

**ATTACHMENT P: WETLAND AND NON-WETLAND WATERS
DELINEATION REPORT**



Hop Hill Wetland and Non-Wetland Waters Delineation Report

SEPTEMBER 2022

PREPARED FOR
HOHI bn LLC

PREPARED BY
SWCA Environmental Consultants

**HOP HILL WETLAND AND NON-WETLAND WATERS
DELINEATION REPORT
TOWNSHIP 10 NORTH, RANGE 24 EAST, MULTIPLE
SECTIONS AND PARCELS, BENTON COUNTY,
WASHINGTON**

Prepared for

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INTRODUCTION

SWCA Environmental Consultants (SWCA) conducted an on-site wetland and non-wetland waters delineation for HOHI, bn LLC (HOHI or Applicant), a subsidiary of BrightNight LLC. The project is located in Benton County, Washington, approximately 11 miles north of the city of Prosser (Figure 1). The proposed solar array siting area covers approximately 11,180 acres and includes the parcels shown on Figure 2 and listed in Table 1. The solar array siting area is in Sections 7 to 11, 14, 15, 17 to 23, 26 to 28, and 33 to 35, Township 10 North, Range 24 East, Willamette Meridian. The site is west of N Crosby Road and north of W Snipes Road. The centroid latitude and longitude of the site are 46.345761 and -119.813279. Fieldwork was conducted on June 28 to July 1, 2022, by Jessalynn Spears, Wetland Scientist.

The solar array siting area is characterized by rural rangeland and agricultural lands with limited residential or commercial development. The Applicant is considering various design layouts for the solar arrays within the solar array siting area and is in the process of narrowing down the final project area (approximately 5,000 acres within the siting area), which will be based on the results of geotechnical investigations; avoidance of wetlands, waters, and other sensitive natural and cultural resources; and the overall slope and aspect of the project.

The purpose of this report is to summarize all wetlands and non-wetland waters delineated within the solar array siting area that could constrain development or require additional approvals, including all critical areas designated under Benton County's Critical Areas Ordinance (CAO) (Benton County Code [BCC] Chapter 15).

Table 1. Solar Array Siting Area Parcel Lot Summary

Township	Range	Section	Parcel	Acres
10 North	24 East	07	107040000000000	617
		08	108041000000000	498
		09	109040000000000	656
		10	110040000000000 (partial)	648
		11	110040000000000 (partial)	634
		14	113040000000000	663
		15	114040000000000	574
			115040000000000	72
		17	116041000002000	673
		18	117040000000000	628
			118041000000000	3
		19	119040000000000	633
		21	121040000000000	627
		22	122040000000000	645
		23	123040000000000	661
		26	125040000000000	665
		27	126040000000000	632
		28	127040000000000	315

Township	Range	Section	Parcel	Acres
			128043000001000	79
			128041000000000	39
		33	133041000000000	230
		34	134041000000000	354
		35	135041000001000	419
		multiple	Road ROW	215
Total				11,180

METHODS

The methodology used for determining the presence of wetlands and delineating wetland boundaries followed the U.S. Army Corps of Engineers (USACE) *Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (USACE 2008), used by both the Washington Department of Ecology (Ecology) and USACE. *The National Wetland Plant List* (USACE 2020) was used to assign wetland indicator status for the appropriate region. Each stream was visited at one to three sections to confirm presence, width, and features, and delineate a portion of the ordinary high water lines (OHWLs; minimum of 50 feet delineated). The OHWLs of the streams were spot delineated based on the *Corps' Regulatory Guidance Letter 05-05: Ordinary High Water Mark Identification* (USACE 2005). Stream mapping within the solar array siting area, once confirmed with site visits and initial delineation, was completed with digitized mapping of stream centerline and field verified widths using Google Earth imagery and ArcGIS software. Features outside the solar array siting area and within a 250-foot buffer were visually surveyed to ensure no wetland and water features were missed and ensure avoidance. Features outside the 250-foot buffer were not recorded, as they are outside the potentially buildable area and beyond all Benton County Code buffers.

Soils, vegetation, and any indicators of hydrology were recorded at six sample plot locations within the solar array siting area on standardized wetland determination data forms (Appendix A) to document site conditions. Soil colors were identified using a Munsell Soil Color Chart (X-Rite 2000). Sample plot locations and photograph locations were collected using a Juniper Geode Global Navigation Satellite System (GNSS) receiver paired with a Samsung computer tablet using Collector for ArcGIS software capable of submeter accuracy. These data were imported into geographic information system (GIS) software to produce the report maps. Ground-level site photographs are provided in Appendix B.

Per Washington Administrative Code 463-60-333 and Benton County Code (BCC) 15.04.101b, SWCA rated the delineated wetlands using the *Washington State Wetland Rating System for Eastern Washington, 2014 Update* (Hruby 2014) and determined their scores for habitat, water quality, and hydrologic functions. Wetland rating forms and figures are provided in Appendix C. Wetland categories are used to identify the wetland buffer width required to protect the functionality of each wetland (BCC 15.04.040).

Data Sources

The information presented in this report was obtained through desktop review of the following publicly available data sources, followed by a field visit to confirm wetlands and waters within the solar array siting area.

- Google Earth aerial imagery (Google Earth 2022)
- Benton County Code (Benton County 2022)
- Natural Resources Conservation Service (NRCS) soils data (NRCS 2022a)
- National Oceanic and Atmospheric Administration (NOAA) WETS and precipitation data. (NOAA 2022)
- U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) online mapping tool (USFWS 2022a)
- USFWS Critical Habitat for Threatened and Endangered Species online mapping tool (USFWS 2022b)
- USFWS National Wetlands Inventory (NWI) data (USFWS 2022c)
- Washington State Parcel data (Washington State Geospatial Portal 2022)
- Washington Department of Fish and Wildlife (WDFW), Priority Habitats and Species Maps (WDFW 2022)
- Washington Department of Natural Resources (WADNR) Forest Practices Application Review System (FPARS) mapper (WADNR 2022)
- U.S. Environmental Protection Agency (EPA) Ecoregions (EPA or Thorson et al. 2003)
- U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle map

SITE DESCRIPTION

Topography and Plant Community

The topography of the solar array siting area consists of rolling hillslopes generally facing southwest with elevations highest in the northeastern portion of the solar array siting area (2,300 feet above mean sea level [amsl]) and lowest (1,200 amsl) in the southwestern portion. The solar array siting area encompasses many undeveloped parcels, all which have been used as cattle pasture and rangeland. Three single-family dwellings and outbuildings and facilities associated with the cattle ranch are situated at the intersection of four parcels.

The EPA Level III ecoregion encompassing the solar array siting area is the Columbia Plateau, which is typically dominated by arid sagebrush steppe and grassland (Thorson et al. 2003). The USGS National Landcover Dataset (NLCD) (USGS 2019), and field observations from previous habitat surveys (ERM 2021; SWCA 2022) confirmed the entire solar array siting area and the land surrounding is dominated by weedy sagebrush steppe and grassland. Dominant species include big sagebrush (*Artemisia tridentata*), downy cheatgrass (*Bromus tectorum*), and filaree (*Erodium cicutarium*).

Precipitation

The closest WETS climate station is the Prosser, Washington, station (NOAA 2022). Observed precipitation for the water year starting October 1, 2021, compared to normal from 1991 to 2022 (Appendix D), were slightly above normal (Table 2). Although the precipitation for the 3 months prior to the field visit was well above normal, the precipitation for June was 0.54 inch above normal and the preceding 2 weeks was 0.16 inch below normal. Given the near normal precipitation in general and slightly below normal precipitation just before the field visit, the earlier unusual precipitation patterns likely did not affect the SWCA scientist's ability to observe hydrology during the field visit.

Table 2. Observed and Normal Monthly Precipitation for Water Year Preceding July 1, 2022

Month	Average (inches)	30% Chance Will Have		Observed Precipitation (inches)	Within Normal Range?
		Less Than	More Than		
		(inches)			
October	0.77	0.37	0.95	0.81	105%
November	0.86	0.53	1.07	1.57	183%
December	1.33	0.72	1.56	0.87	65%
January	1.24	0.68	1.32	0.48	39%
February	0.90	0.46	1.01	0.07	8%
March	0.69	0.39	0.77	0.63	91%
April	0.74	0.27	0.76	1.40	189%
May	0.88	0.40	0.89	1.70	193%
June	0.68	0.29	1.22	1.22	179%
Water Year through June 30, 2022	8.09	4.11	9.04	8.75	108%

Note: Monthly averages based on the climate period 1991–2020.

Source: NOAA (2022).

Existing Wetland Mapping

There are no mapped wetlands and several mapped streams within the solar array siting area according to the USFWS (2022c) NWI (Figure 3). Stream presence for a majority of mapped streams was confirmed by field survey. A couple of mapped stream features in the south-central portion of the site did not meet the definition of stream (Appendix B). The three wetlands identified in this report were not mapped by publicly available sources.

Soils

According to the NRCS Benton County, Washington, area soil survey map (NRCS 2022a), there are 26 soil units within the solar array siting area (Table 3; Figure 4). None are hydric, but one has hydric inclusions: Scootney silt loam has 2% Wamba hydric inclusions, is a well-drained soil, and is not conducive to supporting wetlands. Two soils are mapped where wetlands were identified: Finley stony fine sandy loam and Shano silt loam. They both have 0% hydric inclusions, are well-drained soils, and are not known to form wetlands (NRCS 2022b).

Table 3. Soil Map Units

Map Unit Symbol	Map Unit Name	Hydric	Hydric Inclusion
BmAB	Burke silt loam, 0 to 5 percent slopes	No	No
BmB	Burke silt loam, 2 to 5 percent slopes	No	No
BmC	Burke silt loam, 5 to 8 percent slopes	No	No
BmE3	Burke silt loam, 15 to 30 percent slopes, severely eroded	No	No
BnB	Burke silt loam, shallow, 0 to 5 percent slopes	No	No
BoD2	Burke very fine sandy loam, 0 to 15 percent slopes, eroded	No	No
FfE	Finley stony fine sandy loam, 0 to 30 percent slopes	No	No
KnE	Kiona very stony silt loam, 0 to 30 percent slopes	No	No
KnF	Kiona very stony silt loam, 30 to 65 percent slopes	No	No
ReB	Ritzville silt loam, 0 to 5 percent slopes	No	No
ReE3	Ritzville silt loam, 15 to 30 percent slopes, severely eroded	No	No
ReF	Ritzville silt loam, 30 to 65 percent slopes	No	No
RfD2	Ritzville very fine sandy loam, 0 to 15 percent slopes, eroded	No	No
ScAB	Scootenev silt loam, 0 to 5 percent slopes	No	Wamba
ShAB	Shano silt loam, 0 to 5 percent slopes	No	No
ShB	Shano silt loam, 2 to 5 percent slopes	No	No
ShD	Shano silt loam, 8 to 15 percent slopes	No	No
SmB	Shano silt loam, deep, 2 to 5 percent slopes	No	No
SmC	Shano silt loam, deep, 5 to 8 percent slopes	No	No
SnD2	Shano very fine sandy loam, 0 to 15 percent slopes, eroded	No	No
SnE2	Shano very fine sandy loam, 15 to 30 percent slopes, eroded	No	No
SsE	Starbuck rocky silt loam, 5 to 45 percent slopes	No	No
WsB	Willis silt loam, 0 to 5 percent slopes	No	No
WsE3	Willis silt loam, 15 to 30 percent slopes, severely eroded	No	No
WsF	Willis silt loam, 30 to 65 percent slopes	No	No
WtD	Willis silt loam, shallow, 0 to 15 percent slopes	No	No

Source: NRCS (2022a, 2022b).

RESULTS

Uplands

Upland areas were dominated by shrubsteppe and grassland. Dominant plant species observed in upland areas included big sagebrush, downy cheatgrass, filaree, wall barley (*Hordeum murinum*), Great Basin lyme grass (*Leymus cinereus*), tall hedge-mustard (*Sisymbrium altissimum*), and western tansymustard (*Descurainia pinnata*), with some scattered lupine (*Lupinus* sp.), phlox (*Phlox* spp.), desert-parsley (*Lomatium* sp.), and goosefoot (*Chenopodium* sp). Soils were dark brown silt loam with no redoximorphic features and very rocky, with rock refusal around 6 inches below ground surface. Soils were dry and displayed no primary or secondary indicators of hydrology.

Wetlands

Three wetlands were observed within the solar array siting area (Figures 5 to 13).

Wetland A (0.01 acre / 556.59 square feet)

Wetland A (Figure 14) is classified as a palustrine emergent wetland (PEM) using the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979), and Riverine/Category III using the *Washington State Wetland Rating System for Eastern Washington* (Hruby 2014). Wetland A's hydrology is artificial, provided by cattle water troughs that are fed by a pipe that exits the ground and continuously drips into the northwesternmost trough, flows through the subsequent troughs, and slowly drips into the wetland from an exit pipe. The wetland extends from the troughs along a stream bed depression until water saturation dries and can no longer support wetland vegetation.

Wetland A vegetation was dominated by American-brooklime (*Veronica americana*) and spotted lady's-thumb (*Persicaria maculosa*). Soils in the wetland displayed the Redox Dark Surface (F6) hydric soil indicator. Wetland hydrology indicators included Surface Water (A1) and Saturation (A3) to the surface. Two small (less than 1-foot-diameter) surface water pools were identified under emergent vegetation cover with lesser duckweed (*Lemna minor*) in the water; the remainder of the wetland was saturated to the surface. The wetland boundary is defined by a distinct change in slope, elevation, and plant community, as well as a change in soils and hydrology.

Wetland B (0.03 acre / 1,499.51 square feet)

Wetland B (Figure 15) is classified as PEM (Cowardin et al. 1979), and Riverine/Category III (Hruby 2014). Wetland B's hydrology is artificial, provided by cattle water troughs that are fed by a pipe that exits the ground and continuously drips into the northernmost trough, flows through the subsequent troughs, and slowly drips into the wetland from an exit pipe. The wetland extends from the troughs along a stream bed depression until water saturation dries and can no longer support wetland vegetation.

Wetland B vegetation was dominated by American-brooklime and spotted lady's-thumb. Soils in the wetland were problematic, with almost 90% angular gravels with silt in between, and rock refusal at 2 inches. Therefore, the procedure for problematic soils was followed: 1) hydrophytic vegetation community presence was recorded, 2) primary indicators of hydrology were recorded, and 3) landscape setting in the stream bed that was appropriate for wetland formation was confirmed. Due to finding both angular and rounded gravels and evidence nearby of gravel reinforcement of stream banks it is presumed that additional gravels intended for bank reinforcement have disturbed the wetland soil, obscuring scientists' ability to observe the soil profile. This soil also likely qualifies as 4.b.3 Vegetated Sand and Gravel Bars within Floodplains, due to the wetland's location in the very rocky stream bed of an ephemeral portion of Spring Creek. This, in addition to the similarity to Wetland A, which did have hydric soil indicators, qualifies the soil to be considered hydric. Wetland hydrology indicators included Surface Water (A1), High Water Table (A2), and Saturation (A3) to the surface. Three small (less than 1-foot-diameter) surface water pools were identified under emergent vegetation cover with lesser duckweed in the water; the remainder of the wetland was saturated to the surface. The wetland boundary is defined by a distinct change in slope, elevation, and plant community, as well as a change in soils and hydrology.

Wetland C (0.03 acre / 1,144.57 square feet)

Wetland C (Figure 16) is classified as PEM (Cowardin et al. 1979), and Riverine/Category IV (Hruby 2014). Hydrology appears to be provided subsurface from a canal pipe that runs underground to connect

open water canals to the north and south of the wetland, parallel to the gravel road. Wetland C lies entirely within the OHWL of Stream E, which flows from the northeast to the southwest when water is present.

Wetland C vegetation was dominated by reed canary grass (*Phalaris arundinacea*) and tall scouring-rush (*Equisetum hyemale*). Soils in the wetland displayed the Redox Dark Surface (F6) hydric soil indicator. Wetland hydrology indicators included High Water Table (A2) and Saturation (A3) to the surface, with surface water visible 6 inches to the south of the wetland sample plot.

Waters

Seventeen streams and tributaries were delineated within the solar array siting area (Table 4) including one named stream, Spring Creek (see Figures 5 to 13).

Table 4. Waters with Ordinary High Water Line Indicators Observed in the Solar Array Siting Area

Stream ID	Length (linear feet / miles)
Canal 1	2,853.67 / 0.54
Spring Creek	18,222.82 / 3.45
Spring Creek Tributary 1	7,490.30 / 1.42
Spring Creek Tributary 2	7,775.12 / 1.47
Spring Creek Tributary 3	5,357.14 / 1.01
Spring Creek Tributary 4	1,515.64 / 0.29
Stream A	442.35 / 0.08
Stream B	784.14 / 0.15
Stream C	477.67 / 0.09
Stream D	4,230.47 / 0.80
Stream E	14,994.92 / 2.84
Stream E Tributary 1	6,895.69 / 1.31
Stream E Tributary 2	9,344.50 / 1.77
Stream E Tributary 3	5,661.03 / 1.07
Stream E Tributary 4	7,153.89 / 1.35
Stream F	3,921.57 / 0.74
Stream F Tributary 1	789.29 / 0.15
Stream G	2,397.60 / 0.45

Waters on site generally had the same width of 1 to 3 feet, with the exception of Spring Creek and Stream E, which had wider stream beds, between 10 and 30 feet wide, and braided channels below the OHWL. Streams flowed from the north-northeast to the south-southwest and were all dry at the time of survey. The streams were all classified as ephemeral based on the lack of submerged aquatic vegetation, obligate (OBL) wetland vegetation, or facultative wetland (FACW) vegetation within the stream channel. Substrate within the stream beds are silt and rounded cobbles. Each OHWL was delineated based on the bed and bank topography, natural scour line impressed on the bank, sediment sorting, and changes in plant community. Vegetation in the stream beds was downy cheatgrass and filaree, and a clear difference

in density was seen between the stream beds and riparian areas surrounding the streams and the big sagebrush-dominated stream banks.

Two sections of one canal exist in the far west edge of the solar array siting area. The canal enters the site from two points in the west, flowing east and then toward Wetland C, and is not seen resurfacing in the solar array siting area. The canal is approximately 4 feet wide, with silt substrate and dense reed canary grass, lamp rush (*Juncus effusus*), and blue grass (*Poa* sp.) lining the banks.

No fish-bearing streams are present in the solar array siting area. Waters buffers are 50 feet for streams with adjacent slopes of less than 10%, and 100 feet on parcels with streams with adjacent slopes of 10% or greater (BCC 15.15.40-2).

Wetland Rating and Buffer

Wetland rating forms and figures are provided in Appendix C. Wetlands A and B are rated as emergent riverine Category III wetlands and Wetland C is rated as emergent riverine Category IV wetland. Overall, the functionality of the wetlands is limited by the potential of the solar array siting area and landscape to provide functions due to the highly disturbed setting, simple structure, and low plant diversity of the wetlands. The site potentials of Wetlands A and B are rated as low for improving water quality and habitat, and moderate for hydrologic function; landscape potential is moderate for improving water quality and hydrologic, and low for habitat. The total habitat score of Wetlands A and B is 4. Wetland C's site potential and landscape potential are both rated as moderate for improving water quality and hydrologic function and low for habitat. Wetland C's total habitat score is 4. None of the wetlands have special characteristics. The buffer for Wetlands A and B is 60 feet and for Wetland C is 40 feet (BCC 15.04.040-1).

CONCLUSION

Three wetlands and 19 miles of ephemeral stream, including the named Spring Creek, were identified within the solar array siting area. Jurisdictional determination is the responsibility of the regulatory agencies.

All impacts are proposed to be avoided and would be well outside existing buffers. Any impacts to jurisdictional wetlands and/or buffers will require review by USACE, Ecology, and/or Benton County.

REQUIRED DISCLAIMER

This report documents the investigation, best professional judgment, and conclusions of the investigators. It is correct and complete to the best of our knowledge. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and used at your own risk unless it has been reviewed and approved in writing by Ecology.

LIST OF PREPARERS

A handwritten signature in black ink that reads "Jessalynn Spears". The signature is fluid and cursive, with the first name and last name clearly distinguishable.

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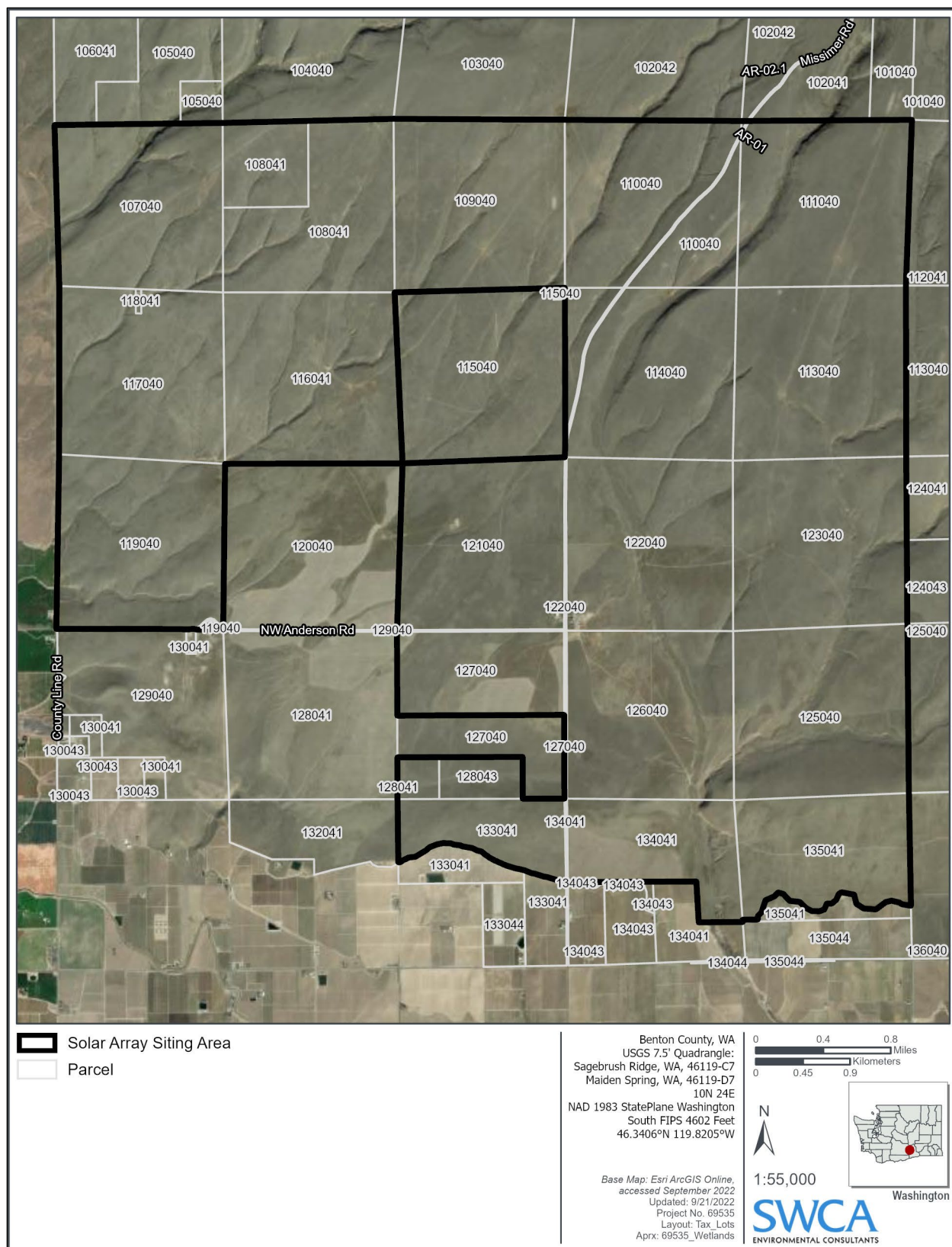
A handwritten signature in blue ink that reads "Chris Moller". The signature is stylized and cursive, with the first name and last name clearly distinguishable.

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LITERATURE CITED

- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. Washington, D.C.: U.S. Fish and Wildlife Service. Available at: <http://www.fws.gov/wetlands/Documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States.pdf>. Accessed June 2022.
- Benton County. 2022. Benton County, Washington, Permitting Map. Available at: <https://map.co.thurston.wa.us/Html5Viewer/Index.html?viewer=Permitting.Main>. Accessed June 2022.
- Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. Online edition. Vicksburg, Mississippi: U.S. Army Engineer Waterways Experiment Station. Available at: <https://usace.contentdm.oclc.org/digital/collection/p266001coll1/id/4530>. Accessed June 2022.
- ERM-West, Inc. (ERM). 2021. *Hop Hill Solar Project – Biological Field Survey Results*. October 29, 2021.
- Google Earth. 2022. Aerial photographs of 6328 Zangle Road NE, Olympia, Washington. Available at: <http://earth.google.com>. Accessed June 2022.
- Hruby, T. 2014. *Washington State Wetland Rating System for Eastern Washington: 2014 Update*. Publication No. 14-06-030. Olympia: Washington State Department of Ecology.
- National Oceanic and Atmospheric Administration (NOAA). 2022. AgACIS Regional Climate Center website. Available at: <http://agacis.rcc-acis.org/>. Accessed June 2022.
- Natural Resources Conservation Service (NRCS). 2022a. Web soil survey. Available at: <http://websoilsurvey.nrcs.usda.gov/app/>. Accessed June 2022.
- . 2022b. Hydric Soils List: Benton County Area, Washington. Natural Resources Conservation Service. Available at: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd1316620.html. Accessed June 2022.
- Thorson, T.D., S.A. Bryce, D.A. Lammers, A.J. Woods, J.M. Omernik, J. Kagan, D.E. Pater, and J.A. Comstock. 2003. Ecoregions of Oregon. Color poster with map, descriptive text, summary tables, and photographs. Reston, Virginia: U.S. Geological Survey. Available at: https://gaftp.epa.gov/epadatacommons/ORD/Ecoregions/wa/wa_eco.pdf. Accessed June 15, 2022.
- U.S. Army Corps of Engineers (USACE). 2005. *Regulatory Guidance Letter 05-05*. Available at: <http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/GuidanceLetters.aspx>. Accessed June 2022.
- . 2008. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West (Version 2.0)*, edited by J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-08-28. Vicksburg, Mississippi: U.S. Army Corps of Engineers Engineer Research and Development Center.

- . 2020. National Wetland Plant List. Version 3.5. Hanover, New Hampshire: U.S. Army Corps of Engineers Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory. Available at: <http://wetland-plants.usace.army.mil/>. Accessed June 2022.
- U.S. Fish and Wildlife Service. (USFWS) 2022a. Information for Planning and Conservation (IPaC) online mapping tool. Available at: <https://ipac.ecosphere.fws.gov/>. Accessed June 2022.
- . 2022b. Critical Habitat for Threatened and Endangered Species online mapping tool. Available at: <https://fws.maps.arcgis.com/home/item.html?id=9d8de5e265ad4fe09893cf75b8dbfb77#!> Accessed June 2022.
- . 2022c. National Wetlands Inventory. Available at: <https://www.fws.gov/program/national-wetlands-inventory/wetlands-mapper>. Accessed June 2022.
- U.S. Geological Survey (USGS). 2019. National Land Cover Database (NLCD). Available at: <https://www.mrlc.gov/data/nlcd-2019-land-cover-conus>.
- Washington Department of Fish and Wildlife (WDFW). 2022. Washington Department of Fish and Wildlife Priority Habitats and Species. PHS on the Web. Available at: <https://geodataservices.wdfw.wa.gov/hp/phs/>. Accessed June 2022.
- Washington Department of Natural Resources (WADNR). 2022. Washington Department of Natural Resources Forest Practices Application Review System mapper. Available at: <https://fpamt.dnr.wa.gov/default.aspx>. Accessed June 2022.
- Washington State Geospatial Portal. 2022. Current Parcels. Available at: <https://geo.wa.gov/datasets/current-parcels/explore?location=47.123976%2C-122.882317%2C16.00>. Accessed June 2022.
- X-Rite. 2000. *Munsell Soil Color Charts*. Revised washable edition. Grand Rapids, Michigan: X-Rite.



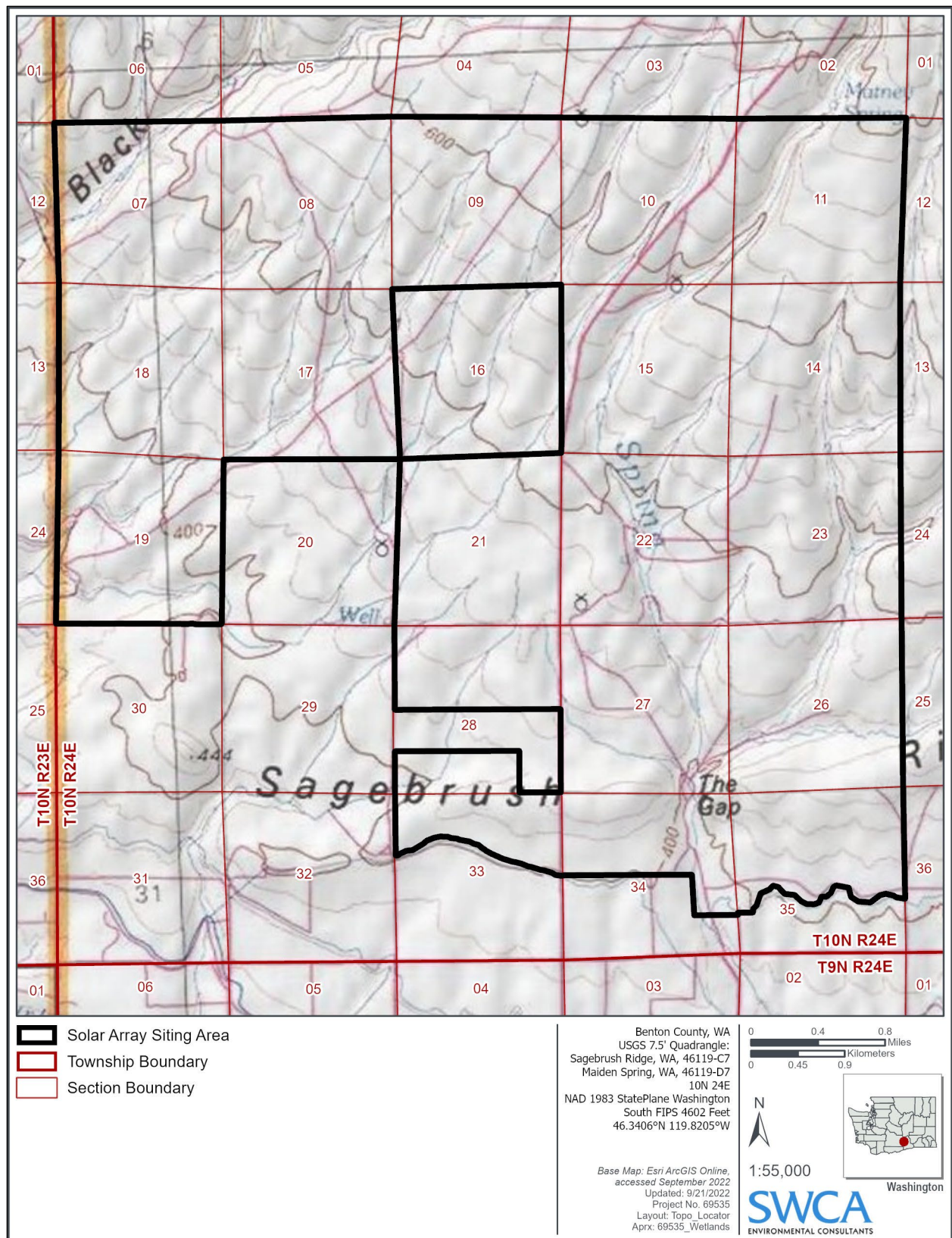


Figure 2. Parcel map (paper base).

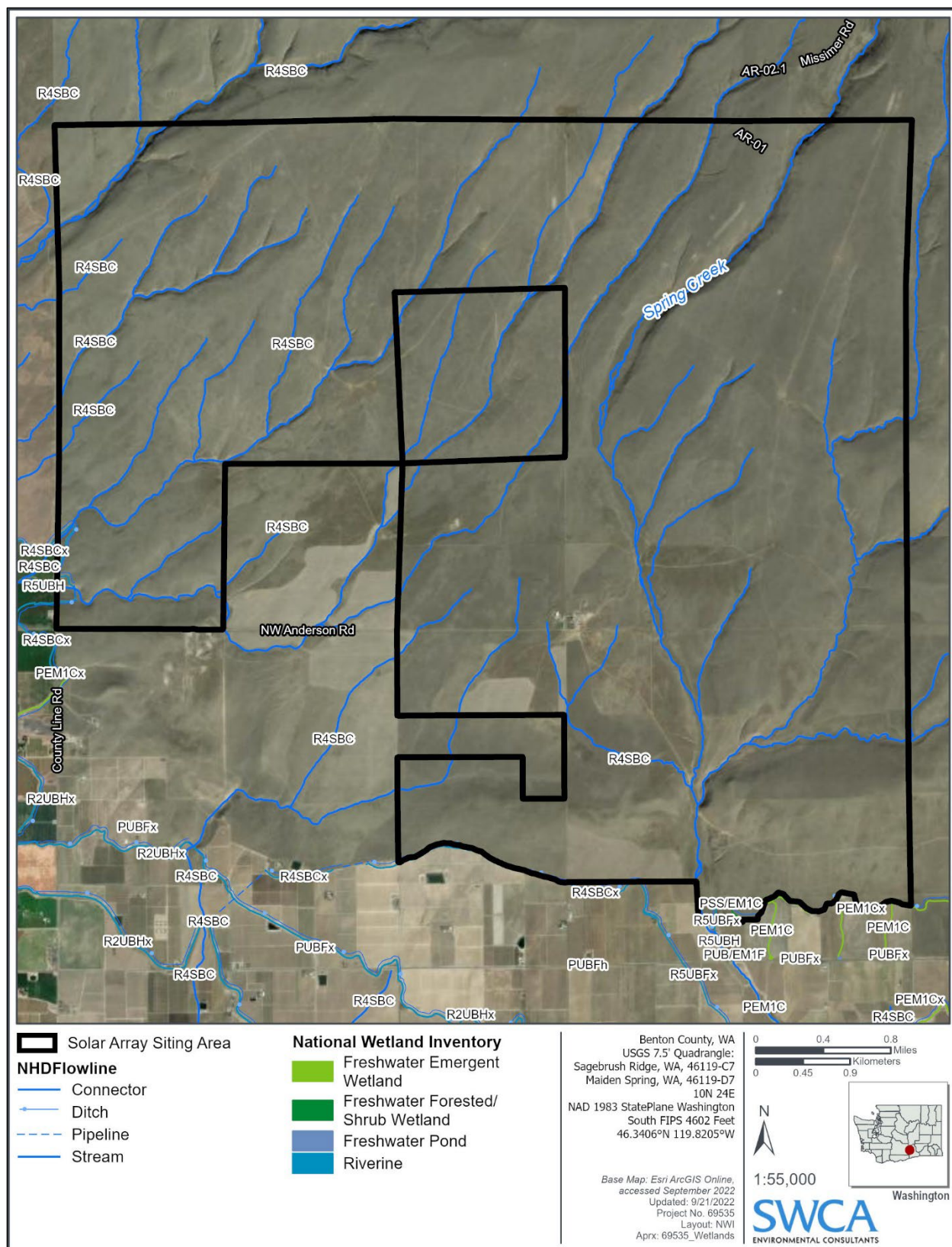


Figure 3. National Wetlands Inventory map.

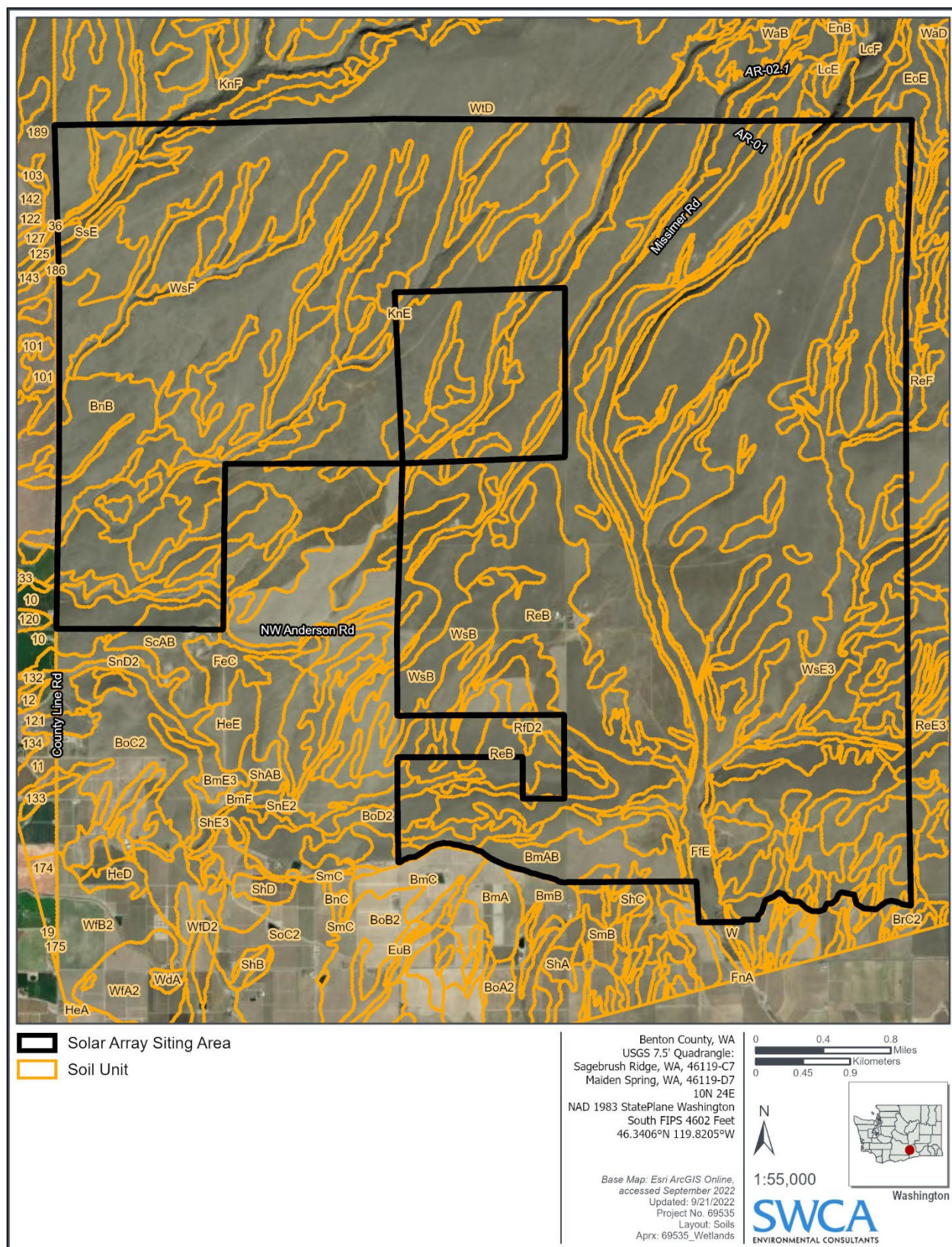


Figure 4. Soils map.

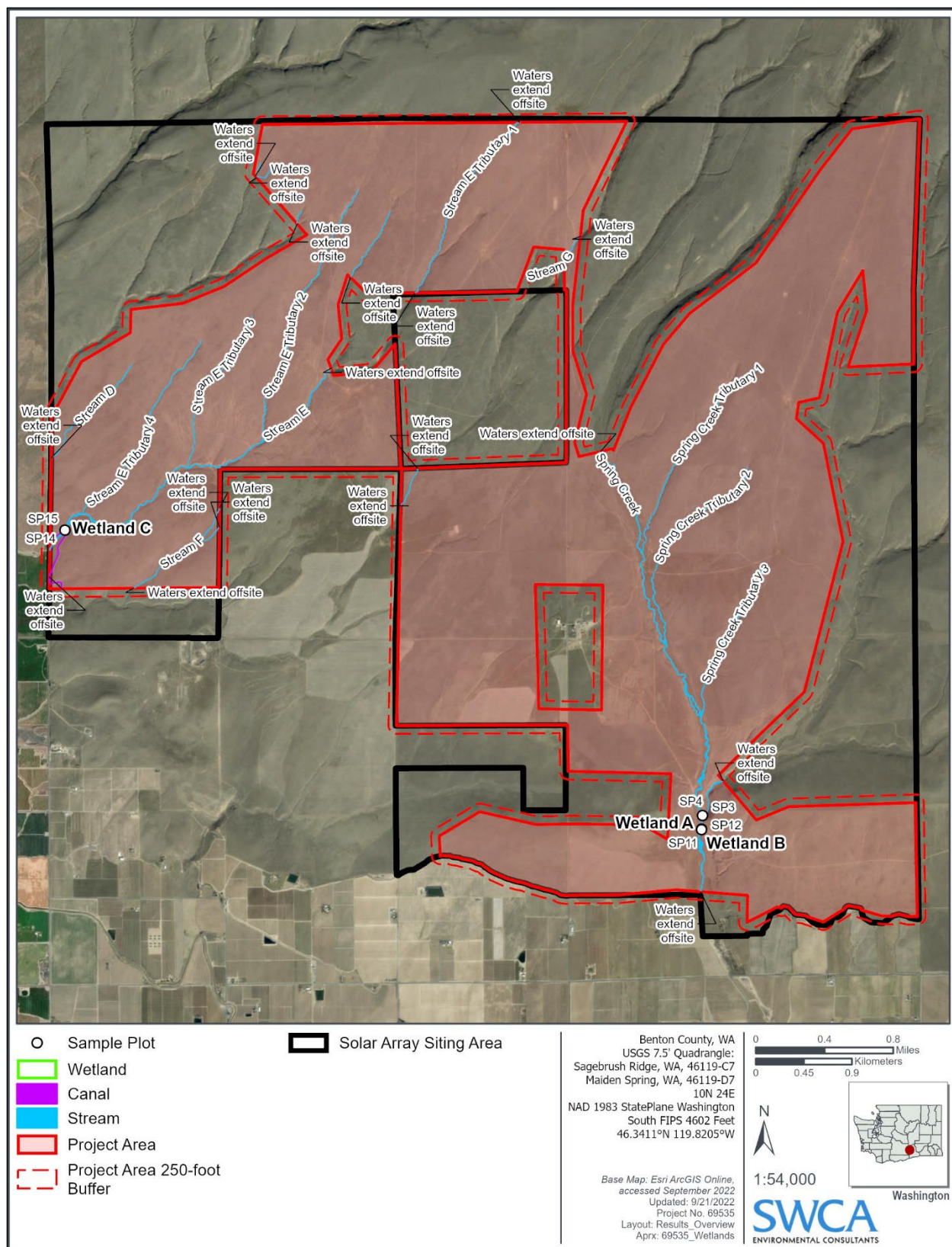


Figure 5. Wetland and other waters delineation overview map.

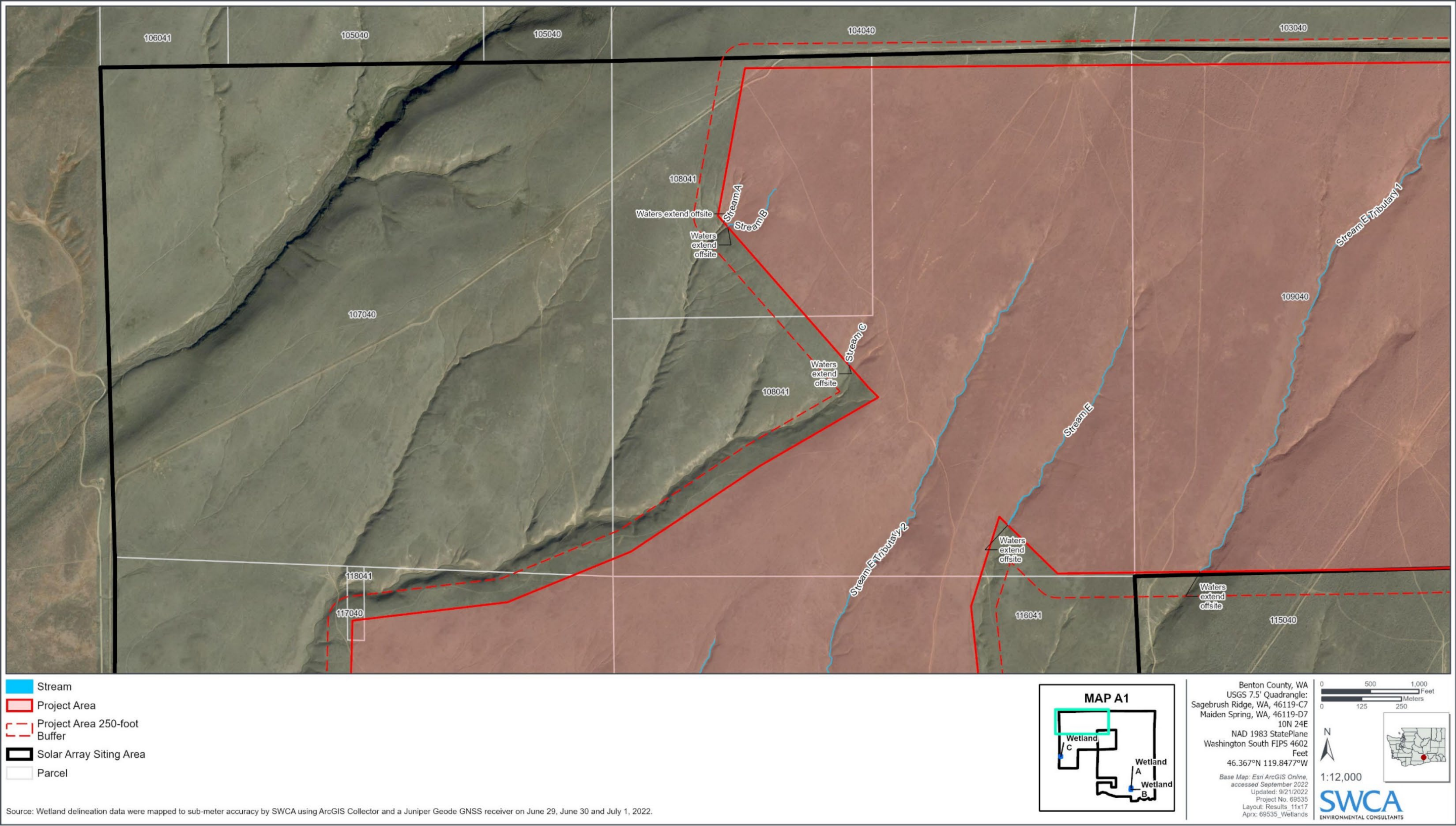


Figure 6. Wetland and other waters delineation results map A1.



Figure 7. Wetland and other waters delineation results map A2.

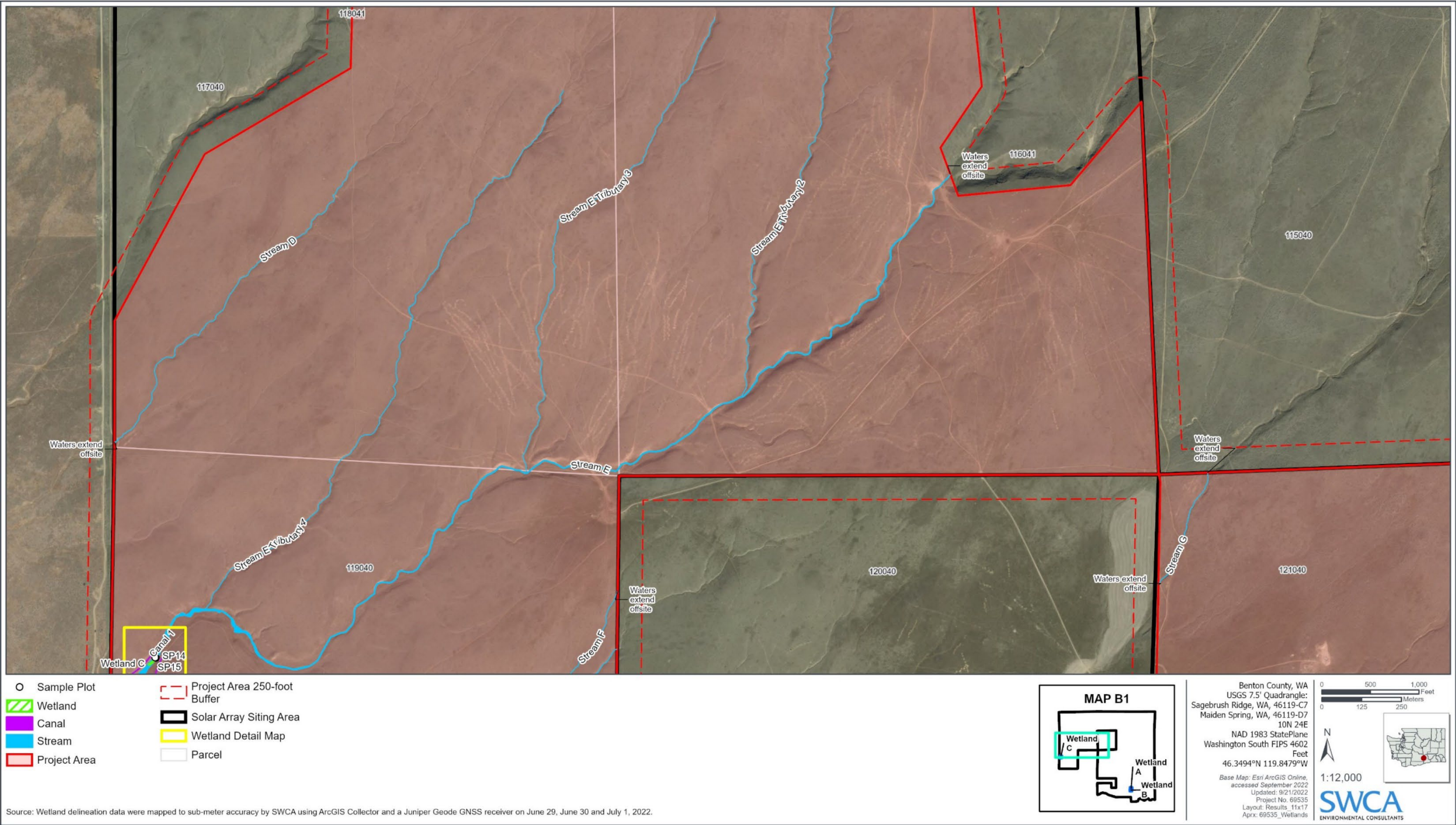


Figure 8. Wetland and other waters delineation results map B1.



Figure 9. Wetland and other waters delineation results map B2.

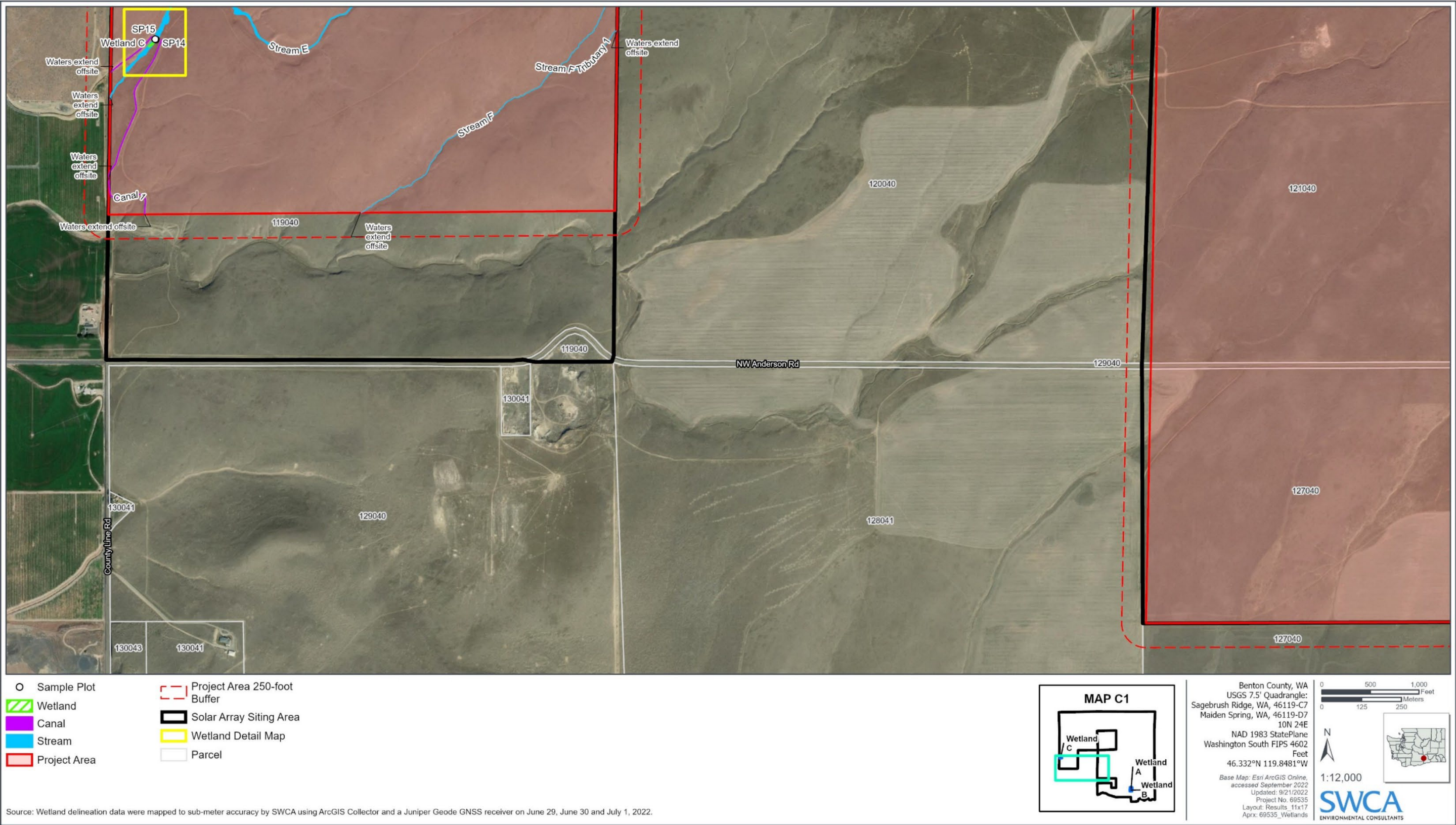


Figure 10. Wetland and other waters delineation results map C1.

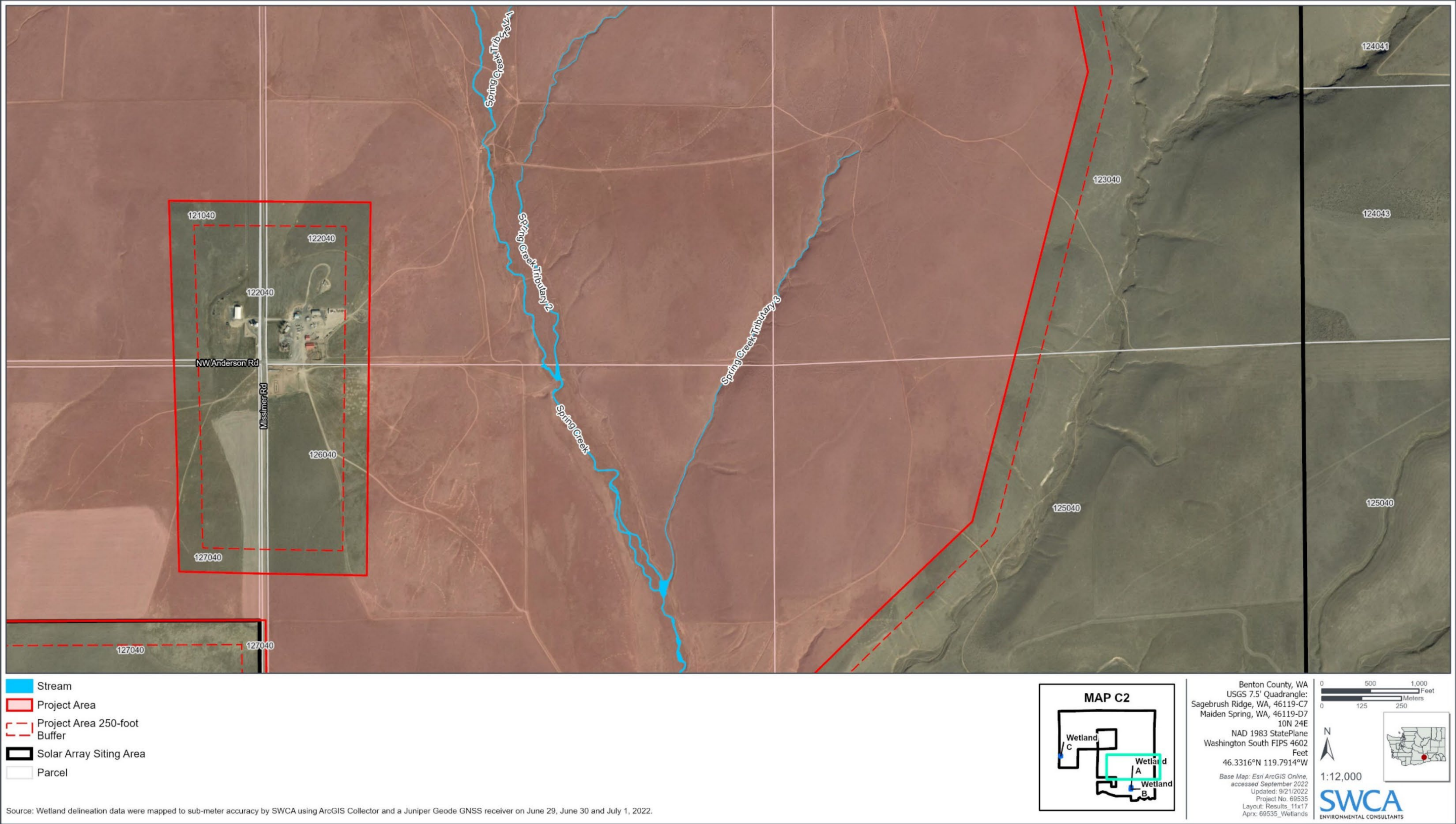


Figure 11. Wetland and other waters delineation results map C2.

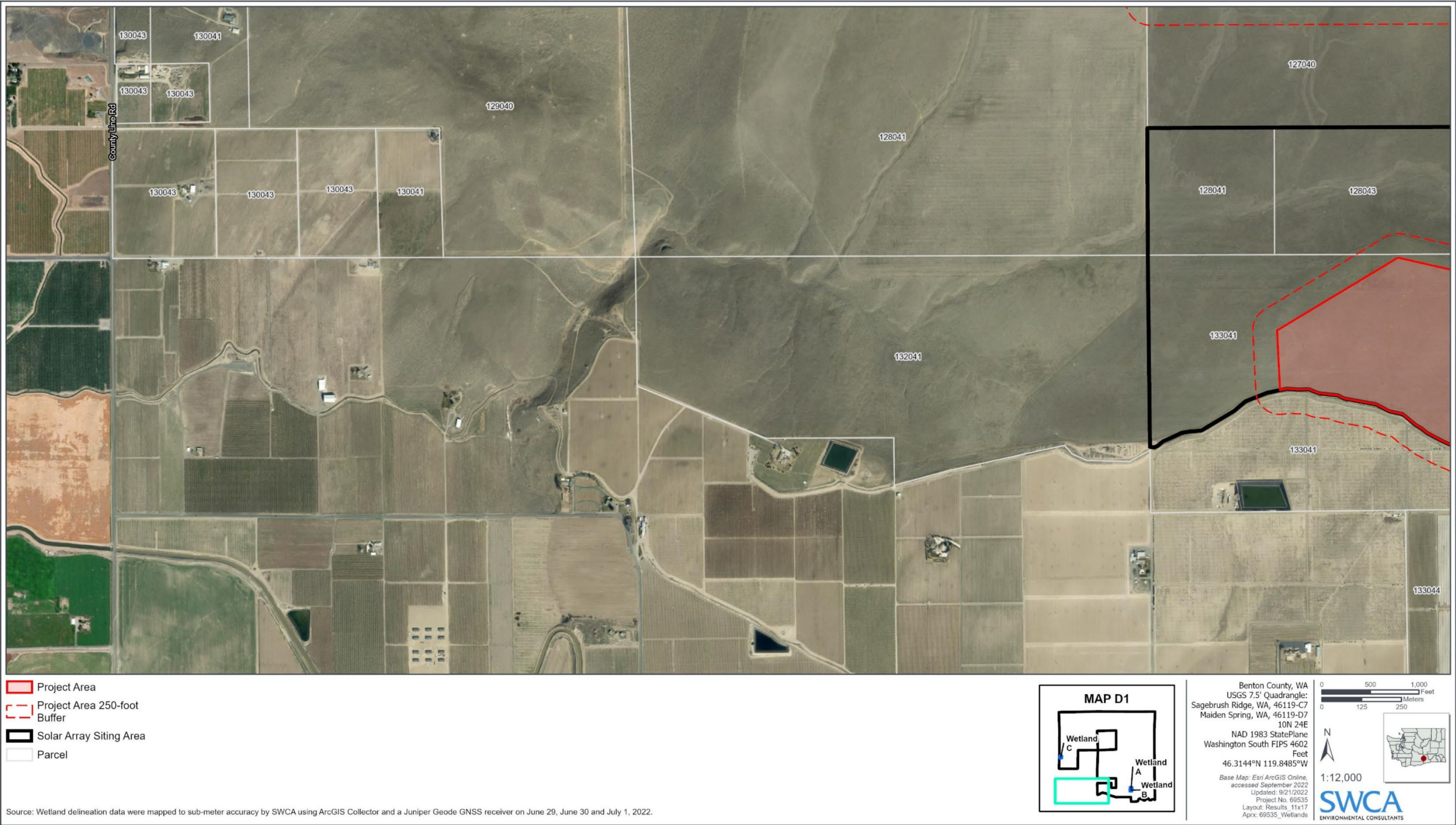


Figure 12. Wetland and other waters delineation results map D1.

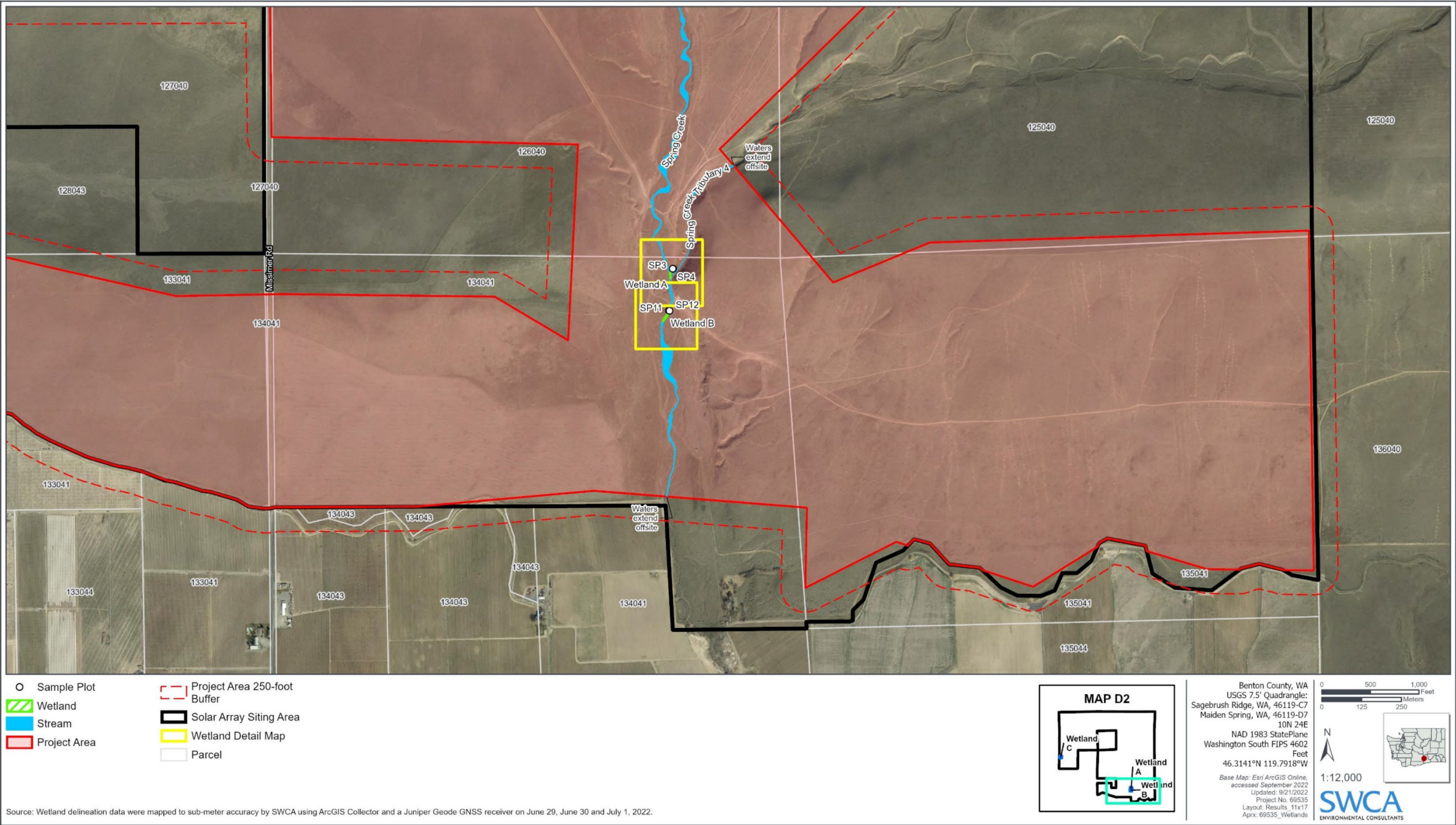


Figure 13. Wetland and other waters delineation results map D2.

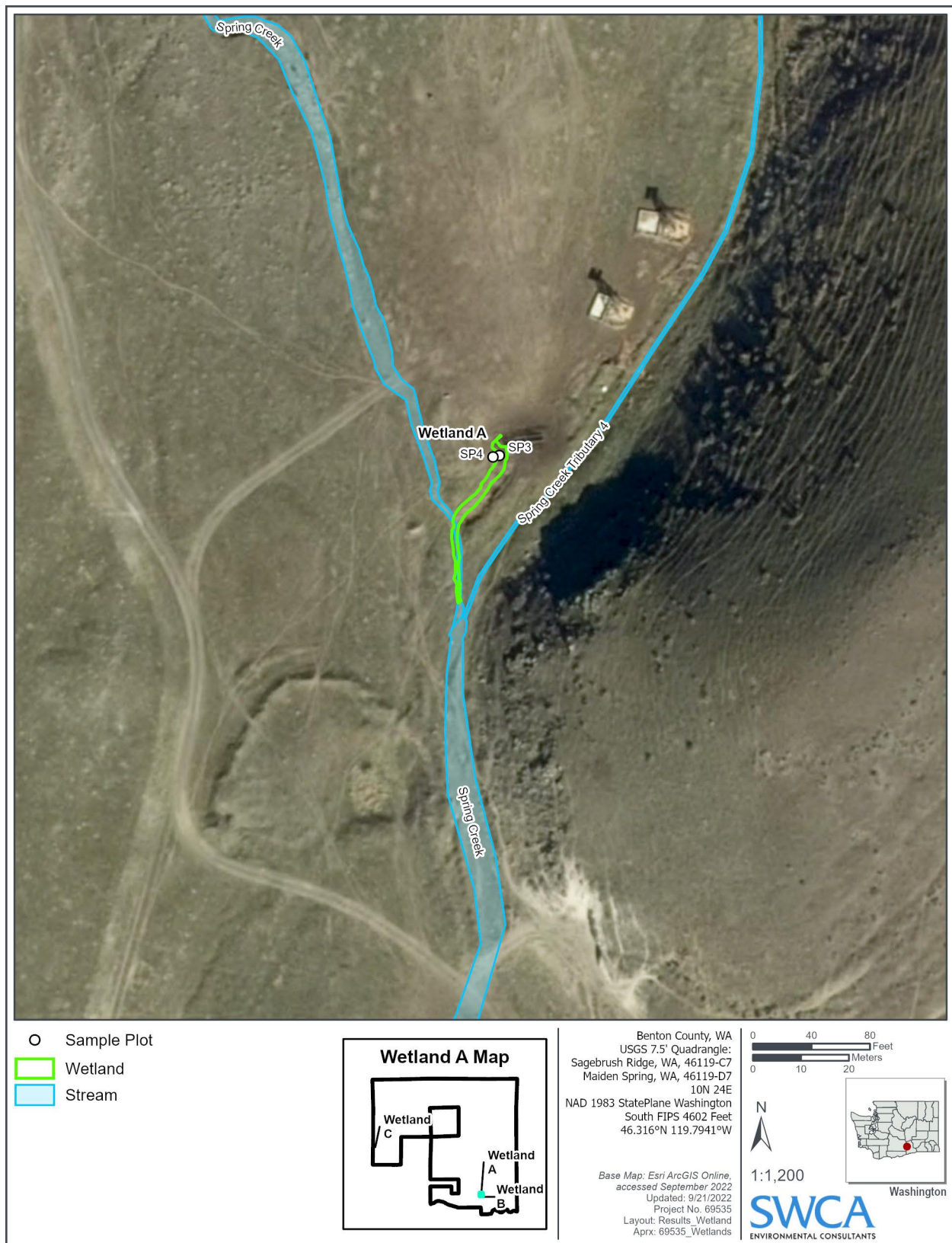


Figure 14. Wetland A results map.

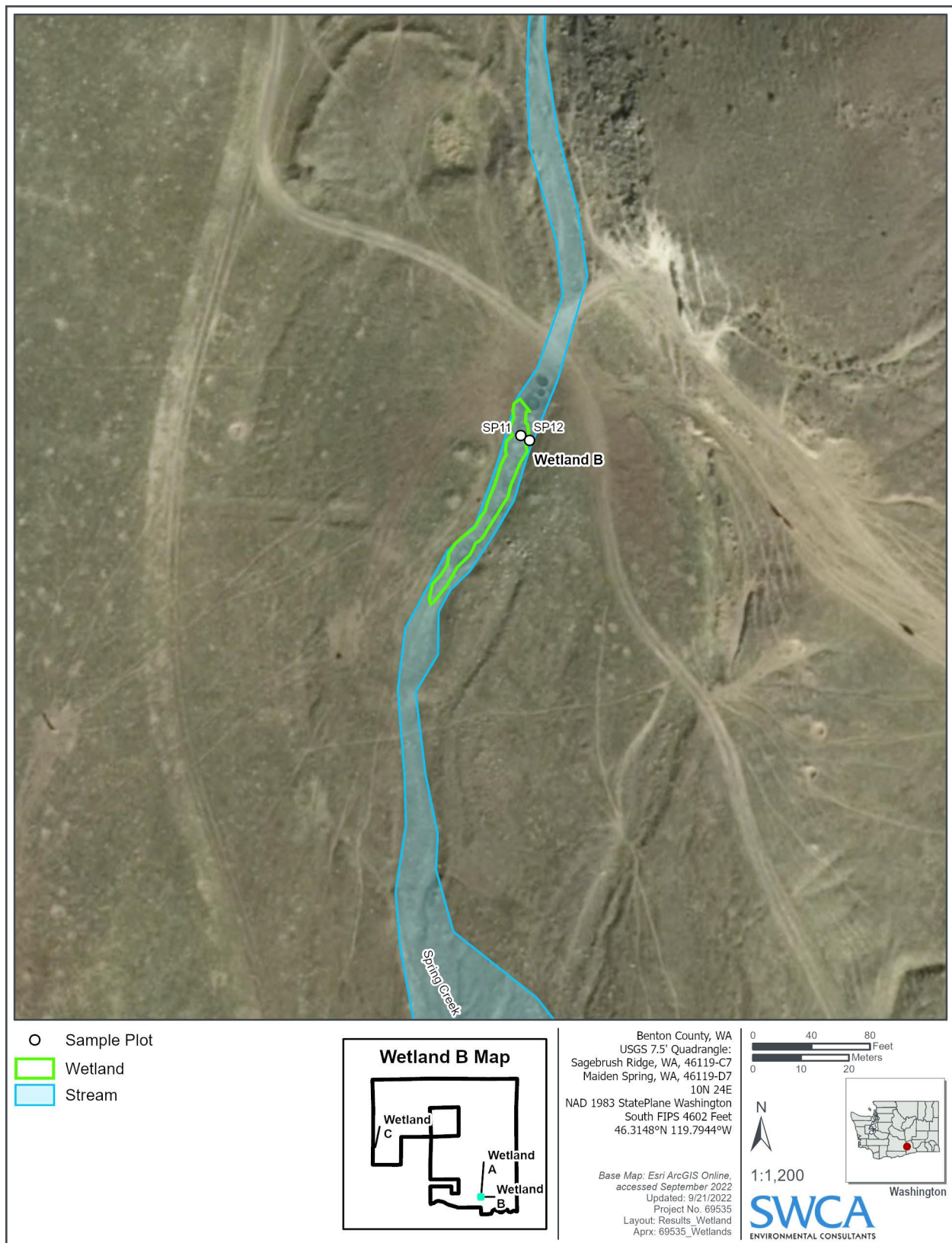


Figure 15. Wetland B results map.

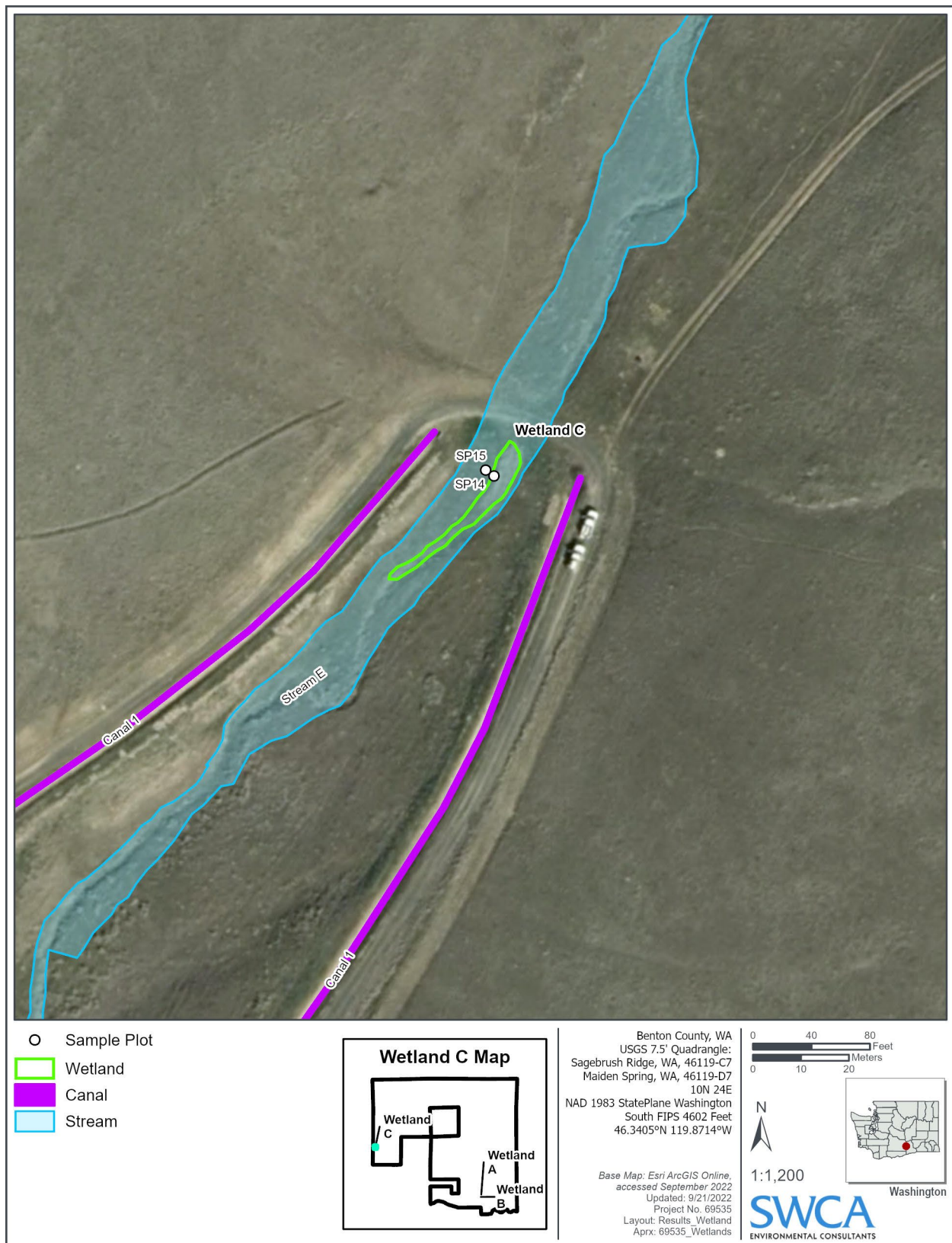


Figure 16. Wetland C results map.

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Appendix A

Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Hop Hill Wetland Delineation City/County: Benton County Sampling Date: 6/29/2022
 Applicant/Owner: HOHI State: OR Sampling Point: SP3
 Investigator(s): Jessalynn Spears Section, Township, Range: T10NR24E
 Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 1
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 46.316099 Long: -119.794077 Datum: NAD 1983
 Soil Map Unit Name: Finley stony fine sandy loam, 0 to 30 percent slopes NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
 Are Vegetation _____, 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 <u>X</u>	No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present?	Yes <u>X</u>	No _____	
Wetland Hydrology Present?	Yes <u>X</u>	No _____	
Precipitation prior to fieldwork: <u>0.1 inch in prior two weeks</u>			
Remarks: <u>Depression, low spot where water outflows continuously from pipe fed troughs.</u>			

VEGETATION

Tree Stratum	(Plot size: <u>30' r</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	
3.	_____	_____	_____	_____	
4.	_____	_____	_____	_____	
		0% = Total Cover			Hydrophytic Vegetation Indicators: X 1 - Rapid Test for Hydrophytic Vegetation X 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants ¹ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present.
Sapling/Shrub Stratum (Plot size: <u>10' r</u>)					
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	
3.	_____	_____	_____	_____	
4.	_____	_____	_____	_____	Hydrophytic Vegetation Yes <u>X</u> No _____ Present?
5.	_____	_____	_____	_____	
		0% = Total Cover			
Herb Stratum (Plot size: <u>5' r</u>)					
1.	<u>Veronica americana</u>	<u>50%</u>	<u>Yes</u>	<u>OBL</u>	
2.	<u>Persicaria maculosa</u>	<u>50%</u>	<u>Yes</u>	<u>FACW</u>	
3.	_____	_____	_____	_____	
4.	_____	_____	_____	_____	
5.	_____	_____	_____	_____	
6.	_____	_____	_____	_____	
7.	_____	_____	_____	_____	
8.	_____	_____	_____	_____	
9.	_____	_____	_____	_____	
10.	_____	_____	_____	_____	
11.	_____	_____	_____	_____	
		100% = Total Cover			
Woody Vine Stratum (Plot size: <u>10' r</u>)					
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	
		0% = Total Cover			
% Bare Ground in Herb Stratum <u>0%</u>					

Remarks: _____ Entered by: KS QC by: JS
 Plot adjusted to wetland topographic area.

SOIL

Sampling Point: **SP3**

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-8	10YR 2/1	95	7.5YR 2.5/3	5	C	M	SaCL	Saturated
8-10.5	2.5Y 2.5/1	100					LS	Saturated
								Rocky

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

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

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)
<input type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)
Rock refusal @ 10.5, soil very high in organics.

HYDROLOGY

Wetland Hydrology Indicators:

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

<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	

Secondary Indicators (2 or more required)

<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☒ No ☐ Depth (inches): 0.25
Water Table Present? Yes ☐ No ☐ Depth (inches): _____
Saturation Present? Yes ☒ No ☐ Depth (inches): surface
(includes capillary fringe)

Wetland Hydrology Present?
Yes ☒ No ☐

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

Remarks: _____ Entered by: KS QC by: JS

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Hop Hill Wetland Delineation City/County: Benton County Sampling Date: 6/29/2022
 Applicant/Owner: HOHI State: OR Sampling Point: SP4
 Investigator(s): Jessalynn Spears Section, Township, Range: T10NR24E
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 15
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 46.316096 Long: -119.794093 Datum: NAD 1983
 Soil Map Unit Name: Finley stony fine sandy loam, 0 to 30 percent slopes NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
 Are Vegetation _____, 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 <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Precipitation prior to fieldwork: <u>0.1 inch in prior two weeks</u>			
Remarks:			

VEGETATION

Tree Stratum	(Plot size: <u>30' r</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0%</u> (A/B)
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	
3.	_____	_____	_____	_____	
4.	_____	_____	_____	_____	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>5</u> x 3 = <u>15</u> FACU species <u>35</u> x 4 = <u>140</u> UPL species <u>60</u> x 5 = <u>300</u> Column Totals: <u>100</u> (A) <u>455</u> (B) Prevalence Index = B/A = <u>4.55</u>
0% = Total Cover					
Sapling/Shrub Stratum (Plot size: <u>10' r</u>)					
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants ¹ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present.
3.	_____	_____	_____	_____	
4.	_____	_____	_____	_____	
5.	_____	_____	_____	_____	
0% = Total Cover					Hydrophytic Vegetation Yes _____ No <u>X</u> Present?
Herb Stratum (Plot size: <u>5' r</u>)					
1.	<u>Descurainia pinnata</u>	<u>60%</u>	<u>Yes</u>	<u>NOL</u>	
2.	<u>Cynoglossum officinale</u>	<u>30%</u>	<u>Yes</u>	<u>FACU</u>	
3.	<u>Hordeum murinum</u>	<u>5%</u>	<u>No</u>	<u>FAC</u>	Woody Vine Stratum (Plot size: <u>10' r</u>) 1. _____ 2. _____ 0% = Total Cover % Bare Ground in Herb Stratum <u>0%</u>
4.	<u>Chenopodium album</u>	<u>5%</u>	<u>No</u>	<u>FACU</u>	
5.	_____	_____	_____	_____	
6.	_____	_____	_____	_____	
7.	_____	_____	_____	_____	Remarks: Plot adjusted along wet/upl lines.
8.	_____	_____	_____	_____	
9.	_____	_____	_____	_____	
10.	_____	_____	_____	_____	
11.	_____	_____	_____	_____	Entered by: <u>KS</u> QC by: <u>JS</u>
100% = Total Cover					
Woody Vine Stratum (Plot size: <u>10' r</u>)					
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	Remarks: Plot adjusted along wet/upl lines.
0% = Total Cover					
% Bare Ground in Herb Stratum <u>0%</u>					
Remarks:					

SOIL

Sampling Point: **SP4**

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

[illegible]

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

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

Indicators for Problematic Hydric Soils³:

_____ Histosol (A1)	_____ Sandy Redox (S5)
_____ Histic Epipedon (A2)	_____ Stripped Matrix (S6)
_____ Black Histic (A3)	_____ Loamy Mucky Mineral (F1) (except MLRA 1)
_____ Hydrogen Sulfide (A4)	_____ Loamy Gleyed Matrix (F2)
_____ Depleted Below Dark Surface (A11)	_____ Depleted Matrix (F3)
_____ Thick Dark Surface (A12)	_____ Redox Dark Surface (F6)
_____ Sandy Mucky Mineral (S1)	_____ Depleted Dark Surface (F7)
_____ Sandy Gleyed Matrix (S4)	_____ Redox Depressions (F8)

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present?	Yes	No	X
----------------------	-----	----	----------

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)
Rock refusal @ 7.

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (2 or more required)

Surface Water (A1)	Water-Stained Leaves (B9) (except MLRA
High Water Table (A2)	1, 2, 4A, and 4B)
Saturation (A3)	Salt Crust (B11)
Water Marks (B1)	Aquatic Invertebrates (B13)
Sediment Deposits (B2)	Hydrogen Sulfide Odor (C1)
Drift Deposits (B3)	Oxidized Rhizospheres along Living Roots (C3)
Algal Mat or Crust (B4)	Presence of Reduced Iron (C4)
Iron Deposits (B5)	Recent Iron Reduction in Tilled Soils (C6)
Surface Soil Cracks (B6)	Stunted or Stressed Plants (D1) (LRR A)
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)
Sparsely Vegetated Concave Surface (B8)	

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes _____	No <u>X</u> _____	Depth (inches): _____
Water Table Present?	Yes _____	No <u>X</u> _____	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No <u>X</u> _____	Depth (inches): _____

Wetland Hydrology Present?

Yes No **X**

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

Remarks:	Entered by: KS	QC by: JS
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WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Hop Hill Wetland Delineation City/County: Benton County Sampling Date: 6/29/2022
 Applicant/Owner: HOHI State: OR Sampling Point: SP11
 Investigator(s): Jessalynn Spears Section, Township, Range: T10NR24E
 Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 1
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 46.314921 Long: -119.794255 Datum: NAD 1983
 Soil Map Unit Name: Finley stony fine sandy loam, 0 to 30 percent slopes NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
 Are Vegetation _____, 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 <u>X</u>	No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present?	Yes <u>X</u>	No _____	
Wetland Hydrology Present?	Yes <u>X</u>	No _____	
Precipitation prior to fieldwork: <u>0.1 inch in prior two weeks</u>			
Remarks: <u>Pipe fed wetland after 3 10' diameter water troughs, artificial source.</u>			

VEGETATION

Tree Stratum	(Plot size: <u>30' r</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	
3.	_____	_____	_____	_____	
4.	_____	_____	_____	_____	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species <u>80</u> x 1 = <u>80</u> FACW species <u>20</u> x 2 = <u>40</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>100</u> (A) <u>120</u> (B) Prevalence Index = B/A = <u>1.20</u>
Sapling/Shrub Stratum (Plot size: <u>10' r</u>)		0% = Total Cover			
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	
3.	_____	_____	_____	_____	Hydrophytic Vegetation Indicators: X 1 - Rapid Test for Hydrophytic Vegetation X 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants ¹ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present.
4.	_____	_____	_____	_____	
5.	_____	_____	_____	_____	
Herb Stratum (Plot size: <u>5' r</u>)		0% = Total Cover			
1.	<u>Veronica americana</u>	80%	Yes	OBL	
2.	<u>Persicaria maculosa</u>	20%	Yes	FACW	
3.	_____	_____	_____	_____	
4.	_____	_____	_____	_____	
5.	_____	_____	_____	_____	
6.	_____	_____	_____	_____	
7.	_____	_____	_____	_____	
8.	_____	_____	_____	_____	
9.	_____	_____	_____	_____	Hydrophytic Vegetation Yes <u>X</u> No _____ Present?
10.	_____	_____	_____	_____	
11.	_____	_____	_____	_____	
Woody Vine Stratum (Plot size: <u>10' r</u>)		100% = Total Cover			
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	
		0% = Total Cover			
% Bare Ground in Herb Stratum <u>0%</u>					
Remarks:					Entered by: <u>KS</u> QC by: <u>JS</u>

SOIL

Sampling Point: **SP11**

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	10YR 2/2	100					SiL	

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

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

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input checked="" type="checkbox"/> Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)
Problematic soil w/ almost 90% angular gravels w/ silt in between, rock refusal. Problematic soil situation followed, assumed hydric soil due to stream bed substrate and similarity to Wetland A.

HYDROLOGY

Wetland Hydrology Indicators:

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

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	

Secondary Indicators (2 or more required)

<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☒ No ☐ Depth (inches): 1-Jan
Water Table Present? Yes ☒ No ☐ Depth (inches): Surface
Saturation Present? Yes ☒ No ☐ Depth (inches): Surface
(includes capillary fringe)

Wetland Hydrology Present?
Yes ☒ No ☐

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

Remarks: Surface water. Entered by: KS QC by: JS

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Hop Hill Wetland Delineation City/County: Benton County Sampling Date: 6/29/2022
 Applicant/Owner: HOHI State: OR Sampling Point: SP12
 Investigator(s): Jessalynn Spears Section, Township, Range: T10NR24E
 Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 10
 Subregion (LRR): B, Columbia/Snake River Plateau Lat: 46.314912 Long: -119.794231 Datum: NAD 1983
 Soil Map Unit Name: Finley stony fine sandy loam, 0 to 30 percent slopes NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No _____ (If no, explain in Remarks)
 Are Vegetation _____, 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 <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Precipitation prior to fieldwork: <u>0.1 inch in prior two weeks</u>			
Remarks:			

VEGETATION

Tree Stratum	(Plot size: <u>30' r</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50%</u> (A/B)
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	
3.	_____	_____	_____	_____	
4.	_____	_____	_____	_____	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>25</u> x 3 = <u>75</u> FACU species <u>50</u> x 4 = <u>200</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>75</u> (A) <u>275</u> (B) Prevalence Index = B/A = <u>3.67</u>
0% = Total Cover					
Sapling/Shrub Stratum (Plot size: <u>10' r</u>)					
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants ¹ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present.
3.	_____	_____	_____	_____	
4.	_____	_____	_____	_____	
5.	_____	_____	_____	_____	
0% = Total Cover					Hydrophytic Vegetation Yes _____ No <u>X</u> Present?
Herb Stratum (Plot size: <u>5' r</u>)					
1.	<u>Sisymbrium altissimum</u>	<u>50%</u>	<u>Yes</u>	<u>FACU</u>	
2.	<u>Hordeum murinum</u>	<u>20%</u>	<u>Yes</u>	<u>FAC</u>	
3.	<u>Leymus cinereus</u>	<u>5%</u>	<u>No</u>	<u>FAC</u>	Hydrophytic Vegetation Yes _____ No <u>X</u> Present?
4.	_____	_____	_____	_____	
5.	_____	_____	_____	_____	
6.	_____	_____	_____	_____	
7.	_____	_____	_____	_____	Hydrophytic Vegetation Yes _____ No <u>X</u> Present?
8.	_____	_____	_____	_____	
9.	_____	_____	_____	_____	
10.	_____	_____	_____	_____	
11.	_____	_____	_____	_____	Hydrophytic Vegetation Yes _____ No <u>X</u> Present?
75% = Total Cover					
Woody Vine Stratum (Plot size: <u>10' r</u>)					
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	Hydrophytic Vegetation Yes _____ No <u>X</u> Present?
0% = Total Cover					
% Bare Ground in Herb Stratum <u>25%</u>					
Remarks: <u>Bare ground is soil and boulders.</u>					

SOIL

Sampling Point: **SP12**

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

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

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

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

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

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

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)
Rock refusal @ 4".

HYDROLOGY

Wetland Hydrology Indicators:

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

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	

Secondary Indicators (2 or more required)

<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Frost-Heave Hummocks (D7)

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: _____ Entered by: KS QC by: JS

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Hop Hill Wetland Delineation City/County: Benton Sampling Date: 6/30/2022
 Applicant/Owner: HOHI State: OR Sampling Point: SP13
 Investigator(s): Jessalynn Spears Section, Township, Range: T10NR24E
 Landform (hillslope, terrace, etc.): stream bank Local relief (concave, convex, none): convex Slope (%): 3
 Subregion (LRR): A, Northwest Forests and Coast Lat: 46.340605 Long: -119.871419 Datum: NAD 1983
 Soil Map Unit Name: Shano silt loam, 8 to 15 percent slopes NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
 Are Vegetation _____, 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 <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Precipitation prior to fieldwork: <u>0.1 inch in prior two weeks</u>			
Remarks: <u>Bank below OHW next to wetland.</u>			

VEGETATION

Tree Stratum	(Plot size: <u>30' r</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0%</u> (A/B)
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	
3.	_____	_____	_____	_____	
4.	_____	_____	_____	_____	
		0% = Total Cover			
Sapling/Shrub Stratum (Plot size: <u>10' r</u>)					
1.	_____	_____	_____	_____	Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0 ¹ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants ¹ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present.
2.	_____	_____	_____	_____	
3.	_____	_____	_____	_____	
4.	_____	_____	_____	_____	
5.	_____	_____	_____	_____	
		0% = Total Cover			
Herb Stratum (Plot size: <u>5' r</u>)					
1.	<u>Geranium dissectum</u>	<u>70%</u>	<u>Yes</u>	<u>NOL</u>	Hydrophytic Vegetation Yes _____ No <u>X</u> Present?
2.	<u>Bromus tectorum</u>	<u>15%</u>	<u>No</u>	<u>NOL</u>	
3.	<u>Sisymbrium altissimum</u>	<u>5%</u>	<u>No</u>	<u>FACU</u>	
4.	<u>Lolium perenne</u>	<u>3%</u>	<u>No</u>	<u>FAC</u>	
5.	<u>Bromus hordeaceus</u>	<u>2%</u>	<u>No</u>	<u>FACU</u>	
6.	<u>unknown grass</u>	<u>1%</u>	<u>No</u>	<u>FAC ?</u>	
7.	_____	_____	_____	_____	
8.	_____	_____	_____	_____	
9.	_____	_____	_____	_____	
10.	_____	_____	_____	_____	
11.	_____	_____	_____	_____	
		96% = Total Cover			
Woody Vine Stratum (Plot size: <u>10' r</u>)					
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	
		0% = Total Cover			
% Bare Ground in Herb Stratum <u>4%</u>					
Remarks: _____ Entered by: <u>KS</u> QC by: <u>JS</u>					

SOIL

Sampling Point: **SP13**

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6"	10YR 3/2	100					SiL	dry

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

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

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	³ Indicators of hydrophytic vegetation and
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	wetland hydrology must be present,
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____	Hydric Soil Present? Yes _____ No X _____
Depth (inches): _____	

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)
Rock refusal @ 6".

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

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

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

Remarks: _____ Entered by: KS QC by: JS

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Hop Hill Wetland Delineation City/County: Benton Sampling Date: 6/30/2022
 Applicant/Owner: HOHI State: OR Sampling Point: SP14
 Investigator(s): Jessalynn Spears Section, Township, Range: T10NR24E
 Landform (hillslope, terrace, etc.): stream bed Local relief (concave, convex, none): concave Slope (%): 10
 Subregion (LRR): A, Northwest Forests and Coast Lat: 46.340587 Long: -119.871420 Datum: NAD 1983
 Soil Map Unit Name: Shano silt loam, 8 to 15 percent slopes NWI classification: _____
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
 Are Vegetation _____, 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 <u>X</u>	No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present?	Yes _____	No _____	
Wetland Hydrology Present?	Yes _____	No _____	
Precipitation prior to fieldwork: <u>0.1 inch in prior two weeks</u>			
Remarks:			

VEGETATION

Tree Stratum	(Plot size: <u>30' r</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
1.	_____	_____	_____	_____	
2.	_____	_____	_____	_____	
3.	_____	_____	_____	_____	
4.	_____	_____	_____	_____	
		0% = Total Cover			
Sapling/Shrub Stratum (Plot size: <u>10' r</u>)					
1.	_____	_____	_____	_____	Hydrophytic Vegetation Indicators: <u>1</u> - Rapid Test for Hydrophytic Vegetation <u>X</u> <u>2</u> - Dominance Test is >50% <u>3</u> - Prevalence Index is ≤3.0 ¹ <u>4</u> - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u>5</u> - Wetland Non-Vascular Plants ¹ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present.
2.	_____	_____	_____	_____	
3.	_____	_____	_____	_____	
4.	_____	_____	_____	_____	
5.	_____	_____	_____	_____	
		0% = Total Cover			
Herb Stratum (Plot size: <u>5' r</u>)					
1.	<u>Phalaris arundinacea</u>	<u>80%</u>	<u>Yes</u>	<u>FACW</u>	Hydrophytic Vegetation Yes <u>X</u> No _____ Present?
2.	<u>Equisetum hyemale</u>	<u>20%</u>	<u>No</u>	<u>FACW</u>	
3.	<u>Lolium perenne</u>	<u>1%</u>	<u>No</u>	<u>FAC</u>	
4.	_____	_____	_____	_____	
5.	_____	_____	_____	_____	
6.	_____	_____	_____	_____	
7.	_____	_____	_____	_____	
8.	_____	_____	_____	_____	
9.	_____	_____	_____	_____	
10.	_____	_____	_____	_____	
11.	_____	_____	_____	_____	
		101% = Total Cover			
Woody Vine Stratum (Plot size: <u>10' r</u>)					
1.	_____	_____	_____	_____	Hydrophytic Vegetation Yes <u>X</u> No _____ Present?
2.	_____	_____	_____	_____	
		0% = Total Cover			
% Bare Ground in Herb Stratum <u>0%</u>					
Remarks:					
Entered by: <u>KS</u> QC by: <u>JS</u>					

SOIL

Sampling Point: **SP14**

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

[illegible]

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

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

Indicators for Problematic Hydric Soils³:

<u> </u> Histosol (A1)	<u> </u> Sandy Redox (S5)
<u> </u> Histic Epipedon (A2)	<u> </u> Stripped Matrix (S6)
<u> </u> Black Histic (A3)	<u> </u> Loamy Mucky Mineral (F1) (except MLRA 1)
<u> </u> Hydrogen Sulfide (A4)	<u> </u> Loamy Gleyed Matrix (F2)
<u> </u> Depleted Below Dark Surface (A11)	<u> </u> Depleted Matrix (F3)
<u> </u> Thick Dark Surface (A12)	<u> </u> X Redox Dark Surface (F6)
<u> </u> Sandy Mucky Mineral (S1)	<u> </u> Depleted Dark Surface (F7)
<u> </u> Sandy Gleyed Matrix (S4)	<u> </u> Redox Depressions (F8)

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present?	Yes	X	No
----------------------	-----	----------	----

Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)
Rock refusal @ 10".

HYDROLOGY

Wetland Hydrology Indicators:

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

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes <u> </u>	No <u> X </u>	Depth (inches): <u> </u>
Water Table Present?	Yes <u> X </u>	No <u> </u>	Depth (inches): <u> 2" </u>
Saturation Present? (includes capillary fringe)	Yes <u> X </u>	No <u> </u>	Depth (inches): <u> Surface </u>

Wetland Hydrology Present?

Yes **X** No

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

Remarks:	Entered by: <u>KS</u>	QC by: <u>JS</u>
Surface water 6" south.		

Appendix B

Ground-Level Site Photographs

APPENDIX B

Ground-Level Site Photographs.

Photos taken June 28 – July 1, 2022.

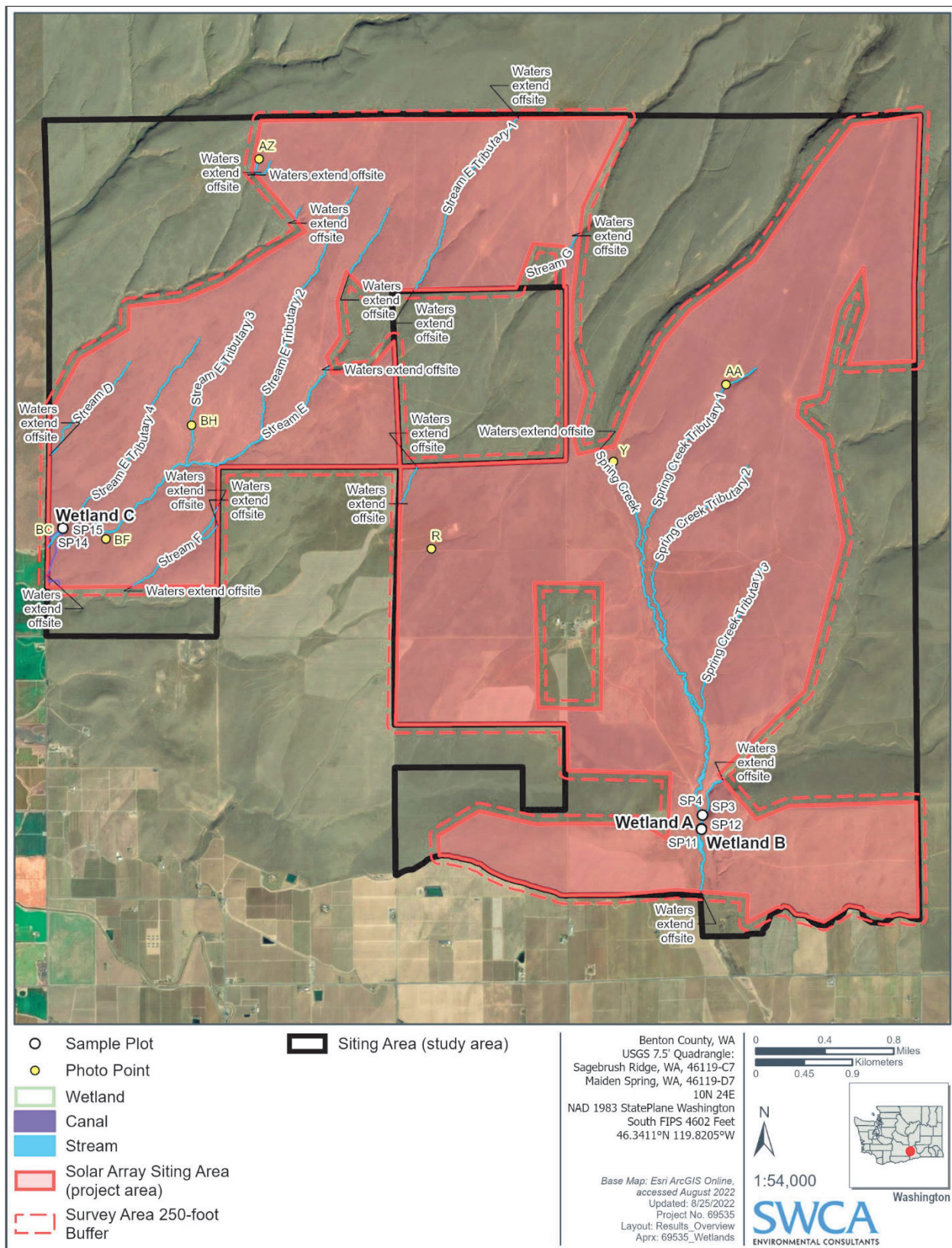


Photo point location map.



Photo 1. Wetland A overview , view to the south.

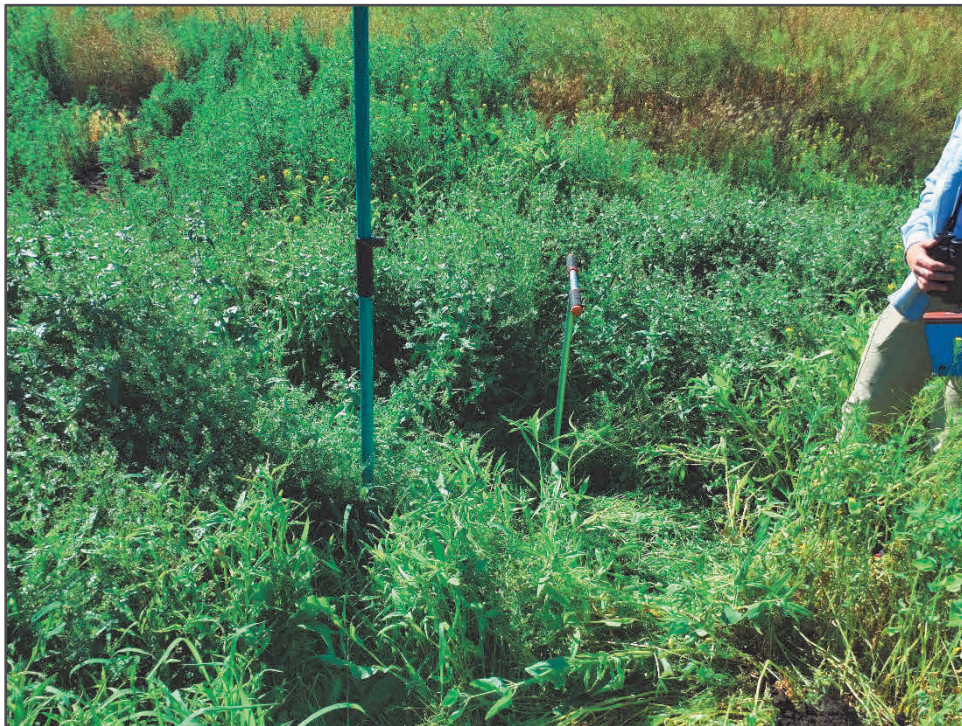


Photo 2. Wetland A, auger in wetland plot, view to the south.

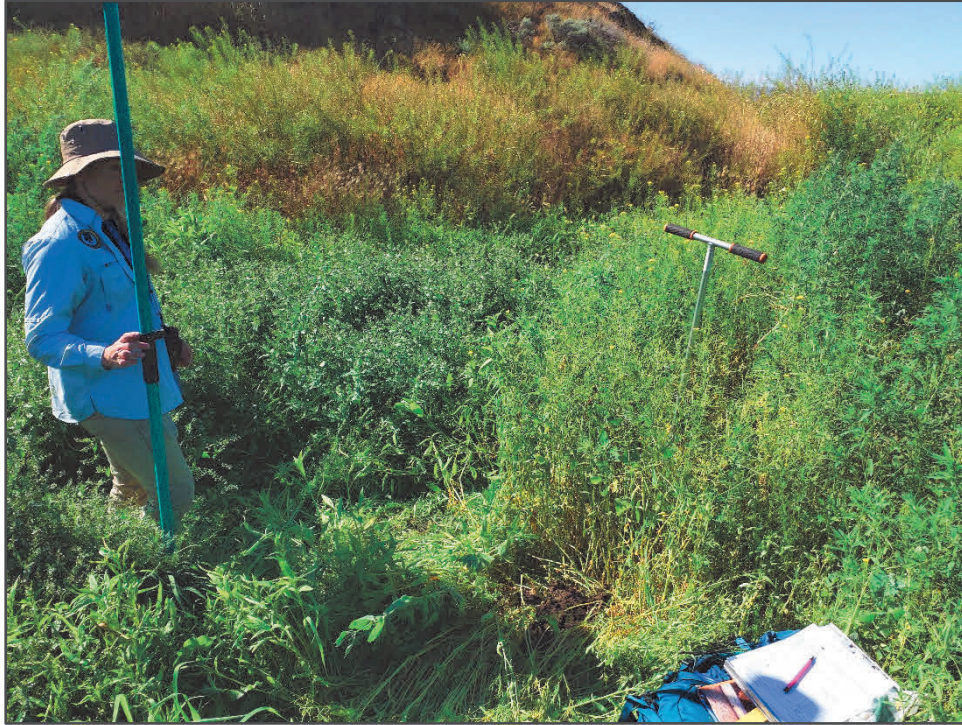


Photo 3. Wetland A, auger in upland plot, view to the south.



Photo 4. Wetland A, trough outlet to wetland.



Photo 5. Wetland A overview, view to the north.



Photo 6. Wetland B overview, view to the south.



Photo 7. Wetland B, auger in wetland plot, upland plot in the foreground, view to the west.



Photo 8. Wetland B, trough outlet to the wetland.



Photo 9. Wetland C, view to the south.



Photo 10. Wetland C, view of wetland plot.



Photo 11. Photo point R, no stream at mapped NWI water, view north.



Photo 12. Photo point R, no stream at mapped NWI water, view south.



Photo 13. Photo point Y, Spring Creek, view to the south, braid enters at turn.

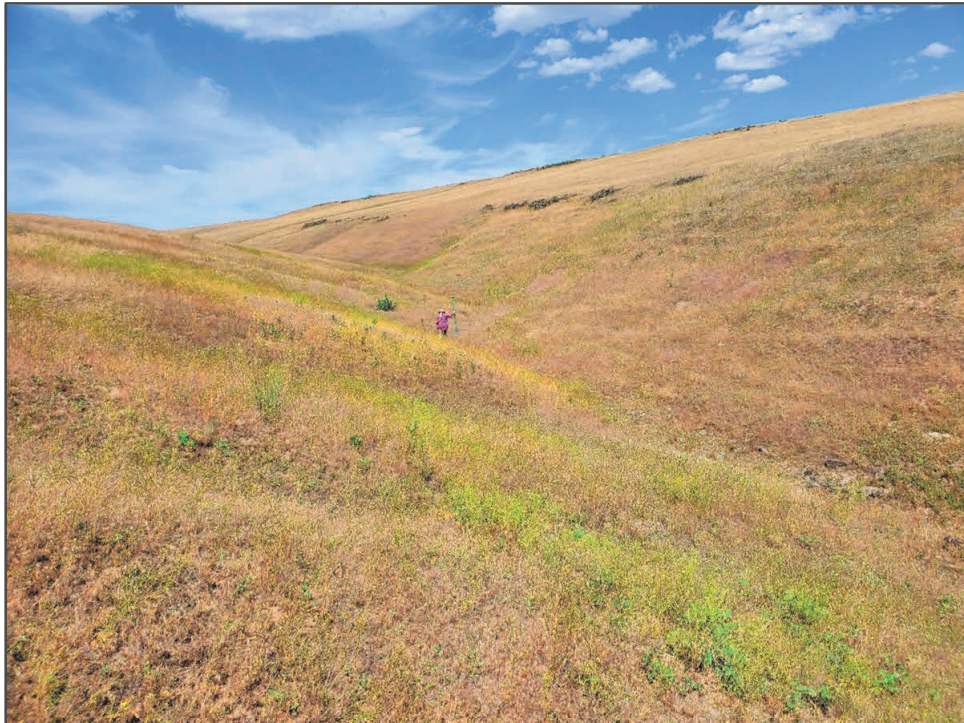


Photo 14. Photo point AA, typical 1-3 foot stream, view to the northeast.



Photo 15. Photo point AZ, typical 1-3 foot stream, view to the south.



Photo 16. Photo point BC, canal, view to the west.



Photo 17. Photo point BH, typical 1-3 foot eroded stream, view to the south.



Photo 18. BF, Stream E, example of braided channel, view to the north.

Appendix C

Wetland Rating Forms and Maps

Wetland name or number A

RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): Wetland A Date of site visit: 6/29/2022

Rated by Jessalynn Spears & Chris Moller Trained by Ecology? X Yes No Date of training 10/09/18

HGM Class used for rating Riverine Wetland has multiple HGM classes? Y X N

NOTE: Form is not complete without the figures requested (figures can be combined).

Source of base aerial photo/map ESRI/Google Earth

OVERALL WETLAND CATEGORY (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

X **Category III** – Total score = 16-18

 Category IV – Total score = 9-15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
<i>Circle the appropriate ratings</i>				
Site Potential	H M L	H M L	H M L	
Landscape Potential	H M L	H M L	H M L	
Value	H M L	H M L	H M L	TOTAL
Score Based on Ratings	7	6	4	17

**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 <i>Circle the appropriate category</i>
Vernal Pools	II III
Alkali	I
Wetland of High Conservation Value	I
Bog and Calcareous Fens	I
Old Growth or Mature Forest – slow growing	I
Aspen Forest	I
Old Growth or Mature Forest – fast growing	II
Floodplain forest	II
None of the above	

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 (<i>can be added to map of hydroperiods</i>)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	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	A
Hydroperiods	H 1.2, H 1.3	A
Ponded depressions	R 1.1	A
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	R 2.4	A
Map of the contributing basin	R 2.2, R 2.3, R 5.2	C
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	A
Width of wetland vs. width of stream (<i>can be added to another figure</i>)	R 4.1	A
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	B
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	C
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	D

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 (<i>can be added to another figure</i>)	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 (<i>can be added to figure above</i>)	S 4.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	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.

Wetland name or number A

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 wetland 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.*

Wetland name or number A

RIVERINE WETLANDS		Points (only 1 score per box)
Water Quality Functions - Indicators that the site functions to improve water quality		
R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: Depressions cover $> \frac{1}{3}$ area of wetland points = 6 Depressions cover $> \frac{1}{10}$ area of wetland points = 3 Depressions present but cover $< \frac{1}{10}$ area of wetland points = 1 No depressions present points = 0	1	
R 1.2. Structure of plants in the wetland (areas with $>90\%$ cover at person height; not Cowardin classes): Forest or shrub $> \frac{2}{3}$ the area of the wetland points = 10 Forest or shrub $\frac{1}{3} - \frac{2}{3}$ area of the wetland points = 5 Ungrazed, herbaceous plants $> \frac{2}{3}$ area of wetland points = 5 Ungrazed herbaceous plants $\frac{1}{3} - \frac{2}{3}$ area of wetland points = 2 Forest, shrub, and ungrazed herbaceous $< \frac{1}{3}$ area of wetland points = 0	5	
Total for R 1	Add the points in the boxes above	6

Rating of Site Potential If score is: 12-16 = H 6-11 = M 0-5 = L

Record the rating on the first page

R 2.0. Does the landscape have the potential to support the water quality function of the site?		
R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	
R 2.2. Does the contributing basin include a UGA or incorporated area?	Yes = 1 No = 0	
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	1
R 2.4. Is $> 10\%$ of the area within 150 ft of wetland in land uses that generate pollutants	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1-R 2.4? Source _____	Yes = 1 No = 0	
Total for R 2	Add the points in the boxes above	2

Rating of Landscape Potential If score is: 3-6 = H 1 or 2 = M 0 = L

Record the rating on the first page

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	1
R 3.2. Does the river or stream have TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	1
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? <i>Answer YES if there is a TMDL for the drainage in which wetland is found.</i>	Yes = 2 No = 0	2
Total for R 3	Add the points in the boxes above	4

Rating of Value If score is: 2-4 = H 1 = M 0 = L

Record the rating on the first page

RIVERINE WETLANDSPoints
(only 1 score
per box)**Hydrologic Functions** - Indicators that site functions to reduce flooding and stream erosion**R 4.0. Does the site have the potential to reduce flooding and erosion?****R 4.1. Characteristics of the overbank storage the wetland provides:***Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).*

If the ratio is more than 2

points = 10

If the ratio is 1-2

points = 8

If the ratio is ½-<1

points = 4

If the ratio is ¼-< ½

points = 2

If the ratio is < ¼

points = 1

8

R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have > 90% cover at person height. These are NOT Cowardin classes).*

Forest or shrub for more than 2/3 the area of the wetland

points = 6

Forest or shrub for >1/3 area OR emergent plants > 2/3 area

points = 4

Forest or shrub for > 1/10 area OR emergent plants > 1/3 area

points = 2

Plants do not meet above criteria

points = 0

4

Total for R 5

Add the points in the boxes above

12

Rating of Site Potential If score is: 12-16 = H 6-11 = M 0-5 = L

Record the rating on the first page

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?**R 5.1. Is the stream or river adjacent to the wetland downcut?**

Yes = 0 No = 1

0

R 5.2. Does the up-gradient watershed include a UGA or incorporated area?

Yes = 1 No = 0

0

R 5.3. Is the up-gradient stream or river controlled by dams?

Yes = 0 No = 1

1

Total for R 5

Add the points in the boxes above

1

Rating of Landscape Potential If score is: 3 = H 1 or 2 = M 0 = L

Record the rating on the first page

R 6.0. Are the hydrologic functions provided by the site valuable to society?**R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.***

The sub-basin immediately down-gradient of site has surface flooding problems that result in damage to human or natural resources

points = 2

Surface flooding problems are in a basin farther down-gradient

points = 1

No flooding problems anywhere downstream

points = 0

0

R 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

0

Total for R 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.		(only 1 score per box)
HABITAT FUNCTIONS - Indicators that site functions to provide important habitat		
H 1.0. Does the wetland have the potential to provide habitat for many species?		
H 1.1. Structure of the plant community: <i>Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is $\geq \frac{1}{4}$ ac or $\geq 10\%$ of the wetland if wetland is < 2.5 ac.</i> <input type="checkbox"/> Aquatic bed <input type="checkbox"/> Emergent plants 0-12 in (0-30 cm) high are the highest layer and have $> 30\%$ cover <input checked="" type="checkbox"/> Emergent plants >12-40 in (>30-100 cm) high are the highest layer with $>30\%$ cover <input type="checkbox"/> Emergent plants > 40 in (> 100 cm) high are the highest layer with $>30\%$ cover <input type="checkbox"/> Scrub-shrub (areas where shrubs have $>30\%$ cover) 4 or more checks: points = 3 <input type="checkbox"/> Forested (areas where trees have $>30\%$ cover) 3 checks: points = 2 <div style="text-align: right;">2 checks: points = 1 1 check: points = 0</div>		0
H 1.2. Is one of the vegetation types Aquatic Bed?		Yes = 1 No = 0
H 1.3. <u>Surface water</u> H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least $\frac{1}{4}$ 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 $\frac{1}{4}$ ac or 10% of its area? Answer yes only if H 1.3.1 is No. Yes = 3 No = 0		0
H 1.4. <u>Richness of plant species</u> Count the number of plant species in the wetland that cover at least 10 ft ² . <i>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)</i> # of species _____ <div style="text-align: right;">Scoring: > 9 species: points = 2 4-9 species: points = 1 < 4 species: points = 0</div>		0
H 1.5. <u>Interspersion of habitats</u> 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. <i>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.</i>		Figure__
<div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;"> None = 0 points </div> <div style="text-align: center;"> Low = 1 point </div> <div style="text-align: center;"> Moderate = 2 points </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-end; margin-top: 20px;"> <div style="text-align: center;"> High = 3 points </div> <div style="text-align: center;"> </div> <div style="text-align: center;"> </div> </div> <div style="text-align: right; margin-top: 10px;"> Binarian braided channels with 2 classes </div>		
		0

Wetland name or number A

H 1.6. Special habitat features <i>Check the habitat features that are present in the wetland. The number of checks is the number of points.</i> ___ 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. X 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 X Invasive species cover less than 20% in each stratum of vegetation (canopy, sub-canopy, shrubs, herbaceous, moss/ground cover)		2
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: <i>Calculate:</i> % undisturbed habitat <u>0</u> + [(% moderate and low intensity land uses)/2] <u>0</u> = <u>0</u> % > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1km Polygon points = 2 10-19% of 1km Polygon points = 1 <u><10% of 1km Polygon points = 0</u>		0
H 2.2. Undisturbed habitat in 1 km Polygon around wetland. <i>Calculate:</i> % undisturbed habitat _____ + [(% moderate and low intensity land uses)/2] _____ = _____ % 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 <u>Undisturbed habitat < 10% of Polygon points = 0</u>		0
H 2.3. Land use intensity in 1 km Polygon: <u>> 50% of Polygon is high intensity land use</u> 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	-2

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 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 <u>Site has 1 or 2 priority habitats within 100 m (see Appendix B)</u> points = 1 Site does not meet any of the criteria above points = 0		1

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
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
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. <i>If you find perennial, obligate, wetland plants, the wetland is probably NOT a vernal pool.</i> — 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. <div style="text-align: right;">Yes – Go to SC 1.1 No = Not a vernal pool</div>	
SC 1.1. Is the vernal pool relatively undisturbed in February and March? <div style="text-align: right;">Yes – Go to SC 1.2 No = Not a vernal pool with special characteristics</div>	
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.)? <div style="text-align: right;">Yes = Category II No = Category III</div>	Cat. II Cat. 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 $\frac{3}{4}$ 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. <div style="text-align: right;">Yes = Category I No = Not an alkali wetland</div>	Cat. I
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? <div style="text-align: right;">Yes – Go to SC 3.2 No – Go to SC 3.3</div> SC 3.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? <div style="text-align: right;">Yes = Category I No = Not a WHCV</div> 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 <div style="text-align: right;">Yes – Contact WNHP/WDNR and go to SC 3.4 No = Not a WHCV</div> SC 3.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and it is listed on their website? <div style="text-align: right;">Yes = Category I No = Not a WHCV</div>	Cat. I

<p>SC 4.0 Bogs and Calcareous Fens</p> <p>Does the wetland (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs or calcareous fens? <i>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.</i></p> <p>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? <i>See Appendix C for a field key to identify organic soils.</i> Yes – Go to SC 4.3 No – Go to SC 4.2</p> <p>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</p> <p>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.</p> <p>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</p> <p>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</p> <p>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 (CaCO₃) 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</p>	<p>Cat. I</p> <p>Cat. I</p>
<p>SC 5.0. Forested Wetlands</p> <p>Does the wetland have an area of forest rooted within its boundary that meets at least one of the following three criteria? (<i>Continue only if you have identified that a forested class is present in question H 1.1</i>)</p> <ul style="list-style-type: none"> — The wetland is within the 100 year floodplain of a river or stream — Aspen (<i>Populus tremuloides</i>) 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 (<i>see definitions in question H3.1</i>) <p>Yes – Go to SC 5.1 No = Not a forested wetland with special characteristics</p> <p>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 (<i>see Table 7</i>)? Yes = Category I No – Go to SC 5.2</p> <p>SC 5.2. Does the wetland have areas where aspen (<i>Populus tremuloides</i>) represents at least 20% of the total cover of woody species? Yes = Category I No – Go to SC 5.3</p> <p>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 (<i>see Table 7</i>)? Yes = Category II No – Go to SC 5.4</p> <p>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</p>	<p>Cat. I</p> <p>Cat. I</p> <p>Cat. II</p> <p>Cat. II</p>
<p>Category of wetland based on Special Characteristics</p> <p><i>Choose the highest rating if wetland falls into several categories</i></p> <p>If you answered No for all types, enter “Not Applicable” on Summary Form</p>	

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: **NOTE:** *This question is independent of the land use between the wetland 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.
- **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- **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 > 12 in (30 cm) in eastern 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.

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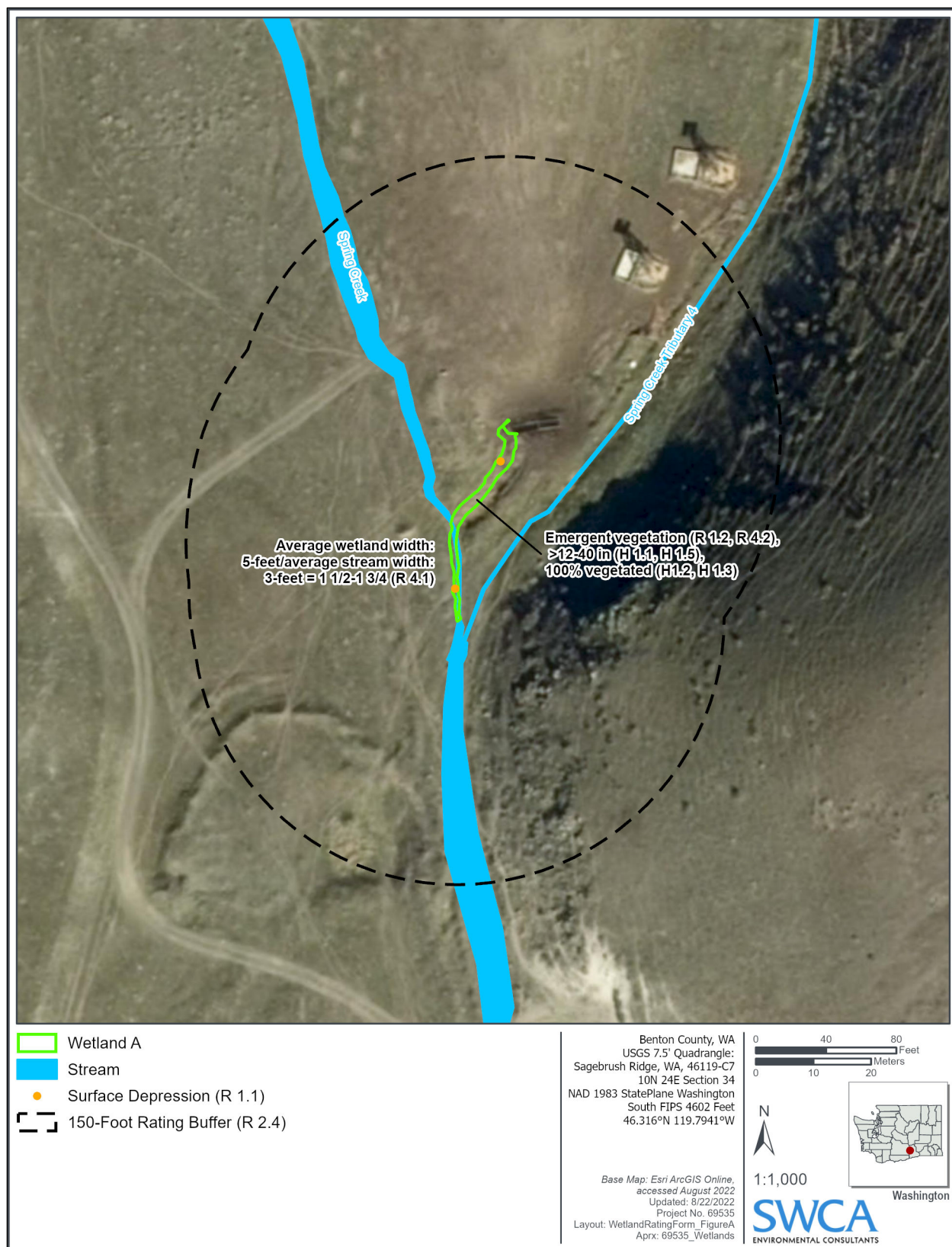


Figure A: Wetland A

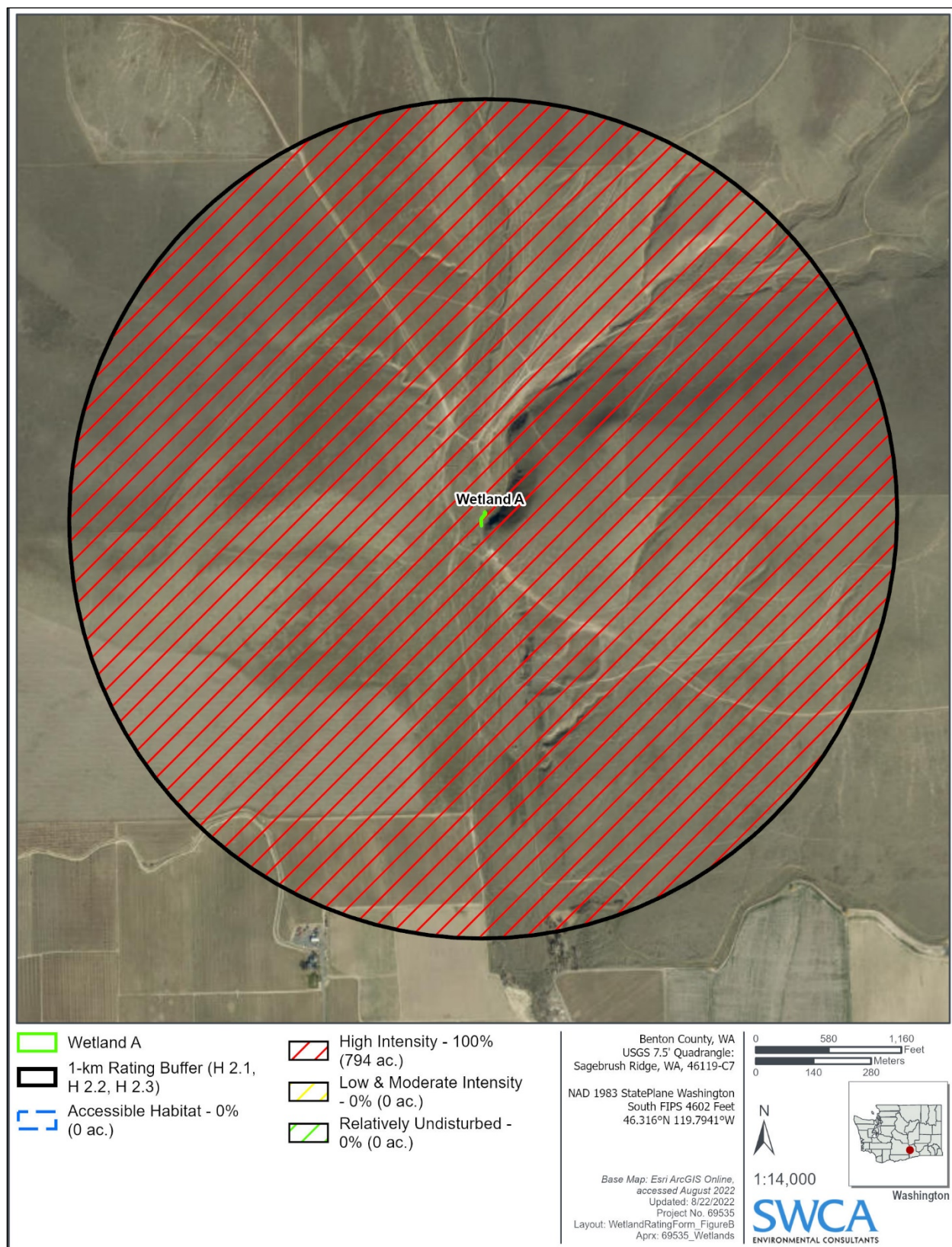


Figure B: Wetland A

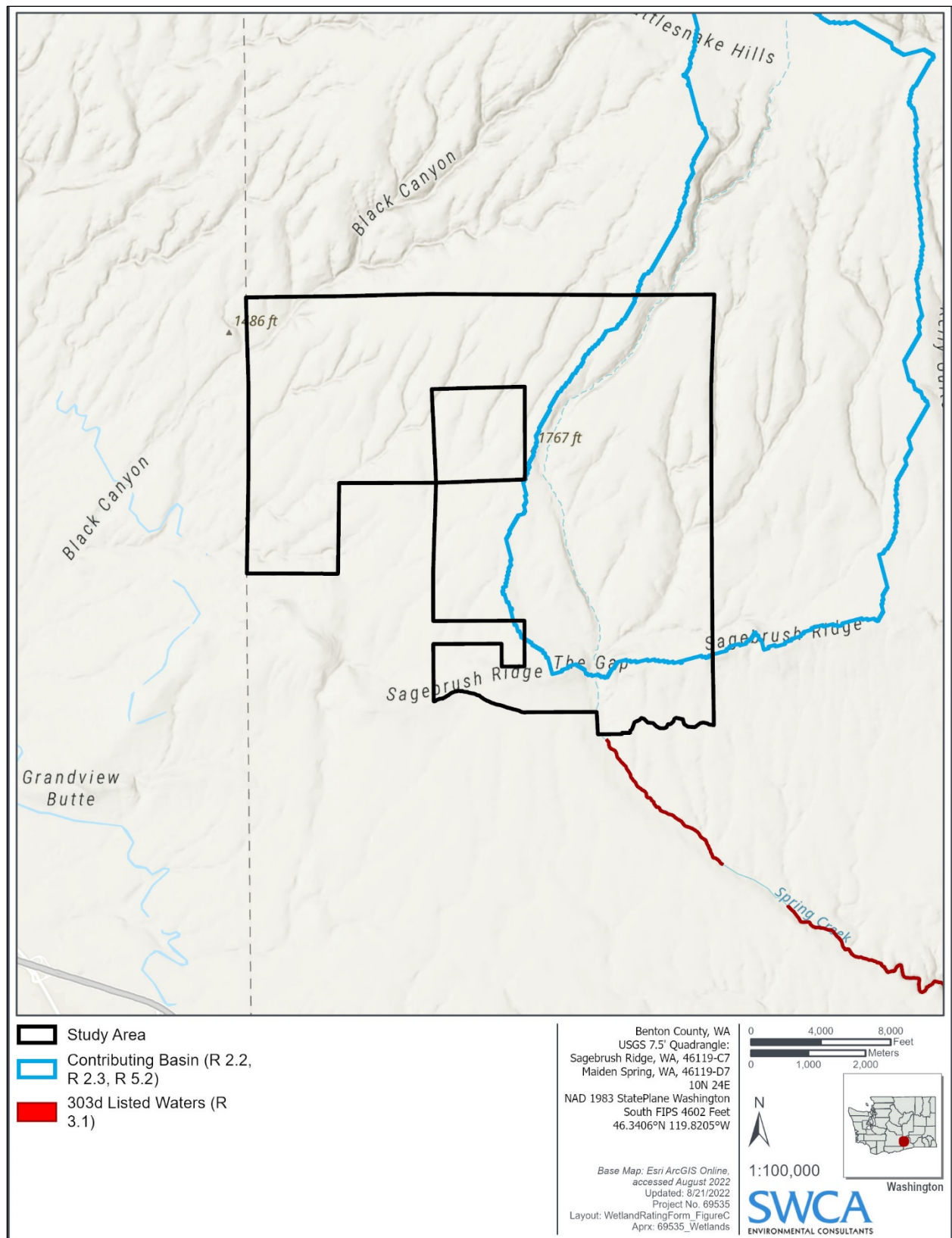


Figure C: Wetland A

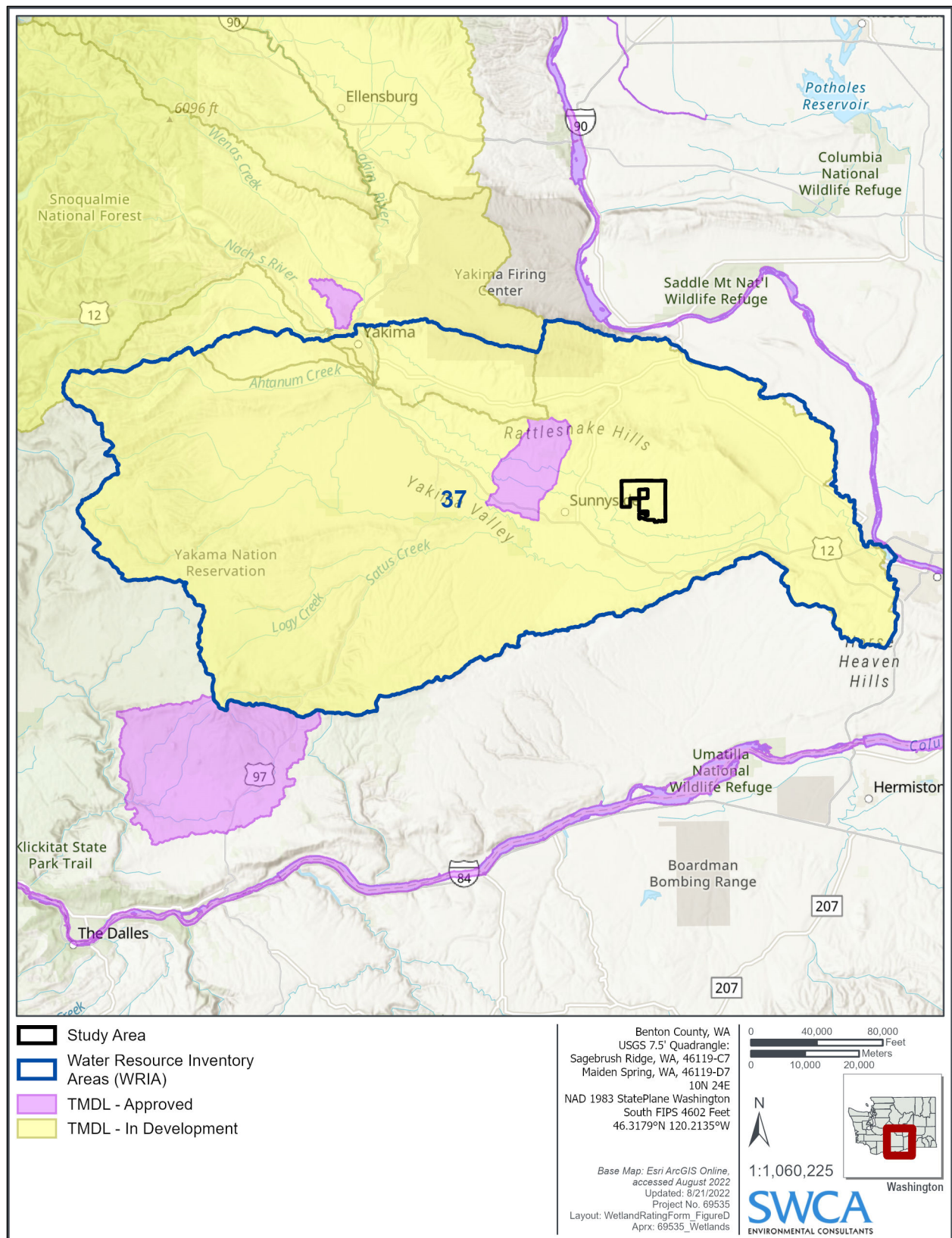


Figure D: Wetland A

Wetland name or number B

RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): Wetland B Date of site visit: 6/29/2022

Rated by Jessalynn Spears & Chris Moller Trained by Ecology? X Yes No Date of training 10/09/18

HGM Class used for rating Riverine Wetland has multiple HGM classes? Y X N

NOTE: Form is not complete without the figures requested (figures can be combined).

Source of base aerial photo/map ESRI/Google Earth

OVERALL WETLAND CATEGORY (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

X Category III – Total score = 16-18

 Category IV – Total score = 9-15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Circle the appropriate ratings				
Site Potential	H M L	H M L	H M L	
Landscape Potential	H M L	H M L	H M L	
Value	H M L	H M L	H M L	TOTAL
Score Based on Ratings			4	6

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
	Circle the appropriate category
Vernal Pools	II III
Alkali	I
Wetland of High Conservation Value	I
Bog and Calcareous Fens	I
Old Growth or Mature Forest – slow growing	I
Aspen Forest	I
Old Growth or Mature Forest – fast growing	II
Floodplain forest	II
None of the above	

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 (<i>can be added to map of hydroperiods</i>)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	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	A
Hydroperiods	H 1.2, H 1.3	A
Ponded depressions	R 1.1	A
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	R 2.4	A
Map of the contributing basin	R 2.2, R 2.3, R 5.2	C
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	A
Width of wetland vs. width of stream (<i>can be added to another figure</i>)	R 4.1	A
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	B
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	C
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	D

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 (<i>can be added to another figure</i>)	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 (<i>can be added to figure above</i>)	S 4.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	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.

Wetland name or number B

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 wetland 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.*

Wetland name or number B

RIVERINE WETLANDS		Points (only 1 score per box)
Water Quality Functions - Indicators that the site functions to improve water quality		
R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: Depressions cover $> \frac{1}{3}$ area of wetland points = 6 Depressions cover $> \frac{1}{10}$ area of wetland points = 3 Depressions present but cover $< \frac{1}{10}$ area of wetland points = 1 No depressions present points = 0		1
R 1.2. Structure of plants in the wetland (areas with $>90\%$ cover at person height; not Cowardin classes): Forest or shrub $> \frac{2}{3}$ the area of the wetland points = 10 Forest or shrub $\frac{1}{3} - \frac{2}{3}$ area of the wetland points = 5 Ungrazed, herbaceous plants $> \frac{2}{3}$ area of wetland points = 5 Ungrazed herbaceous plants $\frac{1}{3} - \frac{2}{3}$ area of wetland points = 2 Forest, shrub, and ungrazed herbaceous $< \frac{1}{3}$ area of wetland points = 0		5
Total for R 1	Add the points in the boxes above	6

Rating of Site Potential If score is: 12-16 = H **X 6-11 = M** 0-5 = L

Record the rating on the first page

R 2.0. Does the landscape have the potential to support the water quality function of the site?		
R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	
R 2.2. Does the contributing basin include a UGA or incorporated area?	Yes = 1 No = 0	
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	1
R 2.4. Is $> 10\%$ of the area within 150 ft of wetland in land uses that generate pollutants	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1-R 2.4? Source _____	Yes = 1 No = 0	
Total for R 2	Add the points in the boxes above	2

Rating of Landscape Potential If score is: 3-6 = H **X 1 or 2 = M** 0 = L

Record the rating on the first page

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	1
R 3.2. Does the river or stream have TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	1
R 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? <i>Answer YES if there is a TMDL for the drainage in which wetland is found.</i>	Yes = 2 No = 0	2
Total for R 3	Add the points in the boxes above	4

Rating of Value If score is: **X 2-4 = H** 1 = M 0 = L

Record the rating on the first page

RIVERINE WETLANDSPoints
(only 1 score
per box)**Hydrologic Functions** - Indicators that site functions to reduce flooding and stream erosion**R 4.0. Does the site have the potential to reduce flooding and erosion?****R 4.1. Characteristics of the overbank storage the wetland provides:***Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).*

If the ratio is more than 2 points = 10

If the ratio is 1-2 points = 8

If the ratio is $\frac{1}{2}$ -<1 points = 4If the ratio is $\frac{1}{4}$ -< $\frac{1}{2}$ points = 2If the ratio is < $\frac{1}{4}$ points = 1

4

R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have > 90% cover at person height. These are NOT Cowardin classes).*Forest or shrub for more than $\frac{2}{3}$ the area of the wetland points = 6Forest or shrub for $>\frac{1}{3}$ area OR emergent plants $>\frac{2}{3}$ area points = 4Forest or shrub for $>\frac{1}{10}$ area OR emergent plants $>\frac{1}{3}$ area points = 2

Plants do not meet above criteria points = 0

4

Total for R 5

Add the points in the boxes above

8

Rating of Site Potential If score is: 12-16 = H X 6-11 = M 0-5 = L

Record the rating on the first page

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?**R 5.1. Is the stream or river adjacent to the wetland downcut?** Yes = 0 No = 1

0

R 5.2. Does the up-gradient watershed include a UGA or incorporated area? Yes = 1 No = 0

0

R 5.3. Is the up-gradient stream or river controlled by dams? Yes = 0 No = 1

1

Total for R 5

Add the points in the boxes above

1

Rating of Landscape Potential If score is: 3 = H X 1 or 2 = M 0 = L

Record the rating on the first page

R 6.0. Are the hydrologic functions provided by the site valuable to society?**R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.***

The sub-basin immediately down-gradient of site has surface flooding problems that result in damage to human or natural resources points = 2

Surface flooding problems are in a basin farther down-gradient points = 1

No flooding problems anywhere downstream points = 0

0

R 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

0


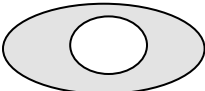
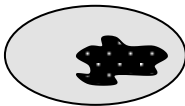
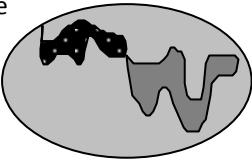
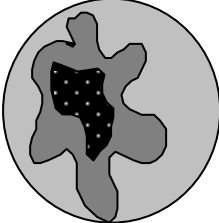
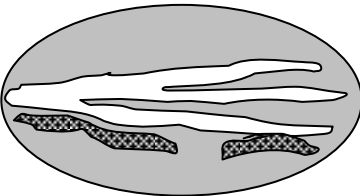
Total for R 6

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.		(only 1 score per box)	
HABITAT FUNCTIONS - Indicators that site functions to provide important habitat			
H 1.0. Does the wetland have the potential to provide habitat for many species?			
<p>H 1.1. Structure of the plant community: <i>Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is $\geq \frac{1}{4}$ ac or $\geq 10\%$ of the wetland if wetland is < 2.5 ac.</i></p> <p> <input type="checkbox"/> Aquatic bed <input type="checkbox"/> Emergent plants 0-12 in (0-30 cm) high are the highest layer and have $> 30\%$ cover <input type="checkbox"/> Emergent plants $> 12-40$ in ($> 30-100$ cm) high are the highest layer with $> 30\%$ cover <input type="checkbox"/> Emergent plants > 40 in (> 100 cm) high are the highest layer with $> 30\%$ cover <input type="checkbox"/> Scrub-shrub (areas where shrubs have $> 30\%$ cover) <input type="checkbox"/> Forested (areas where trees have $> 30\%$ cover) </p> <p style="text-align: right;"> 4 or more checks: points = 3 3 checks: points = 2 2 checks: points = 1 1 check: points = 0 </p>	0		
H 1.2. Is one of the vegetation types Aquatic Bed?	Yes = 1 No = 0	0	
H 1.3. <u>Surface water</u> H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least $\frac{1}{4}$ 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 $\frac{1}{4}$ ac or 10% of its area? Answer yes only if H 1.3.1 is No. Yes = 3 No = 0			0
H 1.4. <u>Richness of plant species</u> Count the number of plant species in the wetland that cover at least 10 ft^2 . <i>Different patches of the same species can be combined to meet the size threshold. You do not have to name the species.</i> <i>Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Russian olive, Phragmites, Canadian thistle, yellow-flag iris, and saltcedar (Tamarisk)</i> # of species _____ Scoring: > 9 species: points = 2 4-9 species: points = 1 < 4 species: points = 0			0
H 1.5. <u>Interspersion of habitats</u> 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. <i>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.</i>		Figure__	
<div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>None = 0 points</p> </div> <div style="text-align: center;">  <p>Low = 1 point</p> </div> <div style="text-align: center;">  <p>Moderate = 2 points</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-end; margin-top: 20px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  <p>Riparian braided channels with 2 classes</p> </div> </div> <p>All three diagrams in this row are High = 3 points</p>		0	

Wetland name or number B

H 1.6. Special habitat features <i>Check the habitat features that are present in the wetland. The number of checks is the number of points.</i> ___ 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)		2
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: <i>Calculate:</i> % undisturbed habitat <u>0</u> + [(% moderate and low intensity land uses)/2] <u>0</u> = <u>0</u> % > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1km Polygon points = 2 10-19% of 1km Polygon points = 1 <10% of 1km Polygon points = 0		0
H 2.2. Undisturbed habitat in 1 km Polygon around wetland. <i>Calculate:</i> % undisturbed habitat <u>0</u> + [(% moderate and low intensity land uses)/2] <u>0</u> = <u>0</u> % 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 Polygon points = 0		0
H 2.3. Land use intensity in 1 km Polygon: > 50% of 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	-2

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 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		1

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
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
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. <i>If you find perennial, obligate, wetland plants, the wetland is probably NOT a vernal pool.</i> — 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. <div style="text-align: right;">Yes – Go to SC 1.1 No = Not a vernal pool</div>	
SC 1.1. Is the vernal pool relatively undisturbed in February and March? <div style="text-align: right;">Yes – Go to SC 1.2 No = Not a vernal pool with special characteristics</div>	
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.)? <div style="text-align: right;">Yes = Category II No = Category III</div>	Cat. II Cat. 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 $\frac{3}{4}$ 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. <div style="text-align: right;">Yes = Category I No = Not an alkali wetland</div>	Cat. I
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? <div style="text-align: right;">Yes – Go to SC 3.2 No – Go to SC 3.3</div> SC 3.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? <div style="text-align: right;">Yes = Category I No = Not a WHCV</div> 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 <div style="text-align: right;">Yes – Contact WNHP/WDNR and go to SC 3.4 No = Not a WHCV</div> SC 3.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and it is listed on their website? <div style="text-align: right;">Yes = Category I No = Not a WHCV</div>	Cat. I

<p>SC 4.0 Bogs and Calcareous Fens</p> <p>Does the wetland (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs or calcareous fens? <i>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.</i></p> <p>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? <i>See Appendix C for a field key to identify organic soils.</i> Yes – Go to SC 4.3 No – Go to SC 4.2</p> <p>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</p> <p>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.</p> <p>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</p> <p>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</p> <p>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 (CaCO₃) 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</p>	<p>Cat. I</p> <p>Cat. I</p>
<p>SC 5.0. Forested Wetlands</p> <p>Does the wetland have an area of forest rooted within its boundary that meets at least one of the following three criteria? (<i>Continue only if you have identified that a forested class is present in question H 1.1</i>)</p> <ul style="list-style-type: none"> — The wetland is within the 100 year floodplain of a river or stream — Aspen (<i>Populus tremuloides</i>) 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 (<i>see definitions in question H3.1</i>) <p>Yes – Go to SC 5.1 No = Not a forested wetland with special characteristics</p> <p>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 (<i>see Table 7</i>)? Yes = Category I No – Go to SC 5.2</p> <p>SC 5.2. Does the wetland have areas where aspen (<i>Populus tremuloides</i>) represents at least 20% of the total cover of woody species? Yes = Category I No – Go to SC 5.3</p> <p>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 (<i>see Table 7</i>)? Yes = Category II No – Go to SC 5.4</p> <p>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</p>	<p>Cat. I</p> <p>Cat. I</p> <p>Cat. II</p> <p>Cat. II</p>
<p>Category of wetland based on Special Characteristics</p> <p><i>Choose the highest rating if wetland falls into several categories</i></p> <p>If you answered No for all types, enter “Not Applicable” on Summary Form</p>	

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: **NOTE:** *This question is independent of the land use between the wetland 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.
- **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- **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 > 12 in (30 cm) in eastern 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.

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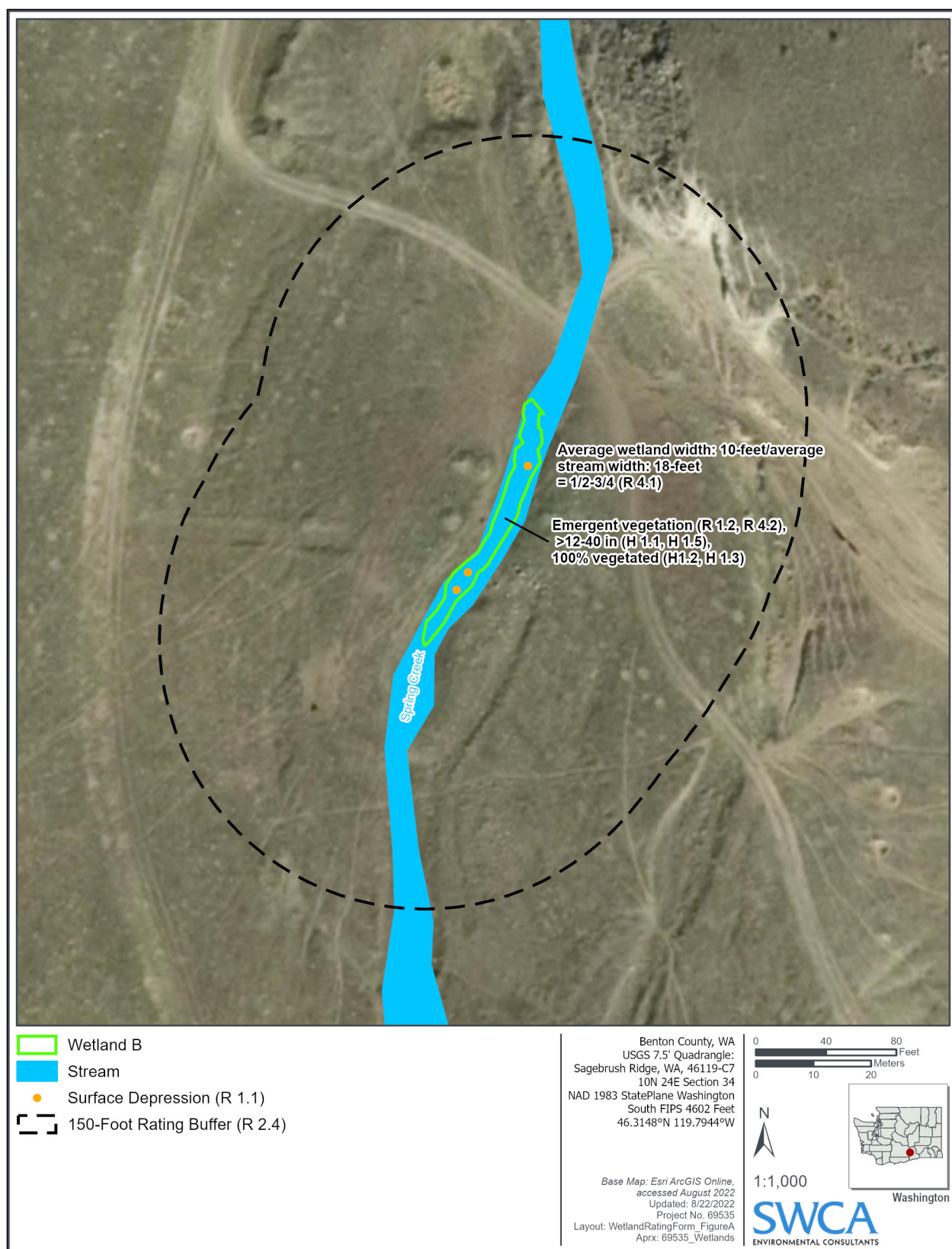


Figure A: Wetland B

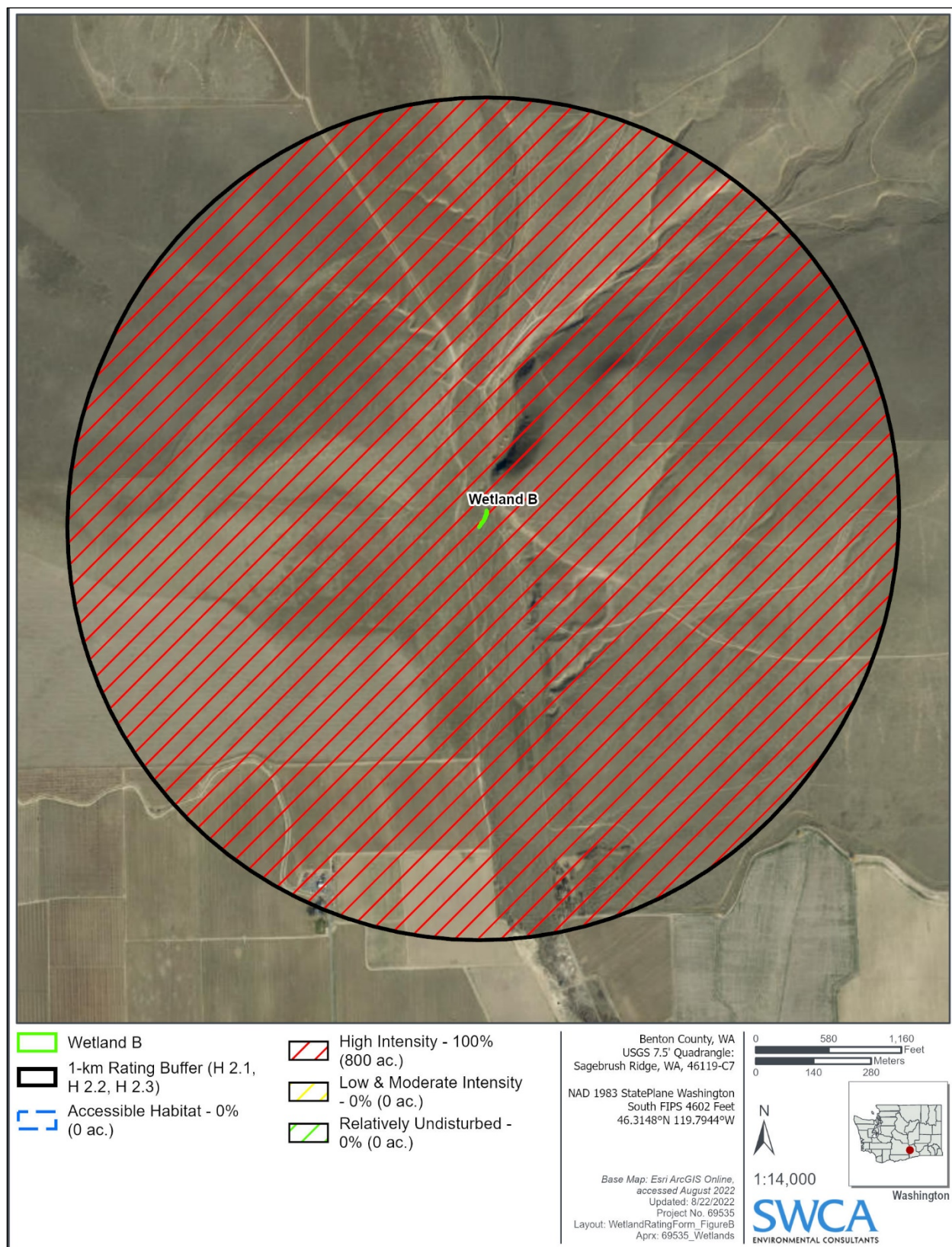


Figure B: Wetland B

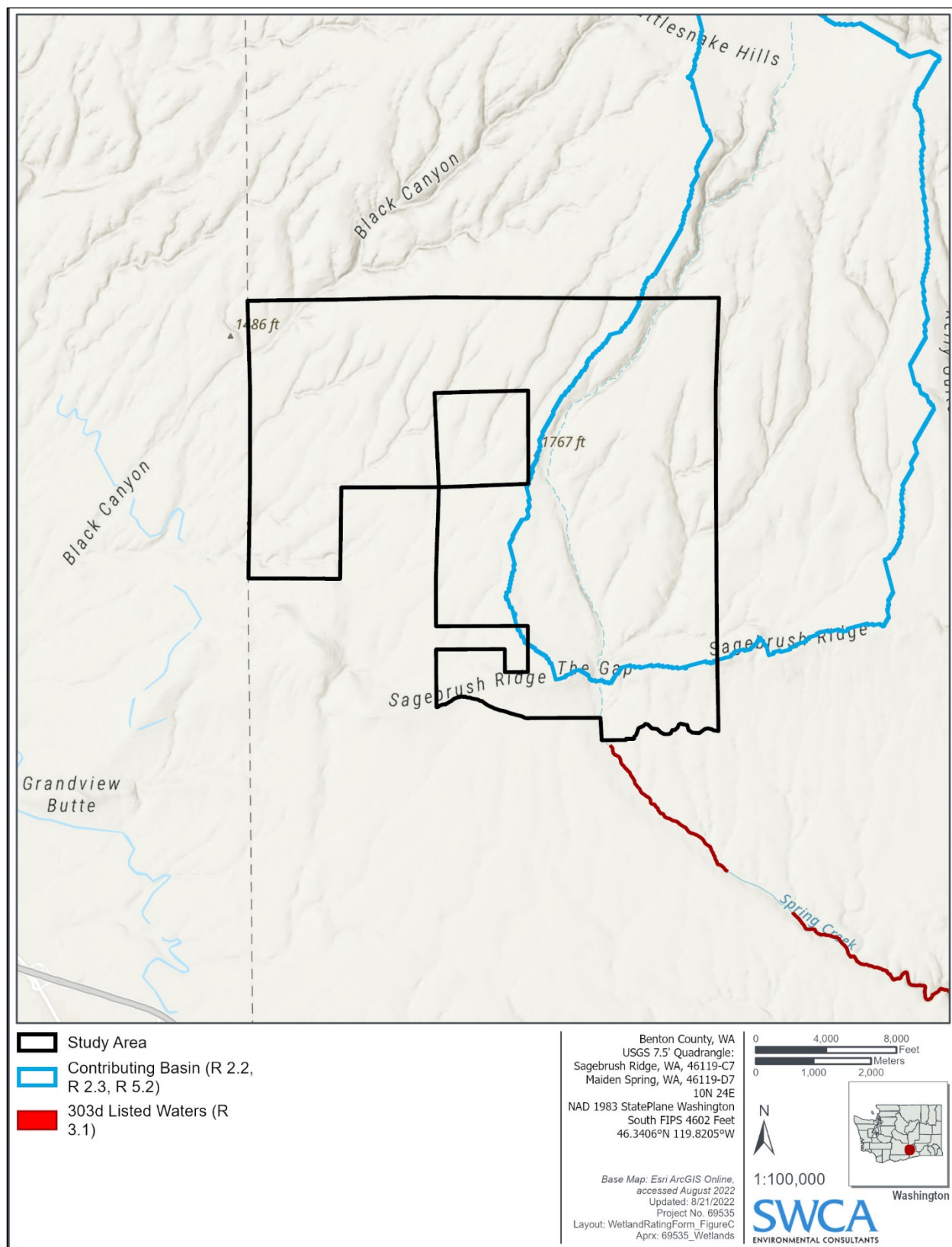


Figure C: Wetland B

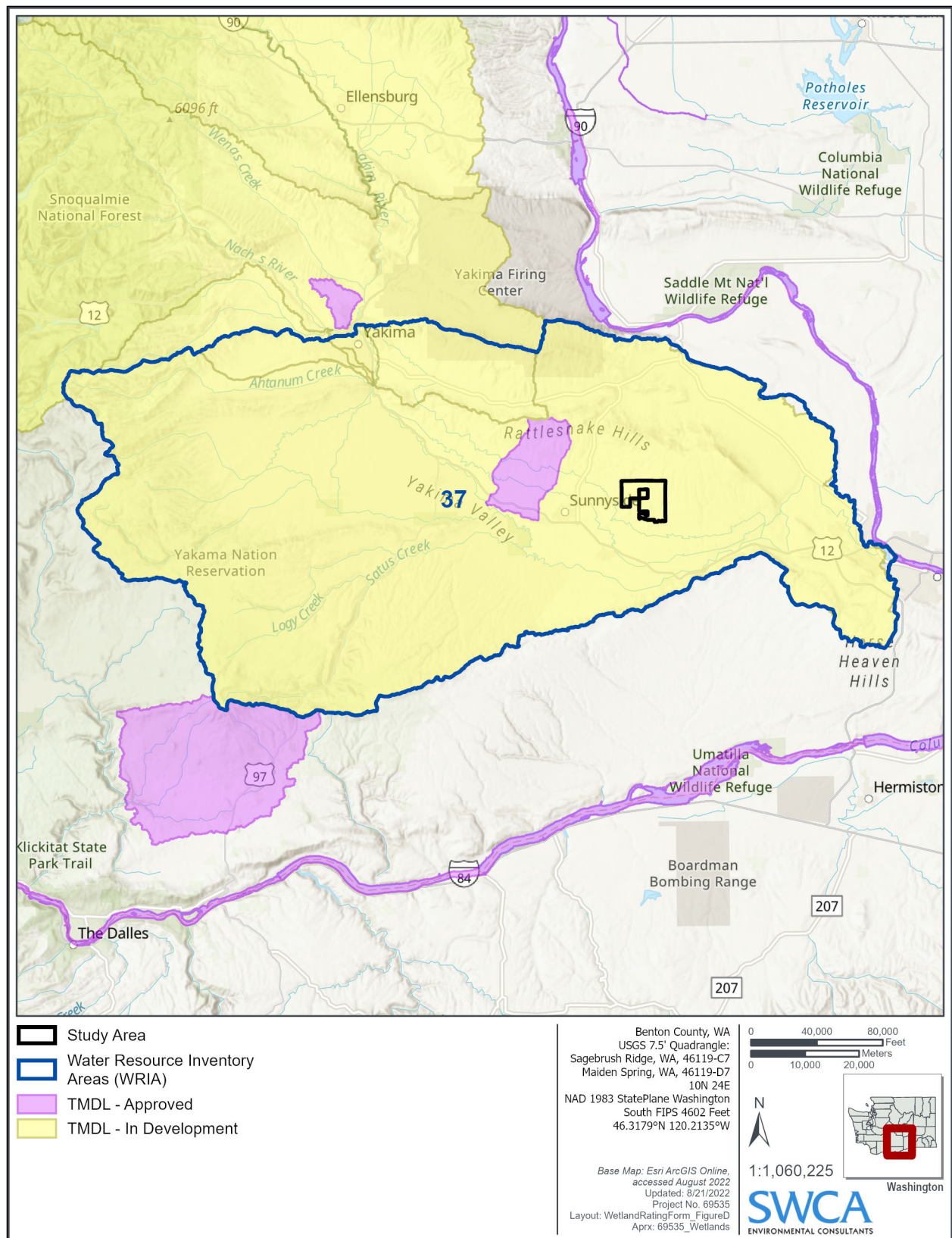


Figure D: Wetland B

Wetland name or number C

RATING SUMMARY – Eastern Washington

Name of wetland (or ID #): Wetland C Date of site visit: 6/30/2022

Rated by Jessalynn Spears & Chris Moller Trained by Ecology? X Yes No Date of training 10/09/18

HGM Class used for rating Riverine Wetland has multiple HGM classes? Y X N

NOTE: Form is not complete without the figures requested (figures can be combined).

Source of base aerial photo/map ESRI/Google Earth

OVERALL WETLAND CATEGORY (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	
<i>Circle the appropriate ratings</i>				
Site Potential	H M L	H M L	H M L	
Landscape Potential	H M L	H M L	H M L	
Value	H M L	H M L	H M L	TOTAL
Score Based on Ratings	6	5	4	15

**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 <i>Circle the appropriate category</i>
Vernal Pools	II III
Alkali	I
Wetland of High Conservation Value	I
Bog and Calcareous Fens	I
Old Growth or Mature Forest – slow growing	I
Aspen Forest	I
Old Growth or Mature Forest – fast growing	II
Floodplain forest	II
None of the above	

Wetland name or number C

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 (<i>can be added to map of hydroperiods</i>)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	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	A
Hydroperiods	H 1.2, H 1.3	A
Ponded depressions	R 1.1	A
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	R 2.4	A
Map of the contributing basin	R 2.2, R 2.3, R 5.2	C
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	A
Width of wetland vs. width of stream (<i>can be added to another figure</i>)	R 4.1	A
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	B
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	C
Screen capture of list of TMDLs for WRIA in which wetland is found (website)	R 3.2, R 3.3	D

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 (<i>can be added to another figure</i>)	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 (<i>can be added to figure above</i>)	S 4.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	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.

Wetland name or number C

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 wetland 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.*

Wetland name or number C

RIVERINE WETLANDS		Points (only 1 score per box)
Water Quality Functions - Indicators that the site functions to improve water quality		
R 1.0. Does the site have the potential to improve water quality?		
R 1.1. Area of surface depressions within the Riverine wetland that can trap sediments during a flooding event: Depressions cover $> \frac{1}{3}$ area of wetland points = 6 Depressions cover $> \frac{1}{10}$ area of wetland points = 3 Depressions present but cover $< \frac{1}{10}$ area of wetland points = 1 No depressions present points = 0		0
R 1.2. Structure of plants in the wetland (areas with >90% cover at person height; not Cowardin classes): Forest or shrub $> \frac{2}{3}$ the area of the wetland points = 10 Forest or shrub $\frac{1}{3} - \frac{2}{3}$ area of the wetland points = 5 Ungrazed, herbaceous plants $> \frac{2}{3}$ area of wetland points = 5 Ungrazed herbaceous plants $\frac{1}{3} - \frac{2}{3}$ area of wetland points = 2 Forest, shrub, and ungrazed herbaceous $< \frac{1}{3}$ area of wetland points = 0		5
Total for R 1	Add the points in the boxes above	5

Rating of Site Potential If score is: 12-16 = H 6-11 = M 0-5 = L Record the rating on the first page

R 2.0. Does the landscape have the potential to support the water quality function of the site?		
R 2.1. Is the wetland within an incorporated city or within its UGA?	Yes = 2 No = 0	0
R 2.2. Does the contributing basin include a UGA or incorporated area?	Yes = 1 No = 0	0
R 2.3. Does at least 10% of the contributing basin contain tilled fields, pastures, or forests that have been clearcut within the last 5 years?	Yes = 1 No = 0	1
R 2.4. Is > 10% of the area within 150 ft of wetland in land uses that generate pollutants	Yes = 1 No = 0	1
R 2.5. Are there other sources of pollutants coming into the wetland that are not listed in questions R 2.1-R 2.4? Source _____	Yes = 1 No = 0	0
Total for R 2	Add the points in the boxes above	2

Rating of Landscape Potential If score is: 3-6 = H 1 or 2 = M 0 = L Record the rating on the first page

R 3.0. Is the water quality improvement provided by the site valuable to society?		
R 3.1. Is the wetland along a stream or river that is on the 303(d) list or on a tributary that drains to one within 1 mi?	Yes = 1 No = 0	0
R 3.2. Does the river or stream have TMDL limits for nutrients, toxics, or pathogens?	Yes = 1 No = 0	1
R 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 in which wetland is found.	Yes = 2 No = 0	2
Total for R 3	Add the points in the boxes above	3

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

RIVERINE WETLANDSPoints
(only 1 score
per box)**Hydrologic Functions** - Indicators that site functions to reduce flooding and stream erosion**R 4.0. Does the site have the potential to reduce flooding and erosion?****R 4.1. Characteristics of the overbank storage the wetland provides:***Estimate the average width of the wetland perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of wetland)/(average width of stream between banks).*

If the ratio is more than 2 points = 10

If the ratio is 1-2 points = 8

If the ratio is ½-<1 points = 4

If the ratio is ¼-< ½ points = 2

If the ratio is < ¼ points = 1

2

R 4.2. Characteristics of plants that slow down water velocities during floods: *Treat large woody debris as forest or shrub. Choose the points appropriate for the best description (polygons need to have > 90% cover at person height. These are NOT Cowardin classes).*

Forest or shrub for more than ²/₃ the area of the wetland points = 6

Forest or shrub for >¹/₃ area OR emergent plants > ²/₃ area points = 4

Forest or shrub for > ¹/₁₀ area OR emergent plants > ¹/₃ area points = 2

Plants do not meet above criteria points = 0

4

Total for R 5

Add the points in the boxes above

6

Rating of Site Potential If score is: 12-16 = H 6-11 = M 0-5 = L

Record the rating on the first page

R 5.0. Does the landscape have the potential to support the hydrologic functions of the site?

R 5.1. Is the stream or river adjacent to the wetland downcut? Yes = 0 No = 1

0

R 5.2. Does the up-gradient watershed include a UGA or incorporated area? Yes = 1 No = 0

0

R 5.3. Is the up-gradient stream or river controlled by dams? Yes = 0 No = 1

1

Total for R 5

Add the points in the boxes above

1

Rating of Landscape Potential If score is: 3 = H 1 or 2 = M 0 = L

Record the rating on the first page

R 6.0. Are the hydrologic functions provided by the site valuable to society?**R 6.1. Distance to the nearest areas downstream that have flooding problems? *Choose the description that best fits the site.***

The sub-basin immediately down-gradient of site has surface flooding problems that result in damage to human or natural resources points = 2

Surface flooding problems are in a basin farther down-gradient points = 1

No flooding problems anywhere downstream points = 0

0

R 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

0


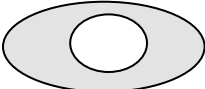
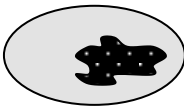
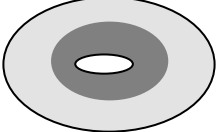
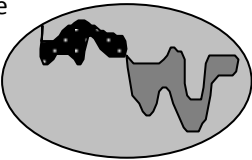
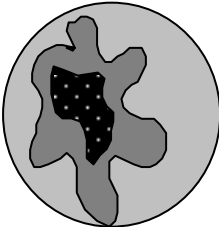
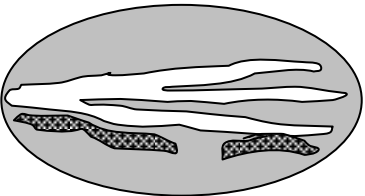
Total for R 6

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.		(only 1 score per box)
HABITAT FUNCTIONS - Indicators that site functions to provide important habitat		
H 1.0. Does the wetland have the potential to provide habitat for many species?		
<p>H 1.1. Structure of the plant community: <i>Check the Cowardin vegetation classes present and categories of emergent plants. Size threshold for each category is $\geq \frac{1}{4}$ ac or $\geq 10\%$ of the wetland if wetland is < 2.5 ac.</i></p> <p> <input type="checkbox"/> Aquatic bed <input type="checkbox"/> Emergent plants 0-12 in (0-30 cm) high are the highest layer and have $> 30\%$ cover <input type="checkbox"/> Emergent plants $> 12-40$ in ($> 30-100$ cm) high are the highest layer with $> 30\%$ cover <input type="checkbox"/> Emergent plants > 40 in (> 100 cm) high are the highest layer with $> 30\%$ cover <input type="checkbox"/> Scrub-shrub (areas where shrubs have $> 30\%$ cover) 4 or more checks: points = 3 <input type="checkbox"/> Forested (areas where trees have $> 30\%$ cover) 3 checks: points = 2 2 checks: points = 1 1 check: points = 0 </p>	0	
H 1.2. Is one of the vegetation types Aquatic Bed? Yes = 1 No = 0	0	
<p>H 1.3. <u>Surface water</u></p> <p>H 1.3.1. Does the wetland have areas of open water (without emergent or shrub plants) over at least $\frac{1}{4}$ 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</p> <p>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 $\frac{1}{4}$ ac or 10% of its area? Answer yes only if H 1.3.1 is No. Yes = 3 No = 0</p>	0	
<p>H 1.4. <u>Richness of plant species</u></p> <p>Count the number of plant species in the wetland that cover at least 10 ft^2. <i>Different patches of the same species can be combined to meet the size threshold. You do not have to name the species.</i> <i>Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Russian olive, Phragmites, Canadian thistle, yellow-flag iris, and saltcedar (Tamarisk)</i></p> <p># of species _____</p> <p>Scoring: > 9 species: points = 2 4-9 species: points = 1 < 4 species: points = 0</p>	0	
<p>H 1.5. <u>Interspersion of habitats</u></p> <p>Decide from the diagrams below whether interspersions among types of plant structures (described in H 1.1), and unvegetated areas (open water or mudflats) is high, moderate, low, or none.</p> <p><i>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.</i></p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>None = 0 points</p> </div> <div style="text-align: center;">  <p>Low = 1 point</p> </div> <div style="text-align: center;">  <p>Moderate = 2 points</p> </div> <div style="text-align: center;">  </div> </div> <p>All three diagrams in this row are High = 3 points</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;">    </div> <p style="text-align: center;">Riparian braided channels with 2 classes</p>	Figure__ 0	

Wetland name or number C

H 1.6. Special habitat features <i>Check the habitat features that are present in the wetland. The number of checks is the number of points.</i> _____ 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 (<i>canopy, sub-canopy, shrubs, herbaceous, moss/ground cover</i>)		0
Total for H 1	Add the points in the boxes above	0

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: <i>Calculate:</i> % undisturbed habitat <u>0</u> + [(% moderate and low intensity land uses)/2] <u>0</u> = <u>0</u> % > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1km Polygon points = 2 10-19% of 1km Polygon points = 1 <10% of 1km Polygon points = 0		0
H 2.2. Undisturbed habitat in 1 km Polygon around wetland. <i>Calculate:</i> % undisturbed habitat <u>0</u> + [(% moderate and low intensity land uses)/2] <u>45</u> = <u>45</u> % 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 Polygon points = 0		0
H 2.3. Land use intensity in 1 km Polygon: > 50% of 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	-2

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 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		1

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
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
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. <i>If you find perennial, obligate, wetland plants, the wetland is probably NOT a vernal pool.</i> — 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. <div style="text-align: right;">Yes – Go to SC 1.1 No = Not a vernal pool</div>	
SC 1.1. Is the vernal pool relatively undisturbed in February and March? <div style="text-align: right;">Yes – Go to SC 1.2 No = Not a vernal pool with special characteristics</div>	
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.)? <div style="text-align: right;">Yes = Category II No = Category III</div>	Cat. II Cat. 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 $\frac{3}{4}$ 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. <div style="text-align: right;">Yes = Category I No = Not an alkali wetland</div>	Cat. I
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? <div style="text-align: right;">Yes – Go to SC 3.2 No – Go to SC 3.3</div> SC 3.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? <div style="text-align: right;">Yes = Category I No = Not a WHCV</div> 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 <div style="text-align: right;">Yes – Contact WNHP/WDNR and go to SC 3.4 No = Not a WHCV</div> SC 3.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and it is listed on their website? <div style="text-align: right;">Yes = Category I No = Not a WHCV</div>	Cat. I

<p>SC 4.0 Bogs and Calcareous Fens</p> <p>Does the wetland (or any part of the wetland unit) meet both the criteria for soils and vegetation in bogs or calcareous fens? <i>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.</i></p> <p>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? <i>See Appendix C for a field key to identify organic soils.</i> Yes – Go to SC 4.3 No – Go to SC 4.2</p> <p>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</p> <p>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.</p> <p>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</p> <p>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</p> <p>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 (CaCO₃) 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</p>	<p>Cat. I</p> <p>Cat. I</p>
<p>SC 5.0. Forested Wetlands</p> <p>Does the wetland have an area of forest rooted within its boundary that meets at least one of the following three criteria? (<i>Continue only if you have identified that a forested class is present in question H 1.1</i>)</p> <ul style="list-style-type: none"> — The wetland is within the 100 year floodplain of a river or stream — Aspen (<i>Populus tremuloides</i>) 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 (<i>see definitions in question H3.1</i>) <p>Yes – Go to SC 5.1 No = Not a forested wetland with special characteristics</p> <p>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 (<i>see Table 7</i>)? Yes = Category I No – Go to SC 5.2</p> <p>SC 5.2. Does the wetland have areas where aspen (<i>Populus tremuloides</i>) represents at least 20% of the total cover of woody species? Yes = Category I No – Go to SC 5.3</p> <p>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 (<i>see Table 7</i>)? Yes = Category II No – Go to SC 5.4</p> <p>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</p>	<p>Cat. I</p> <p>Cat. I</p> <p>Cat. II</p> <p>Cat. II</p>
<p>Category of wetland based on Special Characteristics</p> <p><i>Choose the highest rating if wetland falls into several categories</i></p> <p>If you answered No for all types, enter “Not Applicable” on Summary Form</p>	

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: **NOTE:** *This question is independent of the land use between the wetland 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.
- **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- **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 > 12 in (30 cm) in eastern 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.

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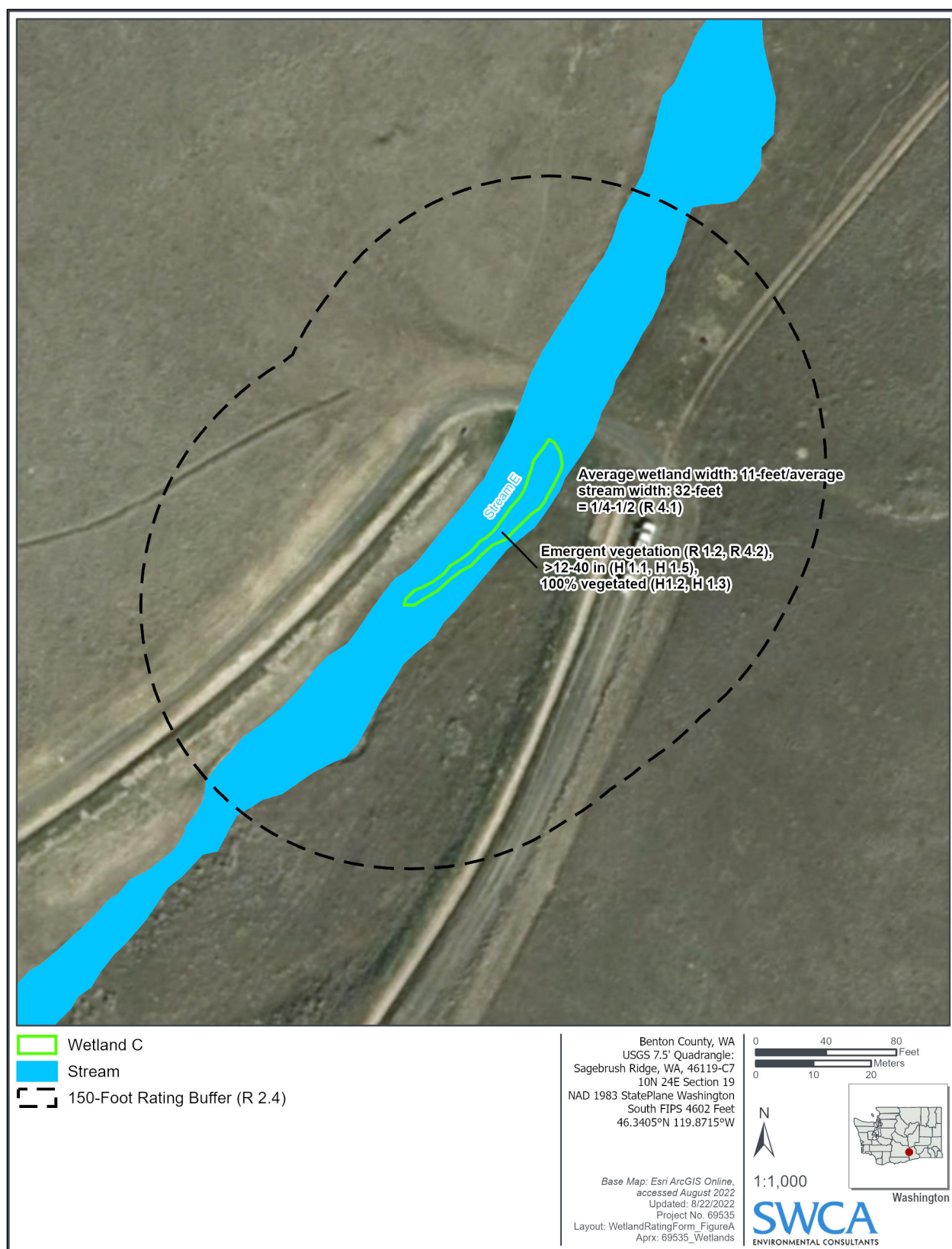


Figure A: Wetland C

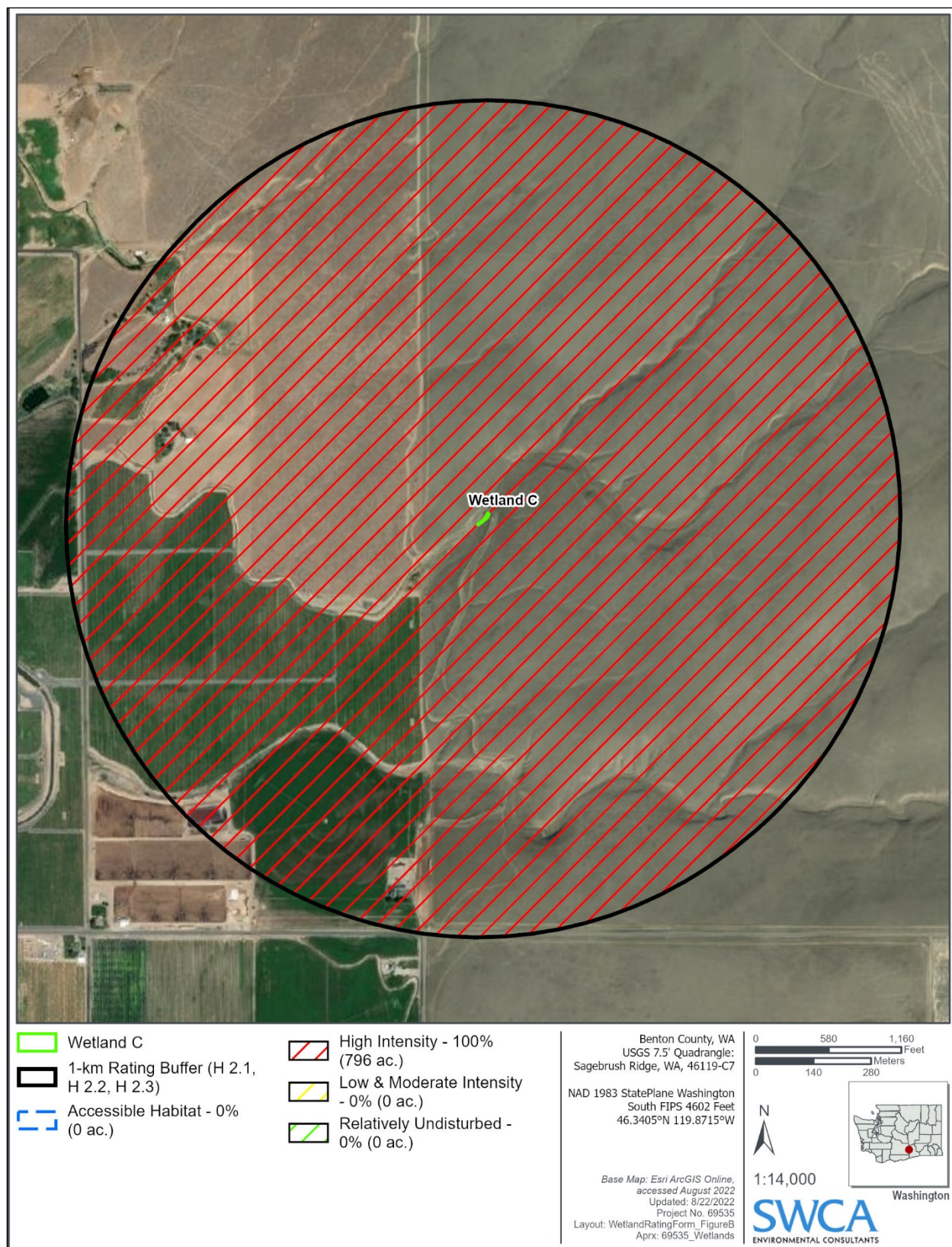


Figure B: Wetland C

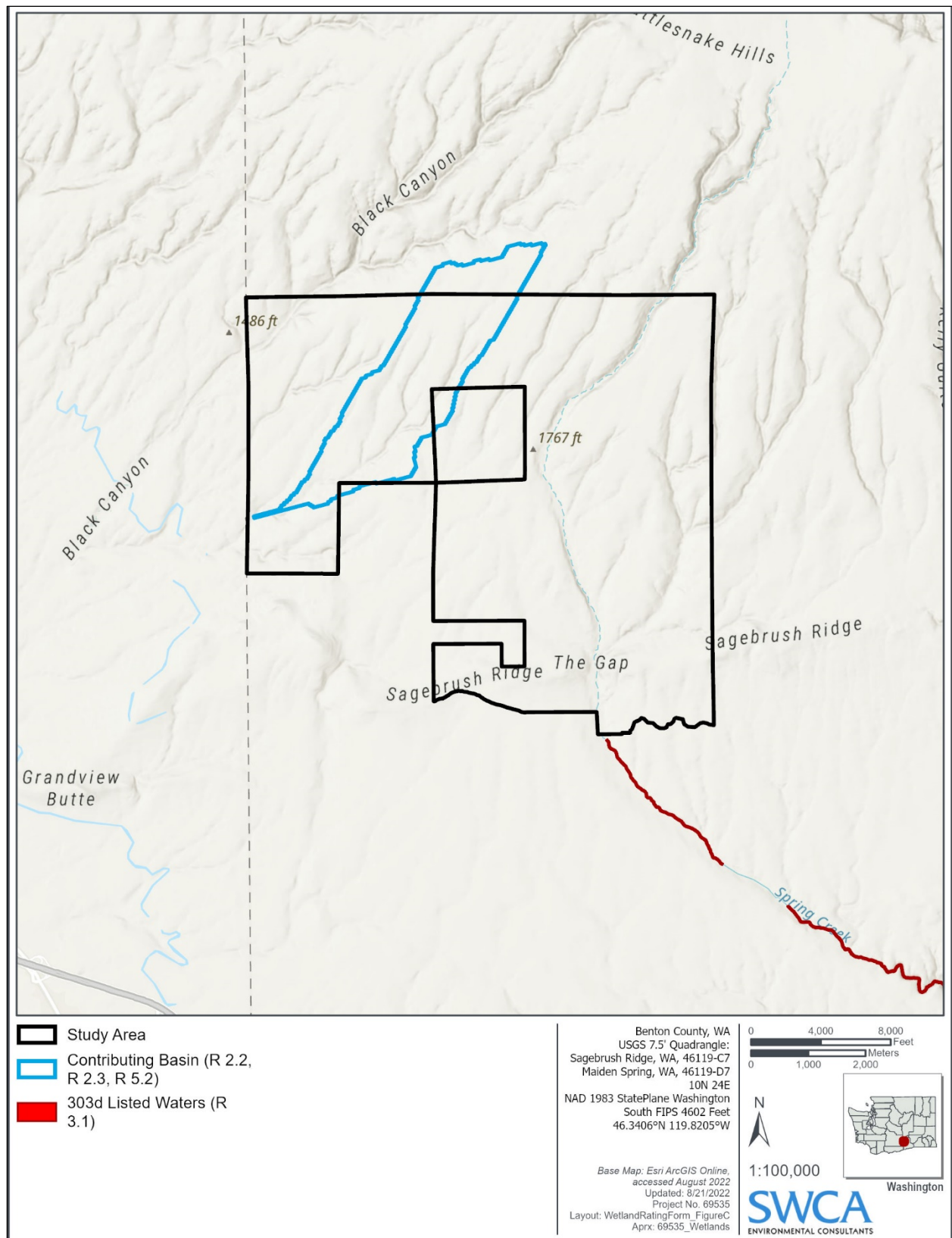


Figure C: Wetland C

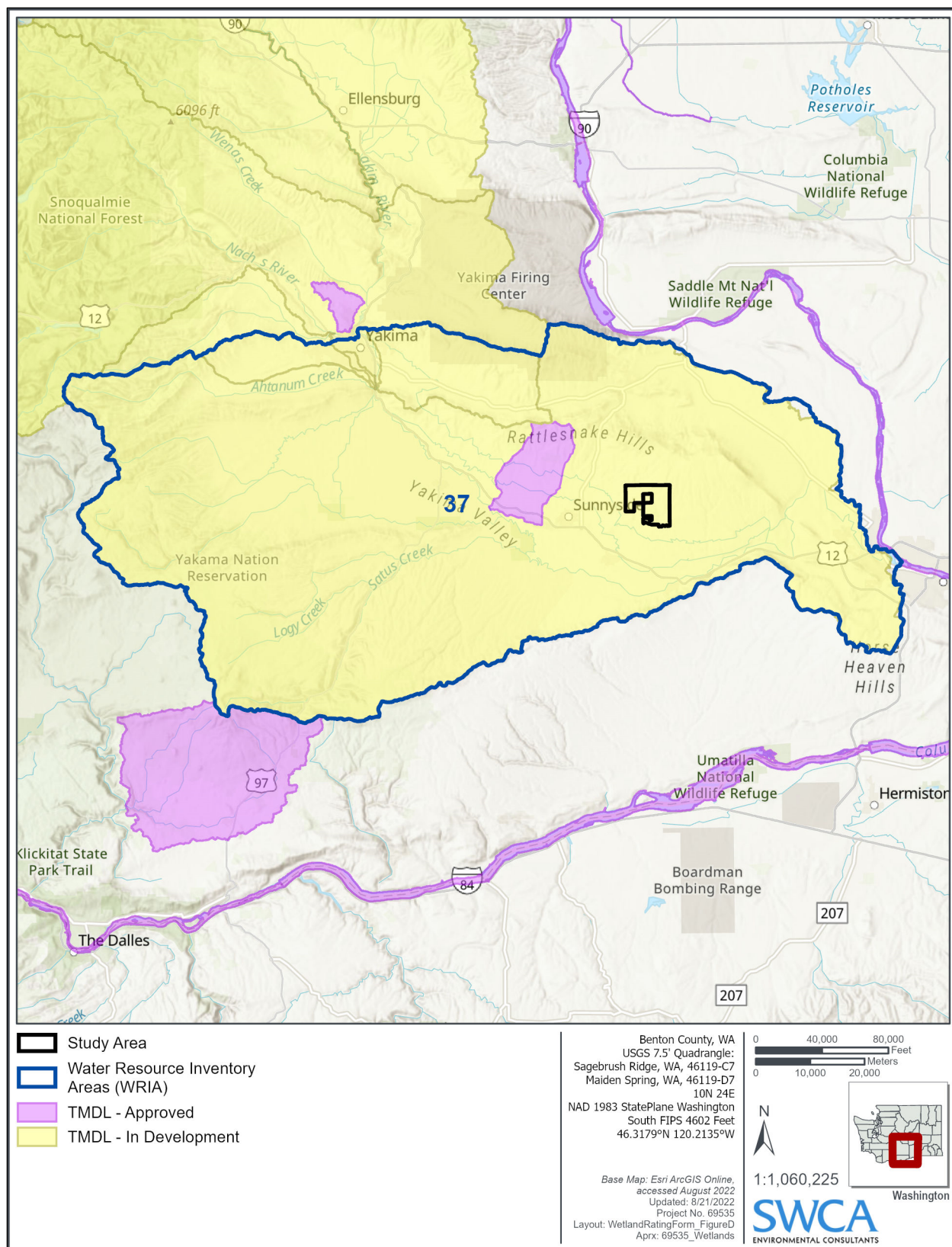


Figure D: Wetland C

Appendix D

Precipitation Data

Assessing Rainfall for the Preceding 3-Month Period (Antecedent Rainfall)									Climate Period 1991-2020	
WETS Station: PROSSER WA 1991-2020									Since Oct. 1st	Since Jan. 1st
Measured Rainfall: Prosser WA 2021-2022 Water Year									Departure from Normal* 0.66	Departure from Normal* 0.37
		WETS Rainfall Percentile		Measured Rainfall inches	Condition Dry, Wet, Normal	Condition Value (1=dry, 2=normal, 3=wet)	Month Weight	Multiply previous 2 columns		
Prior Month		30th	70th							
Most Recent First		-----inches-----								
1st	June	0.29	0.71	1.22	Wet	3	3	9	WYTD*	CYTD*
2nd	May	0.40	0.89	1.70	Wet	3	2	6	8.75	5.50
3rd	April	0.27	0.76	1.40	Wet	3	1	3	Normal 8.09	Normal 5.13
				4.32					*As of Date: 7/1/2022	
Jan-22		0.68	1.32	0.48	Normals 1.24					
Feb-22		0.46	1.01	0.07	0.90					
Mar-22		0.39	0.77	0.63	0.69					
Apr-22		0.27	0.76	1.40	0.74					
May-22		0.40	0.89	1.70	0.88					
Jun-22		0.29	0.71	1.22	0.68					
Jul-21		0.00	0.23	0.00	0.21					
Aug-21		0.08	0.20	0.04	0.16					
Sep-21		0.12	0.29	0.76	0.27					
Oct-21		0.37	0.95	0.81	0.77					
Nov-21		0.53	1.07	1.57	0.86					
Dec-21		0.72	1.56	0.87	1.33					
Totals:		4.31	9.76	9.55	8.73		Sum	18		
Rainfall of prior period was: drier than normal (sum is 6-9), normal (sum is 10-14), wetter than normal (sum is 15-18)								Wetter than Normal		

WETS Table (based on climate period 1991-2020) and Measured Rainfall source:
Normals are calculated based on climate period 1991-2020.

<http://agacis.rcc-acis.org/>

WETS Table

WETS Station: PROSSER, WA								
Requested years: 1991 - 2020								
Month	Avg Max Temp	Avg Min Temp	Avg Mean Temp	Avg Precip	30% chance precip less than	30% chance precip more than	Avg number days precip 0.10 or more	Avg Snowfall
Jan	40.1	26.8	33.5	1.24	0.68	1.32	4	-
Feb	46.7	28.6	37.7	0.90	0.46	1.01	3	-
Mar	55.9	34.9	45.4	0.69	0.39	0.77	3	-
Apr	64.6	39.9	52.3	0.74	0.27	0.76	2	-
May	74.1	47.9	61.0	0.88	0.40	0.89	2	-
Jun	80.9	53.6	67.3	0.68	0.29	0.71	2	-
Jul	90.4	59.5	75.0	0.21	0.00	0.23	1	-
Aug	89.2	57.7	73.5	0.16	0.08	0.20	1	-
Sep	79.7	50.1	64.9	0.27	0.12	0.29	1	-
Oct	64.7	40.8	52.8	0.77	0.37	0.95	2	-
Nov	49.3	31.7	40.5	0.86	0.53	1.07	3	-
Dec	39.5	26.3	32.9	1.33	0.72	1.56	4	-
Annual:					-	-		
Average	64.6	41.5	53.0	-	-	-	-	-
Total	-	-	-	8.73			28	-

GROWING SEASON DATES

Years with missing data:	24 deg = 12	28 deg = 12	32 deg = 8
Years with no occurrence:	24 deg = 0	28 deg = 0	32 deg = 0
Data years used:	24 deg = 18	28 deg = 18	32 deg = 22
Probability	24 F or higher	28 F or higher	32 F or higher
50 percent *	Insufficient data	Insufficient data	4/19 to 10/21: 185 days
70 percent *	Insufficient data	Insufficient data	4/8 to 11/1: 207 days

* Percent chance of the growing season occurring between the Beginning and Ending dates.

STATS TABLE - total precipitation (inches)													
Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annl
1925							0.00						0.00
1926		M0.60	0.10	0.22	0.75	0.86		0.10	0.38	M0.88	M3.64	1.50	9.03
1927	M1.08	1.07	0.60	0.05	0.69	0.23	0.01	0.35	1.54	1.08	1.51	0.23	8.44
1928		0.10	0.87	M0.81	0.05	0.58			M0.27	0.36	M1.10	1.73	5.87
1929	1.10	M0.10	0.11		0.21	M0.67	0.00	0.01	M0.04	M0.17	0.03	1.74	4.18
1930	0.83	0.96	0.20	0.22	0.36	0.00	0.00	0.04	M0.03	0.10	0.35	0.21	3.30
1931	0.50	0.20	1.17	0.43	0.01	0.80	0.00	0.00	M0.17	0.51	1.51	3.02	8.32
1932	M0.48	0.37	0.75	0.39	0.62	0.00	0.05	0.10	0.00	0.94	1.00	0.43	5.13
1933	0.60	0.62	0.97	0.35	1.15	0.42	0.07	0.17	0.	0.	0.32	1.	7.36

									98	47	24	
1934	0.64	0.28	0.75	0.43	0.44	0.21	0.00	0.61	0.52	1.17	1.02	0.57 6.64
1935	0.14	0.53	0.02	0.38	0.07	0.28	0.34	T	0.05	0.90	0.40	1.13 4.24
1936	1.73	0.68	0.16	0.31	0.32	0.78	0.06	0.00	0.10	0.03	0.02	1.08 5.27
1937	0.88	0.90	M0.63	0.99	0.04	1.46	0.39	0.21	0.34	0.82	2.09	2.03 10.78
1938	0.80	0.73	1.05	0.30	0.22	1.64	0.00	0.02	0.03	0.92	0.46	0.39 6.56
1939	0.88	0.65	0.56	0.04	0.08	0.17	M0.16	0.00	0.66	0.31	T	1.14 4.65
1940	1.20	3.18	0.59	0.52	0.15	0.19	0.61	0.00	0.69	2.12	1.58	1.53 12.36
1941	1.61	0.87	0.28	0.38	1.11	1.74	0.30	0.78	0.66	0.80	0.95	0.60 10.08
1942	1.11	0.85	0.09	0.33	1.65	1.37	0.02	0.06	T	0.75	1.80	1.62 9.65
1943	0.41	0.73	0.50	1.08	0.25	0.22	0.00	0.25	0.00	1.58	0.31	0.41 5.74
1944	0.30	0.40	0.39	1.70	0.27	0.58	0.00	T	0.26	0.19	1.62	1.03 6.74
1945	0.98	1.24	0.79	0.48	1.74	0.06	0.03	0.05	0.48	0.70	0.82	1.55 8.92
1946	0.20	0.44	1.33	0.34	0.55	1.01	0.25	0.32	0.51	0.92	0.98	0.06 6.91
1947	M0.06	0.64	0.32	0.84	0.07	1.36	0.57	0.95	0.62	2.50	0.77	0.65 9.35
1948	1.44	0.76	0.07	0.89	1.41	1.54	0.32	0.25	0.21	0.77	0.95	1.07 9.68
1949	0.15	0.90	1.18	0.10	0.27	0.01	MT	0.06	0.70	0.30	1.39	0.05 5.11
1950	1.66	1.24	1.16	0.47	0.13	2.73	M0.02	0.03	0.10	2.73	0.81	1.17 12.25
1951	0.96	0.60	0.13	M0.36	0.57	1.19	0.16	0.31	0.56	1.29	M1.12	0.61 7.86
1952	0.66	0.51	0.41	0.42	0.52	0.91	T	0.07	0.16	0.03	0.23	M1.00 4.92
1953	2.35	0.25	0.23	0.83	M0.63	0.28	0.00	M0.48	0.00	0.74	1.48	0.83 8.10
1954	0.95	0.20	0.72	0.26	M0.39	0.14	0.43	0.04	0.48	0.58	0.99	0.29 5.47
1955	0.31	0.17	0.24	0.81	0.23	0.21	M0.65	0.00	0.77	0.72	1.75	2.41 8.27
1956	2.08	0.86	0.13	0.00	0.53	0.55	0.02	0.33	0.06	1.48	0.20	0.69 6.93
1957	0.38	M0.40	1.89	0.54	1.03	1.90	0.10	0.02	0.83	2.57	0.62	0.81 11.09
1958	2.10	M1.63	0.72	1.45	0.75	0.28	0.38	0.07	0.04	0.25	1.06	1.27 10.00
1959	2.00	0.60	0.31	0.30	0.16	0.53	0.18	0.03	0.90	0.24	0.30	0.36 5.91
1960	0.61	0.99	0.68	0.87	1.14	0.24	0.02	0.22	0.32	0.40	1.60	0.69 7.78
1961	0.70	3.08	1.18	1.42	1.90	0.47	0.17	0.69	0.19	0.11	0.97	0.91 11.79
1962	0.16	0.79	0.55	0.47	2.06	M0.25	0.00	0.55	0.46	1.39	1.10	0.96 8.74
1963	0.29	0.77	0.74	1.55	0.87	0.36	0.44	0.03	0.08	0.41	0.92	1.32 7.78
1964		0.05	0.16	0.10	T	1.54	0.07	0.25	0.03	0.37	1.16	3.46 7.19
1965	1.04	0.01	0.10	0.41	0.28	0.57	0.06	0.25	0.09	0.06	1.35	0.54 4.76
1966	0.56	0.06	0.45	0.06	0.12	0.70	1.16	0.02	0.23	0.42	2.16	1.10 7.04
1967	0.73	T	0.29	1.07	0.31	0.79	0.00	0.00	0.	0.	0.51	0. 4.37

									14	29	24	
1968	0.93	0.75	0.05	0.09	0.20	0.45	0.03	0.74	0.40	1.41	1.73	0.91 7.69
1969	1.57	0.68	0.25	0.95	0.94	0.23	T	0.00	0.57	0.14	0.32	1.59 7.24
1970	2.94	1.16	0.21	0.36	0.26	0.15	0.09	0.00	0.15	0.48	1.03	0.65 7.48
1971	0.94	0.12	1.35	0.27	0.36	1.32	0.20	0.20	1.19	0.29	0.72	1.25 8.21
1972	0.11	0.08	1.07	0.12	2.29	1.52	0.27	0.16	0.24	0.21	0.45	1.46 7.98
1973	0.84	0.32	0.23	0.06	0.45	0.13	0.00	0.02	0.56	1.59	2.74	2.75 9.69
1974	0.66	0.54	0.62	1.44	0.42	0.20	0.75	0.00	0.01	0.22	1.03	1.20 7.09
1975	1.44	1.04	0.36	0.93	0.20	0.06	0.40	1.13	0.00	1.15	0.70	1.13 8.54
1976	0.65	0.13	0.18	0.63	0.29	0.01	0.43	0.79	0.04	0.16	T	0.17 3.48
1977	0.11	0.64	0.48	0.02	0.69	0.27	0.11	1.53	0.74	0.11	0.62	2.37 7.69
1978	2.25	0.80	0.33	0.88	0.63	0.14	0.71	1.10	0.22	0.00	0.54	0.23 7.83
1979	0.95	0.23	0.40	0.55	0.16	T	0.27	0.68	0.26	1.71	1.45	0.71 7.37
1980	M1.56	1.39	0.49	0.84	1.49	0.84	0.02	0.00	1.04	0.47	0.60	2.19 10.93
1981	0.49	0.70	0.31	0.10	0.99	0.79	0.15	0.05	0.72	0.62	0.99	1.90 7.81
1982	M0.49	0.22	0.68	1.33	0.36	1.61	0.04	0.42	1.33	2.05	0.66	1.49 10.68
1983	M1.47	1.52	1.08	0.81	0.66	0.74	0.69	0.67	0.34	0.96	2.44	M1.96 13.34
1984	0.11	0.86	1.03		0.79	0.83	T	0.02	0.90	0.12	2.20	0.59 7.45
1985	0.39	0.65	0.55	0.10	0.61	0.50	T	0.27	0.99	0.51	0.75	0.74 6.06
1986	1.85	1.05	1.07	0.19				0.07	1.81	0.62	0.63	1.32 8.61
1987	0.80		1.53	0.39	M0.19	0.62	0.06	0.04	0.12	0.00	0.55	2.06 6.36
1988	1.07	0.00	0.63	1.18	0.53	0.55	0.15	0.00	0.54	0.04	1.59	0.40 6.68
1989	0.35	0.58	1.78		0.55	0.06	0.05	0.99		0.71	0.77	0.50 6.34
1990	0.89	0.38	0.23	0.62	0.80	0.59	0.04	1.11	0.00		0.07	0.60 5.33
1991	0.44	0.96	M0.56	0.33	0.81	1.25	0.24	0.05	0.00	0.61	2.00	0.84 8.09
1992				2.19	0.02	1.18	0.48	0.42	0.30	0.64	1.33	0.83 7.39
1993	1.23	0.66		0.88	0.38	0.54	0.32	0.12	0.00	0.05	0.19	0.90 5.27
1994	1.01	0.86	0.13		1.08	0.74	0.37	0.13				4.32
1995				0.41								0.41
1996									0.29	1.35	1.16	M1.92 4.72
1997	1.73	M0.56	M1.36	0.83	0.28	0.49	0.52	M0.18	0.86	M0.80	0.80	0.50 8.91
1998	1.45	1.04		0.33	1.26	0.23	0.55	0.27		0.10	1.55	1.19 7.97
1999	0.93	1.64	0.17	0.00	0.41	0.10	0.03	0.12	0.00	0.71	0.71	1.28 6.10
2000	M0.80	1.59	1.12	0.03	1.21	0.84	0.00	0.00	0.51	0.42	1.28	0.27 8.07
2001	M0.53	M0.16	0.81	0.79	0.43	0.60	0.15	0.15	0.08	0.61	1.75	1.27 7.33
2002	0.56	0.83	0.30	0.02	0.76	0.67	0.19	0.00	0.	0.	0.43	2.6.74

Notes: Data missing in any month have an "M" flag. A "T" indicates a trace of precipitation.
Data missing for all days in a month or year is blank.
Creation date: 2022-08-19

AgACIS

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.04	0.03	0.03	0.02	0.02	0.03	0.01	0.01	0.01	0.01	0.03	0.04
2	0.04	0.03	0.03	0.03	0.03	0.02	0.01	0.00	0.00	0.02	0.03	0.04
3	0.05	0.04	0.03	0.02	0.03	0.03	0.01	0.01	0.01	0.01	0.03	0.03
4	0.04	0.03	0.02	0.03	0.02	0.03	0.01	0.00	0.01	0.02	0.02	0.04
5	0.05	0.03	0.03	0.02	0.03	0.02	0.01	0.00	0.01	0.02	0.03	0.04
6	0.04	0.04	0.02	0.03	0.03	0.03	0.01	0.01	0.01	0.01	0.03	0.04
7	0.05	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.01	0.02	0.03	0.04
8	0.05	0.03	0.02	0.02	0.03	0.02	0.01	0.01	0.00	0.02	0.02	0.04
9	0.04	0.03	0.03	0.03	0.03	0.03	0.01	0.00	0.01	0.02	0.03	0.03
10	0.05	0.03	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.03	0.04
11	0.04	0.04	0.02	0.03	0.03	0.03	0.00	0.01	0.01	0.03	0.03	0.04
12	0.05	0.03	0.02	0.02	0.03	0.02	0.01	0.00	0.00	0.02	0.02	0.04
13	0.04	0.03	0.03	0.03	0.03	0.03	0.01	0.01	0.01	0.02	0.03	0.04
14	0.04	0.04	0.02	0.02	0.02	0.03	0.00	0.00	0.01	0.03	0.03	0.04
15	0.04	0.03	0.02	0.02	0.03	0.02	0.01	0.01	0.01	0.03	0.02	0.04
16	0.04	0.03	0.02	0.03	0.03	0.03	0.01	0.01	0.00	0.02	0.03	0.05
17	0.04	0.04	0.02	0.02	0.02	0.02	0.00	0.00	0.01	0.03	0.03	0.04
18	0.04	0.03	0.02	0.03	0.03	0.03	0.01	0.01	0.01	0.03	0.03	0.05
19	0.04	0.03	0.02	0.02	0.03	0.02	0.00	0.00	0.01	0.02	0.03	0.04
20	0.03	0.03	0.02	0.03	0.03	0.02	0.01	0.01	0.01	0.03	0.03	0.05
21	0.04	0.04	0.02	0.02	0.03	0.02	0.00	0.00	0.01	0.03	0.03	0.05
22	0.03	0.03	0.02	0.03	0.03	0.02	0.01	0.01	0.01	0.03	0.03	0.04
23	0.04	0.03	0.02	0.03	0.03	0.02	0.00	0.00	0.01	0.03	0.02	0.05
24	0.04	0.03	0.02	0.02	0.03	0.01	0.01	0.01	0.01	0.03	0.03	0.05
25	0.03	0.03	0.02	0.02	0.03	0.02	0.01	0.00	0.01	0.03	0.03	0.05
26	0.04	0.03	0.02	0.03	0.03	0.02	0.00	0.01	0.01	0.03	0.03	0.05
27	0.03	0.03	0.02	0.02	0.04	0.01	0.01	0.00	0.01	0.03	0.03	0.05
28	0.04	0.03	0.02	0.02	0.03	0.02	0.00	0.01	0.01	0.03	0.03	0.04
29	0.03	-	0.02	0.03	0.02	0.02	0.01	0.00	0.02	0.04	0.04	0.05
30	0.04	-	0.02	0.02	0.03	0.01	0.00	0.01	0.01	0.03	0.03	0.04
31	0.03	-	0.02	-	0.03	-	0.01	0.00	-	0.03	-	0.05