate or high, it is assumed that the appropriate mitigation measures from this Draft Programmatic EIS would be adopted by the applicant to minimize impacts.

4.3.1 Criteria for Assessing a Potentially Significant Cumulative Impact

This Draft Programmatic EIS has established thresholds for cumulative impacts, which are described for each resource in **Table 4.3-1**.

Table 4.3-1: Criteria for Assessing Potentially Significant Cumulative Impacts

Chapter Section	Element of the Environment	High Impact Determination Description
Section 3.2	Earth Resources	A project, in combination with RFAs, would have significant and potentially severe cumulative impacts on earth resources if they collectively result in permanent soil disturbance, including significant erosion, compaction, and potential loss of soil fertility. Significant cumulative impacts could also result from substantial changes to geological formations, which could permanently affect stability, thereby increasing risk of landslides or other geotechnical issues.
Section 3.3	Air Quality	A project, in combination with RFAs, would have significant and potentially severe cumulative impacts on air quality if considerable amounts of emissions are released and there is a risk of exceeding relevant air quality standards and regulations. Adverse effects on air quality would be permanent and affect a larger area, not just localized to the construction site.
Section 3.4	Water Resources	A project, in combination with RFAs, would have significant and potentially severe cumulative impacts on water resources if they collectively result in permanent, significant water quality degradation, water access reduction, redirection, or wetland destruction and potential loss of hydrological formations. There would be substantial cumulative changes to watershed or river basins, wetlands and floodplains, or groundwater aquifers, which could permanently affect the water resources of the area. This might result in a permanent, cumulative increased risk of drought, flood, or other water issues.
Section 3.5	Vegetation	A project, in combination with RFAs, would have significant and potentially severe cumulative impacts on vegetation if they collectively result in permanent, significant changes to the resiliency and adaptability of the species or populations thereby impacting the viability of the species or populations. Populations would be at risk of extirpation. Adverse cumulative impacts would also result from permanent, significant impacts to the functionality and ecosystem services provided by the ecosystem, rendering the ecosystem non-functional.
Section 3.6	Habitat, Wildlife, and Fish	A project, in combination with RFAs, would have significant and potentially severe cumulative impacts on habitat, wildlife, and fish if they collectively have an incremental change that is expected to exceed the resiliency and adaptability of the species or populations thereby permanently impacting the viability of the species or populations.

Chapter Section	Element of the Environment	High Impact Determination Description
Section 3.7	Energy and Natural Resources	A project, in combination with RFAs, would have significant and potentially severe cumulative impacts if they collectively consume energy and natural resources such that it permanently effects availability of resources and the environment.
Section 3.8	Public Health and Safety	A project, in combination with RFAs, would have significant and potentially severe cumulative impacts if they collectively result in permanent, substantial exposure to hazardous materials or EMF, extreme occupational hazards, and high risks of wildfire. Significant cumulative impacts would occur if frequent and extended power outages adversely impact the health and safety of affected individuals.
Section 3.9	Land and Shoreline Use	A project, in combination with RFAs, would have significant and potentially severe cumulative impacts on land and shoreline use if they collectively result in permanent, significant adverse changes to or conflicts with existing land and shoreline uses. Permanent, significant adverse impacts would occur from conflicts with relevant goals or policies. Significant adverse impacts on military utilized airspace or civilian airfield operations would affect the military's ability to conduct flight training and/or operations. Significant adverse impacts on agricultural production or loss of GMA Agricultural lands would affect the ability of a farm to remain profitable and continue operations.
Section 3.10	Transportation	A project, in combination with RFAs, would have significant and potentially severe cumulative impacts on transportation if changes to transportation infrastructure or operations have permanent, measurable consequences on supply chains or the management and distribution of people or materials. Significant cumulative impacts would also result when prolonged road closures or detours cause major inconvenience to commuters. Additionally, significant cumulative impacts would occur when there is permanent, substantial interference with electronic devices and communication systems, or there is an increased risk of accidents and hazards.
Section 3.11	Public Services and Utilities	A project, in combination with RFAs, would have significant and potentially severe cumulative impacts on public services and utilities if they collectively result in permanent, adverse impacts on the demand for public services or utilities, emergency response times, existing utility infrastructure, or the risk of power outages at public service facilities.
Section 3.12	Visual Quality	A project, in combination with RFAs, would have significant and potentially severe cumulative impacts on visual quality if they collectively result in permanent, uncharacteristic, and extensive changes to the existing aesthetic and/or scenic character of the area.
Section 3.13	Noise and Vibration	A project, in combination with RFAs, would have significant and potentially severe cumulative impacts on noise and vibration if they collectively result in permanent impacts on sensitive receptors and/or structures. Permanent loss of hearing would occur.
Section 3.14	Recreation	A project, in combination with RFAs, would have significant and potentially severe cumulative impacts on recreational resources if they collectively affect the environmental and natural landscape such that they permanently affect the resource.

Chapter Section	Element of the Environment	High Impact Determination Description
Section 3.15	Cultural and Historic Resources	A project, in combination with RFAs, would have significant and potentially severe cumulative impacts on cultural and historic resources if they collectively result in physical or visual impacts on National Historic Landmarks, Tribal Resources, or Traditional Cultural Places that result in changes to the character of the property's use or of physical features within the property's setting that contribute to its historic significance, introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features.
Section 3.16	Socioeconomics	A project, in combination with RFAs, would have significant and potentially severe cumulative impacts on socioeconomics if they collectively result in permanent adverse impacts on the general welfare, social conditions and economic environment. Additionally, a significant cumulative impact on environmental justice would occur if they collectively result in a permanent, disproportionate impact on vulnerable populations and/or overburdened communities.

EIS = Environmental Impact Statement; GMA = Growth Management Act; RFA = reasonably foreseeable action

4.3.2 Cumulative Impact Determination

This Draft Programmatic EIS provides an assessment of potential cumulative impacts and a cumulative impact determination[5] for each element of the environment. The cumulative impact determination identifies whether transmission facility development would result in a probable significant cumulative adverse impact. This determination is a qualitative assessment of potential compounding and incremental impacts from the development of transmission facilities.

This assessment identifies probable significant cumulative adverse impacts based on professional judgment and information available at the time of writing. A precautionary approach has been taken for the assessment where information is currently unknown or unavailable.

4.3.3 No Action Alternative

Although no significant adverse impacts were identified for the No Action Alternative, this cumulative impact analysis evaluated what would likely occur if this Draft Programmatic EIS was not implemented. Under the No Action Alternative, project-specific applications would be evaluated according to current regulatory framework and permitting procedures. Cumulative impacts for each element of the environment would continue to be evaluated on a project-specific basis, and permits would be issued based on project-specific conditions.

4.3.4 Action Alternative

This section evaluates potential cumulative impacts resulting from the Action Alternative for each element of the environment. **Table 4.3-2** identifies the impacts on each element of the environment that could contribute to a significant adverse impact. As evaluated in Chapter 3, all significant direct and indirect adverse impacts could be reduced to a less than significant level with the implementation of applicable general conditions, avoidance criteria, and mitigation measures.

[5] An assessment of whether transmission facility development would result in a probable significant cumulative adverse impact. This determination is a qualitative assessment of potential compounding and incremental impacts from the development of transmission facilities and past, present, and reasonably foreseeable actions.

Table 4.3-2: Summary of Resource Impacts

Chapter Section	Element of the Environment	Impact Identified
Section 3.2	Earth Resources	• Alteration of topography and drainage patterns • Increased soil erosion and/or accretion • Compaction of soil • Damage from a Geological Event or Geohazard
Section 3.3	Air Quality	• Increased fugitive dust emissions • Increased emissions from fuel-burning equipment • Increased SF_6 emissions

Section 3.4	Water Resources	• Impacts on water quality, including:
		  o Changes in sedimentation
		  o Changes in water chemistry
		• Impacts on water quantity, including:
		  o Increased water usage
		  o Altered hydrology
		  o Temporary water diversions
		  o Groundwater extraction
		• Damage to infrastructure

Section 3.5	Vegetation	• Direct impacts and mortality, including:
		  o Loss of habitat
		  o Loss of species or populations
		  o Loss of ecosystem functionality
		• Indirect impacts, including:
		  o Introduction or spread of invasive plants or noxious weeds
		  o Surface runoff
		  o Deposition of dust
		  o Introduction of hazardous substances
		• Fragmentation

Section 3.6	Habitat, Wildlife, and Fish	• Direct habitat loss • Indirect habitat loss • Mortality of species • Barriers to movement • Fragmentation
Section 3.7	Energy and Natural Resources	• Consumption of non-renewable resources • Consumption of renewable resources • Consumption of energy
Section 3.8	Public Health and Safety	• Increase in accidents and injuries • Exposure to hazardous materials • Increased risk of wildfire • Exposure to EMF • Excess heat generation • Inundation of vaults in floodplains
Section 3.8	Land Use	• Incompatible land use • Conflict with relevant goals and policies • Loss of function and value of shorelines • Loss of function and value of agricultural lands and rangelands • Conflicts with military utilized airspace and civilian airfield operations

Chapter Section	Element of the Environment	Impact Identified
Section 3.10	Transportation	• Impacts on vehicular transportation and infrastructure, including: o Closures and diversions o Increased traffic and increased collision risk o Impacts from access road construction o Impacts on road authority • Impacts on waterborne vessels and infrastructure, including: o Closures and diversions o Increased collision risk o Impacts from infrastructure modification • Impacts on rail transportation and infrastructure, including: o Closures and diversions o Increased collision risk o Impacts on rail stability o Impacts from infrastructure modification • Impacts on air transportation and infrastructure[6], including: o Impacts from airspace restrictions o Increased collision risk o Decreased visibility
Section 3.11	Public Services and Utilities	• Conflicts with existing utility infrastructure • Increased solid waste production • Increased water demand • Increased demand for fire protection services, law enforcement, and emergency responders • Increased emergency response times • Increased risk of power outages at public service facilities
Section 3.12	Visual Quality	• Degradation of scenic natural resources • Degradation of aesthetics • Degradation of night sky
Section 3.13	Noise and Vibration	• Increased noise at sensitive receptors • Increased ground-borne vibration at off-site structures • Hearing loss
Section 3.14	Recreation	• Temporary closure or restricted access • Permanent closure • Increase in use • Change in integrity • Increased risk of wildfire
Section 3.15	Cultural and Historic Resources	• Physical impacts on historic and cultural resources • Visual impacts on historic and cultural resources • Physical impacts on TCPs and Tribal resources • Visual impacts on TCPs and Tribal resources

[6] Section 3.09, Land and Shoreline Use analyzes impacts on military utilized airspace and civilian airfield operations

Chapter Section	Element of the Environment	Impact Identified

Section 3.16	Socioeconomics	• Degradation of the natural and built environment, including:
		  o Noise and vibration
		  o Air quality
		  o Visual quality
		  o Land and shoreline use, and recreation
		• Changes in housing availability
		• Changes in home values
		• Changes in fiscal conditions and employment

EMF = electromagnetic field; SF6 = sulfur hexafluoride; TCP = Traditional Cultural Place

4.3.4.1 Earth Resources

The construction, operation and maintenance, and upgrade or modification of transmission facilities could impact earth resources through alteration of topography and drainage patterns, soil erosion and/or accretion, compaction, and geological instability. As discussed in Section 3.2, there are many factors associated with these activities that could contribute to potential impacts, including vegetation removal, grading, stormwater runoff, sediment transport, soil composition, water infiltration, and seismic activity. Construction of transmission facilities often involves alterations to the topography or drainage patterns during clearing and grading, the construction of access roads, and foundation excavation, thereby leading to increased soil erosion and accretion. The duration of these impacts would be short-term and can generally by controlled through implementation of standard BMPs and mitigation measures outlined in Section 3.2, Earth Resources. Impacts on earth resources are generally anticipated to be greater with the construction of underground transmission facilities due to the significant surface disruption involved with open trenching.

Cumulative impacts from RFAs could also affect earth resources. As shown in **Table 4.2-1**, this Draft Programmatic EIS considered a variety of RFAs that are underway or could occur in the state. Transmission facility development, combined with other RFAs related to energy generation and transmission, mining, forestry, agriculture, community growth, and both land- and water-based transportation, could contribute to adverse cumulative impacts on earth resources. These RFAs would directly and/or indirectly increase soil erosion and compaction, resulting in potential adverse impacts. These RFAs include, but are not limited to, the following:

- Horse Heaven Wind Farm
- Hop Hills Solar Energy Project
- Shelton-Fairmount No. 1 Transmission Line Rebuild Project
- Wanapum to Mountain View
- JUB Engineering Quarry
- Pioneer Aggregates South Parcel Mine Expansion
- Fly By Night Timber Sale
- Conk Timber Sale

- Swift Creek Poultry Farm
- Jungquist Farms Depth of Cover
- Wallula Gap Business Park
- Bullfrog Flats Development
- Interstate (I) 405/SR 167 Corridor Program
- I-405/Renton to Bellevue Widening and Express Toll Lanes Project
- Lower Columbia River Channel Maintenance Plan
- Interstate Bridge Replacement Program

While some RFAs could contribute to adverse cumulative impacts, others may help mitigate adverse effects on earth resources. RFAs related to recreation, wildlife and habitat conservation could reduce the potential for future soil erosion and compaction. Beneficial RFAs include, but are not limited to, the following:

- Miller Peninsula State Park Property Planning
- Amendment to Riverside State Park Classification and Management Plan to include Glen Tana Property
- Tonata-Trout Project
- Little White Salmon Forest Resiliency and Fire Risk Mitigation Project

Cumulative Impact Determination: The cumulative impact on earth resources would depend on the size, scale, and timing of a project-specific application in combination with RFAs within the geographic setting and timing. Adverse impacts on earth resources are primarily associated with construction. Adverse impacts would be localized, and the duration would be short term. Furthermore, significant adverse impacts would be minimized with the implementation of general conditions, avoidance criteria, and mitigation measures. The construction, operation and maintenance, and upgrade or modification of transmission facilities would not be likely to contribute to a probable significant cumulative adverse impact on earth resources.

4.3.4.2 Air Quality

The construction, operation and maintenance, and upgrade or modification of transmission facilities could impact air quality in several ways. Potential adverse impacts could include temporary increases in emissions from the use of equipment and vehicles during construction and routine maintenance. Construction could also increase fugitive dust emissions resulting from grading, vegetation clearing and removal, building access roads, traveling on site using unpaved surfaces, and blasting for tower footings. Additionally, fugitive emissions from sulfur hexafluoride (SF_6) can be linked to electricity transmission and distribution equipment of overhead facilities (EPA 2024). SF_6 can be emitted from the seals and joints of the equipment if not properly installed, maintained, or managed. Significant adverse impacts would be minimized with the implementation of mitigation measures identified in Section 3.3, Air Quality.

Other RFAs, including those related to community growth, land- and water-based transportation, forestry, and mining projects, are likely to contribute to cumulative air quality impacts. Construction activities related to these

RFAs could temporarily increase air pollutants in a manner similar to the Action Alternative. These RFAs include, but are not limited to:

- Wallula Gap Business Gap
- Bullfrog Flats Development
- I-405/Renton to Bellevue Widening and Express Toll Lanes Project
- I-90 - Snoqualmie Pass East Project (Phase 3)
- Lower Columbia River Channel Maintenance Plan
- Interstate Bridge Replacement Program
- Fly By Night Timber Sale
- Conk Timber Sale
- JUB Engineering Quarry
- Pioneer Aggregates South Parcel Mine Expansion

Furthermore, according to the Washington State Department of Ecology (Ecology), smoke from wildfires is the largest source of air particulate pollution in Washington. In recent years, Washington has experienced extended smoke events from regional wildfires in the Pacific Northwest (Ecology n.d.). Although an increase in the number and size of wildfires could continue to contribute to the degradation of air quality, several state and local RFAs intend to improve fire resiliency of forests and natural habitats and thus could reduce the prevalence and intensity of these impacts. These RFAs include:

- Buckhorn Project
- Little White Salmon Forest Resiliency and Fire Risk Mitigation Project
- Cle Elum Ridge Large Landscape Project
- 4-0 Ranch Forest Restoration - Chief Joseph Wildlife Area

Other RFAs, such as those related to renewable energy generation and sustainable transportation, could reduce the long-term release of air pollutants due to the decrease in the overall use of fossil fuel power plants or single-passenger vehicle trips. These RFAs include:

- Goldendale Energy Project
- Horse Heaven Wind Farm
- East Link Extension
- Puget Sound Gateway Program

Cumulative Impact Determination: The cumulative impact on air quality would depend on the size, scale, and timing of a project-specific application in combination with RFAs within the geographic setting and timing. Adverse impacts on air quality are primarily associated with construction activities, and the duration of these impacts would be short term. Furthermore, significant adverse impacts would be minimized with the implementation of general conditions, avoidance criteria, and mitigation measures. The construction, operation and maintenance, and upgrade or modification of transmission facilities would not be likely to contribute to a probable significant cumulative adverse impact on air quality.

4.3.4.3 Water Resources

The construction of transmission facilities could impact water quality and quality. Temporary water diversions, altered hydrology, and the increased use of water for construction activities, such as concrete mixing and dust control, can impact water availability. If not managed properly, increased soil erosion and sediment transport from erodible sources, such as blasting sites and soil stockpiles, can increase the concentration of suspended solids and sedimentation in surface waterbodies. Additionally, transmission facility infrastructure or construction sites could be damaged due to inundation during a flood event or storm surge. Transmission facility development would be required to comply with current water quality regulatory requirements and BMPs. Additionally, mitigation measures identified in this Draft Programmatic EIS would further minimize potential significant adverse impacts on water quality and quantity.

Cumulative impacts from RFAs could also affect water resources. RFAs related to energy generation and transmission, community growth, forestry, mining, agriculture, and land and water-based transportation, could contribute to both direct and indirect adverse cumulative impacts on water resources. Direct impacts could include increased water usage, temporary water diversions, groundwater extraction, and altered hydrology. Indirect impacts could include increased impervious areas, resulting in soil erosion and sediment transport, which could have adverse impacts on water quality. These RFAs include, but are not limited to:

- Horse Heaven Wind Farm
- Hop Hills Solar Energy Project
- Cascade Renewable Transmission Project
- Shelton-Fairmount No. 1 Transmission Line Rebuild
- Wallula Gap Business Park
- Bullfrog Flats Development
- Fly by Night Timber Sale
- Conk Timber Sale
- JUB Engineering Quarry
- Pioneer Aggregates South Parcel Mine Expansion
- Flying A Land Rezone
- US Golden Farm Irrigation Pond
- I-405/Renton to Bellevue Widening and Express Toll Lanes Project

- I-90 - Snoqualmie Pass East Project (Phase 3)
- Lower Columbia River Maintenance Plan
- Interstate Bridge Replacement Program

Although the RFAs identified above could contribute to adverse cumulative impacts, there are other RFAs, such as those related to water resources, recreation, and wildlife and habitat conservation, that could have a beneficial cumulative impact on water resources. These RFAs could improve aquifer recharge, water availability, and reliability and restore river and floodplain processes. RFAs with potential beneficial impacts on water resources could include the following:

- Odessa Groundwater Replacement Program EL 86.4 On-Farm Project
- Trafton Floodplain Restoration
- Miller Peninsula State Park Property Planning
- Flora Park and Cross Country Course (Phase 2)
- Scroggie Canyon
- Wenas Watershed/Miracle Mile

Cumulative Impact Determination: The cumulative impact on water resources would depend on the size, scale, and timing of a project-specific application in combination with RFAs within the geographic setting and timing. Adverse impacts on water resources are primarily associated with construction activities. Adverse impacts would be localized, and the duration of these impacts would be short-term. Furthermore, significant adverse impacts would be minimized with the implementation of general conditions, avoidance criteria, and mitigation measures. The construction, operation and maintenance, and upgrade or modification of transmission facilities would not be likely to contribute to a probable significant cumulative adverse impact on water resources.

4.3.4.4 Vegetation

The construction of transmission facilities would require vegetation clearing for permanent structure placement, access and maintenance roads, rights-of-way (ROWs), and substations. Underground transmission facilities may require more grubbing and excavation to facilitate construction than overhead transmission facilities. Following construction, some vegetative communities may be compatible with restoration objectives in the transmission ROWs, such as grasslands; however, deep-rooted species would be incompatible with underground facilities, and tall shrub and tree-dominated ecosystems would be incompatible with overhead facilities.

Indirect impacts on vegetation may result from the spread of invasive plants, sedimentation, dust, accidental spill of hazardous material, and use of herbicides. These impacts could extend beyond the active construction or maintenance site into adjacent areas, resulting in degradation of adjacent ecosystems. Additionally, construction of transmission facilities could create new fragmentation on the vegetative landscape, increasing edge effects where ecosystems were previously intact. Creating new transmission ROW through natural ecosystems is expected to result in long-term ecological changes by dividing larger vegetation patches into smaller, fragmented habitats.

Other RFAs throughout the state, such as those related to community growth, energy generation and transmission, forestry, mining, and transportation, could contribute to cumulative impacts on vegetation. These RFAs could result in direct and indirect impacts similar to those described above for transmission facilities. Many development projects require vegetation clearing for construction and have the potential to spread invasive plants, increase sedimentation, and use herbicides for maintenance. Such RFAs include, but are not limited to, the following:

- Wallula Gap Business Park
- Bullfrog Flats Development
- Horse Heaven Wind Farm
- Hops Hills Solar Energy Project
- Shelton-Fairmount No. 1 Transmission Line Rebuild Project
- Wanapum to Mountain View
- Fly By Night Timber Sale
- Conk Timber Sale
- JUB Engineering Quarry
- Pioneer Aggregates South Parcel Mine Expansion
- I-405/SR 167 Corridor Program
- I-405/Renton to Bellevue Widening and Express Toll Lanes Project

However, some RFAs focused on conservation and habitat restoration may have beneficial impacts on vegetation by restoring, expanding, or creating new recreation and conservation areas. In some instances, these RFAs could still contribute to adverse cumulative impacts on vegetation as a result of construction-related activities. However, they would generally result in beneficial cumulative impacts on vegetation. These RFAs include, but are not limited to the following:

- Make Beacon Hill Public – Phase 2
- Sky Valley Sportsman’s Park
- Cedar River Municipal Watershed Forest Management Plan
- Duckabush Estuary Restoration Project
- Tonata-Trout Project
- Scroggie Canyon

Cumulative Impact Determination: The cumulative impact on vegetation would depend on the size, scale, and timing of a project-specific application in combination with RFAs within the geographic setting and timing. Adverse impacts on vegetation would be minimized through the implementation of general conditions, avoidance criteria, and mitigation measures. However, despite efforts to minimize adverse impacts, the long-term incremental loss and impacts on vegetation from the construction, operation and maintenance, and upgrade or modification of transmission facilities would likely contribute to probable significant cumulative adverse impacts.

4.3.4.5 Habitat, Wildlife, and Fish

The construction, operation and maintenance, and upgrade or modification of transmission facilities could impact habitat, wildlife, and fish resources in several ways. Adverse impacts on habitat, wildlife, and fish can include direct and indirect habitat loss, mortality, barriers to wildlife movement, and habitat fragmentation.

Direct habitat loss could occur as a result of clearing and grubbing for the construction and development of transmission facilities. Direct habitat loss is expected to be more pronounced in the western portion of the state, in ecoregions such as the Coast Range, Puget Lowland, Cascades, North Cascades, Eastern Cascade Slopes and Foothills, and Northern Rockies. Naturally open ecosystems generally found in central and eastern Washington in the Columbia Plateau ecoregion and portions of the Blue Mountain ecoregion are likely to be less impacted by direct habitat loss because portions of these habitats can be spanned by transmission lines. Direct habitat loss could impact many different wildlife groups, including birds, mammals, amphibians and reptiles, invertebrates, fish, and special status species. Direct habitat removal, either temporary or permanent, may have a greater impact on special status species due to their already limited or fragmented habitat. Furthermore, special status species are also vulnerable to loss or changes of important features in their ranges required for denning, nesting, or foraging (WDFW 2015).

Indirect habitat loss could occur as a result of a change in habitat quality or perceived change associated with the development of a project. Transmission facility development could require clearing forests or portions of a forest for ROW or access roads. This activity would create a new forest edge that can change light regimes and changes in exposure to wind, thereby affecting soil conditions and vegetation composition, and ultimately, habitat quality. Indirect impacts on habitat, wildlife, and fish could result from construction-related noise, light, increased human presence and vehicle traffic, the spread of invasive species, or structures in the landscape that change wildlife movement or behavior.

Transmission facility development could create both physical and perceived barriers to wildlife movement. Physical barriers, such as construction fencing, sediment and erosion control measures, and material laydowns, would be removed at the end of the construction phase. However, permanent barriers could include fencing, roads, vehicle traffic, and overhead transmission facilities. Furthermore, transmission facility development could result in the loss of habitat and microhabitat features that support important linkages between habitats that are used by wildlife, resulting in habitat fragmentation and barriers to movement. Similar to loss of other habitat types, conversion of treed habitat to low-growing or no vegetation near transmission facilities could be considered a loss of habitat for species that will not use open habitat for movement.

Vegetation clearing and grubbing would likely pose the greatest risk for wildlife mortality. Wildlife-vehicle collisions could also occur when wildlife crosses roads to access habitat patches. The operation of overhead transmission facilities is the primary cause of electrocution and collisions of wildlife, particularly for aerial species such as birds and bats. Wildlife mortality could also occur through changes in predator-prey dynamics and collisions with maintenance equipment and vehicles. Risk of wildlife mortality during the operation and maintenance of an underground transmission line system is expected to be limited to vehicle strikes and crushing during line maintenance.

Cumulative impacts from RFAs could also affect earth resources. Many other RFAs identified in **Table 4-1** could also contribute to cumulative impacts on habitat, wildlife, and fish. RFAs such as those related to community growth, energy generation and transmission, forestry, mining, and land- and water-based transportation could result in direct and indirect impacts related to habitat loss, mortality, barriers to wildlife movement, and habitat fragmentation. Specifically, RFAs include, but are not limited to, the following:

- Bullfrog Flats Development
- Mission Ridge Expansion
- Horse Heaven Wind Farm
- Hop Hills Solar Energy Project
- Cascade Renewable Transmission Project
- Wanapum to Mountain View
- Fly By Night Timber Sale
- Conk Timber Sale
- JUB Engineering Quarry
- Pioneer Aggregates South Parcel Mine Expansion
- I-405/SR 167 Corridor Program
- North Spokane Corridor
- Lower Columbia River Maintenance Plan
- SR 520 Montlake Project

A number of RFAs throughout the state are anticipated to improve conditions or conserve habitat for wildlife. These RFAs include new or expanded conservation areas, removal of fish barriers, forest management areas, and restoration areas. Although some of these RFAs could result in temporary construction-related impacts, they are anticipated to have an overall beneficial cumulative impact on habitat, wildlife, and fish. These RFAs include, but are not limited to, the following:

- Hoffstadt Hills
- Scroggie Canyon
- US 101 - SR 109 Grays Harbor, Jefferson, and Clallam Counties - Remove Fish Barriers
- I-90 – Lewis, W. Village Park, Schneider Creeks – fish passage projects
- Cedar River Municipal Watershed Forest Management Plan
- Little White Salmon Forest Resiliency and Fire Risk Mitigation Project

- Trafton Floodplain Restoration
- Duckabush Estuary Restoration Project

Cumulative Impact Determination: The cumulative impact on habitat, wildlife, and fish would depend on the size, scale, and timing of a project-specific application in combination with RFAs within the geographic setting and timing. Adverse impacts on habitat, wildlife, and fish would be minimized with the implementation of general conditions, avoidance criteria, and mitigation measures. However, despite efforts to minimize adverse impacts on habitat, wildlife, and fish, the long-term incremental loss and impacts from the construction, operation and maintenance, and upgrade or modification of transmission facilities would likely contribute to probable significant cumulative adverse impacts.

4.3.4.6 Energy and Natural Resources

Development of transmission facilities would result in the consumption of non-renewable and renewable resources, including metal, aggregate, concrete, fuel, oil, water, and electricity. As described in Section 3.7, Energy and Natural Resources, the construction of underground transmission facilities would generally require more raw materials than overhead transmission facilities. As a result of the raw materials being globally abundant and available, the changes are not anticipated to hinder supply chains or the management and distribution of natural resources. Transmission facilities could also improve the reliability and service of electricity resources, which would have a beneficial impact on energy resources.

Other RFAs may increase or decrease overall adverse cumulative impacts on energy and natural resources. RFAs related to community growth, energy generation and transmission, and land- and water-based transportation would likely require large quantities of renewable and non-renewable resources for construction, including aggregate, concrete, fuel, oil, water, and electricity for construction and operation. These RFAs would decrease or limit the available amount of energy and natural resources, depending on the size and timing. Such RFAs may include:

- Wallula Gap Business Park
- Bullfrog Flats Development
- Horse Heaven Wind Farm
- Hops Hills Solar Energy Project
- Cascade Renewable Transmission Project
- Wanapum to Mountain View
- I-405/SR 167 Corridor Program
- I-405/Renton to Bellevue Widening and Express Toll Lanes Project
- Lower Columbia River Maintenance Plan
- SR 520 Montlake Project

Other RFAs such as expanded, improved, or new energy facilities, water resources, mining, and forestry projects could increase the available amount of renewable and non-renewable resources. Although these RFAs could increase available resources for consumption, they would likely still require fuel, water, electricity, and aggregates for construction and maintenance. RFAs that could contribute to beneficial cumulative impacts on energy and natural resources include:

- Goldendale Energy Project
- Horse Heaven Wind Farm
- Cedar River Municipal Watershed Forest Management Plan
- Trafton Floodplain Restoration
- JUB Engineering Quarry
- Pioneer Aggregates South Parcel Mine Expansion
- Fly By Night Timber Sale
- Conk Timber Sale

Cumulative Impact Determination: The cumulative impact on energy and natural resources would depend on the size, scale, and timing of a project-specific application in combination with RFAs within the geographic setting and timing. Adverse impacts on energy and natural resources are primarily associated with construction activities, and the duration of these impacts would be short-term. Furthermore, adverse impacts would be minimized with the implementation of general conditions, avoidance criteria, and mitigation measures. The construction, operation and maintenance, and upgrade or modification of transmission facilities would not be likely to contribute to a probable significant cumulative adverse impact on energy and natural resources.

4.3.4.7 Public Health and Safety

Transmission facility development has the potential to impact public health and safety in several ways. Adverse impacts could result from increases in potential occupational injuries during construction, maintenance, and/or upgrade or modification activities. Other potentially adverse impacts could include increased risk of fires and power outages; the generation or release of solid, hazardous, and toxic materials and waste; and exposure to electromagnetic fields (EMF). Additionally, impacts could result from the leakage of insulating fluids, excess heat generation, and inundation of vaults located in floodplains. Transmission facility development would be required to comply with current design standards, and applicable laws and regulations regarding hazardous waste and occupational safety, which would reduce these adverse impacts to some extent but not completely eliminate them.

Adverse and beneficial cumulative impacts on public health and safety could result from other RFAs, depending on the nature of the RFA. RFAs identified in **Table 4.2-1**, including those related to community growth, energy generation and transmission, land- and water-based transportation, forestry, mining, agriculture, and water resources, have the potential to contribute to adverse cumulative impacts on public health and safety. These RFAs could result in impacts on public health and safety similar to those identified for the Action Alternative. RFAs that have the potential to contribute to adverse cumulative impacts on public health and safety include, but are not limited to:

- Wallula Gap Business Park
- Bullfrog Flats Development
- Horse Heaven Wind Farm
- Hop Hills Solar Energy Project
- Cascade Renewable Transmission Project
- Shelton-Fairmount No. 1 Transmission Line Rebuild Project
- I-405/SR 167 Corridor Program
- I-405/Renton to Bellevue Widening and Express Toll Lanes Project
- Interstate Bridge Replacement Program
- SR 520 Montlake Project
- Fly By Night Timber Sale
- Klondike Timber Sale
- JUB Engineering Quarry
- Pioneer Aggregates South Parcel Mine Expansion
- Swift Creek Poultry Farm
- Jungquist Farms Depth of Cover
- Chehalis River Basin Flood Damage Reduction Project
- Eightmile Dam Rebuild and Restoration

Beneficial impacts on public health and safety could result from improved electricity service and reliability from energy-generating and transmission projects, such as:

- Goldendale Energy Project
- Horse Heaven Wind Farm
- Cascade Renewable Transmission Project
- Shelton-Fairmount No. 1 Transmission Line Rebuild Project

Cumulative Impact Determination: The cumulative impact on public health and safety would depend on the size, scale, and timing of a project-specific application in combination with RFAs within the geographic setting and timing. Adverse impacts on public health and safety would be localized, and the duration of these impacts would be short-term. Adverse impacts on public health and safety would be minimized with the implementation of general conditions, avoidance criteria, and mitigation measures. The construction, operation and maintenance, and upgrade or modification of transmission facilities would not be likely to contribute to a probable significant cumulative adverse impact on public health and safety.

4.3.4.8 Land and Shoreline Use

The construction, operation and maintenance, and upgrade or modification of transmission facilities could impact land and shoreline uses in several ways. Adverse impacts could result from being incompatible with or convert land uses on site or those adjacent to the project—particularly, military and civilian airfields, shorelines, agricultural lands, and natural resource lands. Other adverse impacts could result from being inconsistent with planning documents and programs, damaging agricultural lands, restricting crop types, and presenting obstacles for natural resource operations or activities.

Cumulative impacts from RFAs related to community growth, energy generation and transmission, and agriculture are likely to have the greatest adverse cumulative impact on land and shoreline uses across the state. These RFAs include, but are not limited to, the following:

- Wallula Gap Business Park
- Copperstone Planned Development
- Hop Hills Solar Energy Project
- Wautoma Solar Energy Project
- Cascade Renewable Transmission Project
- Shelton-Fairmount No. 1 Transmission Line Rebuild Project
- Flying A Land Rezone
- Kang/Nazarene Church/Lange Rezone

A number of RFAs throughout the state intend to address and preserve critical areas and land use, including those related to water resources and wildlife and habitat conservation, and thus could contribute beneficial cumulative impacts. These RFAs may include, but are not limited to, the following:

- Cedar River Municipal Watershed Forest Management Plan
- Trafton Floodplain Restoration
- Tonata-Trout Project
- Little White Salmon Forest Resiliency and Fire Risk Mitigation Project

Cumulative Impact Determination: The cumulative impact on land and shoreline use would depend on the size, scale, and timing of a project-specific application in combination with RFAs within the geographic setting and timing. Adverse impacts on land and shoreline use would be minimized with the implementation of general conditions, avoidance criteria, and mitigation measures. However, despite efforts to minimize adverse impacts on land and shoreline use, the long-term incremental loss and impacts from the construction, operation and maintenance, and upgrade or modification of transmission facilities would likely contribute to a probable significant cumulative adverse impact on land and shoreline use.

4.3.4.9 Transportation

The construction of transmission facilities could have temporary and permanent adverse impacts on vehicular, waterborne, rail, and air traffic. Construction activities could require temporary closures or detours of roads and navigable waterways resulting in delays and increased vehicular congestion. Construction activities near rail lines or airfields could lead to temporary disruptions and delays for passengers and operators. Operation of overhead transmission facilities could generate EMF that may interfere with communication systems associated with waterborne vessels, railroads, and aircraft. However, mitigation measures outlined in this Draft Programmatic EIS would be implemented as part of project-level applications to minimize significant adverse impacts.

Other RFAs with overlapping construction timeframes and that are within the vicinity of a transmission facility project may cumulatively contribute to transportation impacts. Construction activities related to land- and water-based transportation, community growth, energy generation and transmission, and forestry are anticipated to have the greatest potential for contributing to adverse cumulative impacts on transportation. These RFAs would likely require road closures, detours, delays, and/or increased congestion on roadways. Cumulatively contributing RFAs include, but are not limited to:

- I-405/SR 167 Corridor Program
- I-405/Renton to Bellevue Widening and Express Toll Lanes Project
- Lower Columbia River Maintenance Plan
- Interstate Bridge Replacement Program
- Bullfrog Flats Development
- FRED310 Industrial Development
- Horse Heaven Wind Farm
- Hop Hills Solar Energy Project
- Shelton-Fairmount No. 1 Transmission Line Rebuild Project
- Puget Sound Energy - Underground Electric Cable Replacement Program
- Fly By Night Timber Sale
- Conk Timber Sale

Cumulative Impact Determination: The cumulative impact on transportation would depend on the size, scale, and timing of a project-specific application in combination with RFAs within the geographic setting and timing. Adverse impacts on transportation are primarily associated with construction. Adverse impacts would be localized, and the duration of these impacts would be short-term. Furthermore, adverse impacts would be minimized with the implementation of general conditions, avoidance criteria, and mitigation measures. The construction, operation and maintenance, and upgrade or modification of transmission facilities would not be likely to contribute to a probable significant cumulative impact on transportation.

4.3.4.10 Public Services and Utilities

Development of transmission facilities could impact public services and utilities in a variety of ways. Adverse impacts could include creating conflicts with existing utilities and obstacles for emergency responders, increasing the demand for emergency responders, increasing solid waste production and water demand, and increasing the risk of power outages at public service facilities. A beneficial impact of transmission facility development could include improved electricity service and reliability.

Cumulative impacts from RFAs could also affect public services and utilities. Several energy-generating and transmission facility RFAs were identified that could have a cumulatively beneficial impact on electricity service and reliability across the state. These RFAs include the following:

- Goldendale Energy Project
- Horse Heaven Wind Farm
- Cascade Renewable Transmission Project
- Shelton-Fairmount No. 1 Transmission Line Rebuild Project

In addition, several wildlife and habitat conservation RFAs were identified that could reduce the demand for emergency responders, particularly fire protection services. These RFAs may include the following:

- Little White Salmon Forest Resiliency and Fire Risk Mitigation Project
- Cle Elum Ridge Large Landscape Project

Although there is a statewide emphasis on improving electricity service and reliability, other RFAs could have an adverse impact on public services and utilities. RFAs related to community growth and land- and water-based transportation are likely to have the greatest adverse impact on public services and utilities. Impacts from these RFAs would likely result in an increased demand in utilities and public services, as well as increased emergency response service times. RFAs that may contribute to an adverse cumulative impact on public services and utilities include, but are not limited to, the following:

- Bullfrog Flats Development
- Mission Ridge Expansion
- I-405/SR 167 Corridor Program
- I-405/Renton to Bellevue Widening and Express Toll Lanes Project
- Interstate Bridge Replacement Program
- SR 520 Montlake Project

Cumulative Impact Determination: The cumulative impact on public services and utilities would depend on the size, scale, and timing of a project-specific application in combination with RFAs within the geographic setting and timing. Adverse impacts on public services and utilities are primarily associated with construction activities, and the duration of these impacts would be short-term. Furthermore, adverse impacts would be minimized with the implementation of general conditions, avoidance criteria, and mitigation measures. The construction, operation and maintenance, and upgrade or modification of transmission facilities would not be likely to contribute to a probable significant cumulative adverse impact on public services and utilities.

4.3.4.11 Visual Quality

The construction, operation and maintenance, or upgrade or modification of transmission facilities could degrade existing natural landscapes and scenic resources, as well as introduce new sources of light and glare. During construction, site preparation could include vegetation clearing and grubbing, as well as earthwork and grading that may alter natural topographic variations. The impact of natural vegetation removal may be visually prominent, especially in forested areas where the clearing of the linear ROW corridor may be conspicuous. Construction also has the potential to temporarily introduce lighting related to the transportation of materials and equipment to the project site that may occur at night.

Development of transmission facilities generally requires large, permanently cleared corridors, which could pass through forests, fields, and other natural areas. This can disrupt the visual continuity of the landscape and detract from the natural character of the area. The presence of tall towers and extensive wiring from overhead transmission facilities can also alter the scenic quality of previously undisturbed or minimally impacted areas. Additionally, the large size of transmission towers, combined with their strongly vertical form and their angular geometry, may contrast strongly with the character of nearby rural landscapes, as well as residential communities.

Many RFAs identified in **Table 4.2-1** could contribute to adverse cumulative impacts on visual quality. Most development RFAs would modify the existing landscape character from construction through operation and maintenance. Construction of RFAs could degrade the existing visual setting through the introduction of equipment, materials, and lighting. Operation of RFAs could result in permanent impacts on the visual landscape, contributing to an overall adverse cumulative impact on the visual quality of the state. These RFAs include:

- Wallula Gap Business Park
- Mission Ridge Expansion
- Horse Heaven Wind Farm
- Desert Claim Wind Power Project
- I-405/SR 167 Corridor Program
- I-405/Renton to Bellevue Widening and Express Toll Lanes Project
- Interstate Bridge Replacement Program
- SR 520 Montlake Project

Cumulative Impact Determination: The cumulative impact on visual quality would depend on the size, scale, and timing of a project-specific application in combination with RFAs within the geographic setting and timing. Adverse impacts on visual quality would be minimized with the implementation of general conditions, avoidance criteria, and mitigation measures. However, despite efforts to minimize adverse impacts on visual quality, the long-term incremental impacts on visual quality from the construction, operation and maintenance, and upgrade or modification of transmission facilities would likely contribute to probable significant cumulative adverse impacts.

4.3.4.12 Noise and Vibration

The construction, operation and maintenance, and upgrade or modification of transmission facilities could result in adverse impacts related to noise and vibration. Construction activities would require the use of construction equipment similar to that used during typical public works projects; however, some atypical sources of noise may include blasting and rock breaking, implosive devices used during conductor stringing, and helicopter operations. These activities could result in increased noise at sensitive receptors and ground-borne vibration. Operational noise from overhead transmission facilities could result from corona discharge and new substations. Underground transmission facilities would result in similar impacts, except there would be no operational noise impacts. Significant adverse impacts resulting from the development of transmission facilities would be minimized with the implementation of established state and local government noise limits, and mitigation measures identified in Section 3.13, Noise and Vibration.

Other RFAs could also create new or additive sources of noise and vibration. Noise and vibration could result from RFAs related to community growth, energy generation and transmission, transportation (terrestrial and water-related), forestry, and mining. RFAs that could result in noise and vibration impacts include, but are not limited to, the following:

- Copperstone Planned Development
- Mission Ridge Expansion
- Horse Heaven Wind Farm
- Hop Hills Solar Energy Project
- Puget Sound Energy - Underground Electric Cable Replacement Program
- Energize Eastside
- East Link Extension
- Puget Sound Gateway Program
- Interstate Bridge Replacement Program
- SR 520 Portage Bay Bridge and Roanoke Lid Project
- Portrait Timber Sale
- Forest Practice Application #3027124
- JUB Engineering Quarry
- Pioneer Aggregates South Parcel Mine Expansion

Cumulative Impact Determination: The cumulative impact on noise and vibration would depend on the size, scale, and timing of a project-specific application in combination with RFAs within the geographic setting and timing. Adverse impacts on noise and vibration are primarily associated with construction. Adverse impacts would be localized, and the duration of these impacts would be short-term. Furthermore, adverse impacts would be minimized with the implementation of general conditions, avoidance criteria, and mitigation measures. The construction, operation and maintenance, and upgrade or modification of transmission facilities would not be likely to contribute to a probable significant cumulative impact on noise and vibration.

4.3.4.13 Recreation

The construction, operation and maintenance, or upgrade or modification of transmission facilities may adversely impact recreational resources in several ways. Adverse impacts could include temporary or permanent closures or restricted access to recreational areas, adverse changes to the quality of the recreational experience, adverse impacts on the integrity of the recreational resource, and an increase in health and safety risks for recreational users.

Overlapping impacts from RFAs could contribute to adverse cumulative impacts on recreational resources. A variety of RFAs may have adverse cumulative impacts on recreational resources, including community growth, land- and water-based transportation, and energy generation and transmission. These RFAs include, but are not limited to, the following:

- Bullfrog Flats Development
- Mission Ridge Expansion
- I-405/SR 167 Corridor Program
- I-405/Renton to Bellevue Widening and Express Toll Lanes Project
- Lower Columbia River Maintenance Plan
- Interstate Bridge Replacement Program
- Horse Heaven Wind Farm
- Hop Hills Solar Energy Project
- Wanapum to Mountain View
- Shelton-Fairmount No. 1 Transmission Line Rebuild Project

Other RFAs are intended to improve or increase recreational opportunities. Additionally, a number of RFAs are anticipated to improve the quality or conditions for recreational activities, such as fishing, hunting, camping, and hiking. These RFAs include those related to recreation, water resources, and wildlife and habitat conservation. RFAs include, but are not limited to, the following:

- Miller Peninsula State Park Property Planning
- Flora Park and Cross Country Course (Phase 2)
- US 101 - SR 109 Grays Harbor, Jefferson, and Clallam Counties - Remove Fish Barriers

- I-90 – Lewis, W. Village Park, Schneider Creeks – fish passage projects
- Tonata-Trout Project
- Scroggie Canyon

Cumulative Impact Determination: The cumulative impact on recreational resources would depend on the size, scale, and timing of a project-specific application in combination with RFAs within the geographic setting and timing. Adverse impacts on recreational resources would be minimized with the implementation of general conditions, avoidance criteria, and mitigation measures. However, despite efforts to minimize adverse impacts on recreational resources, it is expected that the long-term incremental impacts on recreational resources from the construction, operation and maintenance, and upgrade or modification of transmission facilities would likely contribute to probable significant cumulative adverse impacts.

4.3.4.14 Cultural and Historic Resources

The construction of transmission facilities could impact historic and cultural resources in two primary ways: physically and visually. Construction could physically or visually damage or destroy resources or elements that contribute to historic properties, including historic districts, National Historic Landmarks, farmsteads, landscapes, historic trails/byways, Tribal resources, archaeological sites, and Traditional Cultural Places. Furthermore, loss of vegetation and construction of transmission facilities within the boundaries of National Historic Landmarks or properties listed on the National Register of Historic Properties can visually impact these resources if setting is an important aspect of the historic property’s integrity. Overall, adverse visual impacts on historic resources during construction of underground transmission facilities would be far less than for overhead transmission facilities. However, adverse physical impacts from ground disturbance for construction of conduits and vaults related to underground facilities would be greater than for aboveground transmission lines. Adverse physical impacts from ground-disturbing activities, including access roads and staging areas, would be similar to impacts for aboveground transmission lines.

Other RFAs in the Study Area identified in **Table 4.2-1** could contribute to cumulative impacts on cultural and historic resources. Community growth, land- and water-based transportation, energy generation and transmission, and mining-related RFAS could result in impacts similar to those of the Action Alternative. Adverse cumulative impacts from RFAs may affect the location, setting, feeling, and/or association of historic and cultural resources, resulting in a potential loss of the integrity of these resources. RFAs include, but are not limited to, the following:

- Wallula Gap Business Park
- Bullfrog Flats Development
- I-405/SR 167 Corridor Program
- Puget Sound Gateway Program
- Replacement of Granite Falls Bridge #102
- SR 520 Montlake Project
- Horse Heaven Wind Farm

- Hop Hills Solar Energy Project
- Shelton-Fairmount No. 1 Transmission Line Rebuild Project
- Wanapum to Mountain View
- Chelatchie Bluff Surface Mine Overlay Annual Review
- Pioneer Aggregates South Parcel Mine Expansion

Cumulative Impact Determination: The cumulative impact on historic and cultural resources would depend on the size, scale, and timing of a project-specific application in combination with RFAs within the geographic setting and timing. Adverse impacts on historic and cultural resources would be minimized with the implementation of general conditions, avoidance criteria, and mitigation measures. However, despite efforts to minimize adverse impacts on historic and cultural resources, the long-term incremental loss and impacts on historic and cultural resources from the construction, operation and maintenance, and upgrade or modification of transmission facilities would likely contribute to probable significant cumulative adverse impacts.

4.3.4.15 Socioeconomics

Transmission facility development could impact socioeconomics and environmental justice communities, including both urban and rural people of color populations, low-income populations, and overburdened communities, in a variety of ways. Adverse impacts could include increased noise and air pollutant levels, restricted access to land resources and recreational areas, new sources of noise that disrupt and affect educational performance, and decreased available housing. Additionally, overhead transmission facilities could create adverse impacts on visual quality that result in decreased property values. Beneficial impacts from the development of transmission facilities could include enhanced fiscal conditions, improved reliability of electricity, and increased employment opportunities.

Many other RFAs identified in **Table 4.2-1** could contribute to cumulative impacts on socioeconomics and environmental justice communities, including those related to community growth, energy generation and transmission, transportation, mining, forestry, and agriculture. These RFAs are anticipated to result in impacts similar to those of the Action Alternative, such as increasing noise and air pollutants during construction, requiring road closures or detours, and having adverse impacts on the visual quality of the surrounding respective project area. RFAs that could contribute to adverse cumulative impacts include, but are not limited to, the following:

- Wallula Gap Business Park
- Bullfrog Flats Development
- Horse Heaven Wind Farm
- Hop Hills Solar Energy Project
- Shelton-Fairmount No. 1 Transmission Line Rebuild Project
- Wanapum to Mountain View
- I-405/SR 167 Corridor Program

- I-405/Renton to Bellevue Widening and Express Toll Lanes Project
- JUB Engineering Quarry
- Pioneer Aggregates South Parcel Mine Expansion
- Fly By Night Timber Sale
- Conk Timber Sale
- Swift Creek Poultry Farm
- Jungquist Farms Depth of Cover

Additionally, some RFAs related to energy generation and transmission, transportation (terrestrial and water-related), and recreation could have beneficial cumulative impacts on socioeconomics and environmental justice. Energy generation and transmission RFAs could provide more renewable and reliable electric power. For example, transportation improvement RFAs and recreation-related RFAs could improve the quality of life for environmental justice communities by decreasing long-term commuting times and providing access to more recreational facilities. These RFAs include, but are not limited to, the following:

- Goldendale Energy Project
- Horse Heaven Wind Farm
- I-405/SR 167 Corridor Program
- East Link Extension
- SR 520 Portage Bay Bridge and Roanoke Lid Project
- SR 520 Montlake Project
- Cascade Renewable Transmission Project
- Shelton-Fairmount No. 1 Transmission Line Rebuild Project
- Make Beacon Hill Public – Phase 2
- Flora Park and Cross Country Course (Phase 2)

Cumulative Impact Determination: The cumulative impact on socioeconomics and environmental justice communities would depend on the size, scale, and timing of a project-specific application in combination with RFAs within the geographic setting and timing. Adverse impacts on socioeconomics and environmental justice communities would be minimized with the implementation of general conditions, avoidance criteria, and mitigation measures. However, despite efforts to minimize adverse impacts on socioeconomics and environmental justice communities, it is expected that the long-term adverse impacts from the construction, operation and maintenance, and upgrade or modification of transmission facilities would likely contribute to probable significant cumulative adverse impacts.

4.4 Summary of Findings

As described in the preceding sections, this Draft Programmatic EIS considers the potential cumulative effects of the Action Alternative. **Table 4.4-1** summarizes the potential cumulative impacts of the Action Alternative in combination with other present projects and RFAs across the state. As outlined in General Condition Gen-7 – Cumulative Impact Assessment, the SEPA Lead Agency for project-specific applications would be required to analyze cumulative adverse impacts, identify appropriate mitigation measures, and determine significance based on the physical setting of the site-specific project.

Table 4.4-1: Summary of Potential Cumulative Impacts

Element of the Environment	Activities Associated with a Potential Cumulative Impact	Associated Potential Cumulative Impact	Probable Significant Cumulative Adverse Impact?
Earth Resources	• Grading • Removing vegetation • Excavating • Building access roads • Siting and constructing transmission facilities in geologically unstable areas	• Alteration of topography and drainage patterns • Increased soil erosion and/or accretion • Compaction of soil • Damage from a geological event or geohazard	No
Air Quality	• Grading • Removing vegetation • Excavating • Building access roads • Moving equipment and vehicles over unpaved surfaces • Disrupting soils susceptible to erosion • Using portable generators, heavy equipment, and concrete batch plants • Installing and handling gas-insulated switchgear and other electrical equipment that use SF_6	• Increased fugitive dust emissions • Increased emissions from fuel-burning equipment • Increased SF_6 emissions	No
Water Resources	• Creating temporary water diversions • Altering hydrology patterns • Using water for construction activities, such as concrete mixing and dust control • Increasing soil erosion and sediment transport due to construction activities • Flooding or storm surges	• Impacts on water quality, including: o Changes in sedimentation o Changes in water chemistry • Impacts on water quantity, including: o Increased water usage o Altered hydrology o Temporary water diversions o Groundwater extraction • Damage to infrastructure	No
Vegetation	• Removing vegetation • Building new access or maintenance roads • Creating new ROWs • Spreading invasive species • Increasing sedimentation or dust due to construction activities	• Direct impacts and mortality, including: o Loss of habitat o Loss of species or populations o Loss of ecosystem functionality • Indirect impacts, including: o Introduction or spread of invasive plants or noxious weeds	Yes

Element of the Environment	Activities Associated with a Potential Cumulative Impact	Associated Potential Cumulative Impact	Probable Significant Cumulative Adverse Impact?
	• Using herbicides • Accidentally spilling hazardous materials	o Surface runoff o Deposition of dust o Introduction of hazardous substances • Fragmentation	
Habitat, Wildlife, and Fish	• Grading • Removing vegetation • Excavating • Changes in vegetation composition, exposure to wind, soil conditions, noise levels, light regimes, and human presence • Increasing collisions with vehicles • Destructing nests/dens • Introducing nuisance or invasive species • Changes in water flow or quality • Constructing fences or sediment fences	• Direct habitat loss • Indirect habitat loss • Mortality of species • Barriers to movement • Fragmentation	Yes
Energy and Natural Resources	• Using resources such as metal, aggregate, concrete, fuel, and oil • Using resources such as land and water • Using resources such as electricity	• Consumption of non-renewable resources • Consumption of renewable resources • Consumption of energy	No
Public Health and Safety	• Handling motor vehicles and equipment • Increased exposure to extreme weather events • Working at extreme heights • Electricity-related risks such as electric shock • Increased exposure to hazardous substances • Conducting hot-work activities • Operating combustion engines and motor vehicles over vegetated areas • Generating EMF • Generating heat during the operation of underground transmission facilities • Flooding or storm surges	• Increase in accidents and injuries • Exposure to hazardous materials • Increased risk of wildfire • Exposure to EMF • Excess heat generation • Inundation of vaults in floodplains	No

Element of the Environment	Activities Associated with a Potential Cumulative Impact	Associated Potential Cumulative Impact	Probable Significant Cumulative Adverse Impact?
Land and Shoreline Use	• Being inconsistent with existing land uses • Being inconsistent with goals or policies in relevant planning and program documents • Interfering with natural resource operations, such as farming, due to equipment laydown and staging, and constructing access roads • Soil erosion and sedimentation due to clearing vegetation, constructing foundations and laying materials within or adjacent to shorelines • Siting and constructing overhead facilities within or close proximity to military utilized airspace and civilian airports	• Incompatible land use • Conflict with relevant goals and policies • Loss of function and value of shorelines • Loss of function and value of agricultural lands and rangelands • Conflicts with military utilized airspace and civilian airfield operations	Yes
Transportation	• Creating temporary road closures • Creating temporary detours • Constructing access roads • Moving heavy construction vehicles and equipment • Generating EMF	• Impacts on vehicular transportation and infrastructure, including: o Closures and diversions o Increased traffic and increased collision risk o Impacts from access road construction o Impacts on road authority • Impacts on waterborne vessels and infrastructure, including: o Closures and diversions o Increased collision risk o Impacts from infrastructure modification • Impacts on rail transportation and infrastructure, including: o Closures and diversions o Increased collision risk o Impacts on rail stability o Impacts from infrastructure modification	No

Element of the Environment	Activities Associated with a Potential Cumulative Impact	Associated Potential Cumulative Impact	Probable Significant Cumulative Adverse Impact?
		• Impacts on air transportation and infrastructure[7], including: o Impacts from airspace restrictions o Increased collision risk o Decreased visibility	
Public Services and Utilities	• Impacting existing utility infrastructure • Creating excess solid waste from excavating, clearing vegetation and soils, packing materials, etc. • Using water for dust or fire control, concrete mixing, and revegetation efforts • Increasing risks of fires, worker injuries, vehicular collisions, theft, vandalism, and trespassing • Creating temporary road closures, detours, and increased traffic	• Conflicts with existing utility infrastructure • Increased solid waste production • Increased water demand • Increased demand for fire protection services, law enforcement, and emergency responders • Increased emergency response times • Increased risk of power outages at public service facilities	No
Visual Quality	• Grading • Removing vegetation • Excavating • Open trenching for underground transmission facilities • Creating new ROW corridors • Building access roads, fencing, bridges, temporary laydown areas, turnaround areas, and watercourse crossings • Assembling foundations, structures, and substations • Transporting materials and equipment at night	• Degradation of scenic natural resources • Degradation of aesthetics • Degradation of night sky	Yes
Noise and Vibration	• Transporting materials and equipment • Staging materials • Assembling transmission structures and other project features • Constructing access roads • Increasing vehicle traffic from commuting workers and trucks • Blasting and rock breaking • Using implosive devices during conductor stringing	• Increased noise at sensitive receptors • Increased ground-borne vibration at off-site structures • Hearing loss	No

[7] Section 3.09, Land and Shoreline Use analyzes impacts on military utilized airspace and civilian airfield operations

Element of the Environment	Activities Associated with a Potential Cumulative Impact	Associated Potential Cumulative Impact	Probable Significant Cumulative Adverse Impact?
	• Using helicopter • Conducting open-trenching operations • Conducting horizontal directional drilling operations • Conducting trenchless crossing operations • Corona discharge		
Recreation	• Grading • Removing vegetation • Excavating • Open trenching for underground transmission facilities • Creating new ROW corridors for overhead and underground transmission facilities • Increasing publicity of recreational facilities • Using recreational facilities • Welding, vehicle ignition, and blasting	• Temporary closure or restricted access • Permanent closure • Increase in use • Change in integrity • Increased risk of wildfire	Yes
Cultural and Historic Resources	• Grading • Removing vegetation • Excavating • Compacting soils • Creating new ROW corridors for overhead and underground transmission facilities • Creating a modern intrusion • Replacing gates or fences for access roads • Collocating conduits on historic bridges	• Physical impacts on historic and cultural resources • Visual impacts on historic and cultural resources • Physical impacts on TCPs and Tribal resources • Visual impacts on TCPs and Tribal resources	Yes
Socioeconomics and Environmental Justice	• Grading • Removing vegetation • Excavating • Transporting materials and equipment • Staging materials • Assembling transmission structures and other project features • Creating an increase in fugitive dust emissions, emissions from fuel-burning equipment, and SF_6 emissions • Creating new ROW corridors	• Degradation of the natural and built environment, including: o Noise and vibration o Air quality o Visual quality o Land and shoreline use, and recreation • Changes in housing availability • Changes in home values • Changes in fiscal conditions and employment	Yes

Element of the Environment	Activities Associated with a Potential Cumulative Impact	Associated Potential Cumulative Impact	Probable Significant Cumulative Adverse Impact?
	• Constructing access roads • Blasting and rock breaking • Conducting open-trenching operations • Conducting horizontal directional drilling operations • Conducting trenchless crossing operations • Generating corona discharge • Generating EMF • Creating an influx of construction workers looking for temporary housing • Requiring land acquisitions that displace residents or housing units • Imposing a tariff for the additional cost of undergrounding a transmission facility • Creating temporary road closures • Creating temporary detours • Vehicle traffic from commuting workers and trucks • Creating an increase in employment opportunities • Increasing the earnings of workers and sole proprietors • Increasing tax revenue		

4.5 Phased Environmental Review for Cumulative Impacts

All applicants are required to apply general condition Gen-7 as part of their project-specific applications. This general condition requires applicants to prepare an updated RFA list based on the project-specific application, in coordination with the SEPA Lead Agency. The applicant would prepare the updated RFA list based on the geographic setting of the project-level application and the SEPA Lead Agency would consider the geographic setting for each element of the environment, as outlined in **Table 4.5-1**. More detail on the geographic settings provided in **Table 4.5-1** can be found in the respective resource section in Chapter 3. The SEPA Lead Agency would analyze cumulative adverse impacts, identify appropriate mitigation measures, and determine significance.

Table 4.5-1: Geographic Setting for Environmental Resources

Resource	Geographic Setting
Earth Resources	▪ Project Site and Immediate Vicinity ▪ Soil and Geology ▪ Seismic Hazards ▪ Previous Earthworks
Air Quality	▪ Project Site and Immediate Vicinity ▪ Air Basin
Water Resources	▪ Project Site and Immediate Vicinity ▪ Watershed and River Basins ▪ Wetlands and Floodplains ▪ Groundwater Aquifers
Vegetation	▪ Project Site and Immediate Vicinity ▪ A Local Study Area Surrounding the Project Site
Wildlife, Habitat, and Fish	▪ Project Site and Immediate Vicinity ▪ Protected Areas ▪ Aquatic Ecosystems ▪ Critical Habitat ▪ Sensitive Species Habitat ▪ Migration Corridors
Energy and Natural Resources	▪ Project Site and Immediate Vicinity ▪ Affected Geography
Public Health and Safety	▪ Project Site and Immediate Vicinity
Land and Shoreline Use	▪ Project Site and Immediate Vicinity ▪ Agriculture and Rangelands ▪ Shorelines ▪ Military Utilized Airspace and Civilian Airfields
Transportation	▪ Project Site and Immediate Vicinity ▪ Transportation corridors ▪ Transportation Infrastructure ▪ Airspace and Flight Paths ▪ Safety and Reliability
Public Services and Utilities	▪ Project Site and Immediate Vicinity ▪ Existing Utilities

Resource	**Geographic Setting**
Visual Quality	■ Project Site and Immediate Vicinity ■ Assessment Zone ■ Viewshed
Noise and Vibration	■ Project Site and Immediate Vicinity ■ Existing Noise Environment ■ Climate and Elevation
Recreation	■ Project Site and Immediate Vicinity ■ Viewshed
Historic and Cultural Resources	■ Project Site and Immediate Vicinity ■ Viewshed
Socioeconomics	■ Project Site and Immediate Vicinity ■ Vulnerable Populations and Overburdened Communities

5.0 CHAPTER 5 – CONSULTATION AND PUBLIC ENGAGEMENT

This chapter describes the public scoping efforts; government-to-government consultation; and agency cooperation, consultation, and coordination that helped support the development of the Draft Programmatic Environmental Impact Statement (EIS).

In defining the scope of nonproject review of electrical transmission facilities with a nominal voltage of 230 kilovolts or greater (transmission facilities), the Washington Energy Facility Site Evaluation Council (EFSEC) requested input from agencies, federally recognized Indian Tribes, industry partners, stakeholders, local governments, and the public.

5.1 Public Scoping

Public scoping was used to inform the scope and geographic areas analyzed for the siting of transmission facilities. The 30-day public scoping period for the Draft Programmatic EIS began when EFSEC sent the public scoping notice to Tribal governments, agencies, and interested parties on June 28, 2024.

5.1.1 Public Scoping Meetings

Public scoping meetings are an essential part of the environmental review process, particularly under the State Environmental Policy Act (SEPA). These meetings serve several important purposes, including the following:

- **Early Public Involvement:** Scoping meetings invite the public to participate early in the EIS process. This early involvement helps identify the range of issues and concerns that need to be addressed.
- **Defining the Scope:** The meetings help define the scope of the EIS by gathering input on the potential environmental impacts, alternatives, and mitigation measures that should be considered as well as the geographic extent.
- **Transparency and Communication:** Scoping meetings ensure transparency by providing information about the project and the EIS process. They also offer a platform for open communication between the public, industry partners, and regulatory agencies.
- **Public Input:** These meetings provide an opportunity for the public to voice their opinions, ask questions, and submit written comments. This input is crucial for ensuring that the EIS addresses all relevant concerns and reflects the community's interests.
- **Regulatory Compliance:** Holding public scoping meetings is a requirement under SEPA. It ensures that the environmental review process complies with legal standards and incorporates public participation.

EFSEC held the following public scoping meetings for the Programmatic EIS:

Meeting Date and Time[a]	Meeting Location	Approximate Number of Attendees
July 18, 2024, 5:00 p.m.	Virtual (Microsoft Teams)	20
July 23, 2024, 5:00 p.m.	Virtual (Microsoft Teams)	15

Notes:
[a] All times are Pacific Standard Time

5.1.2 Public Scoping Comment Period

The public scoping comment period was held from June 28, 2024, to July 28, 2024. EFSEC accepted written scoping comments online, by postal mail, and verbally during online public scoping meetings.

A variety of scoping materials were available on EFSEC's Programmatic EIS website, **https://www.efsec.wa.gov/energy-facilities/programmatic-eis**, for public review throughout the scoping period. The website provided information on scoping, including how to comment and a link to an online comment form. The Scoping Summary Memo can be found in **Appendix 5.1-1**.

5.2 EFSEC Public Meetings

In addition to the previously held scoping meetings, EFSEC invites the public to participate in public meetings to discuss this published Draft Programmatic EIS. The public's input is invaluable as EFSEC works to ensure that all potential significant adverse environmental impacts are considered. EFSEC encourages all interested parties to attend and share their perspectives. Participation is crucial in helping make informed decisions that reflect the needs and values of our communities.

5.2.1 Public Information Meeting

On April 8, 2025, a public informational meeting will be held featuring a presentation of the Draft Programmatic EIS materials. This meeting will provide an overview of the project, outline key findings, and offer an opportunity for the public to ask questions and learn more about the proposed project before submitting formal comments. No comments will be taken at the public informational meeting. The public information meeting will be held virtually.

5.2.2 Public Comment Hearings

Public comment will also be taken at two hearings for the Draft Programmatic EIS. The public comment hearings will be held virtually on April 22, 2025, and April 24, 2025.

For more information about the Draft Programmatic EIS and the upcoming meetings, please visit EFSEC's website at: **https://www.efsec.wa.gov/energy-facilities/programmatic-eis,** contact EFSEC by phone at **(360) 664-1345,** or e-mail at **efsec@efsec.wa.gov**.

5.3 Tribal Engagement and Consultation

EFSEC provided notification of the Draft Programmatic EIS to Tribal Chairs and Natural and Cultural Resources Directors of all federally recognized Tribes with lands and territories in Washington and Executive Directors of Tribal organizations. Government-to-government consultation was offered to federally recognized Tribes in Washington as an option at any time during the Draft Programmatic EIS process.

EFSEC will continue to provide opportunities for Tribal input during the public comment period and after the public comment period while the Final Programmatic EIS is being finalized. The following Tribes were notified of this Draft Programmatic EIS:

- Affiliated Tribes of Northwest Indians
- Chinook Indian Nation
- Coeur d'Alene Tribe
- Columbia River Inter-Tribal Fish Commission
- Confederated Tribes and Bands of the Yakama Nation
- Confederated Tribes of the Chehalis Reservation
- Confederated Tribes of the Colville Reservation

- Confederated Tribes of the Grande Ronde Community of Oregon
- Confederated Tribes of the Umatilla Indian Reservation
- Confederated Tribes of the Warm Springs
- Cowlitz Indian Tribe
- Duwamish Tribe
- Hoh Indian Tribe
- Jamestown S'Klallam Tribe
- Kalispel Tribe of Indians
- Kikiallus Indian Nation
- Lower Elwha Klallam Tribe
- Lummi Nation
- Makah Tribe
- Marietta Band of the Nooksack Tribe
- Muckleshoot Indian Tribe
- Nez Perce Tribe
- Nisqually Tribe
- Nlaka'pamux Tribal Nation
- Nooksack Indian Tribe
- Port Gamble S’Klallam Tribe
- Puyallup Tribe of Indians
- Quileute Nation (Tribe)
- Quinault Indian Nation
- Samish Indian Nation
- Sauk-Suiattle Indian Tribe
- Shoalwater Bay Indian Tribe
- Skokomish Indian Tribe
- Snohomish Tribe
- Snoqualmie Indian Tribe
- Snoqualmoo Tribe of Indians
- Spokane Tribe of Indians
- Squaxin Island Tribe
- Steilacoom Tribe
- Stillaguamish Tribe of Indians
- Suquamish Tribe
- Swinomish Indian Tribal Community
- Tulalip Tribes
- Upper Skagit Indian Tribe
- Wanapum Tribe

5.4 Agency Cooperation, Consultation, and Coordination

The following agencies provided input or technical review for this Draft Programmatic EIS:

- Bonneville Power Administration
- U.S. Department of Defense
- Washington Department of Fish and Wildlife
- Washington State Department of Archaeology and Historic Preservation
- Washington State Department of Ecology
- Washington State Department of Natural Resources

- Washington State Department of Transportation
- Washington Utilities and Transportation Commission

5.5 Industry Partners

The following industry partners provided input for this Draft Programmatic EIS:

- Avista Corporation
- PacifiCorp
- Puget Sound Energy, Inc.

6.0 CHAPTER 6 – REFERENCES

Note: Electronic sources were consulted on the access dates provided; web addresses and web-based information are subject to change.

6.1 Executive Summary

EFSEC (Washington Energy Facility Site Evaluation Council). 2022a. Transmission Corridors Work Group Cover Letter. October 31, 2022. Accessed November 8, 2024. https://www.efsec.wa.gov/sites/default/files/181034/20221031_TCWG%20Cover%20Letter%20from%20EFSEC%20Chair_GovInslee.pdf

EFSEC (Washington Energy Facility Site Evaluation Council). 2022b. Transmission Corridors Work Group Final Report. Accessed November 8, 2024. https://www.efsec.wa.gov/sites/default/files/181034/Final_TCWG_Report%20_2022_0801.pdf

6.2 Chapter 1 – Introduction

ACEG (Americans for a Clean Energy Grid). 2023. Recommended Siting Practices for Electric Transmission Developers. Accessed February 2025. https://cleanenergygrid.org/wp-content/uploads/2023/02/Recommended-Siting-Practices-for-Electric-Transmission-Developers-ACEG-February-2023.pdf

BLM (Bureau of Land Management). 2024. Section 368 Energy Corridor Revisions Scoping Summary Report. Accessed February 2025. https://eplanning.blm.gov/public_projects/2022227/200537494/20107548/251007548/Corridors%20EIS%20Scoping%20Report_508compliant.pdf

BLM (Bureau of Land Management). Not dated. Section 368 Energy Corridors Environmental Impact Statement and Resource Management Plan Amendments Frequently Asked Questions. Accessed February 2025. https://eplanning.blm.gov/public_projects/2022227/200537494/20100789/251000789/EVS_Section%20368%20Corridor%20EIS%20FAQ_R5.pdf

BPA (Bonneville Power Administration). 2023. South of Tri-Cities Reinforcement Project. Accessed February 2025. https://www.bpa.gov/learn-and-participate/public-involvement-decisions/project-reviews/south-of-tri-cities

BPA (Bonneville Power Administration). 2017. I-5 Corridor Reinforcement Project (DOE/EIS-0436). Accessed February 2025. https://www.bpa.gov/learn-and-participate/public-involvement-decisions/project-reviews/i-5-corridor-project

City of Bellevue. 2018. Final Environmental Impact Statement, Energize Eastside Project. Accessed November 2024. https://bellevuewa.gov/sites/default/files/media/pdf_document/DSD%20005391%20-%20005841%20%255BEnergizeEastside_FinalEIS_Vol%201%255D.pdf https://www.energizeeastsideeis.org/library.html - finaleis

DOI (U.S. Department of the Interior). 2016. Final Environmental Impact Statement for the Vantage to Pomona Heights 230 kV Transmission Line Project. Accessed February 2025. https://www.energy.gov/sites/default/files/2016/10/f33/EIS-0505_FEIS_Summary-2016.pdf

Ecology (Washington State Department of Ecology). 2024. Stormwater Management Manuals. Accessed February 2025. https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/stormwater-permittee-guidance-resources/stormwater-manuals

Ecology (Washington State Department of Ecology). 2018. State Environmental Policy Act Handbook. Accessed November 2024. https://ecology.wa.gov/getattachment/4c9fec2b-5e6f-44b5-bf13-b253e72a4ea1/2-2018-SEPA-Handbook-Update.pdf

Ecology (Washington State Department of Ecology). 2006a. Wetland Mitigation in Washington State Part 1: Agency Policies and Guidance. Accessed February 2025. https://apps.ecology.wa.gov/publications/documents/0606011a.pdf

Ecology (Washington State Department of Ecology). 2006b. Wetland Mitigation in Washington State Part 2: Best Management Practices. https://wsdot.wa.gov/sites/default/files/2021-10/part2-bestmanagementpractices-regionalroadmaintenance.pdf

Ecology (Washington State Department of Ecology). Not dated. Lead Agency Determination and Responsibilities. Accessed November 2024. https://ecology.wa.gov/regulations-permits/sepa/environmental-review/sepa-guidance/guide-for-lead-agencies/lead-agency-determination-and-responsibilities

EFSEC (Washington Energy Facility Site Evaluation Council). 2019. Certification Process. Accessed November 8, 2024. https://www.efsec.wa.gov/about-efsec/certification-process

EFSEC (Washington Energy Facility Site Evaluation Council). 2022a. Transmission Corridors Work Group Cover Letter. October 31, 2022. Accessed November 8, 2024. https://www.efsec.wa.gov/sites/default/files/181034/20221031_TCWG%20Cover%20Letter%20from%20EFSEC%20Chair_GovInslee.pdf

EFSEC (Washington Energy Facility Site Evaluation Council). 2022b. Transmission Corridors Work Group Final Report. Accessed November 8, 2024. https://www.efsec.wa.gov/sites/default/files/181034/Final_TCWG_Report%20_2022_0801.pdf

PacifiCorp. 2023. 2023 Integrated Resource Plan Volume I. Accessed February 2025. https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/2023-irp/2023_IRP_Volume_I.pdf

Tri-Cities Area Journal of Business. 2024. BPA's Plans Aim to Support Growing Tri-Cities' Economy. Accessed February 2025. https://www.tricitiesbusinessnews.com/articles/hairston-2024

WDFW (Washington Department of Fish and Wildlife). 2020. Riparian Ecosystems, Volume 2: Management Recommendations. Accessed February 2025. https://wdfw.wa.gov/sites/default/files/publications/01988/wdfw01988.pdf

WECC (Western Energy Coordination Council). 2024. Western Assessment of Resource Adequacy. Accessed February 2025. https://feature.wecc.org/wara/#group-section-Summary-eSoUDW1Hw8

West-wide Energy Corridor. 2008. Guide to the West-Wide Energy Corridor Final Programmatic Environmental Impact Statement (PEIS). Accessed February 2025. https://corridoreis.anl.gov/eis/guide/index.cfm

WSDOT (Washington Department of Transportation). 2018. Best Management Practices Field Guide for ESA Habitat Protection. Accessed February 2025. https://wsdot.wa.gov/sites/default/files/2021-10/bestmanagementpracticesfieldguideregionalroadmaintenance.pdf

WSDOT (Washington Department of Transportation). Not dated. Regional Road Maintenance Best management practices (Part 2). Accessed February 2025. https://wsdot.wa.gov/sites/default/files/2021-10/part2-bestmanagementpractices-regionalroadmaintenance.pdf

6.3 Chapter 2 – Overview of Transmission Facilities, Development Considerations, and Regulations

Adirondack Explorer. 2024. Lake Champlain Power Cables Set to Be Installed This Summer. May 15, 2024. Accessed November 2024. https://www.adirondackexplorer.org/stories/lake-champlain-power-cable-line-work-begins

AEP Transmission. Not dated. A Safe and Reliable Power Grid. Accessed December 2024. https://aeptransmission.com/dist/docs/power-ready-grid/Safe-Reliable-PowerGrid_OnePager_V5.pdf

APLIC (Avian Power Line Interaction Committee). 2012. Reducing Avian Collisions with Power Lines: The State of the Art in 2012. October 2012. Accessed February 2025. https://www.aplic.org/uploads/files/15518/Reducing_Avian_Collisions_2012watermarkLR.pdf

Babcock & Brown. 2007. Trans Bay Cable Project Presentation to Board of Governors. Accessed November 2024. https://www.caiso.com/documents/070418_briefingontransbaycableproject_presentation_originalpresentation.pdf

BPA (Bonneville Power Administration). 2021. Vegetation Management Takes to the Skies with Helicopter Tree Trimming. November 9, 2021. Accessed December 2024. https://www.bpa.gov/about/newsroom/news-articles/2021/20211109-vegetation-management-takes-to-the-skies-with-helicopter-tree-trimming

City of Portland. Not dated. Horizontal Directional Drilling (HDD). Accessed November 2024. https://www.portland.gov/bes/improvements/methods/horizontal-directional-drilling

CPUC (California Public Utilities Commission). 2014a. Transmission System Components. Accessed November 2024. https://ia.cpuc.ca.gov/environment/info/aspen/cltp/archive/files_8_26_14/_3TransmissionComponentsFactSheet.pdf

CPUC (California Public Utilities Commission). 2014b. Transmission Line Construction. Accessed November 2024. https://ia.cpuc.ca.gov/environment/info/aspen/cltp/archive/files_8_26_14/_5transmissionlineconstructionfactsheet.pdf

DOE (US Department of Energy). 2015. Quadrennial Technology Review 2015 Chapter 3: Enabling Modernization of the Electric Power System. Accessed December 2024. https://www.energy.gov/sites/prod/files/2015/09/f26/QTR2015-3F-Transmission-and-Distribution_1.pdf

DOE (US Department of Energy). 2020. Advanced Transmission Technologies. Accessed November 2024. https://www.energy.gov/sites/prod/files/2021/02/f82/Advanced%20Transmission%20Technologies%20Report%20-%20final%20as%20of%2012.3%20-%20FOR%20PUBLIC.pdf

DOE (US Department of Energy). 2023a. National Transmission Needs Study. October 2023. Accessed November 2024. https://www.energy.gov/sites/default/files/2023-12/National%20Transmission%20Needs%20Study%20-%20Final_2023.12.1.pdf

DOE (US Department of Energy). 2023b. How It Works: Electric Transmission & Distribution and Protective Measures. November 2023. Accessed February 2025. https://www.energy.gov/sites/default/files/2023-11/FINAL_CESER%20Electricity%20Grid%20Backgrounder_508.pdf

EFSEC (Washington State Energy Facility Site Evaluation Council). 2024. State Environmental Policy Act Scoping Document. For Programmatic Environmental Impact Statement on Transmission Facilities in Washington State. June 2024. Accessed December 18, 2024. https://www.efsec.wa.gov/sites/default/files/181034/scoping/20240628_Scoping%20Memo.pdf

EIA (U.S. Energy Information Administration). 2012. Power Outages Often Spur Questions around Burying Power Lines. July 25, 2012. Accessed November 2024. https://www.eia.gov/todayinenergy/detail.php?id=7250

FAA (Federal Aviation Administration). Not dated. Section 2. Air Navigation and Obstruction Lighting. Aeronautical Lighting and Other Airport Visual Aids. Accessed November 2024. https://www.faa.gov/air_traffic/publications/atpubs/aim_html/chap2_section_2.html

FDOT (Florida Department of Transportation). 2010. Standard Specifications for Road and Bridge Construction. Accessed November 2024. https://www.fdot.gov/docs/default-source/programmanagement/Implemented/Specbooks/2010/Files/2010Master.pdf

FERC (Federal Energy Regulatory Commission). 2023. Transmission Line Vegetation Management. Last updated November 17, 2023. Accessed February 2025. https://www.ferc.gov/transmission-line-vegetation-management

FERC (Federal Energy Regulatory Commission). 2024. Transmission Maintenance. Last updated September 26, 2024. Accessed February 2025. https://www.nerc.com/pa/Stand/Reliability%20Standards/FAC-501-WECC-4.pdf

GAO (U.S. Government Accountability Office). 2022. Securing the U.S. Electricity Grid from Cyberattacks. Accessed May 14, 2024. https://www.gao.gov/blog/securing-u.s.-electricity-grid-cyberattacks.

Grid Lab. 2024. Reconductoring with Advanced Conductors Can Accelerate the Rapid Transmission Expansion Required for a Clean Grid. April 2024. Accessed December 2024. https://www.2035report.com/wp-content/uploads/2024/06/GridLab_2035-Reconductoring-Technical-Report.pdf

Hair, J. 2015. PR-277-144507-Z01 Installation of Pipelines by Horizontal Directional Drilling. September 23, 2015. Accessed November 2024. http://doi.org/10.55274/R0010542

National Grid. 2023. River Ouse – Possible Installation Methods for Underground Cables. Accessed February 2025. https://www.nationalgrid.com/electricity-transmission/document/148826/download#:~:text=Tunnelling%20%2D%20Tunnel%20Boring%20Machine%20(TBM)&text=Characteristically%2C%20microtunnelling/pipejacking%20methods%20are,TBM%20tunnelling%20installation%20in%20general.&text=During%20construction%2C%20construction%20compounds%20are,established%20to%20power%20the%20TBM.

NERC (National Energy Reliability Corporation). Not dated. Standard TPL-001-4 — Transmission System Planning Performance Requirements. Accessed February 2025. https://www.nerc.com/pa/Stand/Reliability%20Standards/TPL-001-4.pdf

NWPPA (Northwest Public Power Association). Not dated. Helicopter Aided Construction (What to Know for Efficient and Cost-Effective Projects). Accessed December 2024. https://www.nwppa.org/wp-content/uploads/Helicopter-Aided-Construction-Shane-Watson.pdf

Oldcastle Infrastructure. Not dated. 10′x20′ Electrical Transmission Vault-Edison. Accessed May 14, 2024. https://oldcastleinfrastructure.com/product/10x20′-electricaltransmission-vault-edison/ https://oldcastleinfrastructure.com/product/10x20%E2%80%B2-electrical-transmission-vault-edison/

PacifiCorp. 2021. TA-General. Information Standards. Transmission Construction Standards.

Prismecs. 2024. 12 Substation Protection Equipment You Must Recognize. February 11, 2024. Accessed February 2025. https://prismecs.com/blog/12-substation-protection-equipment-you-must-recognize#:~:text=Ans:%20A%20substation%20is%20a,for%20system%20protection%20and%20monitoring.

PRPA (Platte River Power Authority). 2025. Overhead vs. Underground. Accessed February 2025. https://www.prpa.org/transmission/types/

PSCW (Public Service Commission of Wisconsin). 2011. Underground Electric Transmission Lines. Accessed November 2024. https://psc.wi.gov/Documents/Brochures/Under%20Ground%20Transmission.pdf

PSCW (Public Service Commission of Wisconsin). 2013. Environmental Impacts of Substations. Accessed November 2024. https://psc.wi.gov/Documents/Brochures/Impacts%20of%20Substations.pdf

PSE (Puget Sound Energy). 2014. Energize Eastside Underground Transmission Lines Fact Sheet. April 2014. Accessed February 2025. https://energizeeastside2.blob.core.windows.net/media/Default/Library/March11Webinar/Underground_Utilities_FactSheet.pdf

Riverkeeper. 2024. What to Know About Hydropower Cable Installation in the Hudson River. July 17, 2024. Accessed November 2024. https://www.riverkeeper.org/news-and-events/news-and-updates/what-to-know-about-hydropower-cable-installation-in-the-hudson-river

USDA (United States Department of Agriculture). 2001. Design Guide for Rural Substations. June 2001. Accessed November 2024. https://www.rd.usda.gov/files/UEP_Bulletin_1724E-300.pdf.

Xcel Energy. 2024. Overhead vs. Underground: Information about Burying High-Voltage Transmission Lines. May 2024. Accessed November 2024. https://xcelnew.my.salesforce.com/sfc/p/#1U0000011ttV/a/8b000002ZAgG/fFXdbyR9TgaRcEOrD2SDyGOV57cQCQPLFEXczPQx6cM

6.4 Chapter 3 – Affected Environment, Significant Impacts, and Mitigation

Section 3.2 – Earth Resources

Americans for a Clean Energy Grid. 2023. Recommended Siting Practices for Electric Transmission Developers. Accessed September 16, 2024. https://cleanenergygrid.org/wp-content/uploads/2023/02/Recommended-Siting-Practices-for-Electric-Transmission-Developers-ACEG-February-2023.pdf

Atwater, B. F., A. R. Nelson, J. J. Clague, G. A. Carver, 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, M. A. Reinhart, and D.K. Yamaguchi. 1995. Summary of Coastal Geologic Evidence for Past Great Earthquakes at the Cascadia Subduction Zone. Earthquake Spectra 11:1–18.

Atwater, B. F., M. R. Satoko, S. Kenji, T. Yoshinobu, U. Kazue, and D. K. Yamaguchi. 2005. The Orphan Tsunami of 1700: Japanese Clues to a Parent Earthquake in North America. USGS Professional Paper 1707.

Brocher, T. M., R. E. Wells, A. P. Lamb, and C. S. Weaver. 2017. Evidence for Distributed Clockwise Rotation of the Crust in the Northwestern United States from Fault Geometries and Focal Mechanisms. Tectonics 36(5):787–818.

Cascadia Department of Bioregion. Not dated. The Cascadia Subduction Zone. Accessed August 2, 2023. https://cascadiabioregion.org/cascadia-subduction-zone

CEATI International (Centre for Energy Advancement through Technological Innovation. Not dated. Guide for Transmission Line Foundations with Least Impact to the Environment. Report No. T153700-33107. Contractor: Peter Kandaris, P.E., DiGioia Gray, Inc. Tempe, Arizona, USA. Accessed November 20, 2024. https://www.cooperative.com/programs-services/bts/documents/reports/91002k_presentation.pdf

Clague, J. J., P. T. Bobrowsky, and I. Hutchinson. 2000. A Review of Geological Records for Large Tsunamis at Vancouver Island, British Columbia and Implications for Hazard. Quaternary Science Reviews 19: 849–863.

DNR (Washington State Department of Natural Resources). 2024a. Geologic Provinces of Washington. Accessed November 20, 2024. https://www.dnr.wa.gov/programs-and-services/geology/explore-popular-geology/geologic-provinces-washington

DNR (Washington State Department of Natural Resources). 2024b. Earthquakes and Faults. Accessed November 21, 2024. https://www.dnr.wa.gov/programs-and-services/geology/geologic-hazards/earthquakes-and-faults#what-are-faults-and-earthquakes?.7

EERI and WMDEMD (Earthquake Engineering Research Institute and the Washington Military Department Emergency Management Division). 2005. Scenario for a Magnitude 6.7 Earthquake on the Seattle Fault. Accessed August 7, 2023. https://mitigation.eeri.org/wp-content/uploads/seattscen_full_book.pdf.

Hipple, Karl W. Not dated. Washington Soil Atlas. Accessed November 20, 2024. https://www.nrcs.usda.gov/sites/default/files/2022-09/Washington%20Soil%20Atlas.pdf.

Huntting, M. T., 1956, Inventory of Washing ton minerals; Part II— Metallic minerals: Washington Division of Mines and Geology Bulletin 37, Part II, 2 v.

Kelsey, H. M., A. R. Nelson, E. Hemphill-Haley, and R. Witter. 2005. Tsunami History of an Oregon Coastal Lake Reveals a 4600 Year Record of Great Earthquakes on the Cascadia Subduction Zone. Geological Society of America Bulletin 117:1009–1032.

National Academies Press. 2024. Appendix A Soil Taxonomy. Accessed November 21, 2024. https://nap.nationalacademies.org/read/4766/chapter/14

Nelson, A. R., H. M. Kelsey, and R. C. Witter. 2006. Great Earthquakes of Variable Magnitude at the Cascadia Subduction Zone. Quaternary Research 65:354–365.

Norman, D. K., 2000, Mining regulations in Washington: Washington Division of Geology and Earth Resources Open File Report 2000-3, 22 p. [http://www.wa.gov/dnr/htdocs/ger/pdf/ofr00-3.pdf].

PNSN (Pacific Northwest Seismic Network). Not dated. Cascadia Subduction Zone. Accessed November 23, 2021. https://pnsn.org/outreach/earthquakesources/csz.

Porter, S.C., and T.W. Swanson. 1998. Radiocarbon Age Constraints on Rates of Advance and Retreat of the Puget Lobe of the Cordilleran Ice Sheet during the Last Glaciation. University of Washington. Quaternary Research 50, 205–213 (Article No. QR982004).

Reidel, S. P, B.S. Martin, and H. L. Petcovic. 2003. Western Cordillera and Adjacent Areas – Chapter 4: The Columbia River Flood Basalts and the Yakima Fold Belt.

Schasse, H.W., Koler, M. L., Eberle, N.A., and Christie, R.A. 1994. The Washington State Coal Mine Map Collection: A Catalog, Index, and User's Guide, Washington Division of Mines and Geology, Open File Report 94-7. June.

Swanson, D. A., K. A. Cameron, R. C. Evarts, P. T. Pringle, and J. A. Vance. 1989. IGC Field Trip T106: Cenozoic Volcanism in the Cascade Range and Columbia Plateau, Southern Washington and Northernmost Oregon. Field Trip Guidebooks, 106, 1-60. American Geophysical Union.

Sweeny, M. R., E. V. McDonald, and D. R. Gaylord. 2017. Generation of the Palouse Loess: Exploring the Linkages between Glaciation, Outburst Megafloods, and Eolian Deposition in Washington State. From the Puget Lowland to East of the Cascade Range: Geologic Excursions in the Pacific Northwest 49.

Thorson, R. M. 1989. Glacioistatic Response of the Puget Sound Area, Washington. Geological Society of America Bulletin 101, 1163–1174.

U.S. Bureau of Mines, 1995, Spatial data extracted from the Minerals Availability System/Mineral Industry Location system (MAS/ MILS): U.S. Bureau of Mines Special Publication 95-12.

USDA NRCS (U.S. Department of Agriculture Natural Resources Conservation Service). Not dated. The Twelve Orders of Soil Taxonomy. Accessed November 21, 2024. https://www.nrcs.usda.gov/resources/education-and-teaching-materials/the-twelve-orders-of-soil-taxonomy

USGS (U.S. Geological Survey). Not dated (a). Geologic Units Containing Landslide. Accessed December 17, 2021. https://mrdata.usgs.gov/geology/state/sgmc-lith.php?code=1.5.4.

USGS. Not dated (b). Liquefaction Susceptibility. Accessed March 19, 2025. https://earthquake.usgs.gov/education/geologicmaps/liquefaction.php

Wells, R. E., and P. L. Heller. 1988. The Relative Contribution of Accretion, Shear, and Extension to Cenozoic Tectonic Rotation in the Pacific Northwest. Geological Society of America Bulletin 100:325–338.

Wells, R. E., and R. W. Simpson. 2001. Northward Migration of the Cascadia Forearc in the Northwestern U.S. and Implications for Subduction Deformation. Earth Planet Special Publication 53:275–283.

WSDOT (Washington State Department of Transportation). Not dated. Part 2 – Best Management Practices. Accessed November 20, 2024. https://wsdot.wa.gov/sites/default/files/2021-10/part2-bestmanagementpractices-regionalroadmaintenance.pdf

Section 3.3 – Air Quality

AGC (AGC of Washington Education Foundation) and the Fugitive Dust Task Force. 1997. Guide to Handling Fugitive Dust from Construction Projects. Seattle, Washington 1997. Accessed February 13, 2025. https://wsdot.wa.gov/sites/default/files/2024-09/Handling-FugitiveDust-%20from-ConstructionProjects-Guide.pdf

Americans for a Clean Energy Grid. 2023. Recommended Siting Practices for Electric Transmission Developers. Accessed February 13, 2025. https://cleanenergygrid.org/wp-content/uploads/2023/02/Recommended-Siting-Practices-for-Electric-Transmission-Developers-ACEG-February-2023.pdf

Commerce (Washington State Department of Commerce). Not dated. Washington's Diverse Climate and Geography. Accessed February 13, 2025. https://choosewashingtonstate.com/research-resources/about-washington/climate-geography/

Ecology (Washington State Department of Ecology). 2016. Methods for Dust Control. Accessed February 13, 2025. https://apps.ecology.wa.gov/publications/publications/96433.pdf

Ecology (Washington State Department of Ecology). 2024. Washington State Department of Ecology. 2020 Washington Comprehensive Emissions Inventory Technical Support Document. Accessed February 13, 2025. https://apps.ecology.wa.gov/publications/documents/2002012.pdf

Ecology (Washington State Department of Ecology). Not dated (a). Washington's Air Quality Implementation Plan. Accessed February 13, 2025. https://ecology.wa.gov/Regulations-Permits/Plans-policies/State-implementation-plans

Ecology (Washington State Department of Ecology). Not dated (b). Determining if Areas in Washington Meet National Air Quality Standards. Accessed February 13, 2025. https://ecology.wa.gov/regulations-permits/plans-policies/areas-meeting-and-not-meeting-air-standards

Ecology (Washington State Department of Ecology). Not dated (c). Wildfire Risks Caused by Climate Change. Accessed February 13, 2025. https://ecology.wa.gov/air-climate/responding-to-climate-change/wildfire-risks#:~:text=The%20risk%20and%20extent%20of,burn%20hotter%20and%20spread%20fasterhttps://ecology.wa.gov/air-climate/responding-to-climate-change/wildfire-risks

EPA (U.S. Environmental Protection Agency). 2022. Fugitive Dust Control Measures and Best Practices. Accessed February 13, 2025. https://www.epa.gov/system/files/documents/2022-02/fugitive-dust-control-best-practices.pdf

EPA (U.S. Environmental Protection Agency). 2024. Clean Air Act Permit Modeling Guidance. Last updated November 29, 2024. Accessed February 13, 2025. https://www.epa.gov/scram/clean-air-act-permit-modeling-guidance#appw

EPA (U.S. Environmental Protection Agency). 2025a. Climate Change Indicators: Atmospheric Concentrations of Greenhouse Gases. Last updated January 15, 2025a. Accessed February 13, 2025. https://www.epa.gov/climate-indicators/climate-change-indicators-atmospheric-concentrations-greenhouse-gases

EPA (U.S. Environmental Protection Agency). 2025b. Air Quality Statistics Report for 2023. Accessed February 13, 2025. https://www.epa.gov/outdoor-air-quality-data/air-quality-statistics-report

EPA (U.S. Environmental Protection Agency). 2025c. Overview of Greenhouse Gases. Accessed February 13, 2025. https://www.epa.gov/ghgemissions/overview-greenhouse-gases

EPA (U.S. Environmental Protection Agency). 2025d. About the Electric Power Systems Partnership. Accessed February 13, 2025. https://www.epa.gov/eps-partnership/about-electric-power-systems-partnership

EPA (U.S. Environmental Protection Agency). 2025e. Sulfur Hexafluoride (SF6) Basics. Accessed February 13, 2025. https://www.epa.gov/eps-partnership/sulfur-hexafluoride-sf6-basics

WRCC (Western Regional Climate Center). Not dated. Western Washington. Retrieved January 29, 2025, from https://wrcc.dri.edu/Climate/narrative_wa.php.

WSDOT (Washington State Department of Transportation). 2022. Guidance on Addressing Air Quality, Greenhouse Gas Emissions, and Energy for WSDOT Projects. April 2022. Accessed February 13, 2025. https://wsdot.wa.gov/sites/default/files/2022-05/Env-ANE-AQGuidance.pdf

WSDOT (Washington State Department of Transportation). 2025. Air Quality, Energy & Greenhouse Gas Emissions. Accessed February 13, 2025. https://wsdot.wa.gov/engineering-standards/environmental-guidance/air-quality-energy-greenhouse-gas-emissions

Section 3.4 – Water Resources

Americans for a Clean Energy Grid. 2023. Recommended Siting Practices for Electric Transmission Developers. Accessed September 16, 2024. https://cleanenergygrid.org/wp-content/uploads/2023/02/Recommended-Siting-Practices-for-Electric-Transmission-Developers-ACEG-February-2023.pdf

DNR (Washington State Department of Natural Resources). 2025. Groundwater. Accessed February 5, 2025. https://www.dnr.wa.gov/geology-groundwater

Ecology (Washington State Department of Ecology). 2013. Water Rights in Washington. Accessed September 18, 2024. https://apps.ecology.wa.gov/publications/documents/961804swr.pdf

Ecology (Washington State Department of Ecology). 2019. Stormwater Management Manual for Eastern Washington. August 2019. https://apps.ecology.wa.gov/publications/documents/1810044.pdf

Ecology (Washington State Department of Ecology). 2024. Stormwater Management Manual for Western Washington. July 2024. https://apps.ecology.wa.gov/publications/documents/2410013.pdf

EPA (U.S. Environmental Protection Agency). 2024. Overview of Total Maximum Daily Loads (TMDLs). Last updated October 25, 2025. Accessed October 29, 2024. https://www.epa.gov/tmdl/overview-total-maximum-daily-loads-tmdls

EPA (U.S. Environmental Protection Agency). 2025. Current Implementation of Waters of the United States. Last updated January 17, 2025. Accessed February 5, 2025. https://www.epa.gov/wotus/current-implementation-waters-united-states

EPA (U.S. Environmental Protection Agency). Not dated. Map of Sole Source Aquifer Locations. Accessed October 25, 2024. https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=9ebb047ba3ec41ada1877155fe31356b

FHWA, EPA, and WSDOT (Federal Highway Administration, U.S. Environmental Protection Agency, and Washington State Department of Transportation). 2014. Sole Source Aquifers in the State of Washington. Accessed September 19, 2024. https://www.wsdot.wa.gov/publications/manuals/fulltext/M31-11/agreements/FHWA_EPA_MOU_SSA.pdf

NOAA (National Oceanic and Atmospheric Administration). 2022. Washington. Accessed October 25, 2024. https://statesummaries.ncics.org/downloads/Washington-StateClimateSummary2022.pdf

USGS (U.S. Geological Survey). 2021. Hydrologic Unit Maps. Accessed September 18, 2024. https://www.usgs.gov/tools/hydrologic-unit-maps

USGS (U.S. Geological Survey). 2025a. USGS Surface-Water Data for Washington. Accessed February 5, 2025. https://waterdata.usgs.gov/wa/nwis/sw

USGS (U.S. Geological Survey). 2025b. USGS Water Data for Washington. Accessed February 5, 2025. https://waterdata.usgs.gov/wa/nwis

USGS (U.S. Geological Survey). Not dated. Watersheds. Accessed October 29, 2024. https://www.usgs.gov/centers/california-water-science-center/science/science-topics/watersheds

Washington State Department of Health. 2012. Source Water Protection Requirements. 331-106. May 2012. Accessed October 4, 2024. https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs/331-106.pdf

Washington State Department of Health. Not dated. Source Water Protection. Source Water Protection Program. Accessed October 2, 2024. https://doh.wa.gov/community-and-environment/drinking-water/source-water/source-water-protection

Section 3.5 – Vegetation

Americans for a Clean Energy Grid. 2023. Recommended Siting Practices for Electric Transmission Developers. Accessed September 16, 2024. https://cleanenergygrid.org/wp-content/uploads/2023/02/Recommended-Siting-Practices-for-Electric-Transmission-Developers-ACEG-February-2023.pdf

Arid Lands Initiative. 2014. The Arid Lands Initiative – Shared Priorities for Conservation at a Landscape Scale. Summary Prepared by Sonia A. Hall (SAH Ecologia LLC) and the Arid Lands Initiative Core Team, Wenatchee, Washington. https://aridlandsinitiative.org/our-shared-priorities/

Azerrad, J. M., J. L. Michalak, and T. P. Johnson. 2023. PHS Local Government User Guide: Biodiversity Areas and Corridors Map. Habitat Program, Washington Department of Fish and Wildlife, Olympia, Washington. Accessed November 8, 2024. https://wdfw.wa.gov/publications/02426

BC (British Columbia) Ministry of Transportation and Infrastructure. 2022. Erosion and Sediment Control Manual. Accessed October 10, 2024. https://www2.gov.bc.ca/assets/gov/driving-and-transportation/transportation-infrastructure/engineering-standards-and-guidelines/environment/references/erosion-and-sediment-control-manual.pdf

Benson, J. E., R. T. Tveten, M. G. Asher, and P. W. Dunwiddie. 2011. Shrub-Steppe and Grassland Restoration Manual for the Columbia River Basin. Olympia, Washington: Washington Department of Fish and Wildlife. https://wdfw.wa.gov/publications/01330

Bentrup, G. 2008. Conservation Buffers. Design Guidelines for Buffers, Corridors, and Greenways. General Technical Report SRS-109. U.S. Department of Agriculture National Agroforestry Center and Forest Service Southern Research Station. Accessed January 27, 2025. https://doi.org/10.2737/SRS-GTR-109

Bradley, B. A., C. A. Curtis, E. J. Fusco, J. T. Abatzoglou, J. K. Balch, S. Dadashi, and M. Tuanmu. 2017. Cheatgrass (*Bromus tectorum*) Distribution in the Intermountain Western United States and its Relationship to Fire Frequency, Seasonality, and Ignitions. Biological Invasions 20(7):1493–1506. Accessed January 27, 2025. https://doi.org/10.1007/s10530-017-1641-8

Butts, T. R., B. K. Fritz, K. B. Kouame, J. K. Norsworthy, L. T. Barber, W. J. Ross, G. M. Lorenz, B .C. Thrash, N. R. Bateman, and J. J. Adamczyk. 2022. Herbicide Spray Drift from Ground and Aerial Applications: Implications for Potential Pollinator Foraging Sources. Scientific Reports 12:18017. Accessed January 27, 2025. https://doi.org/10.1038/s41598-022-22916-4

da Silva Correa, H., C. T. Blum, F. Galvão, and L. T. Maranho. 2022. Effects of Oil Contamination on Plant Growth and Development: A Review. Environmental Science and Pollution Research International 29: 42501-43515. Accessed January 27, 2025. https://doi.org/10.1007/s11356-022-19939-9

Dhakal, S., B. B. Shrestha, K. P. Sharma, S. Paudel, and M. Siwakoti. 2023. Grasslands Are More Vulnerable to Plant Invasions than Forests in South-central Nepal. Environmental Challenges 15: 100929. Accessed January 27, 2025. https://doi.org/10.1016/j.envc.2024.100929

DNR (Washington State Department of Natural Resources). 2007. Conservation Strategy for Washington State Inland Sand Dunes. Natural Heritage Report 2007-05. Accessed January 27, 2025. https://www.dnr.wa.gov/publications/amp_nh_inland_dunes.pdf?jsdf0n

DNR (Washington State Department of Natural Resources). 2018. State of Washington Natural Heritage Plan. Accessed September 13, 2024. https://www.dnr.wa.gov/publications/amp_nh_plan_2018.pdf

DNR (Washington State Department of Natural Resources). 2021. Habitat Conservation Plan Lands. Accessed February 2025. https://geo.wa.gov/datasets/wadnr::habitat-conservation-plan-lands/about

DNR (Washington State Department of Natural Resources). 2022a. Oaks and Grasslands of the Puget Trough Ecoregion. Accessed February 2025. https://data-wadnr.opendata.arcgis.com/datasets/wadnr::oaks-and-grasslands-of-the-puget-trough-ecoregion/about

DNR (Washington State Department of Natural Resources). 2022b. Ecoregions of the Pacific Northwest. Accessed August 21, 2024. https://data-wadnr.opendata.arcgis.com/datasets/wadnr::ecoregions-of-the-pacific-northwest/explore?location=42.975673%2C-119.790189%2C5.18

DNR (Washington State Department of Natural Resources). 2022b. Washington Natural Heritage Program Element Occurrences – Historical. Accessed February 2025. https://data-wadnr.opendata.arcgis.com/datasets/wadnr::washington-natural-heritage-program-element-occurrences-historical/about

DNR (Washington State Department of Natural Resources). 2023. Washington Natural Heritage Program Element Occurrences – Current. Accessed February 2025. https://data-wadnr.opendata.arcgis.com/datasets/wadnr::washington-natural-heritage-program-element-occurrences-current/about

Dubé, C., S. Pellerin, and M. Poulin. 2011. Do Power Line Rights-of-way Facilitate the Spread of Non-Peatland and Invasive Plants in Bogs and Fens? Botany 89(2):91-103. Accessed January 27, 2025. https://doi.org/10.1139/B10-089

Ecology (Washington State Department of Ecology). 2013. Update on Wetland Buffers: The State of the Science Final Report. Publication no. 13-06-11. Accessed October 17, 2024. https://apps.ecology.wa.gov/publications/documents/1306011.pdf

Ecology (Washington State Department of Ecology). 2024a. Stormwater Management Manual for Western Washington. Accessed October 11, 2024. https://fortress.wa.gov/ecy/ezshare/wq/SWMMs/2024SWMMWW/Content/Resources/DocsForDownload/2024SWMMWW_6-14-24.pdf

Ecology (Washington State Department of Ecology). 2024b. Stormwater Management Manual for Eastern Washington. Accessed October 11, 2024. https://fortress.wa.gov/ecy/ezshare/wq/SWMMs/2024SWMMEW/Content/Resources/DocsForDownload/2024SWMMEW_6-14-24.pdf

Ecology (Washington State Department of Ecology). 2024c. Wetlands: Nature's Water Filters, Sponges & Nurseries. Accessed September 13, 2024. https://ecology.wa.gov/water-shorelines/wetlands/wetlands-overview

Ecology (Washington State Department of Ecology). 2024d. Riparian Education. Accessed January 2, 2025. https://ecology.wa.gov/water-shorelines/puget-sound/helping-puget-sound/riparian-restoration/riparian-education

Ecology (Washington State Department of Ecology), U.S. Army Corps of Engineers Seattle District, and U.S. Environmental Protection Agency Region 10. 2006. Wetland Mitigation in Washington State – Part 2: Developing Mitigation Plans (Version 1). Washington State Department of Ecology Publication 06-06-011b. Accessed January 27, 2025. https://apps.ecology.wa.gov/publications/documents/0606011b.pdf

Ecology (Washington State Department of Ecology), U.S. Army Corps of Engineers Seattle District, and U.S. Environmental Protection Agency Region 10. 2021. Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance (Version 2). Washington State Department of Ecology Publication 21-06-003. Accessed January 27, 2025. https://apps.ecology.wa.gov/publications/documents/2106003.pdf

EPA (U.S. Environmental Protection Agency). 2024. Permit Program under CWA Section 404. Accessed September 19, 2024. https://www.epa.gov/cwa-404/permit-program-under-cwa-section-404

Farmer, A. M. 1993. The Effects of Dust on Vegetation – A Review. Environmental Pollution 79(1): 63-75. Accessed January 27, 2025. https://doi.org/10.1016/0269-7491(93)90179-R

Folkerts, K. E., T. P. Johnson, and J. L. Michalak. 2023. PHS Local Government User Guide: Shrubsteppe and Eastside Steppe Map. Olympia, Washington: Habitat Program, Washington Department of Fish and Wildlife. https://wdfw.wa.gov/publications/02424

Government of Canada. 2014. Why Some Species Become at Risk. Accessed December 16 2024. https://www.canada.ca/en/environment-climate-change/services/species-risk-education-centre/why-some-species-become-at-risk.html

Greenwood, P. and N. J. Kuhn. 2014. Does the Invasive Plant, *Impatiens glandulifera,* Promote Soil Erosion along the Riparian Zone? An Investigation on a Small Watercourse in Northwest Switzerland. Journal of Soils and Sediments 14: 637-650. Accessed January 27, 2025. https://link.springer.com/article/10.1007/s11368-013-0825-9

Haddad, N. M., L. A. Brudvig, J. Clobert, K. F. Davies, A. Gonzalez, R. D. Holt, et al. 2015. Habitat Fragmentation and Its Lasting Impact on Earth's Ecosystems. Science Advances 1(2):1-9. Accessed January 27, 2025. https://doi.org/10.1126/sciadv.1500052

Kameswaran, S., Y. Gunavathi, and P. Gopi Krishna. 2019. Dust Pollution and Its Influence on Vegetation – A Critical Analysis. Research Journal of Life Sciences, Bioinformatics, Pharmaceutical and Chemical Sciences 5(1):341-363. Accessed January 27, 2025. https://doi.org/10.26479/2019.0501.31

Lampinen, J., K. Ruokolainen, and A. Huhta. 2015. Urban Power Line Corridors as Novel Habitats for Grassland and Alien Plant Species in South-Western Finland. PLoS ONE 10(11):e0142236. Accessed January 27, 2025. https://doi.org/10.1371/journal.pone.0142236

LANDFIRE (Landscape Fire and Resource Management Planning Tools). 2016a. LANDFIRE: Existing Vegetation Type Layer, LANDFIRE 2.0, U.S. Department of the Interior, U.S. Geological Survey, and U.S. Department of Agriculture. Accessed September 4, 2024. https://www.landfire.gov/viewer

LANDFIRE (Landscape Fire and Resource Management Planning Tools). 2016b. Existing Vegetation Type. Accessed September 4, 2024. https://www.landfire.gov/vegetation/evt

LANDFIRE (Landscape Fire and Resource Management Planning Tools). 2016c. About LANDFIRE. Accessed September 4, 2024. https://www.landfire.gov/about-landfire

Lehtinen, R. M. 2023. Empirical Evidence for the Rescue Effect from a Natural Microcosm. Animals 13(12): 1907. Accessed January 27, 2025. https://doi.org/10.3390/ani13121907

McIntosh, T. T., M. Vander Haegen, and M. A. Schroeder. 2007. Patterns in Biological Soil Crust Recovery in Conservation Reserve Program fields, Washington State. Report. Washington Department of Fish and Wildlife, Olympia, Washington. Accessed October 22, 2024. https://wdfw.wa.gov/publications/01306

Michaud, J. P. 2001. The Functions and Values of Wetlands. In At Home with Wetlands: A Landowner's Guide. Washington State Department of Ecology Publication, 17-22. Accessed January 27, 2025. https://apps.ecology.wa.gov/publications/documents/9031.pdf

Miller, J. E. D., S. Wessel, and W. Fertig. 2024. 2024 Washington Vascular Plant Species of Conservation Concern. Natural Heritage Report 2024-07. Washington Department of Natural Resources Natural Heritage Program. Accessed September 13, 2024. https://www.dnr.wa.gov/publications/amp_nh_vascular_ets.pdf?4jnufw6

NatureServe. 2024a. Conservation Status Assessment. Accessed December 13, 2024. https://www.natureserve.org/conservation-status-assessment

NatureServe. 2024b. Definitions of NatureServe Conservation Status Ranks. Accessed October 10, 2024. https://help.natureserve.org/biotics/content/record_management/Element_Files/Element_Tracking/ETRACK_Definitions_of_Heritage_Conservation_Status_Ranks.htm

NatureServe. 2024c. International Terrestrial Ecological System: Columbia Plateau Western Juniper Woodland and Savanna. Arlington, Virginia. Accessed January 21, 2025. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.740155/Columbia_Plateau_Western_Juniper_Woodland_and_Savanna

North American Electric Reliability Corporation (NERC). 2016. Transmission Vegetation Management FAC-003-4. Accessed January 7, 2025. https://www.nerc.com/pa/stand/reliability%20standards/fac-003-4.pdf

NWCB (Washington State Noxious Weed Control Board). 2024a. Controlling Noxious Weeds. Accessed September 23, 2024. https://www.nwcb.wa.gov/control-and-disposal

NWCB (Washington State Noxious Weed Control Board). 2024b. Disposing of Noxious Weeds. Accessed September 23, 2024. https://www.nwcb.wa.gov/disposing-of-noxious-weeds

Olson, E. and J. M. Doherty. 2012. The Legacy of Pipeline Installation on the Soil and Vegetation of Southeast Wisconsin Wetlands. Ecological Engineering 39:53-62. Accessed January 27, 2025. https://doi.org/10.1016/j.ecoleng.2011.11.005

ORIA (Governor's Office for Regulatory Innovation & Assistance). 2019. Wetland Mitigation Bank Certification. Accessed September 19, 2024. https://www.oria.wa.gov/site/alias__oria/mid__12357/403/handbook-entry?ItemID=131

Poulenard J. and P. Podwojewski. 2004. Alpine Soils. Encyclopedia of Soil Science. DOI: 10.1081/E-ESS 120017544.

PSCW (Public Service Commission of Wisconsin). Not dated. Environmental Impacts of Transmission Lines. Accessed October 22, 2024. https://psc.wi.gov/Documents/Brochures/Enviromental%20Impacts%20TL.pdf

Rodrick, E. and R. Milner, eds. 1991. Management Recommendations for Washington's Priority Habitats and Species. Olympia, Washington: Washington Department of Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/publications/00032

Urgenson, L. S., S. H. Reichard, and C. B. Halpern. 2009. Community and Ecosystem Consequences of Giant Knotweed (*Polygonum sachalinense*) Invasion into Riparian Forests of Western Washington, USA. Biological Conservation 142(7):1536–1541. Accessed January 27, 2025. https://doi.org/10.1016/j.biocon.2009.02.023

USACE and EPA (U.S. Army Corps of Engineers and U.S. Environmental Protection Agency). 2024. Wetlands; Wetland Definition. Accessed December 16, 2024. https://www.nww.usace.army.mil/Business-With-Us/Regulatory-Division/Wetlands/

USFWS (U.S. Fish and Wildlife Service). 2024a. Permits for Native Endangered and Threatened Species. Accessed September 19, 2024. https://www.fws.gov/library/collections/permits-native-endangered-and-threatened-species

USFWS (U.S. Fish and Wildlife Service). 2024b. Wetland Mapper. National Wetlands Inventory Surface Water and Wetlands. Accessed September 23, 2024. https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/

UTC (Washington Utilities and Transportation Commission). 2025. Wildfires. Accessed February 4, 2025. https://www.utc.wa.gov/regulated-industries/utilities/energy/wildfires

WDFW (Washington Department of Fish and Wildlife). 2005. Washington’s Comprehensive Wildlife Conservation Strategy. Wildlife Research and Management. Accessed January 27, 2025 https://wdfw.wa.gov/sites/default/files/publications/00727/wdfw00727.pdf

WDFW (Washington Department of Fish and Wildlife). 2009a. Landscape Planning for Washington's Wildlife: Managing for Biodiversity in Developing Areas. Olympia, Washington. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/publications/00023/wdfw00023.pdf

WDFW (Washington Department of Fish and Wildlife). 2009b. Washington Department of Fish and Wildlife Wind Power Guidelines. April 2009. Accessed January 29, 2025. https://wdfw.wa.gov/sites/default/files/publications/00294/wdfw00294.pdf

WDFW (Washington Department of Fish and Wildlife). 2020a. Management Recommendations for Washington's Priority Habitats: Shrubsteppe. Accessed October 17, 2024. https://wdfw.wa.gov/sites/default/files/publications/01333/wdfw01333.pdf

WDFW (Washington Department of Fish and Wildlife) 2020b. Riparian Ecosystems, Volume 2: Management Recommendations. Accessed October 17, 2024. https://wdfw.wa.gov/sites/default/files/publications/01988/wdfw01988.pdf

WDFW (Washington Department of Fish and Wildlife). 2023. State of Washington Priority Habitats and Species List. Accessed October 17, 2024. https://wdfw.wa.gov/sites/default/files/publications/00165/wdfw00165.pdf

WDFW (Washington Department of Fish and Wildlife). 2024a. Best Management Practices for Mitigating Impacts to Oregon White Oak Priority Habitat. Accessed November 8, 2024. https://wdfw.wa.gov/sites/default/files/publications/02465/wdfw02465.pdf

WDFW (Washington Department of Fish and Wildlife). 2024b. Washington Shrubsteppe Restoration and Resiliency Initiative: Long-Term Strategy 2024 – 2054. Olympia, Washington: Washington Department of Fish and Wildlife, Washington State Department of Natural Resources, Washington State Conservation Commission. https://wdfw.wa.gov/publications/02489

WDFW (Washington Department of Fish and Wildlife). 2024c. Priority Habitat and Species Database. Geospatial database provided by WDFW on August 21, 2024, to WSP Canada Inc.

Weidenhamer, J. D. and R. M. Callaway. 2010. Direct and Indirect Effects of Invasive Plants on Soil Chemistry and Ecosystem Function. Journal of Chemical Ecology 36(1):59-69. Accessed January 27, 2025. http://dx.doi.org/10.1007/s10886-009-9735-0

Wetland Stewardship Partnership. 2009. Interim Guidelines for Wetland Protection and Conservation in British Columbia; Chapter 9 Road and Utility Corridors. Accessed January 6, 2025. https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/wetland_ways_ch_9_corridors.pdf

Zedler, J. B. and S. Kercher. 2004. Causes and Consequences of Invasive Plants in Wetlands: Opportunities, Opportunists, and Outcomes. Critical Reviews in Plant Sciences 23(5): 431-452. Accessed January 27, 2025. https://doi.org/10.1080/07352680490514673

Section 3.6 – Habitat, Wildlife, and Fish

Akins, J. R. 2016. Distribution, Genetic Structure, and Conservation Status of the Cascade Red Fox in Southern Washington [Ph.D. Dissertation]. University of California, Davis. Accessed January 23, 2025. https://doi.org/10.13140/RG.2.2.30741.73443

Altman, B., D. W. Stinson, and G. E. Hayes. 2020. Status Report for the Oregon Vesper Sparrow in Washington. Olympia, Washington: Washington Department of Fish and Wildlife, 1-40. Accessed January 22, 2025. https://wdfw.wa.gov/sites/default/files/publications/02147/wdfw02147.pdf

Americans for a Clean Energy Grid. 2023. Recommended Siting Practices for Electric Transmission Developers. Accessed September 16, 2024. https://cleanenergygrid.org/wp-content/uploads/2023/02/Recommended-Siting-Practices-for-Electric-Transmission-Developers-ACEG-February-2023.pdf

Anguiano, M. P. and J. E. Diffendorfer. 2015. Effects of Fragmentation on the Spatial Ecology of the California Kingsnake (*Lampropeltis californiae*). Journal of Herpetology, 49(3):420–427. Accessed January 22, 2025. http://www.jstor.org/stable/44164615

APLIC (Avian Power Line Interaction Committee). 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Washington, D.C.: Edison Electric Institute and APLIC. Accessed January 22, 2025. https://www.nrc.gov/docs/ML1224/ML12243A391.pdf

APLIC (Avian Power Line Interaction Committee). 2012. Reducing Avian Collisions with Power Lines: The State of the Art in 2012. Washington, D.C.: Edison Electric Institute and APLIC. Accessed January 23, 2025. https://www.resolutionmineeis.us/sites/default/files/references/avian-power-line-2012.pdf

APLIC (Avian Power Line Interaction Committee). 2015. Best Management Practices for Electric Utilities in Sage-Grouse Habitat. Washington, D.C.: Edison Electric Institute and APLIC. Accessed January 23, 2025. https://aplic.org/uploads/files/15646/SAGR%20BMP%20FINAL_June%202015.pdf

Arcese, P., M. K. Sogge, A. B. Marr, and M. A. Patten. 2020. Song Sparrow (*Melospiza melodia*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Ithaca, New York: Cornell Lab of Ornithology. Accessed January 23, 2025. USA. https://doi.org/10.2173/bow.sonspa.01

Arid Lands Initiative. 2014. The Arid Lands Initiative – Shared Priorities for Conservation at a Landscape Scale. Summary Prepared by Sonia A. Hall (SAH Ecologia LLC) and the Arid Lands Initiative Core Team, Wenatchee, Washington. https://aridlandsinitiative.org/our-shared-priorities/

Audubon. 2024. Audubon Open Data Library – IBA Polygons Public. Accessed January 6, 2025. https://data-library-audubon.hub.arcgis.com/datasets/audubon::iba-polygons-public-1/explore?layer=0&location=47.407528%2C-120.384628%2C7.89

Audubon Washington. Not dated. The Great Washington State Birding Trail. Accessed September 20, 2024. https://wa.audubon.org/birds/great-washington-state-birding-trail

AZA Small Carnivore TAG (Taxon Advisory Group). 2010. Mustelid (*Mustelidae*) Care Manual. Silver Spring, Maryland: Association of Zoos and Aquariums. Accessed October 31, 2024. https://nagonline.net/wp-content/uploads/2014/05/MustelidCareManual2010-NAG-EDIT.pdf

Azerrad, J. M. 2012. Management Recommendations for Washington's Priority Species: Great Blue Heron. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 23, 2025. https://wdfw.wa.gov/sites/default/files/publications/01371/wdfw01371.pdf

Azerrad, J. M., K. A. Divens, M. F. Livingston, M. S. Teske, H. L. Ferguson, and J. L. Davis. 2011. Site-specific Management: How to Avoid and Minimize Impacts of Development to Shrub-steppe. Olympia, Washington: Washington Department of Fish and Wildlife. https://wdfw.wa.gov/publications/01335

Babic, F. 2017. Discussion on Noise and its Impact on Birds. Canadian Acoustical Association, 45(3):112–113. Accessed January 23, 2025. https://jcaa.caa-aca.ca/index.php/jcaa/article/view/3072

Balmori, A. 2006. The Incidence of Electromagnetic Pollution on the Amphibian Decline: Is this an Important Piece of the Puzzle? Toxicological & Environmental Chemistry, 88(2):287–299. Accessed January 23, 2025. https://doi.org/10.1080/02772240600687200

Balmori, A. 2010. Mobile Phone Mast Effects on Common Frog (*Rana temporaria*) Tadpoles: The City Turned Into a Laboratory. Electromagnetic Biology and Medicine, 29(1–12):31–35. Accessed January 23, 2025. https://doi.org/10.3109/15368371003685363

Balmori, A. 2015. Anthropogenic Radiofrequency Electromagnetic Fields as an Emerging Threat to Wildlife Orientation. Science of The Total Environment, 518–519:58–60. Accessed January 23, 2025. https://www.sciencedirect.com/science/article/abs/pii/S0048969715002296?via%3Dihub

Barnard, R. J., J. Johnson, P. Brooks, K. M. Bates, B. Heiner, J. P. Klavas, D. C. Ponder, P. D. Smith, and P. D. Powers. 2013. Water Crossing Design Guidelines, Washington Department of Fish and Wildlife. Olympia, Washington. Accessed January 23, 2025. https://wdfw.wa.gov/sites/default/files/publications/01501/wdfw01501.pdf

Barnes, T. A., J. F. Dwyer, E. K. Mojica, P. A. Petersen, and R. E. Harness. 2022. Wildland Fires Ignited by Avian Electrocutions. Wildlife Society Bulletin, 46(3). Accessed January 23, 2025. https://doi.org/10.1002/wsb.1302

Barrass, A. N. 1985. The effects of highway traffic noise on the phonotactic and associated reproductive behavior of selected anurans [Thesis]. Vanderbilt University, Nashville, Tennessee. Accessed November 5, 2024. https://www.proquest.com/docview/303436432?fromopenview=true&fromunauthdoc=true&pq-origsite=gscholar&sourcetype=Dissertations%20&%20Theses

Barré, K., I. Thomas, I. Le Viol, K. Spoelstra, and C. Kerbiriou. 2023. Manipulating Spectra of Artificial Light Affects Movement Patterns of Bats Along Ecological Corridors. Animal Conservation, 26(6):865-875. Accessed January 23, 2025. https://zslpublications.onlinelibrary.wiley.com/doi/10.1111/acv.12875

Bartzke, G. S., R. May, K. Bevanger, S. Stokke, and E. Røskaft. 2014. The Effects of Power Lines on Ungulates and Implications for Power Line Routing and Rights-Of-Way Management. International Journal of Biodiversity and Conservation, 6(9):647–662. Accessed January 23, 2025. https://pdfs.semanticscholar.org/c728/88c139b7459b704760244abeaa5f2cfce007.pdf

Bartzke, G. S., R. May, E. J. Solberg, C. M. Rolandsen, and E. Røskaft. 2015. Differential Barrier and Corridor Effects of Power Lines, Roads and Rivers on Moose (*Alces alces*) Movements. Ecosphere, 6(4):1–17. Accessed January 23, 2025. http://dx.doi.org/10.1890/ES14-00278.1

Baxter-Gilbert, J. H., J. L. Riley, C. J. H. Neufeld, J. D. Litzgus, and D. Lesbarrères. 2015. Road Mortality Potentially Responsible for Billions of Pollinating Insect Deaths Annually. Journal of Insect Conservation, 19:1029–1035. Accessed January 23, 2025. https://link.springer.com/article/10.1007/s10841-015-9808-z

Bayne, E. M. and K. A. Hobson. 1998. The Effects of Habitat Fragmentation by Forestry and Agriculture on the Abundance of Small Mammals in the Southern Boreal Mixedwood Forest. Canadian Journal of Zoology, 76(1):62–68. Accessed January 23, 2025. https://cdnsciencepub.com/doi/10.1139/z97-171

Bayne, E. M., L. Habib, and S. Boutin. 2008. Impacts of Chronic Anthropogenic Noise from Energy-Sector Activity on Abundance of Songbirds in the Boreal Forest. Conservation Biology, 22(5):1186–1193. Accessed January 23, 2025. https://pubmed.ncbi.nlm.nih.gov/18616740/

Bee, M. A. and E. M. Swanson. 2007. Auditory Masking of Anuran Advertisement Calls by Road Traffic Noise. Animal Behaviour, 74(6):1765–1776. Accessed January 23, 2025. https://doi.org/10.1016/j.anbehav.2007.03.019

Bélisle, M. and C. C. St. Clair. 2001. Cumulative Effects of Barriers on the Movements of Forest Birds. Conservation Ecology, 5(2). Accessed November 29, 2023. https://doi.org/10.5751/ES-00312-050209

Benítez-López, A., R. Alkemade, and P. A. Verweij. 2010. Are Mammal and Bird Populations Declining in the Proximity of Roads and Other Infrastructure? CEE review 09-007 (SR68). Collaboration for Environmental Evidence. Accessed June 9, 2022. https://environmentalevidence.org/project/are-mammal-and-bird-populations-declining-in-the-proximity-of-roads-and-other-infrastructure-systematic-review/

Benoit-Pépin, A., M. J. Feldman, L. Imbeau, and O. Valeria. 2024. Use of Linear Features by Mammal Predators and Prey in Managed Boreal Forests. Forest Ecology and Management, 561. Accessed January 23, 2025. https://doi.org/10.1016/j.foreco.2024.121911

Benson, J. E., R. K. Tveten, M. G. Asher, and P. W. Dunwiddie. 2011. Shrub-Steppe and Grassland Restoration Manual for the Columbia River Basin. Olympia, Washington: Washington Department of Fish and Wildlife. https://wdfw.wa.gov/publications/01330

Berg, Å., K. Bergman, J. Wissman, M. Żmihorski, and E. Öckinger. 2016. Power-Line Corridors as Source Habitat for Butterflies in Forest Landscapes. Biological Conservation, 201:320–326. Accessed January 23, 2025. https://doi.org/10.1016/j.biocon.2016.07.034

Bergamini, E., S. Prandelli, F. Minelli, and R. C. Gatti. 2024. Impacts of Noise Pollution from High-speed rail and Road on Bird Diversity: A Case Study in a Protected Area of Italy. Environmental Science and Pollution Research, 31(22):1–10. Accessed January 23, 2025. https://www.researchgate.net/publication/379960112_Impacts_of_noise_pollution_from_high-speed_rail_and_road_on_bird_diversity_a_case_study_in_a_protected_area_of_Italy

Bernardino, J., K. Bevanger, R. Barrientos, J. F. Dwyer, A. T. Marques, R. C. Martins, J. M. Shaw, J. P. Silva, and F. Moreira. 2018. Bird Collisions with Power Lines: State of the Art and Priority areas for research. Biological Conservation, 222:1–13. Accessed January 23, 2025. https://www.sciencedirect.com/science/article/abs/pii/S0006320717317925

Beschta, R. L. 1997. Riparian Shade and Stream Temperature: An Alternative Perspective. Rangelands, 19(2):25–28. Accessed January 23, 2025. https://journals.uair.arizona.edu/index.php/rangelands/article/viewFile/11326/10599#:~:text=Riparian%20Shade%20and%20Stream%20Temperature

Betts, M. G., Z. Yang, A. S. Hadley, A. C. Smith, J. S. Rousseau, J. M. Northrup, J. J. Nocera, N. Gorelick, and B. D. Gerber. 2022. Forest Degradation Drives Widespread Avian Habitat and Population Declines. Nature Ecology and Evolution, 6:709–719. Accessed January 23, 2025. https://www.nature.com/articles/s41559-022-01737-8

Biasotto, L. D. and A. Kindel. 2018. Power Lines and Impacts on Biodiversity: A Systematic Review. Environmental Impact Assessment Review, 71:110–119. Accessed January 23, 2025. https://doi.org/10.1016/j.eiar.2018.04.010

BirdLife International. 2021. Protecting Birds Where They Live and Migrate. Accessed July 31, 2024. https://www.birdlife.org/projects/ibas-mapping-most-important-places/

Bird Studies Canada. 2024. IBA Criteria. Accessed September 16, 2024. https://www.ibacanada.ca/iba_criteria.jsp?lang=EN

BirdWeb. 2005. Ecoregions and Birding Sites. Accessed July 30, 2024. www.birdweb.org/birdweb/sites

BirdWeb. 2024. Okanogan Ecoregion and Birding Sites. Accessed October 8, 2024. https://www.birdweb.org/birdweb/ecoregion/sites/okanogan/%27site%27

Bishop, C. A. and J. M. Brogan. 2013. Estimates of Avian Mortality Attributed to Vehicle Collisions in Canada. Avian Conservation and Ecology, 8(2):2. Accessed January 23, 2025. http://dx.doi.org/10.5751/ACE-00604-080202

Bonneville Power Administration. 2019. Threatened Frogs Find Refuge in BPA Transmission Line Corridors. Accessed August 20, 2024. https://www.bpa.gov/-/media/Aep/about/publications/news-releases/20190415-pr-05-19-threatened-frogs-find-refuge-in-bpa-transmission-line-corridors.pdf

Borowik, T., M. Ratkiewicz, W. Maślanko, N. Duda, and R. Kowalczyk. 2020. The Level of Habitat Patchiness Influences Movement Strategy of Moose in Eastern Poland. PLOS ONE, 15(3). Accessed January 23, 2025. https://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0230521

Bouskila, A. 1995. Interactions Between Predation Risk and Competition: A Field study of Kangaroo Rats and Snakes. Ecology. 76(1):165–178. Accessed January 23, 2025. https://esajournals.onlinelibrary.wiley.com/doi/10.2307/1940639

Bowers, M. 1988. Seed Removal Experiments on Desert Rodents: The Microhabitat by Moonlight Effect. Journal of Mammalogy. 69(1):201–204. Accessed January 23, 2025. https://www.semanticscholar.org/paper/Seed-Removal-Experiments-on-Desert-Rodents%3A-The-by-Bowers/c0c6c6be43ea4a9c41601175498e38cec930e672

Boyes, D. H., D. M. Evans, R. Fox, M. S. Parsons, and M. J. O. Pocock. 2021. Street Lighting Has Detrimental Impacts on Local Insect Populations. Science Advances 7(35). Accessed January 23, 2025. https://www.science.org/doi/10.1126/sciadv.abi8322

Boyle, S. P., J. D. Litzgus, and D. Lesbarrères. 2020. Limited Evidence for Negative Effects of Highway Widening on North American Large Mammals. European Journal of Wildlife Research, 66(90). Accessed January 23, 2025. https://doi.org/10.1007/s10344-020-01428-4

Bradshaw, C. J. A., S. Boutin, and D. M. Hebert. 1997. Effects of Petroleum Exploration on Woodland Caribou in Northeastern Alberta. Journal of Wildlife Management 61(4):1127–1133. Accessed January 23, 2025. https://researchnow.flinders.edu.au/en/publications/effects-of-petroleum-exploration-on-woodland-caribou-in-northeast

Bramble, W. C., W. R. Byrnes, and M. D. Schuler. 1986. Effects of Special Right-of-Way Maintenance on an Avian Population. Journal of Arboriculture, 12(9). Accessed January 23, 2025. https://auf.isa-arbor.com/content/isa/12/9/219.full.pdf

Bramble, W. C., R. H. Yahner, and W. R. Byrnes. 1992. Breeding-Bird Population Changes Following Right-of-Way Maintenance Treatments. Journal of Arboriculture, 18(1). Accessed January 23, 2025. https://auf.isa-arbor.com/content/isa/18/1/23.full.pdf

Brosius. M. 2010. Effects of Transmission Lines and Pipelines on Wetland and Wildlife, and Best Management Practices – A Literature Review. Maryland Department of the Environment. Baltimore, Maryland: Wetlands and Waterways Program. Accessed January 23, 2025. https://www.nawm.org/state_meeting/2017/doc_bmp_final_conv.pdf

Browne, C. L. and C. A. Paszkowski. 2010. Hibernation Sites of Western Toads (Anaxyrus boreas): Characterization and Management Implications. Herpetological Conservation and Biology, 5(1):49–63. Accessed January 23, 2025. https://www.researchgate.net/publication/228493631_Hibernation_sites_of_western_toads_Anaxyrus_boreas_Characterization_and_management_implications

Bull, E. 2006. Sexual Differences in the Ecology and Habitat Selection of Western Toads (Bufo boreas) in Northeastern Oregon. Herpetological Conservation and Biology, 1(1):27–38. Accessed January 23, 2025. https://www.herpconbio.org/volume_1/issue_1/Bull_2006.pdf

Burke Museum. 2013. Mammals of Washington. Seattle, Washington. Accessed July 31, 2024. https://www.burkemuseum.org/collections-and-research/biology/mammalogy/mamwash/?_ga=2.1566001.1884039949.1730158265-2075511111.1730158265.

Butler, R. W. 1991. Habitat Selection and Time of Breeding in the Great Blue Heron, (*Ardea herodias*) [PhD Thesis]. University of British Columbia. Accessed December 14, 2023. https://open.library.ubc.ca/soa/cIRcle/collections/ubctheses/831/items/1.0100392

Butler, R. W. 1997. The Great Blue Heron: A Natural History and Ecology of a Seashore Sentinel. Vancouver, British Columbia: UBC Press.

Cabrera-Cruz, S. A. and R. Villegas-Patraca. 2016. Response of Migrating Raptors to an Increasing Number of Wind Farms. Journal of Applied Ecology, 53(6):1667–1675. Accessed January 23, 2025. https://besjournals.onlinelibrary.wiley.com/doi/10.1111/1365-2664.12673

CALTRANS (California Department of Transportation). 2016. Technical Guidance for Assessment and Mitigation of the Effects of Traffic Noise and Road Construction Noise on Birds. Sacramento, California: The California Department of Transportation, Division of Environmental Analysis, Sacramento. Accessed October 31, 2024. https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/noise-effects-on-birds-jun-2016-a11y.pdfpdf

Cassola, F. 2016. *Marmota olympus*. The IUCN Red List of Threatened Species 2016.T42459A22257452. Accessed January 23, 2025. https://www.iucnredlist.org/species/42459/22257452#population

Castaneda E., V. R. Leavings, R. F. Noss, and M. K. Grace. 2020. The Effects of Traffic Noise on Tadpole Behavior and Development. Urban Ecosystems, 23:245–253. Accessed January 23, 2025. https://link.springer.com/article/10.1007/s11252-020-00933-3

CEC (Commission for Environmental Cooperation). 2011. North American Terrestrial Ecoregions—Level III (E. Wiken, F. J. Nava, and G. Griffith, Editors). Montreal, Québec. Accessed July 30, 2024. www.cec.org/files/documents/publications/10415-north-american-terrestrial-ecoregionslevel-iii-en.pdf.

Cecala, K. K., W. H. Lowe, and J. C. Maerz. 2014. Riparian Disturbance Restricts In-Stream Movement of Salamanders. Freshwater Biology, 59(11):2354–2364. Accessed January 23, 2025. https://doi.org/10.1111/fwb.12439

Chamberlain, C. P., V. R. Kane, and M. J. Case. 2021. Accelerating the Development of Structural Complexity: lidar Analysis Supports Restoration as a Tool in Coastal Pacific Northwest Forests. Forest Ecology and Management, 500. Accessed January 23, 2025. https://www.sciencedirect.com/science/article/abs/pii/S0378112721007313

Chan-McLeod, A. C. A. 2003. Factors Affecting the Permeability of Clearcuts to Red-Legged Frogs. The Journal of Wildlife Management, 67(4):663–671. Accessed January 23, 2025. https://doi.org/10.2307/3802673

Colorado State University. 2016. Outdoor Recreation in Protected Areas Negatively Impacts Wildlife. Fort Collins, Colorado. Accessed September 3, 2024. https://phys.org/news/2016-12-outdoor-recreation-areas-negatively-impacts.html

Combs, J. K, D. W. Stinson, and A. Potter. 2023. Periodic status review for the Mardon Skipper. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 23, 2025. https://wdfw.wa.gov/sites/default/files/publications/02417/wdfw02417.pdf

Conservation Biology Institute. 2024. Data Basin. Accessed September 11, 2024. https://databasin.org/maps/new/#datasets=ae02301d773945c983001a109cef09d6

Copping, A. E., L. G. Hemery, H. Viehman, A. C. Seitz, G. J. Staines, and D. J. Hasselman. 2021. Are Fish in Danger? A Review of Environmental Effects of Marine Renewable Energy on Fishes. Biological Conservation, 262:1–13. Accessed January 23, 2025. https://doi.org/10.1016/j.biocon.2021.109297

Corkran, C. C. and C. Thoms. 1996. Amphibians of Oregon, Washington and British Columbia: A Field Identification Guide. Tukwila, Washington: Long Pine Pub.

Cornell, E. A. and J. P. Hailman. 1984. Pupillary Responses of Two Rana Pipiens-complex Anuran Species. Herpetologica. 40(4):356–366. Accessed January 23, 2025. https://www.jstor.org/stable/3892087

Cornell Lab. 2024. Birds of the World. Ithaca, New York: Cornell Lab of Ornithology. Accessed September 9, 2024. https://birdsoftheworld-org.proxy.birdsoftheworld.org/bow/home

COSEWIC. 2012. COSEWIC Assessment and Status Report on the Western Toad (Anaxyrus boreas) Non-calling Population/Calling Population in Canada. COSEWIC Ott. xiv:71. Accessed October 28, 2024. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/western-toad-2012.html

Cott, P. A., A. Schein, B. W. Hanna, T. A. Johnston, D. D. MacDonald, and J. M. Gunn. 2015. Implications of Linear Developments on Northern Fishes. Environmental Review, 23:1–14. Accessed January 23, 2025. https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/Cott%20et%20al.%202015_linear%20devel_fish_Env.%20Rev..pdf

Cramer, M. L. (Managing Editor). 2012. Stream Habitat Restoration Guidelines. Olympia, Washington: Co-published by the Washington Departments of Fish and Wildlife, Natural Resources, Transportation, and Ecology, Washington State Recreation and Conservation Office, Puget Sound Partnership, and the US. Fish and Wildlife Service. Accessed January 23, 2025. https://wdfw.wa.gov/sites/default/files/publications/01374/wdfw01374.pdf

Crooks, K. R., C. L. Burdett, D. M. Theobald, S. R. B. King, M. Di Marco, C. Rondinini, and L. Boitani. 2017. Quantification of habitat fragmentation reveals extinction risk in terrestrial mammals. Proceedings of the National Academy of Sciences, 114(29):7635–7640. Accessed January 23, 2025. https://pubmed.ncbi.nlm.nih.gov/28673992/

Cullinan, T. 2001. Important Bird Areas of Washington. Olympia, Washington: Audubon Washington. Accessed January 23, 2025. https://wa.audubon.org/sites/default/files/static_pages/attachments/iba-1-50_pacific_coast.pdf

Dániel-Ferreira, J., R. Bommarco, J. Wissman, and E. Öckinger. 2020. Linear Infrastructure Habitats Increase Landscape-scale Diversity of Plants but not of Flower-visiting Insects. Scientific Reports, 10(21374). Accessed January 23, 2025. https://doi.org/10.1038/s41598-020-78090-y

Dawson, W. R. 2020. Pine Siskin (Spinus pinus), version 1.0. In Birds of the World (A. F. Poole, Editor). Ithaca, New York: Cornell Lab of Ornithology. Accessed January 23, 2025. https://doi.org/10.2173/bow.pinsis.01

DeMars, C. A. and S. A. Boutin. 2018. Nowhere to Hide: Effects of Linear Features on Predator–Prey Dynamics in a Large Mammal System. Journal of Animal Ecology, 87(1):274–284. Accessed January 23, 2025. https://besjournals.onlinelibrary.wiley.com/doi/10.1111/1365-2656.12760

Desimone, S. M. 2016. Periodic Status Review for the Marbled Murrelet in Washington. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 23, 2025. https://wdfw.wa.gov/publications/01827

Desrochers A. and S. Hannon. 1997. Gap Crossing Decisions by Forest Songbirds during the Post-Fledging Period. Conservation Biology, 11(5):1204–1210. Accessed January 23, 2025. https://www.jstor.org/stable/2387402

Develop with Care. 2014. Environmental Guidelines for Urban and Rural Land Development in British Columbia. Fact Sheet #13, Western Toad. Accessed September 25, 2024. https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/develop-with-care/fact-sheet-13-western-toad.pdf

Dickie, M., S. R. McNay, G. D. Sutherland, M. Cody, and T. Avgar. 2020. Corridors or Risk? Movement Along, and Use of, Linear Features Varies Predictably Among Large Mammal Predator and Prey Species. The Journal of Animal Ecology, 89(2):623–634. Accessed January 23, 2025. https://besjournals.onlinelibrary.wiley.com/doi/10.1111/1365-2656.13130

DNR (Washington State Department of Natural Resources). 2022. Ecoregions of the Pacific Northwest. Accessed August 21, 2024. https://data-wadnr.opendata.arcgis.com/datasets/wadnr::ecoregions-of-the-pacific-northwest/explore?location=42.975673%2C-119.790189%2C5.18

DNR (Washington State Department of Natural Resources). 2024. Forest Practices Water Typing. Accessed August 19, 2024. https://www.dnr.wa.gov/forest-practices-water-typing

Doody, J. S., P. West, J. Stapley, M. Welsh, A. Tucker, E. Guarino, M. Pauza, et al. 2003. Fauna By-Catch in Pipeline Trenches: Conservation, Animal Ethics, and Current Practices in Australia. Australian Zoologist, 32(3):410–419. Accessed January 23, 2025. https://meridian.allenpress.com/australian-zoologist/article/32/3/410/134968/Fauna-by-catch-in-pipeline-trenches-conservation

Ducks Unlimited Canada. 2008. Next Box Guide for Waterfowl. Accessed September 20, 2024. https://www.ab-conservation.com/downloads/educational_materials/brochures/nest_box_guide_and_instructions.pdf

Drewitt, A. L. and R. H. W. Langston. 2006. Assessing the Impacts of Wind Farms on Birds. Ibis, 148(s1):29–42. Accessed January 23, 2024. https://onlinelibrary.wiley.com/doi/full/10.1111/j.1474-919X.2006.00516.x

D'Souza, F. and R. D. Martin. 1974. Maternal Behaviour and the Effects of Stress in Tree Shrews. Nature, 251:309–311. Accessed January 23, 2025. https://doi.org/10.1038/251309a0

Dwyer J. F., A. K. Pandey, L. A. McHale, and R. E. Harness. 2019. Near-Ultraviolet Light Reduced Sandhill Crane Collisions with a Power Line by 98%. The Condor, 121(2):1–10. Accessed January 23, 2025. https://academic.oup.com/condor/article/121/2/duz008/5476728

Ecology (Washington State Department of Ecology). 2012a. Stormwater Management Manual for Western Washington. Volume IV Source Control BMPs. Publication No. 12-10-030. Olympia, Washington. Accessed January 23, 2025. https://apps.ecology.wa.gov/publications/parts/1210030part5.pdf

Ecology (Washington State Department of Ecology). 2012b. Vehicle and Equipment Washwater Discharges. Best Management Practices Manual. Olympia, Washington. Accessed January 23, 2025. https://apps.ecology.wa.gov/publications/summarypages/95056.html

Ecology (Washington State Department of Ecology). 2024. Stormwater Management Manual for Eastern Washington. Olympia, Washington. Accessed October 28, 2024. https://fortress.wa.gov/ecy/ezshare/wq/SWMMs/2024SWMMEW/Content/Resources/DocsForDownload/2024SWMMEW_6-14-24.pdf

Ecology (Washington State Department of Ecology), U.S. Army Corps of Engineers Seattle District, and U.S. Environmental Protection Agency Region 10. 2006. Wetland Mitigation in Washington State-Part 2: Developing Mitigation Plans (Version 1), Washington State Department of Ecology Publication #06-06-011b. Olympia, Washington. Accessed January 23, 2025. https://apps.ecology.wa.gov/publications/parts/1210030part5.pdf

Ecology (Washington State Department of Ecology), U.S. Army Corps of Engineers Seattle District, and U.S. Environmental Protection Agency Region 10. 2021. Wetland Mitigation in Washington State- Part 1: Agency Policies and Guidance (Version 2), Washington State Department of Ecology Publication #21-06-003. Olympia, Washington. Accessed January 23, 2025. https://apps.ecology.wa.gov/publications/documents/2106003.pdf

ECOSTEM Ltd. 2019. Keeyask Transmission Project: Environmental Effects Monitoring – Ecosystem Diversity Monitoring in 2018. A Report Prepared for Manitoba Hydro by ECOSTEM Ltd., January 2019. Accessed January 23, 2025. https://www.hydro.mb.ca/docs/projects/keeyask/ecosystem_diversity_report_2019.pdf

Eftestøl, S., D. Tsegaye, K. Flydal, and J. E. Colman. 2016. From High Voltage (300kV) to Higher Voltage (420kV) Power Lines: Reindeer Avoid Construction Activities. Polar Biology, 39:689–699. Accessed August 30, 2024. https://link.springer.com/article/10.1007/s00300-015-1825-6

Eggeman, S. L., M. Hebblewhite, H. Bohm, J. Whittington, and E. H. Merrill. 2016. Behavioural Flexibility in Migratory Behaviour in a Long-Lived Large Herbivore. Journal of Animal Ecology, 85(3):785–797. Accessed January 23, 2025. https://besjournals.onlinelibrary.wiley.com/doi/10.1111/1365-2656.12495

Enge, K. M., D. T. Cobb, G. L. Sprandel, and D. L. Francis. 1996. Wildlife Captures in a Pipeline Trench in Gadsen County, Florida. Florida Scientist, Quarterly Journal of The Florida Academy of Sciences, 59(1):1–11. Accessed January 23, 2025. https://www.jstor.org/stable/24320660

Environmental BioAcoustics. 2007. The Effects of Highway Noise on Birds. Prepared for The California Department of Transportation. Accessed January 23, 2025. https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/bio-effects-hwy-noise-birds-100707-a11y.pdf

Erritzøe, J., T. D. Mazgajski, and R. Lukasz. 2003. Bird Casualties on European Roads - A Review. Acta Ornithologica, 38(2):77–93. Accessed January 23, 2025. https://www.researchgate.net/publication/258211778_Bird_Casualties_on_European_Roads_-_A_Review

Erskine D. J. and V. H. Hutchison. 1982. Reduced Thermal Tolerance in an Amphibian Treated with Melatonin. Journal of Thermal Biology, 7(2):121–123. Accessed January 23, 2025. https://www.academia.edu/103963986/Reduced_thermal_tolerance_in_an_amphibian_treated_with_melatonin?uc-sb-sw=6642114

Ervin, E.L., R.N. Fisher, and K.R. Crooks. 2001. Factors Influencing Road-Related Amphibian Mortality in Southern California. University of California, Davis: Road Ecology Center. Accessed January 23, 2025. https://escholarship.org/uc/item/9tq3k4vr

Ewers, R. M. and R. K. Didham. 2006. Confounding Factors in the Detection of Species Responses to Habitat Fragmentation. Biological Reviews, 81(1):117–142. Accessed January 23, 2025. https://onlinelibrary.wiley.com/doi/abs/10.1017/S1464793105006949

Fain, G. L., H. R. Matthews, M. C. Cornwall, and Y. Koutalos. 2001. Adaptation in Vertebrate Photoreceptors. Physiological Review, 81(1):117–151. Accessed January 23, 2025. https://pubmed.ncbi.nlm.nih.gov/11152756/

Ferrer, M., M. De Lucas., E. Hinojosa, and V. Morandini. 2020. Transporting Biodiversity Using Transmission Power Lines as Stepping-Stones? Diversity, 12(11):439. Accessed January 23, 2025. https://doi.org/10.3390/d12110439

Fisher, C. and M. Slater. 2010. Effects of Electromagnetic Fields on Marine Species: A Literature Review. Portland, Oregon: Oregon Wave Energy Trust. Accessed January 23, 2025. https://tethys.pnnl.gov/sites/default/files/publications/Effects_of_Electromagnetic_Fields_on_Marine_Species.pdf

Folkerts, K. E., T. P. Johnson, and J. L. Michalak. 2023. PHS Local Government User Guide: Shrubsteppe and Eastside Steppe Map. Olympia, Washington: Habitat Program, Washington Department of Fish and Wildlife. https://wdfw.wa.gov/publications/02424

Formicki, K. and A. Winnicki. 1998. Reactions of Fish Embryos and Larvae to Constant Magnetic Fields. Italian Journal of Zoology, 65:S1, 479–482. Accessed January 23, 2025. https://www.tandfonline.com/doi/pdf/10.1080/11250009809386870

Fortin, C. and G. Doucet. 2008. Small Mammal Communities along Transmission Power Line Rights-of-Way in Deciduous Forests of Québec. Environment Concerns in Rights-of-Way Management 8th International Symposium. Accessed January 23, 2025. https://www.semanticscholar.org/paper/Small-Mammal-Communities-along-Transmission-Power-Fortin-Doucet/4478906d57cca8b2959b96450ac6fe3d4e7d309e

Francis C. D., C. P. Ortega, and A. Cruz. 2009. Noise Pollution Changes Avian Communities and Species Interactions. Current Biology, 19(16):1415–1419. Accessed January 23, 2025. https://pubmed.ncbi.nlm.nih.gov/19631542/

Froidevaux J. S. P., G. Jones, C. Kerbiriou, and K. J. Park. 2023. Acoustic Activity of Bats at Power Lines Correlates with Relative Humidity: A Potential Role for Corona Discharges. Proceedings of the Royal Society B: Biological Sciences, 290(1995). Accessed January 23, 2025. https://doi.org/10.1098/rspb.2022.2510

Fukumoto, J. and S. Herrero. 1998. Observations of the Long-toed Salamander, Ambystoma macrodactylum, in Waterton Lakes National Park, Alberta. Canadian Field-Naturalist ,112(4):579–585. Accessed January 23, 2025. https://www.biodiversitylibrary.org/part/358485

Garshelis, D. L. 2000. Delusions in Habitat Evaluation: Measuring Use, Selection and Importance. In Boitani, L. and T. K. Fuller (Editors), pp. 111–164, Research Techniques in Animal Ecology: Controversies and Consequences. New York, New York: Columbia University Press. Accessed January 23, 2025. https://www.researchgate.net/publication/236981849_Delusions_in_Habitat_Evaluation_Measuring_Use_Selection_and_Importance

Gaston K. J., and J. Bennie. 2014. Demographic Effects of Artificial Nighttime Lighting on Animal Populations. Environmental Reviews, 22(4):323–330. Accessed January 23, 2025. https://doi.org/10.1139/er-2014-0005

Gaston K. J., J. Bennie, T. W. Davies, and J. Hopkins. 2013. The Ecological Impacts of Nighttime Light Pollution: A Mechanistic Appraisal. Biological Reviews, 88(4):912–927. Accessed January 23, 2025. https://onlinelibrary.wiley.com/doi/full/10.1111/brv.12036

Gerlach, G. and K. Musolf. 2000. Fragmentation of Landscape as a Cause for Genetic Subdivision in Bank Voles. Conservation Biology, 14(4):1066–1074. Accessed January 23, 2025. https://conbio.onlinelibrary.wiley.com/doi/abs/10.1046/j.1523-1739.2000.98519.x

Goodwin, J. G. 1975. Big Game Movement Near a 500-kV Transmission Line in Northern Idaho. Prepared for the Bonneville Power Administration, Engineering and Construction Division, Portland, Oregon. Boulder, Colorado: Intern with the Western Interstate Commission for Higher Education (WICHE), Resources Development Internship Program (RDIP).

Gravel M., M. J. Mazerolle, and M. Villard. 2012. Interactive Effects of Roads and Weather on Juvenile Amphibian Movements. Amphibia-Reptilia, 33(1):113–127. Accessed January 23, 2025. https://brill.com/view/journals/amre/33/1/article-p113_11.xml

Grid North Partners. 2021. Underground Transmission Lines. Accessed September 27, 2024. https://gridnorthpartners.com/wp-content/uploads/2021/02/Underground-Transmission-Lines.pdf

Gunson, K. E., B. Chruszcz, and A. P. Clevenger. 2003. Large Animal-Vehicle Collisions in the Central Canadian Rocky Mountains: Patterns and Characteristics. In Irwin, C. L., P. Garett, and K. P. McDermott (Editors), pp. 355–366, Proceedings of the 2003 International Conference on Ecology and Transportation. Raleigh, North Carolina: Center for Transportation and the Environment, North Carolina State University. Accessed January 23, 2025. https://escholarship.org/uc/item/3qm680qb

Gutiérrez, R. J., A. B. Franklin, and W. S. Lahaye. 2020. Spotted Owl (*Strix occidentalis*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Ithaca, New York: Cornell Lab of Ornithology. Accessed January 23, 2025. https://doi.org/10.2173/bow.spoowl.01

Gyug, L. W., R. C. Dobbs, T. E. Martin, and C. J. Conway. 2023. Williamson's Sapsucker (*Sphyrapicus thyroideus*), version 2.0. In Birds of the World (S. M. Billerman and B. K. Keeney, Editors). Ithaca, New York: Cornell Lab of Ornithology. Accessed January 23, 2025. https://doi.org/10.2173/bow.wilsap.02

Habib, L., E. M. Bayne, and S. Boutin. 2007. Chronic Industrial Noise Affects Pairing Success and Age Structure of Ovenbirds. Journal of Applied Ecology, 44(1):176–184. Accessed January 23, 2025. https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/j.1365-2664.2006.01234.x

Haddad, N. M, L. A. Brudvig, J. Clobert, K. F. Davies, A. Gonzalez, R. D. Holt., T. E Lovejoy, J. O. Sexton, M. P. Austin, J. R. Townsend, et al. 2015. Habitat Fragmentation and Its Lasting Impact on Earth's Ecosystems. ScienceAdvances, 1(2). Accessed January 23, 2025. https://doi.org/10.1126/sciadv.1500052

Hallock, L. A., A. McMillan, and G. J. Wiles. 2017. Periodic status review for the Western Pond Turtle in Washington. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 23, 2025. https://wdfw.wa.gov/publications/01853

Hanski, I. 2015. Habitat Fragmentation and Species Richness. Journal of Biogeography, 42:989–994. Accessed January 23, 2025. https://onlinelibrary.wiley.com/doi/pdf/10.1111/jbi.12478

Harris, R. J. and J. M. Reed. 2002. Behavioral Barriers to Non-Migratory Movements of Birds. Annales Zoologici Fennici, 39(4):275–290. Accessed January 23, 2025. https://www.jstor.org/stable/23735827

Harvey, J. A., M. Abarca, P. K. Abram, J. G. Kingsolver, P. J. Ode, N. Stork, et al. 2023. Scientists' Warning on Climate Change and Insects. Ecological Monographs, 93(1), e1553. Accessed January 23, 2025. https://doi.org/10.1002/ecm.1553

Hayes, G. E. and J. A. Gallie. 2024. Draft periodic status review for the Pygmy Rabbit. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 23, 2925. https://wdfw.wa.gov/sites/default/files/publications/02507/wdfw02507.pdf

Hayes, G. E. and J. W. Watson. 2021. Periodic Status Review for the Ferruginous Hawk. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 23, 2025. https://wdfw.wa.gov/publications/02210

Hayes, G. E. and G. J. Wiles. 2013. Washington State Bat Conservation Plan. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 23, 2025. https://wdfw.wa.gov/publications/01504

Hays, D. W. and D. W. Stinson. 2019. Draft Periodic Status Review for the Oregon Silverspot in Washington. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 23, 2025. https://wdfw.wa.gov/publications/02052

Hill, L. 2003. Assessing the Relative Contributions Transmission Line Rights-Of-Way Have on Habitat Utilization by Moose Case Study: Riding Mountain National Park [Thesis]. Winnipeg, Manitoba: University of Manitoba. Accessed January 23, 2025. https://mspace.lib.umanitoba.ca/items/94247b8e-292e-45f7-9f90-153ccfda0d69

Hunt, P. D. and D. J. Flaspohler. 2020. Yellow-rumped Warbler (Setophaga coronata), version 1.0. In Birds of the World (P. G. Rodewald, Editor). Ithaca, New York: Cornell Lab of Ornithology. Accessed January 23, 2025. https://doi.org/10.2173/bow.yerwar.01

Husby, M. 2016. Factors Affecting Road Mortality in Birds. Norway: Nord University. Accessed January 23, 2025. https://www.researchgate.net/publication/313574432_Factors_affecting_road_mortality_in_birds iNaturalist Community. 2024a. Observations of Arthropods from Washington, United States, observed up to September 13, 2024. Accessed September 13, 2024. https://www.inaturalist.org

iNaturalist Community. 2024b. Observations of Molluscs from Washington, United States, observed up to September 13, 2024. Accessed September 13, 2024. https://www.inaturalist.org

iNaturalist Community. 2024c. Observations of Annelids from Washington, United States, observed up to September 13, 2024. Accessed September 13, 2024. https://www.inaturalist.org

IUCN (International Union for Conservation of Nature). 2024. The IUCN Red List of Threatened Species. Version 2024-2. Cambridge, United Kingdom: IUCN Biodiversity Assessment & Knowledge Team: Red List Unit. Accessed December 2024. https://www.iucnredlist.org

Jalkotzy, M. G., P. I. Ross, and M. D. Nasserden. 1997. The Effects of Linear Developments on Wildlife: A Review of Selected Scientific Literature. Calgary, Alberta: Prepared for Canadian Association of Petroleum Producers by Arc Wildlife Services Ltd. Accessed January 23, 2025. https://www.arlis.org/docs/vol1/A/65937142.pdf

James, R. D. 1984. Habitat Management Guidelines for Cavity-Nesting Birds in Ontario. Peterborough, Ontario: Ontario Ministry of Natural Resources. Accessed September 20, 2024. https://www.birdscanada.org/wp-content/uploads/2021/03/Habitat-Management-Guidelines-for-Cavity-nesting-birds-in-Ontario-1.pdf

Janža, R., N. Stritih-Peljhan, A. Škorjanc, J. Polajnar, and M. Virant-Doberlet. 2024. Vibrational Noise Disrupts *Nezara viridula* Communication, Irrespective of Spectral Overlap. Communications Biology, 7:1533. Accessed January 23, 2025. https://doi.org/10.1038/s42003-024-07185-3

Jochimsen, D. M., C. R. Peterson, K. M. Andrews, and J. W. Gibbons. 2004. A Literature Review of the Effects of Roads on Amphibians and Reptiles and the Measures Used to Minimize Those Effects. Idaho Fish and Game Department and USDA Forest Service. Accessed January 23, 2025. https://idfg.idaho.gov/sites/default/files/old-web/docs/wildlife/collisionAmphibRep.pdf

Johnson-Bice, S. M., T. D. Gable, A. T. Homkes, S. K. Windels, J. K. Bump, and J. G. Bruggink. 2023. Logging, Linear Features, and Human Infrastructure Shape the Spatial Dynamics of Wolf Predation on an Ungulate Neonate. Ecological Applications, 33(7). Accessed January 23, 2025. https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/eap.2911

Jones. P. F., A. F. Jakes, A. C. Telander, H. Sawyer, B. H. Martin, and M. Hebblewhite. 2019. Fences Reduce Habitat for a Partially Migratory Ungulate in the Northern Sagebrush Steppe. Ecosphere, 10(7). Accessed September 5, 2024. https://esajournals.onlinelibrary.wiley.com/doi/epdf/10.1002/ecs2.2782

Kahnonitch I., Y. Lubin, and C. Korine. 2018. Insectivorous Bats in Semi-Arid Agroecosystems − Effects on Foraging Activity and Implications for Insect Pest Control. Agriculture, Ecosystems & Environment, 261:80-92. Accessed January 24, 2025. https://www.sciencedirect.com/science/article/abs/pii/S0167880917304851

Kaiser K., D. G. Scofield, M. Alloush, R. M. Jones, S. Marczak, K. Martineau, M. A. Oliva, and P. M. Narins. 2011. When Sounds Collide: The Effect of Anthropogenic Noise on a Breeding Assemblage of Frogs in Belize, Central America. Behaviour, 148(2):215–232. Accessed January 24, 2025. https://www.jstor.org/stable/25799807

Kauffman, M., B. Lowrey, C. Beaupre, S. Bergen, S. Bergh, K. Blecha, S. Bundick, H. Burkett, et al. 2024. Ungulate migrations of the Western United States, volume 4: U.S. Geological Survey Scientific Investigations Report 2024–5006. Accessed January 24, 2025. https://doi.org/10.3133/sir20245006

Kauffman, M., B. Lowrey, J. Berg, S. Bergen, D. Brimeyer, P. Burke, T. Cufaude, et al. 2022. Ungulate Migrations of the Western United States, Volume 3: U.S. Geological Survey Scientific Investigations Report 2022–5088. Accessed January 24, 2025. https://doi.org/10.3133/sir20225088

Kays, R., A. W. Parsons, M. C. Baker, E. L. Kalies, T. Forrester, R. Costello, C. T. Rota, et al. 2017. Does Hunting or Hiking Affect Wildlife Communities in Protected Areas? Journal of Applied Ecology, 54(1):242–252. Accessed January 24, 2025. https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/1365-2664.12700

Keehn, J., K. Shoemaker, and C. Feldman. 2019. Population-Level Effects of Wind Farms on a Desert Lizard. Journal of Wildlife Management, 83(1):145–157. DOI: 10.1002/jwmg.21565.

Kempenaers, B., P. Borgström, P. Loës, E. Schlicht, and M. Valcu. 2010. Artificial Night Lighting Affects Dawn Song, Extra-pair Siring Success, and Lay Date in Songbirds. Current Biology, 20(19):1735–1739. Accessed January 24, 2025. https://www.sciencedirect.com/science/article/pii/S0960982210010183

King, J. J. and R. S. Wagner. 2010. Toxic Effects of the Herbicide Roundup® Regular on Pacific Northwestern Amphibians. Northwestern Naturalist, 91(3):318-324. Accessed January 24, 2025. https://www.researchgate.net/publication/232693449_Toxic_Effects_of_the_Herbicide_RoundupR_Regular_on_Pacific_Northwestern_Amphibians/citations

Knight, K. 2009. Land Use Planning for Salmon, Steelhead and Trout. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/publications/00033

Lambert, T. D., K. L. Sumpter, J. W. Dittel, S. Dupre, K. Casanova, A. Winker, and G. H. Adler. 2014. Roads as Barriers to Seed Dispersal by Small Mammals in a Neotropical Forest. Tropical Ecology, 55(2):263-269. Accessed January 3, 2025. https://www.researchgate.net/profile/Jacob-Dittel/publication/286348484_Roads_as_barriers_to_seed_dispersal_by_small_mammals_in_a_neotropical_forest/links/567304dc08ae04d9b099bb32/Roads-as-barriers-to-seed-dispersal-by-small-mammals-in-a-neotropical-forest.pdf

Langlois L. A., S. J. Brenner, and M. C. Brittingham. 2023. Collocating Pipelines to Minimize Fragmentation: Evaluating Ecological Costs of a Shale Gas Mitigation Practice. Journal of Wildlife Management, 87(7):e22468. Accessed January 24, 2025. https://wildlife.onlinelibrary.wiley.com/doi/full/10.1002/jwmg.22468

Larsen, E. M. (Editor). 1997. Management Recommendations for Washington's Priority Species, Volume III: Amphibians and Reptiles. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/publications/00025/wdfw00025.pdf

Larsen, E. M., J. M. Azerrad, N. Nordstrom (Editors). 2004. Management Recommendations for Washington's Priority Species, Volume IV: Birds. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/publications/00026/wdfw00026.pdf#:~:text=Management%20Recommendations%20for

Larsen, E. M., E. Rodrick, and R. Milner (Editors). 1995. Management Recommendations for Washington's Priority Species, Volume I: Invertebrates. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/publications/00024/wdfw00024.pdf

Larson, C. L., S. E. Reed, A. M. Merenlender, and K. R. Crooks. 2016. Effects of Recreation on Animals Revealed as Widespread through a Global Systematic Review. PLOS ONE, 11(12). Accessed January 24, 2025. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0167259

LeBeau, C. W., K. T. Smith, M. J. Holloran, J. L. Beck, M. E. Kauffman, and G. D. Johnson. 2019. Greater Sage-Grouse Habitat Function Relative to 230-kV Transmission Lines. The Journal of Wildlife Management, 83(3):1773–1786. Accessed August 28, 2024. https://www.uwyo.edu/esm/faculty-and-staff/faculty/beck/_files/docs/publications/lebeau-et-al-2019-jwm.pdf

Lehman, R. N., J. A. Savidge, P. L. Kennedy, and R. E. Harness. 2010. Raptor Electrocution Rates for a Utility in the Intermountain Western United States. Journal of Wildlife Management, 74(3):459–470. Accessed January 24, 2025. https://www.researchgate.net/publication/229514812_Raptor_Electrocution_Rates_for_a_Utility_in_the_Intermountain_Western_United_States

Lehmkuhl, J. F. and L. F. Ruggiero. 1991. Forest Fragmentation in the Pacific Northwest USA and its Potential Effects on Wildlife. U.S. Forest Service General Technical Report PNW, 285:35–46. Accessed January 24, 2025. https://www.researchgate.net/publication/265280291_Forest_Fragmentation_in_the_Pacific_Northwest_and_its_Potential_Effects_on_Wildlife

Lengagne, T. 2008. Traffic Noise Affects Communication Behavior in a Breeding Anuran, *Hyla arborea*. Biological Conservation, 141(8):2023–2031. Accessed January 24, 2025. https://www.sciencedirect.com/science/article/abs/pii/S0006320708002024

Lesbarrères, D., S. L. Ashpole, C. A. Bishop, G. Blouin-Demers, R. J. Brooks, P. Echaubard, P. Govindarajulu, et al. 2014. Conservation of Herpetofauna in Northern Landscapes: Threats and Challenges from a Canadian Perspective. Biological Conservation, 170:48-55. Accessed January 24, 2025. https://www.sciencedirect.com/science/article/abs/pii/S0006320713004515

Lewis, J. C. 2019. Periodic Status Review for the Grizzly Bear in Washington. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/publications/01963

Lewis, J. S., S. Spaulding, H. Swanson, W. Keeley, A. R. Gramza, S. VandeWoude, and K. R. Crooks. 2021. Human Activity Influences Wildlife Populations and Activity Patterns: Implications for Spatial and Temporal Refuges. Ecosphere, 12(5). Accessed January 24, 2025. https://esajournals.onlinelibrary.wiley.com/doi/10.1002/ecs2.3487

Linders, M. J., K. Lewis, and K. Curry. 2020. 2019 Review Draft of the Final Annual Report related to: US Fish and Wildlife Service (Cooperative Agreement #F16AC00588, F19AC00408) and Joint Base Lewis-McChord (Contract #W911S8-12-H-0001, W911S8-18-2-0008, W911S81820017, W911S81920011). Accessed January 24, 2025. https://cascadiaprairieoak.org/wp-content/uploads/2021/04/2019_EetTrans_Lindersetal2019_FinalAnnualReport_16Jun2020.pdf

Linders, M. J., W. M. Vander Haegen, J. M. Azerrad, R. Dobson, and T. Labbe. 2010. Management Recommendations for Washington's Priority Species: Western Gray Squirrel. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/2019-10/western_gray_squirrel_final.pdf#:~:text=Western%20Gray%20Squirrel%20habitat%20is

Loss, S. R., T. Will, and P. P. Marra. 2014. Refining Estimates of Bird Collision and Electrocution Mortality at Power Lines in the United States. PLOS ONE, 9(7). Accessed January 24, 2025. https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0101565&type=printable

Lutz, D. W., J. R. Heffelfinger, S. A. Tessmann, R. S. Gamo, and S. Siegel. 2011. Energy Development Guidelines for Mule Deer. Boise, Idaho: Mule Deer Working Group, Western Association of Fish & Wildlife Agencies. Accessed January 24, 2025. https://wafwa.org/wpdm-package/energy-development-guidelines-for-mule-deer/

Lyons, A. L., W. L. Gaines, C. Servheen. 2003. Black Bear Resource Selection in the Northeast Cascades, Washington. Biological Conservation, 113(1):55-62. Accessed January 24, 2025. https://www.sciencedirect.com/science/article/abs/pii/S000632070200349X

Mainstream Restoration Inc. 2007. Pend Oreille River in the Box Canyon Reservoir, Riverbank Stabilization Guidelines. Bozeman, Montana: Prepared for Washington Department of Fish and Wildlife, Olympia, Washington, by Mainstream Restoration Inc. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/publications/00651/wdfw00651.pdf

Manci, K. M., D. N. Gladwin, R. Villella, and M. G. Cavendish. 1988. Effects of Aircraft Noise and Sonic Booms on Domestic Animals and Wildlife: A Literature Synthesis. Fort Collins, Colorado: U.S. Department of the Interior, Fish and Wildlife Service, National Ecology Research Center. Accessed January 24, 2025. https://www.semanticscholar.org/paper/Effects-of-Aircraft-Noise-and-Sonic-Booms-on-and-A-Manci-Gladwin/7eba60ce0860e7fc747ad3995111cc628ff20e39

Manitoba Hydro. 2010. Fur, Feathers, Fins & Transmission Lines How Transmission Lines and Rights-of-Way Affect Wildlife. Winnipeg, Manitoba: Manitoba Hydro. Accessed January 24, 2025. https://www.hydro.mb.ca/docs/corporate/fur_feathers_fins_and_transmission_lines.pdf

Manville II, A. M. 2016. Impacts to Birds and Bats Due to Collisions and Electrocutions from Some Tall Structures in the United States: Wires, Towers, Turbines, and Solar Arrays—State of The Art in Addressing the Problems (Angelici, F. M., Editor), pp. 415–442. Problematic wildlife a cross-disciplinary approach. New York, New York: Springer International Publishing. Accessed January 24, 2025. https://link.springer.com/chapter/10.1007/978-3-319-22246-2_20

Martin, C. J., E. W. Bork, and S. E. Nielsen. 2022. Mortality of Grassland Birds Increases with Transmission Lines. Avian Conservation and Ecology, 17(1):17. Accessed January 24, 2025. https://ace-lab.ca/assets_b/Martin%20et%20al.%20(2022)%20ACE-ECO.pdf

Martin, M. F. and J. M. Azerrad. 2023a. Management Recommendations for Washington's Priority Habitats and Species: Riparian Pollinators. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/publications/02451/wdfw02451.pdf

Martin, M. F. and J. M. Azerrad. 2023b. Management Recommendations for Washington's Priority Species: Western Bumble Bee. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/publications/02441

Martín, J., J. R. Garrido López, H. Clavero Sousa, and V. Barrios (Editors). 2022. Wildlife and Power Lines. Guidelines for Preventing and Mitigating Wildlife Mortality Associated with Electricity Distribution Networks. Gland, Switzerland: IUCN. Accessed January 24, 2025. https://portals.iucn.org/library/node/50657

Matsuda, B. M., D. M. Green, and P. T. Gregory. 2006. Amphibians and Reptiles of British Columbia Handbook. Victoria, British Columbia: Royal BC Museum.

Maxcy, K. A. and J. Richardson. 2000. Abundance and Movements of Terrestrial Salamanders in Second-Growth Forests of Southwestern British Columbia. Vol. 1. In Darling, L. M. (Editor), p. 490. Proceedings of a Conference on the Biology and Management of Species and Habitats at Risk, B.C. Kamloops, British Columbia: B.C. Ministry of Environment, Lands and Parks, Victoria, B.C., and University College of the Cariboo. Accessed January 24, 2025. https://www.env.gov.bc.ca/wld/documents/ce12maxcy.pdf

Mazerolle, M. J. and A. Desrochers. 2005. Landscape Resistance to Frog Movements. Canadian Journal of Zoology, 83(3):455–464. Accessed January 24, 2025. https://www.researchgate.net/publication/236874792_Landscape_resistance_to_frog_movements

McIntyre, A., T. Janeski, G. Garman, C. Deloglos, and A. Filippas. 2016. Behavioral Responses of Sub-Adult Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) to Electromagnetic and Magnetic Fields Under Laboratory Conditions. Richmond, Virginia: Virginia Commonwealth University. Accessed January 24, 2025. https://tethys.pnnl.gov/publications/behavioral-responses-sub-adult-atlantic-sturgeon-acipenser-oxyrinchus-oxyrinchus

Meffe, G. K. and C. R. Carroll. 1994. Principles of Conservation Biology. Sunderland, Massachusetts: Sinauer Associates, Inc.

Merems, J. L., A. L. Brose, H. E. Frater, B. Khadka, J. L. Goethlich, and T. R. Van Deelen. 2022. Measuring Ungulate–Forest Interactions: A Methods Primer. Journal of Fish and Wildlife Management, 13(2):576-590. Accessed January 24, 2025. https://meridian.allenpress.com/jfwm/article/13/2/576/482782/Measuring-Ungulate-Forest-Interactions-A-Methods

Merrell, D. J. 1977. Life History of the Leopard Frog, *Rana pipiens*, in Minnesota. St. Paul, Minnesota: Occas. Pap. No. 15, Bell Museum, University of Minnesota.

Mitchell J. C., R. E. Jung Brown, and B. Bartholomew. 2008. Urban Herpetology. Society for the Study of Amphibians and Reptiles (Herpetological Conservation Series). Accessed April 11, 2024. https://www.nhbs.com/urban-herpetology-book

Narango, D. L., D. W. Tallamy, and P. P Marra. 2017. Native Plants Improve Breeding and Foraging Habitat for an Insectivorous Bird. Biological Conservation, 213:42-50. Accessed January 24, 2025. https://www.sciencedirect.com/science/article/abs/pii/S0006320717305153

Nash R. F., G. G. Gallup, Jr., and M. K. McClure. 1970. The Immobility Reaction in Leopard Frogs (*Rana pipiens*) as a Function of Noise-Induced Fear. Psychonomic Science. 21(3):155–156. Accessed January 24, 2025. https://link.springer.com/article/10.3758/BF03331860

NatureServe. 2024. Arlington, Virginia: NatureServe Explorer. Accessed August 19, 2024. https://explorer.natureserve.org/

NCC (Nature Conservancy Canada). 2024. Cougar. Accessed September 03, 2024. https://www.natureconservancy.ca/en/what-we-do/resource-centre/featured-species/mammals/cougar.html

Nelson, S. B. M., J. J. Coon, C. J. Duchardt, J. D. Fischer, S. J. Halsey, A. J. Kranz, C. M. Parker, S. C. Schneider, T. M. Swartz, and J. R. Miller. 2017. Patterns and Mechanisms of Invasive Plant Impacts on North American Birds: A Systematic Review. Biological Invasions, 19(5):1547–1563. Accessed January 24, 2025. Accessed January 24, 2025. https://doi.org/10.1007/s10530-017-1377-5

Nelson, S. K. 2020. Marbled Murrelet (Brachyramphus marmoratus), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Ithaca, New York: Cornell Lab of Ornithology. Accessed January 24, 2025. https://doi.org/10.2173/bow.marmur.01

Newcombe, C. P. and J. O. T. Jensen. 1996. Channel Suspended Sediment and Fisheries: A Synthesis for Quantitative Assessment of Rish and Impact. North American Journal of Fisheries Management, 16(4):693–727. Accessed January 24, 2025. https://doi.org/10.1577/1548-8675(1996)016<0693:CSSAFA>2.3.CO;2

Newcombe, P. B., C. Nilsson, T.-Y. Lin, K. Winner, G. Bernstein, S. Maji, D. Sheldon, A. Farnsworth, and K. G. Horton. 2019. Migratory Flight on the Pacific Flyway: Strategies and Tendencies of Wind Drift Compensation. Biology Letters, 15(9). Accessed January 24, 2025. https://doi.org/10.1098/rsbl.2019.0383

Nextgen Highways. 2023. Transmission Line and Highway Rights-of-Way (ROW) Requirements, Fact Sheet. Accessed January 24, 2025. https://nextgenhighways.org/wp-content/uploads/2023/04/Transmission-Line-and-Highway-ROW-Requirements-V2.pdf

NOAA (National Oceanic and Atmospheric Administration) Fisheries. 2015. ESA Recovery Plan for Snake River Sockeye Salmon (*Oncorhynchus nerka*). June 8. Accessed October 8, 2024. https://www.fisheries.noaa.gov/resource/document/recovery-plan-snake-river-sockeye-salmon-oncorhynchus-nerka

NRC (National Research Council). 2011. Guide for the Care and Use of Laboratory Animals. 8th ed. Washington, D.C.: National Academies Press (US) (The National Academies Collection: Reports funded by National Institutes of Health). Accessed January 24, 2025. http://www.ncbi.nlm.nih.gov/books/NBK54050/

NWSRS (Natural Wild and Scenic Rivers System). Not dated. River Mileages & Classifications. Accessed August 19, 2024. https://www.rivers.gov/river-miles

Oddone Aquino, A. G. H. E. and S. L. Nkomo. 2021. Spatio-Temporal Patterns and Consequences of Road Kills: A Review. Animals, 11(3):799. Accessed January 24, 2025. https://doi.org/10.3390/ani11030799

Oliveira, F. G., J. T. Tapisso, S. von Merten, L. Rychlik, P. J. Fonseca, and M. Mathias. 2021. Behavioral Responses of Rural and Urban Greater White-Toothed Shrews (*Crocidura russula*) to Sound Disturbance. Urban Ecosystems, 24:851–862. Accessed January 24, 2025. https://doi.org/10.1007/s11252-020-01079-y

O'Neill, C. and H. Yurk. 2017. In-air Noise Impact Assessment for Birds and Reptiles: Based on a Preliminary Design of the Third Crossing of the Cataraqui River, Kingston, ON. Victoria, British Columbia: Technical Report prepared for Golder Associates Ltd. by Jasco Applied Sciences. Accessed September 2, 2024.

OWI (Oregon Wildlife Institute). Not dated. Slender-Billed Nuthatch (*Sitta carolinenses aculeata*). Wildlife Conservation in Willamette Valley Grassland & Oak Habitats, Species Account. Corvallis, Oregon. Accessed January 24, 2025. https://www.oregonwildlife.org/documents/nuthatch_web2.pdf

Oxley, D. J., M. B. Fenton, and G. R. Carmody. 1974. The Effects of Roads on Populations of Small Mammals. Journal of Applied Ecology, 11(1):51–59. Accessed January 24, 2025. https://www.jstor.org/stable/2402004

Pálsdóttir, A. E., J. A. Gill, S. Pálsson, J. A. Alves, V. Méndez, B. Þórisson, and T. G. Gunnarsson. 2022. Effects of Overhead Power-Lines on the Density of Ground-Nesting Birds in Open Sub-Arctic Habitats. IBIS, 164(4):1257–1264. Accessed January 24, 2025. https://onlinelibrary.wiley.com/doi/10.1111/ibi.13089

Parayko, N. W., J. W. Ng, J. Marley, R. S. Wolach, T. I. Wellicome, and E. M. Bayne. 2021. Response of Ferruginous Hawks to Temporary Habitat Alterations for Energy Development in Southwestern Alberta. Avian Conservation and Ecology, 16(2):17. Accessed January 24, 2025. https://tethys.pnnl.gov/sites/default/files/publications/Parayko_et_al_2021.pdf

Parks Canada Agency. 2005. Recovery Strategy for Multi-species at Risk in Vernal Pools and Other Ephemeral Wet Areas in Garry Oak and Associated Ecosystems in Canada (proposed). In Species at Risk Act Recovery Strategy Series. Ottawa, Ontario: Parks Canada Agency. Accessed January 24, 2025. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/recovery-strategies/vernal-pools-ephemeral-wet-areas-garry-oak-proposed-2005.html

Parris, K. M, M. Velik-Lord, and J. M. A. North. 2009. Frogs Call at a Higher Pitch in Traffic Noise. Ecology and Society, 14(1). Accessed January 24, 2025. https://www.jstor.org/stable/26268025

Perry, G., B. W. Buchanan, R. Fisher, M. Salmon, and S. E. Wise. 2008. Effects of Artificial Night Lighting on Amphibians and Reptiles in Urban Environments. Urban Herpetology, 3:239–256. Accessed January 24, 2025. Accessed January 24, 2025. https://www.researchgate.net/publication/239531413_Effects_of_artificial_night_lighting_on_amphibians_and_reptiles_in_urban_environments

Popper, A. N., T. J. Carlson, A. D. Hawkins, B. L. Southall, and R. L. Gentry. 2006. Interim Criteria for Injury of Fish Exposed to Pile Driving Operations: A White Paper. Washington, D.C.: United States Nuclear Regulatory Commission. Accessed January 24, 2025. https://www.nrc.gov/docs/ML0932/ML093210627.pdf

Potter, A. E. 2016. Periodic status review for Taylor's Checkerspot in Washington. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/publications/01798

Proppe, D. S., C. B. Sturdy, and C. C. St. Clair. 2013. Anthropogenic Noise Decreases Urban Songbird Diversity and May Contribute to Homogenization. Global Change Biology,19(4):1075–1084. Accessed January 24, 2025. https://www.researchgate.net/publication/236057381_Anthropogenic_noise_decreases_urban_songbird_diversity_and_may_contribute_to_homogenization

Quinn, T., G. F. Wilhere, and K. L. Krueger. 2020. Riparian Ecosystems, Volume 1: Science Synthesis and Management Implications. Olympia, Washington: Habitat Program, Washington Department of Fish and Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/publications/01987/wdfw01987.pdf

Randall, L., N. Lloyd, and A. Moehrenschlager. 2018. Guidelines for Mitigation Translocations of Amphibians: Applications for Canada's Prairie Provinces. Version 1.0. Calgary, Alberta: Centre for Conservation Research, Calgary Zoological Society. Accessed January 24, 2025 https://sccp.ca/sites/default/files/species-habitat/documents/amphibian_translocation_guidelines%20Alberta%202018.pdf

Rentz, T., A. Windrope, K. Folkerts, and J. Azerrad. 2020. Riparian Ecosystems, Volume 2: Management Recommendations. Olympia, Washington: Habitat Program, Washington Department of Fish and Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/publications/01988/wdfw01988.pdf

Rodrick, E. and R. Milner, eds. 1991. Management Recommendations for Washington's Priority Habitats and Species. Olympia, Washington: Washington Department of Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/publications/00032

Rosenberg, K. V, A. M. Dokter, P. J. Blancher, J. R. Sauer, A. C. Smith, P. A. Smith, J. C. Stanton, A. Panjabi, L. Helft, M. Parr, and P. P. Marra. 2019. Decline of the North American Avifauna. Science, 366(6461):120–124. Accessed January 24, 2025. https://www.science.org/doi/10.1126/science.aaw1313

Rosenberg, K. V., J. A. Kennedy, R. Dettmers, R. P. Ford, D. Reynolds, J. D. Alexander, C. J. Beardmore, et al. 2016. Partners in Flight Landbird Conservation Plan: 2016. Revision for Canada and Continental United States. Partners in Flight Science Committee. Accessed January 24, 2025. https://partnersinflight.org/resources/the-plan/

Rothermel, B. B. 2004. Migratory Success of Juveniles: A Potential Constraint on Connectivity for Pond-Breeding Amphibians. Ecological Applications, 14(5):1535–1546. Accessed January 24, 2025. https://esajournals.onlinelibrary.wiley.com/doi/10.1890/03-5206

Rutherford, T. K., L. M. Maxwell, N. J. Kleist, E. C. Teige, R. J. Lehrter, M. A. Gilbert, D. J. A. Wood, et al. 2023. Effects of Noise from Oil and Gas Development on Ungulates and Small Mammals—A science Synthesis to Inform National Environmental Policy Act Analyses (ver. 1.1, July 2024). Reston, Virginia: U.S. Geological Survey Scientific Investigations Report 2023–5114, United States Geological Survey. Accessed January 24, 2025. https://doi.org/10.3133/sir20235114

Ruuskanen, S., M. J. Rainio, M. Uusitalo, K. Saikkonen, and M. Helander. 2020. Effects of Parental Exposure to Glyphosate-Based Herbicides on Embryonic Development and Oxidative Status: A Long-Term Experiment in a Bird Model. Scientific Reports, 10(6349). Accessed August 28, 2024. https://www.nature.com/articles/s41598-020-63365-1

Santos, S. M., A. Mira, P. A. Salgueiro, P. Costa, D. Medinas, and P. Beja. 2016. Avian Trait-Mediated Vulnerability to Road Traffic Collisions. Biological Conservation, 200:122–130. Accessed January 24, 2025. https://doi.org/10.1016/j.biocon.2016.06.004

Sawyer, H., M. J. Kauffman, A. D. Middleton, T. A. Morrison, R. M. Nielson, and T. B. Wyckoff. 2013. A framework for Understanding Semi-Permeable Barrier Effects on Migratory Ungulates. Journal of Applied Ecology, 50(1):68–78. Accessed January 24, 2025. https://doi.org/10.1111/1365-2664.12013

Schöll, E. M. and U. Nopp-Mayr. 2021. Impact of Wind Power Plants on Mammalian and Avian Wildlife Species in Shrub- and Woodlands. Biological Conservation, 256. Accessed January 24, 2025. https://www.sciencedirect.com/science/article/pii/S0006320721000896

Schowalter, T. D., J. A. Noriega, and T. Tscharntke. 2018. Insect Effects on Ecosystem Services — Introduction. Basic and Applied Ecology, 26:1–7. Accessed January 24, 2025. https://doi.org/10.1016/j.baae.2017.09.011

Schroeder, M. A., M. T. Atamian, C. L. Lowe, J. Lowe, K. M. Thorburn, M. C. Finch, D. J. Peterson, et al. 2023. Recovery of Greater Sage-Grouse in Washington: Progress Report. Olympia, Washington: Washington Department of Fish and Wildlife, with United States Department of Defense and United States Department of the Interior, Bureau of Land Management. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/2024-03/20231212-sag-annual-report-2023.pdf

Scobie, C. A., E. M. Bayne, and T. I. Wellicome. 2016. Influence of Human Footprint and Sensory Disturbances on Night-Time Space Use of an Owl. Endangered Species Research, 31:75-87. Accessed January 24, 2025. https://doi.org/10.3354/esr00756

Seip, D. and E. Jones. 2013. Core High-Elevation Winter Habitat for the southern Narraway Caribou Herd. Accessed September 25, 2024. https://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/wildlife-wildlife-habitat/caribou/core_high_elevation_habitat_for_the_narraway_herd.pdf

Semlitsch, R. D. 1998. Biological Delineation of Terrestrial Buffer Zones for Pond-Breeding Salamanders. Conservation Biology, 12(5):1113-1119. Accessed January 24, 2025. https://conbio.onlinelibrary.wiley.com/doi/abs/10.1046/j.1523-1739.1998.97274.x

Shannon, G., M. F. McKenna, L. M. Angeloni, K. R. Crooks, K. M. Fristrup, E. Brown, K. A. Warner, M. D. Nelson, C. White, J. Briggs, S. McFarland, and G. Wittemyer. 2016. A Synthesis of Two Decades of Research Documenting the Effects of Noise on Wildlife. Biological Reviews, 91(4):982–1005. Accessed January 24, 2025. https://doi.org/10.1111/brv.12207

Shepherd S., G. Hollands, V. C. Godley, S. M. Sharkh, C. W. Jackson, and P. L. Newland. 2019. Increased Aggression and Reduced Aversive Learning in Honey Bees Exposed to Extremely Low Frequency Electromagnetic Fields. PLOS ONE, 14(10): e0223614. Accessed January 24, 2025. https://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0223614

Shurtliff, Q. R. and J. C. Whiting. 2021. Common Raven Nesting and Spatial Distancing on Power Lines in Southeast Idaho, USA. Human–Wildlife Interactions 15(3):289-303, Winter 2021. Accessed January 24, 2025. https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1772&context=hwi

Smith, J. A. and J. F. Dwyer. 2016. Avian Interactions with Renewable Energy Infrastructure: An Update. Ornithological Applications, 118(2):411-423. Accessed January 24, 2025. https://academic.oup.com/condor/article/118/2/411/5153228

Smith, J. B., B. T. Maletzke, T. Roussin, and G. R. Spence. 2024. Periodic Status Review for the Gray Wolf in Washington. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed October 29, 2024. https://wdfw.wa.gov/sites/default/files/publications/02427/wdfw02427.pdf

Smith, K. T., K. L. Taylor, S. E. Albeke, and J. L. Beck. 2020. Pronghorn Winter Resource Selection before and after Wind Energy Development in South-central Wyoming. Rangeland Ecology and Management 73(2):227–233. Accessed January 24, 2025. https://doi.org/10.1016/j.rama.2019.12.004

Staude, I. R., L. M. Navarro, and H. M. Pereira. 2019. Range Size Predicts the Risk of Local Extinction from Habitat Loss. Global Ecology and Biogeography, 29(1):16–25. Accessed January 24, 2025. https://onlinelibrary.wiley.com/doi/full/10.1111/geb.13003?msockid=3a569d6a25d661ce3bb28937246f601c

St. Clair, C. C., M. Bélisle, A. Desrochers, and S. Hannon. 1998. Winter Responses of Forest Birds to Habitat Corridors and Gaps. Conservation Ecology, 2(2). Accessed January 24, 2025. https://www.jstor.org/stable/26271681

Stewart, F. E. C., N. A. Heim, A. P. Clevenger, J. Paczkowski, J. P. Volpe, and J. T. Fisher. 2016. Wolverine Behavior Varies Spatially with Anthropogenic Footprint: Implications for Conservation and Inferences About Declines. Ecology and Evolution, 6:1493–1503. Accessed January 24, 2025. https://doi.org/10.1002/ece3.1921

Stinson, D. W. 2017. Periodic Status Review for the Columbian Sharp-tailed Grouse in Washington. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/publications/01921

Stinson, D. W. 2020. Mazama Pocket Gopher Recovery Plan and Periodic Status Review. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/publications/01449/wdfw01449.pdf

Stinson, D. W. and M. A. Schroeder. 2012. Washington State Recovery Plan for the Columbian Sharptailed Grouse. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/publications/00882

St-Laurent, M. H., C. Dussault, J. Ferron, and R. Gagnon. 2009. Dissecting Habitat Loss and Fragmentation Effects Following Logging in Boreal Forest: Conservation Perspectives from Landscape Simulations. Biological Conservation, 142:2240–2249. Accessed January 24, 2025. https://doi.org/10.1016/j.biocon.2009.04.025

Stone, E. L., G. Jones, and S. Harris. 2009. Street Lighting Disturbs Commuting Bats. Current Biology, 19(13):1123–1127. Accessed January 24, 2025. https://www.sciencedirect.com/science/article/pii/S0960982209011932

Stone, K. 2010. *Martes americana, M. caurina*. In Fire Effects Information System. Missoula, Montana: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. Accessed January 13, 2025. https://www.fs.usda.gov/database/feis/animals/mammal/mart/all.html

Sun, J. W. C. and P. M. Narins. 2005. Anthropogenic Sounds Differentially Affect Amphibian Call Rate. Biological Conservation, 121(3):419–427. Accessed January 24, 2025. https://doi.org/10.1016/j.biocon.2004.05.017

Swihart, R. K., T. M. Gehring, M. B. Kolozsvary, T. E. Nupp. 2003. Responses of ‘Resistant’ Vertebrates to Habitat Loss and Fragmentation: The Importance of Niche Breadth and Range Boundaries. Diversity and Distributions, 9(1):1–18. Accessed January 24, 2025. https://onlinelibrary.wiley.com/doi/10.1046/j.1472-4642.2003.00158.x

Tella, J. L., D. Hernández-Brito, G. Blanco, and F. Hiraldo. 2020. Urban Sprawl, Food Subsidies and Power Lines: An Ecological Trap for Large Frugivorous Bats in Sri Lanka? Diversity, 12(3):94. Accessed January 24, 2025. https://doi.org/10.3390/d12030094

Theobald, D. M., K. R. Crooks, and J. B Norman. 2011. Assessing Effects of Land Use on Landscape Connectivity: Loss and Fragmentation of Western U.S. Forests. Ecological Applications, 21(7): 2445–2458. Accessed January 24, 2025. https://esajournals.onlinelibrary.wiley.com/doi/abs/10.1890/10-1701.1

Thompson, L. S. 1977. Overhead Transmission Lines: Impact on Wildlife. Helena, Montana: Montana Department of Natural Resources & Conservation.

TOCS (The Oregon Conservation Strategy). 2024. Barriers to Animal Movement. Accessed September 5, 2024. https://www.oregonconservationstrategy.org/key-conservation-issue/barriers-to-animal-movement/

Tremblay M. A. and C. St. Clair. 2011. Permeability of a Heterogeneous Urban Landscape to the Movements of Forest Songbirds. Journal of Applied Ecology, 48(3):679–688. Accessed January 24, 2025. https://doi.org/10.1111/j.1365-2664.2011.01978.x

Tucker, M. A., K. Böhning-Gaese, W. F. Fagan, J. M. Fryxell, B. Van Moorter, S. C. Alberts, A. H. Ali, et al. 2018. Moving in the Anthropocene: Global Reductions in Terrestrial Mammalian Movements. Science, 359(6374):466–469. Accessed January 24, 2025. https://www.science.org/doi/full/10.1126/science.aam9712

Turner, J. G., J. L. Parrish, L. F. Hughes, L. A. Toth, and D. M. Caspary. 2005. Hearing in Laboratory Animals: Strain Differences and Nonauditory Effects of Noise. Comparative Medicine, 55(1):12–23. Accessed January 24, 2025. https://pmc.ncbi.nlm.nih.gov/articles/PMC3725606/

Twerd, L., A. Sobieraj-Betlińska, and P. Szefer. 2021. Roads, Railways, and Power Lines: Are They Crucial for Bees in Urban Woodlands? Urban Forestry & Urban Greening, 61(June 2021). Accessed January 24, 2025. https://doi.org/10.1016/j.ufug.2021.127120

Tyler, N., K.-A. Stokkan, C. Hogg, C. Nellemann, A.-I. Vistnes, and G. Jeffery. 2014. Ultraviolet Vision and Avoidance of Power Lines in Birds and Mammals. Conservation Biology, 28(3):630–631. Accessed January 24 2025. https://doi.org/10.1111/cobi.12262

USFWS (U.S. Fish & Wildlife Service). 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. Accessed January 24, 2025. https://www.federalregister.gov/documents/2003/06/10/03-14354/endangered-and-threatened-wildlife-and-plants-status-review-and-12-month-finding-for-a-petition-to

USFWS (U.S. Fish & Wildlife Service). 2010. Best Management Practices to Minimize Adverse Effects to Pacific Lamprey (*Entosphenus tridentatus*). Accessed January 24, 2025. https://semspub.epa.gov/work/10/100016741.pdf

USFWS (U.S. Fish & Wildlife Service). 2011. Species Assessment and Listing Priority Assignment Form: *Urocitellus washingtoni*, Washington ground squirrel. Portland, Oregon: U.S. Fish and Wildlife Service.

USFWS (U.S. Fish & Wildlife Service). 2016. Bald and Golden Eagles: Population Demographics and Estimation of Sustainable Take in the United States, 2016 update. Washington, D.C.: Division of Migratory Bird Management. Accessed January 24, 2025. https://www.fws.gov/media/population-demographics-and-estimation-sustainable-take-united-states-2016-update

USFWS (U.S. Fish & Wildlife Service). 2017a. Critical Habitat. Accessed July 31, 2024. https://www.fws.gov/project/critical-habitat

USFWS (U.S. Fish & Wildlife Service). 2017b. Critical Habitat What is it? Accessed July 31, 2024. www.fws.gov/sites/default/files/documents/critical-habitat-fact-sheet.pdf.

USFWS (U.S. Fish & Wildlife Service). 2024a. Electric Transmission Lines. Accessed August 27, 2024. https://www.fws.gov/node/266176

USFWS (U.S. Fish & Wildlife Service). 2024b. IPaC Information for Planning and Consultation. Accessed December 19, 2024. https://ipac.ecosphere.fws.gov/

USFWS (U.S. Fish & Wildlife Service). Not dated. Recommended Standard Best Management Practice. Accessed September 27, 2024. https://www.fws.gov/sites/default/files/documents/Best%20Management%20Practices%20For%20Work%20In%20or%20Around%20Aquatic%20Environment-April%202022.pdf

van de Kerk, M., R. T. Larsen, D. D. Olson, K. R. Hersey, and B. R. McMillan. 2021. Variation in Movement Patterns of Mule Deer: Have We Oversimplified Migration? Movement Ecology, 9(44). Accessed January 24, 2025. https://movementecologyjournal.biomedcentral.com/articles/10.1186/s40462-021-00281-7

Van den Broeck, M., R. De Cock, S. Van Dongen, and E. Matthysen. 2021. Blinded by the Light: Artificial Light Lowers Mate Attraction Success in Female Glow-Worms (*Lampyris noctiluca* L.). Insects, 12(8):734. Accessed January 24, 2025. https://www.mdpi.com/2075-4450/12/8/734

Vanderhoff, N., P. Pyle, M. A. Patten, R. Sallabanks, and F. C. James (2020). American Robin (*Turdus migratorius*), version 1.0. In Birds of the World (P. G. Rodewald, Editor). Ithaca, New York: Cornell Lab of Ornithology. Accessed January 24, 2025. https://doi.org/10.2173/bow.amerob.01

van Klink, R., T. August, Y. Bas, P. Bodesheim, A. Bonn, F. Fossøy, T. T. Høye, et al. 2022. Emerging Technologies Revolutionise Insect Ecology and Monitoring. Trends in Ecology and Evolution, 37(10):872–885. Accessed January 24, 2025. https://www.sciencedirect.com/science/article/pii/S0169534722001343

Vanecek J. 1998. Cellular mechanisms of melatonin action. Physiological Reviews ,78(3):686–721. Accessed January 24, 2025. https://pubmed.ncbi.nlm.nih.gov/9674691/

Vennesland, R. G. 2000. The Effects of Disturbance from Humans and Predators on the Breeding Decisions and Productivity of the Great Blue Heron in South-Coastal British Columbia [Master of Science Thesis]. Burnaby, British Columbia: Simon Fraser University. Accessed November 27, 2023. https://www.nlc-bnc.ca/obj/s4/f2/dsk1/tape2/PQDD_0009/MQ61507.pdf?is_thesis=1&oclc_number=1006674982.

Verbeek, N. A., C. Caffrey, A. B. Clark, K. J. McGowan, and P. Pyle (2024). American Crow (*Corvus brachyrhynchos*), version 1.2. In Birds of the World (A. F. Poole, F. B. Gill, and M. G. Smith, Editors). Ithaca, New York: Cornell Lab of Ornithology. Accessed January 24, 2025. https://doi.org/10.2173/bow.amecro.01.2

Wagner, D. L., K. J. Metzler, and H. Frye. 2019. Importance of Transmission Line Corridors for Conservation of Native Bees and Other Wildlife. Biological Conservation, 235:147–156. Accessed January 24, 2025. https://doi.org/10.1016/j.biocon.2019.03.042

Wagner, R. B., C. R. Brune, and V. D. Popescu. 2021. Snakes on a Lane: Road Type and Edge Habitat Predict Hotspots of Snake Road Mortality. Journal for Nature Conservation, 61. Accessed January 24, 2025. https://www.sciencedirect.com/science/article/abs/pii/S161713812100025X

Warnock, N. 2010. Stopping vs. Staging: The Difference Between a Hop and a Jump. Journal of Avian Biology, 41(6):621–626. Accessed January 24, 2025. https://nsojournals.onlinelibrary.wiley.com/doi/abs/10.1111/j.1600-048X.2010.05155.x?msockid=0f0715f343f664d311a201a742d2650c

Washington Biodiversity Council. 2007. Washington's Biodiversity: Status and Threats. Olympia, Washington. Accessed August 20, 2024. https://rco.wa.gov/wp-content/uploads/2019/07/BiodiversityStatusThreats.pdf

Watson, J. W., and J. M. Azerrad. 2024. Management Recommendations for Washington's Priority Species: Ferruginous Hawk. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/publications/02511/wdfw02511.pdf

WDFW (Washington Department of Fish and Wildlife). 2000. Washington's Ecoregional Conservation Strategy. Olympia, Washington. Accessed December 18, 2024. https://wdfw.wa.gov/sites/default/files/publications/00727/chapter_vi.pdf

WDFW (Washington Department of Fish and Wildlife). 2002. Integrated Streambank Protection Guidelines. Washington State Aquatic Habitat Guidelines Program. Olympia, Washington. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/publications/00046/wdfw00046.pdf

WDFW (Washington Department of Fish and Wildlife). 2008. State of Washington Priority Habitats and Species List. August 2008 (updated June 2023). Olympia, Washington. Accessed January 24, 2025. https://wdfw.wa.gov/publications/00165

WDFW (Washington Department of Fish and Wildlife). 2009. Landscape Planning for Washington's Wildlife: Managing for Biodiversity in Developing Areas. Olympia, Washington. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/publications/00023/wdfw00023.pdf

WDFW (Washington Department of Fish and Wildlife). 2010. Management Recommendations for Washington's Priority Species Volume V: Mammals (Interim). Olympia, Washington. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/publications/00027/wdfw00027.pdf

WDFW (Washington Department of Fish and Wildlife). 2011. Priority Habitats and Species Management Recommendations: Mazama Pocket Gopher. Olympia, Washington. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/publications/01175/wdfw01175.pdf

WDFW (Washington Department of Fish and Wildlife). 2012a. Olympic Mudminnow. Fact Sheet. Olympia, Washington. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/2019-03/olympic_mudminnow.pdf

WDFW (Washington Department of Fish and Wildlife). 2012b. Oregon Spotted Frog (Rana pretiosa). Endangered Species. Olympia, Washington. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/2019-03/oregon_spotted_frog.pdf

WDFW (Washington Department of Fish and Wildlife). 2013. Threatened and Endangered Wildlife in Washington: 2012 Annual Report. Olympia, Washington: Listing and Recovery Section, Wildlife Program, Washington Department of Fish and Wildlife. Accessed October 30, 2024. https://wdfw.wa.gov/publications/01542

WDFW (Washington Department of Fish and Wildlife). 2015. Washington's State Wildlife Action Plan: 2015 Update. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/publications/01742/wdfw01742.pdf

WDFW (Washington Department of Fish and Wildlife). 2016. Olympia, Washington: Washington State Mule Deer Management Plan, Wildlife Program. Accessed January 6, 2024. https://wdfw.wa.gov/publications/01755

WDFW (Washington Department of Fish and Wildlife). 2018. Washington Department of Fish and Wildlife: Times when spawning or incubating salmonids are least likely to be within Washington State Freshwaters. Olympia, Washington. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/2019-02/freshwater_incubation_avoidance_times.pdf

WDFW (Washington Department of Fish and Wildlife). 2019a. State of Washington Alternative Mitigation Policy Guidance for Aquatic Permitting Requirements from the Department of Ecology and Fish and Wildlife. Olympia, Washington. Accessed January 23, 2025. https://wdfw.wa.gov/sites/default/files/publications/00972/wdfw00972.pdf

WDFW (Washington Department of fish and Wildlife). 2019b. Mitigation for Better Projects. Olympia, Washington. Accessed August 19, 2024. https://wdfw.wa.gov/sites/default/files/2019-02/mitigation_for_better_projects.pdf

WDFW (Washington Department of Fish and Wildlife). 2021. Sandhill Cranes Stop Here. Olympia, Washington. Accessed August 27, 2024. https://storymaps.arcgis.com/stories/8b9411db02614c9aaccb02ea0c4c8416

WDFW (Washington Department of Fish and Wildlife). 2023. Invasive Quagga Mussels Detected in Idaho; Monitoring and Prevention Efforts Ramp up in Washington. Olympia, Washington. Accessed September 3, 2024. https://wdfw.medium.com/invasive-quagga-mussels-detected-in-idaho-monitoring-and-prevention-efforts-ramp-up-in-washington-5913c555dccb

WDFW (Washington Department of Fish and Wildlife). 2024a. Washington Shrubsteppe Restoration and Resiliency Initiative: Long-Term Strategy 2024 – 2054. Olympia, Washington: Washington Department of Fish and Wildlife, Washington State Department of Natural Resources, Washington State Conservation Commission. https://wdfw.wa.gov/publications/02489

WDFW (Washington Department of Fish and Wildlife). 2024b. Amphibians and Reptiles of Washington. Olympia, Washington. Accessed August 1, 2024. https://wdfw.wa.gov/species-habitats/amphibians-reptiles#frogs

WDFW (Washington Department of Fish and Wildlife). 2024c. Threatened and Endangered Species. Olympia, Washington. Accessed December 18, 2024. https://wdfw.wa.gov/species-habitats/at-risk/listed?species=&state_status=All&federal_status=All&category=All&page=4

WDFW (Washington Department of Fish and Wildlife). 2024d. Endangered Species Critical Habitat Areas. Olympia, Washington. Accessed January 10, 2025. https://wdfw.maps.arcgis.com/home/item.html?id=d46156cc921d4b41923c70c280b82458

WDFW (Washington Department of Fish and Wildlife). 2024e. Mountain Goat (*Oreamnos americanus*). Olympia, Washington. Accessed September 27, 2024. https://wdfw.wa.gov/species-habitats/species/oreamnos-americanus

WDFW (Washington Department of Fish and Wildlife). 2024f. Wolverine. Olympia, Washington. Accessed December 18, 2024. https://wdfw.wa.gov/species-habitats/species/gulo-gulo-luscus#resources

WDFW (Washington Department of Fish and Wildlife). 2024g. Washington ground squirrel (*Urocitellus washingtoni*). Olympia, Washington. Accessed December 18, 2024. https://wdfw.wa.gov/species-habitats/species/urocitellus-washingtoni#conservation

WDFW (Washington Department of Fish and Wildlife). 2024h. Birding and Community Science. Olympia, Washington. Accessed August 1, 2024. https://wdfw.wa.gov/get-involved/educational-resources/birding

WDFW (Washington Department of Fish and Wildlife). 2024i. Species in Washington. Olympia, Washington. Accessed August 19, 2024. https://wdfw.wa.gov/species-habitats/species

WDFW (Washington Department of Fish and Wildlife). 2024j. Amphibians and Reptiles. Olympia, Washington. Accessed August 1, 2024. https://wdfw.wa.gov/get-involved/educational-resources/amphibians-reptiles#amphibians

WDFW (Washington Department of Fish and Wildlife). 2024k. Northwestern Pond Turtle (*Actinemys marmorata*). Olympia, Washington. Accessed August 2, 2024. https://wdfw.wa.gov/species-habitats/species/actinemys-marmorata#desc-range

WDFW (Washington Department of Fish and Wildlife). 2024l. Northern Sagebrush Lizard (*Sceloporus graciosus*) Olympia, Washington. Accessed August 2, 2024. https://wdfw.wa.gov/species-habitats/species/sceloporus-graciosus#desc-range

WDFW (Washington Department of Fish and Wildlife). 2024m. State Listed Species. Revised March 2024. Olympia, Washington. Accessed January 24, 2025. https://wdfw.wa.gov/sites/default/files/2024-03/wa-state-listed-and-candidate-species-list.pdf

WDFW (Washington Department of Fish and Wildlife). 2024n. Marine Shorelines. Olympia, Washington. Accessed August 21, 2024. https://wdfw.wa.gov/species-habitats/ecosystems/marine-shorelines#at-risk-fish

WDFW (Washington Department of Fish and Wildlife). 2024o. Riparian Areas. Olympia, Washington. Accessed August 19, 2024. https://wdfw.wa.gov/species-habitats/ecosystems/riparian#places-explore

WDFW (Washington Department of Fish and Wildlife). 2024p. Aquatic Invasive Species. Olympia, Washington. Accessed August 26, 2024. https://wdfw.wa.gov/species-habitats/invasive/species?species_name=&category=25382&family=All&classification=25392

WDFW (Washington Department of Fish and Wildlife). 2024q. Northern Pike. Olympia, Washington. Accessed August 27, 2024. https://wdfw.wa.gov/species-habitats/invasive/esox-lucius#desc-range

WDFW (Washington Department of Fish and Wildlife). 2024r. Periodic Status Review for the Northern Spotted Owl. Olympia, Washington. Accessed September 4, 2024. https://wdfw.wa.gov/sites/default/files/publications/01752/wdfw01752.pdf

Weldy, M. J., C. W. Epps, D. B. Lesmeister, T. Manning, M. A. Linnell, and E. D. Forsman. 2019. Abundance and Ecological Associations of Small Mammals. The Journal of Wildlife Management, 83(4):902–915. Accessed January 24, 2025. https://wildlife.onlinelibrary.wiley.com/doi/full/10.1002/jwmg.21641

Weller, T. J., K. T. Castle, F. Liechti, C. D. Hein, M. R. Schirmacher, and P. M. Cryan. 2016. First Direct Evidence of Long-distance Seasonal Movements and Hibernation in a Migratory Bat. Scientific Reports, 6(34585). Accessed August 27, 2024. https://www.nature.com/articles/srep34585

Wever E. G. 1978. The reptile ear: Its structure and function. Princeton, New Jersey: Princeton University Press.

WHCWG (Washington Wildlife Habitat Connectivity Working Group). 2012. Washington Connected Landscapes Project: Analysis of the Columbia Plateau Ecoregion. Olympia, Washington: Washington's Department of Fish and Wildlife and Department of Transportation. Accessed January 24, 2025. https://waconnected.org/wp-content/themes/whcwg/docs/WHCWG_ColumbiaPlateauEcoregion_ExecSummary_2012.pdf

WHCWG (Washington Wildlife Habitat Connectivity Working Group). 2024a. Habitat Connectivity Mapping Tools. Olympia, Washington: Washington Department of Fish and Wildlife and Washington State Department of Transportation. Accessed August 16, 2024. https://waconnected.org/habitat-connectivity-mapping-tools/

WHCWG (Washington Wildlife Habitat Connectivity Working Group). 2024b. Washington Connected Landscapes Project: Cascades to Coast Analysis. Olympia, Washington: Washington Department of Fish and Wildlife and Washington State Department of Transportation. Accessed January 24, 2025. https://waconnected.org/coastal-washington-analysis/

Wiles, G. J., D. W. Stinson, and M. J. Linders. 2023. Periodic Status Review for the Western Gray Squirrel. Olympia, Washington: Washington Department of Fish and Wildlife. Accessed January 24, 2025. https://wdfw.wa.gov/publications/02410

Wilson, S. F. 2016. Managing Zone-of-Influence Impacts of Oil and Gas Activities on Terrestrial Wildlife and Habitats in British Columbia. Journal of Ecosystems and Management, 16(1). Accessed January 24, 2025. https://jem-online.org/index.php/jem/article/view/585

Wind, E. 2021. Western Toad Winter Habitat Requirements in Modified Landscapes on Vancouver Island Summary. Nanaimo, British Columbia: Prepared for Ministry of Forest, Lands and Natural Resource Operations, Nanaimo, BC, by E. Wind Consulting. Accessed January 24, 2025. https://cvrd.ca/DocumentCenter/View/99754/Western-Toad-Winter-Habitat-Requirments-in-Modified-Landscapes-on-Vancouver-Island-Summary?bidId=

WISC (Washington Invasive Species Council). 2025. Invasive Species, Priority Species. Olympia, Washington: Washington State Recreation and Conservation Office. Accessed January 13, 2025. https://invasivespecies.wa.gov/find-a-priority-species/?_sft_priority-specie-type=invasive-animals

Wise, S. and B. Buchanan. 2006. Influence of Artificial Illumination on the Nocturnal Behavior and Physiology of Salamander. In Ecological Consequences of Artificial Night Lighting. Washington, DC: Island Press, pp. 221–251.

Wright, D. G. and G. E. Hopky. 1998. Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters. Winnipeg, Manitoba: Science Directorate, Central and Arctic Region, Department of Fisheries and Oceans, and Ottawa, Ontario: Habitat Management & Environmental Science Directorate, Department of Fisheries and Oceans. Accessed January 24, 2025. https://publications.gc.ca/collections/Collection/Fs97-6-2107E.pdf

WSDOT (Washington State Department of Transportation). 2018. Best Management Practices Field Guide for ESA 4 (d) Habitat Protection. Olympia, Washington. Accessed January 24, 2025. https://wsdot.wa.gov/sites/default/files/2021-10/bestmanagementpracticesfieldguideregionalroadmaintenance.pdf

WSDOT (Washington State Department of Transportation). 2020. Biological Assessment Preparation Manual. Chapter 7, Part 2: Construction Noise Impact Assessment. Olympia, Washington. https://wsdot.wa.gov/sites/default/files/2021-10/Env-FW-BA_ManualCH07.pdf

WSDOT (Washington State Department of Transportation). 2023. Fish Exclusion - Protocol and Standards. Olympia, Washington. Accessed January 24, 2025. https://wsdot.wa.gov/sites/default/files/2021-12/FishMoving-Policy-StandardsProtocols.pdf

WSDOT (Washington State Department of Transportation). 2024. Habitat Connectivity Investment Priorities. Olympia, Washington. Accessed September 11, 2024. https://geo.wa.gov/datasets/WSDOT::wsdot-habitat-connectivity-investment-priorities/about

Wydoski, R. S. and R. R. Whitney. 2003. Inland Fishes of Washington (second ed.). Seattle, Washington: University of Washington Press.

Xerces Society. 2018. Managing for Monarchs in the West: Best Management Practices for Conserving the Monarch Butterfly and Its Habitat. Portland, Oregon: The Xerces Society for Invertebrate Conservation. Accessed January 24, 2025. https://www.xerces.org/sites/default/files/2018-06/18-009_01-Monarch_BMPs_Final_Web.pdf

Xerces Society. 2019. Western Monarch Management Windows. Timing Management in Monarch Breeding Habitat. Accessed January 24, 2025. https://xerces.org/sites/default/files/2019-10/18-010-02_Timing-Management-in-Western-Monarch-Habitat.pdf

Young B. A. 2003. Snake bioacoustics: Toward a Richer Understanding of the Behavioral Ecology of Snakes. Quarterly Review of Biology, 78(3):303–325. Accessed January 24, 2025. https://pubmed.ncbi.nlm.nih.gov/14528622/

Zastrow, M. 2014. Power Lines Look Like Terrifying Bursts of Light to Animals. Nova. New York, New York: Thirteen PBS. Accessed August 29, 2024. https://www.pbs.org/wgbh/nova/article/power-lines-look-like-terrifying-bursts-of-light-to-animals/

Section 3.7 – Energy and Natural Resources

Americans for a Clean Energy Grid. 2023. Recommended Siting Practices for Electric Transmission Developers. Accessed September 16, 2024. https://cleanenergygrid.org/wp-content/uploads/2023/02/Recommended-Siting-Practices-for-Electric-Transmission-Developers-ACEG-February-2023.pdf

AISI (American Iron and Steel Institute). 2024. New & Expanding Demand for Steel in Energy. Accessed October 1, 2024. https://www.steel.org/steel-markets/energy/

DOE (U.S. Department of Energy). Not dated. Artificial Intelligence. Accessed February 18, 2024. https://www.energy.gov/topics/artificial-intelligence

DOE (U.S. Department of Energy). 2021. State of Washington Energy Sector Risk Profile. Accessed February 18, 2025. https://www.energy.gov/sites/default/files/2021-09/State%20of%20Washington%20Energy%20Sector%20Risk%20Profile.pdf

EFSEC (Energy Facility Site Evaluation Council). 2022. Transmission Corridors Work Group Final Report. Accessed October 1, 2024. https://www.efsec.wa.gov/sites/default/files/181034/Final_TCWG_Report%20_2022_0801.pdf

EFSEC (Energy Facility Site Evaluation Council). Not dated. Energy Facilities. Accessed November 4, 2024. https://www.efsec.wa.gov/energy-facilities

EIA (U.S. Energy Information Agency). 2023. Frequently Asked Questions (FAQs). Last updated November 7, 2023. Accessed December 2024. https://www.eia.gov/tools/faqs/faq.php?id=105&t=3#:~:text=How%20much%20electricity%20is%20lost,not%20contribute%20to%20T&D%20losses.&text=Last%20updated:%20November%207%2C%202023,at%20the%20time%20of%20update

EIA (U.S. Energy Information Agency). 2024a. Washington State Energy Profile. Last updated October 17, 2024. Accessed November 4, 2024. https://www.eia.gov/state/print.php?sid=WA

EIA (U.S. Energy Information Agency). 2024b. Washington Net Electricity Generation by Source, Jul. 2024. Accessed August 23, 2024. https://www.eia.gov/state/?sid=WA

Energy Basics. Not dated. Basics of Electricity Transportation. Accessed October 16, 2024. https://www.energybasics.org/electricity-transmission

FERC (Federal Energy Regulatory Commission). 2024. Electric Transmission Facilities Permit Process. Accessed December 2024. https://www.ferc.gov/electric-transmission-facilities-permit-process#:~:text=The%20width%20of%20the%20right,expect%20to%20seek%20Commission%20authorization

Grajek, C. 2016. Underground Electrical Vaults: Safety Concerns and Controls. Accessed October 16, 2024. https://incident-prevention.com/blog/underground-electrical-vaults-safety-concerns-and-controls/

NERC (North American Electric Reliability Corporation). 2023. Standard Processes Manual Version 5, Effective November 28, 2023. Accessed December 2024. https://www.nerc.com/AboutNERC/RulesOfProcedure/Appendix_3A_SPM_Clean_Mar2019.pdf

NWPCC (Northwest Power and Conservation Council). 2022. The 2021 Northwest Power Plan. Accessed August 23, 2024. https://www.nwcouncil.org/fs/17680/2021powerplan_2022-3.pdf

NWPCC (Northwest Power and Conservation Council). 2024a. Map of power generation in the Northwest. Accessed October 9, 2024. https://www.nwcouncil.org/energy/energy-topics/power-supply/map-of-power-generation-in-the-northwest/

NWPCC (Northwest Power and Conservation Council). 2024b. Council Briefings: NW Sets Summer Record for Peak Power Demand & an Update on the Western Resource Adequacy Program. Accessed December 2024. https://www.nwcouncil.org/news/2024/09/18/july-heatwave-western-resource-adequacy-program-update/

PNUCC (Pacific Northwest Utilities Conference Committee). 2024. Northwest Regional Forecast of Power Loads and Resources: August 2024 through July 2034. Accessed November 5, 2024. https://www.pnucc.org/wp-content/uploads/2024-PNUCC-Northwest-Regional-Forecast-final.pdf

Portland Cement Association. 2024. Cement & Concrete. Accessed August 23, 2024. https://www.cement.org/cement-concrete

PSCW (Public Service Commission of Wisconsin). 2011. Underground Electric Transmission Lines. Accessed September 30, 2024. https://psc.wi.gov/Documents/Brochures/Under%20Ground%20Transmission.pdf

TTES (Transformer Network). 2024. Transformer Winding – Learn More About What It Is, Types, Materials. Accessed December 2024. https://ttesusa.com/blog/transformer-winding-learn-more-about-what-it-is-types-materials/#elementor-toc__heading-anchor-9

USGS (U.S. Geological Survey). 2024a. Iron and Steel. Accessed October 2, 2024. https://pubs.usgs.gov/periodicals/mcs2024/mcs2024-iron-steel.pdf

USGS (U.S. Geological Survey). 2024b. Aluminum. Accessed October 2, 2024. https://pubs.usgs.gov/periodicals/mcs2024/mcs2024-aluminum.pdf

USGS (U.S. Geological Survey). 2024c. Copper. Accessed October 2, 2024. https://pubs.usgs.gov/periodicals/mcs2024/mcs2024-copper.pdf

USGS (U.S. Geological Survey). 2024d. Sand and Gravel (Construction). Accessed August 23, 2024. https://pubs.usgs.gov/periodicals/mcs2024/mcs2024-sand-gravel.pdf

Washington State Department of Commerce. Not dated. Forest Products. Accessed October 1, 2024. https://choosewashingtonstate.com/why-washington/our-key-sectors/forest-products/#:~:text=Washington%20has%2022%20million%20acres,lumber%20in%20the%20United%20Stateshttps://choosewashingtonstate.com/why-washington/our-key-sectors/forest-products/

WECC (Western Electricity Coordinating Council). 2024. 2024 State of the Interconnection. Updated September 2024. Accessed September 12, 2024. https://feature.wecc.org/soti/index.html

Zichella, C. and J. Hladik. Not dated. Siting: Finding a Home for Renewable Energy and Transmission. America's Power Plan. Accessed September 16, 2024. https://www.energy.gov/sites/prod/files/2015/03/f20/APP-SITING-PAPER.pdf

Section 3.8 – Public Health and Safety

Americans for a Clean Energy Grid. 2023. Recommended Siting Practices for Electric Transmission Developers. Accessed March 3, 2025. https://cleanenergygrid.org/wp-content/uploads/2023/02/Recommended-Siting-Practices-for-Electric-Transmission-Developers-ACEG-February-2023.pdf

DNR (Washington State Department of Natural Resources). 2019. Washington State Wildland Fire Protection 10-Year Strategic Plan. Accessed March 3, 2025. http://dnr.wa.gov/publications/rp_wildfire_strategic_plan.pdf.

DNR (Washington State Department of Natural Resources). 2023. Commissioner Franz, DNR Leaders Recap Wildfire Season, Celebrate Partnerships. Accessed September 18, 2024. https://www.dnr.wa.gov/news/commissioner-franz-dnr-leaders-recap-wildfire-season-celebrate-partnerships

Ecology (Washington State Department of Ecology). 2013. Frequently Asked Questions Toxics Cleanup Program. February 2013. Accessed Accessed March 3, 2025. https://apps.ecology.wa.gov/publications/documents/1309172.pdf#:~:text=Passed%20by%20voters%20as%20Initiative%2097%2C%20this%20law,encourages%20public%20involvement%20in%20the%20decision%20making%20process

Ecology (Washington State Department of Ecology. 2024. Contaminated Sites List. Accessed Accessed March 3, 2025. https://apps.ecology.wa.gov/cleanupsearch/reports/cleanup/contaminated

Electrical Engineering Portal. 2017. Technical issues of undergrounding high voltage transmission lines. Accessed March 3, 2025. https://electrical-engineering-portal.com/download-center/books-and-guides/electricity-generation-t-d/undergrounding-hv-lines

Electrical Safety Foundation. 2023. Workplace Injury & Fatality Statistics. Accessed March 3, 2025. https://www.esfi.org/workplace-safety/workplace-injury-fatality-statistics/

EPA (U.S. Environmental Protection Agency). 2016. Polychlorinated Biphenyls (PCBs). Accessed September 24, 2024. https://19january2017snapshot.epa.gov/pcbs/learn-about-polychlorinated-biphenyls-pcbs_.html

EPA (U.S. Environmental Protection Agency). 2019. Electric Power Generation, Transmission and Distribution Industry Practices and Environmental Characterization. June 2019. Accessed March 3, 2025. https://www.epa.gov/sites/default/files/2019-07/documents/cercla_108b_industry_practices.pdf

EPA (U.S. Environmental Protection Agency). 2021. Stormwater Best Management Practices: Hazardous Materials Storage. Accessed March 3, 2025. https://www.epa.gov/system/files/documents/2021-11/bmp-hazardous-materials-storage.pdf

Healthline. Not dated. EMF: What is it? Healthline. Accessed March 3, 2025. https://www.healthline.com/health/emf

ICNIRP (International Commission on Non-Ionizing Radiation Protection). 2010. ICNIRP Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1 Hz–100 kHz). Health Physics 99(6): 818–836. Accessed March 3, 2025. http://www.icnirp.org/cms/upload/publications/ICNIRPLFgdl.pdf

IEEE (Institute of Electrical and Electronics Engineers). 2019. C95.1-2019 - IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic and Electromagnetic Fields, 0 to 300 kHz. IEEE Standard C95.1-2019. New York.

NIEHS (National Institute of Environmental Health Sciences). 2024. Electric & Magnetic Fields. Accessed March 3, 2025. https://www.niehs.nih.gov/health/topics/agents/emf

NIEHS (National Institute of Environmental Health Sciences). 1999. NIEHS Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields. https://www.niehs.nih.gov/sites/default/files/health/assets/docs_p_z/report_powerline_electric_mg_predates_508.pdf

NOAA (National Oceanic and Atmospheric Administration) Center for Environmental Information. 2024. Monthly Wildfires Report for Annual 2023. Accessed September 18, 2024. https://www.ncei.noaa.gov/access/monitoring/monthly-report/fire/202313.

NPS (National Park Service). Not dated. Understanding Fire Danger. Accessed March 2025. https://www.nps.gov/articles/understanding-fire-danger.htm#:~:text=Low%20humidity%20takes%20moisture%20from,these%20fine%20fuels%20become%20drier.

San Diego Gas & Electric Company. 2008. Section D.10 Public Health and Safety, Table D.10-7 Hazardous Materials Typically Used for Transmission Line Construction, Sunrise Powerlink Project, Sunrise Powerlink Application to California Public Utilities Commission, August 4. Accessed September 17, 2024. https://ia.cpuc.ca.gov/environment/info/aspen/sunrise/deir/D10%20Safety.pdf

U.S. Bureau of Labor Statistics. 2023. Census of Fatal Occupational Injuries Summary, 2022. Accessed September 9, 2024. https://www.bls.gov/news.release/archives/cfoi_12192023.pdf

Washington State Department of Labor & Industries. 2019. Washington State Work-Related Fatalities Report. Accessed September 26, 2024. https://www.lni.wa.gov/safety-health/safety-research/files/2020/93_5_2020_WorkRelatedFatalitiesInWashingtonState_2019.pdf

Wertheimer, N. and E. Leeper. 1979. Electrical Wiring Configurations and Childhood Cancer. American Journal of Epidemiology, 109(3), 273–284. Accessed August 25, 2024. https://doi.org/10.1093/oxfordjournals.aje.a112681

Xcel Energy. 2021.Overhead Vs. Underground: Information about Burying High Voltage Transmission Lines. Accessed March 3, 2025. https://xcelnew.my.salesforce.com/sfc/p/#1U0000011ttV/a/8b000002ZAgG/fFXdbyR9TgaRcEOrD2SDyGOV57cQCQPLFEXczPQx6cM

Section 3.9 – Land and Shoreline Use

Americans for a Clean Energy Grid. 2023. Recommended Siting Practices for Electric Transmission Developers. Accessed September 16, 2024. https://cleanenergygrid.org/wp-content/uploads/2023/02/Recommended-Siting-Practices-for-Electric-Transmission-Developers-ACEG-February-2023.pdf

Columbia River Inter-Tribal Fish Commission. 2024. Confederated Tribes and Bands of the Yakama Nation. Accessed October 21, 2024. https://critfc.org/member-tribes-overview/the-confederated-tribes-and-bands-of-the-yakama-nation/

Congressional Research Service. 2020. Federal Land Ownership: Overview and Data. Accessed September 2024. https://sgp.fas.org/crs/misc/R42346.pdf

Cowlitz Indian Tribe. 2017. Cowlitz Indian Tribe Tribal Services Profile. December 27, 2017. Accessed September 2024. https://aihc-wa.com/wp-content/uploads/2019/01/Cowlitz-Tribe.pdf

DNR (Washington State Department of Natural Resources). Not dated. Managed Lands. Accessed September 2024. https://www.dnr.wa.gov/managed-lands

DOC (Washington State Department of Commerce). 2022a. Military Installations and Ranges. Accessed October 30, 2024. https://cesa-wacommerce.hub.arcgis.com/datasets/070da3dce31e49cf8b5257d84e0da582_1/explore?showTable=true

DOC (Washington State Department of Commerce). 2022b. Washington State Compatible Energy Siting Assessment. Accessed January 2025. https://deptofcommerce.app.box.com/s/qgqvpdimhdpvmx4yl8r4xzzbocb7k01a

DOD (U.S. Department of Defense). 2016. Northwest Training Range Complex User's Manual. Accessed January 2025. https://nwtteis.com/portals/nwtteis/files/references/DoN_2016_Northwest_Training_Complex_User_Manual.pdf

DOD (U.S. Department of Defense). 2022. Compatible Use and Installation Resilience Grantee Guide. Accessed January 2025. https://oldcc.gov/sites/default/files/resources/OEA0182%20MIS%20Grantee%20Guide%20508%20%28jc%29_0.pdf

DOD (U.S. Department of Defense). 2023. Defense Spending by State, Fiscal Year 2023. Accessed January 2025. https://oldcc.gov/sites/default/files/defense-spending-rpts/OLDCC_DSBS_FY2023_FINAL_WEB_20240929.pdf

Ecology (Washington State Department of Ecology). Not dated. State-Approved SMP List. Accessed September 2024. https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Shoreline-coastal-planning/State-approved-Shoreline-Master-Programs

EPA (U.S. Environmental Protection Agency). Not dated. Quileute Tribe Water Monitoring Program. Accessed September 2024. https://storymaps.arcgis.com/stories/6ec98e665ba044f7b04815ac0a1c8b38/print

FAA (Federal Aviation Administration). Not dated (a). ENR 1.4 ATS Airspace Classification. Accessed January 2025. https://www.faa.gov/air_traffic/publications/atpubs/aip_html/part2_enr_section_1.4.html

FAA (Federal Aviation Administration). Not dated (b). ENR 5.1 Navigation Warnings. Accessed January 2025. https://www.faa.gov/air_traffic/publications/atpubs/aip_html/part2_enr_section_5.1.html#moXR911c9chri

FAA (Federal Aviation Administration). Not dated (c). Glossary Section S. Accessed January 2025. https://www.faa.gov/air_traffic/publications/atpubs/pcg_html/glossary-s.html#$SPECIAL%20USE%20AIRSPACE

FAA (Federal Aviation Administration). Not dated (d). Section 5. Other Airspace Areas. January 2025. https://www.faa.gov/air_traffic/publications/atpubs/aim_html/chap3_section_5.html#:~:text=In%20an%20effort%20to%20ensure%20the%20greatest%20practical,for%20the%20purpose%20of%20conducting%20low%E2%80%90altitude%2C%20high%E2%80%90speed%20training

Federal Register. 2018. Military Aviation and Installation Assurance Siting Clearinghouse; Notice and Request for Public Comment on Boardman, Oregon, and NAS Patuxent River, Maryland, Geographic Areas of Concern. Accessed January 2025. https://www.govinfo.gov/content/pkg/FR-2018-08-08/pdf/2018-16886.pdf

Muckleshoot Indian Tribe. 2024. Our Origins, Ancestors, and Identity. Accessed September 2024. https://www.muckleshoot.nsn.us/history

National Congress of American Indians. Not Dated. Swinomish Indian Tribal Community. Accessed September 2024. https://archive.ncai.org/tribal-vawa/sdvcj-today/swinomish-indian-tribal-community

NRSIG (Natural Resource Spatial Informatics Group). 2014. Accessed September 3, 2024. https://nrsig.org/projects/public-land-inventory#:~:text=The%20estimated%20total%20land%20area,total%20about%2019.8%20million%20acres

Nisqually Indian Tribe. 2024. Heritage. Accessed September 2024. http://www.nisqually-nsn.gov/index.php/heritage/#:~:text=Tribal

Port Gamble S'Klallam Tribe. 2024. History & Culture. Accessed September 2024. https://pgst.nsn.us/history-culture/

President of the Washington State Senate. Not dated. Washington Tribes. Accessed August 2024. https://www.ltgov.wa.gov/washington-tribes

Puyallup Tribe of Indians. 2017. Puyallup Tribe All Hazard Mitigation Plan 2017-2022 Edition. Accessed September 2024. https://www.puyalluptribe-nsn.gov/wp-content/uploads/2017PTI-Profile-Section.pdf

Renker, A. M. Not dated. The Makah Tribe: People of the Sea and the Forest. Accessed September 2024. https://content.lib.washington.edu/aipnw/renker.html

REPI (Readiness and Environmental Protection Integration). 2023. REPI State Fact Sheet | Washington. Accessed September 2024. https://www.repi.mil/Portals/44/Documents/State_Fact_Sheets/Washington_StateFacts.pdf

Samish Indian Nation. Not Dated. Samish Indian Nation Timeline. Accessed September 2024. https://storymaps.arcgis.com/stories/33d042bc581b456ea7bf286dd4393970

Shoalwater Bay Indian Tribe. Not Dated. Origins of Shoalwater Bay Indian Tribe. Accessed September 2024. https://www.shoalwaterbay-nsn.gov/about-the-tribe/history/

Snoqualmie Tribe. 2022. Snoqualmie Tribe Acquires 12,000 Acres of Ancestral Forestland in King County. Accessed September 2024. https://snoqualmietribe.us/snoqualmie-tribe-acquires-12000-acres-of-ancestral-forestland-in-king-county/

Stillaguamish Tribe of Indians. 2023. About Us. Accessed September 2023. https://www.stillaguamish.com/about-us/

Suquamish Tribe. 2024. 2024. Frequently Asked Questions. Accessed September 2024. https://suquamish.nsn.us/home/about-us/faqs/ Z. Jiangong, Y. Jiawei, T. Bo, H. Bin, and Z. Gan. 2018. Protecting Distance between Radar Stations and UHV Power Transmission Lines. Accessed January 2025. https://benthamopenarchives.com/contents/pdf/TOEEJ/TOEEJ-12-12.pdf

U.S. Census Bureau. 2010. State Area Measurements and Internal Point Coordinates. Accessed October 22, 2024. https://www.census.gov/geographies/reference-files/2010/geo/state-area.html

USDA (U.S. Department of Agriculture). 2023. Press Release, National Agricultural Statistics Service. Accessed September 2024. https://www.nass.usda.gov/Statistics_by_State/Washington/Publications/Current_News_Release/2023/VOP_WA_2022.pdf

USDA (U.S. Department of Agriculture). 2024a. Farmland Protection Policy Act. Accessed September 2024. https://www.nrcs.usda.gov/conservation-basics/natural-resource-concerns/land/cropland/farmland-protection-policy-act

USDA (U.S. Department of Agriculture). 2024b. Environmental Compliance Library Farmland Protection Policy Act. Accessed September 2024. https://www.nrcs.usda.gov/sites/default/files/2022-06/FPPA_Law.pdf

USDA (U.S. Department of Agriculture). 2024c. News Release, 2022 Census of Agriculture Data Down to the County Level. Accessed September 2024. https://www.nass.usda.gov/Statistics_by_State/Washington/Publications/Current_News_Release/2024/WA%20News%20Release%20Ag%20Census%20FINAL.pdf

USFS (U.S. Forest Service). 2023a. Areas by State. Accessed January 2025. https://www.fs.usda.gov/land/staff/lar/LA2023/LARTable4.pdf

USFS (U.S. Forest Service). 2023b. National Scenic Areas By State. Accessed January 2025. https://www.fs.usda.gov/land/staff/lar/LA2023/LARTable12.pdf

USFS (U.S. Forest Service). 2023c. National Volcanic Monument Areas by State. Accessed January 2025. https://www.fs.usda.gov/land/staff/lar/LA2023/LARTable19.pdf

USFWS (U.S. Fish and Wildlife Service). Not Dated. USFWS Facilities. Accessed September 2024. https://www.fws.gov/our-facilities?type=%5B%22National%20Wildlife%20Refuge%22%5D&state_name=%5B%22Washington%22%5Dhttps://www.fws.gov/our-facilities?state_name=%5B%22Washington%22%5D

USGS (U.S. Geological Survey). 2019. Gap Analysis Program (GAP). Accessed September 2024. Retrieved from Land Cover Data Download at: https://www.usgs.gov/programs/gap-analysis-project/science/land-cover-data-download

Washington Governor Jay Inslee. Not dated. Parks and Recreation Commission. Accessed October 30, 2024. https://governor.wa.gov/boards-commissions/board-commission-profiles/Parks%20and%20Recreation%20Commission

Washington National Guard. Not Dated. Armory and Readiness Center Locations. Accessed September 2024. https://mil.wa.gov/washington-national-guard-locations

Washington State Department of Agriculture. 2023. Agricultural Land Use in Washington State. Accessed September 2024. https://experience.arcgis.com/experience/ab85f44a941047878e54503400924388/

Washington State Department of Agriculture. Not Dated. Agriculture: A Cornerstone of Washington's Economy. Accessed August 2024. https://agr.wa.gov/washington-agriculture

WDFW (Washington Department of Fish and Wildlife). 2024. WDFW Lands Management. Accessed October 30, 2024 at https://wsponlinenam.sharepoint.com/sites/US-Transmission-Line/Data%20Collection%20and%20Analysis/Section%203.09%20-%20Land%20Use/References/Other%20References/WDFW%20Lands%20Management%20_%20Washington%20Department%20of%20Fish%20&%20Wildlife.pdf?CT=1730331578110&OR=ItemsView

Section 3.10 – Transportation

AASHTO (American Association of State Highway and Transportation Officials). 2001. Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT 400). Washington, DC: American Association of State Highway and Transportation Officials. Accessed February 3, 2025. https://store.transportation.org/Common/DownloadContentFiles?id=451&srsltid=AfmBOorLNGIRoZWWFO3M-oXYYKwuIBX2cjG3IGWsrZmdtaNJH4lzpc5Z

AASHTO (American Association of State Highway and Transportation Officials). 2011. Roadside Design Guide, 4th Edition. Accessed February 3, 2025. https://highways.dot.gov/safety/rwd/reduce-crash-severity/aashto-guidance

AASHTO (American Association of State Highway and Transportation Officials). 2024. AASHTO Guide for Accommodating Utilities within Highways and Freeways. Washington, DC: American Association of State Highway and Transportation Officials. Accessed February 2025. https://store.transportation.org/Common/DownloadContentFiles?id=2432&srsltid=AfmBOorInQtEeh9mdMmkFafkDSUBv5h0P8Qs7nB0n0ddKuuBy3-g2DC6

Americans for a Clean Energy Grid. 2023. Recommended Siting Practices for Electric Transmission Developers. Accessed September 16, 2024. https://cleanenergygrid.org/wp-content/uploads/2023/02/Recommended-Siting-Practices-for-Electric-Transmission-Developers-ACEG-February-2023.pdf

BLM (U.S. Department of the Interior Bureau of Land Management). 2014. MS 9102 – Facility Design. Accessed February 3, 2025. https://www.blm.gov/sites/blm.gov/files/uploads/mediacenter_blmpolicymanual9102.pdf

BLM (U.S. Department of the Interior Bureau of Land Management). 2015. MS 9113 – Roads. Accessed February 3, 2025. https://www.blm.gov/sites/blm.gov/files/uploads/mediacenter_blmpolicymanual9113.pdf

Burns, A. 2024. Washington Railroads: State Map, History, Abandoned Lines. September 7, 2024. Accessed December 26, 2024. https://www.american-rails.com/wa.html

FAA (Federal Aviation Administration). 2018. FAA Advisory Circular 70/7460- 1L. Accessed February 3, 2025. https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_70_7460-1L_-_Obstuction_Marking_and_Lighting_-_Change_2.pdf

FHWA (Federal Highway Administration). 2023. Manual on Uniform Traffic Control Devices for Streets and Highways (11th edition). Accessed February 3, 2025. https://mutcd.fhwa.dot.gov/pdfs/11th_Edition/mutcd11thedition.pdf

FHWA (Federal Highway Administration). 2025. FHWA Route Log and Finder List. Accessed January 3, 2025. https://www.fhwa.dot.gov/planning/national_highway_system/interstate_highway_system/routefinder/table01.cfm

Transportation Research Board. 2016. Highway Capacity Manual 6th Edition: A Guide for Multimodal Mobility Analysis. Washington, DC: The National Academies Press. https://doi.org/10.17226/24798

USDOT (U.S. Department of Transportation). 2022. National Roadway Safety Strategy. Accessed November 8, 2024. https://www.transportation.gov/sites/dot.gov/files/2022-02/USDOT-National-Roadway-Safety-Strategy.pdf

WPPA (Washington Public Ports Association). Not dated. Frequently Asked Questions. Accessed December 3, 2024. https://www.washingtonports.org/frequently-asked-questions/

WSDOT (Washington State Department of Transportation). 2018. Best Management Practices Field Guide for ESA § 4 (d) Habitat Protection. Accessed February 3, 2025. https://wsdot.wa.gov/sites/default/files/2021-10/bestmanagementpracticesfieldguideregionalroadmaintenance.pdf

WSDOT (Washington State Department of Transportation). 2021. Regional Road Maintenance Forum Best Management Practices Guide. Accessed February 4, 2025. https://wsdot.wa.gov/sites/default/files/2021-10/part2-bestmanagementpractices-regionalroadmaintenance.pdf

WSDOT (Washington State Department of Transportation). 2022. Washington State Freight System Plan. Accessed December 3, 2024. https://wsdot.wa.gov/sites/default/files/2022-12/WA-State-Freight-System-Plan-2022_0.pdf

WSDOT (Washington State Department of Transportation). 2023. Public Transportation Benefit Area Formation Process Guidebook. Accessed November 7, 2024. https://wsdot.wa.gov/sites/default/files/2023-02/Public%20Transportation%20Benefit%20Area%20Formation%20Process%20Guidebook.pdf

WSDOT (Washington State Department of Transportation). 2025a. WSDOT Planning Study Guidance. Accessed February 3, 2025. https://wsdot.wa.gov/engineering-standards/planning-guidance/planning-study-guidance

WSDOT (Washington State Department of Transportation). 2025b. Annual Mileage and Travel Information. Accessed November 7, 2024. https://wsdot.wa.gov/about/transportation-data/travel-data/annual-mileage-and-travel-information

WTSC (Washington Traffic Safety Commission). 2024. State of the State: Washington Traffic Fatalities. Brief No. 11. May 2024. Accessed November 7, 2024. https://wtsc.wa.gov/wp-content/uploads/2024/06/11_State-of-the-State_May2024.pdf

Section 3.11 – Public Services and Utilities

AESD (Association of Educational Service Districts). Not dated. Our Educational Service Districts. Accessed February 2025. https://www.waesd.org/about-us/esds/

Americans for a Clean Energy Grid. 2023. Recommended Siting Practices for Electric Transmission Developers. Accessed February 2025. https://cleanenergygrid.org/wp-content/uploads/2023/02/Recommended-Siting-Practices-for-Electric-Transmission-Developers-ACEG-February-2023.pdf

American Rivers. Not dated. Columbia River. Accessed February 2025. https://www.americanrivers.org/river/columbia-river/

BLS (U.S. Bureau of Labor Statistics). 2023. May 2023 State Occupational Employment and Wage Estimates Washington. Accessed February 2025. https://www.bls.gov/oes/2023/may/oes_wa.htm#29-0000

BPA (Bonneville Power Administration). 2001. The Columbia River System Inside Story. April 2021. Accessed February 2025. https://www.bpa.gov/-/media/Aep/power/hydropower-data-studies/columbia_river_inside_story.pdf

Deloitte. 2020. Trust Land Portfolio Evaluation. Prepared for Washington State Department of Natural Resources. September 30, 2020. Accessed February 2025. https://www.dnr.wa.gov/publications/em_trustassessment_entire.pdf

DOE (U.S. Department of Energy). 2015. State of Washington Energy Sector Risk Profile. Accessed February 2025. https://www.energy.gov/sites/prod/files/2015/05/f22/WA-Energy%20Sector%20Risk%20Profile.pdf

DOE (U.S. Department of Energy). Not dated. Transmission Siting and Permitting Efforts. Accessed February 2025. https://www.energy.gov/gdo/transmission-siting-and-permitting-efforts

Ecology (Washington State Department of Ecology). 2021. The Sate Solid and Hazardous Waste Plan. December 2021. Accessed February 2025. https://apps.ecology.wa.gov/publications/documents/2104050.pdf

Ecology (Washington State Department of Ecology). 2024a. Ecology Proposes Rulemaking on Electricity Markets. June 8, 2024. Accessed February 2025. https://ecology.wa.gov/about-us/who-we-are/news/2024-news-stories/june-28-electricity-markets-rule-proposal#:~:text=As%20centralized%20electricity%20markets%20continue,rulemaking%20can%20be%20found%20online

Ecology (Washington State Department of Ecology). 2024b. Waste in Washington. November 4, 2024. Accessed February 2025. https://storymaps.arcgis.com/stories/81f7dfd33e204263b2a8cd3014b14ed4

Ecology (Washington State Department of Ecology). Not dated. What is Wastewater? Accessed February 2025. https://ecology.wa.gov/Water-Shorelines/Water-quality/Wastewater

EIA (U.S. Energy Information Administration). 2024. Washington State Profile and Energy Estimates. Last Updated April 18, 2024. Accessed February 2025. https://www.eia.gov/state/analysis.php?sid=WA

NWPCC (Northwest Power and Conservation Council). 2024. Council Briefings: NW Sets Summer Record for Peak Power Demand & an Update on the Western Resource Adequacy Program. September 18, 2024. Accessed February 2025. https://www.nwcouncil.org/news/2024/09/18/july-heatwave-western-resource-adequacy-program-update/

NWPCC (Northwest Power and Conservation Council). 2025. Transmission. Accessed February 2025. https://www.nwcouncil.org/reports/columbia-river-history/transmission/

Solar Washington. Not dated. Utilities in Washington. Accessed February 2025. https://www.solarwa.org/utilities_washington_state

U.S. Department of Justice. 2022. Census of State and Local Law Enforcement Agencies, 2018 – Statistical Tables. October 2022. Accessed February 2025. https://bjs.ojp.gov/sites/g/files/xyckuh236/files/media/document/csllea18st.pdf

U.S. Fire Administration. 2025. Washington Fire Loss and Fire Department Profile. Page last reviewed January 1, 2025. Accessed February 2025. https://www.usfa.fema.gov/statistics/states/washington.html

UTC (Washington Utilities and Transportation Commission). 2022a. Companies. Accessed February 2025. https://www.utc.wa.gov/companies?&exposed_select_industry=564

UTC (Washington Utilities and Transportation Commission). 2022b. Pipeline Operators by County. Accessed February 2025. https://www.utc.wa.gov/pipeline-operators-county

Washington State Department of Health. Not dated. Directory of Washington Hospitals. Accessed February 2025. https://doh.wa.gov/sites/default/files/legacy/Documents/2300/HospPatientData/HospDirPrint.pdf

WPUDA (Washington Public Utility Districts Association). Not dated (a). Frequently Asked Questions. Accessed February 2025. https://www.wpuda.org/faqs

WPUDA (Washington Public Utility Districts Association). Not dated (b). Water PUD Map. Accessed February 2025. https://www.wpuda.org/water

Washington Secretary of State. 2023. Summary of Service. Accessed February 2025. https://www2.sos.wa.gov/_assets/library/libraries/libdev/downloads/statistics/23stats/summary.pdf

Washington State Department of Health. Not dated. Drinking Water and Climate Change. Accessed February 2025. https://doh.wa.gov/community-and-environment/climate-and-health/drinking-water.

Washington State Department of Labor & Industries. Not dated. Electrical Utility Providers. Accessed February 2025. https://lni.wa.gov/licensing-permits/electrical/electrical-installation-information/electrical-utility-providers

Section 3.12 – Visual Quality

Americans for a Clean Energy Grid. 2023. Recommended Siting Practices for Electric Transmission Developers. Accessed February 18, 2025. https://cleanenergygrid.org/wp-content/uploads/2023/02/Recommended-Siting-Practices-for-Electric-Transmission-Developers-ACEG-February-2023.pdf

BLM (U.S. Department of the Interior, Bureau of Land Management). Not dated. Federal Agency Visual Impact Mitigation Guidance. Accessed February 18, 2025. https://blmwyomingvisual.anl.gov/mitigation/federal/index.cfm

BLM (U.S. Department of the Interior, Bureau of Land Management). 1986. Visual Contrast Rating (Bureau of Land Management Manual Handbook H-8431-1). Washington, D.C. Accessed February 18, 2025. https://www.blm.gov/sites/blm.gov/files/program_recreation_visual%20resource%20management_quick%20link_BLM%20Handbook%20H-8431-1%2C%20Visual%20Resource%20Contrast%20Rating.pdf

BLM (U.S. Department of the Interior, Bureau of Land Management). 2013. Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands. https://blmwyomingvisual.anl.gov/docs/BLM_RenewableEnergyVisualBMPs_LowRes.pdf

BOEM (U.S. Bureau of Ocean and Energy Management). 2021. Seascape, Landscape, and Visual Impact Assessment (SLVIA). Argonne National Laboratory, Lemont, Illinois. Accessed February 18, 2025. https://www.boem.gov/sites/default/files/documents/environment/environmental-studies/BOEM-2021-032.pdf

CIE (Commission Internationale de l'Eclairage). 2017. Technical Report: Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Installations. Vienna, Austria. CIE 150.

Department for Energy Security and Net Zero. 2023. National Policy Statement for Electricity Networks Infrastructure (EN-5). Accessed February 18, 2025. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147384/NPS_EN-5.pdf

Donaldson, J. J. Not dated. Mitigating Visual Impacts of Utility-Scale Energy Projects. U.S. Department of Agriculture. Accessed February 18, 2025. https://www.fs.usda.gov/nrs/pubs/gtr/gtr-nrs-p-183papers/23-donaldson-VRS-gtr-p-183.pdf

ExperienceOlympia.com. 2025. Best Outdoor Adventures along the Thurston Bountiful Byway. Accessed February 18, 2025. https://www.experienceolympia.com/blog/best-outdoor-adventures-along-the-thurston-bountiful-byway/#afternoon-biking-with-cookie-pit-stop

GO ASTRONOMY. 2025. WA Dark Sky Places. Accessed February 18, 2025. https://www.go-astronomy.com/dark-sky-parks-stargazing-state.php?State=WA

Landscape Institute. 2002. Guidelines for Landscape and Visual Impact Assessment, 2nd edition. New York, NY: Spon Press, Taylor and Francis Group. Accessed February 18, 2025. https://inquiry.leedstrolleybus.org/wp-content/uploads/2015/06/Guidelines-for-Landscape-and-Visual-Impact-Assessment-2nd_Edition-The-Landscape-Institute.pdf

NWSRS (National Wild and Scenic Rivers System). Not dated. Accessed February 18, 2025. https://www.rivers.gov/washington

Scott, Douglas. Not dated. Take a Drive along the Ultimate Columbia River Gorge Loop. ClarkCounty Talk. Accessed February 18, 2025. https://clarkcountytalk.com/2017/11/08/take-drive-along-ultimate-columbia-river-gorge-loop/

State of Washington. 2025. Scenic Byways. Accessed February 18, 2025. https://stateofwatourism.com/scenic-byways/

Sullivan, R., N. Glines-Bovio, K.N. Rogers, J.H. McCarty, D. Korzilius, and H. Hartmann. 2023. Night Sky and Dark Environments: Best Management Practices for Artificial Light at Night on BLM-Managed Lands. Tech Note 457. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, Colorado. Accessed February 18, 2025. https://bjspark.com/BLM/index.html

USDOT (U.S. Department of Transportation). 2002. Scenic Byways: A Design Guide for Roadside Improvements. U.S. Department of Transportation Federal Highway Administration Coordinated Federal Lands Highway Technology Implementation Program. Accessed February 18, 2025. http://www.npshistory.com/publications/usfs/scenic-byways-design-guide.pdf

USDOT (U.S. Department of Transportation).Not dated. National Scenic Byways & All-American Roads. Accessed February 18, 2025. https://fhwaapps.fhwa.dot.gov/bywaysp/States/Show/WA

USGS (U.S. Geological Survey). Not dated. Volcanoes of Washington's Cascade Range. Accessed February 18, 2025. https://volcanoes.usgs.gov/vsc/file_mngr/file-103/5-6-14%20USGS%20CVO%20NIE%20Part%201.pdf

Section 3.13 – Noise and Vibration

APHA (American Public Health Association). 2021. Noise as a Public Health Hazard. October 2021. Accessed March 2025. https://apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2022/01/07/noise-as-a-public-health-hazard#:~:text=Noise%20is%20defined%20in%20this,definition%2C%20associated%20with%20the%20workplace.

Americans for a Clean Energy Grid. 2023. Recommended Siting Practices for Electric Transmission Developers. Accessed February 24, 2025. https://cleanenergygrid.org/wp-content/uploads/2023/02/Recommended-Siting-Practices-for-Electric-Transmission-Developers-ACEG-February-2023.pdf

Bolt Beranek and Newman Inc. 1984. Electric Power Plant Environmental Noise Guide. Edison Electric Institute. Volume 1, 2nd Edition. Cambridge, Massachusetts. https://www.nrc.gov/docs/ML2004/ML20042B483.pdf

DOD (U.S. Department of Defense). 2022. Unified Facilities Criteria (UFC) Noise and Vibration Control. UFC 3-450-01. December 8, 2022. Accessed February 24, 2025. https://www.wbdg.org/FFC/DOD/UFC/ufc_3_450_01_2022.pdf

EPA (U.S. Environmental Protection Agency). 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. Office of Noise Abatement and Control. Washington, DC. Accessed February 24, 2025. https://nepis.epa.gov/Exe/ZyPDF.cgi/2000L3LN.PDF?Dockey=2000L3LN.PDF

FHWA (Federal Highway Administration). 2017. Roadway Construction Noise Model User Guide. Accessed February 24, 2025. https://www.fhwa.dot.gov/Environment/noise/construction_noise/rcnm/rcnm00.cfm

FTA (Federal Transit Administration). 2018. Transit Noise and Vibration Impact Assessment Manual, FTA Report No. 0123. Accessed February 24, 2025. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

Idaho Power. 2018. Exhibit AA Electric and Magnetic Fields. September 2018. Accessed March 2025. https://www.oregon.gov/energy/facilities-safety/facilities/Facilities%20library/2018-09-28-B2H-ASC-Exhibit-AA.pdf

IEEE (Institute of Electrical and Electronics Engineers). 2017. IEEE 1829-2017 Guide for Conducting Corona Tests on Hardware for Overhead Transmission Lines and Substations. September 2017. Accessed March 2025. https://standards.ieee.org/ieee/1829/4966/

ISO (International Organization of Standardization). 1993. Attenuation of Sound during Propagation Outdoors, Part 1: Calculation of the Absorption of Sound by the Atmosphere. Geneva, Switzerland: ISO.

World Population Review. 2024. Washington Cities by Population (2024). Accessed February 24, 2025. https://worldpopulationreview.com/us-cities/washington

Section 3.14 – Recreation

Americans for a Clean Energy Grid. 2023. Recommended Siting Practices for Electric Transmission Developers. Accessed September 16, 2024. https://cleanenergygrid.org/wp-content/uploads/2023/02/Recommended-Siting-Practices-for-Electric-Transmission-Developers-ACEG-February-2023.pdf

Army MWR. 2024. Washington Military Campgrounds. Accessed September 19, 2024. https://www.armymwr.com/programs-and-services/outdoor-recreation/camping-rv-parks/washington

BLM (U.S. Department of Interior, Bureau of Land Management). 2016. Policy Guidance for Processing Right-of-Way Applications for High-Voltage Electric Transmission Lines. Permanent IM 2017-002. November 18, 2016. Accessed September 19, 2024. https://www.blm.gov/policy/permanent-im-2017-002

DAHP (Washington State Department of Archaeology and Historic Preservation. 2024. Data Downloads. Last updated July 10, 2024. Accessed February 20, 2025. https://www.nps.gov/subjects/nationalregister/data-downloads.htm

ECONorthwest. 2019. Economic, Environmental, & Social Benefits of Recreational Trails in Washington State. October 1, 2019. Accessed August 2024. https://rco.wa.gov/wp-content/uploads/2020/01/HikingBikingStudy.pdf

NPS (National Park Service). Not dated. Washington. Parks. Accessed February 20, 2025. https://www.nps.gov/state/wa/index.htm

NPS (National Park Service). 2024. National Parks. Accessed August 20, 2024. https://irma.nps.gov/DataStore/Reference/Profile/2224545?lnv=True

Parks Commission (Washington State Parks and Recreation Commission). 2020. Strategic Plan 2021–2031. September 2020. Accessed August 2024. https://parks.wa.gov/sites/default/files/2023-10/2020-9%20Strategic%20Plan.pdf

RCO (Washington State Recreation and Conservation Office). 2019. Recreational Assets of Statewide Significance in Washington State Study Report. September 30, 2019. Accessed September 19, 2024. https://rco.wa.gov/wp-content/uploads/2019/10/RecAssetStateSignificance.pdf

RCO (Washington State Recreation and Conservation Office). 2023. 2023 Recreation and Conservation Plan. Accessed July 2024. https://rco.wa.gov/wp-content/uploads/2023/07/SCORPExecSummary.pdf

RCO (Washington State Recreation and Conservation Office). 2024. Investing in Washington's Great Outdoors. Accessed August 2024. https://rco.wa.gov/

Van Deynze, B. 2024. Fishing, Hunting, and Wildlife-Associated Recreation in Washington: Participation and Expenditures in 2022. Washington Department of Fish and Wildlife, Olympia, Washington. January 18, 2024. Accessed August 2024. https://wdfw.wa.gov/sites/default/files/publications/02466/wdfw02466.pdf

Washington State Department of Commerce. 2021. Energy Facility Siting in Washington: Projects, Strategies and Resources. August 2021. Accessed September 19, 2024. https://www.commerce.wa.gov/wp-content/uploads/2021/09/Energy-Facility-Projects-Strategies-and-Resources_Aug-2021.pdf

Washington State Parks. Not dated. Winter Recreation Program. Accessed August 2024. https://parks.wa.gov/about/agency/winter-recreation-program

Washington Wild. 2024. Wilderness Designation: Preserving our Lands for Future Generations. Accessed August 2024. https://wawild.org/protect/wilderness-designation/#:~:text=There%20are%2031%20Wilderness%20areas,and%20Bureau%20of%20Land%20Management

WDFW (Washington Department of Fish and Wildlife). 2022. Washington Hunters' Attitudes Toward Wildlife and Hunting Management. Conducted for the Washington Department of Fish and Wildlife. Accessed August 2024. https://wdfw.wa.gov/sites/default/files/2022-08/WA%202022%20Hunter%20Report%202022%2007%2029.pdf

WDFW (Washington Department of Fish and Wildlife). 2024a. Game Management Planning. Accessed September 19, 2024. https://wdfw.wa.gov/hunting/management/planning

WDFW (Washington Department of Fish and Wildlife). 2024b. Places to Go Hunting. Accessed August 2024. https://wdfw.wa.gov/hunting/locations

WDFW (Washington Department of Fish and Wildlife) 2024c. Fishing & Shellfishing. Accessed August 2024. https://wdfw.wa.gov/fishing

WDFW (Washington Department of Fish and Wildlife). Not dated. Game Management Plan July 2015 – June 2021. https://wdfw.wa.gov/sites/default/files/publications/01676/wdfw01676.pdf

WSPRC (Washington State Parks and Recreation Commission). 2024. PARKS – Park Boundaries. Accessed August 20, 2024. https://geo.wa.gov/datasets/wa-stateparks::parks-park-boundaries/about

WTA (Washington Trails Association). 2024. Hike Washington's National Forests. Accessed September 23, 2024. https://www.wta.org/go-outside/seasonal-hikes/summer-destinations/hike-washingtons-national-forests

Section 3.15 – Historic and Cultural Resources

Americans for a Clean Energy Grid. 2023. Recommended Siting Practices for Electric Transmission Developers. Accessed September 16, 2024. https://cleanenergygrid.org/wp-content/uploads/2023/02/Recommended-Siting-Practices-for-Electric-Transmission-Developers-ACEG-February-2023.pdf

APA (American Planning Association). 1997. APA Policy Guide on Historic and Cultural Resources. Accessed September 13, 2024. https://www.planning.org/policy/guides/adopted/historic.htm

Artifacts Consulting, Inc. 2008. Heritage Barns: Statewide Survey and Physical Needs Assessment. Commissioned by the Washington State Department of Archaeology and Historic Preservation, Olympia, Washington, for the Washington State Heritage Barn Preservation Advisory Committee, June 30, 2008. Accessed August 2024. https://dahp.wa.gov/sites/default/files/HeritageBarnReport.pdf

Artifacts Consulting, Inc. 2011. A Maritime Resource Survey for Washington's Saltwater Shores. Washington State Department of Archaeology and Historic Preservation, Olympia, Washington, June 27, 2011. https://dahp.wa.gov/sites/default/files/MaritimeResourcesSurvey_0.pdf

Artifacts Consulting, Inc. and Past Forward Northwest Cultural Resources. 2011. National Register of Historic Places Multiple Property Documentation Form: Historic Barns of Washington State. United States Department of the Interior, National Park Service, Washington, D.C., September 2011. Accessed August 2024. https://dahp.wa.gov/sites/default/files/HistoricBarns_ofWAState_MPD_0.pdf

Beckham, S. D. 1978. Identifying and Assessing Historical Cultural Resources in the Pacific Northwest (Region 6, U.S.F.S). United States Department of Agriculture (USDA), Forest Service, Pacific Northwest Region, 1978. Accessed September 13, 2024. https://npshistory.com/publications/usfs/region/6/crm-2.pdf

BPA (Bonneville Power Administration). 2010. Corridors of Power. Historic Context Statement for the Bonneville Power Administration Portland, Oregon, under Master Agreement #38010. Prepared by George Kramer, M. S. Accessed September 13, 2024. https://www.bpa.gov/-/media/Aep/environmental-initiatives/cultural-resources/transmission-projects/corridors-of-power.pdf

BPA (Bonneville Power Administration). 2020. Manual for Built Resources. May 2020. Accessed September 13, 2024. https://www.bpa.gov/-/media/Aep/environmental-initiatives/cultural-resources/transmission-projects/bpa-manual-for-built-resources-report.pdf

BPA (Bonneville Power Administration). Not dated. Draft Programmatic Agreement among The Bonneville Power Administration, The Oregon State Historic Preservation Office, The Washington State Historic Preservation Office, The Idaho State Historic Preservation Office, The Montana State Historic Preservation Office, And The Advisory Council On Historic Preservation To Address Effects To BPA Transmission Lines. Accessed September 13, 2024. https://www.bpa.gov/-/media/Aep/environmental-initiatives/cultural-resources/national-historic-preservation-act-section-106-programmatic-agreement-draft.pdf

Bruce, R., C. Holstine, R. H. Krier, and J. B. Barber. 1995. National Register of Historic Places, Multiple Property Documentation Form: Washington State Highway Bridges, 1941-1950. United States Department of the Interior, National Park Service, Washington, D.C., February 1995. Accessed September 13, 2024. https://npgallery.nps.gov/NRHP/GetAsset/NRHP/64500697_text

CEQ and ACHP (Council on Environmental Quality and Advisory Council for Historic Preservation). 2013. NEPA and NHPA: A Handbook for Integrating NEPA and Section 106. Accessed June 2023. https://www.achp.gov/sites/default/files/2017-02/NEPA_NHPA_Section_106_Handbook_Mar2013_0.pdf

DAHP (Washington State Office of Archaeology and Historic Preservation). 1989. Built in Washington: 12,000 years of Pacific Northwest Archaeological Sites and Historic Buildings. Pullman Washington: Washington State University Press

DAHP (Washington State Department of Archaeology and Historic Preservation). 2017. Traditional Cultural Properties (TCPs). Letter signed by Washington State Historic Preservation Officer to DAHP (Department Wide), December 1, 2017. Accessed September 2024. https://dahp.wa.gov/sites/default/files/2017_SIGNED_TCP.pdf

DAHP (Washington State Department of Archaeology and Historic Preservation). Not dated (a). “Thematic/MPD Nominations of the State of Washington.” Accessed August 2024. https://dahp.wa.gov/sites/default/files/THEME_LIST%20FINAL_0.pdf

DAHP (Washington State Department of Archaeology and Historic Preservation). Not dated (b). Washington Information System for Architectural and Archaeological Records Data (WISAARD). Accessed January 30, 2025. https://wisaard.dahp.wa.gov/

Dougherty, P. 2020. Boldt Decision: *United States v. State of Washington*. HistoryLink.org. Accessed October 15, 2024. https://www.historylink.org/File/21084

EFSEC (Washington Energy Facility Site Evaluation Council). 2022. Transmission Corridors Work Group Final Report. August 1, 2022. Accessed September 12, 2024. https://www.efsec.wa.gov/sites/default/files/181034/Final_TCWG_Report%20_2022_0801.pdf

Garfield, L. and G. Griffith. 1987. National Register of Historic Places Multiple Property Documentation Form: Rural Public Schools in Washington from Early Settlement to 1945. United States Department of the Interior, National Park Service, Washington, D.C. Prepared by Archaeology and Historic Preservation, Olympia, Washington, March 17, 1986. Accessed August 2024. https://www.historicspokane.org/wp-content/uploads/2015/10/Rural-Public-Schools-in-WA-1987.pdf

Kramer, G. 1992. U.S. Department of the Interior National Parks Service National Register of Historic Places Multiple Property Documentation Form. Bonneville Power Administration [BPA] Pacific Northwest Transmission System. March 1992. Accessed September 13, 2024. https://www.bpa.gov/-/media/Aep/environmental-initiatives/cultural-resources/transmission-projects/multiple-property.pdf

NPS (National Park Service). 2023. National Register Bulletin: Identifying, Evaluating, and Documenting Traditional Cultural Places (DRAFT). United States Department of the Interior, National Park Service, Cultural Resources, Partnerships, and Science, Washington, D.C., November 6, 2023. Accessed September 2024. https://parkplanning.nps.gov/showFile.cfm?sfid=697992&projectID=107663

NPS (National Park Service). 2024. National Historic Landmarks. List of NHLs by State. October 9, 2024. Accessed October 14, 2024. https://www.nps.gov/subjects/nationalhistoriclandmarks/list-of-nhls-by-state.htm

Soderberg, L. 1982. National Register of Historic Places Inventory – Nomination Form: Historic Bridges and Tunnels in Washington State Thematic Resources. United States Department of the Interior, National Park Service, Washington, D.C., 1980. Accessed September 13, 2024. https://npgallery.nps.gov/NRHP/GetAsset/NRHP/64000902_text

Soderberg, L. 1988. National Register of Historic Places Multiple Property Documentation Form: Hydroelectric Power Plants in Washington State, 1890-1938. United States Department of the Interior, National Park Service, Washington, D.C., 1988. Accessed August 2024. https://npgallery.nps.gov/NRHP/GetAsset/43391db0-2ead-433d-a77b-02a8fdfa250d

Swope, C. T. 2005. Classic Houses of Seattle: High Style to Vernacular, 1870-1950. Portland, Oregon: Timber Press, Inc.

WAPA (Western Area Power Administration). 2015. BLM National NEPA Register. TransWest Express Transmission Project, Final Environmental Impact Statement. U.S. Department of the Interior, Bureau of Land Management, Wyoming State Office. Accessed September 13, 2024. https://eplanning.blm.gov/eplanning-ui/project/65198/570

Section 3.16 – Socioeconomics

Americans for a Clean Energy Grid. 2023. Recommended Siting Practices for Electric Transmission Developers. Accessed September 16, 2024. https://cleanenergygrid.org/wp-content/uploads/2023/02/Recommended-Siting-Practices-for-Electric-Transmission-Developers-ACEG-February-2023.pdf

Associated General Contractors of America. 2024. Construction Outlook Washington Survey Results. Accessed August 30, 2024. https://www.agc.org/sites/default/files/users/user21902/2024_Outlook_Washington_FINAL.pdf

Bank of America Global Research. 2024. Global Energy Weekly. Accessed September 16, 2024. https://rsch.baml.com/access?q=cdtyt3g8dmw&ps=true&pv=validated

BEA (Bureau of Economic Analysis). 2024a. Gross Domestic Product by State and Personal Income by State, 2nd Quarter 2024. Accessed August 30, 2024. https://www.bea.gov/data/gdp/gdp-state

BEA (Bureau of Economic Analysis). 2024b. GDP by County, Metro, and Other Areas. Accessed August 30, 2024. https://www.bea.gov/data/gdp/gdp-county-metro-and-other-areas

BLS (Bureau of Labor Statistics). 2024a. Quarterly Census of Employment and Wages. Accessed September 30, 2024. https://www.bls.gov/cew/about-data/location-quotients-explained.htm

BLS (Bureau of Labor Statistics). 2024b. State and Area Employment, Hours, and Earnings, Washington, 2024. Accessed August 30, 2024. https://data.bls.gov/timeseries/SMS53000002000000001?amp%253bdata_tool=XGtable&output_view=data&include_graphs=true

Brattle Group, Inc. and Grid Strategies, LLC. 2021. Transmission Planning for the 21st Century: Proven Practices That Increase Value and Reduce Costs. Accessed October 18, 2024. https://acore.org/wp-content/uploads/2021/10/Transmission-Planning-for-the-21st-Century.pdf

CDC (Centers for Disease Control and Prevention). 2023. Glossary of Terms. Accessed October 17, 2024. https://www.cdc.gov/dhdsp/health_equity/glossary.htm

CEQ (Council on Environmental Quality). 1997. Environmental Justice Guidance under the National Environmental Policy Act. Accessed September 3, 2024. https://www.energy.gov/sites/default/files/nepapub/nepa_documents/RedDont/G-CEQ-EJGuidance.pdf

CEQ (Council on Environmental Quality). 2022. Climate and Economic Justice Screening Tool: Frequently Asked Questions. Accessed March 2025. https://bidenwhitehouse.archives.gov/wp-content/uploads/2022/02/CEQ-CEJST-QandA.pdf

CEQ (Council on Environmental Quality). 2024. Climate and Economic Justice Screening Tool (CEJST) Technical Support Document. Accessed March 2025. https://dataverse.harvard.edu/file.xhtml?fileId=10764777&version=1.1

Data Center Map. Not dated. Washington Data Centers. Accessed January 10, 2025. https://www.datacentermap.com/usa/washington/

Dgtl Infra. 2024. Data Center Power: A Comprehensive Overview of Energy. Accessed August 30, 2024. https://dgtlinfra.com/data-center-power/

DOC (Washington State Department of Commerce). 2025. Clean Energy Transformation Act (CETA). March 17, 2025. Accessed March 2025. https://www.commerce.wa.gov/energy-policy/electricity-policy/ceta/

DOC (Washington State Department of Commerce). Not dated. Accessibility Statement. Accessed November 22, 2024. https://choosewashingtonstate.com/accessibility/

DOE (U.S. Department of Energy). 2017. Guide to Advancing Opportunities for Community Benefits through Energy Project Development. Accessed October 18, 2024. https://www.energy.gov/sites/prod/files/2017/09/f36/CBA%20Resource%20Guide.pdf

DOE (U.S. Department of Energy). 2018. Low-Income Household Energy Burden Varies Among States – Efficiency Can Help In All of Them. December 2018. Accessed March 2025. https://www.energy.gov/sites/prod/files/2019/01/f58/WIP-Energy-Burden_final.pdf

DOE (U.S. Department of Energy). 2024a. National Transmission Planning Study. Accessed October 18, 2024. https://www.energy.gov/sites/default/files/2024-10/NationalTransmissionPlanningStudy-ExecutiveSummary.pdf

DOE (U.S. Department of Energy). 2024b. LEAD Tool, Energy Burden in Washington. Accessed August 30, 2024. https://www.energy.gov/scep/slsc/lead-tool

DOH (Washington State Department of Health). 2022. Washington Environmental Health Disparities Map Technical Report. July 2022. Accessed March 2025. https://doh.wa.gov/sites/default/files/2022-07/311-011-EHD-Map-Tech-Report_0.pdf

DOH (Washington State Department of Health). 2024. Environmental Justice Assessment Report. November 2023. Accessed March 2025. https://doh.wa.gov/sites/default/files/2024-06/300-048.pdf

Donalds, S. 2022. Washington State's Roadmap to 100% Clean Energy – Leading with Equity and Public Participation. Accessed August 30, 2024. https://www.cesa.org/washington-roadmap-to-100-clean-energy/

Ecology (Washington Department of Ecology). 2024. Layer: Overburdened Communities of Washington State. May 2024. Accessed March 2025. https://gis.ecology.wa.gov/hosting/rest/services/Hosted/WA_OBC_May2024/FeatureServer/0

Ecology (Washington Department of Ecology). Not dated. Climate Commitment Act. Accessed March 2025. https://ecology.wa.gov/Air-Climate/Climate-Commitment-Act#revenueanchor

EFSEC (Washington Energy Facility Site Evaluation Council). 2022. Transmission Corridors Work Group Final Report. August 2, 2022. Accessed November 8, 2024. https://www.efsec.wa.gov/sites/default/files/181034/Final_TCWG_Report%20_2022_0801.pdf

EIA (U.S. Energy Information Administration). 2024a. Washington State Profile and Energy Estimates, Profile Analysis. Accessed August 30, 2024. https://www.eia.gov/state/analysis.php?sid=WA

EIA (U.S. Energy Information Administration). 2024b. Retail Electricity Prices Closely Tracked Inflation over the Last 10 Years. Accessed September 16, 2024. https://www.eia.gov/todayinenergy/detail.php?id=63064

Environmental Justice Task Force. 2020. Recommendations for Prioritizing EJ in Washington State Government. Accessed December 4, 2024. https://healthequity.wa.gov/sites/default/files/2022-01/EJTF%20Report_FINAL%281%29.pdf

EPA (U.S Environmental Protection Agency). 2024a. Environmental Justice Mapping and Screening Tool EJScreen Technical Documentation for Version 2.3. U.S. Environmental Protection Agency, Office of Environmental Justice and External Civil Rights. Accessed January 10, 2025. https://www.epa.gov/system/files/documents/2024-07/ejscreen-tech-doc-version-2-3.pdf

EPA (U.S Environmental Protection Agency). 2024b. EJScreen Community Report. Adams County. Accessed September 5, 2024. https://ejscreen.epa.gov/mapper/

EPA (U.S Environmental Protection Agency). 2024c. EJScreen Community Report. Chelan County. Accessed September 5, 2024. https://ejscreen.epa.gov/mapper/

EPA (U.S Environmental Protection Agency). 2024d. EJScreen Community Report. Grant County. Accessed September 5, 2024. https://ejscreen.epa.gov/mapper/

EPA (U.S Environmental Protection Agency). 2024e. EJScreen Community Report. Okanogan County. Accessed September 5, 2024. https://ejscreen.epa.gov/mapper/

EPA (U.S Environmental Protection Agency). 2024f. EJScreen Community Report. Yakima County. Accessed September 5, 2024. https://ejscreen.epa.gov/mapper/

ESD (Washington State Employment Security Department). Not dated (a). Projections. Accessed September 16, 2024. https://esd.wa.gov/labormarketinfo/projections

ESD (Washington State Employment Security Department). Not dated (b). Monthly Employment Report. Accessed September 16, 2024. https://esd.wa.gov/labormarketinfo/monthly-employment-report

NREL (National Renewable Energy Laboratory). 2013. Transmission Line Jobs and Economic Development Impact (JEDI) Model User Reference Guide. Accessed September 30, 2024. https://www.nrel.gov/docs/fy14osti/60250.pdf

OFM (Office of Financial Management). 2017. Growth Management Act Population Projections for Counties: 2010 to 2040. 2017 Projections. Accessed August 30, 2024. https://ofm.wa.gov/washington-data-research/population-demographics/population-forecasts-and-projections/growth-management-act-county-projections/growth-management-act-population-projections-counties-2010-2040-0

OFM (Office of Financial Management). 2024a. Components of Population Change. Accessed August 30, 2024. https://ofm.wa.gov/washington-data-research/statewide-data/washington-trends/population-changes/components-population-change

OFM (Office of Financial Management). 2024b. Growth Management Act Population Projections for Counties: 2020 to 2050. 2022 Projections. Accessed August 30, 2024. https://ofm.wa.gov/washington-data-research/population-demographics/population-forecasts-and-projections/growth-management-act-county-projections/growth-management-act-population-projections-counties-2020-2050

OFM (Office of Financial Management). 2024c. Annual Comprehensive Financial Report, Management's Discussion and Analysis. Accessed August 30, 2024. https://ofm.wa.gov/accounting/financial-audit-reports/annual-comprehensive-financial-report.

PNUCC (Pacific Northwest Utilities Conference Committee). 2024. Northwest Regional Forecast of Power Loads and Resources: August 2024 through July 2034. Accessed August 30, 2024. https://www.pnucc.org/wp-content/uploads/2024-PNUCC-Northwest-Regional-Forecast-final.pdf

PSE (Puget Sound Energy). Not Dated. Open Access Transmission Tariff. Accessed February 2025. https://www.oasis.oati.com/psei/pseidocs/2016-09-01_pse_currently_effective_oatt.pdf

Raphael D., T. Bryan, J. Mikkonen, and A. Raphael. 2020. Social Determinants of Health: The Canadian Facts - 2nd Edition. Accessed September 4, 2024. https://thecanadianfacts.org/The_Canadian_Facts-2nd_ed.pdf

Revenue (Washington State Department of Revenue). 2022a. Business and Occupation (B&O) Tax. Accessed August 30, 2024. https://dor.wa.gov/education/industry-guides/private-mailing-business-tax-guide/business-and-occupation-bo-tax

Revenue (Washington State Department of Revenue). 2022b. Construction Tax Matrix. Accessed August 30, 2024. https://dor.wa.gov/education/industry-guides/construction/construction-tax-matrix

SIA (The Interorganizational Committee on Guidelines and Principles for Social Impact Assessment). 1994. Guidelines and Principles for Social Impact Assessment. Accessed October 18, 2024. https://www.iaia.org/pdf/IAIAMemberDocuments/Publications/Guidelines_Principles/SIA%20Guide.PDF

Thuraisingham, Mariel. 2021. An Equitable Transition to 100% Clean Energy in Washington. March 2021. Accessed March 2025. https://frontandcentered.org/an-equitable-transition-to-100-clean-energy-in-washington/

U.S. Census Bureau. 2020a. RACE. Decennial Census, DEC Redistricting Data (PL 94-171), Table P1. Accessed August 15, 2024. https://data.census.gov/table/DECENNIALPL2020.P1?q=P1: RACE&g=040XX00US53$0500000

U.S. Census Bureau. 2020b. Hispanic or Latino, and Not Hispanic or Latino by Race. Decennial Census, DEC Demographic and Housing Characteristics, Table P9. Accessed August 15, 2024. https://data.census.gov/table/DECENNIALDHC2020.P9?q=P9: HISPANIC OR LATINO, AND NOT HISPANIC OR LATINO BY RACE&g=040XX00US53,53$0500000

U.S. Census Bureau. 2021. Group Quarters and Housing Unit Estimates Terms and Definitions. Accessed September 3, 2024. https://www.census.gov/programs-surveys/popest/about/glossary/housing.html

U.S. Census Bureau. 2022a. Poverty Status in the Past 12 Months. American Community Survey, ACS 5-Year Estimates Subject Tables, Table S1701. Accessed August 16, 2024. https://data.census.gov/table/ACSST5Y2022.S1701?t=Income and Poverty&g=040XX00US53$0500000

U.S. Census Bureau. 2022b. Selected Housing Characteristics. American Community Survey, ACS 5-Year Estimates Data Profiles, Table DP04. Accessed September 4, 2024. https://data.census.gov/table/ACSDP5Y2022.DP04?q=median home value &g=040XX00US53,53$0500000

U.S. Census Bureau. 2023. Urban and Rural. Accessed October 22, 2024. https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural.html

U.S. Department of Health and Human Services. Not dated (a). Social Cohesion. Accessed January 29, 2025. https://odphp.health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/social-cohesion#:~:text=Social%20cohesion%20refers%20to%20the,9

U.S. Department of Health and Human Services. Not dated (b). Social Determinants of Health. Accessed December 4, 2024. https://health.gov/healthypeople/objectives-and-data/social-determinants-health

U.S. Department of Labor. 2024. The Employment Situation – September 2024. Accessed October 22, 2024. https://www.bls.gov/news.release/pdf/empsit.pdf

U.S. Treasury Department. 2010. An Economic Analysis of Infrastructure Investment. Accessed January 28, 2025. https://home.treasury.gov/system/files/226/An_Economic_Analysis_of_Infrastructure_Investment_OCT2010.pdf

UTC (Washington Utilities and Transportation Commission). 2018. About Energy Rates. Accessed September 16, 2024. https://www.commerce.wa.gov/wp-content/uploads/2018/05/UTC-About-Energy-Rates-May18.pdf

6.5 Chapter 4 – Cumulative Impacts

Bonneville Power Administration. Not Dated. Shelton-Fairmount No 1 Transmission Line Rebuild Project (DOE/EA-2224). Accessed 2025. https://www.bpa.gov/learn-and-participate/public-involvement-decisions/project-reviews/shelton-fairmount-no-1-transmission-line-rebuild-project

City of Cle Elum. 2025. Bullfrog Flats Development. Accessed 2025. https://cleelum.gov/city-services/planning/bullfrog-flats-development/

City of Spokane Valley. Not dated. Future Spokane Valley Cross Course. Accessed 2025. https://spokanevalleywa.gov/692/Future-Spokane-Valley-Cross-Course

Chehalis Basin Strategy. 2024. State Environmental Review of Proposed Chehalis River Basin Flood Damage Reduction Project. Accessed 2025.https://chehalisbasinstrategy.com/sepa-process/ https://chehalisbasinstrategy.com/sepa-process/

Chelan County Community. 2020. Master Planned Resort Overlay and Development Agreement Application. Accessed 2025. https://www.co.chelan.wa.us/files/community-development/documents/Mission%20Ridge/02%20Revised%20Project%20Narrative%20-%2020200116.pdf

Columbia River Ports. Not Dated. Lower Columbia River Channel Maintenance Plan. Accessed 2025. https://www.lcrports.com/#:~:text=The%20Corps%20and%20five%20lower%20Columbia%20River%20ports%20are%20developing

County of Benton, Washington, Community Development Department. 2024. Exhibit List for CUP 2024-004 JUB Engineers For Interstate Concrete And Asphalt Hospital Quarry. Accessed 2025. https://bentoncountywa.municipalone.com/files/documents/CUP2024-004JUBEngineersforInterstatagenda131281406041824-015241PMc.pdf

East Columbia Basin Irrigation District. 2024. East Columbia Basin Irrigation District Breaks Ground on Second Odessa Groundwater Replacement Program System. Accessed 2025. https://ecbid.org/east-columbia-basin-irrigation-district-breaks-ground-on-second-odessagroundwater-replacement-program-system/

Ecology (Washington State Department of Ecology). 2024. State Environmental Policy Act Draft Programmatic Environmental Impact Statement for Utility-Scale Solar Energy Facilities in Washington State. September 2024. Accessed February 2025. https://apps.ecology.wa.gov/publications/SummaryPages/2406011.html

Ecology (Washington State Department of Ecology). 2024. State Environmental Policy Act Draft Programmatic Environmental Impact Statement for Utility-Scale Solar Energy Facilities in Washington State. September 2024. Accessed February 2024. https://apps.ecology.wa.gov/publications/SummaryPages/2406011.html

Ecology (Washington State Department of Ecology). 2025. State Environmental Policy Act Draft Programmatic Environmental Impact Statement for Green Hydrogen Energy Facilities in Washington State. January 2025. Accessed February 2025. https://apps.ecology.wa.gov/publications/SummaryPages/2406028.html

Ecology (Washington State Department of Ecology). Not dated. Wildfire Risks Caused by Climate Change. Accessed September 30, 2024. https://ecology.wa.gov/air-climate/responding-to-climate-change/wildfire-risks.

Ecology (Washington State Department of Ecology). Not dated. Eightmile Dam rebuild & restoration. Accessed 2025. https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-supply-projects-EW/Icicle-Creek-strategy/Eightmile-Dam.

EPA (U.S. Environmental Protection Agency). 2024. Sulfur Hexafluoride (SF6) Basics. Accessed August 20, 2024. https://www.epa.gov/eps-partnership/sulfur-hexafluoride-sf6-basics

Forest Service, U.S. Department of Agriculture. Not Dated. Tonata-Trout Project. Accessed 2025. https://www.fs.usda.gov/project/colville/?project=65138

Grant County Washington. Not Dated. Appledale Energy Center, LLC Conditional Use Permit & SEPA Applications. Accessed 2025. https://www.grantcountywa.gov/1492/Appledale-Energy-Center-LLC

Grant County Washington. Not Dated. Dry Falls Energy Center, LLC. Applications. Accessed 2025. https://www.grantcountywa.gov/1488/Dry-Falls-Energy-Center-LLC

Grant County Washington. Not Dated. Quincy Valley Solar, LLC. Applications. Accessed 2025. https://www.grantcountywa.gov/1491/Quincy-Valley-Solar-LLC

Grant PUD. Not Dated. Quincy Transmission Expansion Plan. Accessed 2025. https://www.grantpud.org/qtep

King County. 2025. Ames Lake Trestle Bridge Replacement Project. Accessed 2025. https://kingcounty.gov/en/dept/local-services/transit-transportation-roads/roads-and-bridges/projects-and-programs/ames-lake-bridge.

Okaniogan County Washington. 2025. Copperstone Planned Development. Accessed 2025. https://okanogancounty.org/government/planning/projects___plans/copperstone_planned_development.php#outer-5544

Pierce County. Not Dated. FRED 310 Industrial Development. Accessed 2025. https://www.piercecountywa.gov/7639/FRED-310#:~:text=Applications%20to%20develop%20two%20parcels%20consisting%20of%20approximately%20310%20acres

Port of Walla Walla. Not Dated. Port of Walla Walla - Wallula Gap Business Park. Accessed 2025. http://wgbp.portwallawalla.com/stuff/General%20Information/001-WGBP%20Overview.pdf

Port of Walla Walla. Not Dated. Wallula Gap Business Park Wallula, Washington. Accessed 2025. https://portwallawalla.com/images/pdf/industrial/PDF_Sites/Wallula_Gap_Business_Park.pdf

Puget Sound Energy. 2024. Underground Electric Cable Replacement Program. Accessed 2025. https://www.pse.com/en/pages/pse-projects/underground-electric-cable-replacement-program

Snohomish County. 2023. Granite Falls Bridge 102 Replacement. Accessed 2025. https://snohomishcountywa.gov/608/Mt-Loop-Hwy-Br-102---Granite-Falls-2026

Snohomish County. 2023. Sky Valley Sportsman's Park. Accessed 2025. https://www.snohomishcountywa.gov/2706/Sky-Valley-Sportsmans-Park

Snohomish County. 2024. Thomas' Eddy Restoration Project. Accessed 2025. https://www.snohomishcountywa.gov/5816/Thomas-Eddy-Restoration-Project

Snohomish County. 2024. Trafton Floodplain Restoration. Accessed 2025. https://www.snohomishcountywa.gov/6143/Trafton-Floodplain-Restoration

Sound Transit. Not Dated. East Link Extension. Accessed 2025. https://www.soundtransit.org/system-expansion/east-link-extension#:~:text=Fourteen%20miles%20long%2C%20the%20entire,area%20to%20Redmond%20Technology%20Station.

Spokane City. Not Dated. Make Beacon Hill Public Phase 2. Accessed 2025. https://my.spokanecity.org/parksrec/about/planning/make-beacon-hill-public-phase-2/

Spokane City. 2024. February 2024 Project Updated. Accessed 2025. https://static.spokanecity.org/documents/parksrec/aboutus/planning/beacon-hill-phase-2/beacon-hill-phase-2-project-information-boards-feb-2024.pdf

State of Washington Energy Facility Site Evaluation Council. 2023. Carriger Solar Project information. Accessed 2025. https://www.efsec.wa.gov/energy-facilities-1

State of Washington Energy Facility Site Evaluation Council. 2024. Cascade Renewable Transmission Project. Accessed 2025. https://www.efsec.wa.gov/energy-facilities/cascade-renewable-transmission-project#:~:text=Cascade%20Renewable%20Transmission%20Project%20%7C%20EFSEC,Energy%20Facility%20Site%20Evaluation%20Council

State of Washington Energy Facility Site Evaluation Council. 2023. Desert Claim. Accessed 2025. https://www.efsec.wa.gov/energy-facilities/desert-claim

Tri-Cities Airport. 2023. The Port of Pasco and the Tri-Cities Airport host open house for AIM Center. Retrieved Accessed 2025.https://www.flytricities.com/press-release/the-port-of-pasco-and-the-tri-cities-airport-host-open-house-for-aim-center

Washington Department of Fish and Wildlife. 2023. Beezley Hills. Accessed 2025.https://wdfw.wa.gov/sites/default/files/2023-11/beezley-hills-2023.pdf.

Washington Department of Natural Resources. 2024. Federal Funding Secured to Protect 9,700 Acres Adjacent to the Teanaway Community Forest. Accessed 2025. https://www.dnr.wa.gov/news/federal-funding-secured-protect-9700-acres-adjacent-teanaway-community-forest

Washington State Department of Ecology. 2022. Badger Mountain Solar Energy Project. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202201079

Washington State Department of Ecology. 2022. Goldendale Energy Storage Project. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202206265

Washington State Department of Ecology. 2022. Hop Hills Solar Energy Project. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202203738

Washington State Department of Ecology. 2022. New Hatton Rezone. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202206264

Washington State Department of Ecology. 2023. Cedar River Municipal Watershed Forest Management Plan. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202304397

Washington State Department of Ecology. 2023. Chelatchie Bluff Surface Mine Overlay Annual Review. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202301565

Washington State Department of Ecology. 2023. Horse Heaven Wind Farm. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202305223

Washington State Department of Ecology. 2023. SEPA 2022-34 Walton Rezone. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202300371

Washington State Department of Ecology. 2023. Tonata-Trout Project Proposal. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202305536

Washington State Department of Ecology. 2024. 4-0 Ranch Forest Restoration. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202402755

Washington State Department of Ecology. 2024. Amendment to Riverside State Park Classification and Management Plan (CAMP) to include Glen Tana Property. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202404063

Washington State Department of Ecology. 2024. Buckhorn Project. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202403412

Washington State Department of Ecology. 2024. Conk Timber Sale #106237 . Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202400883

Washington State Department of Ecology. 2024. Deception Pass State Park OSRSI Rezone. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202404362

Washington State Department of Ecology. 2024. Farmland Reserve Water Bank. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202404263

Washington State Department of Ecology. 2024. Lewisville Mine Expansion. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202304424

Washington State Department of Ecology. 2024. Flora Park and Cross Country Course (Phase 2). Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202404240

Washington State Department of Ecology. 2024. Fly By Night Timber Sale #106349. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202401378

Washington State Department of Ecology. 2024. Flying A Land Rezone. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202403560

Washington State Department of Ecology. 2024. Forest Practice Application #3027124. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202402755

Washington State Department of Ecology. 2024. Forest Practice Application #3027198 Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202403251

Washington State Department of Ecology. 2024. Gibson Rezone. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202404594

Washington State Department of Ecology. 2024. Interstate Bridge Replacement Program. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202404445

Washington State Department of Ecology. 2024. Jungquist Farms Depth of Cover. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202404181

Washington State Department of Ecology. 2024. Kang/Nazarene Church/Lange Rezone. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202403895

Washington State Department of Ecology. 2024. Klondike Timber Sale #106084. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202400452

Washington State Department of Ecology. 2024. Little White Salmon Forest Resiliency and Fire Risk Mitigation Project. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202404334

Washington State Department of Ecology. 2024. Pasco Gravel Pit Mine. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202401487

Washington State Department of Ecology. 2024. Pioneer Aggregates South Parcel Mine Expansion. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202403111

Washington State Department of Ecology. 2024. Portrait Timber Sale #106261. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202402784

Washington State Department of Ecology. 2024. Project Sequoia. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202402545

Washington State Department of Ecology. 2024. Zone Change Application. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202305547

Washington State Department of Ecology. 2024. Rocky Pond Comp Plan Amendment, Master Plan Resort. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202403621

Washington State Department of Ecology. 2024. Swift Creek Poultry Farm. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202403973

Washington State Department of Ecology. 2024. Syndrome SWT Timber Sale #106448. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202404319

Washington State Department of Ecology. 2024. US Golden Farm Irrigation Pond. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202403376

Washington State Department of Ecology. 2024. Wautoma Solar Energy Project. Accessed 2025. https://apps.ecology.wa.gov/separ/Main/SEPA/Record.aspx?SEPANumber=202402596

Washington Department of Fish and Wildlife. 2022. Fish and Wildlife Commission Presentation Summary Sheet. Accessed 2025. https://wdfw.wa.gov/sites/default/files/2022-12/4-20221209-lands-2020-summary-sheet-commission.pdf

Washington Department of Fish and Wildlife. 2022. Hoffstadt Hills Cowlitz County. Accessed 2025. https://wdfw.wa.gov/sites/default/files/2022-10/hoffstadt_hills.pdf

Washington Department of Fish and Wildlife. 2022. Wenas Watershed – Miracle Mile Yakima County. Accessed 2025. https://wdfw.wa.gov/sites/default/files/2022-10/wenas_watershed_miracle_mile.pdf

Washington Department of Fish and Wildlife. 2023. Fish and Wildlife Commission Presentation Summary Sheet. Accessed 2025. https://wdfw.wa.gov/sites/default/files/2023-12/5-lands-2020-summary-sheet-0_0.pdf

Washington Department of Fish and Wildlife. 2023. Scroggie Canyon, Chelan County. Accessed 2025. https://wdfw.wa.gov/sites/default/files/2023-11/scroggie-canyon-2023.pdf

Washington Department of Fish and Wildlife. 2024. Fish and Wildlife Commission Presentation Summary/Decision Sheet. Accessed 2025. https://wdfw.wa.gov/sites/default/files/2024-04/5-summary-sheet-land-transaction-41924.pdf

Washington Department of Fish and Wildlife. 2024 Springwood Ranch Yakima Basin Integrated Plan. Accessed 2025. https://wdfw.wa.gov/sites/default/files/2024-01/springwood-ranch.pdf

Washington Department of Fish and Wildlife. Not Dated. Duckabush Estuary Restoration Project. Accessed 2025. https://wdfw.wa.gov/species-habitats/habitat-recovery/puget-sound/estuary-restoration-projects/duckabush-estuary-restoration-project#details

Washington Department of Fish and Wildlife. Not Dated. Duckabush Wildlife Area Unit. Accessed 2025. https://wdfw.wa.gov/places-to-go/wildlife-areas/duckabush-wildlife-area-unit

Washington Department of Fish and Wildlife. Not Dated. Duckabush Estuary Restoration Project (Presentation). Accessed 2025. https://wdfw.wa.gov/sites/default/files/2024-09/duckabush-open-house-handout.pdf

Washington State Department of Transportation. Not Dated. I-405/Renton to Bellevue Widening and Express Toll Lanes Project. Accessed 2025. https://wsdot.wa.gov/construction-planning/search-projects/i-405renton-bellevue-widening-and-express-toll-lanes-project

Washington State Department of Transportation. Not Dated. I-405/SR 167 Corridor Program. Accessed 2025. https://wsdot.wa.gov/construction-planning/major-projects/i-405sr-167-corridor-program

Washington State Department of Transportation. Not Dated. I-5 East Fork Lewis River NB Bridge - Replacement. Accessed 2025. https://wsdot.wa.gov/construction-planning/search-projects/i-5-east-fork-lewis-river-nb-bridge-replacement

Washington State Department of Transportation. I-90 – Lewis, W. Village Park, Schneider Creeks – Fish Passage Projects. Not Dated. Accessed 2025. https://wsdot.wa.gov/construction-planning/search-projects/i-90-lewis-w-village-park-schneider-creeks-fish-passage-projects

Washington State Department of Transportation. Not Dated. I-90 - Sunset Creek - Fish Passage. Accessed 2025. https://wsdot.wa.gov/construction-planning/search-projects/i-90-sunset-creek-fish-passage

Washington State Department of Transportation. Not Dated. North Spokane Corridor. Accessed 2025. https://wsdot.wa.gov/construction-planning/major-projects/north-spokane-corridor

Washington State Department of Transportation. Not Dated. Puget Sound Gateway Program. Accessed 2025. https://wsdot.wa.gov/construction-planning/major-projects/puget-sound-gateway-program

Washington State Department of Transportation. Not Dated. SR 155 Spur/Okanogan River Bridge Replacement. Accessed 2025. https://wsdot.wa.gov/construction-planning/search-projects/sr-155-spur-okanogan-river-bridge-replacement

Washington State Department of Transportation. Not Dated. SR 3, SR 16 and SR 166, Gorst Vicinity - Remove Fish Barriers. Accessed 2025. https://wsdot.wa.gov/construction-planning/search-projects/sr-3-sr-16-and-sr-166-gorst-vicinity-remove-fish-barriers

Washington State Department of Transportation. Not Dated. SR 520 Montlake Project. Accessed 2025. https://wsdot.wa.gov/construction-planning/search-projects/sr-520-montlake-project

Washington State Department of Transportation. Not Dated. SR 520 Portage Bay Bridge and Roanoke Lid Project. Accessed 2025. https://wsdot.wa.gov/construction-planning/search-projects/sr-520-portage-bay-and-roanoke-lid-project

Washington State Department of Transportation. Not Dated. SR 527 - Penny Creek - Fish Passage. Accessed 2025. https://wsdot.wa.gov/construction-planning/search-projects/sr-527-penny-creek-fish-passage

Washington State Department of Transportation. Not Dated. SR 9 – Marsh Road to 2nd Street Vicinity – Widening & Bridge Painting. Accessed 2025. https://wsdot.wa.gov/construction-planning/search-projects/sr-9-marsh-road-2nd-street-vicinity-widening-bridge-painting

Washington State Department of Transportation. Not Dated. US 12 - SR 8 - Grays Harbor County Fish Passage Barriers - Remove Fish Barriers. Accessed 2025. https://wsdot.wa.gov/construction-planning/search-projects/us-12-sr-8-grays-harbor-county-fish-passage-barriers-remove-fish-barriers

Washington State Department of Transportation. Not Dated. US 101 - SR 109 Grays Harbor, Jefferson and Clallam Counties - Remove Fish Barriers. Accessed 2025. https://wsdot.wa.gov/construction-planning/search-projects/us-101-sr-109-grays-harbor-jefferson-and-clallam-counties-remove-fish-barriers

Washington State Parks. Not Dated. Miller Peninsula State Park Property Planning. Accessed 2025. https://parks.wa.gov/about/strategic-planning-projects-public-input/projects/miller-peninsula-state-park-property-planning

Whatcom County. 2024. Nielson Campground Project. Accessed 2025. https://www.whatcomcounty.us/4437/Nielson-Campground-Project

NRCS (Natural Resources Conservation Service). 2023. Five projects in Washington to receive $74.3 million through RCPP. Accessed 2025. https://www.nrcs.usda.gov/conservation-basics/conservation-by-state/washington/news/five-projects-in-washington-to-receive

WDFW (Washington Department of Fish and Wildlife). 2015. Washington's State Wildlife Action Plan: 2015 Update. Washington Department of Fish and Wildlife, Olympia, Washington, USA. https://wdfw.wa.gov/sites/default/files/publications/01742/wdfw01742.pdf

This Page Intentionally Left Blank

7.0 CHAPTER 7 – GLOSSARY

A

adaptability	In biology, a species' ability to continue functioning after a disturbance.
accelerometer	A device that measures the acceleration of ground motion caused by seismic waves during events like earthquakes.
accretion	Refers to the process of growth or increase, typically by the gradual accumulation of additional layers of matter.
addendum	A SEPA term defined in WAC 197-11-706 as "an environmental document used to provide additional information or analysis that does not substantially change the analysis of significant impacts and alternatives in the existing environmental document. The term does not include supplemental EISs."
adoption	A SEPA term defined in WAC 197-11-708 as "an agency's use of all or part of an existing environmental document to meet all or part of the agency's responsibilities under SEPA to prepare an EIS or other environmental document."
advertisement call	A call used by male frogs to advertise to female frogs during the breeding season.
air basin	A geographic area characterized by similar meteorological and geographic conditions throughout. Air basins are often defined by natural boundaries such as mountains, which can trap air and pollutants within the basin, leading to unique air quality challenges.
alternating current	An electric current that periodically reverses direction and changes its magnitude continuously with time.
alternative fuel	An energy source that can be used to generate electricity as a substitute for traditional fossil fuels like coal, oil, and natural gas. Alternative fuels are often more sustainable and considered more environmentally friendly.
ambient air quality	The quality of the air in the outdoor environment. Ambient air quality is determined by the concentration of pollutants in the atmosphere, which can affect human health and the environment.
ambient air quality standards	Regulatory limits set to protect public health and the environment from harmful levels of air pollutants. These standards define the maximum allowable concentrations of specific pollutants in the outdoor air over a given period.
ambient noise	Also known as background noise, refers to the surrounding sounds in an environment that are not the primary focus of attention.

ancillary equipment	Secondary systems and devices that support main transmission infrastructure.
anthropogenic	Caused or created by humans.
aquaculture	The practice of cultivating aquatic organisms (e.g., fish or shellfish) for food.
arboreal	An organism which is adapted to living in trees.
arc-quenching	The process of extinguishing an electrical arc that forms when current-carrying contacts in a circuit breaker or switchgear separate. This arc is a highly ionized, conductive path that can cause significant damage if not properly managed. Effective arc-quenching is crucial for ensuring the safe and efficient interruption of electrical currents.
archaeological resources	Material remains of human activities that can provide information about the behavioral traits and environmental and cultural adaptations of a people.
attainment area	A geographic region that meets or exceeds the National Ambient Air Quality Standards set by the U.S. Environmental Protection Agency.
attainment plan	A detailed strategy developed to bring a specific geographic area into compliance with the National Ambient Air Quality Standards set by the U.S. Environmental Protection Agency.
audiometric testing	A method used to evaluate a person's hearing ability. It involves a series of tests that measure how well a person can hear sounds of varying frequencies and intensities.
automatic transfer equipment	Systems and devices that automatically switch a power supply from its primary source to a backup source when a failure or outage occurs.
avoidance criteria	Criteria that limit the scope of the environmental review and provide a consistent baseline for evaluating the potential impacts of project-specific applications. This Draft Programmatic EIS assumes that applicants would comply with the avoidance criteria specified in Section 3.1. When projects cannot meet the avoidance criteria, additional environmental review and mitigation measures would be required to address related project-specific impacts.
A-weighted decibels (dBA)	A scale expressing relative loudness as perceived by the human ear. The A-weighting curve de-emphasizes low and very high frequencies, which the human ear is less sensitive to, and emphasizes frequencies in the mid-range, where our hearing is most sensitive making dBA a more accurate representation of perceived loudness.

B

backstop sitting	The Federal Energy Regulatory Commission's limited authority to approve the siting of certain electric transmission lines when state authorities fail to do so. This authority is granted under specific conditions outlined in the Energy Policy Act of 2005 and further clarified by the Infrastructure Investment and Jobs Act of 2021.
bauxite	Rock composed of aluminum oxides, along with other minerals. Bauxite is the world’s primary source of aluminum. After mining, bauxite is refined into alumina, which is then converted into aluminum.
best management practice	Activities, maintenance procedures, managerial practices, or structural features that prevent or reduce pollutants or other adverse impacts.
bioengineering	The incorporation of biological materials and structures in engineering design.
biofuel	A type of fuel derived from biological materials, such as plants, algae, or animal waste. Unlike fossil fuels, which take millions of years to form, biofuels are produced over a much shorter time span and are considered renewable.
bioturbation	Reworking of soils and sediments by living organisms.
bivalves	An animal in the phylum Mollusca. These are soft-bodied invertebrates which typically contain a calcium carbonate shell around their body.
blasting	Controlled use of explosives to break, excavate, or shape rock, concrete, or other materials.
block group	Cluster of blocks within the same census tract. Each census tract contains at least one block group, and block groups are uniquely numbered within census tracts. A block group usually covers a contiguous area but never crosses county or census tract boundaries. Block groups may, however, cross the boundaries of other geographic entities like county subdivisions, places, urban areas, voting districts, congressional districts, and American Indian / Alaska Native / Native Hawaiian areas.
boreal	A type of climatic zone related to northern forests that are dominated by conifers.
borrow pit	An excavated area where dirt has been dug to be used to fill another location.

C

cairn	A human-made pile or stack of stones, often constructed for various purposes such as marking a trail, serving as a memorial, or designating a burial site.
call assemblage	A collection of different calls from different animals at the same time.
candidate species	A species that is currently under review to determine if it should be listed under the Endangered Species Act. This category is also used by state agencies such as the Washington State Department of Fish and Wildlife.
carbon monoxide	A pollutant gas that is predominantly produced by incomplete combustion of carbon-containing materials.
carbon-neutral	A balance between emitting carbon and absorbing carbon from the atmosphere in carbon sinks. In a carbon-neutral state, any carbon dioxide (CO_2) released into the atmosphere from activities such as burning fossil fuels is offset by an equivalent amount of CO_2 being removed, resulting in no net increase in atmospheric CO_2.
Cascades Volcanic Arc	A major volcanic region in western North America, extending from southwestern British Columbia through Washington and Oregon to Northern California.
census tract	A small geographical unit used by the U.S. Census Bureau for collecting demographic data.
cirque	A bowl-shaped, amphitheater-like valley formed by glacial erosion.
CO_2 equivalent per year	A metric used to compare the emissions of various greenhouse gases based on their global warming potential.
coastal zone	Refers to the area where coastal waters and adjacent shorelands interact closely, including various ecosystems such as islands, wetlands, salt marshes, and beaches. It extends to the international boundary in the Great Lakes and to the outer limits of state ownership in other areas. The zone encompasses land necessary to manage shorelands that significantly impact coastal waters and areas vulnerable to sea level rise and excludes lands under federal control.
collision response strategy	A strategy that a permittee will use to identify eagle collision occurrences, identify factors that could have led to the collision, and implement risk-reduction measures.
columnar basalt	A type of rock that has standing vertical columns.
conditional use permit	A permit that allows the use of land that does not conform to the standard zoning regulations for a given area.

conservation reserve program	A program administered by the Farm Service Agency, in which farmers receive a yearly payment in exchange for removing environmentally sensitive land from agricultural production.
Consumable	An item that is intended to be used up relatively quickly and needs to be replaced regularly.
control zone	A designated area where specific regulations and guidelines are applied to manage traffic and ensure safety.
corona discharge	A discharge of electricity at the surface of a conductor or between two conductors on the same transmission line.
corona noise	Ionization of the air that occurs at the surface of electrical conductors and power lines under some conditions, leading to loss of energy, audible noise, and release of ozone gas.
cover crops	Plants grown primarily to cover and protect soil rather than for harvest.
cradle to grave	The entire lifecycle of a product or system, from its creation (cradle) to its disposal (grave).
crepuscular	Active primarily during dusk and dawn.
crustal fissures	Fractures or cracks in the Earth's crust that can vary in size from a few feet to several miles. Crustal fissures can form due to various geological processes, including tectonic activity, volcanic activity, and the cooling and contraction of lava.
cryptic	Designed for concealing or camouflage.
cumulative impact determination	An assessment of whether transmission facility development would result in a probable significant cumulative adverse impact. This determination is a qualitative assessment of potential compounding and incremental impacts from the development of transmission facilities and past, present, and reasonably foreseeable actions.

D

debris flow	Fast-moving landslide composed of a mixture of water, soil, rock, and organic material that travels down slopes under the influence of gravity.
debris jam	Buildup of woody material of variable sizes and quantities into a distinctive unit.
deciduous	A type of tree that sheds its leaves annually.
decommissioning	The steps taken to safely retire a facility from service. This process ensures that a site can be reused or returned to pre-project conditions.
design	Detailed planning of a development project, such as transmission infrastructure.
design consideration	May include guidance documents, manuals, and/or best management practices. Design considerations are typically standardized practices designed to prevent environmental impacts and are often included in regulatory compliance programs or implemented as routine practices.
dewatering	The process of removing groundwater or surface water from a construction site. Dewatering is typically done to create a dry and stable environment for excavation, foundation work, or other construction activities.
differential settlement	Uneven settling of a structure's foundation, in which different parts of the foundation settle at different rates.
direct current	An electric current that flows in one direction.
direct federal highway project	A highway construction, reconstruction, rehabilitation, repair, or improvement project that is directly managed and funded by the federal government.
director	Per RCW 80.50.020, director means the director of the energy facility site evaluation council appointed by the chair of the council in accordance with RCW 80.50.360.
disadvantaged	A community is identified as disadvantaged (i.e., overburdened and underserved) on the Council on Environmental Quality's Climate and Economic Justice Screening Tool (CEJS) Tool map if it is in a census tract that is 1) at or above the threshold for one or more environmental, climate, or other burdens, and 2) at or above the threshold for an associated socioeconomic burden. In addition, a census tract that is completely surrounded by disadvantaged communities and is at or above the 50th percentile for low income is also considered disadvantaged.

dispersal of air pollutant	The process by which air pollutants spread from their source into the surrounding atmosphere. This process is crucial for understanding and predicting air quality impacts.
dissected plateau	A type of landform that has been eroded by rivers and streams, resulting in a landscape with sharp relief and deep valleys.
district commission	A governing body or board responsible for overseeing various functions within a district.
diurnal	Active during the day.
draw	Also known as a re-entrant, a draw is a terrain feature characterized by two parallel ridges with low ground in between them. The low ground area itself is the draw. Draws are similar to valleys but on a smaller scale. While valleys run parallel to a ridgeline, draws are perpendicular to the ridge and rise with the surrounding ground, often disappearing upslope.
dynamic line rating	A technology used in electric power transmission to optimize the capacity of transmission lines based on real-time conditions rather than static assumptions.

E

eagle take permit	A permit for proponents of projects that may result in the incidental injury or killing of bald and golden eagles. An eagle take permit is issued to proponents who prove they are using best practices for reducing eagle mortality, and who have created a Collision Response Strategy, a Proactive Retrofit Strategy, a Reactive Retrofit Strategy, and a Shooting Response Strategy.
early successional stage	First stages after disturbance of an ecosystem (e.g. clearing or fire) where plants and animals first start recolonizing an area.
edge effect	A phenomenon in which species composition changes near the boundary of a habitat. This term is typically used in the context of habitat degradation, where intact habitat contains less diversity near the point of contact with disturbed areas, such as clearcuts or agricultural land.
electrical arcing	Occurs when an electric current jumps across a gap between two conductive points, creating a visible discharge of electricity. An electrical arc generates significant heat, which can cause burns or ignite flammable materials. It also may cause sparks at the point of discharge.
electromagnetic interference	A disturbance generated by an external source that affects an electrical circuit; when this disturbance occurs in the radio frequency spectrum, it is known as radio-frequency interference.
electrosensitive	Sensitive to electrical current.
emissions standards	Regulatory limits set by governments that specify the maximum allowable levels of pollutants that can be released into the atmosphere from various sources.
energy security	Reliable and affordable access to sufficient energy resources; often refers to a nation’s ability to produce or obtain enough energy to support economic stability, national security, and the daily activities of citizens.
enhanced services facility	A specialized residential setting designed to provide care for individuals with complex personal care and behavioral challenges who do not require institutionalization.
Environmental Designation for Noise Abatement	A classification system used to establish maximum permissible noise levels within specific areas or zones. This system helps manage and control noise pollution by setting different noise limits based on the type of environment.

environmental benefits	Activities that: (a) Prevent or reduce existing environmental harms or associated risks that contribute significantly to cumulative environmental health impacts; (b) Prevent or mitigate impacts to overburdened communities or vulnerable populations from, or support community response to, the impacts of environmental harm; or (c)meet a community need formally identified to a covered agency by an overburdened community or vulnerable population that is consistent with the intent of chapter 70A.02 RCW.
environmental harms	The individual or cumulative environmental health impacts and risks to communities caused by historic, current, or projected: (a) Exposure to pollution, conventional or toxic pollutants, environmental hazards, or other contamination in the air, water, and land; (b) Adverse environmental effects, including exposure to contamination, hazardous substances, or pollution that increase the risk of adverse environmental health outcomes or create vulnerabilities to the impacts of climate change;(c) Loss or impairment of ecosystem functions or traditional food resources or loss of access to gather cultural resources or harvest traditional foods; or (d) Health and economic impacts from climate change.
environmental justice	The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations and policies. This definition emphasizes addressing disproportionate environmental and health impacts on vulnerable populations and overburdened communities.
ephemeral aquatic habitat	A water-based habitat that exists only during certain times of the year when conditions are wet enough.
epoch	A specific period in time, often marked by notable events or developments.
equitable distribution	A fair and just, but not necessarily equal, allocation intended to mitigate disparities in benefits and burdens that are based on current conditions, including existing legacy and cumulative impacts, that are informed by cumulative environmental health impact analysis.
estuarine environment	Unique and dynamic ecosystem where rivers meet the sea, creating a mix of fresh and saltwater known as brackish water.
ethnohistoric	Describes the study of cultures and indigenous peoples that involves examining historical records and other sources of information about their lives and history. This field combines methods from both anthropology and history to understand the customs, social structures, and experiences of various ethnic groups, often focusing on those that may no longer exist.
evapotranspiration	Combined process of water movement from the Earth's surface to the atmosphere through evaporation and transpiration.

exogenous	Refers to something that originates from outside an organism, system, or process.
extensional	Refers to processes and structures associated with the stretching and thinning of the Earth's crust or lithosphere. Extensional processes typically occur in regions where tectonic forces pull the crust apart, leading to the formation of features such as normal faults, rift valleys, and mid-ocean ridges.
extirpation	The state of a species or population becoming locally extinct in a specific geographic area while still existing elsewhere.

F

federal discharge permit	A legal document issued by regulatory agencies that authorizes the release of pollutants into waterbodies under specific conditions. These permits are designed to ensure that the discharge meets environmental standards to protect water quality and public health.
fire cracked rock	An archeological term that refers to rock that has been cracked or split as a result of deliberate heating.
fire district	A special-purpose governmental entity created to provide fire protection and emergency medical services to a specific geographic area.
fish weir	A fence, dam, or other enclosure set in a stream or river for capturing fish.
fish-bearing	Streams, rivers, or other bodies of water that support fish populations at any time of the year. Fish-bearing watercourses provide essential habitats for various fish species, including spawning, rearing, and feeding areas.
fledging	The process by which an immature bird develops flight feathers.
flyway	A path that is annually flown by migratory birds.
forb	A broad-leaved, non-woody flowering plant that is not a grass.
fugitive dust	Tiny particles of material that become airborne due to various activities, rather than being emitted through a confined flow stream like a chimney or exhaust pipe.

G

gastropod	An animal in the class Gastropoda, which includes snails and slugs.
general condition	As used in this Draft Programmatic EIS, a measure that provides a consistent baseline for evaluating the potential impacts of project-specific applications for transmission facility development. This Draft Programmatic EIS assumes that applicants adhere to the general conditions specified in Section 3.1.
generalist	A species with a high level of tolerance for different environmental conditions.
geographically isolated	Describes a population that is geographically separated from other populations of the same species.
glaciation	The process associated with the period in the Earth's history when large ice sheets covered portions of the continents.
glare	Light reflected off of a stationary object.
glyptic	Refers to the art or process of carving or engraving, especially on gems or precious stones.
government-to-government consultation	The formal process of dialogue and negotiation between sovereign governments.
green electrolytic	Refers to the process of producing substances, particularly hydrogen, through electrolysis powered by renewable energy sources.
greenhouse gases	Gases in the Earth's atmosphere that trap heat, contributing to the raising of the Earth's average temperature over time.
Growth Management Act	A Washington State law that requires state and local governments to manage growth by identifying and protecting critical areas and natural resource lands, designating urban growth areas, and preparing and implementing comprehensive land use plans.

H

habitat concentration area	A model variable specific to the Washington Habitat Concentration Working Group's modeling of habitat connectivity. Habitat concentration areas are areas that are important or suspected to be important to a species of focus based on surveys or modeling data.
habitat conservation plan	A plan developed by applicants to conserve the habitat of a species at risk if their project is expected to cause incidental take of the species.
habitat fragmentation	The process by which habitat is divided into smaller pieces by a disturbance, typically an anthropogenic disturbance. For example, the construction of a road through a forest would lead to habitat fragmentation.
habitat gap	A gap between two different habitats caused by human infrastructure like roads.
habitat matrix contrast	The contrast between different habitat types in matrix habitat.
habitat mitigation plan	A plan that identifies habitat to protect when a proportion of the same habitat will impacted by a development.
habitat patch	Small areas of habitat. This term is typically used in the context of habitat loss, where only habitat patches remain.
habitat specialization	The act of an organism adapting to a specific habitat.
habituation	The process of becoming accustomed to something; often used in wildlife biology to refer to a species becoming accustomed to people.
hazardous areas	Areas susceptible to erosion, sliding, earthquakes, or other geological events or areas that could pose a threat to health and safety when incompatible commercial, residential, or industrial development is sited in areas of significant hazard (e.g., landfills, underground mines, cutbanks, etc.).
heavy-duty trucks and engines	Long-haul trucks, dump trucks, and other large commercial vehicles with a gross vehicle weight rating over 26,000 pounds.
hemispherical propagation	A decrease in level that occurs when a sound wave propagates away from a source uniformly in all directions aboveground.
high-voltage transmission facilities	As defined in this Programmatic EIS, electrical transmission facilities with a nominal voltage of 230 kilovolts or greater.

historic period	The time in human history that begins with the advent of written records. This period follows prehistory, which is characterized by the absence of written documentation. The historic period varies by region, as different cultures developed writing systems at different times.
home range	The typical range that an animal will occupy throughout its life.
horizon	A distinct layer of soil or sediment that has unique characteristics that distinguish the layers above and below it.
host plant	A plant that is required by a species, typically an arthropod, for feeding, egg laying, or some other part of its lifecycle.
hot-work activities	Work that generates heat, sparks, or open flames, which can pose significant safety risks.

I

ignition source operations	Activities or use of equipment that can produce sparks, flames, or heat, potentially igniting flammable materials. These activities may not necessarily be part of a hot-work process (i.e., electrical equipment).
illuminance	Measurement of the amount of light falling onto and spreading over a given surface area.
immunity testing	Testing that evaluates how components (i.e., electronic devices, automotive components, medical devices, etc.) respond to electromagnetic fields from external sources.
Important Bird Area	A site that provides an essential service for bird populations during a part of their annual movement cycle.
impulsive noise	Short bursts of sound that are significantly louder than the ambient noise level.
inadvertent discovery plan	A document that outlines the procedures to follow when unexpected archaeological materials or human remains are discovered during construction or other ground-disturbing activities.
incidental take	An unintentional, but not unexpected, take of a protected species.
incidental take permit	A permit that allows the accidental mortality or injury of a protected animal species if the permittee is taking the required steps to mitigate risk of such an occurrence.
incidental trapping	Inadvertently catching an animal in a trap or a structure designed for another purpose (e.g., open construction trench).
incorporate by reference	A SEPA term defined in WAC 197-11-754 as “the inclusion of all or part of any existing document in an agency's environmental documentation by reference”.
Industrial Revolution	A transformative period from the late 18th to the early 19th century, marked by a shift from agrarian and handicraft economies to industrial and machine manufacturing economies.
inter-grid connectivity	Linking of multiple electrical grids to allow the exchange of electricity between them. This connection helps balance supply and demand across different regions, enhancing the reliability and stability of the power supply.
intermittent	As used in hydrology, refers to bodies of water that flow only during certain times of the year, typically after rainfall or snowmelt.

J

joint use agreement	A legally binding contract that allows multiple utility companies to share the same infrastructure or right-of-way.

K

key observation point	A typical or sensitive viewing location that represents a critical place from which the public would view a project; used to assess visual impacts.

L

lacustrine sediments	Deposits that form at the bottom of lakes. These sediments are typically composed of fine particles like silt, clay, and sometimes organic matter, which settle out of the water due to the low-energy environment of a lake.
land use plan	A document that guides the land use decisions of a local government.
landing	A designated area where logs are collected, processed, and loaded onto trucks for transportation to mills or other destinations.
landscape character	The overall visual appearance of a given landscape, including both natural features and human-created modifications.
lateral spreading	A type of ground deformation that occurs when saturated soil layers lose their strength and move laterally due to seismic activity, such as an earthquake.
State Environmental Policy Act (SEPA) Lead Agency	A Lead Agency is defined as the agency with the main responsibility for complying with the procedural requirements of the Washington State Environmental Policy Act (SEPA).
leisure park	A designated outdoor area designed for various recreational activities and relaxation. Leisure parks typically offer a range of amenities and facilities to cater to different interests and age groups.
light trespass	Light falling where it is not intended or needed.
Like-for-like	In the context of a transmission facility, “like for like” generally refers to replacing facility components with other components of the same type, capacity, and function. This means that the new parts should not significantly alter the original design, capacity, or operational characteristics of the facility.
limited access facility	Defined as a highway or street especially designed or designated for through traffic, and over, from, or to which owners or occupants of abutting land, or other persons, have no right or easement, or only a limited right or easement of access, light, air, or view by reason of the fact that their property abuts upon such limited access facility, or for any other reason to accomplish the purpose of a limited access facility.
linguistic isolation	Linguistic Isolation refers households where no one over age 14 speaks English very well, based on data obtained from the U.S. Census Bureau’s American Community Survey.
lithic debitage	Waste material produced during the process of creating stone tools.

lithic scatter	An archaeological term referring to an area where there is a concentration of stone tools and debris from tool-making activities.
location quotient	An analytical statistic used to measure a region’s industrial specialization relative to a larger geographic unit.
low plasticity silt	Fine-grained soil that exhibits low plasticity, meaning it has limited ability to deform without cracking or breaking when wet.
lux	A unit of measurement for illuminance, which indicates how much light is received on a surface. One lux is equal to one lumen per square meter.

M

major load center	An area with high concentrations of electricity demand.
mantle hotspot	A location in the Earth's mantle where hot, buoyant material rises toward the surface, creating volcanic activity.
mass wasting	Movement of soil, rock, and debris down a slope due to the force of gravity.
matrix habitat	Habitat that occurs between, and connects, habitat patches.
medium-duty trucks and engines	A category that typically includes delivery trucks, utility trucks, and some vocational trucks. These vehicles have a gross vehicle weight rating of 10,001 to 26,000 pounds.
memorandum of agreement	A formal document that outlines the specific responsibilities and actions each party will take to achieve a shared goal.
merchantable timber	Trees that have a commercial value and can be harvested or sold.
microclimatic	Describes a climate that is local and small scale.
microgrid	A small, controllable electrical system that can generate its own power and operate independently from the main power grid.
microhabitat	Small habitat features that typically provide special functions to a plant or animal in a certain landscape.
micropascal	A unit of measurement that is a millionth of a pascal. A pascal is a unit of pressure.
micro-siting survey	The process used to identify the exact placement of a transmission facility structure.
mitigation	WAC 197-11-768 outlines the concept of mitigation in the context of environmental impact. Mitigation includes 1. Avoiding the impact, 2. Minimizing impacts, 3. Rectifying the Impact, 4. Reducing or eliminating the impact, 5. Compensating for the impact, and 6. Monitoring the impact and taking the appropriate corrective measures.
mobile sources	Vehicles, engines, and equipment that emit air pollutants and can move from one location to another.
montane	An area with lots of mountains, or on a mountain.
moraine valley	A type of valley formed by the accumulation of glacial debris, known as a moraine.

mudflat	A type of habitat consisting of a wet muddy area, typically near the ocean, that becomes muddy at low tide and is covered by water at high tide.

N

nameplate generating capacity	The maximum amount of electrical power that a generator or power plant can produce under specific conditions, as determined by the manufacturer. This capacity is typically measured in megawatts (MW) or kilowatts and represents the full-load sustained output of a facility. For example, a power plant with a nameplate capacity of 100 MW can theoretically produce 100 MW of electricity when operating at full capacity under ideal conditions. However, actual output can vary due to factors like maintenance, fuel availability, and operational efficiency. Also known as rated capacity or nominal capacity.
National Interest Electric Transmission Corridors	Geographic areas designated by the U.S. Department of Energy where electricity transmission limitations are significantly affecting consumers. These corridors are identified based on findings from the National Transmission Needs Study and other relevant data.
natural break	A method used in data classification to divide data into distinct classes based on natural groupings inherent in the data. This technique, also known as the Jenks Natural Breaks method, identifies gaps or breaks in the data distribution to create class intervals. These breaks occur at points where there are relatively large differences in data values, effectively grouping similar values together and maximizing the differences between classes.
nitrogen oxides	A group of gases that include nitric oxide (NO) and nitrogen dioxide (NO_2), which are predominantly produced by combustion of fossil fuels.
noise	A sound that is “unwanted”—i.e., this term is based on human perception.
noise abatement	A set of strategies or techniques aimed at reducing and controlling annoying or harmful noise in an environment.
noise propagation	The way sound waves travel through different environments.
nominal voltage	The standard voltage level assigned to a transmission facility. The voltage level is used as a reference point for the design, operation, and regulation of the facility.
nonattainment area	A region that does not meet the National Ambient Air Quality Standards set by the U.S. Environmental Protection Agency for certain pollutants.
non-emitting	Describes an energy source or technology that does not release greenhouse gases during its operation.

nonproject environmental review	Defined in WAC 197-11-70(b) as an environmental analysis of governmental actions that are not tied to a specific project. These actions typically involve decisions about policies, plans, or programs that set standards for controlling or modifying the environment, or that govern a series of connected actions.
non-specular conductors	A conductor that has been treated with an outer layer that reduces light reflection.
notice of construction	A formal document used to inform relevant parties and regulatory bodies about the commencement, progress, or completion of a construction project.
notice to air missions	A notice containing information that is essential to pilots and other air personnel.
no-till farming	Also known as zero tillage or direct drilling, no-till farming is an agricultural technique in which crops are grown without disturbing the soil through tillage. Instead of plowing, farmers use specialized equipment to plant seeds directly in the soil, leaving crop residues on the surface.
nuisance wildlife	Wildlife that can cause a problem or danger for humans, such as bears that become accustomed to eating garbage.

O

obligate	A species that must live in a specific condition or environment to survive.
off-highway vehicle	Any type of vehicle capable of driving off roads or on non-paved surfaces like trails.
omnidirectional	Refers to the capability of receiving or transmitting signals in all directions.
overburdened community	Geographic areas where vulnerable populations face combined, multiple environmental harms and health impacts. This includes, but is not limited to, highly impacted communities as defined in RCW 19.405.020.

P

parent material	A distinct layer of soil or sediment that has unique characteristics compared to the layers above and below it.
patch isolation	The extent to which a habitat patch is disconnected from other similar habitats.
permeability to movement	Describes an area’s ability to allow animals to move through it. An area with low permeability will allow less movement through it, and an area with high permeability will allow more movement.
petroglyph	An image created by removing part of a rock surface through methods such as incising, picking, carving, or abrading. Petroglyphs are a form of rock art and are found worldwide, often associated with prehistoric peoples. Petroglyphs can depict a wide range of subjects, including animals, human figures, symbols, and abstract patterns.
pH	A measurement of the acidity and alkalinity of water; stands for “potential of hydrogen.”
phased review	A SEPA term defined in WAC 197-11-776 as “the coverage of general matters in broader environmental documents, with subsequent narrower documents concentrating solely on the issues specific to the later analysis”.
physiographic	Refers to the study of physical features of the Earth’s surface. Physiographic regions are defined by their distinct geology and topography, such as hills, valleys, and flat areas.
pictograph	A visual representation that uses images, symbols, or drawings to convey information or data.
pioneering trees	The first trees to colonize disturbed or damaged ecosystems.
planning area	For this Programmatic EIS, the entire State of Washington.
plutonic intrusion	A body of igneous rock that forms when magma cools and solidifies beneath the Earth’s surface.
population persistence	The ability of a population of organisms to continue living.
population sink	A type of habitat that can attract organisms but does not have enough resources to support them, resulting in their eventual extirpation from the sink, unless it is constantly supplied by another population.
porosity	The volume of pore spaces or voids within the soil.
post-construction reclamation	The process of restoring land to its original or agreed-upon condition after construction activities, such as building infrastructure.

predator sightline	The line of sight a predator has when hunting. Logging and other industrial practices can affect predator sightlines.
prehistory	Refers to the period of human history before the invention of writing systems and recorded history. This era encompasses the time from the earliest known use of stone tools by hominids, around 3.3 million years ago, up to the advent of writing, which occurred at different times in different parts of the world.
prevention of significant deterioration	A key component of the Clean Air Act, designed to protect air quality in areas that meet or exceed the National Ambient Air Quality Standards.
principal aquifer	A regional, extensive aquifer system with the potential to be used as a source of drinking water.
primitive recreation	Outdoor activities that emphasize simplicity and a connection to nature, often involving non-motorized and non-mechanical means of travel. This type of recreation typically includes activities such as hiking, horseback riding, canoeing, and camping in wilderness areas.
priority habitat	Habitat that is given priority for conservation and management by the Washington Department of Fish and Wildlife; may refer to a unique vegetation association (e.g., shrubsteppe) or a particular habitat feature (e.g., cliffs).
priority species	In Washington, species of concern for which special conservation actions may be required. These include, but are not, limited to, species that are state listed as endangered, threatened, sensitive, or candidate, or considered vulnerable.
proactive retrofit strategy	A plan developed by applicants that identifies infrastructure that is not avian safe and includes a timeline and strategy for how to retrofit it in an avian safe manner.
programmatic agreement	A legal document that outlines how federal agencies will comply with Section 106 of the National Historic Preservation Act. This section requires federal agencies to consider the effects of their undertakings on historic properties and to consult with various stakeholders, including State Historic Preservation Officers, Tribal Historic Preservation Officers, and the Advisory Council on Historic Preservation.
programmatic EIS	A type of EIS that evaluates the environmental impacts of broad policies, plans, or programs. This approach allows for a comprehensive analysis of potential impacts at a higher level, which can then be used to inform more specific, subsequent environmental reviews.

protohistory	The period between prehistory and recorded history. During this time, a culture or civilization has not yet developed its own writing system, but other cultures with writing systems have documented their existence.
proxy noise source level	A noise source level used in acoustic modeling to estimate the sound levels produced by various activities or equipment when direct measurements are not available. These proxy levels are derived from similar activities or equipment in comparable environments.
public scoping	A process that gives the public an opportunity to provide input on issues.
public utility district	A community-owned, not-for-profit utility that provides essential services such as electricity, water, and, sometimes sewer, to residents within a specific geographic area.
pure tone	A sound that consists of a single frequency.

R

racial or ethnic minorities	The CEQ's defines "minority populations" where either: a) the minority population of the affected area exceeds 50 percent, or b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographical analysis.
radiator	Device that generates and emits radio frequency by radiation or induction.
rain shadow effect	A phenomenon that occurs when a mountain range blocks the passage of rain-producing weather systems, casting a "shadow" of dryness behind it.
reactive retrofit strategy	A plan developed by proponents that identifies measures that they will take to identify and detect eagles that have been electrocuted. If a deceased eagle is found, the pole that caused its mortality must be retrofitted unless it is already avian safe. More information can be found here: https://www.ecfr.gov/current/title-50/chapter-I/subchapter-B/part-22/subpart-E/section-22.260
reasonably foreseeable action	Projects that are formally being proposed or planned, those about which a formal decision has been made, and developments currently under construction. RFAs that are formally being proposed or planned have readily available published planning documents or public notifications. RFAs for which a formal decision has been made include those that have undergone a federal, state, and/or local approval or application process(es), such as environmental clearance, application review, and/or permitting process(es).
recolonization	The reestablishment of a species into an area after it was extirpated.
reconductoring	The replacement of cable or wire on an electric circuit, typically a high-voltage transmission line, to afford a greater electric-current-carrying capability.
reference threshold	A reference threshold can be used as a standard or benchmark for a comparative analysis. For example, an environmental justice assessment could find that nine of 12 census blocks in the affected area have more than 20 percent low-income residents (and some as many as 90 percent), while the reference county has 16 percent low-income residents county-wide. The difference indicates that a low-income population is present for purposes of conducting an environmental justice assessment.
remanent habitat	An area of land that retains its original natural vegetation and ecological characteristics, having avoided significant disturbance from human activities such as agriculture, urban development, or logging.

reradiated	Refers to the process by which absorbed energy is emitted again, typically in the form of radiation.
restricted range	Species with ranges that are bounded by some factor, which could be biological, physical, or behavioral.
retail electric load	The total amount of electricity consumed by end-use customers, such as residential, commercial, and industrial users, within a specific area or market.
right-size replacement	Under FERC Order No. 1920, right-size replacement refers to modifying or upgrading an existing transmission facility to increase its capacity, thereby extending a system's useful life and reducing the need for new transmission facilities.
riparian	Relating to a feature on the edge of a waterbody.
rural	Rural encompasses all population, housing, and territory not included within an urban area.

S

salmonid	Belonging to the family Salmonidae, such as salmon or trout.
scope	The range of proposed actions, alternatives, and impacts to be analyzed in an environmental document. For this Draft Programmatic EIS, the scope is high-voltage transmission facilities within the defined Study Area.
scree	Loose, rocky debris on a hill or cliff.
sediment load	The amount of sediment in a waterbody.
sedimentation	The process by which particles of soil, sand, and other materials are dislodged and transported by natural forces such as water, wind, or human activities like construction and deforestation.
seismic wave	An energy wave generated by an earthquake, volcanic eruption, or explosion.
seismometer	An instrument that measures the motion of the ground, especially motions caused by earthquakes, volcanic eruptions, and explosions.
sensitive receptors	In relation to noise and vibration, locations where people reside and sleep. These areas typically include residential property; multiple family living accommodations; recreational facilities with overnight accommodations such as camps, parks, camping facilities, and resorts; and community service facilities, including orphanages, homes for the aged, hospitals, and health and correctional facilities. In relation to air quality, sensitive receptors are people who are considered to be more sensitive than others to air pollutants.
shielding	In relation to noise and vibration, the reduction in noise levels that occurs when buildings are positioned between the noise source and the receiver.
shooting response strategy	A plan developed by proponents to monitor eagle mortality and identify if shooting is the suspected cause, and if so, to identify reduction measures and inform law enforcement. More information can be found here: https://www.ecfr.gov/current/title-50/chapter-I/subchapter-B/part-22/subpart-E/section-22.260
shrubsteppe	An arid ecosystem that is dominated by grasses and shrubs in a landscape of rolling hills. In Washington, this is found in the southeast part of the state.
significant	A SEPA term defined in WAC 197-11-794 as “a reasonable likelihood of more than a moderate adverse impact on environmental quality.”

silvicultural	Describes the practice of managing the growth, composition, health, and quality of forests to meet diverse needs and values, such as timber production, wildlife habitat, water resources, and recreation.
siting	Identifying and evaluating potential routes for transmission facilities.
slumping	Vertical collapse of a bank caused by a slide or rotation away, leaving a concave scar or scarp and a clump of sediment at the base. Can occur when structures are built too close to the bank of a river, or when riparian vegetation is removed.
Sno-Park	A parking lot that has been cleared of snow that is close to groomed or other backcountry snow trails.
soil order	The highest level of classification in the U.S. Department of Agriculture Soil Taxonomy system. There are 12 soil orders, each defined by specific characteristics and processes that influence soil formation.
soundscape	The acoustic environment as perceived by humans, encompassing all sounds within a particular area.
spark arrestor	A device designed to prevent the emission of flammable debris, such as sparks or hot particles, from combustion sources like internal combustion engines.
special status species	For this Draft Programmatic EIS, special status fish and freshwater invertebrate species are defined as either listed under the federal Endangered Species Act or Bald and Golden Eagle Protection Act or listed by Washington State as endangered, threatened, sensitive, or candidate.
State Environmental Policy Act (SEPA)	A Washington law designed to ensure that environmental values are considered during decision-making by state and local agencies. SEPA requires these agencies to evaluate the environmental impacts of their actions, including issuing permits, adopting regulations and funding projects. The goal is to identify and mitigate potential environmental harm before decisions are made.
State Implementation Plan	A comprehensive plan developed by the Washington State Department of Ecology to ensure that the state meets the National Ambient Air Quality Standards set by the U.S. Environmental Protection Agency.
stationary source	A fixed site that emits air pollutants. Stationary sources include buildings, structures, facilities, or installations that release pollutants into the atmosphere.
stopover	In reference to birds, an important resting or feeding area during migration.
stratigraphy	A branch of geology that classifies and interprets rock layers.

Study Area, or geographic scope	For this Programmatic EIS, the entire State of Washington excluding the areas identified in Chapter 1.
subalpine	A region on a mountain just below the tree line. This is typically the transition zone between montane forest and treeline.
subduction	A geological process in which one tectonic plate moves under another and sinks into the Earth's mantle.
substrate	A layer of material or surface where an organism could live.
subwatershed	A smaller division within a larger watershed. It represents a specific area of land where all the water drains to a particular point within the larger watershed.
supplemental EIS	The supplemental EIS process is outline in Chapter 197-11 WAC, which specifies that a Supplemental EIS is required if changes to the proposed action would result in significant environmental impacts not previously evaluated or new information or circumstances relevant to environmental concerns arise, leading to significant impacts not covered in the original EIS.
sulfur dioxide	A pollutant gas that is emitted when fuels that contain sulfur are combusted.

T

taiga	A climatic zone typically with sparse conifers mixed with rocks and shrubs. Generally, taigas are more northern than boreal areas and closer to the tree line and tundra.
take	Harassment, hunting, capturing, or killing of an animal.
talus	A deposition of rocks that have fallen from a slope or cliff and collected near the base.
temporal loss	Refers to the delay between the loss of a habitat or resource and the point when mitigation efforts fully compensate for that loss.
terrane boundaries	Typically marked by faults or complex fault zones, these boundaries form where a terrane, which is a fragment of crust with a distinct geological history, has been accreted or attached to a larger continental mass.
thermoregulatory	Refers to the process of maintaining a certain temperature regardless of external temperature pressure.
third octave spectra	The division of the audible frequency range into smaller bands, each spanning one-third of an octave.
threshold determinations	A SEPA term defined in WAC 197-11-797 as “the decision by the responsible official of the lead agency whether or not an EIS is required for a proposal that is not categorically exempt”.
thrust fault	A type of reverse fault where the fault plane has a low dip angle, typically less than 45 degrees. In a thrust fault, the hanging wall (the block of rock above the fault plane) moves up and over the footwall (the block below the fault plane) due to compressional forces.
time immemorial	A period so long ago that it extends beyond the reach of memory, record, or tradition.
transboundary movement	Movement across different boundaries; in the context of wildlife studies, transboundary movement refers to movement across ecoregion boundaries.
translocation experiment	An experiment that involves moving an organism from one place to another to see how it adapts and if it can colonize the new area.
transmission corridor	A designated pathway or right-of-way where high-voltage transmission lines are constructed and maintained.

U

ungulate	A mammal with hooves, including deer, moose, elk, and caribou.
urban	The U.S. Census Bureau's urban areas represent densely developed territory, and encompass residential, commercial, and other non-residential urban land uses. An urban area must comprise a densely settled core of census blocks that meet minimum housing unit density and/or population density requirements. This includes adjacent territory containing non-residential urban land uses. To qualify as an urban area, the territory identified according to criteria must encompass at least 2,000 housing units or have a population of at least 5,000.

V

vernal pool	Seasonal pool of water that provides habitat for plants and animals.
vibration	The oscillating movement of a particle or object around its stationary reference position. Vibration can be caused by mechanical processes such as machinery operation, construction activities, or transportation systems.
viewshed	The geographical area that is visible from a specific location.
volatile organic compounds	A variety of chemicals that are emitted as gases from certain solids or liquids, some of which may have short- and long-term adverse health effects.
vulnerable populations	Population groups that are more likely to be at higher risk for poor health outcomes in response to environmental harms, due to: (i) Adverse socioeconomic factors, such as unemployment, high housing and transportation costs relative to income, limited access to nutritious food and adequate health care, linguistic isolation, and other factors that negatively affect health outcomes and increase vulnerability to the effects of environmental harms; and (ii) sensitivity factors, such as low birth weight and higher rates of hospitalization. Vulnerable populations includes, but is not limited to: (i) Racial or ethnic minorities; (ii) Low-income populations; (iii) Populations disproportionately impacted by environmental harms; and (iv) Populations of workers experiencing environmental harms.

W

water rights	A legal entitlement that allows a person or entity to use water from a specific source, such as a river, stream, lake, or groundwater, for a particular purpose like irrigation, industrial use, or domestic consumption.
Waters of the State	All salt and fresh waters that are waterward of the ordinary high water line and within the territorial boundaries of the state. This includes lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the state's jurisdiction.
Waters of the United States (WOTUS)	Defines the scope of waters that fall under federal jurisdiction for regulatory purposes. The definition of WOTUS has been subject to changes and legal interpretations. The most recent update, following the Supreme Court's decision in Sackett v. EPA, refined the criteria for what constitutes WOTUS, particularly focusing on wetlands directly connected to permanent waters.
watershed	A watershed is an area of land that drains all streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel.
Western Interconnection	One of the five alternating current power grids or interconnections that make up the power grid in North America. The Western Interconnection stretches from western Canada south to Baja California Norte in Mexico, reaching eastward over the Rockies to the Great Plains.
wetland mitigation banking	A system designed to compensate for unavoidable impacts on wetlands. A wetland mitigation bank is a site where wetlands are restored, created, enhanced, or, in exceptional cases, preserved.
wholesale electric power transaction	The buying and selling of large quantities of electricity between electricity producers (such as power plants) and electricity suppliers (such as utility companies). These transactions typically occur in wholesale electricity markets, which were established during the deregulation of the electricity markets in the 1990s.
wildlife guild	A group of species that is similar in a specific way, such as in acquiring nutrients, habitat requirements, or in movement mechanisms.

8.0 CHAPTER 8 – LIST OF PREPARERS

This chapter lists the individuals who contributed to the preparation of this Draft Programmatic Environmental Impact Statement (EIS). It also includes each individual's organization affiliation and a brief description of their professional background.

8.1 Washington State Energy Facility Site Evaluation Council

Belkina, Maria – Site Specialist

Role: Environmental Impact Statement Guidance and Review

Education: MS, Ecology and Environmental Management; BS, Ecology and Natural Resource

Expertise: Over 10 years of experience in environmental services, energy facility siting, and sustainability programs, with a strong focus on transmission lines of varying lengths and voltages, including international project experience. Ms. Belkina coordinates applications for site certification of energy facilities under EFSEC jurisdiction, manages permit application reviews, and oversees the permitting process related to energy facility sitting.

Betts, Patricia – Washington State Environmental Policy Act (SEPA) Specialist

Role: Environmental Impact Statement Guidance and Review

Education: BS, Zoology

Expertise: Over 30 years of experience in SEPA implementation for three Washington State agencies: Department of Ecology (Ecology), Department of Natural Resources, and the Energy Facility Site Evaluation Council (EFSEC). Ms. Betts' SEPA duties have included managing state agency SEPA EISs; participating in the development of, reviewing, and commenting on other SEPA and National Environmental Policy Act (NEPA) EISs; interpreting SEPA rules and advising agencies, the public, and applicants; and preparing SEPA guidance, conducting training, and developing SEPA policy.

Bumpus, Sonia – EFSEC Director

Role: EFSEC Executive Director and SEPA Responsible Official

Education: BS in Biological and Health Sciences

Expertise: Appointed EFSEC Executive Director in June 2022, having previously served as EFSEC Manager from 2019 to 2022. Director Bumpus has dedicated her career to public service with over 15 years in energy facility siting, environmental permitting, and reform including 12 years at EFSEC. Director Bumpus also serves as the SEPA Responsible Official overseeing the environmental review of multiple energy projects, including preparation of project and nonproject environmental impact statements.

Caputo, Lance – Site Specialist

Role: Environmental Impact Statement Review

Education: MS, Urban & Regional Planning; BS in Environmental Design

Expertise: Approximately 20 years experience in various capacities preparing and reviewing SEPA documents; including serving as Responsible SEPA Official for local government. Mr. Caputo coordinates applications for site certification of energy facilities under EFSEC jurisdiction, manages permit application reviews, and oversees the permitting process related to clean energy facility sitting.

Greene, Sean – Washington SEPA Specialist

Role: Environmental Impact Statement Guidance and Review

Education: MS, Environmental Studies; BA, History; BA, Political Science

Expertise: Over 10 years of experience in the environmental field, including time spent performing environmental and listed species assessments, technical assistance, environmental planning, permitting, and regulatory compliance. Mr. Greene has coordinated complex interagency project reviews in a variety of regulatory frameworks, including NEPA and Clean Water Act assessments of large transportation and energy facility projects.

Hafkemeyer, Amí – Director of Siting and Compliance

Role: Contract Manager & Environmental Impact Statement Review

Education: MS, Natural Resources; BS, Ecology and Evolutionary Biology

Expertise: Over 15 years of experience working in environmental compliance, having worked as an environmental quality program manager for industry prior to joining the EFSEC staff. Ms. Hafkemeyer has experience overseeing Clean Water Act and Oil and Petroleum Act compliance programs. In her role with EFSEC, she oversees technical staff in their implementation of SEPA reviews and permit application reviews to process applications for site certification.

McLean, Lisa - Legislative & Policy Manager & Tribal Liaison

Role: Community Engagement & Tribal Relations

Education: MA, International Relations, BA, Economics

Expertise: Over 30 years of experience designing community engagement strategies in Washington state and abroad. Recent experience in Washington has included encouraging statewide community involvement and Tribal consultations in the decadal redistricting process and organization of a statewide campaign targeted at Tribes and local communities to encourage participation in the 2020 Census.

8.2 State Agencies

Office of the Attorney General

Jonathon Thompson – Assistant Attorney General

Washington Department of Fish and Wildlife (WDFW)

Michael Ritter – Statewide Technical Lead: Solar and Wind (Habitat, Wildlife and Fish)
Emily Grabowsky – Solar and Wind Biologist (Habitat, Wildlife and Fish)
Michelle Huppert – Solar and Wind Biologist (Habitat, Fish and Wildlife
Ryan Lothrop – Columbia River Fishery Manager (Fish)

Washington State Department of Archaeology and Historic Preservation (DAHP)

Catherine Oberheim – Technical Reviewer
Stephanie Jolivette – Technical Reviewer
David Witt, Assistant State Archaeologist – Technical Reviewer

Washington State Department of Ecology (Ecology)

Diane Butorac, Regional Planner – Technical Reviewer
Alexandra Shin, Regional Planner – Technical Reviewer
Andrew Hollenbaugh, Regional Planner – Technical Reviewer

Mark Daniel, Environmental Justice Senior Policy Advisor – Technical Reviewer
Kelsey Brotherton, Environmental Engineer - Technical Reviewer (Water Quality, Air Quality)
Noel Tamboer - Technical Reviewer (Water Quality)

Washington State Department of Natural Resources (DNR)
Scott Nelson, Engineering and Rights of Way – Technical Reviewer
Natalie Waid, Policy Advisor – Technical Reviewer
Brittany Poirson, Aquatic Policy Analyst – Technical Reviewer
James Woodward, Clean Energy Program Manager – Technical Reviewer

Washington State Department of Transportation (WSDOT)
Greg Gachowsky – Technical Reviewer

Washington State Utilities and Trade Commission (UTC)
Andy Sellards, Energy Policy Advisor – Technical Reviewer (Public Services and Utilities)

8.3 Federal Agencies

Department of Defense
Kimberly Peacher

8.4 WSP

EFSEC was supported by WSP USA Inc. (WSP) in preparing the Draft Programmatic EIS. WSP's team included project management, resource specialists, technical writers, and geographic information system (GIS) analysts.

Akkinepally, Vamshi – Transportation Engineer
Role: Transportation Technical Reviewer
Education: MENG, Civil and Environmental Engineer
Expertise: Over 20 years' experience in transportation systems analysis, transportation planning, travel demand modeling, traffic engineering, traffic operations, and safety.

Cadillo, Jimena – Environmental Consultant
Role: Project Controls
Lead – Built Environment
Air Quality Technical Author
Socioeconomics Contributing Author
Education: MS, Environmental Engineering; BS, Industrial Engineering
Expertise: Over 10 years' experience in management and coordination of environmental planning and permitting projects related to the infrastructure, energy, and mining sectors. Ms. Cadillo supported U.S. Government sector activities like business development initiatives, strategic client development and financial planning. She is also experienced in project controls functions such as cost controls, scheduling, forecasting, and progress and performance analysis.

Clark, Kyle – Editor

Role: Junior Technical Editor

Education: BS, Biopsychology

Expertise: A junior technical editor with experience enhancing document quality and ensuring adherence to standards. Mr. Clark's experience has also included managing technical manuscripts and implementing streamlined editorial workflows. He ensures consistent language and style across documents.

Cook, Amy – Lead Editor

Role: Technical Editor

Education: Ph.D., English Literature, BA, Linguistics

Expertise: A senior technical editor with a 20-year background in technical and academic writing and editing academic book manuscripts, scientific journal articles, and a wide variety of research reports and plans in the environmental sciences. Dr. Cook has experience developing reports associated with environmental permitting for a variety of energy projects, as well as hazardous waste site investigations, remedial action planning documents, and emergency management and response operations for both private-sector and government clients.

Cox, Jason – Vice President – Earth and Environment PNW

Role: Earth Resources Technical Reviewer

Education: MS, Geotechnical Engineering; BS, Civil Engineering

Expertise: Over 11 years of experience in various geotechnical engineering projects. Mr. Cox has served as the geotechnical task lead, project manager, and engineer of record for several power, energy, infrastructure, and transportation projects in Washington and California. His technical experience involves deep and shallow bridge foundations, retaining structures, earthen embankments and cut slopes stability, landslide assessment and mitigation, pipelines, infiltration design, and earthquake engineering for permanent installations.

DeCastro, Caitlin – Associate Consultant, Environmental Science

Role: Vegetation Contributing Author

Education: MS, Botany; BS, Botany

Expertise: Over seven years of experience in botanical/ecological surveys, environmental planning, and mine permitting, reclamation, and closure. Ms. Caitlin has experience in floristics, plant physiology, ecophysiology, forestry, and plant hydrology. Her work has informed decision-making processes for multiple sites related to watershed management, land management, and mine closure activities.

Dragan, Massimo – Environmental Intelligence Global Offering Lead

Role: GoldSET Technical Director

Education: Degree in Natural Sciences, PhD in Environmental Modeling

Expertise: Mr. Dragan leads the Digital Innovation business unit at WSP Italy and provides cross-sector support on digital solutions and decision analysis. Mr. Dragan is the WSP Technical Director of GoldSET, WSP's siting, routing and multi-criteria decision support analysis suite of tools.

Duppel, Kyralai – Environmental Planner

Role: Socioeconomics Contributing Author
Water Contributing Author

Education: BS, Society and Environment

Expertise: Almost five years of experience in environmental planning and consulting. Ms. Duppel has experience in preparing NEPA, SEPA, and CEQA analyses for renewable energy, natural resources, and infrastructure projects.

Fernetti, Michele – Digital Innovation Senior GIS Analyst

Role: GoldSET Lead Developer

Education: Degree in Natural Sciences, PhD in Environmental Modeling

Expertise: Mr. Fernetti is a senior data scientist, GIS analyst and information management specialist. Mr. Fernetti is the lead developer of GoldSET Spatial and oversees GIS automation and programming for the Digital innovation business unit.

Flaherty, Alana – Senior Consultant, Environmental Planning

Role: Deputy Project Manager
Cumulative Impacts Technical Author
Public Services and Utilities Technical Author
Land and Shoreline Use Technical Author

Education: BA, Environmental Business

Expertise: Over six years of environmental and transportation planning. Ms. Flaherty has experience in preparing NEPA and CEQA analyses for transit and infrastructure projects.

Frohning, Rebecca – Assistant Vice President, Environmental Science

Role: Energy and Natural Resources Contributing Author

Education: BS, Earth and Atmospheric Sciences

Expertise: Over 20 years of experience in air quality, greenhouse gas, and energy analyses for purposes of NEPA, SEPA, CEQA, stationary source air permitting, and compliance with the Clean Air Act.

George, Gracey – Early Career Biologist

Role: Recreation Contributing Author
Transportation Contributing Author
Public Health and Safety Contributing Author

Education: BS, Biology

Expertise: Almost five years of experience in laboratory operations, specializing in analytical report writing. Ms. George is experienced in biological monitoring, environmental data analysis, and comprehensive ecological assessment.

Harmening, Sierra – Assistant Vice President, Environmental Planning and Permitting

Role: Project Manager
SEPA Compliance and Consistency Reviewer
Transportation Technical Author
Recreation Contributing Author
Earth Resources Contributing Author
Water Resources Contributing Author

Education: MS, Environmental Law and Policy; BASc, Management in Technology
Expertise: Over 15 years of lands permitting, environmental consulting, energy consulting, and mine site management experience. Ms. Harmening's experience includes management and preparation of documents for permit renewals, closure planning, closure cost estimation, NEPA analysis, SEPA analysis, and compliance monitoring plans.

Hindley, Gabrielle – Biologist
Role: Vegetation Technical Author
Education: MSc Ecological Restoration; BS, Biology
Expertise: Over five years of project experience in planning and executing field programs, terrestrial ecosystem mapping, research, ecological restoration, and vegetation monitoring. Ms. Hindley also has experience conducting wildlife surveys, environmental monitoring, and designing mitigation.

Hull, Alan – Senior Vice President, Earth and Environment
Role: Earth Resources Technical Reviewer
Education: Ph.D., Geological Sciences; MSc, Geology; BSc, Geology
Expertise: Over 40 years of project experience focusing on earthquake hazard assessment and incorporating seismically active faults into engineering analysis and design.

Hyggen, Thompson – Associate Biologist
Role: Habitat, Wildlife, and Fish Contributing Author
Education: BCS Biology (Hons); Biologist in Training (BIT)
Expertise: Almost five years of experience contributing to biodiversity research and report, with skills in bird and insect management and data collection. Mr. Thompson has contributed to environmental assessment, species management plans, mitigation strategies, and wildlife population studies.

Kristen, Mary – Geospatial Analyst
Role: GIS Specialist
GoldSET United States Lead
Education: MA, Geomatics for Environmental Management; BA, Geography
Expertise: Five years of experience in GIS analysis.

Lovegrove, Alice – Director, Sustainable Infrastructure
Role: Air Quality Technical Author
Education: MS, Environmental and Waste Management; BE, Engineering Science
Expertise: Over 35 years of experience in environmental engineering emphasizing global climate change, energy analysis, and mobile source air quality modeling for both operational and construction phases of a project. Ms. Lovegrove conducts environmental analyses and resolves conformity issues for bridges, rail (light, heavy and high speed), and highways across the United States.

McCarthy, Patrick – Geospatial Analyst
Role: GIS Specialist
Education: BSc, Environmental Science and Remote Sensing Technologies
Expertise: Geographic Information Systems Professional (GISP) with 25 years' experience in GIS analysis, remote sensing, modeling, civil design, and project management.

McCaughan, Misha – Intermediate Biologist
Role: Wildlife and Wildlife Habitat Contributor
Education: MSc, Animal Biology and Toxicology; BSc, Animal Biology
Expertise: Almost five years of experience in wildlife surveys, data analysis, and reporting.

Mcdonald, Camilla – Lead Consultant, History
Role: Historic and Cultural Resources Technical Reviewer
Education: MA, Anthropology; BA, Anthropology and History
Expertise: A Registered Professional Archaeologist with 13 years' experience conducting fieldwork and work in compliance with Section 106 of the National Historic Preservation Act across the United States. She has contributed to the National Register of Historic Places evaluation of a variety of precontact and historic archaeological sites. In the field, she has led field crews and is experienced in archaeological surveys, excavation, and monitoring.

McVey, Brennah – Geospatial Analyst
Role: GIS Specialist
Education: MS, Earth Sciences; BS, Geophysical Engineering
Expertise: Five years of experience in GIS analysis. Ms. McVey is a certified Geographic Information Systems Professional (GISP).

Miller, Gage – Senior Environmental Scientist
Role: Noise and Vibration Technical Author
Education: BS, Environmental Science
Expertise: Over 20 years of noise-related experience, including noise modeling, sound propagation calculations, sound level field measurement, assessments, impact analysis, mitigation analysis, and providing expert testimony. Mr. Miller has experience in performing noise impact assessments in support of permitting activities at the state level and environmental impact assessments in support of large domestic and international projects.

Moss, Kate – Principal Biologist
Role: Natural Environment, Lead
Habitat, Wildlife, and Fish Technical Reviewer
Water Resources Contributing Author
Vegetation Technical Reviewer
Education: BSs, Biology; Registered Professional Biologist (RPBio)
Expertise: Over 20 years of experience designing, managing, and conducting bio-inventories, biodiversity studies, invasive species studies, wildlife salvages, species at risk surveys, impact assessments, and habitat compensation/ mitigation design. Ms. Moss has been involved in conducting baseline surveys for amphibians, birds, terrestrial gastropods and mammals, annual population monitoring, and relative abundance analysis, as well as impact analysis and designing project mitigation and resource management.

Nazar Nia, Naghmeh – Environmental Planner

Role: Socioeconomics Contributing Author

Education: MSc, Geography, Urban, and Environmental Studies; BA, Architecture

Expertise: Over ten years of experience in designing and implementing urban and environmental planning and assessment projects. Ms. Nazar Nia is skilled in socioeconomic and land use research, data collection, impact analysis, and management planning for large and small projects in mining, oil and gas, power, and sustainable energy projects. She has supported the preparation of land use, marine use, visual quality and stakeholder engagement, and indigenous rights and interest chapters of environmental assessments.

Oki, Koya – Environmental Planner

Role: Transportation Contributing Author

Education: BA Sustainable Environmental Design

Expertise: Almost five years of transportation planning experience. Mr. Oki has experience in conducting comprehensive transportation studies, analyzing rural transportation systems, and designing improvements to transportation networks at local and regional scales. Mr. Oki has assisted in project development and grant applications, ensuring regulatory compliance and community alignment.

Paris, Jeremy – Vice President, Environmental Planner

Role: Project Director
SEPA Compliance and Consistency Reviewer
Socioeconomic Technical Author
Energy and Natural Resources Contributing Author

Education: MS, Biological Sciences; BS, Biological Sciences

Expertise: Over 20 years of professional consulting experience leading projects in support of the energy, maritime, transportation, and government sectors. Mr. Paris has prepared high-level NEPA documents, Endangered Species Act biological assessments, International Finance Corporation Performance Standards Compliant environmental and social impact assessments, CEQA compliant documents, and master plans for water quality improvement programs.

Porto, Louise – Biologist

Role: Habitat, Wildlife and Fish Contributing Author

Education: MSc, Zoology; BSc, Zoology; Registered Professional Biologist (RPBio)

Expertise: Over 30 years of experience in the field of fisheries biology, specializing in anthropogenic impacts on freshwater fish and fish habitat for energy sector projects. Her experience includes regulatory compliance and permitting, impact mitigation and offsetting for fish and fish habitat.

Povalyaev, Ilya – Biologist

Role: Habitat, Wildlife and Fish Contributing Author

Education: BSc, Biology; Registered Professional Biologist (RPBio)

Expertise: 15 years of experience that includes conducting environmental assessments for major projects across multiple sectors, oversight of wildlife mitigation and monitoring programs, coordinating and leading wildlife surveys, data analyses and interpretation, and technical report preparation. Much of Mr. Povalyaev's work is related to characterizing potential project interactions with wildlife, identifying mitigation strategies to reduce potential adverse effects, and developing monitoring programs to evaluate mitigation efficacy within an adaptive management framework. Mr. Povalyaev possesses in-depth technical knowledge of bird ecology.

Rayos, Krystle – Environmental Planner

Role: Land Use Contributing Author
Cumulative Impacts Contributing Author

Education: BS, Geology

Expertise: Almost five years of experience in environmental planning. Ms. Rayos has experience in preparing NEPA and CEQA analyses for a variety of projects.

Romansky, Alexander – Geospatial Analyst

Role: GIS Specialist

Education: MA, Applied Geography and Geospatial Science, BA Geology

Expertise: Five years of experience in GIS analysis.

Romero, Patrick – Senior Consultant

Role: Noise and Vibration Technical Reviewer

Education: MS, Environmental Policy & Management; BS, Environmental Science

Expertise: Over 20 years of experience leading and supporting noise and vibration analyses related to infrastructure projects.

Ruslanbek Uulu, Bakai – Senior Economic Consultant

Role: Socioeconomics Technical Reviewer

Education: MA in International Economics and Finance; BS in Economics

Expertise: Over eight years of experience in economic impact and benefit-cost analyses of infrastructure and energy projects. Mr. Ruslandbek Uulu has significant experience in estimating jobs and fiscal impacts of construction activities, cross-border trade, and operational improvements in California, Texas, New York, Washington, etc.

Smedley, Roselyn – Biologist

Role: Habitat, Wildlife, and Fish Contributing Author
Water Resources Contributing Author

Education: MSc, Freshwater Ecology; BSs, Aquatic Biology

Expertise: Over 10 years experience in a variety of disciplines—including hydrology, water quality, and engineering—on projects related to various industrial sectors, such as mining; oil and gas; linear developments (highways, pipelines, and transmission lines); and construction.

Smith, Michael – Senior Vice President, Environmental Process, Policy, and Assessment

Role: Technical Reviewer

Education: PhD, Environmental and Natural Resources Sociology; MA, Geography and Resource Management; BA, Environmental Studies

Expertise: Over 30 years experience in environmental impact assessment, project and program management, policy development, land use planning, business development, group leader, and training/education with the federal government, state governments, private sector, academia, and non-governmental organizations. Dr. Smith's technical areas of expertise include helping clients successfully navigate complex permitting situations; cumulative impact analysis; greenhouse gas emissions and climate change analysis; socioeconomics and environmental justice analysis; and designing strategies for streamlining federal and state permitting processes.

Starr, Bob – Assistant Vice President, Environmental Engineer

Role: Water Resources Technical Reviewer

Education: PhD, Earth Sciences; MS, Earth Sciences; BCE, Civil Engineering

Expertise: Over 45 years of environmental science and engineering experience. Dr. Starr's primary expertise is in hydrogeology, particularly characterizing and remediating sites with contaminants in groundwater, soil, and the vadose zone.

Steele, Jesse – Assistant Vice President, Environmental Health and Safety

Role: Health and Safety Technical Reviewer

Education: MSc, Physical Geography; BS, Geography

Expertise: Over 20 years of environmental, health and safety experience working in mining, manufacturing, chemical, energy, oil and gas and maritime industries. Mr. Steele specializes in health and safety compliance, integrated management systems, auditing, certification, and assurance. He has worked to support a variety of strategic environmental projects and sustainability planning and helped clients meet a wide range of federal, state, and local regulatory requirements.

Stein, David – Vice President, Environmental Planning and Permitting

Role: Air Quality Technical Reviewer

Education: MS, Environmental Engineering; BS, Environmental Engineering; BS, Biological Sciences

Expertise: Over 40 years of environmental management and permitting experience working with major gas and electric utilities, independent power plant developers (both renewable and fossil), major oil and petrochemical conglomerates, refiners, chemical plants, mining facilities, and various other industries. Mr. Stein is an air quality specialist with experience providing regulatory and rulemaking strategy and advocacy for air quality districts, technical support, permit procurement and compliance support, and expert witness testimony.

Stevens, Kathryn – Project Coordinator

Role: Project Controls

Education: BA, Communications

Expertise: Over 20 years of administrative and environmental experience on large-scale projects and reports. Mrs. Stevens completes quality control, comment response review and tracking, outreach coordination, administrative records, and research.

Stropkay, James Kyle – Economic Consultant

Role: Socioeconomics Support

Education: MPA in Energy and Environment; B.A. in Economics

Expertise: Experience in economic and environmental impact analysis of infrastructure projects. Kyle has several years of experience in evaluating socioeconomic impacts of international development projects, including renewable energy technologies in emerging markets.

Symmes, Melissa – Environmental Planning

Role: Recreation Technical Author
Cumulative Impacts Contributing Author

Education: BA, Environmental Studies and MPP, Environmental Policy

Expertise: Almost five years of experience working of environmental planning. Ms. Symmes has assisted in conducting qualitative analysis for varying levels of NEPA, including transportation, stormwater, recreation, and public land planning documents. Additionally, prior to WSP, she analyzed statutes and management plans for policy development across the Pacific Northwest.

Thiede, Peter – GIS Analyst

Role: Visual Resources Contributing Author

Education: Dipl.-Ing. (MS equivalent), Environmental Planning

Expertise: Over 15 years of experience in visual modeling and application of GIS analysis to visual resources and visual resource assessment.

Umlauf, Kate – Architectural Historian

Role: Historic and Cultural Resources Technical Author

Education: MA, Heritage Management; BA, Anthropology

Expertise: Over five years of experience conducting architectural surveys, integrity research, National Register of Historic Places evaluations and nominations, and historical research and context development in fulfillment of Section 106 and 110 of the National Historic Preservation Act and NEPA. Ms. Umlauf is also experienced in transportation research, historic property documentation and historic structure reports, and historic cemetery restoration.

Williams, Peter – Senior Visual and Land Use Assessment Specialist

Role: Visual Resources Technical Author

Education: MA, Landscape Architecture

Expertise: Over 12 years' experience conducting visual impact assessment and scenic resource management. Mr. Williams was the lead of the British Columbia (BC) Government's Visual Resource Management Program and has extensive experience performing landscape and visual impact assessments for major projects. His expert knowledge of assessment frameworks includes the BC visual resource management system, as well as the U.S. Bureau of Land Management protocols.

8.5 Plateau CRM

Fulgham, Samantha – Project Archaeologist/Precision Services Director

Role: Cultural and Historic Resources Technical Author

Education: MA, Anthropology

Expertise: Has conducted archaeological field investigations throughout Washington, Idaho, and Oregon. Ms. Fulgham has completed and initiated a variety of projects, including survey and testing, monitoring, and excavation work for a variety of clients. As Precision Services Director, she has specialized in excavation projects, forest service projects, human remains recovery, and large-scale projects. She has a background in excavation, survey, Tribal and agency consultation, curation preparation, and laboratory analysis of archaeological collections.

Harder, David – Principal Investigator

Role: Cultural and Historic Resources Technical Reviewer

Education: MA, Anthropology

Expertise: Over 30 years' experience as a professional archaeologist. Mr. Harder is trained in many aspects of archaeological method, theory, and research, including the National Historic Preservation Act Section 106 process, NEPA and historic properties, lithic analysis, faunal identification, and geo-archaeological method and theory.

9.0 CHAPTER 9 – DISTRIBUTION

Notice of the Draft Programmatic Environmental Impact Statement (EIS) was sent to the following stakeholders.

9.1 Federal Agencies

Bonneville Power Administration

Bureau of Land Management

Department of Defense

Federal Aviation Administration

Federal Energy Regulatory Commission

National Park Service

U.S. Department of Energy

U.S. Environmental Protection Agency, Region 10

U.S. Forest Service

U.S. Fish and Wildlife Services, Washington Office

Yakima Training Center

9.2 Tribal Governments

Affiliated Tribes of Northwest Indians

Chinook Indian Nation

Coeur d’Alene Tribe

Columbia River Inter-Tribal Fish Commission

Confederated Tribes and Bands of the Yakama Nation

Confederated Tribes of the Chehalis Reservation

Confederated Tribes of the Colville Reservation

Confederated Tribes of the Grande Ronde Community of Oregon

Confederated Tribes of the Umatilla Indian Reservation

Confederated Tribes of the Warm Springs

Cowlitz Indian Tribe

Duwamish Tribe

Hoh Indian Tribe

Jamestown S'Klallam Tribe

Kalispel Tribe of Indians

Kikiallus Indian Nation

Lower Elwha Klallam Tribe

Lummi Nation

Makah Tribe

Marietta Band of the Nooksack Tribe

Muckleshoot Indian Tribe

Nez Perce Tribe

Nisqually Tribe

Nlaka'pamux Tribal Nation

Nooksack Indian Tribe

Port Gamble S’Klallam Tribe

Puyallup Tribe of Indians

Quileute Nation (Tribe)

Quinault Indian Nation

Samish Indian Nation

Sauk-Suiattle Indian Tribe

Shoalwater Bay Indian Tribe

Skokomish Indian Tribe

Snohomish Tribe

Snoqualmie Indian Tribe

Snoqualmoo Tribe of Indians

Spokane Tribe of Indians

Squaxin Island Tribe

Steilacoom Tribe

Stillaguamish Tribe of Indians

Suquamish Tribe

Swinomish Indian Tribal Community

Tulalip Tribes

Upper Skagit Indian Tribe

Wanapum Tribe

9.3 State Agencies

Clean Energy Siting Coordination Council

Environmental Justice Council

Governor of Washington

Washington State Department of Agriculture

Washington State Department of Archaeology and Historic Preservation

Washington State Department of Commerce

Washington State Department of Ecology

Washington State Department of Fish and Wildlife

Washington State Department of Health

Washington State Department of Natural Resources, SEPA Center

Washington State Department of Transportation, SEPA Reviews

Washington State Office of the Attorney General

Washington State Parks and Recreation Commission

Washington State Utilities & Transportation CommissionWashington State Legislature

9.4 Local and Regional Government

Association of Washington Cities

Northwest Power and Conservation Council

Washington State Association of Counties

9.5 Libraries

Asotin County Library

Cathlamet Public Library

Central Skagit Library

Columbia County Library

Davenport Public Library

Denny Ashby Library

Ellensburg Public Library

Fort Vancouver Regional Libraries

Jefferson County Library

King County Library System

Kitsap Regional Library

Libraries of Stevens County

Longview Public Library

Mid-Columbia Libraries

NCW Libraries

North Olympic Library System

Pend Oreille County Library

Pierce County Libraries

Ritzville Public Library

San Juan Island Library

Spokane County Library District

Sno-Isle Libraries

Timberland Regional Libraries

Walla Walla County Rural Library District

Whatcom County Library System

Whitman County Library

Yakima Valley Libraries

9.6 Fire Departments/Districts

Washington Fire Commissioners Association

Washington State Fire Fighters' Association

9.7 Other Parties

Audubon Washington

Avista

Lower Columbia Basin Audubon Society

The Nature Conservancy

Northwest Energy Coalition

PacifiCorp

Public Power Council

Puget Sound Energy

Sierra Club

Washington Environmental Council

Washington Native Plant Society

Washington Public Utility Districts Association

Washington Rural Electric Cooperative Association

Western Electricity Coordinating Council

Western Power Pool

This Page Intentionally Left Blank