2020 WETLAND MONITORING REPORT

SR 900 78th Vicinity to Newport Way Widening
Lake Sammamish State Park (LSSP) Compensatory Mitigation Site

WIN #A90098V

USACE IP NWS-2007-29-SOD

Northwest Region

Wetlands Program

Issued March 2021

WSDOT

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Site Summary

SR 900 78th Vicinity to Newport Way Widening
Lake Sammamish State Park (LSSP) Compensatory Mitigation Site
USACE IP NWS-2007-29-SOD

General Site Information			
USACE IP Number	NWS-2007-29-SOD		
Ecology WQC	#5317		
Mitigation Location	Southwest of Issaquah Creek in Lake Sammamish State Park		
LLID Number	1220619475588		
Construction Date	2009–2010		
Monitoring Period	2011–2020		
Year of Monitoring	10 of 10		
Type of Impact	Wetland		Buffer
Area of Project Impact[1]	0.75 acre		0.91
Type of Compensation	Wetland Establishment	Wetland Enhancement	Buffer Enhancement
Planned Area of Compensation[2]	1.74 acres	0.11 acre	2.23 acres

[1] Impact numbers sourced from WSDOT (2010).
[2] Compensatory Mitigation numbers sourced from WSDOT (2010).

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1. Introduction

1.1. Summary

This report summarizes final-year (Year-10) monitoring activities at the 900 Lake Sammamish State Park Compensatory Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site success. Monitoring activities included vegetation surveys, photo-documentation, and a wetland delineation. Vegetation monitoring occurred on August 3, and a wetland delineation was conducted on October 7 in 2020.

1.2. Monitoring Results and Management Activities

Performance Standards	2020 Results	Management Activities
Wetland delineation: minimum 1.85 acres wetland	Appendix C	
Minimum 70% fac or wetter woody cover in the wetland	75% (qualitative)	
Minimum 50% woody cover in the buffer	90% (qualitative)	
Maximum 15% cover blackberries	<1% (qualitative)	Blackberry control conducted in March and November, 2020
Knotweed and purple loosestrife will be eradicated	None observed	

2. Site Description

2.1. Location

This 4.08-acre compensatory mitigation site is located in Lake Sammamish State Park, Issaquah, WA (Figure 1).

Driving Directions:
From I-90 East, take Exit 15 for WA-900 West/17th Avenue Northwest. Turn left onto WA-900 East/17th Avenue Northwest. After approximately 0.3 mile, turn left onto Northwest Sammamish Road. After approximately 0.4 mile, turn right into Lake Sammamish State Park. Drive straight to the end of the last parking lot. The trail to the wetland mitigation site starts at the northeast corner of the last parking lot.

2.2. Purpose and Description

This site was created to replace acreage and functions lost due to wetland and buffer impacts associated with the widening of SR 900. As a result of the widening project, 0.75 acre of wetland and 0.91 acre of wetland and stream buffer were permanently impacted. Wetland functions that will be mitigated for at this site include flood flow alteration, flood storage, aquatic invertebrate and amphibian habitat, general wildlife habitat, and sediment, nutrient, and toxicant removal.

2.3. Study Area

The 900 Lake Sammamish State Park Compensatory Mitigation Site comprises 1.74 acres of wetland establishment, 0.11 acre of wetland enhancement, 1.98 acres of wetland buffer enhancement, and 0.25 acre of riparian buffer enhancement within existing state park property (Figure 1).

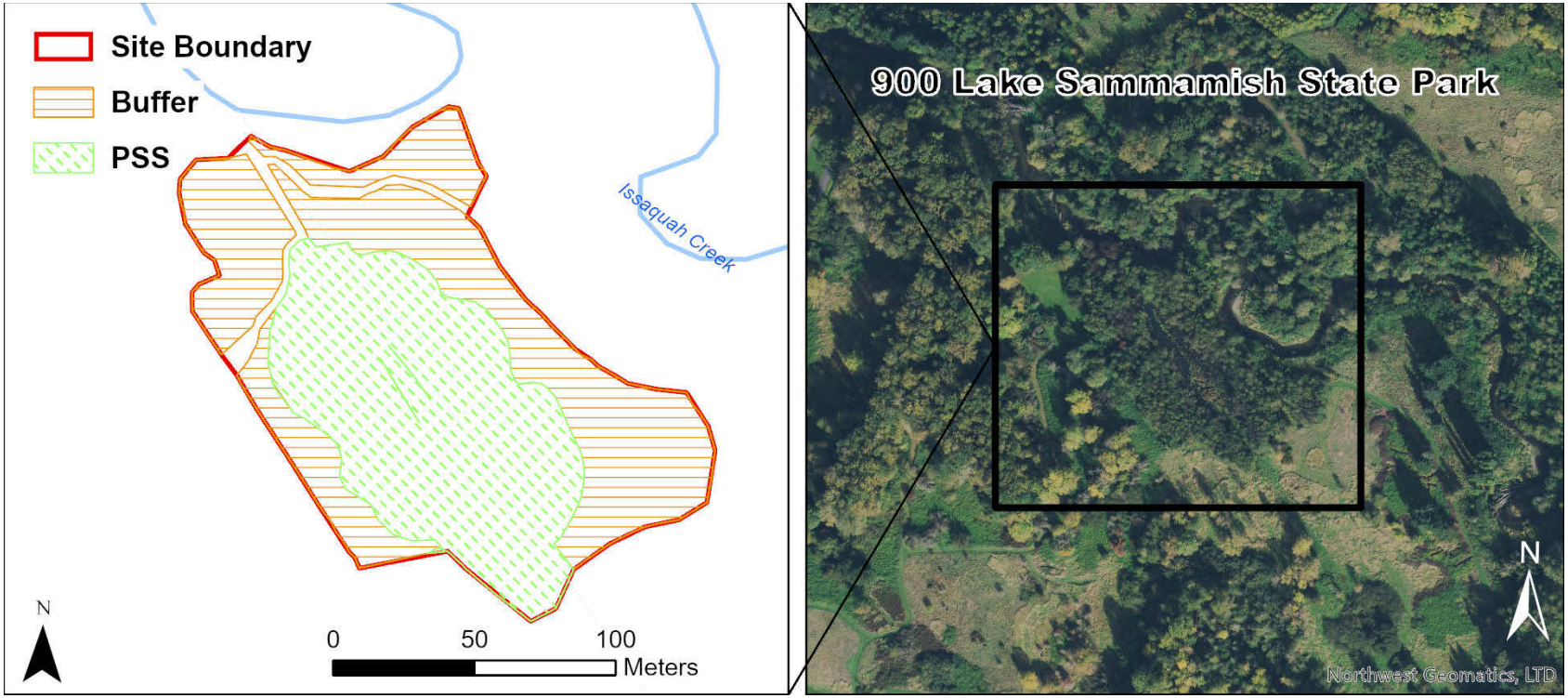

Figure 1. Site Sketch

3. Performance Standards and Methods

3.1. Performance Standards

Year 10

Performance Standard 1
The wetland area at LSSP will be delineated using current methods. The mitigation site will contain 1.74 acres of created wetland and 0.11 acre of enhanced wetland for a total wetland area of 1.85 acres.

Performance Standard 2
Native facultative or wetter woody species will achieve a minimum of 70 percent coverage within the scrub-shrub planting areas. Native colonizing vegetation will be included in these coverage calculations.

Performance Standard 3
Native woody species will achieve a minimum of 50 percent coverage in the wetland buffer and riparian buffer planting areas. Native colonizing vegetation will be included in this coverage calculation.

Performance Standard 4
15% maximum cover across the entire mitigation site for blackberry (*Rubus laciniatus* and *R. armeniacus*)

Performance Standard 5
The presence of Japanese knotweed (*Polygonum cuspidatus* and related species) and purple loostrife (*Lythium salicaria*) will initiate eradication measures.

Appendix A shows the As Built Planting Plan (WSDOT 2010).

3.2. Methods

WSDOT staff performed a wetland delineation using methods described in the *Corps of Engineers Wetlands Delineation* Manual (Environmental Laboratory 1987), *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Version 2.0) (USACE 2010) (Performance Standard 1). A Global Positioning System (Trimble Mapping Grade) was used to collect spatial data.

The tables below document sample methods used for all of the remaining performance standards (PS)/performance criteria (PC) required by the mitigation plan or permits. Additional details on our methods are located here: WSDOT Wetland Mitigation Site Monitoring Methods Paper (WSDOT 2008).

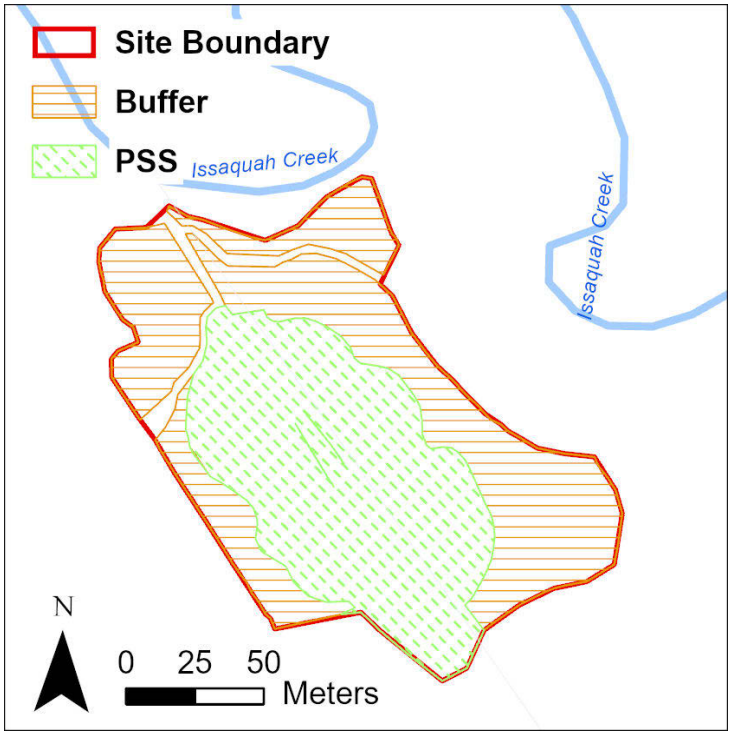

Figure 2. Sample Design

	PS 2, 3	PS 4	PS 5
Attribute	Cover	Cover	Presence/Absence
Target population	Native woody species	Invasive species	Noxious weeds
Zone	Entire site	Entire site	Entire site
Sample method	Qualitative	Qualitative	Qualitative

4. Discussion

4.1. Site development

This site is continuing its successful development and is still meeting all of its current and final-year vegetation performance standards, as it has since 2014. The woody plantings continue to develop well and the only areas that are not approaching total woody cover are the areas directly adjacent to the un-named creek where reed canarygrass (*Phalaris arundinacea*) cover dominates, intermingled with a native emergent community that provides habitat for amphibians.

Reed canarygrass (*Phalaris arundinacea*) cover has increased over the last two years, perhaps due to changes in hydrologic regime near the stream from beaver activity. Reed canarygrass lines the stream for the entire length of the site, and has now encroached on the adjacent wetland community that had begun to develop as an emergent community. This area comprises approximately 10% of the total scrub-shrub wetland area. Since most of the site exhibits high cover with low light penetration, reed canarygrass is not expected to spread much more than it already has, unless beaver activity continues to change the site's water regime.

The mapped buffer area from the original as-built plans was impacted by erosion from Issaquah Creek, but there did not appear to be any new significant erosion along the creek bank since the pedestrian trail was relocated through the buffer in 2017.

Beaver continue to actively use the site. At the time of monitoring, the bridge over the unnamed creek had been removed in order to breach a beaver dam that was causing flood damage to the walking trail. Many fresh beaver chews were observed. Other wildlife observations included deer scat and tracks, and sightings of some bird species, including American robin, black-capped chickadee, and song sparrow. The diverse and multilayered plant community in the scrub-shrub wetland and buffer provides suitable habitat for a variety of species.

In addition to wildlife habitat, the dense woody vegetation is likely performing other intended functions by slowing water flow to improve flood storage capacity and facilitating the removal of sediments and toxicants.

4.2. Results

Performance Standard 1
(Wetland Delineation)

The site was delineated in fall 2020. See Appendix D for a discussion of the results.

Performance Standard 2
(Minimum 70% cover facultative or wetter woody species in the wetland)

Cover of facultative or wetter woody species in the scrub-shrub wetland is qualitatively estimated at 75%-80% (Photo 1). This exceeds the final year performance standard threshold.

The site has developed more rapidly than anticipated and has been meeting the year-10 final year standard for woody cover for seven years. On April 12, 2016 a request to discontinue quantitative sampling for the wetland was sent to USACE and the Department of Ecology; this request was accepted on April 14, 2016. The final year standards are still currently being met.

Dominant species include Pacific willow (*Salix lasiandra*), Scouler's willow (*Salix scouleriana*), black cottonwood (*Populus balsamifera*), redosier dogwood (*Cornus alba*), and Nootka rose (*Rosa nutkana*).

Approximately 10% of the scrub-shrub wetland near the stream that was originally planted with willow species has developed as an emergent community dominated by reed canarygrass (*Phalaris arundinacea*) (Photo 2). Woody cover in this area is estimated at 15%.

Photo 1. Woody cover in the wetland (August 2020)

Photo 2. Reed canarygrass cover along the stream (August 2020)

Performance Standard 3
(Minimum 50% cover woody species in the buffer)

Woody cover in the buffer is qualitatively estimated at 90% (Photo 3). This exceeds the final year performance standard threshold.

The site has developed more rapidly than anticipated and has been meeting the year-10 final year standard for woody cover for seven years. On April 12, 2016 a request to discontinue quantitative sampling for the wetland and buffer was sent to USACE and the Department of Ecology; this request was accepted on April 14, 2016. The final year standards are still currently being met.

A portion of the buffer on the north east side of the site was eroded by Issaquah Creek in 2016, resulting in the relocation of the pedestrian trail through the buffer (Photo 4). No evidence of new erosion was observed, and the trail has not significantly reduced cover in the buffer.

Dominant species include western red cedar (*Thuja plicata*), black cottonwood (*Populus balsamifera*), Pacific crabapple (*Malus fusca*), snowberry (*Symphoricarpos albus*), and thimbleberry (*Rubus parviflorus*).

Photo 3. Woody cover in the buffer (August 2020)

Photo 4. Relocated trail through the buffer (August 2020)

Performance Standard 4

(Maximum 15% cover blackberries)

Cover by Himalayan blackberry (*Rubus armeniacus*) and cutleaf blackberry (*Rubus laciniatus*) is qualitatively estimated at less than 1% across the site.

Performance Standard 5

(Knotweeds and purple loosestrife will be eradicated)

No knotweeds or purple loosestrife were observed at the time of monitoring.

4.3. Adaptive Management

This site met all permit requirements and could close out. Until the Corps sends the letter of close out, WSDOT will maintain the site with four weeding and trash pickups in 2021. When the site officially closes out it will transfer to Washington State Parks and they will maintain it in perpetuity.

5. References

1. [Ecology] Washington State Department of Ecology. 2008. Water Quality Certification Order 5317 for Corps Public Notice No. NWS-2007-29-SOD to widen SR 900 between Talus Drive and Newport Way in the City of Issaquah, King County, Washington.

2. Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Vicksburg (MS): US Army Engineer Waterways Experiment Station. Technical Report Y-87-1. Available at: http://www.swl.usace.army.mil/Portals/50/docs/regulatory/wlman87.pdf

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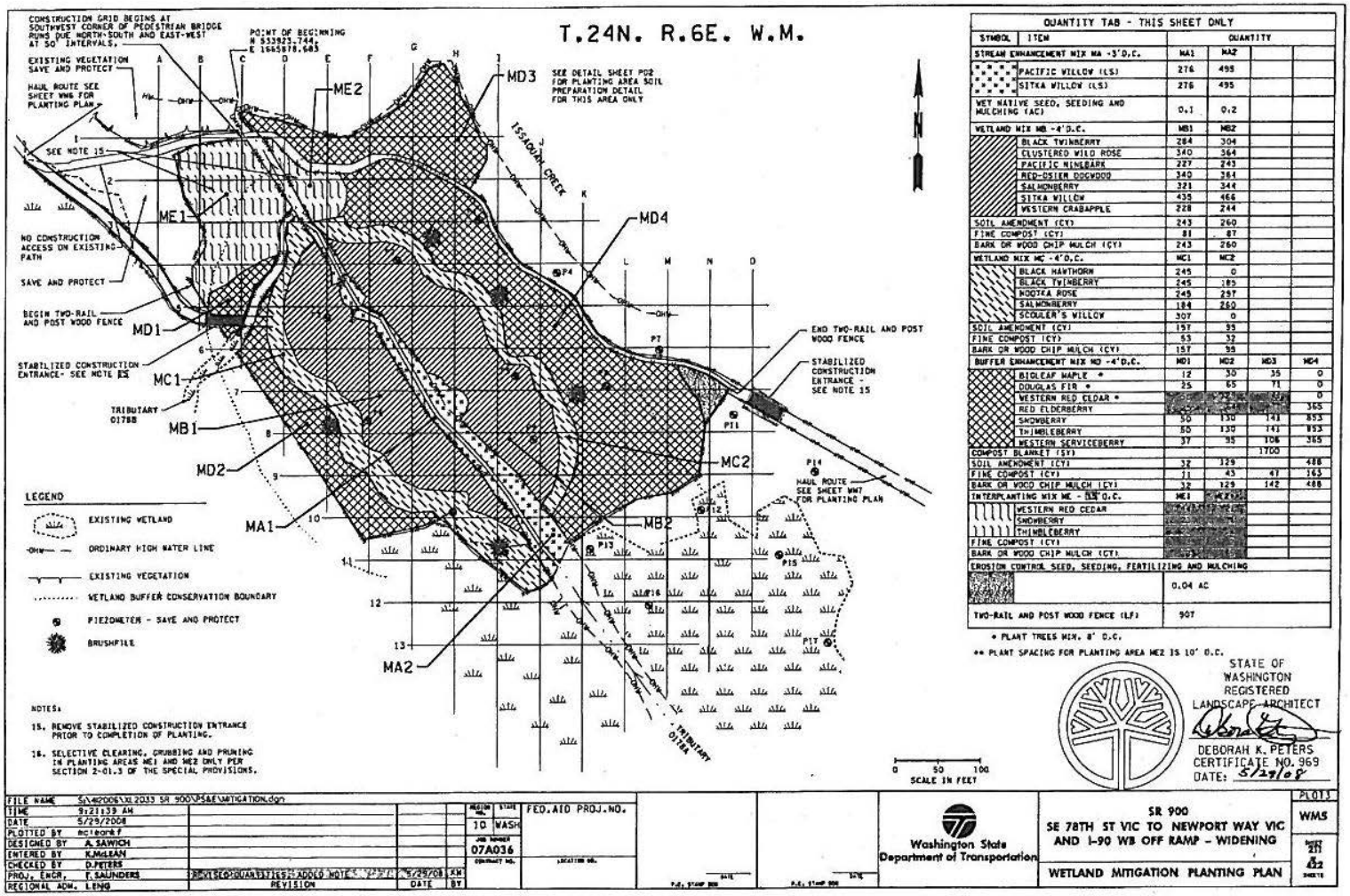
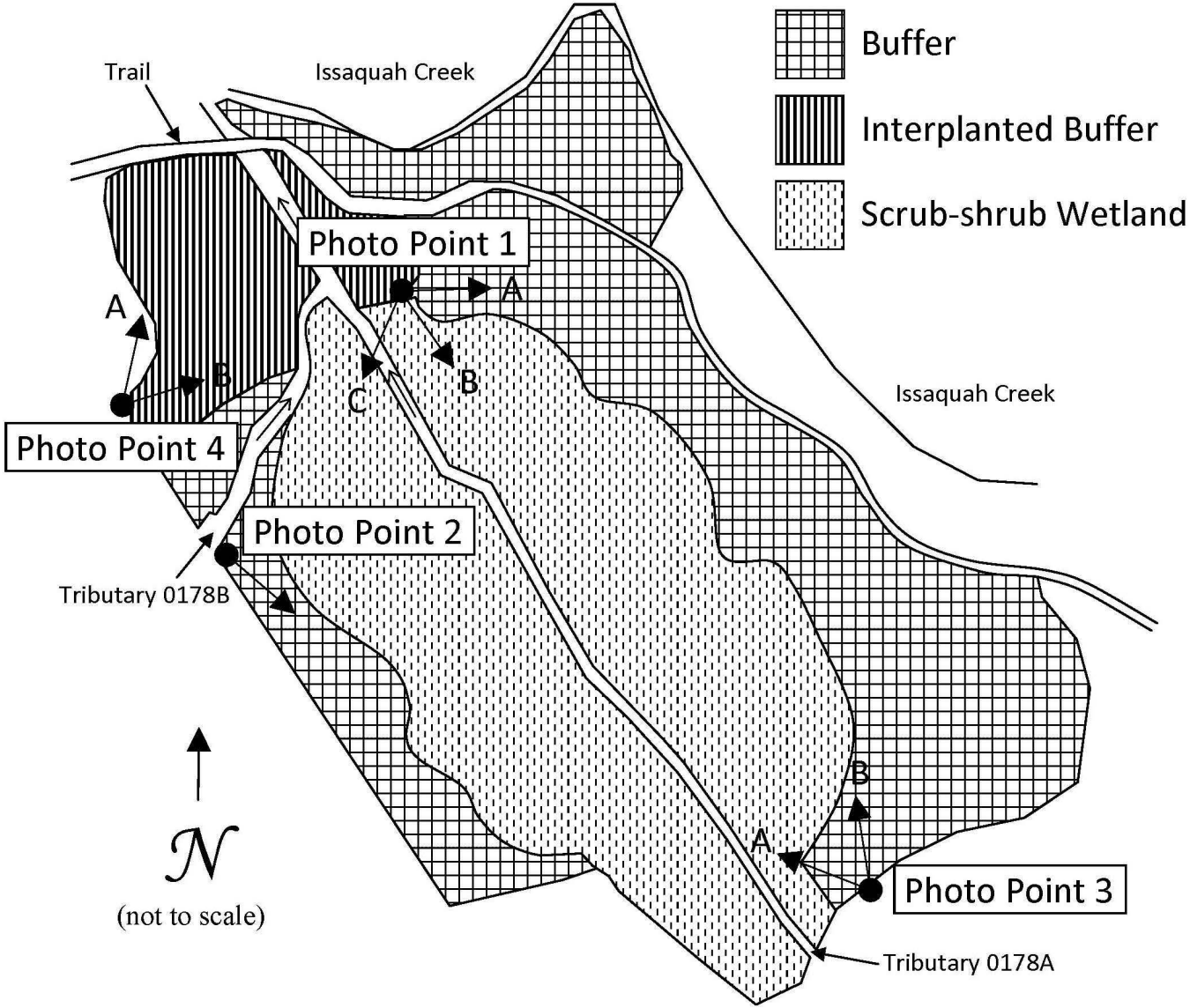
Appendix A. Planting Plan and Photo Point Locations

(from WSDOT 2010)




Buffer
Interplanted Buffer
Scrub-shrub Wetland
Trail
Issaquah Creek
Photo Point 1
A
B
C
Photo Point 4
Photo Point 2
Tributary 0178B
Issaquah Creek
N
(not to scale)
B
A
Photo Point 3
Tributary 0178A

Appendix B. Photo Points

The photographs below were taken from permanent photo-points on August 3, 2020 and document current site success.

Photo Point 1a

Photo Point 1b

Photo Point 1c

Photo Point 2

Photo Point 3a

Photo Point 3b

Photo Point 4a

Photo Point 4b

Appendix C. Wetland Delineation

WETLAND DELINEATION REPORT UPDATE

VERIFICATION OF WETLAND BOUNDARY

SR 900 Lake Sammamish State Park Compensatory Mitigation Site

SR 900: 78th Vicinity to Newport Way Widening
(MP 29.09 to MP 29.10)
USACE (IP) NWS-2007-29-SOD
Ecology WQC Order 5317

King County, Washington

Prepared by:
Jocelyn Munoz
WSDOT Environmental Services Office
Olympia, Washington

February 2021

Washington State
Department of Transportation

Introduction

This report was prepared by the Washington State Department of Transportation (WSDOT) to describe the wetland boundary delineation for the SR 900 Lake Sammamish State Park Compensatory Mitigation Site (Compensation Site). Field work was conducted by WSDOT wetland biologists Tatiana Dreisbach and Jocelyn Munoz, on October 7, 2020. The delineation identifies 1.74 acres of wetland within the mitigation site boundaries and an additional 0.08 acre occurring in intended upland buffer areas of the site.

The wetland was previously delineated in March 2015 (WSDOT 2016). The purpose of the 2020 field work was to reevaluate the prior wetland boundary and document any wetland boundary modifications if necessary. The 2020 delineation resulted in wetland boundary amendments in several locations and biologists elected to delineate the entire wetland boundary instead of amending sections of the previously delineated 2015 wetland boundary.

General Information for the SR 900 Lake Sammamish State Park Compensation Site			
Location:	S20, T24N, R6E. King County. (Vicinity map, Figure 1)		
	**USACE NWP IP Number**	NWS-2007-2-SOD	
	Ecology WQC Order Number	5317	
	Long./Lat. ID Number	1220619475588	
	Land Resource Region (LRR)	A	
	Major Land Resource Area (MLRA)	2	
	Construction Date	2009-2010	
	Monitoring Period	2011-2020	
	Year of Monitoring	10 of 10 (in 2020)	
Area of Project Impact[1]	0.75 acre		
Type of Mitigation	**Required Acreage**[1]	**2020 Delineated Acreage**	
Wetland Establishment	1.74 acres	1.33	
Wetland Enhancement	0.11 acre	0.10	
Stream Enhancement	0.31 acre	0.31	
Totals	2.16 acres	1.74	
Total Delineated Wetland Area	In addition to 1.74 acres of wetland occurring within the required establishment and enhancement areas, an additional 0.08 acres of wetland is present in upland buffer areas. **The total delineated wetland area within the study area is 1.82 acres** (Figure 2).		

[1] Project impact and required acreages from USACE Individual Permit (USACE 2008)/Final Wetland Mitigation Plan (WSDOT 2006).

Location

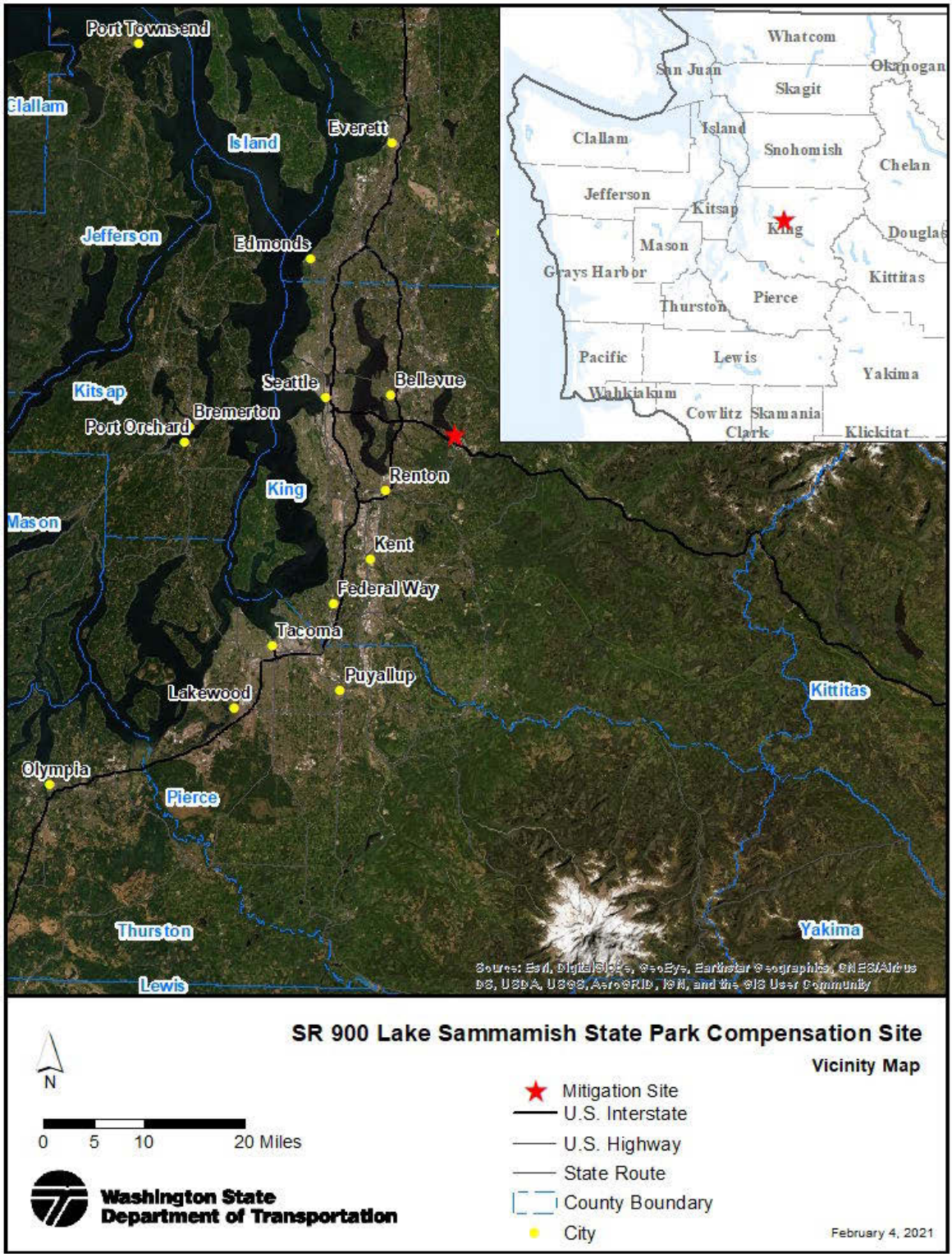


Figure 1. Vicinity Map

Methods

The Year 5 (2015) wetland boundary within the SR 900 Lake Sammamish State Park Compensation Site was compared to current conditions observed in Year 10 (2020). Biologists determined that establishing a new wetland boundary, instead of amending the previous Year 5 boundary, was most applicable method to document conditions observed in Year 10. Biologists used routine methods described in:

- Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987),
- Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (USACE 2010)

Wetland boundaries were delineated based on on-site observations of hydrology, soils, and plant communities, in conjunction with background information.

A Global Positioning System (GPS) equipped Panasonic Toughpad paired with a Trimble R2 Global Navigation Satellite System (GNSS) Receiver mapping grade unit was used to

- navigate to 2015 delineation boundary
- record 2020 sampling point locations and
- record the 2020 wetland boundary (Figure 2).

Wetland mitigation types were georeferenced by digitizing the compensation site planting plan in ArcGIS 10.6.1. Inherent in both GPS and georeferencing are minute errors, resulting in slight inaccuracies in both boundary line placement and acreage calculations. These tools represent the best available methods at the time of the study and report preparation.

Wetland Delineation and Study Area

Study Area

Wetlands described in this report were assessed only within the wetland compensation site boundary (Figure 2). The wetland on the compensation site is contiguous with off-site wetland areas occurring beyond the compensation site boundary. Wetland areas beyond the compensation site boundary were not included in this delineation.

Wetland Changes Since 2015

The SR 900 Lake Sammamish State Park compensation site remains in similar condition as documented in 2015. Wetland area within the site boundary has increased from 1.53 acres in 2015 to 1.82 acres in 2020.

Beaver are present in the watershed and have influenced site conditions, primarily water levels. At one time a beaver dam appeared to increase water levels, however the

dam was not functioning to create ponding conditions during the 2020 site visit. Woody vegetation did not show significant observable beaver signs.

The vegetation community has continued to develop with increased height, cover, and structure. Palustrine emergent (PEM) wetland vegetation is established within the stream channel in some locations. Part of the palustrine scrub-shrub (PSS) community has developed as an emergent wetland due to beaver activity. Additionally, the vegetation along the edge of the palustrine-scrub-shrub developed into a palustrine forested area. The vegetation interspersed with large woody debris and channel sinuosity, combined with variation in hydroperiods and Cowardin classes provide habitat complexity on the compensation site.

Wetland Boundary Verification

The 2020 delineation verification determined 1.74 acres of wetland were present within the wetland establishment and enhancement areas, with an additional 0.08 acre present in the adjacent upland buffer area, totaling 1.82 acres present on the site. Moderate wetland boundary amendments were made in 2020 from conditions documented in 2015, and an entirely new wetland boundary was collected to document the 2020 wetland boundary.

Delineation data were collected at three sampling points and recorded on wetland determination data forms (Appendix A). Paired wetland and upland sample points were used to define the wetland edge and were placed in locations documenting where the wetland boundary required adjustment. An additional sample point characterized conditions found in the interior of the wetland.

Data recorded on wetland determination data forms characterize typical wetland and upland conditions observed on site. Vegetation, soils, and hydrology were examined in many additional sampling locations to determine the wetland boundary.

Precipitation

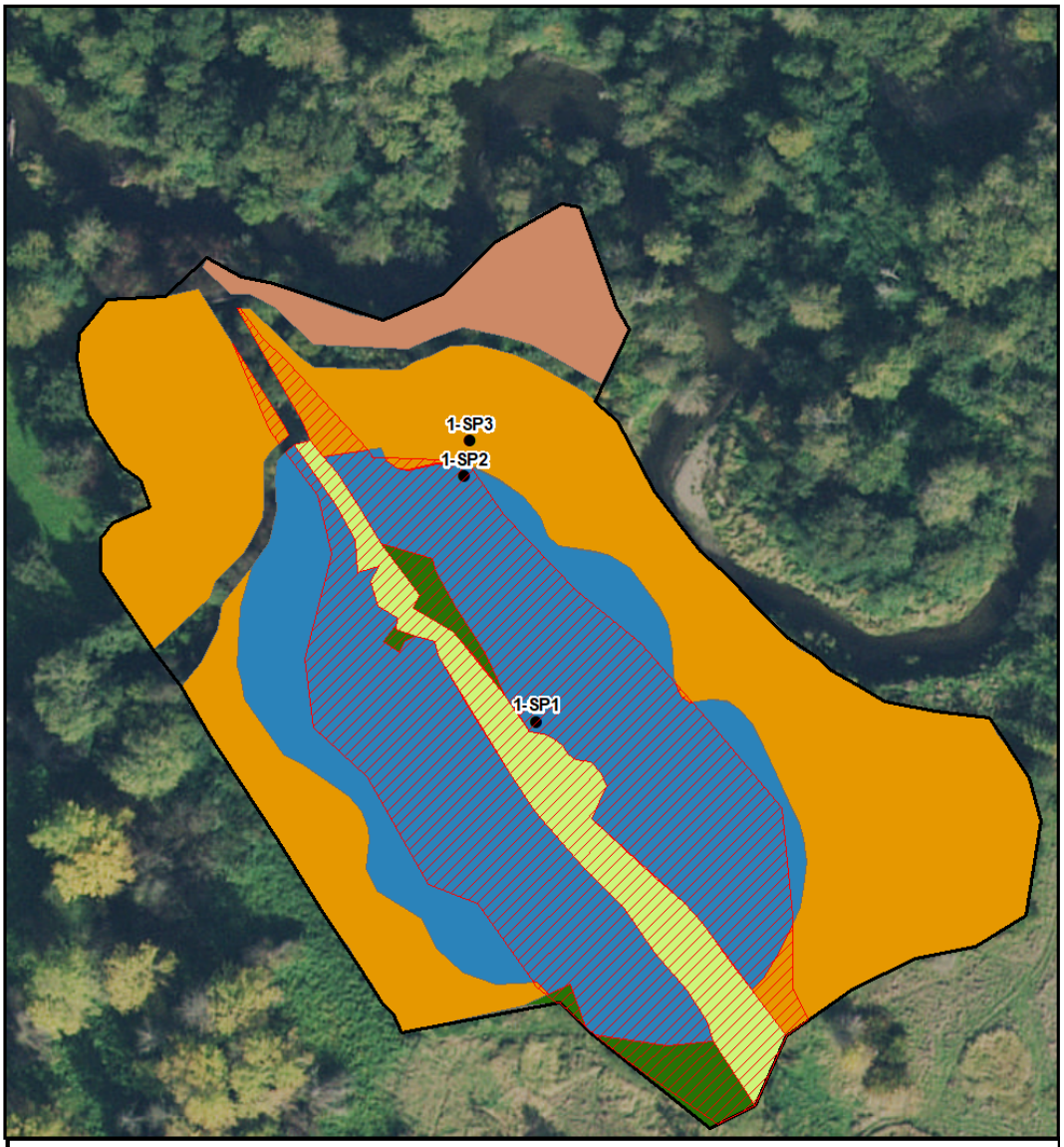
The Regional Delineation Supplement Version 2.0 (USACE 2010) recommends using methods described in Chapter 19 in *Engineering Field Handbook* (NRCS 2015) to determine if precipitation occurring in the three full months prior to the site visit was normal, drier than normal, or wetter than normal. Actual rainfall is compared to the normal range of the 30-year average. When considering the three prior months as a whole, normal precipitation conditions were present prior to field work. The two months prior to field work were within the normal range, and the third prior month was drier than normal (Appendix B-1).

No precipitation was recorded in the ten days preceding field work (Appendix B-2).

Growing Season

The delineation occurred at the very end of the growing season. Most observed herbaceous plants were identifiable to species such as woolgrass (*Scirpus cyperinus*), creeping buttercup (*Ranunculus repens*), and reed canarygrass (*Phalaris arundinacea*). Woody species were identifiable to species.

SR 900 Lake Sammamish State Park, GPS Data: 10/07/2020



2020 Delineation & Intended Mitigation Summary			
Mitigation Type	**Intended ac.**	**2020 Delineation ac.**	**Non-wetland ac.**
Wetland Establishment	1.74	1.33	0.41
Wetland Enhancement	0.11	0.10	0.01
Stream Enhancement	0.31	0.31	0.00
Wetland Totals	**2.16**	**1.74**	**0.42**
Upland Wetland Buffer	1.98	0.08	1.90
Upland Stream Buffer	0.25	0.00	0.25
Total Upland	**2.23**	**0.08**	**2.15**
Totals	**4.39**	**1.82**	**2.57**

Sample Points
Site Boundary
2019 Digital Orthophoto
GPS Data from WSDOT
0 12.5 25 50 Meters
N
Washington State Department of Transportation
February 4, 2021

Figure 2. 2020 Delineation and Mitigation Types Map.

SR 900 Lake Sammamish State Park Compensatory Mitigation Site – Wetland Delineation Summary		
Total Delineated Wetland Area	1.82 acres	
	**Wetland Determination Data Forms**	Appendix A; Sampling Points W1-SP1 and W1-SP2
	Upland Determination Data Form	Appendix A; Sampling Point W1-SP3
	Delineators	Tatiana Dreisbach Jocelyn Munoz
	Delineation Date	October 7, 2020
Vegetation	Trees – black cottonwood (*Populus balsamifera*), red alder (*Alnus rubra*) Pacific willow (*Salix lasiandra*) Shrubs – twinberry honeysuckle (*Lonicera involucrata*), Nootka rose (*Rosa nutkana*), black cottonwood saplings Herbs – reed canarygrass, broadleaf cattail (*Typha latifolia*), woolgrass, giant horsetail (*Equisetum telmateia*)	
Soils	Soils examined to a depth of 20 inches exhibited hydric characteristics. Matrix colors of 10YR 4/2, 5Y 6/2, and 5Y 7/2 were observed. Redoximorphic concentrations and depletions were observed throughout the soil profile. Indicator Depleted Matrix (F3) met.	
Hydrology	A high groundwater appears to be the main source of hydrology, though it was not observed during the October 2020 field visit, which occurred at the end of the dry season. Overbank flooding associated with the tributary to Issaquah Creek, occasionally flow through the wetland, as indicated by the presence of drift deposits. Precipitation also contributes to the hydrologic regime of this wetland. Beaver have been active near the outlet on the southern site boundary. A dam at one point likely ponded water in the interior of the site, however during the October 2020 site visit, the dam was not functioning to pond water on the site. The following indicators were observed: Drift Deposits (B3), Surface Soil Cracks (B6), Geomorphic Position (D2), and FAC-Neutral Test (D5).	
Rationale for Delineation	Positive indicators of all three wetland criteria are present. Placement of boundary determined by vegetation indicators and topographic break. Hydrology and soil indicators were not helpful in informing placement of the boundary. In many places near the wetland boundary hydric soil indicators were present in adjacent upland areas. Concentrations had sharp boundaries in upland areas, while diffuse boundaries were present in adjacent wetland areas indicating presence of soil saturation or inundation during other parts of the year.	

Limitations

This wetland delineation report documents the investigation, best professional judgment, and conclusions of WSDOT based on the site conditions encountered at the time of this study. The wetland delineation was performed in compliance with accepted standards for professional wetland biologists and applicable federal, state, and local laws and ordinances, and WSDOT policies and guidance. It is correct and complete to the best of our knowledge. It should be considered a preliminary jurisdictional determination of wetlands and other waters until it has been reviewed and approved in writing by the appropriate jurisdictional authorities.

References

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Appendix A —Wetland Determination Data Forms

Wetland Delineation Data Forms for:

W1-SP1

W1-SP2

W1-SP3

Wetland polygons, sampling point locations, and wetland names shown in Figure 2.

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

Project/Site: 900 Lake Sammamish | City/County: Issaquah/King | Sampling Date: 10/7/2020

Applicant/Owner: WSDOT | State: WA | Sampling Point: W1-SP1

Investigator(s): Tatiana Dreisbach, Jocelyn Munoz | Section, Township, Range: S 20, T24N, R 6E

Landform (hillslope, terrace, etc.): depression | Local relief (concave, convex, none): concave | Slope (%): 5

Subregion (LRR): A | Lat: 122.0581153W | Long: 47.5568317 N | Datum: NAD83HARN

Soil Map Unit Name: Sammamish Silt Loam | NWI Classification: none

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 ○ No

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

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

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

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20ft x 20ft)	Absolute % Cover	Dom. Sp.?	Relative % Cover	Indicator Status
1.				
2.				
3.				
4.				
	= Total Cover			
Sapling/Shrub Stratum (Plot size: 15ft x 15ft)				
1.				
2.				
3.				
4.				
5.				
	= Total Cover			
Herb Stratum (Plot size: 5ft x 5ft)				
1. *Phalaris arundinacea*	70	**Y**	61.4	FACW
2. *Typha latifolia*	20	N	17.5	OBL
3. *Scirpus cyperinus*	10	N	8.8	OBL
4. *Juncus effusus*	2	N	1.8	FACW
5. *Epilobium ciliatum*	2	N	1.8	FACW
6. *Lotus corniculatus*	2	N	1.8	FAC
7. *Equisetum telmateia*	2	N	1.8	FACW
8. *Alnus rubra*	2	N	1.8	FAC
9. *Salix lasiandra*	2	N	1.8	FACW
10. *Salix scouleriana*	2	N	1.8	FAC
11.				
	114 = Total Cover			
Woody Vine Stratum (Plot size: 5ft x 5ft)				
1.				
2.				
	= Total Cover			

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	78	x 2 =	156
FAC species	6	x 3 =	18
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	114 (A)		204 (B)

Prevalence Index = B/A = 1.789

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? ● Yes ○ No

Remarks:

SOIL

Sampling Point: W1-SP1

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

Depth	Matrix			Redox Features						
(inches)	Color (moist)		%	Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR	4/2	95	7.5YR	4/4	5	C	M	Silt Loam	concentration is distinct
4-12	5Y	6/2	83	5Y	6/1	10	D	M	Silty Clay Loam	
				7.5YR	5/8	2	C	PL		concentration is prominent
				7.5YR	5/6	5	C	M		concentration is prominent
12-19	5Y	6/2	80	7.5YR	5/6	20	C	M	Sandy Loam	concentration is prominent

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

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

- ☐ 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 Depth (inches): _____

Water Table Present? ○ Yes ● No Depth (inches): _____

Saturation Present? (includes capillary fringe) ○ Yes ● No Depth (inches): _____

Wetland Hydrology Present? ● Yes ○ No

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

Remarks:

Delineated at the end of the dry season with little recharge happening in the ground system.

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

Project/Site: 900 Lake Sammamish | City/County: Issaquah/King | Sampling Date: 10/7/2020

Applicant/Owner: WSDOT | State: WA | Sampling Point: W1-SP2

Investigator(s): Tatiana Dreisbach, Jocelyn Munoz | Section, Township, Range: S 20, T 24N, R 6E

Landform (hillslope, terrace, etc.): hillslope | Local relief (concave, convex, none): concave | Slope (%): 10

Subregion (LRR): A | Lat: 122.0583141 W | Long: 47.5572634 N | Datum: NAD83HARN

Soil Map Unit Name: Sammamish Silt Loam | NWI Classification: PSS

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 ○ No

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

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

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

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20ft x 20ft)	Absolute % Cover	Dom. Sp.?	Relative % Cover	Indicator Status
1. *Populus balsamifera*	40	Y	66.7	FAC
2. *Alnus rubra*	10	N	16.7	FAC
3. *Salix lasiandra*	10	N	16.7	FACW
4.				
	60	= Total Cover		
Sapling/Shrub Stratum (Plot size: 20ft x 20ft)				
1. *Lonicera involucrata*	40	Y	47.1	FAC
2. *Rosa nutkana*	40	Y	47.1	FAC
3. *Populus balsamifera*	5	N	5.9	FAC
4.				
5.				
	85	= Total Cover		
Herb Stratum (Plot size: 5ft x 5ft)				
1. *Equisetum telmateia*	10	Y	50.0	FACW
2. *Epilobium ciliatum*	2	Y	10.0	FACW
3. *Rumex crispus*	2	Y	10.0	FAC
4. *Geranium robertianum*	2	Y	10.0	FACU
5. *Geum macrophyllum*	2	Y	10.0	FAC
6. *Agrostis capillaris*	2	Y	10.0	FAC
7.				
8.				
9.				
10.				
11.				
	20	= Total Cover		
Woody Vine Stratum (Plot size: 5ft x 5ft)				
1.				
2.				
		= Total Cover		

% Bare Ground in Herb Stratum 80

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 88.9% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	22	x 2 =	44
FAC species	141	x 3 =	423
FACU species	2	x 4 =	8
UPL species	0	x 5 =	0
Column Totals:	165 (A)		475 (B)

Prevalence Index = B/A = 2.879

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? ● Yes ○ No

Remarks:

SOIL

Sampling Point: W1-SP2

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	85	10YR 6/6	5	C	M	Silt Loam	concentration is prominent
			2.5Y 5/2	10	D	M		
4-16	5Y 7/2	85	7.5YR 4/6	5	C	M	Silty Clay Loam	concentration is prominent
			7.5YR 5/8	5	C	PL		concentration is prominent
			7.5YR 4/4	5	C	M		concentration is prominent

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

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

- ☐ 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 Depth (inches): _____

Water Table Present? ○ Yes ● No Depth (inches): _____

Saturation Present? (includes capillary fringe) ○ Yes ● No Depth (inches): _____

Wetland Hydrology Present? ● Yes ○ No

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

Remarks:

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

Project/Site: 900 Lake Sammamish | City/County: Issaquah/King | Sampling Date: 10/7/2020

Applicant/Owner: WSDOT | State: WA | Sampling Point: W1-SP3

Investigator(s): Tatiana Dreisbach, Jocelyn Munoz | Section, Township, Range: S 20, T24N, R 6E

Landform (hillslope, terrace, etc.): hillslope | Local relief (concave, convex, none): concave | Slope (%): 10

Subregion (LRR): A | Lat: 122.0583022 W | Long: 47.5573272 N | Datum: NAD83HARN

Soil Map Unit Name: Sammamish Silt Loam | NWI Classification: PSS

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 ○ No

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

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

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

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 20ft x 20ft)	Absolute % Cover	Dom. Sp.?	Relative % Cover	Indicator Status
1. *Populus balsamifera*	80	Y	100.0	FAC
2.				
3.				
4.				
	80 = Total Cover			
Sapling/Shrub Stratum (Plot size: 15ft x 15ft)				
1. *Rubus parviflorus*	40	Y	48.8	FACU
2. *Symphoricarpos albus*	40	Y	48.8	FACU
3. *Rosa nutkana*	2	N	2.4	FAC
4.				
5.				
	82 = Total Cover			
Herb Stratum (Plot size: 5ft x 5ft)				
1. *Equisetum telmateia*	10	Y	71.4	FACW
2. *Epilobium ciliatum*	2	N	14.3	FACW
3. *Geum macrophyllum*	2	N	14.3	FAC
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
	14 = Total Cover			
Woody Vine Stratum (Plot size: 5ft x 5ft)				
1.				
2.				
	= Total Cover			

% Bare Ground in Herb Stratum 86

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 4 (B)

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	12	x 2 =	24
FAC species	84	x 3 =	252
FACU species	80	x 4 =	320
UPL species	0	x 5 =	0
Column Totals:	176 (A)		596 (B)

Prevalence Index = B/A = 3.386

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? ○ Yes ● No

Remarks:

SOIL

Sampling Point: W1-SP3

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

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR	4/3	90	10YR	4/4	5	C	M	Silt Loam	concentration is faint
				2.5Y	6/2	2	D	M		
4-16	10YR	4/3	70	10YR	4/6	10	C	M	Silt Loam	concentration is distinct
				10YR	5/2	20	D	M		

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

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators 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:
Soil matrix chroma "too bright" (3) to meet a hydric soil indicator.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

- ☐ 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 Depth (inches): _____

Water Table Present? ○ Yes ● No Depth (inches): _____

Saturation Present? (includes capillary fringe) ○ Yes ● No Depth (inches): _____

Wetland Hydrology Present? ○ Yes ● No

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

Remarks:

Appendix B — Precipitation Data

Appendix B-1. Comparison of Observed and Normal Precipitation (NRCS 2015)

The Regional Delineation Supplement Version 2.0 (USACE 2008 OR 2010) recommends using methods described in Chapter 19 in Engineering Field Handbook (NRCS 2015) to determine if precipitation occurring in the three full months prior to the site visit was normal, drier than normal, or wetter than normal. Actual rainfall is compared to the normal range of the 30-year average. The following table shows this information.

Monthly precipitation data for Kent, Washington.

		Long-term rainfall records[a]							
	Month	**3 yrs. in 10 less than**	**Average**	**3 yrs. in 10 more than**	**Rain fall[a]**	**Condition dry, wet, normal[b]**	**Condition Value**	**Month weight value**	**Product of previous two columns**
1st prior month	Sep	0.66	1.70	1.95	1.86	N	2	3	6
2nd prior month	Aug	0.42	1.18	1.42	0.55	N	2	2	4
3rd prior month	Jul	0.49	0.90	1.08	0.33	D	1	1	1
								Sum	**11**

[a]NRCS 2019
[b] Conditions are considered normal if they fall within the low and high range around the average.

Note: If sum is
- 6 - 9 then prior period has been drier than normal
- 10 - 14 then period has been normal
- 15 - 18 then period has been wetter than normal

Condition value:
- Dry (D) =1
- Normal (N) =2
- Wet (W) =3

Conclusions: Normal precipitation conditions were present prior to the field visit.

Appendix B-2. Daily Precipitation 10 days preceding field work, Kent, Washington

To determine if light, moderate, or heavy precipitation occurred in the 10 days prior to field work, the 10 day total is compared to 1/3 of the monthly average precipitation for the month evaluated (NRCS 2020).

Daily precipitation data preceding the October 7, 2020 field visit for Kent, Washington.

Date (2020)	Daily Precipitation (inches)[a]
October 6	0.00
October 5	0.00A
October 4	S
October 3	0.00
October 2	0.00
October 1	0.00
September 30	M
September 29	0.00
September 28	0.00
September 27	0.00
Sum	**0.00**

[a] NRCS 2019
"S" This data value failed one of NCDC's quality control tests.
"M" values indicate missing data.
"A" values indicate a multiday total, accumulated since the last measurement.

Conclusions: No precipitation was recorded in the ten days preceding field work.