Attachment M: Wetland Delineation Report

WETLAND DELINEATION REPORT – WALLULA GAP SOLAR

Wallula Gap Area of Interest
State Route 14 | T6N-R27E-S33, T5N-R27E-S4
Benton County, Washington

Work Order: 2022-OES-3

Prepared for:

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GG Environmental
WETLANDS • FISH • WILDLIFE

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Executive Summary

OneEnergy Development, LLC (Client) retained GG Environmental (Geoffrey Gray, MA, PWS) to complete a wetland due diligence investigation for a 418-acre (ac) area of interest (AOI) located on State Route 14 (SR 14), approximately five miles west of the intersection of SR 14 and Interstate 82, in unincorporated Benton County, Washington.

The purpose of this report is to: (1) document wetlands that may be regulated under Chapter 15.04 *Wetlands* of the Benton County Code, by the Department of Ecology, or by the Army Corps of Engineers, and (2) document other waters of the United States that may also be regulated by the above agencies.

The AOI has been disturbed for many decades by agricultural practices, including crop circles and cattle grazing. Soils are sandy and pervious with irrigation water infiltrating rapidly down to shallow bedrock. The primary source of hydrology is irrigation water that perches on the bedrock, flows down-gradient, and daylights in several areas where it supports hydrophytic vegetation. Wetland vegetation is dominated by non-native and noxious weeds, most of which are rated as Facultative (FAC). Sandy soils are poor in organics, inhibiting the formation of redoximorphic features that serve as hydric soil indicators.

Two wetland units, both rated Category IV, are present within the AOI. The wetland buffer required by Benton County is 40 feet. Based on best professional science, both wetlands are likely to be exclusively supported during the growing season by the artificial application of up-gradient irrigation water.

Although the National Hydrography Dataset (NHD) maps intermittent streams within the AOI, no streams were observed. The NHD also maps water bodies in the AOI but the only waterbody observed is a small excavated pool utilized by cattle for watering and wallowing. The likely source of hydrology in the pool is upgradient irrigation, including a leaking irrigation wellhead in the nearby vicinity.

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Acronyms and Abbreviations

AOI	Area of Interest
BCC	Benton County Code
Corps	United States Army Corps of Engineers
DNR	Department of Natural Resources
Ecology	Washington State Department of Ecology
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HUC	Hydrologic Unit Code
LRR	Land Resource Region
MLRA	Major Land Resource Area
NHD	National Hydrography Dataset
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
PEM	Palustrine emergent
PSA	Project Survey Area (all areas within 250 ft of the AOI)
PSS	Palustrine scrub-shrub
PWS	Professional Wetland Scientist
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WGS84	World Geodetic System 1984
WRIA	Water Resource Inventory Area

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1. Introduction

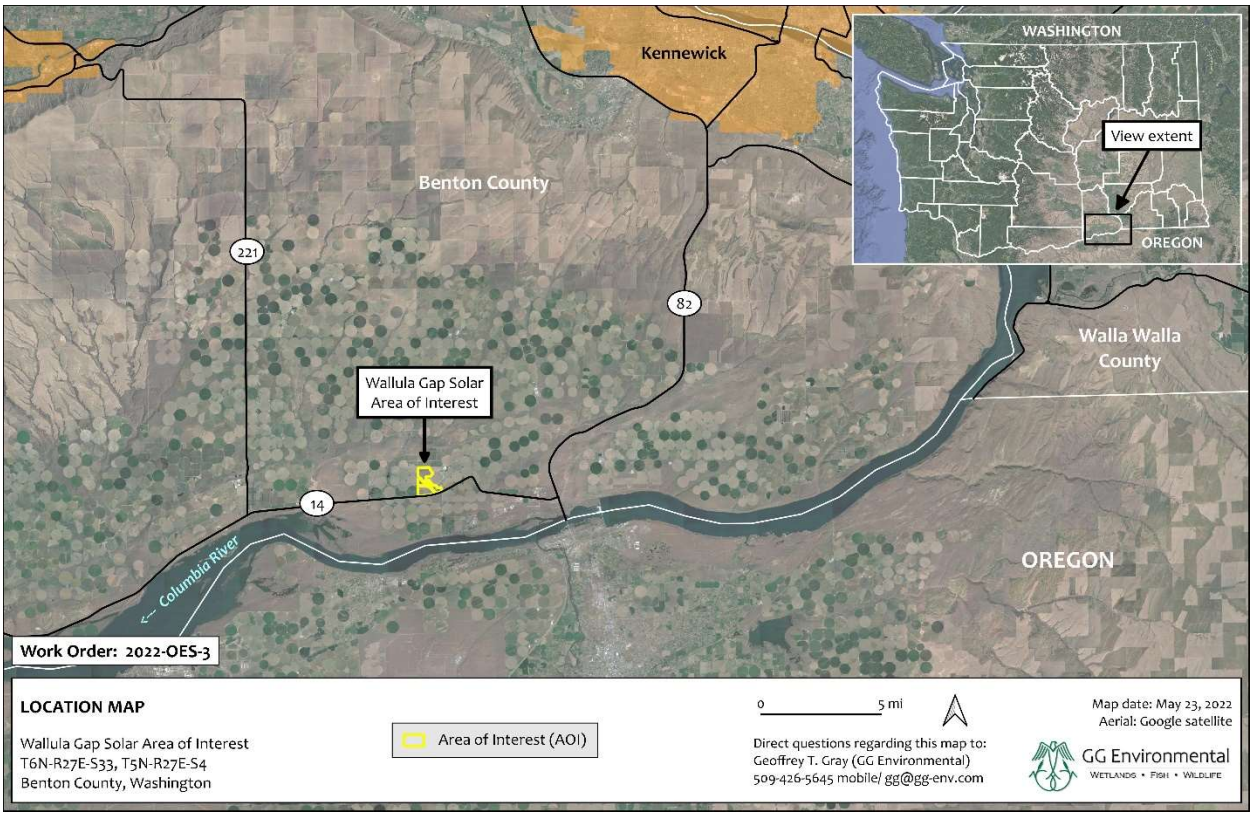
OneEnergy Development, LLC (Client) retained GG Environmental (Geoffrey Gray, MA, PWS) to complete a wetlands due diligence investigation for a 418-acre (ac) area of interest (AOI) located on State Route 14 (SR 14), approximately five miles west of the intersection of SR 14 and Interstate 82, in unincorporated Benton County, Washington (**Figure 1**).

The purpose of this report is to: (1) document wetlands that may be regulated under Chapter 15.04 *Wetlands* of the Benton County Code, by the Department of Ecology (Ecology), or by the Army Corps of Engineers (Corps), and (2) document other waters of the United States that may also be regulated by the above agencies.

The approximate geospatial center of the AOI is latitude 45°57'19.99"North, longitude 119°26'56.03"West (WGS84). Elevation ranges from approximately 385 to 557 feet (ft) (Google 2022).

The AOI also occurs within USDA Land Resource Region (LRR) B and USDA Major Land Resource Area "Columbia Basin" (NRCS 2006), Water Resource Inventory Area (WRIA) 31 (Rock Glade), and unnamed subwatershed (12th Hydrologic Unit Code 170701010403).

Figure 1. Location Map



2. Methods

An overview of the methods employed to determine the status of wetland and stream critical areas within the study area is presented in this section.

2.1. Background Data

The following sources were referenced for existing data on soils, topography, precipitation, floodplains, land use history, vegetation, wetlands, and streams:

- National Wetlands Inventory (NWI) (USFWS 2022a) (**Appendix A-1**).
- Benton County Code (BCC) (Benton County 2022a).
- Benton County mapped wetlands (Benton County 2022b) (**Appendix A-1**).
- Natural Resources Conservation Service soil survey data (NRCS 2022a). (**Appendix A-2**).
- DNR Geologic Information Portal (DNR 2022a).
- United States Geological Survey (USGS) topographic maps (USGS 2022a).
- USGS National Hydrography Dataset (USGS 2022b).
- Historic aerial photography: 1955 (CWU 2022) and 1985-2021 (Google 2022).
- Washington Natural Heritage Program (DNR 2022b).
- Federal Emergency Management Agency (FEMA) floodplain maps (FEMA 1982).

2.2. Field Investigation

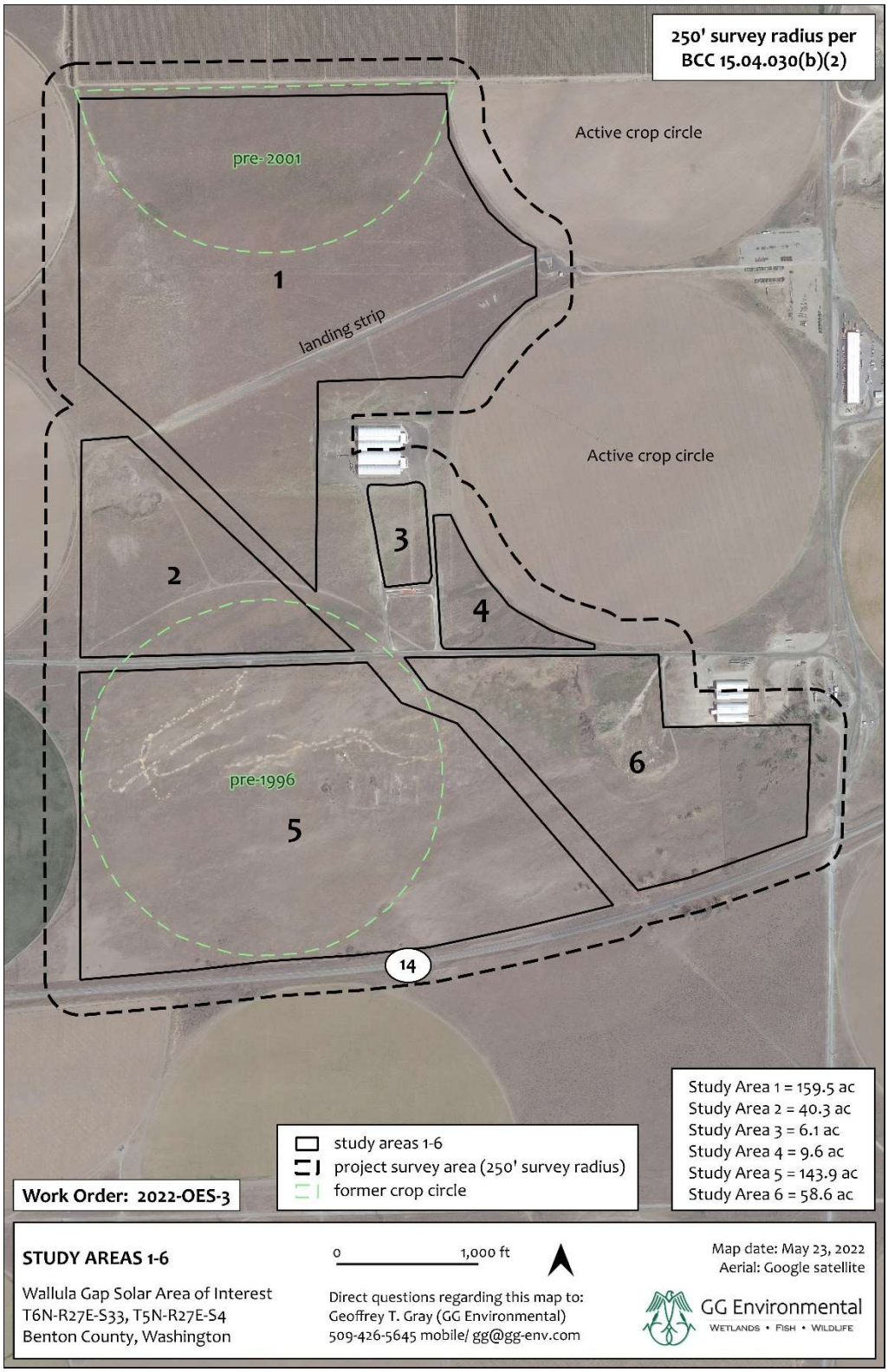
The AOI is comprised of six polygons addressed in this report as "**Study Areas 1-6**." The BCC requires all areas within 250 ft of a proposed project footprint to be evaluated per BCC Chapter 15.04.030(b)(2). As such, the "**Project Survey Area**" (PSA), as illustrated in **Figure 2**, includes all areas within 250 ft of Study Areas 1-6.

Fieldwork was completed on March 11, March 18, and May 4, 2022 by GG Environmental (Geoffrey Gray, MA, PWS). The AOI was traversed on foot.

Wetlands were delineated using routine methods described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Corps 2008). Plants were identified by scientific name and wetland indicator status per the National Wetland Plant List (Corps 2020).

Wetlands were rated per the *Washington State Wetland Rating System for Eastern Washington – 2014 Update* (Hruby 2014) and classified following the U.S. Fish and Wildlife Service (USFWS) *Cowardin Classification System* (Cowardin et al. 1979) and *Hydrogeomorphic Classification System* (HGM) by Brinson (1993).

Figure 2. Project Survey Area and Study Areas 1-6



2.3. Geospatial Documentation

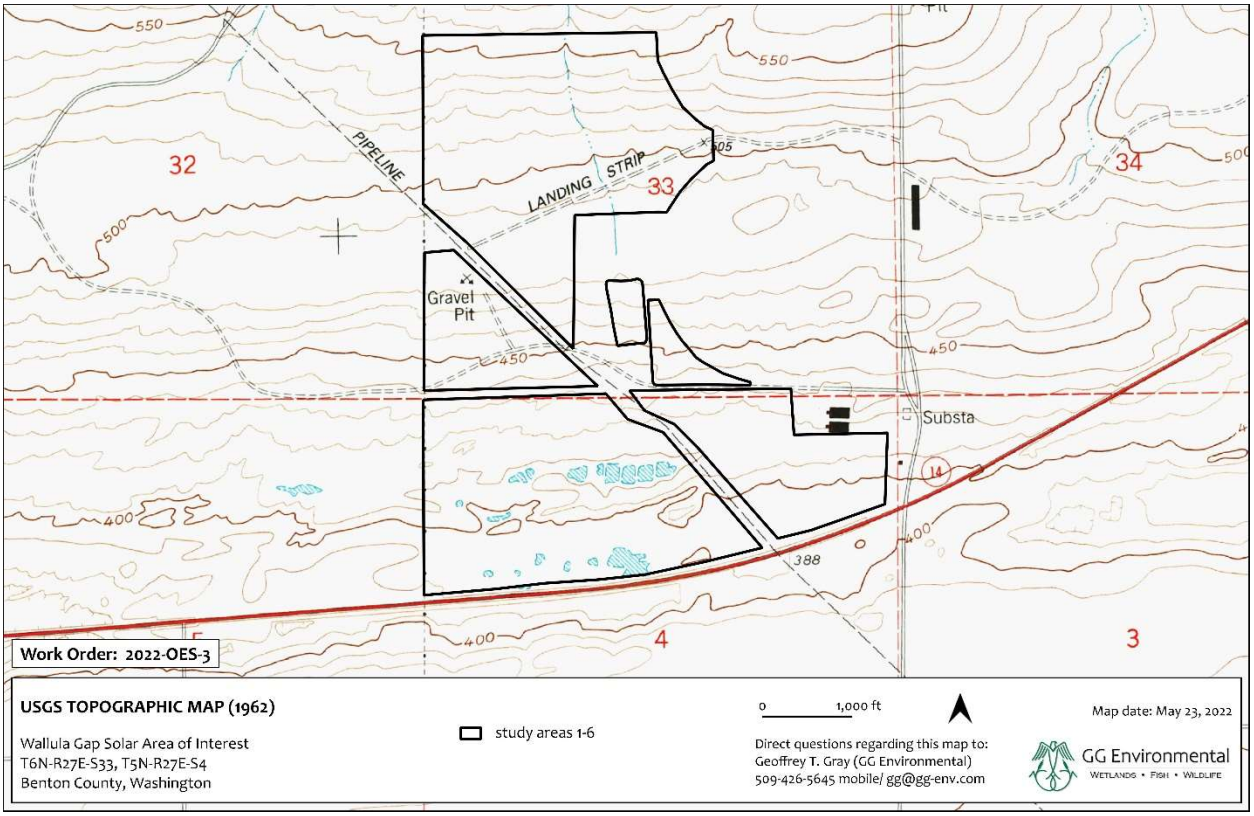
Features were geospatially surveyed with a Motorola G7 Power mobile phone, running the Mapit Spatial Geopackage Manager application paired via Bluetooth® with a Juniper Systems Geode™ Multi-Global Navigation Satellite System (Multi-GNSS) receiver capable of sub-meter horizontal accuracy.

3. Existing Conditions

3.1. Topography

Elevation within the AOI ranges from approximately 390 to 560 ft, sloped at approximate three percent with a southern aspect (**Figure 3**). Historic USGS topographic maps for 1908 and 2000 are included in **Appendix A-3**.

Figure 3. USGS Topographic Map (1962)



3.2. Surrounding Land Management

According to historic aerial imagery, the AOI has been under intensive agricultural management for crop circles and grazeland since at least 1985 (Google 2022). Within a 1-kilometer (0.62-mile) radius, the AOI is entirely encompassed by high-intensity agriculture, comprised of irrigated crop circles and orchards. The AOI is bordered by SR 14 to the south, irrigated crop circles to the east and west, and orchards to the north.

3.3. Soils

The Natural Resources Conservation Service (NRCS) maps eight soil units within the AOI (NRCS 2022a) (**Appendix A-2**):

Burbank loamy fine sand, 0 to 15 percent slopes, is associated with terraces and consists of mixed alluvium and/or eolian deposits over gravelly and stony alluvium. A typical soil profile includes loamy fine sand and loamy sand in the upper 16 inches. Excessively drained, the soil exhibits more than 80 inches to the water table, does not flood or pond, and is not listed as a hydric soil.

Burbank loamy fine sand, basalt substratum, 0 to 30 percent slopes, is associated with terraces and consists of mixed alluvium and/or eolian deposits over residuum weathered from basalt. A typical soil profile includes loamy fine sand, loamy sand, and very gravelly loamy sand in the upper 25 inches. Shallow bedrock occurs at approximately 20 to 40 inches. Excessively drained, the soil exhibits more than 80 inches to the water table, does not flood or pond, and is not listed as a hydric soil.

Burke very fine sandy loam, 0 to 15 percent slopes, eroded is associated with hillslopes and consists of eolian deposits over residuum weathered from basalt. A typical soil profile includes very fine sandy loam and silt loam in the upper 25 inches. Shallow cemented material occurs at approximately 25 to 29 inches. Well drained, the soil exhibits more than 80 inches to the water table, does not flood or pond, and is not listed as a hydric soil.

Dune land is associated with terraces and consists of fine sand in the upper 60 inches. It is not listed as a hydric soil.

Koehler loamy fine sand, 0 to 8 percent slopes is associated with terraces and consists of eolian sands. A typical soil profile includes loamy fine sand in the upper 25 inches. Shallow cemented material occurs at approximately 31 to 35 inches. Somewhat excessively drained, the soil exhibits more than 80 inches to the water table, does not flood or pond, and is not listed as a hydric soil.

Quincy loamy sand, 0 to 30 percent slopes is associated with terraces and consists of eolian sands. A typical soil profile includes loamy sand and loamy fine sand in the upper 60 inches. Excessively drained, the soil exhibits more than 80 inches to the water table, does not flood or pond, and is not listed as a hydric soil.

Scooteney silt loam, 0 to 5 percent slopes is associated with terraces and consists of gravelly alluvium and loess. A typical soil profile includes silt loam in the upper 21 inches. Well-drained, the soil exhibits more than 80 inches to the water table, does not flood or pond, and is not listed as a hydric soil.

Warden very fine sandy loam, 0 to 15 percent slopes is associated with terraces and consists of loess over lacustrine deposits. A typical soil profile includes very fine sandy loam and silt loam in the upper 14 inches. Well-drained, the soil exhibits more than 80 inches to the water table, does not flood or pond, and is not listed as a hydric soil.

Soils observed in the field in Survey Areas 5 and 6 were pure sand or slightly-loamy sand in the upper 16 inches (in).

3.4. Geology

Located approximately six miles west of Sillusi Butte, the AOI lies within a belt mapped as basalt flows (Elephant Mountain Member, Saddle Mountains Basalt) overlain by loess (Palouse Formation) with pockets of Quaternary dune sand (DNR 2022a).

The NRCS maps two soil units within the AOI that include bedrock at only 15 inches (KoC) and 24 inches (BdE). The locations of these soil units are presented in **Appendix A-2** alongside field observations of bedrock at the surface.

3.5. Wetlands

According to 1955 aerial imagery, no wetlands were present in the AOI prior to the advent of agriculture (**Figure 4**). The AOI was xeric, dominated by shrubsteppe species and covered by scattered sand dunes (refer to 1908 USGS topographic map in **Appendix A-3**). At present, the Benton County Planning Department GIS Portal (Benton County 2022b) map wetlands within the AOI (**Appendix A-1**).

3.6. Other Waters

No evidence of streams is indicated in historic aerial imagery for 1955 (**Figure 4**). Although the National Hydrologic Dataset (NHD) shows intermittent streams bisecting the AOI (USGS 2022b) (**Figure 5**) that are identical to the NWI "Riverine" layer (**Appendix A-3**), no streams or relict stream channels were observed in the field.

The NHD maps multiple waterbodies in Study Area 5 (**Figure 5**) but these are the result of crop circle irrigation prior to 1996. Some mapped water bodies to the south were likely slight depressions over shallow bedrock that may have temporarily pooled perched irrigation water. Other mapped waterbodies can be explained by excavation and fill to build berms to level topography for crop circle wheels (refer to **Figure 6** in **Section 4.1**). According to 1985 aerial imagery (Google 2022), these excavated depressions would fill with water when the crop circle was active. However, no pooling is evident in aerial imagery from 1996 onward. No surface water was observed in any of the mapped waterbody locations during the site visits nor was evidence observed of recent surface hydrology like water marks, stained leaves, and/or soil cracks.

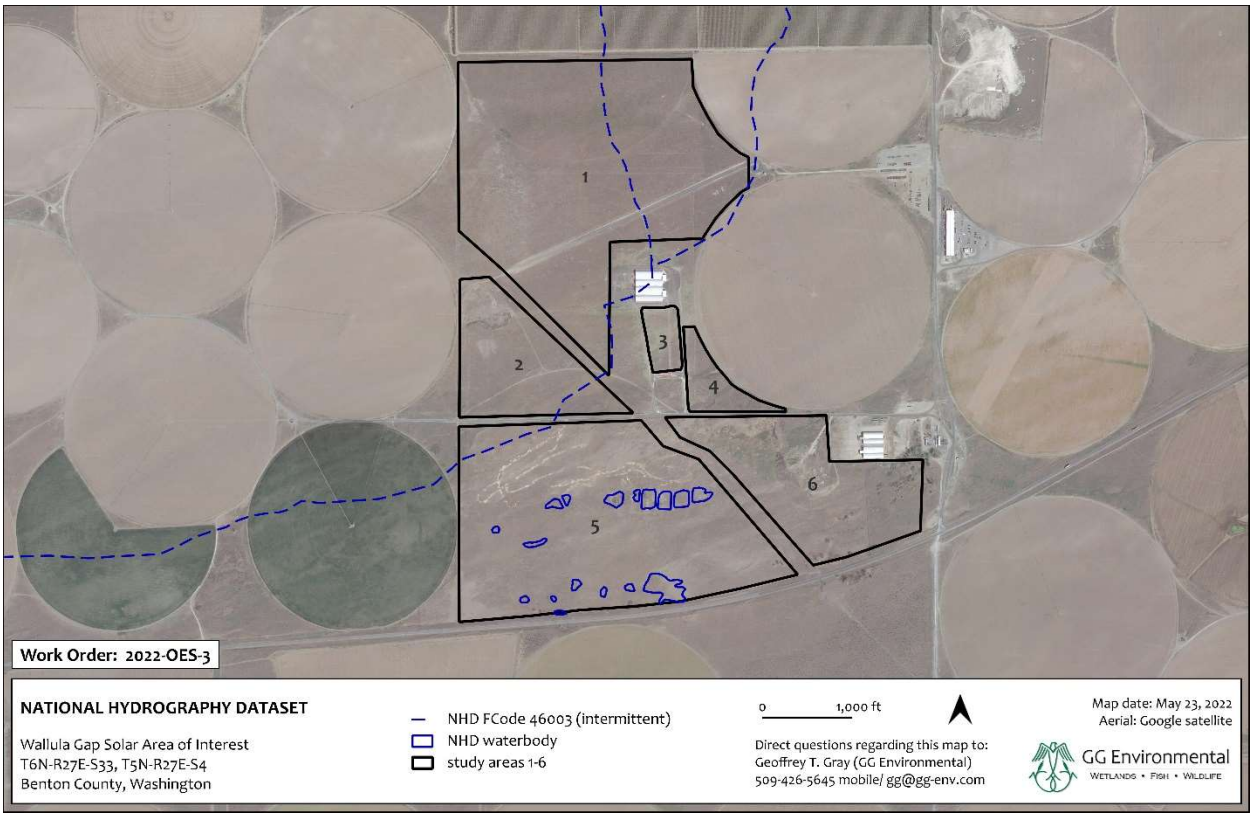
Figure 4. 1955 Aerial Image

The single exception is the westernmost excavation for the crop circle wheels, which today is a small excavated depression in the bedrock utilized as a cattle wallow/watering pool**.** This pool is positioned down-gradient of an old irrigation well pumphouse from which water is leaking. Hydrology in the pool is likely explained by perched groundwater charged by upgradient irrigation and the leaking wellhead nearby. Highly disturbed by cattle and filled with wind-blown tumbleweeds, no vegetation was observed along the steep and rocky pool banks.

3.7. Floodplain

According to FEMA (1982), no floodplain is mapped within or near the AOI.

Figure 5. National Hydrography Dataset



3.8. Vegetation

Large portions of the AOI were previously managed as crop circles but today are laid fallow, utilized as rotating grazeland for cattle. In drier areas, vegetation is dominated by non-native annual weeds including tall hedge-mustard (*Sisymbrium altissimum*), redstem filaree (*Erodium cicutarium*), and cheatgrass (*Bromus tectorum*). Trace numbers of native plants were observed, including common fiddleneck (*Amsinckia intermedia*) and longleaf phlox (*Phlox longifolia*). Wetter areas are dominated by Mexican fireweed (*Bassia scoparia*) and perennial pepperweed (*Lepidium latifolium*), both of which are listed as Benton County Class B noxious weeds (Benton County 2022c). Woody vegetation scattered across the southern half of the AOI is dominated by Russian olive (*Eleagnus angustifolia*) a Washington State Class C noxious weed (NWCB 2022) and native mature cottonwoods (*Populus balsamifera*). It is likely that the cottonwoods first colonized the vicinity when an irrigated crop circle was active there (**Figure 6**).

3.9. Precipitation

Chapter 19 of the Engineering Field Handbook (NRCS 2015) was referenced in determining if precipitation that fell within three months of the site visit was within the normal range (30-year average). Normal climatic conditions prevailed during a three-month aggregate window prior to the May 18 field visit (**Appendix B**).

3.10. Irrigation Regime

Two irrigated crop circles are located directly upgradient of Study Areas 4 and 6 (**Figure 2**) and a irrigation water pump station and truck wash station are located upgradient of Study Area 6 (**Figure 6**). According to AgriNorthwest (AgriNorthwest 2022), water observed seeping into Study Area 5 is "natural" insofar as there are no buried French drains, perforated pipes, or culverts directing irrigation water to that location. The pump station was observed leaking on May 4 to the extent that water was pooled across upland areas of Study Area 6. According to AgriNorthwest, it was not known how long the leak was active before it was reported.

The above data suggest that observed hydrology and wetland vegetation in Study Area 6 is best explained by upgradient irrigation and agricultural infrastructure.

3.11. Regulatory Setting

The local lead regulatory agency is Benton County. Wetlands are regulated under BCC Chapter 15.04 – *Wetlands*. Depending on the wetland rating (I, II, III, or IV) and habitat score, the BCC assigns a wetland buffer ranging from 40 feet (ft) to 190 ft.[1] Other waters, including streams and water bodies, are regulated under BCC Chapter 15.14 – *Fish and Wildlife Habitat Conservation Areas*. Depending on the classification of the stream or waterbody, the BCC assigns a riparian buffer width ranging from 50 feet (ft) to 100 ft.[2]

Impacts limited to wetland or buffers would likely be regulated and permitted by Benton County. Any impacts within a wetland, stream, or waterbody boundary, in particular, fill, would likely involve Ecology and the Corps.

4. Findings

4.1. Wetlands

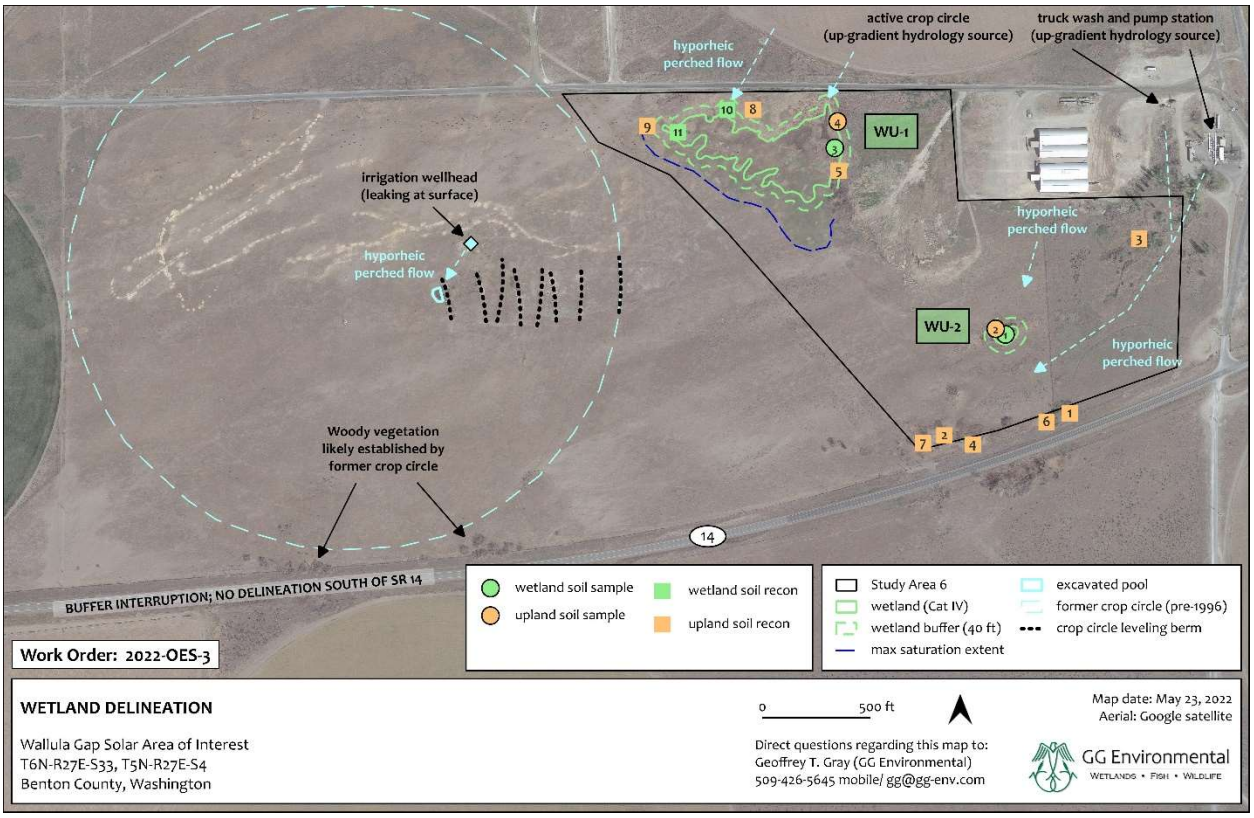
Wetlands are *those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps,*

[1] BCC Table 15.04.040-1 – *Wetland Buffers*
[2] BCC 15.14.040(g)(2)

marshes, bogs, and similar areas (Environmental Laboratory 1987). A wetland exhibits three indicators: wetland vegetation, hydrology during the growing season, and hydric soil. Two wetland units, both rated Category IV with 40-ft[3] regulatory buffers, were delineated within the AOI (**Figure 6, Tables 1-2**).

According to Hruby (2014): *Category IV wetlands demonstrate the lowest levels of functions (scores less than 16 points) and are often heavily disturbed. These are wetlands that we should be able to replace, and in some cases, improve. However, experience has shown that replacement cannot be guaranteed in any specific case. These wetlands may provide some important functions, and also need to be protected.*

Figure 6. Wetland Delineation Map



[3] BCC Table 15.04.040-1 – *Wetland Buffers*

Table 1. Wetland Unit 1

WU-1			
	**Lead Agency**	Benton County	
	Ecology Rating	IV	
	Buffer	40 feet	
	Wetland Delineation Form: 3 (Appendix C)		
	Upland Delineation Form: 4 (Appendix C)		
Description			
HGM – Slope; **Cowardin –** Palustrine emergent (PEM)			
Hydrology			
Source	Supported during the growing season by an irrigation-induced groundwater table.		
Saturation depth (in)	Saturated at surface. Water seeping to surface nearby.		
Vegetation			
Dominants	*Elaeagnus angustifolia* (FAC), *Bassia scoparia* (FAC), *Xanthium strumarium* (FAC), *Elymus repens* (FAC). Trace *Schoenoplectus acutus* (OBL).		
Soils			
Horizon (in)	***Matrix Color***	***Redoximorphic Features***	***Texture***
0-8 8+	10YR 4/3 (100%) shovel denial	none none	sand with heavy root mass rock
Functions Provided (Ecology Rating Form)			
Water Quality:	*4 points (low) – sediment removal, nutrient and toxicant removal*		
Hydrology:	*4 points (low) – erosion control and shoreline stabilization*		
Habitat:	*3 points – (low) – habitat moderate disturbance regime, connectivity*		
Buffer Condition			
Areas surrounding the wetland unit are grazed by cattle and largely devoid of vegetation. Most species are non-native and noxious weeds. As such, the buffer condition is determined to be poor in regard to protection of wetland functions and values.			
Regulatory Status			
Benton County would likely operate as the sole regulatory agency for impacts limited to wetland buffers. However, for disturbance within the wetland boundary, especially fill, a permit would likely be required involving the Department of Ecology and Army Corps of Engineers.			

Table 2. Wetland Unit 2

WU-2		
	**Lead Agency**	Benton County
	Ecology Rating	IV
	Buffer	40 feet
	Wetland Data Sheet(s): **Appendix C;** 1	
	Upland Data Sheet(s): **Appendix C;** 2	

Description			
HGM – Depressional; **Cowardin –** Palustrine emergent (PEM) and Palustrine Scrub-shrub (PSS).			
Hydrology			
Source	Supported during the growing season by an irrigation-induced groundwater table.		
Saturation depth (in)	Not observed but presence of bulrush (OBL) and geomorphic position strongly suggests the presence of wetland hydrology during the growing season.		
Vegetation			
Dominants	*Elaeagnus angustifolia* (FAC), *Phalaris arundinaceae* (FACW), *Schoenoplectus acutus* (OBL).		
Soils (Soil Pit 1)			
Horizon (in)	***Matrix Color***	***Redoximorphic Features***	***Texture***
0-16	10YR 4/2 (100%)	none	sand
Functions Provided (Ecology Rating Form)			
Water Quality:	*4 points (moderate to high) – sediment removal, nutrient and toxicant removal*		
Hydrology:	*4 points (low) – erosion control and shoreline stabilization*		
Habitat:	*3 points – (low) – habitat moderate disturbance regime, connectivity*		
Buffer Condition			
Areas surrounding the wetland unit are grazed by cattle and largely devoid of vegetation. Most species are non-native and noxious weeds. As such, the buffer condition is determined to be poor in regard to protection of wetland functions and values.			
Regulatory Status			
Benton County would likely operate as the sole regulatory agency for impacts limited to wetland buffers. However, for disturbance within the wetland boundary, especially fill, a permit would likely be required involving the Department of Ecology and Army Corps of Engineers.			

4.2. Other Waters

No streams or water bodies were observed, with the small, excavated depression into bedrock that is utilized as a cattle wallow/watering pool discussed in **Section 3.6**. Given the lack of streams within the AOI and artificial construction and continued agricultural use of the pool, it is not anticipated that any "Waters of the United States" as defined under the Clean Water Act would fall under regulatory jurisdiction within the AOI.

5. Consultant Qualifications

Geoffrey Gray is a professional biologist and wetland scientist whose 25-year career has provided him with a unique breadth of experience that can readily assist you in moving your project forward.

Investing eight years in higher education, he earned a Bachelor's Degree in Business Management and a Master's degree in Biology from California State University at Fresno.

Geoffrey has earned 12.4 credit hours of certified professional wetland training, including completion of the *38-hour Army Corps of Engineers Wetland Delineation and Management Training Program*, as well as Corps *Advanced Wetland Delineation ,* Corps *Delineation Manual Regional Supplements*, Washington State Department of Ecology (Ecology) *2014 Wetland Rating System*, Ecology *Credit-Debit Method for Estimating Mitigation Needs*, Ecology *Selecting Wetland Mitigation Sites Using a Watershed Approach*, and multiple courses in wetland plant identification.

Continuously employed as a wetland, fish, and wildlife biologist since 1997, while serving tenures in field research, a large environmental consulting firm, state agencies in both California and Washington, and as an independent environmental consultant, Geoff's resume includes 16 years of full-time duty as a wetland biologist, with experience ranging from the unique vernal pool wetland habitats of California's Central Valley to the diverse wetlands of Eastern Washington State, stretching from the Cascade crest to Idaho.

Spanning his career, Geoff has performed over 130 wetland delineations and has managed 35 wetland mitigation/riparian restoration sites. As a fish and wildlife biologist, he has evaluated over 700 projects for compliance under the Endangered Species Act, including 128 federal consultations.

Geoff founded GG Environmental in 2015, and has since served a diverse palette of clients including habitat restoration groups, private landowners, commercial businesses, and city governments who need assistance in overcoming the challenges of Critical Areas/Shorelines permitting and Endangered Species Act consultation.

A professional-level GPS/GIS user for over 20 years, Geoff employs cutting-edge GPS technology in the field and is proficient in GIS mapping with ArcGIS and QGIS.

Certified as a Professional Wetland Scientist by the Society of Wetland Scientists, Geoff's work is performed to the highest standards and is fully insured.

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Appendix A. Background Information

Appendix A includes the following sub-appendices:

A-1 National Wetlands Inventory and Benton County Wetlands

A-2 NRCS Soil Survey and Bedrock Depth

A-3 Historic USGS Topographic Maps for 1908 and 2000.

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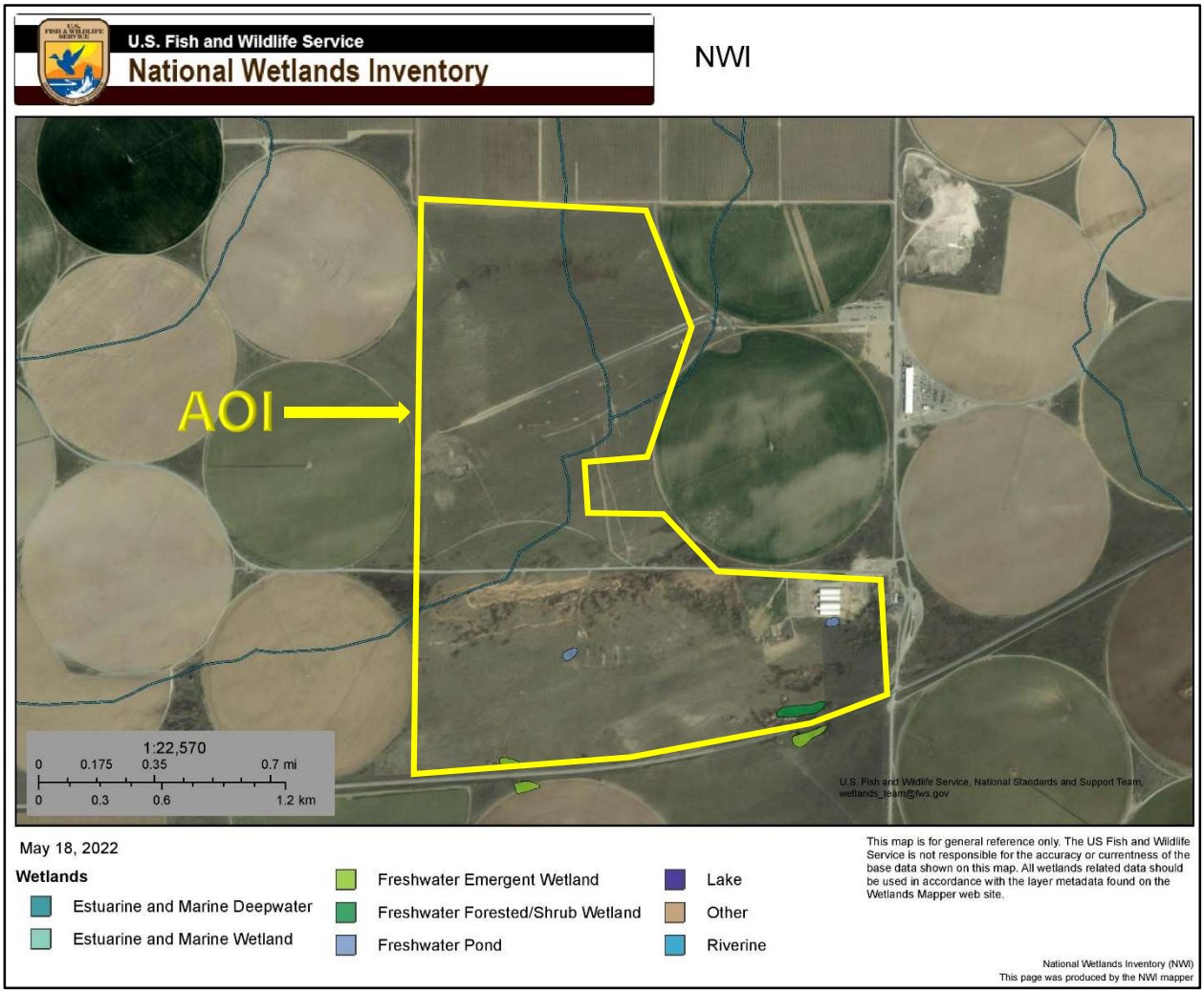
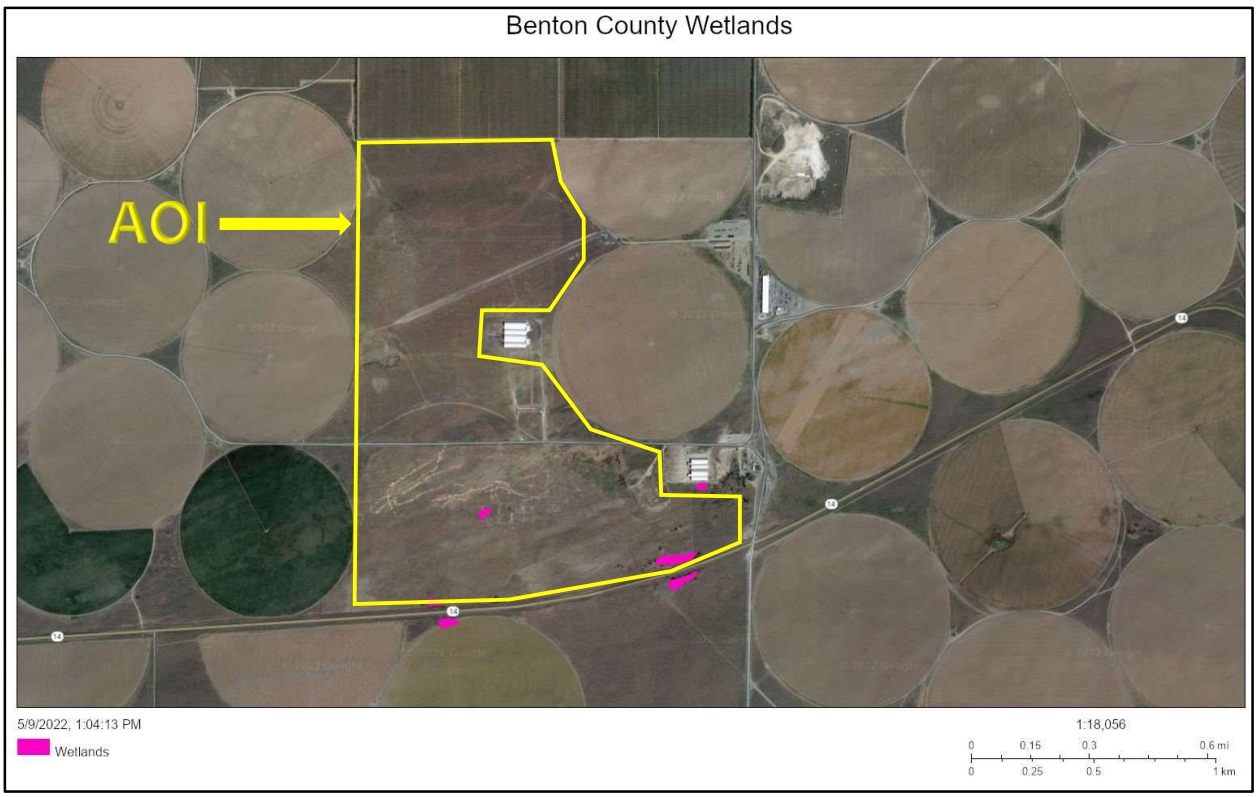
Appendix A-1. National Wetlands Inventory and Benton County Wetlands



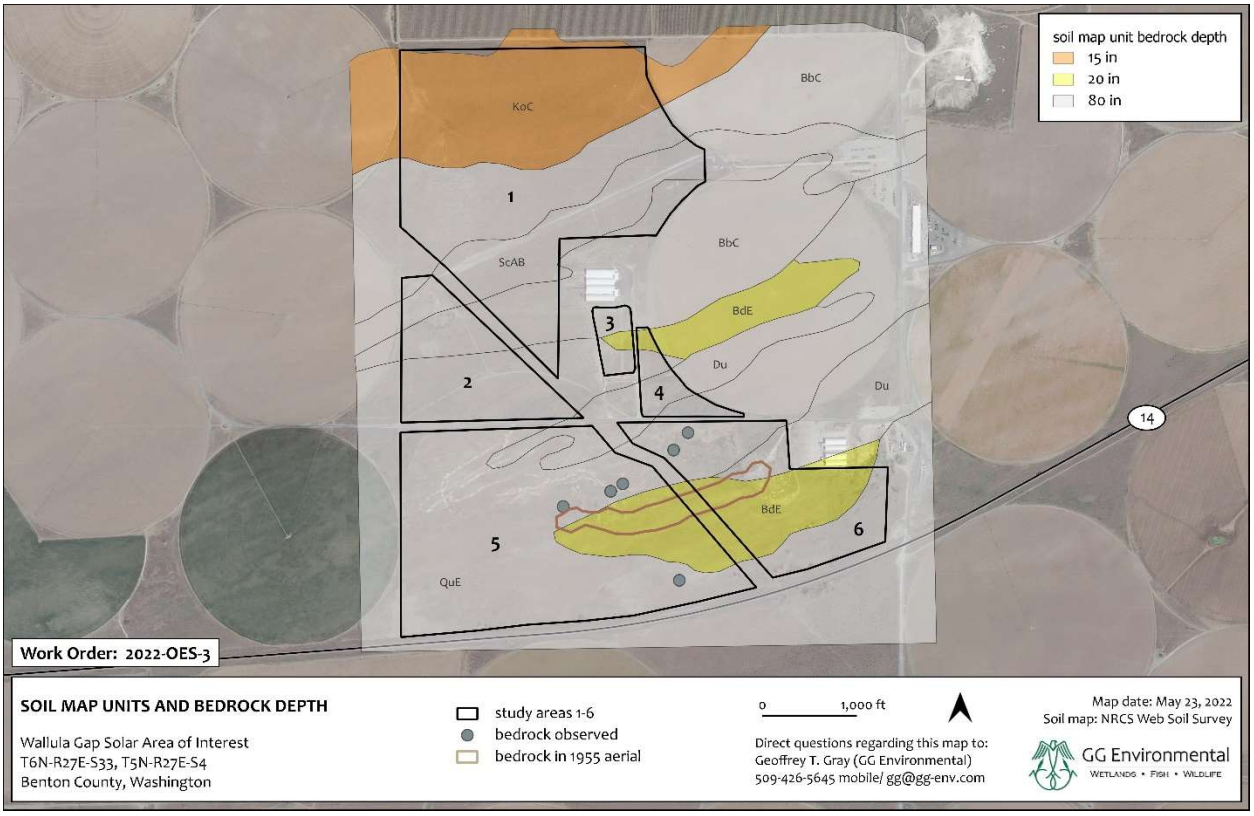

Benton County Wetlands
AOI
5/9/2022, 1:04:13 PM
Wetlands
1:18,056
0
0.15
0.3
0.6 mi
0
0.25
0.5
1 km

Appendix A-2. NRCS Soil Survey and Bedrock Depth

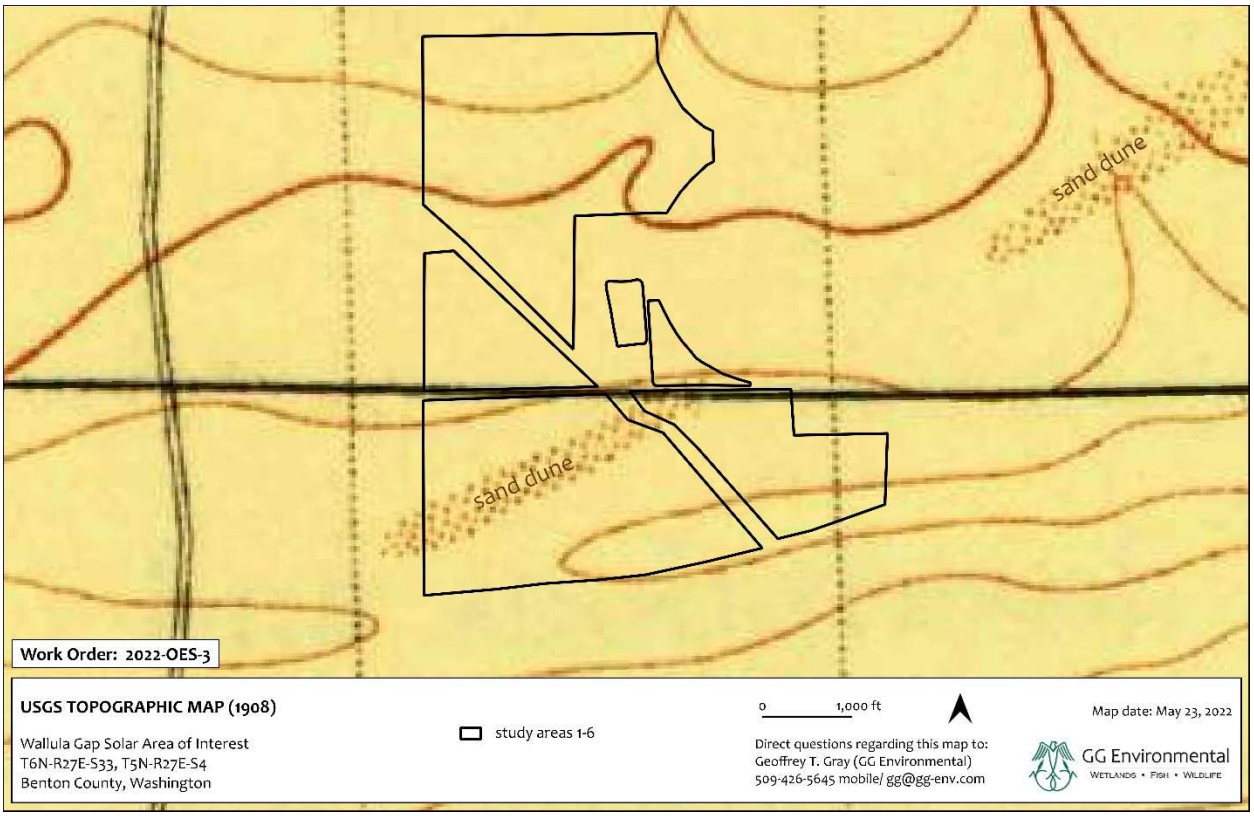
Soil Map—Adams County, Washington

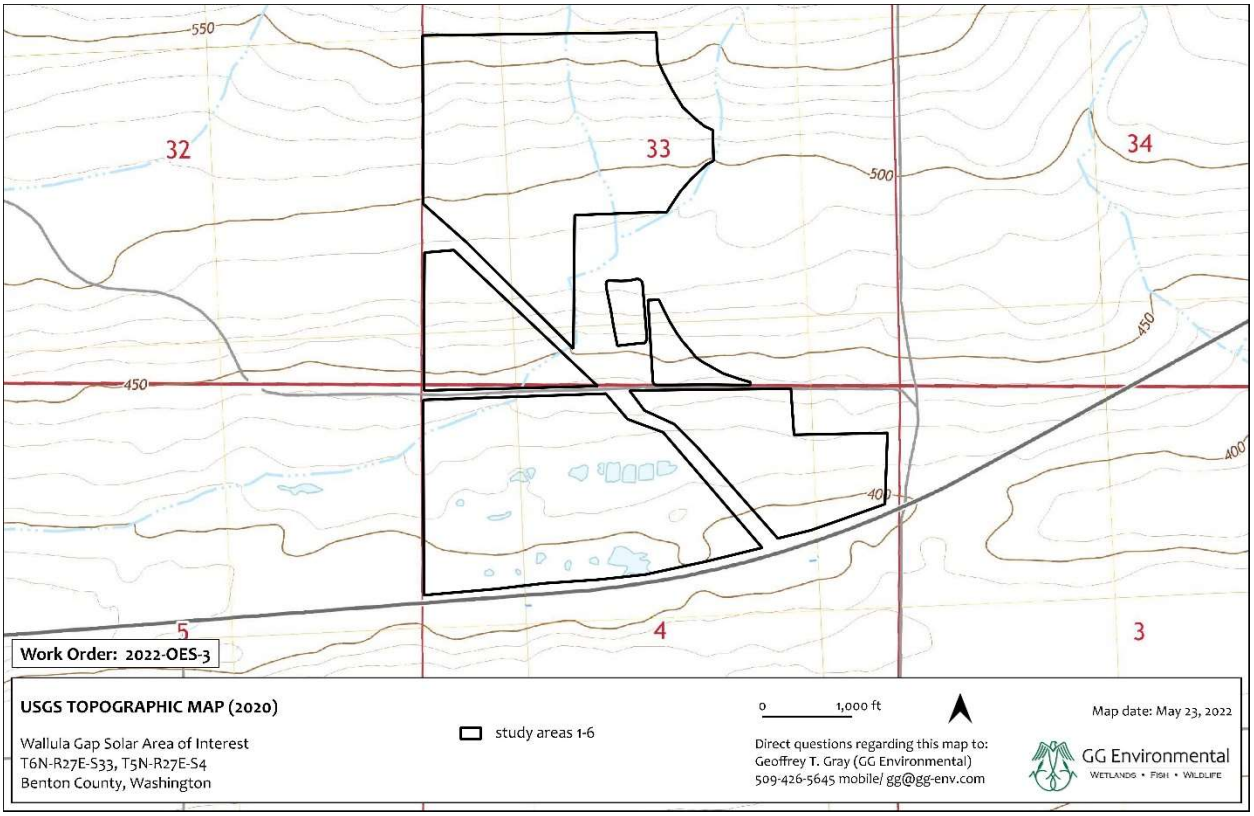
Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ESA	Esquatzel silt loam, 0 to 2 percent slopes	42.4	7.5%
SHB	Shano silt loam, 0 to 5 percent slopes	24.3	4.3%
SHD	Shano silt loam, 5 to 30 percent slopes	106.8	18.9%
SLB	Shano silt loam, moderately shallow, 0 to 5 percent slopes	0.4	0.1%
SMD2	Shano very fine sandy loam, 0 to 30 percent slopes, eroded	390.8	69.2%
Totals for Area of Interest		**564.7**	**100.0%**



Appendix A-3. Historic USGS Topographic Maps for 1908 and 2000




550
32
33
34
500
450
450
400
400
5
4
3
Work Order: 2022-OES-3
USGS TOPOGRAPHIC MAP (2020)
Wallula Gap Solar Area of Interest
T6N-R27E-S33, T5N-R27E-S4
Benton County, Washington
study areas 1-6
0 1,000 ft
Map date: May 23, 2022
Direct questions regarding this map to:
Geoffrey T. Gray (GG Environmental)
509-426-5645 mobile/ gg@gg-env.com
GG Environmental
WETLANDS • FISH • WILDLIFE

Appendix B. Precipitation Analysis

Precipitation analysis per NRCS (2015). All data were obtained from the AgACIS weather station at Kennewick (NRCS 2022b). Fieldwork was completed on March 18 and May 4, 2022.

Normal climatic conditions prevailed the previous three months prior to May 4, 2022 fieldwork.

		Long-term rainfall records[1] (inches)							
	Month	**3 yrs. in 10 less than**	**Average**	**3 yrs. in 10 more than**	**Total Rainfall Obs.[2]**	**Condition dry, wet, normal[3]**	**Condition Value**	**Month weight value[4]**	**Product of previous two columns**
1st prior month	Apr	0.22	0.51	0.61	1.89	Wet	3	3	9
2nd prior month	Mar	0.44	0.77	0.94	0.66	Normal	2	2	4
3rd prior month	Feb	0.48	0.79	0.96	0.13	Dry	1	1	1
								Sum	**14[5]**

[1] WETS table (NRCS 2022b); [2]Accumulated Daily Precipitation (NRCS 2022b); [3] WETS table "30% more than and 30% less than values ere referenced to compare recorded rainfall to statistically-normal precipitation; [4] Value: Dry = 1; Normal = 2; Wet = 3;
[5] 6-9: drier than normal, 10-14: normal, 15-18: wetter than normal.

Date (2022)	Precipitation Total (inches)
May 4 (fieldwork)	0
May 1 – 3	0.66
April 24 – 30 (prior 10 days)	0.11

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Appendix C. Wetland Delineation Forms

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U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Arid West Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Wallula Gap Solar (Work Order: 2022-OES-3) City/County: Benton County Sampling Date: 5-4-2022

Applicant/Owner: OneEnergy Development, LLC State: WA Sampling Point: 1

Investigator(s): Geoffrey Gray, MA, PWS (GG Environmental) Section, Township, Range: T5N-R27E-S4

Landform (hillside, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR B Lat: 45°57'0.81"N Long: 119°26'19.50"W Datum: WGS84

Soil Map Unit Name: Burbank loamy fine sand, basalt substratum, 0 to 30 percent slopes NWI classification: PSS, PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X , Soil ____ , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil X , or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
This location occurs within a slight depression downslope from agricultural operations that release water. The soil unit occurs over shallow basalt bedrock (20-40 in) which likely perches water. This perched water likely daylights in this depression as it flows downslope.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20 x 20 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Elaeagnus angustifolia*	45	Yes	FAC
2.			
3.			
4.			
	45	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 x 15 ft)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
Herb Stratum (Plot size: 5 x 5 ft)			
1. *Phalaris arundinacea*	95	Yes	FACW
2. *Schoenoplectus acutus*	5	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
	100	=Total Cover	
Woody Vine Stratum (Plot size: 5 x 5 ft)			
1.			
2.			
		=Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	95	x 2 =	190
FAC species	45	x 3 =	135
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	145 (A)		330 (B)

Prevalence Index = B/A = 2.28

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

X Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
Vegetation is grazed by cattle, but dominants are identifiable. Dominance by FACW/OBL species (including bulrush) strongly suggests this depression is saturated for extended periods later in the growing season.

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/2	100					Sandy	heavy roots in upper 4 in

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Iron-Manganese Masses (F12) **(LRR D)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

The soils profile lacks redoximorphic features (redox) down to 16 inches. The lack of redox may be explained by lack of organics in the mineral profile, high permeability, and rapid hyporheic flow down-gradient.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

This depression has been heavily vegetated throughout the year in aerial imagery since 1985. The presence of FACW/OBL vegetation strongly suggests it is saturated for extended periods later in the growing season. This soil map unit is underlaid by a shallow basalt layer which perches water - the source of which during the growing season is likely up-gradient agricultural practices.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Arid West Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Wallula Gap Solar (Work Order: 2022-OES-3) City/County: Benton County Sampling Date: 5-4-2022

Applicant/Owner: OneEnergy Development, LLC State: WA Sampling Point: 2

Investigator(s): Geoffrey Gray, MA, PWS (GG Environmental) Section, Township, Range: T5N-R27E-S4

Landform (hillside, terrace, etc.): slope Local relief (concave, convex, none): convex Slope (%): 15

Subregion (LRR): LRR B Lat: 45°57'1.07"N Long: 119°26'20.14"W Datum: WGS84

Soil Map Unit Name: Burbank loamy fine sand, basalt substratum, 0 to 30 percent slopes NWI classification: UPLAND

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X , Soil ____ , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Vegetation is dominated by non-native/noxious weeds and grazed by cattle.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20 x 20 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 x 15 ft)			
1. *Elaeagnus angustifolia*	10	Yes	FAC
2.			
3.			
4.			
5.			
	10 =Total Cover		
Herb Stratum (Plot size: 5 x 5 ft)			
1. *Bassia scoparia*	100	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 5 x 5 ft)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	110	x 3 =	330
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	110 (A)		330 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
Vegetation is grazed by cattle, but dominants are identifiable.

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/3	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Iron-Manganese Masses (F12) **(LRR D)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Pure sand.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Arid West Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Wallula Gap Solar (Work Order: 2022-OES-3) City/County: Benton County Sampling Date: 5-4-2022

Applicant/Owner: OneEnergy Development, LLC State: WA Sampling Point: 3

Investigator(s): Geoffrey Gray, MA, PWS (GG Environmental) Section, Township, Range: T5N-R27E-S4

Landform (hillside, terrace, etc.): slope Local relief (concave, convex, none): convex Slope (%): 8

Subregion (LRR): LRR B Lat: 45°57'9.43"N Long: 119°26'30.53"W Datum: WGS84

Soil Map Unit Name: Quincy loamy sand, 0 to 30 percent slopes NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X , Soil ____ , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
This location occurs upon shallow basalt bedrock (exposed at the surface) just downgradient from two actively-irrigated crop circles. Water perches upon the basalt and daylights as it flows downgradient. Wetland is grazed by cattle.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20 x 20 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 x 15 ft)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 x 5 ft)			
1. *Xanthium strumarium*	100	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: 5 x 5 ft)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	100	x 3 =	300
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		300 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

X Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:
Trace species in the vicinity include Persicaria sp., Epilobium sp., and Schoenoplectus acutus (OBL).

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/3	100					Sandy	heavy roots in upper 4 in
8-9								rock (shovel denial)

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Iron-Manganese Masses (F12) **(LRR D)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Soils observed do not match the mapped soil unit location. Rather the soil better fits BdE (Burbank loamy fine sand, basalt substratum, 0 to 30 percent slopes). No redoximorphic features (redox) were observed. Lack of redox may be explained by lack of organics in the mineral profile, high permeability, and rapid hyporheic flow down-gradient.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- X Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? Yes X No ___ Depth (inches): 0

(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Surface water was presen only two feet from the soil pit.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Arid West Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Wallula Gap Solar (Work Order: 2022-OES-3) City/County: Benton County Sampling Date: 5-4-2022

Applicant/Owner: OneEnergy Development, LLC State: WA Sampling Point: 4

Investigator(s): Geoffrey Gray, MA, PWS (GG Environmental) Section, Township, Range: T5N-R27E-S4

Landform (hillside, terrace, etc.): slope Local relief (concave, convex, none): convex Slope (%): 15

Subregion (LRR): LRR B Lat: 45°57'10.63"N Long: 119°26'30.32"W Datum: WGS84

Soil Map Unit Name: Burbank loamy fine sand, basalt substratum, 0 to 30 percent slopes NWI classification: UPLAND

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X , Soil ____ , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Vegetation is dominated by non-native/noxious weeds and grazed by cattle.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20 x 20 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.	45	Yes	
2.			
3.			
4.			
	45	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 x 15 ft)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
Herb Stratum (Plot size: 5 x 5 ft)			
1. *Bassia scoparia*	100	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	100	=Total Cover	
Woody Vine Stratum (Plot size: 5 x 5 ft)			
1.			
2.			
		=Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	100	x 3 =	300
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		300 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** ____

Remarks:
Vegetation is grazed by cattle, but dominants are identifiable.

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/3	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Iron-Manganese Masses (F12) **(LRR D)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Pure sand.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? Yes ___ No X Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix D. Ecology Rating Forms

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RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): Wetland Unit 1 (WU-1) Date of site visit: 5/4/2022

Rated by Geoffrey Gray, MA, PWS Trained by Ecology? ☑ Yes ☐ No Date of training 2014, 2018

HGM Class used for rating Slope Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map Google Earth

OVERALL WETLAND CATEGORY IV (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

_____ **Category I** - Total score = 22 - 27
_____ **Category II** - Total score = 19 - 21
_____ **Category III** - Total score = 16 - 18
X **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	List appropriate rating (H, M, L)			
Site Potential	L	M	L	
Landscape Potential	M	L	L	
Value	L	L	L	**Total**
Score Based on Ratings	4	4	3	**11**

Score for each function based on three ratings (*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Vernal Pools	
Alkali	
Wetland of High Conservation Value	
Bog and Calcareous Fens	
Old Growth or Mature Forest - slow growing	
Aspen Forest	
Old Growth or Mature Forest - fast growing	
Floodplain forest	
None of the above	**X**

Maps and Figures required to answer questions correctly for Eastern Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	D 1.3, H 1.1, H 1.5	
Hydroperiods (including area of open water for H 1.3)	D 1.4, H 1.2, H 1.3	
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	
Map of the contributing basin	D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	
Hydroperiods	H 1.2, H 1.3	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of wetland vs. width of stream (*can be added to another figure*)	R 4.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	L 1.1, L 4.1, H 1.1, H 1.5	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	1
Hydroperiods	H 1.2, H 1.3	1
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	1
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above*)	S 4.1	1
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	1
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	3
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	S 3.3	3

HGM Classification of Wetland in Eastern Washington

For questions 1 - 4, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 4 apply, and go to Question 5.

1. Does the entire unit **meet both** of the following criteria?

- ☐ The vegetated part of the wetland is on the water side of the Ordinary High Water Mark of a body of permanent open water (without any plants on the surface) that is at least 20 ac (8 ha) in size
- ☐ At least 30% of the open water area is deeper than 10 ft (3 m)

☑ NO - go to 2 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

2. Does the entire wetland unit meet all of the following criteria?

- ☑ The wetland is on a slope (*slope can be very gradual*),
- ☑ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks;
- ☑ The water leaves the wetland **without being impounded**.

☐ NO - go to 3 ☑ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).

3. Does the entire wetland unit **meet all** of the following criteria?

- ☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river;
- ☐ The overbank flooding occurs at least once every 10 years.

☑ NO - go to 4 ☐ **YES** - The wetland class is **Riverine**

NOTE: The Riverine wetland can contain depressions that are filled with water when the river is not flooding.

4. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

☑ NO - go to 5 ☐ **YES** - The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1 - 4 APPLY TO DIFFERENT AREAS IN THE WETLAND UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM Class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine (the riverine portion is within the boundary of depression)	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

SLOPE WETLANDS **Water Quality Functions** - Indicators that the site functions to improve water quality	Points (only 1 score per box)
S 1.0. Does the site have the potential to improve water quality?	
S 1.1. Characteristics of the average slope of wetland: (*a 1% slope has a 1 ft vertical drop in elevation for every 100 ft of horizontal distance*) Slope is 1% or less — points = 3 Slope is > 1% - 2% — points = 2 Slope is > 2% - 5% — points = 1 Slope is greater than 5% — points = 0	1
S 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions*): Yes = 3 No = 0	0
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. *Dense means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 in.* Dense, uncut, herbaceous plants > 90% of the wetland area — points = 6 Dense, uncut, herbaceous plants > ½ of area — points = 3 Dense, woody, plants > ½ of area — points = 2 Dense, uncut, herbaceous plants > ¼ of area — points = 1 Does not meet any of the criteria above for plants — points = 0	0
Total for S 1 — Add the points in the boxes above	**1**

Rating of Site Potential If score is: ☐ **12 = H** ☐ **3 - 11 = M** ☑ **- 5 = L** *Record the rating on the first page*

S 2.0. Does the landscape have the potential to support the water quality function at the site?	
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other Sources Yes = 1 No = 0	0
Total for S 2 — Add the points in the boxes above	**1**

Rating of Landscape Potential If score is: ☑ **1 - 2 = M** ☐ **0 = L** *Record the rating on the first page*

S 3.0. Is the water quality improvement provided by the site valuable to society?	
S 3.1. Does the wetland discharge directly to a stream, river, or lake that is on the 303(d) list (*within 1 mi*)? Yes = 1 No = 0	0
S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? *At least one aquatic resource in the basin is on the 303(d) list.* Yes = 1 No = 0	0
S 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the drainage or basin in which the wetland is found*)? Yes = 2 No = 0	0
Total for S 3 — Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

SLOPE WETLANDS **Hydrologic Functions** - Indicators that the site functions to reduce flooding and erosion	Points (only 1 score per box)
S 4.0. Does the site have the potential to reduce flooding and erosion?	
S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. *Stems of plants should be thick enough (usually > 1/8 in), or dense enough, to remain erect during surface flows.* Dense, uncut, **rigid** plants cover > 90% of the area of the wetland — points = 1 All other conditions — points = 0	1

Rating of site Potential If score is: ☑ **1 = M** ☐ **0 = L** *Record the rating on the first page*

S 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses that generate excess surface runoff? Yes = 1 No = 0	0

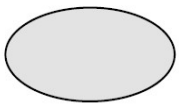
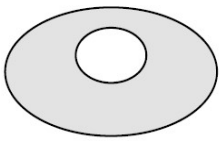
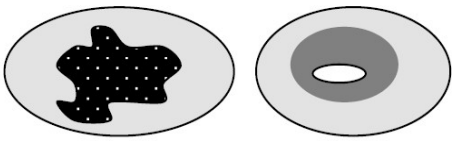
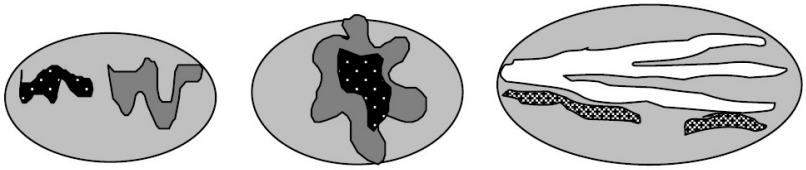
Rating of Landscape Potential If score is: ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

S 6.0. Are the hydrologic functions provided by the site valuable to society?	
S 6.1. Distance to the nearest areas downstream that have flooding problems: The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) — points = 2 Surface flooding problems are in a sub-basin farther down-gradient — points = 1 No flooding problems anywhere downstream — points = 0	0
S 6.2. Has the site been identified as important for flood storage and flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for S 6 — Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

NOTES and FIELD OBSERVATIONS:

All areas within 330 feet of the wetland unit are managed for agriculture, including crop production and cattle grazing. No habitat fitting the definition of shrubsteppe is present. Cattle graze the wetland unit and buffers. Hydrology appears to be upwelling of groundwater influenced by up-gradient irrigation. No streams are present within the vicinity. No flooding problems are documented that would be influenced by the exclusively groundwater-supported wetland. The wetland lies within a 12-unit HUC that does not have A TMDL nor a 303d-listed waterbody.

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat	(only 1 score per box)
H 1.0. Does the wetland have the potential to provide habitat for many species?	
H 1.1. Structure of plant community: *Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is > = ¼ ac or > = 10% of the wetland if wetland is < 2.5 ac.* ☐ Aquatic bed ☐ Emergent plants 0 - 12 in (0-30 cm) high are the highest layer and have > 30% cover ☐ Emergent plants > 12 - 40 in (> 30-100 cm) high are the highest layer with >30% cover ☑ Emergent plants > 40 in (> 100 cm) high are the highest layer with >30% cover ☐ Scrub-shrub (areas where shrubs have > 30% cover) ☐ Forested (areas where trees have > 30% cover) 4 or more checks: points = 3 3 checks: points = 2 2 checks: points - 1 1 check: points = 0	0
H 1.2. Is one of the vegetation types Aquatic Bed? Yes = 1 No = 0	0
H 1.3. Surface water H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least ¼ ac **OR** 10% of its area during the March to early June **OR** in August to the end of September? *Answer YES for Lake Fringe wetlands.* ☐ Yes = 3 points & go to H 1.4 No = go to H 1.3.2 H 1.3.2. Does the wetland have an intermittent or permanent, and unvegetated stream within its boundaries, or along one side, over at least ¼ ac or 10% of its area? *Answer yes only if H 1.3.1 is No.* ☐ Yes = 3 No = 0	0
H 1.4. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold. You do not have to name the species. Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Russian olive, Phragmites, Canadian thistle, yellow-flag iris, and saltcedar (Tamarisk)* # of species _____ Scoring: > 9 species: points = 2 4 - 9 species: points = 1 < 4 species: points = 0	0
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion among types of plant structures (described in H 1.1), and unvegetated areas (open water or mudflats) is high, moderate, low, or none. *Use map of Cowardin and emergent plant classes prepared for questions H 1.1 and map of open water from H 1.3. If you have four or more plant classes or three classes and open water, the rating is always high.*  **None** = 0 points  **Low** = 1 point  **Moderate** = 2 points All three diagrams in this row are **HIGH** = 3 points  Riparian braided channels with 2 classes	1

H 1.6. Special habitat features: *Check the habitat features that are present in the wetland. The number of checks is the number of points.* ☐ Loose rocks larger than 4 in OR large, downed, woody debris (> 4 in diameter) within the area of surface ponding or in stream. ☑ Cattails or bulrushes are present within the wetland. ☐ Standing snags (diameter at the bottom > 4 in) in the wetland or within 30 m (100 ft) of the edge. ☐ Emergent or shrub vegetation in areas that are permanently inundated/ponded. ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 45 degree slope) OR signs of recent beaver activity ☐ Invasive species cover less than 20% in each stratum of vegetation (*canopy, sub-canopy, shrubs, herbaceous, moss/ground cover*)	1
Total for H 1 Add the points in the boxes above	**2**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☐ **7 - 14 = M** ☑ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support habitat functions of the site?	
H 2.1 Accessible habitat (only area of habitat abutting wetland). If total accessible habitat is: *Calculate:* 0 % undisturbed habitat + (19 % moderate & low intensity land uses / 2) = 9.5% > 1/3 (33.3%) of 1 km Polygon points = 3 20 - 33% of 1 km Polygon points = 2 10 - 19% of 1 km Polygon points = 1 < 10 % of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around wetland. *Calculate:* 0 % undisturbed habitat + (43 % moderate & low intensity land uses / 2) = 21.5% Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10 - 50% and in 1 - 3 patches points = 2 Undisturbed habitat 10 - 50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	2
H 2.3 Land use intensity in 1 km Polygon: > 50% of 1 km Polygon is high intensity land use points = (-2) Does not meet criterion above points = 0	-2
H 2.4. The wetland is in an area where annual rainfall is less than 12 in, and its water regime is not influenced by irrigation practices, dams, or water control structures. *Generally, this means outside boundaries of reclamation areas, irrigation districts, or reservoirs* Yes = 3 No = 0	0
Total for H 2 Add the points in the boxes above	**0**

Rating of Landscape Potential If Score is: ☐ **4 - 9 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: points = 2 ☐ It has 3 or more priority habitats within 100 m (see Appendix B) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on state or federal lists) ☐ It is mapped as a location for an individual WDFW species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats within 100 m (see Appendix B) points = 1 Site does not meet any of the criteria above points = 0	0

Rating of Value If Score is: ☐ **2 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate category. NOTE: A wetland may meet the criteria for more than one set of special characteristics. Record all those that apply. NOTE: All wetlands should also be characterized based on their functions.

Wetland Type	Category
Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.	
SC 1.0. Vernal Pools Is the wetland **less than 4000 ft²**, and does it meet at least **two** of the following criteria? ☐ Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input. ☐ Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. *If you find perennial, obligate, wetland plants, the wetland is probably NOT a vernal pool.* ☐ The soil in the wetland is shallow [< 1 ft (30 cm) deep] and is underlain by an impermeable layer such as basalt or clay. ☐ Surface water is present for less than 120 days during the wet season. ☐ Yes - Go to **SC 1.1** ☑ No = **Not vernal pool** SC 1.1. Is the vernal pool relatively undisturbed in February and March? ☐ Yes – Go to **SC 1.2** ☐ No = **Not a vernal pool with special characteristics**	
SC 1.2. Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 mi (other wetlands, rivers, lakes etc.)? ☐ Yes = **Category II** ☐ No = **Category III**	
SC 2.0. Alkali wetlands Does the wetland meet **one** of the following criteria? ☐ The wetland has a conductivity > 3.0 mS/cm. ☐ The wetland has a conductivity between 2.0 and 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as "alkali" species (see Table 4 for list of plants found in alkali systems). ☐ If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. **OR** does the wetland unit meet two of the following three sub-criteria? ☐ Salt encrustations around more than 75% of the edge of the wetland ☐ More than ¾ of the plant cover consists of species listed on Table 4 ☐ A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. ☐ Yes = **Category I** ☑ No = **Not an alkali wetland**	
SC 3.0. Wetlands of High Conservation Value (WHCV) SC 3.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ☑ Yes - Go to **SC 3.2** ☐ No - Go to **SC 3.3** SC 3.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? ☐ Yes = **Category I** ☑ No = **Not WHCV** SC 3.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ☐ Yes - **Contact WNHP/WDNR and to SC 3.4** ☐ No = **Not WHCV** SC 3.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ☐ Yes = **Category I** ☐ No = **Not WHCV**	

SC 4.0. Bogs and Calcareous Fens

Does the wetland (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs or calcareous fens? Use the key below to identify if the wetland is a bog or calcareous fen. ***If you answer yes you will still need to rate the wetland based on its functions.***

SC 4.1. Does an area within the wetland have organic soil horizons (i.e., layers of organic soil), either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? *See Appendix C for a field key to identify organic soils.*

☐ Yes - Go to **SC 4.3** ☑ No - Go to **SC 4.2**

SC 4.2. Does an area within the wetland have organic soils, either peats or mucks, that are less than 16 in deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 4.3** ☑ No = **Is not a bog for rating**

SC 4.3. Does an area within the wetland have more than 70% cover of mosses at ground level AND at least 30% of the total plant cover consists of species in Table 5?

☐ Yes = **Category I bog** ☐ No - Go to **SC 4.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 5 are present, the wetland is a bog.

SC 4.4. Is an area with peats or mucks forested (> 30% cover) with subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 5 provide more than 30% of the cover under the canopy?

☐ Yes = **Category I bog** ☐ No - Go to **SC 4.5**

SC 4.5. Do the species listed in Table 6 comprise at least 20% of the total plant cover within an area of peats and mucks?

☐ Yes = **Is a Calcareous Fen for purpose of rating** ☐ No - Go to **SC 4.6**

SC 4.6. Do the species listed in Table 6 comprise at least 10% of the total plant cover in an area of peats and mucks, AND one of the two following conditions is met:

☐ Marl deposits [calcium carbonate ($CaCO_3$) precipitate] occur on the soil surface or plant stems

☐ The pH of free water is ≥ 6.8 AND electrical conductivity is ≥ 200 uS/cm at multiple locations within the wetland

☐ Yes = **Is a Category I calcareous fen** ☐ No = **Is not a calcareous fen**

SC 5.0. Forested Wetlands

Does the wetland have an area of forest rooted within its boundary that meets **at least one** of the following three criteria? (*Continue only if you have identified that a forested class is present in question H*

☐ The wetland is within the 100 year floodplain of a river or stream

☐ Aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species

☐ There is at least ¼ ac of trees (even in wetlands smaller than 2.5 ac) that are “mature” or “old-growth” according to the definitions for these priority habitats developed by WDFW (*see definitions in question H3.1*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a forested wetland with special characteristics**

SC 5.1. Does the wetland have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees (*see Table 7*)?

☐ Yes = **Category I** ☐ No - Go to **SC 5.2**

SC 5.2. Does the wetland have areas where aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species?

☐ Yes = **Category I** ☐ No - Go to **SC 5.3**

SC 5.3. Does the wetland have at least ¼ acre with a forest canopy where more than 50% of the tree species (by cover) are fast growing species (*see Table 7*)?

☐ Yes = **Category II** ☐ No - Go to **SC 5.4**

SC 5.4. Is the forested component of the wetland within the 100 year floodplain of a river or stream?

☐ Yes = **Category II** ☐ No = **Not a forested wetland with special characteristics**

Category of wetland based on Special Characteristics

Choose the highest rating if wetland falls into several categories

If you answered No for all types, enter “Not Applicable” on Summary Form

Appendix B: WDFW Priority Habitats in Eastern Washington

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE**: This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- ☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- ☐ **Old-growth/Mature forests**: Old-growth east of Cascade crest – Stands are highly variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. In general, stands will be >150 years of age, with 10 trees/ac (25 trees/ha) that are > 21 in (53 cm) dbh, and 1-3 snags/ac (2.5-7.5 snags/ha) that are > 12-14 in (30-35 cm) diameter. Downed logs may vary from abundant to absent. Canopies may be single or multi-layered. Evidence of human-caused alterations to the stand will be absent or so slight as to not affect the ecosystem's essential structures and functions. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west and 80-160 years old east of the Cascade crest.
- ☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- ☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.
- ☐ **Shrub-steppe**: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).
- ☐ **Eastside Steppe**: Nonforested vegetation type dominated by broadleaf herbaceous flora (i.e., forbs), perennial bunchgrasses, or a combination of both. Bluebunch wheatgrass (*Pseudoroegneria spicata*) is often the prevailing cover component along with Idaho fescue (*Festuca idahoensis*), Sandberg bluegrass (*Poa secunda*), rough fescue (*F. campestris*), or needlegrasses (*Achnatherum* spp.).
- ☐ **Juniper Savannah**: All juniper woodlands.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): Wetland Unit 3 (WU-3) Date of site visit: 5/4/2022

Rated by Geoffrey Gray, MA, PWS Trained by Ecology? ☑ Yes ☐ No Date of training 2014, 2018

HGM Class used for rating Depressional Wetland has multiple HGM classes? ☐ Yes ☑ No

NOTE: Form is not complete with out the figures requested (*figures can be combined*).
Source of base aerial photo/map Google Earth

OVERALL WETLAND CATEGORY IV (based on functions ☑ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

_____ **Category I** - Total score = 22 - 27
_____ **Category II** - Total score = 19 - 21
_____ **Category III** - Total score = 16 - 18
X **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
	List appropriate rating (H, M, L)			
Site Potential	L	M	L	
Landscape Potential	M	L	L	
Value	L	L	L	**Total**
Score Based on Ratings	4	4	3	**11**

Score for each function based on three ratings (*order of ratings is not important*)

9 = H, H, H
8 = H, H, M
7 = H, H, L
7 = H, M, M
6 = H, M, L
6 = M, M, M
5 = H, L, L
5 = M, M, L
4 = M, L, L
3 = L, L, L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	Category
Vernal Pools	
Alkali	
Wetland of High Conservation Value	
Bog and Calcareous Fens	
Old Growth or Mature Forest - slow growing	
Aspen Forest	
Old Growth or Mature Forest - fast growing	
Floodplain forest	
None of the above	**X**

Maps and Figures required to answer questions correctly for Eastern Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	D 1.3, H 1.1, H 1.5	1
Hydroperiods (including area of open water for H 1.3)	D 1.4, H 1.2, H 1.3	1
Location of outlet (*can be added to map of hydroperiods*)	D 1.1, D 4.1	1
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	D 2.2, D 5.2	1
Map of the contributing basin	D 5.3	1
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	2
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	3
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	D 3.3	3

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	
Hydroperiods	H 1.2, H 1.3	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	R 2.4	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of wetland vs. width of stream (*can be added to another figure*)	R 4.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	L 1.1, L 4.1, H 1.1, H 1.5	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes and classes of emergents	H 1.1, H 1.5	
Hydroperiods	H 1.2, H 1.3	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above*)	S 4.1	
Boundary of area within 150 ft of the wetland (*can be added to another figure*)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	S 3.3	

HGM Classification of Wetland in Eastern Washington

For questions 1 - 4, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1 - 4 apply, and go to Question 5.

1. Does the entire unit **meet both** of the following criteria?

☐ The vegetated part of the wetland is on the water side of the Ordinary High Water Mark of a body of permanent open water (without any plants on the surface) that is at least 20 ac (8 ha) in size

☐ At least 30% of the open water area is deeper than 10 ft (3 m)

☑ NO - go to 2 ☐ **YES** - The wetland class is **Lake Fringe** (Lacustrine Fringe)

2. Does the entire wetland unit meet all of the following criteria?

☐ The wetland is on a slope (*slope can be very gradual*),

☐ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks;

☐ The water leaves the wetland **without being impounded**.

☑ NO - go to 3 ☐ **YES** - The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).

3. Does the entire wetland unit **meet all** of the following criteria?

☐ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river;

☐ The overbank flooding occurs at least once every 10 years.

☑ NO - go to 4 ☐ **YES** - The wetland class is **Riverine**

NOTE: The Riverine wetland can contain depressions that are filled with water when the river is not flooding.

4. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO - go to 5 ☑ **YES** - The wetland class is **Depressional**

5. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1 - 4 APPLY TO DIFFERENT AREAS IN THE WETLAND UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM Class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine (the riverine portion is within the boundary of depression)	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine

If you are still unable to determine which of the above criteria apply to your wetland, or if you have ***more than 2 HGM classes*** *within a wetland boundary, classify the wetland as Depressional for the rating.*

NOTES and FIELD OBSERVATIONS:
This wetland unit is a slight depression that supports reed canarygrass (FACW), Russian olive (FAC), and hard-stem bulrush (OBL). No hydrology was observed during the wetland delineation but the presence of bulrush strongly suggests hydrology is present during the growing season. No vegetation fitting the definition of shrubsteppe is present within 330 feet of the wetland unit due to historic agricultural practices (grazing) and decades of vegetation managment. Vegetation is dominated by non-native and noxious weeds, including perennial pepperweed, Mexican fireweed, and Russian olive.

Cattle graze the entire wetland unit. Hydrology appears to be upwelling of groundwater influenced by up-gradient irrigation. No streams are present within the vicinity. No flooding problems are documented that would be influenced by the exclusively groundwater-supported wetland. The wetland lies within a 12-unit HUC that does not have A TMDL nor a 303d-listed waterbody.

DEPRESSIONAL WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality			Points (only 1 score per box)
D 1.0. Does the site have the potential to improve water quality?			
D 1.1. Characteristics of surface water outflows from the wetland:			
Wetland has no surface water outlet		points = 5	
☐ Wetland has an intermittently flowing outlet		points = 3	5
☐ Wetland has a highly constricted permanently flowing outlet		points = 3	
Wetland has a permanently flowing, unconstricted, surface outlet		points = 1	
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic (*use NRCS definitions of soils*)	Yes = 3	No = 0	0
D 1.3. Characteristics of persistent vegetation (Emergent, Scrub-shrub, and/or Forested Cowardin classes)			
Wetland has persistent, ungrazed, vegetation for > $^2/_3$ of area		points = 5	
Wetland has persistent, ungrazed, vegetation from $^1/_3$ to $^2/_3$ of area		points = 3	0
Wetland has persistent, ungrazed vegetation from $^1/_{10}$ to < $^1/_3$ of area		points = 1	
Wetland has persistent, ungrazed vegetation < $^1/_{10}$ of area		points = 0	
D 1.4. Characteristics of seasonal ponding or inundation:			
This is the area of ponding that fluctuates every year. Do not count the area that is permanently ponded.			
Area seasonally ponded is > ½ total area of wetland		points = 3	0
Area seasonally ponded is ¼ - ½ total area of wetland		points = 1	
Area seasonally ponded is < ¼ total area of wetland		points = 0	
Total for D 1	Add the points in the boxes above		**5**

Rating of Site Potential If score is: ☐ **12 - 16 = H** ☐ **- 11 = M** ☑ **- 5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?			
D 2.1. Does the wetland receive stormwater discharges?	Yes = 1	No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants?	Yes = 1	No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland?	Yes = 1	No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1 - D 2.3?			0
Source	Yes = 1	No = 0	
Total for D 2	Add the points in the boxes above		**1**

Rating of Landscape Potential If score is: ☐ **3 or 4 = H** ☑ **1 or 2 = M** ☐ **= L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?			
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, or lake that is on the 303(d) list?	Yes = 1	No = 0	0
D 3.2.Is the wetland in a basin or sub-basin where water quality is an issue in some aquatic resource [303(d) list, eutrophic lakes, problems with nuisance and toxic algae]?	Yes = 1	No = 0	0
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the drainage or basin in which the wetland is found*)?	Yes = 2	No = 0	0
Total for D 3	Add the points in the boxes above		**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **= L** *Record the rating on the first page*

DEPRESSIONAL WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and erosion

	Points (only 1 score per box)
D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland:	8
Wetland has no surface water outlet — points = 8	
☐ Wetland has an intermittently flowing outlet — points = 4	
☐ Wetland has a highly constricted permanently flowing outlet — points = 4	
Wetland has a permanently flowing unconstricted surface outlet — points = 0	
(*If outlet is a ditch and not permanently flowing treat wetland as "intermittently flowing"*)	
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or deepest part (if dry).*	0
Seasonal ponding: > 3 ft above the lowest point in wetland or the surface of permanent ponding — points = 8	
Seasonal ponding: 2 ft - < 3 ft above the lowest point in wetland or the surface of permanent ponding — points = 6	
☐ The wetland is a headwater wetland — points = 4	
☐ Seasonal ponding: 1 ft - < 2 ft — points = 4	
Seasonal ponding: 6 in - < 1 ft — points = 2	
Seasonal ponding: < 6 in or wetland has only saturated soils — points = 0	
Total for D 4 — Add the points in the boxes above	**8**

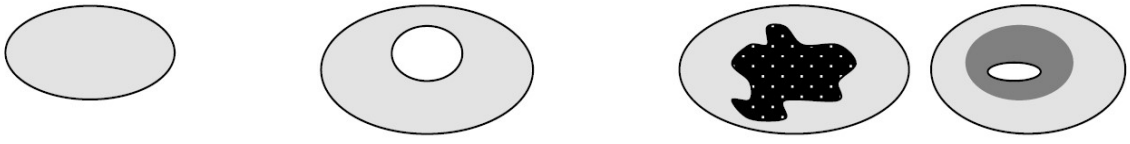
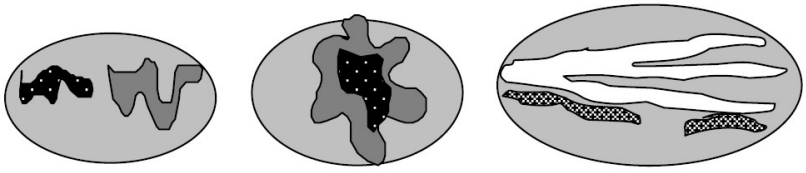
Rating of Site Potential If score is: ☐ **12 - 16 = H** ☑ **7 - 11 = M** ☐ **0 - 5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support the hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	0
D 5.2. Is > 10% of the area within 150 ft of the wetland in land uses that generates runoff? Yes = 1 No = 0	0
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses ? Yes = 1 No = 0	0
Total for D 5 — Add the points in the boxes above	**0**

Rating of Landscape Potential If score is: ☐ **3 = H** ☐ **1 or 2 = M** ☑ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The wetland is in a landscape that has flooding problems. Choose the description that best matches conditions around the wetland being rated. *Do not add points. Choose the highest score if more than one condition is met.*	0
The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds), AND	
Flooding occurs in sub-basin that is immediately down-gradient of wetland — points = 2	
Surface flooding problems are in a sub-basin farther down-gradient — points = 1	
☑ The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. — points = 0	
Explain why	
☐ There are no problems with flooding downstream of the wetland — points = 0	
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	
Total for D 6 — Add the points in the boxes above	**0**

Rating of Value If score is: ☐ **2 - 4 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

These questions apply to wetlands of all HGM classes. **HABITAT FUNCTIONS** - Indicators that site functions to provide important habitat	(only 1 score per box)
H 1.0. Does the wetland have the potential to provide habitat for many species?	
H 1.1. Structure of plant community: *Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is > = ¼ ac or > = 10% of the wetland if wetland is < 2.5 ac.* ☐ Aquatic bed ☐ Emergent plants 0 - 12 in (0-30 cm) high are the highest layer and have > 30% cover ☑ Emergent plants > 12 - 40 in (> 30-100 cm) high are the highest layer with >30% cover ☐ Emergent plants > 40 in (> 100 cm) high are the highest layer with >30% cover ☑ Scrub-shrub (areas where shrubs have > 30% cover) ☐ Forested (areas where trees have > 30% cover) 4 or more checks: points = 3 3 checks: points = 2 2 checks: points - 1 1 check: points = 0	1
H 1.2. Is one of the vegetation types Aquatic Bed? Yes = 1 No = 0	0
H 1.3. Surface water H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least ¼ ac **OR** 10% of its area during the March to early June **OR** in August to the end of September? *Answer YES for Lake Fringe wetlands.* ☐ Yes = 3 points & go to H 1.4 No = go to H 1.3.2 H 1.3.2. Does the wetland have an intermittent or permanent, and unvegetated stream within its boundaries, or along one side, over at least ¼ ac or 10% of its area? *Answer yes only if H 1.3.1 is No.* ☐ Yes = 3 No = 0	0
H 1.4. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *Different patches of the same species can be combined to meet the size threshold. You do not have to name the species. Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Russian olive, Phragmites, Canadian thistle, yellow-flag iris, and saltcedar (Tamarisk)* # of species _____ Scoring: > 9 species: points = 2 4 - 9 species: points = 1 < 4 species: points = 0	0
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion among types of plant structures (described in H 1.1), and unvegetated areas (open water or mudflats) is high, moderate, low, or none. *Use map of Cowardin and emergent plant classes prepared for questions H 1.1 and map of open water from H 1.3. If you have four or more plant classes or three classes and open water, the rating is always high.*  **None** = 0 points **Low** = 1 point **Moderate** = 2 points All three diagrams in this row are **HIGH** = 3 points  Riparian braided channels with 2 classes	1

H 1.6. Special habitat features:	
Check the habitat features that are present in the wetland. The number of checks is the number of points. ☐ Loose rocks larger than 4 in OR large, downed, woody debris (> 4 in diameter) within the area of surface ponding or in stream. ☑ Cattails or bulrushes are present within the wetland. ☐ Standing snags (diameter at the bottom > 4 in) in the wetland or within 30 m (100 ft) of the edge. ☐ Emergent or shrub vegetation in areas that are permanently inundated/ponded. ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 45 degree slope) OR signs of recent beaver activity ☐ Invasive species cover less than 20% in each stratum of vegetation (*canopy, sub-canopy, shrubs, herbaceous, moss/ground cover*)	1
Total for H 1 — Add the points in the boxes above	**3**

Rating of Site Potential If Score is: ☐ **15 - 18 = H** ☐ **7 - 14 = M** ☑ **0 - 6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support habitat functions of the site?	
H 2.1 Accessible habitat (only area of habitat abutting wetland). If total accessible habitat is: *Calculate:* 0 % undisturbed habitat + (19 % moderate & low intensity land uses / 2) = 9.5% > 1/3 (33.3%) of 1 km Polygon — points = 3 20 - 33% of 1 km Polygon — points = 2 10 - 19% of 1 km Polygon — points = 1 < 10 % of 1 km Polygon — points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around wetland. *Calculate:* 0 % undisturbed habitat + (43 % moderate & low intensity land uses / 2) = 21.5% Undisturbed habitat > 50% of Polygon — points = 3 Undisturbed habitat 10 - 50% and in 1 - 3 patches — points = 2 Undisturbed habitat 10 - 50% and > 3 patches — points = 1 Undisturbed habitat < 10% of 1 km Polygon — points = 0	2
H 2.3 Land use intensity in 1 km Polygon: > 50% of 1 km Polygon is high intensity land use — points = (-2) Does not meet criterion above — points = 0	-2
H 2.4. The wetland is in an area where annual rainfall is less than 12 in, and its water regime is not influenced by irrigation practices, dams, or water control structures. *Generally, this means outside boundaries of reclamation areas, irrigation districts, or reservoirs* Yes = 3 No = 0	0
Total for H 2 — Add the points in the boxes above	**0**

Rating of Landscape Potential If Score is: ☐ **4 - 9 = H** ☐ **1 - 3 = M** ☑ **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated*. Site meets ANY of the following criteria: — points = 2 ☐ It has 3 or more priority habitats within 100 m (see Appendix B) ☐ It provides habitat for Threatened or Endangered species (any plant or animal on state or federal lists) ☐ It is mapped as a location for an individual WDFW species ☐ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources ☐ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan Site has 1 or 2 priority habitats within 100 m (see Appendix B) — points = 1 Site does not meet any of the criteria above — points = 0	0

Rating of Value If Score is: ☐ **2 = H** ☐ **1 = M** ☑ **0 = L** *Record the rating on the first page*

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate category. NOTE: A wetland may meet the criteria for more than one set of special characteristics. Record all those that apply. NOTE: All wetlands should also be characterized based on their functions.

Wetland Type	Category
Check off any criteria that apply to the wetland. List the category when the appropriate criteria are met.	
SC 1.0. Vernal Pools Is the wetland **less than 4000 ft²**, and does it meet at least **two** of the following criteria? ☐ Its only source of water is rainfall or snowmelt from a small contributing basin and has no groundwater input. ☐ Wetland plants are typically present only in the spring; the summer vegetation is typically upland annuals. *If you find perennial, obligate, wetland plants, the wetland is probably NOT a vernal pool.* ☐ The soil in the wetland is shallow [< 1 ft (30 cm) deep] and is underlain by an impermeable layer such as basalt or clay. ☐ Surface water is present for less than 120 days during the wet season. ☐ Yes - Go to **SC 1.1** ☑ No = **Not vernal pool** SC 1.1. Is the vernal pool relatively undisturbed in February and March? ☐ Yes – Go to **SC 1.2** ☐ No = **Not a vernal pool with special characteristics**	
SC 1.2. Is the vernal pool in an area where there are at least 3 separate aquatic resources within 0.5 mi (other wetlands, rivers, lakes etc.)? ☐ Yes = **Category II** ☐ No = **Category III**	
SC 2.0. Alkali wetlands Does the wetland meet **one** of the following criteria? ☐ The wetland has a conductivity > 3.0 mS/cm. ☐ The wetland has a conductivity between 2.0 and 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as “alkali” species (see Table 4 for list of plants found in alkali systems). ☐ If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt. **OR** does the wetland unit meet two of the following three sub-criteria? ☐ Salt encrustations around more than 75% of the edge of the wetland ☐ More than ¾ of the plant cover consists of species listed on Table 4 ☐ A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands. ☐ Yes = **Category I** ☑ No = **Not an alkali wetland**	
SC 3.0. Wetlands of High Conservation Value (WHCV) SC 3.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? ☑ Yes - Go to **SC 3.2** ☐ No - Go to **SC 3.3** SC 3.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? ☐ Yes = **Category I** ☑ No = **Not WHCV** SC 3.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf ☐ Yes - **Contact WNHP/WDNR and to SC 3.4** ☐ No = **Not WHCV** SC 3.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? ☐ Yes = **Category I** ☐ No = **Not WHCV**	

SC 4.0. Bogs and Calcareous Fens

Does the wetland (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs or calcareous fens? Use the key below to identify if the wetland is a bog or calcareous fen. ***If you answer yes you will still need to rate the wetland based on its functions.***

SC 4.1. Does an area within the wetland have organic soil horizons (i.e., layers of organic soil), either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? *See Appendix C for a field key to identify organic soils.*

☐ Yes - Go to **SC 4.3** ☑ No - Go to **SC 4.2**

SC 4.2. Does an area within the wetland have organic soils, either peats or mucks, that are less than 16 in deep over bedrock or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

☐ Yes - Go to **SC 4.3** ☑ No = **Is not a bog for rating**

SC 4.3. Does an area within the wetland have more than 70% cover of mosses at ground level AND at least 30% of the total plant cover consists of species in Table 5?

☐ Yes = **Category I bog** ☐ No - Go to **SC 4.4**

NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 5 are present, the wetland is a bog.

SC 4.4. Is an area with peats or mucks forested (> 30% cover) with subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 5 provide more than 30% of the cover under the canopy?

☐ Yes = **Category I bog** ☐ No - Go to **SC 4.5**

SC 4.5. Do the species listed in Table 6 comprise at least 20% of the total plant cover within an area of peats and mucks?

☐ Yes = **Is a Calcareous Fen for purpose of rating** ☐ No - Go to **SC 4.6**

SC 4.6. Do the species listed in Table 6 comprise at least 10% of the total plant cover in an area of peats and mucks, AND one of the two following conditions is met:

☐ Marl deposits [calcium carbonate ($CaCO_3$) precipitate] occur on the soil surface or plant stems

☐ The pH of free water is ≥ 6.8 AND electrical conductivity is ≥ 200 uS/cm at multiple locations within the wetland

☐ Yes = **Is a Category I calcareous fen** ☐ No = **Is not a calcareous fen**

SC 5.0. Forested Wetlands

Does the wetland have an area of forest rooted within its boundary that meets **at least one** of the following three criteria? (*Continue only if you have identified that a forested class is present in question H*

☐ The wetland is within the 100 year floodplain of a river or stream

☐ Aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species

☐ There is at least ¼ ac of trees (even in wetlands smaller than 2.5 ac) that are "mature" or "old-growth" according to the definitions for these priority habitats developed by WDFW (*see definitions in question H3.1*)

☐ Yes - Go to **SC 5.1** ☑ No = **Not a forested wetland with special characteristics**

SC 5.1. Does the wetland have a forest canopy where more than 50% of the tree species (by cover) are slow growing native trees (*see Table 7*)?

☐ Yes = **Category I** ☐ No - Go to **SC 5.2**

SC 5.2. Does the wetland have areas where aspen (*Populus tremuloides*) represents at least 20% of the total cover of woody species?

☐ Yes = **Category I** ☐ No - Go to **SC 5.3**

SC 5.3. Does the wetland have at least ¼ acre with a forest canopy where more than 50% of the tree species (by cover) are fast growing species (*see Table 7*)?

☐ Yes = **Category II** ☐ No - Go to **SC 5.4**

SC 5.4. Is the forested component of the wetland within the 100 year floodplain of a river or stream?

☐ Yes = **Category II** ☐ No = **Not a forested wetland with special characteristics**

Category of wetland based on Special Characteristics

Choose the highest rating if wetland falls into several categories

If you answered No for all types, enter "Not Applicable" on Summary Form

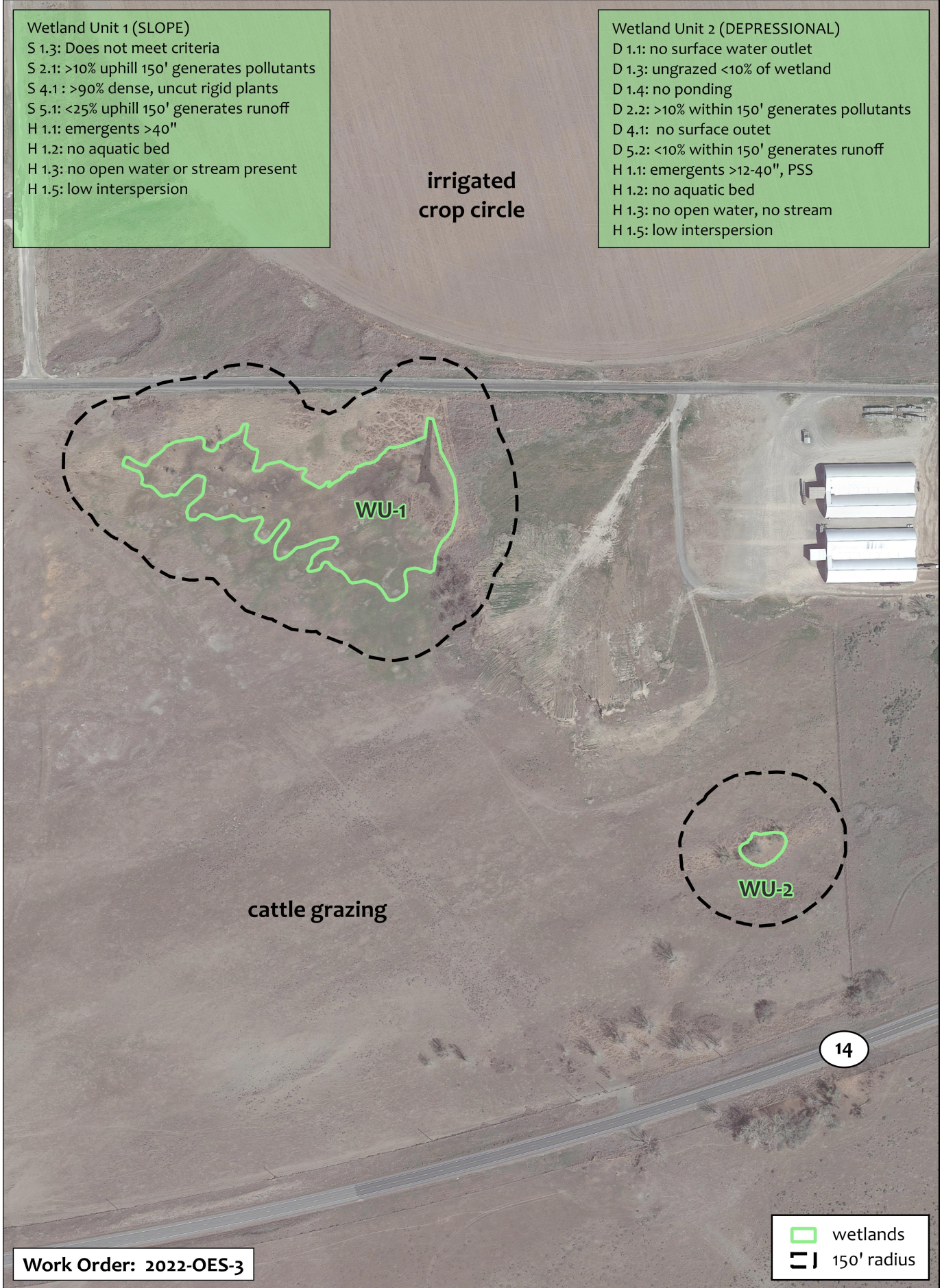
Appendix B: WDFW Priority Habitats in Eastern Washington

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp.
http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here:
http://wdfw.wa.gov/conservation/phs/list/

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE**: This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands**: Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- ☐ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- ☐ **Old-growth/Mature forests**: Old-growth east of Cascade crest – Stands are highly variable in tree species composition and structural characteristics due to the influence of fire, climate, and soils. In general, stands will be >150 years of age, with 10 trees/ac (25 trees/ha) that are > 21 in (53 cm) dbh, and 1-3 snags/ac (2.5-7.5 snags/ha) that are > 12-14 in (30-35 cm) diameter. Downed logs may vary from abundant to absent. Canopies may be single or multi-layered. Evidence of human-caused alterations to the stand will be absent or so slight as to not affect the ecosystem's essential structures and functions. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west and 80-160 years old east of the Cascade crest.
- ☐ **Oregon White Oak**: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☐ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Caves**: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs**: Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- ☐ **Talus**: Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☐ **Snags and Logs**: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.
- ☐ **Shrub-steppe**: A nonforested vegetation type consisting of one or more layers of perennial bunchgrasses and a conspicuous but discontinuous layer of shrubs (see Eastside Steppe for sites with little or no shrub cover).
- ☐ **Eastside Steppe**: Nonforested vegetation type dominated by broadleaf herbaceous flora (i.e., forbs), perennial bunchgrasses, or a combination of both. Bluebunch wheatgrass (*Pseudoroegneria spicata*) is often the prevailing cover component along with Idaho fescue (*Festuca idahoensis*), Sandberg bluegrass (*Poa secunda*), rough fescue (*F. campestris*), or needlegrasses (*Achnatherum* spp.).
- ☐ **Juniper Savannah**: All juniper woodlands.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.



RATING FIGURE 1

Wallula Gap Solar Area of Interest
T6N-R27E-S33, T5N-R27E-S4
Benton County, Washington

0 250 ft

Direct questions regarding this map to:
Geoffrey T. Gray (GG Environmental)
509-426-5645 mobile/ gg@gg-env.com

Map date: May 23, 2022
Aerial: Google satellite

GG Environmental
Wetlands • Fish • Wildlife

RATING FIGURE 2

Wallula Gap Solar Area of Interest
T6N-R27E-S33, T5N-R27E-S4
Benton County, Washington

0 1,000 ft

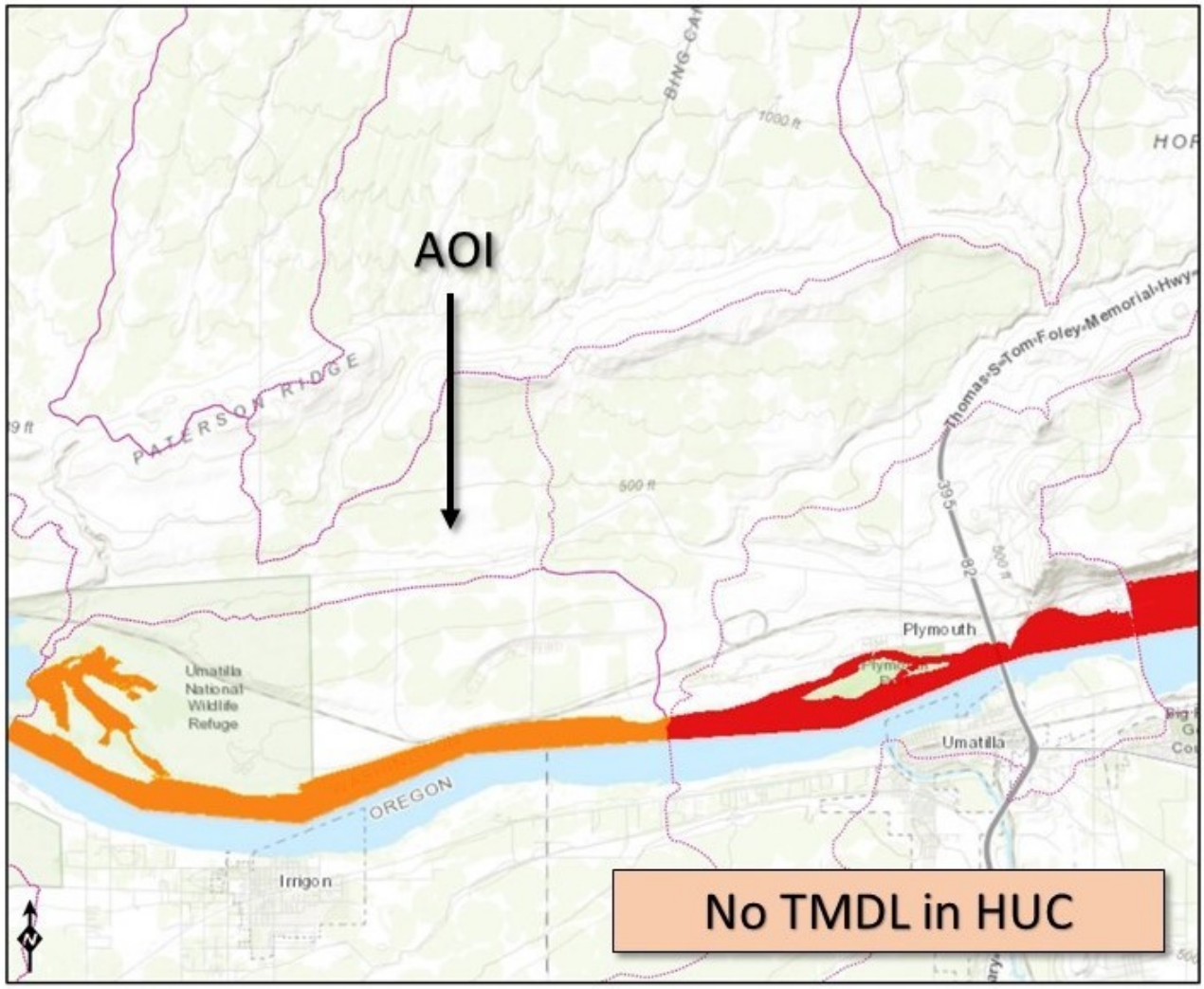
Direct questions regarding this map to:
Geoffrey T. Gray (GG Environmental)
509-426-5645 mobile/ gg@gg-env.com

Map date: May 23, 2022
Aerial: Google satellite

GG Environmental
WETLANDS • FISH • WILDLIFE

Figure 3

May 9, 2022



Assessed Water/Sediment

Water
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Sediment
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Subbasins (12 digit HUCs)
- HUC boundary

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and

DEPARTMENT OF ECOLOGY
State of Washington

Appendix E. Photos

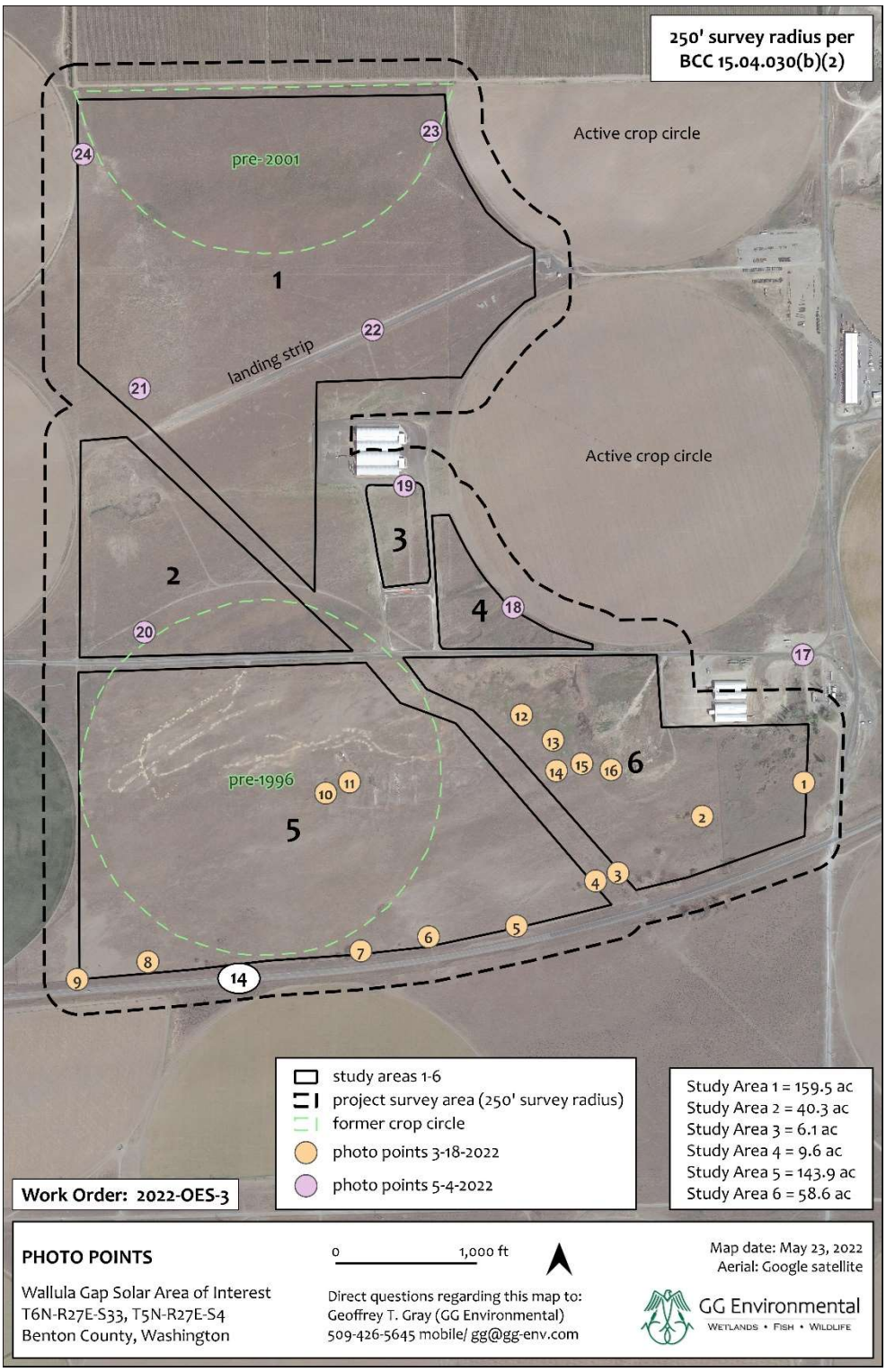


Photo Point 1
View toward NW on 3-18-2022.
Study Area 6 downgradient of pump station.

Photo Point 2
View toward NW on 3-18-2022.
Wetland WU-2 in Study Area 6.

Photo Point 3
View toward E on 3-18-2022.

Photo Point 4
View toward W on 3-18-2022.
Cottonwoods with raptor nest in Study Area 5.

Photo Point 5
View toward N on 3-18-2022.
Study Area 5.

Photo Point 6
View toward NE 3-18-2022.
Sand dune in Study Area 5.

Photo Point 7
View toward W on 3-18-2022.
Study Area 5.

Photo Point 8
View toward W on 3-18-2022.
Sand dune in Study Area 5.

Photo Point 9
View toward N on 3-18-2022.
Study Area 5.

Photo Point 10
View toward NW on 3-18-2022.
Excavated depression/pool in Study Area 5.

Photo Point 11
View toward SW on 3-18-2022.
Raised berms for crop circle wheels.
Study Area 5.

Photo Point 12
View toward NE on 3-18-2022.
Example of groundwater seepage.
Study Area 6.

Photo Point 13
View toward SE on 3-18-2022.
Example of groundwater seepage.
Study Area 6.

Photo Point 14
View toward NE on 3-18-2022.
Example of groundwater seepage.
Study Area 6.

Photo Point 15
View toward SW on 3-18-2022.
Dry sand south of irrigation water seepage.
Study Area 6

Photo Point 16
View toward NW on 3-18-2022.
Edge of raised fill area.
Study Area 6.

Photo Point 17
View toward S on 5-4-2022.
Truck wash station north of Study Area 6.

Photo Point 18
View toward NW on 5-4-2022.
Edge of active crop circle in Study Area 4.

Photo Point 19
View toward S on 5-4-2022.
Study Area 3.

Photo Point 20
View toward SE on 5-4-2022.
Study Area 2.

Photo Point 21
View toward E on 5-4-2022.
Study Area 1.

Photo Point 22
View toward NE on 5-4-2022.
Landing strip in Study Area 1.

Photo Point 23
View toward SW on 5-4-2022.
Study Area 1.

Photo Point 24
View toward SE on 5-4-2022.
Study Area 1.