WETLAND DELINEATION AND STREAM ASSESSMENT REPORT

Zackuse Creek Fish Passage Project

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Executive Summary

The City of Sammamish is planning the Zackuse Creek Fish Passage Project. The project intends to improve fish passage and spawning habitat for native kokanee salmon in Zackuse Creek. There are two components to this project. The first component will replace a partial fish passage blocking concrete culvert with a fish passable box culvert. The second project component is to restore and realign a portion of Zackuse Creek in order to create enhanced stream channel morphology that is better suited for kokanee spawning and rearing habitat.

This wetland and stream delineation report documents baseline wetland and stream boundaries and functions and associated buffer widths in the project area to support planning and permitting for the proposed project. Methods to complete the wetland and stream delineation included reviewing background information, conducting a field investigation, classifying wetlands and streams and assessing their functions, and determining buffer widths per local regulations. The field investigation was conducted in November 2016.

Otak biologists identified and delineated two wetlands in the study area. The total area of delineated wetlands is 3.97 acres. Wetland 1 is a linear depression (0.12 acre) consisting of palustrine forested and scrub shrub habitats. Wetland 1 is located between the East Lake Sammamish (ELS) Parkway and ELS Trail. Wetland 2 is located on the eastern side of ELS Parkway. It is 3.85 acres in the study area, and is comprised of palustrine forested, scrub shrub, and emergent habitats. Both wetlands continue off site.

Wetland 1 is rated as Category III per the Ecology rating system (Hruby 2014) with habitat score of 6. Wetland 2 is rated as Category II per the Ecology rating system (Hruby 2014) with a habitat score of 8. Using Ecology's category and functions conversion chart (Ecology 2017), Wetland 1 has a standard buffer width of 50 feet and Wetland 2 has a standard buffer width of 150 feet per Sammamish Municipal Code (SMC) Chapter 21A.50.290.

The ordinary high water mark on Zackuse Creek was delineated by Otak biologists from 206th Avenue NE to the ELS Trail. This reach of the creek transitions from steep to lower gradient in Wetland 2 where the channel loses definition. Zackuse Creek then flows through a culvert under ELS Parkway and two more culverts before discharging into Lake Sammamish. The Washington Department of Fish and Wildlife lists these culverts as partial fish passage barriers. Zackuse Creek is classified as a Type F stream by the City of Sammamish, and has a 150-foot buffer per SMC Chapter 21A.50.330. Zackuse Creek is classified as a relatively permanent water under the Clean Water Act, and regulated (including abutting Wetlands 1 and 2) by the US Army Corps of Engineers.

Several sensitive fish species are known or presumed to occur in Lake Sammamish and have the potential to occur in Zackuse Creek including: sockeye/kokanee salmon (*Oncorhynchus nerka*), coho salmon *(O. kisutch*), chinook salmon (*O. tshawytscha*), winter-run steelhead (*O. mykiss*), and resident cutthroat (*O. clarki*).
The project has been designed and will be constructed to comply with all mitigation sequencing

requirements, per City of Sammamish Municipal Code (SMC) 21A.50.135. The proposed project is an allowed activity in wetlands and wetland buffers per SMC 21.A.50.300, and an allowed activity in stream and stream buffer habitat per SMC 21.A.50.340.

Table of Contents

Tables

Appendices

Acronyms and Abbreviations

CWA	Clean Water Act
DPS	Distinct Population Segment
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionary Significant Unit
FAC	Facultative
FACW	Facultative wetland
GIS	Geographic Information Systems
GPS	Global Positioning System
HGM	Hydrogeomorphic
HPA	Hydraulic Project Approval
NOAA	National Oceanic and Atmospheric Association
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OBL	Obligate
OHWM	ordinary high water mark
PEM	palustrine emergent
PFO	palustrine forested
PHS	Priority Habitat and Species
PSS	Palustrine scrub shrub
RCW	Revised Code of Washington
ROW	Right of way

SMC	Sammamish Municipal Code
TNW	Traditional Navigable Water
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WAC	Washington Administrative Code
WDFW	Washington State Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WRIA	Water Resource Inventory Area

Chapter 1. Introduction

The City of Sammamish proposes to construct the Zackuse Creek Fish Passage Project. The project is comprised of two components that are intended to improve fish passage, and spawning and rearing habitat for native kokanee salmon. The first project component includes replacing the existing concrete culvert under East Lake Sammamish (ELS) Parkway with a fish passable box culvert. The design of the culvert is based on accepted Washington Department of Fish and Wildlife (WDFW) stream simulation design criteria to provide appropriate fish passage. The second project component is to restore, reconstruct, and realign approximately 200 to 500 feet of the existing Zackuse Creek channel through the wetland upstream of the ELS Parkway culvert. The work will include altering the channel morphology and gradient to enhance kokanee spawning habitat and reduce the risk of major, lateral channel migration.

Currently an undersized culvert under ELS Parkway impedes fish passage in Zackuse Creek. The concrete culvert is a partial fish passage barrier because it is slightly elevated and contributes to high velocity water flows (Lake Sammamish Kokanee Work Group, 2014). Immediately upstream of the culvert and east of ELS Parkway, Zackuse Creek flows in a poorly defined channel through a valley bottom wetland before turning 90 degrees at the ELS Parkway road embankment to enter the culvert. The lack of a linear channel results in poor sediment transport and an accumulation of sediment and debris. This wetland delineation and stream assessment report documents baseline wetland and stream boundaries and functions in the project area to support planning and environmental permitting for the proposed project.

1.1 Project Location and Landscape Setting

The proposed project is located along East Lake Sammamish Parkway NE in the City of Sammamish, King County, Washington. It is located in Section 32, Township 25 North, Range 06 East in Water Resource Inventory Area (WRIA) 8 (Cedar/Sammamish). Zackuse Creek flows into Lake Sammamish along the eastern shoreline approximately 500 ft. south of Lewis Thompson Road. Zackuse Creek flows down a west-facing slope in a steep-sided ravine east of the ELS Parkway before reaching a forested wetland adjacent to the parkway approximately at elevation 40 feet. Zackuse Creek then flows through the culvert under ELS Parkway, and through two more culverts before discharging to Sammamish Lake west of ELS Shore Lane SE. The study area for this report extends from 206th Avenue NE to the ELS Trail along Zackuse Creek (Figure 1 – Vicinity Map).

Land use in the watershed is primarily residential in the upper contributing basin and around the lake-shore. ELS Trail is currently unpaved and is situated between ELS Parkway and ELS Shore Lane SE. Single-family homes border the lake west of ELS Shore Lane SE. The majority of the study area for the project includes a large forested wetland, which is privately owned by a Mr. Walter Pereyra and is identified as Tax Parcel No. 3225069021 (Figure 2 – Study Area and Tax Parcel Map).

Chapter 2. Methods

This chapter summarizes the methods used to comply with local, state, and federal guidance in delineating wetland and stream boundaries in Washington State. See Table A-1 in Appendix A for further details regarding methods used for this report.

2.1 Review of Available Published Information

Available site information was reviewed prior to the field effort to identify any previously documented wetlands, streams, or other site characteristics (e.g., vegetation community patterns, topography, soils, or water courses) that would indicate the presence of wetlands and streams within the study area. These maps are typically used as guidance, and do not supersede conditions in the field. As part of this effort, Otak biologists reviewed the following sources:

- Soils map from the United States Natural Resources Conservation Service (NRCS) (NRCS 2017);
- National Wetlands Inventory (NWI) map (USFWS 2017);
- Washington Department of Natural Resources (WDNR) Forest Practices Application Mapping Tool (WDNR 2017);
- King County iMap (2017);
- WDFW Priority Habitat and Species (PHS) maps (WDFW 2017) and SalmonScape (WDFW 2017a); and,
- Historical aerial photos of the vicinity using Google Earth Pro (Google Maps 2017).

Appendix B includes figures associated with the background review, including: an aerial photograph of the study area (Figure 2), a topographic map (Figure 3), a NRCS soils map (Figure 4), a NWI map (Figure 5), and a King County critical areas map (Figure 6).

Soil units mapped within the study area include Ragnar-Indianola association, Everett very gravelly sandy loam, mixed alluvial land, and Alderwood and Kitsap soils (Table 2-1). The majority of the study area is mapped as Everett very gravelly sandy loam, and Alderwood and Kitsap soils. None of the listed soil units are mapped as hydric. The NRCS soils map is provided as Figure 4 in Appendix B.

Table 2-1. NRCS Soil Units Mapped on the Study Area

Soil Series	Slope %	Drainage Class	Parent Material	Hydric?
Ragnar-Indianola association (moderately steep)	15 - 25	Well drained	Glacial outwash	No
Everett very gravelly sandy loam	8-15	Somewhat excessively drained	Sandy and gravelly glacial outwash	No
Alderwood and Kitsap soils (very steep)	25-70	Moderately well drained	Basal till with some volcanic ash	No
Mixed alluvial land	0-2	Well drained	Mixture of sand, fine sand, loamy fine sand, and gravelly sand	No

NWI freshwater wetlands are mapped within the study area, including linear freshwater forest/shrub and riverine habitats (Figure 5 in Appendix B). The NWI map shows two different alignments for Zackuse Creek and associated wetlands. King County critical areas map identifies a stream similar to the NWI map but no wetland habitats, and erosion and landslide hazards within the upper reaches of Zackuse Creek (Figure 6 in Appendix B). WDNR Forest Practices Application Mapping Tool shows Zackuse Creek as a type F (fish habitat) stream. WDFW Priority Habitats and Species on the Web (WDFW 2017) shows the occurrence of Resident Coastal Cutthroat (*Oncorhynchus clarki*) and Coho (*Oncorhynchus kisutch*) salmon species in Zackuse Creek.

Per Salmonscape (WDFW 2017), fish distribution in Zackuse Creek includes documented presence of Coho salmon in the lower reaches, as well as modelled presence of winter run Steelhead trout (*Oncorhynchus mykiss*), fall run Chinook salmon (*Oncorhynchus tshawytscha*), and Sockeye salmon (*Oncorhynchus nerka*) in the lower reaches. Zackuse Creek occurs within the ESA-listed Chinook Salmon Evolutionary Significant Unit (ESU) Puget Sound recovery domain. The culverts underneath Shore Lane SE, ELS Trail, and ELS Parkway are listed as fish passage barriers (partial blockages) in Zackuse Creek.

2.2 Precipitation Data and Analysis

2.2.1 Evaluation of the Growing Season

Wetland hydrologic conditions are considered present if an area has 14 or more consecutive days of flooding or ponding, or a water table 12 inches or less below the soil surface, during the growing season, depending on soil and plant community conditions (USACE 2010).

In the Pacific Northwest coast region, the beginning and ending dates of the growing season can be defined based on two indicators of biological activity that are readily observable in the field: (1)

above ground growth and development of vascular plants, and (2) soil temperature. However, due to seasonal fluctuations from year to year the growing season dates may also be approximated by the number of frost-free days, defined as the time from the last date in spring when the ambient air temperature drops to 28°F, to the first date in fall when it drops to 28°F, over a 30-year period (USACE, 2010).

As such, the beginning and ending dates for the growing season in the study area were estimated from long-term weather records as the median dates (50 percent probability) for the first and last 28°F days at the Snoqualmie Falls climate station as insufficient data is available at other nearby climate stations to determine the growing season using this method. The growing season dates based on the Snoqualmie Falls climate station data should be treated as a conservative estimate for the project area. Based on long-term weather records at the Snoqualmie Falls climate station the average start and end dates for the growing season for the area are March 9 and November 17, respectively, for a total growing season of 253 days (NRCS 2017).

2.2.2 Precipitation Data during Field Investigation

The field survey was conducted in the study area in 2016 on November 11 and November 18. Approximately 0.03 inch rain fell on November 11 and 0.04 inch fell on November 18 (NRCS 2017). The area received 4.29 inches of precipitation in the two week period (October 28 to November 10) prior to the field survey as measured at the Snoqualmie Falls climate station (NRCS 2017). Precipitation amounts for the 3 months preceding the field survey were below normal for August 2016, normal in September 2016, and below normal in October 2016.

Table 2-2. Summary of Precipitation Data from August 1, 2016 to November 1, 2016

Category	August 2016	September 2016	October 2016
Recorded Precipitation (inches)	0.42	2.14	12.61
Precipitation Average	1.29	2.85	5.69
% of Average Recorded	32.55	75.08	221.61
30-70% Normal Range (inches) from 1971-2000	0.81 – 1.83	1.37 – 3.44	3.17 – 6.26
Comparison to Normal Range	Below normal	Normal	Above normal

Source: NRCS 2017

2.3 Field Investigation

Wetland boundaries and ordinary high water mark (OHWM) along Zackuse Creek were delineated in the study area on November 11 and November 18, 2016. Wetland boundaries were marked in the field with sequentially numbered black and pink striped flagging, and OHW was marked with orange flagging. All flags were professionally surveyed following the delineation.

2.3.1 Wetlands

In accordance with federal, state, and local guidance and regulations, Otak biologists delineated wetlands in the field using the three-parameter approach detailed in the *Corps of Engineers Wetlands Delineation Manual* (USACE, 1987), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (USACE, 2010). Following routine methodology, data on vegetation, soils, and hydrology were collected at three paired (wetland/upland) data points. The location of each of the six data points is shown on the Delineated Wetlands and Streams Map (Figure 7). Data for wetland and upland plots were recorded on USACE wetland determination data forms and are provided in Appendix C.

Soils

Soil samples were obtained at representative data points by digging a pit to a depth of at least 18 inches to determine the presence or absence of hydric soil indicators using the *Field Indicators of Hydric Soils In the United States*, Version 7.0 (NRCS 2010). Soil colors were evaluated against a Munsell® soil color chart (Gretag/Macbeth 2000) to distinguish hydric from non-hydric soils.

Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile (USACE 2010). Hydric soils exhibit certain characteristics that can be observed in the field. Such characteristics or indicators may include high organic content, accumulation of sulfidic material, greenish or bluish-gray color (gley formation), and development of redoximorphic features.

Hydric soils were observed in both sampled wetlands. The presence of 10YR 2/1 muck and a shallow water table was observed in the scrub-shrub wetland west of ELS Parkway. Hydric soil indicators observed in the forested wetland east of ELS Parkway included F3 (Depleted matrix) and A4 (Hydrogen Sulfide).

Hydrology

Wetland hydrologic conditions are considered present if, during the growing season, an area has 14 or more consecutive days of flooding or ponding; or a water table 12 inches or less below the soil surface, during the growing season at a minimum frequency of 5 years in 10, depending on soil and plant community conditions (USACE 2010). Primary and secondary wetland hydrology indicators were also used to evaluate the presence or absence of wetland hydrology.

The presence of wetland hydrologic indicators was determined at each wetland data point. Primary indicators of wetland hydrology may include surface water, soil saturation within 12 inches of the

surface, shallow water table, and evidence of previous water inundation or saturation (e.g., watermarks, drift lines, sediment deposits, and oxidized root channels). Secondary indicators may include wetland drainage patterns, geomorphic position, stunted or stressed plants, micro-topographic relief, and water-stained leaves. When at least one primary or two secondary indicators were observed, wetland hydrology was assumed to occur during the growing season long enough to result in wetland conditions. Primary wetland hydrology indicators frequently observed in the study area included surface water, shallow groundwater, and soil saturation within 12 inches of the surface.

Vegetation

Representative vegetation communities were documented at three paired data point locations (six total) in the study area during the field survey. At each data point, three strata were inventoried, including trees within a 30-foot diameter plot, shrubs within a 15-foot diameter plot, and non-woody herbaceous plants (including forbs, grasses, sedges, and rushes) within a 5-foot diameter plot. Alternately, linear belt transects were used for a linear wetland between ELS Parkway and the ELS Trail to more accurately document vegetation communities at the wetland boundary.

Plant species in each stratum were identified and absolute percent cover was recorded on a wetland determination data form. Each species was listed following the scientific nomenclature given in the United States Department of Agriculture (USDA) PLANTS database (NRCS 2016). The wetland indicator status for each species was assigned using the *2016 National Wetland Plant List for the Western Mountains, Valleys & Coast Region* (Lichvar *et al.* 2016).

The dominance test was primarily used to determine the presence or absence of hydrophytic vegetation indicators. A location is considered to have a hydrophytic vegetation community if more than 50 percent of the dominant species have an indicator status of facultative (FAC), facultative-wetland (FACW), or obligate (OBL). Dominant species are defined as those that individually or collectively account for more than 50 percent of the total areal coverage of vegetation in the stratum, plus any other species that, by itself, accounts for at least 20 percent of the total areal coverage (USACE 2010). If more than 50 percent of the dominant plant species in a community have wetland indictor status of OBL, FACW, or FAC, then the plant community is considered hydrophytic (wetland).

2.3.2 Ordinary High Water Mark

Ordinary high water mark (OHWM) along Zackuse Creek was flagged in the field based on the methodology outlined in USACE Regulatory Guidance Letter 05-05 (USACE 2005) and *Determining the Ordinary High Water Mark on Streams in Washington State* (Ecology 2008). The OWHM was marked with orange flagging in the field. Identification of OHWM was based on the evaluation of stream physical characteristics, such as: presence of bed and banks, a natural line impressed on the bank, change in sediment and vegetation characteristics, wracking, erosion/scour, and silt deposits. For the lower reach of Zackuse Creek that does not have a well-defined channel, the centerline of the wetted channel was surveyed for mapping purposes.

2.4 Wetland and Stream Classification and Ratings

Wetlands in the study area were classified using the *Classification of Wetlands and Deepwater Habitats of Untied States* (Cowardin, et al. 1979), and the hydrogeomorphic (HGM) wetland classification (Brinson 1993) as adopted by Hruby (2014).

In the City of Sammamish, wetland functions were rated using the *Washington State Wetland Rating System for Western Washington – 2014 Update* (Hruby 2014) in accordance with SMC Chapter 21A.50.290. Wetland rating forms and figures are provided in Appendix D (Ecology Rating Forms). Using Ecology's category and functions conversion chart (Ecology 2017), wetland buffer widths were determined based on wetland category and habitat score for each wetland per SMC Chapter 21A.50.290. Wetland buffer conditions were qualitatively assessed based on vegetation cover, land use, and presence of invasive species. Stream classification and buffer widths were determined according to SMC Chapter 21A.50.330 (Streams – Development standards).

Wetland and stream locations are described in Chapter 3, and shown on Figure 7 (Delineated Wetlands and Streams Map) in Appendix B.

2.5 Mapping Methods

Flags depicting the boundaries of wetlands and streams (OHWM) were hung in the field by Otak biologists and professionally surveyed by an Otak land survey crew to an accuracy of +/-0.1 foot. Survey data was converted to GIS files and imported to project maps for this report, resulting in a projected precision of +/- 3 feet. Wetland data points are associated with specific wetland flags that were surveyed in the field. Additional potential stream and wetland areas within 100 feet of the study area boundary were estimated using aerial photography and observations made during the field investigation.

Chapter 3. Existing Conditions

Otak biologists identified and delineated two wetlands in the study area as shown on Figure 7. The total area of delineated wetlands is 3.97 acres, mostly occurring as palustrine forested (PFO) and scrub-shrub (PSS) wetland habitats. Wetland determination data forms are provided in Appendix C, and Ecology wetland ratings forms and figures are provided in Appendix D. A list of plant species observed during field work is included as Appendix E. Additional photographs of sampled wetlands are provided in Appendix F.

3.1 Delineated Wetlands

Two wetlands were delineated in the study area. Wetland 1 is located on City of Sammamish property west of ELS Parkway, between ESL Parkway and the ELS Trail. Wetland 2 is located on Mr. Pereyra's private property east of ELS Parkway and along Zackuse Creek. Both wetlands extend beyond the study area boundaries. Regarding Cowardin classifications (Cowardin, et al. 1979), Wetlands 1 and 2 include palustrine emergent (PEM), palustrine scrub-shrub (PSS) and palustrine forested (PFO) habitats. Wetland 1 and 2 are primarily PFO and PSS habitats in the study area. Regarding HGM classifications for the purposes of wetland ratings as adopted by Hruby (2014), both Wetland 1 and Wetland 2 are classified as depressional. Wetland 2 has multiple HGM classes (riverine, depressional, and slope), and is therefore classified as depressional in the 2014 rating system.

In the study area, Wetland 1 is a 134-foot long linear (5,048 square feet) depression situated between ELS Trail and ELS Parkway with PFO and PSS habitats. Vegetation in Wetland 1 is dominated by black cottonwood (*Populus baslamifera* spp. *trichocarpa*), redstem dogwood (*Cornus alba*), and Nootka rose (*Rosa nutkana*). A patch of reed canarygrass (*Phalaris arundinacea*) dominated PEM habitat is located northeast outside of study area in Wetland 1. Wetland hydrology is supported by shallow groundwater, precipitation, and runoff from adjacent uplands. Wetland 1 discharges to Zackuse Creek, which flows through the wetland as shown on Figure 7.

In the study area, Wetland 2 is approximately 3.85 acres in size and mostly PFO habitat. Zackuse Creek flows through a defined channel within Wetland 2 for approximately 150 feet until it turns into a braided channel system as the stream grade decreases and sediment has accumulated over time. Wetland 2 includes a permanently ponded area along ELS Parkway north of Zackuse Creek, and is supported by shallow groundwater, seeps, and overbank flooding from Zackuse Creek. Dominant plant species in Wetland 2 include black cottonwood, red alder (*Alnus rubra*), western red cedar (*Thuja plicata),* salmonberry (*Rubus spectabilis*), redstem dogwood, skunk cabbage (*Lysichiton americanum*), lady fern (*Athyrium cyclosorum*), and field horsetail (*Equisetum arvense*). Wetland classes, ratings, sizes, and buffer widths are summarized in Table 3-1.

Table 3-1. Delineated Wetlands within the Study Area

Wetland[1]	Wetland Classification		Local Rating	Wetland Size[4] (acre)	Buffer Width (feet)[5]
	Cowardin[2]	HGM	City of Sammamish (Habitat Score)[3]		
1	PFO, PSS	Depressional	III (6)	0.12	50
2	PFO, PSS, PEM	Depressional	II (8)	3.85	150
TOTAL				3.97	

Note:

1. Wetlands shown on Figure 7 in Appendix B.
2. Cowardin et al. (1979). Class based on vegetation: PSS = Palustrine Scrub-Shrub; PFO = Palustrine Forested; PEM = Palustrine Emergent.
3. Wetlands occurring in City of Sammamish rated according to Hruby (2014) per SMC 21A.50.290.
4. Wetland sizes measured within the study area boundaries, and include Zackuse Creek. Both wetlands extend beyond the study area boundaries, and wetland sizes are accordingly larger.
5. Wetland buffer widths according to SMC 21A.50.290 using Ecology's category and functions conversion chart (Ecology 2017)

Individual wetland profiles are provided in Tables 3-2 and 3-3.

Table 3-2. Wetland 1 Summary.

WETLAND 1 – INFORMATION SUMMARY			
Location:	**Between ELS Trail and ELS Parkway in the City of Sammamish**		
		Local Jurisdiction	City of Sammamish
		WRIA	8
		Ecology Rating (Hruby 2014)	III
		Buffer Width	50 Feet (Habitat score of 6)
		Wetland Size on-site	0.12
		Cowardin Classification	PFO, PSS
		HGM Classification	Depressional
		Wetland Data Sheet(s)	1
		Upland Data Sheet (s)	2
		Flag color	Black and pink striped flagging
Dominant Vegetation	*Populus balsamifera* spp. *trichocarpa, Cornus alba, Rosa nutkana, Phalaris arundinacea*		
Soils	Silt loam 10YR 2/1 and 10YR 2/1 muck		
Hydrology	High water table, saturation		
Rationale for Delineation	Satisfies all three wetland criteria.		
Rationale for Local Rating	Follows Ecology rating system (Hruby 2014) per SMC 20A.50.290.		
Wetland Functions Summary			
Hydrologic	Wetland 1 has a slightly constricted outlet, less than two feet of storage during wet periods, and a small contributing basin. The landscape has the potential to support this medium level of hydrologic functioning as more than 25% of the contributing basin is covered in intensive human land use, the wetland receives stormwater runoff, and the buffer includes impervious surfaces.		
Water Quality	Wetland 1 has a slightly constricted outlet, no organic or clay soil two inches below the surface, persistent, ungrazed vegetation for more than 95% of the area and less than ¼ of the total area is seasonally ponded. The wetland receives stormwater discharges and more than 10% of the area within 150 ft. of the wetland generates pollutants. The wetland is within and discharges directly into an aquatic resource on the 303d list, and is within a basin with a TMDL.		
Habitat	Wetland 1 has three Cowardin classes, three different hydroperiods and a medium richness of plant species. Wetland 1 also has a high level of interspersion of habitats, but has no special habitat features. Less than 10% of a 1km polygon around the wetland is directly accessible undisturbed habitat, while more than 50% is high intense land use. Within 100 meters, there are three or more priority habitat features.		
Buffer Condition	The buffer around Wetland 1 is disturbed due to being surrounded on both sides by a roadway and the ELS trail. The vegetated buffer consists of mowed grass and roadside vegetation.		

Table 3-3. Wetland 2 Summary.

WETLAND 2 – INFORMATION SUMMARY			
Location:	**Between ELS Parkway and 206th Avenue NE in the City of Sammamish**		
		Local Jurisdiction	City of Sammamish
		WRIA	8
		Ecology Rating (Hruby 2014)	II
		Buffer Width	150 feet (habitat score of 8)
		Wetland Size	3.85 acre
		Cowardin Classification	PSS, PFO, PEM
		HGM Classification	Depressional, Riverine, Slope
		Wetland Data Sheet(s)	3 & 5
		Upland Data Sheet (s)	4 & 6
		Flag color	Black and pink striped flagging
Dominant Vegetation	*Alnus rubra, Thuja plicata, Populus balsamifera* spp. *trichocarpa, Athyrium cyclosorum, Cornus alba, Rubus spectabilis Equisetum arvense, Lysichiton americanum*		
Soils	Silt loam 10YR 2/1, Loam 10YR 5/2, hydrogen sulfide odor		
Hydrology	Receives hydrology from hyporheic flow, groundwater, and precipitation.		
Rationale for Delineation	Satisfies all three wetland criteria.		
Rationale for Local Rating	Follows Ecology rating system (Hruby 2014) per SMC 20A.50.290.		
Wetland Functions Summary			
Hydrologic	Wetland 2 has a slightly constricted outlet, ponding between 0.5-2 feet depth, and a moderately sized contributing basin compared to the area of the unit. More than 10% of the area within 150ft. of the wetland has land uses that generate excess runoff, and more than 25% of the contributing basin is covered in intensive human land use. The wetland is not within a landscape that has flooding problems.		
Water Quality	Wetland 2 has a constricted outlet, no organic or clay soil 2 inches below the surface, persistent, ungrazed vegetation for more than 95% of the area, and more than ¼ of the total area seasonally ponds (northern arm). The wetland receives stormwater discharges, and more than 10% of the area within 150 ft. of the wetland generates pollutants. The wetland is within and discharges directly into an aquatic resource on the 303d list and is within a basin with a TMDL.		
Habitat	The wetland has four vegetation structures and four hydroperiods. Wetland 2 has a high level of species diversity, a high level of interspersion of habitats, and four special habitat features. Less than 10% of a 1 km polygon around the wetland is undisturbed directly accessible habitat, and more than 50% is undisturbed habitat, while more than 50% is high intense land use. Within 100 meters, there are three or more priority habitat features.		
Buffer Condition	About half of the buffer around Wetland 2 is forested. The remaining buffer consists of a private residences, lawns, paved roads, and roadside ditches.		

3.2 Wetland Functions, Ratings, and Buffer Widths

Wetland 1 is rated as Category III per the Ecology rating system (Hruby 2014) with habitat score of 6. Wetland 2 is rated as Category II per the Ecology rating system (Hruby 2014) with a habitat score of 8. Using Ecology's category and functions conversion chart (Ecology 2017), Wetland 1 has a standard buffer width of 50 feet and Wetland 2 has a standard buffer width of 150 feet (SMC 21A.50.290). Wetland classes, ratings, sizes, and buffer widths are summarized in Table 3-1. Wetland rating forms are provided in Appendix D.

Wetland 1 has a water quality function score of 7. The wetland unit scores medium for site potential, medium for landscape potential, and high for value. The wetland has a slightly constricted outlet that connects to Zackuse Creek that flows through the wetland. Seasonal ponding of the wetland is less than ¼ of its total area. Soil two inches below the surface is a silt loam, and does not meet criteria of being clay or organic. The wetland has persistent, ungrazed vegetation for more than 95% of its total area. The wetland unit discharges into Lake Sammamish which is on the 303d list. The surrounding basin and watershed is also on the 303d list and has been listed as important for maintaining water quality.

Wetland 1 has a score of 6 for hydrologic functions. The wetland unit scores medium for site potential, high for landscape potential, and low for value. The wetland has a slightly constricted outlet into Zackuse Creek, and storage depth of less than two feet. The contributing basin is small and is less than 10 times the unit's total area. The wetland receives stormwater discharges from the adjacent road. East Lake Sammamish Parkway and the neighboring houses contribute to more than 10% of the area within 150 feet that generate excess runoff. More than 25% of the contributing basin of the wetland is covered with intensive human land uses such as homes and roadways. The unit is not within an area that has flooding problems and has not been identified as important in a regional flood control plan.

Wetland 1 has a habitat function score of 5. The wetland unit scores medium for site potential, low for landscape potential, and high for value. Wetland 1 consists of three vegetation structures: emergent plants, scrub-shrub, and forested. It also has three hydroperiods. The wetland is occasionally flooded or inundated by shallow groundwater and precipitation, has saturated soils, and has a permanently flowing stream through the center of the wetland. Though Wetland 1 has a moderate amount of species richness, it rates high for interspersion of habitats as it consists of three separate Cowardin classifications including Zackuse Creek. The wetland has no special habitat features within its boundary, but three WDFW priority habitats are located within 100 meters, including: riparian, instream, and snags and logs. Approximately 2.5% of a 1 kilometer polygon around the area is accessible habitat directly abutting the unit. Within the 1 kilometer polygon, there is 17.4% undisturbed habitat with more than three separate patches, and 79% high intensity land uses.

Wetland 2 also has a water quality function score of 8. The unit scores medium for site potential, high for landscape potential, and high for value. The wetland has a slightly constricted outlet through the culvert under ELS Parkway. The soil was a silty loam two inches below the surface, and did not meet the criteria of being clay or organic material. The wetland consists of more than 95% persistent, ungrazed vegetation, and more than ¼ of the total area is seasonally ponded (northern arm). The wetland receives stormwater discharges from ELS Parkway, and more than 10% of the area within 150 feet of the wetland includes land uses that generate pollutants (e.g., roadways and homes). No septic systems were identified within 250 feet of the unit.

Wetland 2 has a score of 6 for hydrologic functions. The unit scores medium for site potential, high for landscape potential, and low for value. The wetland has a slightly constricted outlet, with less than two feet of storage depth during wet periods. Wetland 2 has a larger contributing basin of 10 to 100 times the total area of the unit. The wetland receives stormwater discharges, and ELS Parkway occupies more than 10% of the buffer area within 150 feet. More than 25% of the contributing basin of the wetland is covered with intensive human land uses (e.g., residential, roads). The unit is not within an area that has flooding problems, and has not been identified as important in a regional flood control plan.

Wetland 2 has a habitat function score of 8. The wetland unit scores high for site potential, medium for landscape potential, and high for value. The wetland consists of three vegetation structures: emergent plants, scrub-shrub, and forested habitats. The forested class also has multiple strata including canopy, shrubs, and an herbaceous layer that each cover 20% of the forested area. Wetland 2 also has four types of water regimes including: seasonally flooded, occasionally flooded, saturated soils and a permanently flowing stream. The wetland has a high richness of plant species, as well as a high interspersion of habitats. Wetland 2 has several special habitat features including: large woody debris, standing snags, at least ¼ acre of thin-stemmed persistent vegetation for amphibian egg laying, and no more than 25% of invasive plant cover. It also has three WDFW priority habitats including: riparian, instream, and snags and logs. Approximately 7.7% of a 1 kilometer polygon around the area is accessible habitat directly abutting the unit. Within the 1 kilometer polygon, there is 56% undisturbed habitat, and 77% high intensity land uses.

3.3 Delineated Watercourses

In the study area, Zackuse Creek (Stream # 08.0148) flows from 206th Avenue NE westward through Wetland 2 and under ELS Parkway before discharging to Lake Sammamish. Zackuse Creek is classified as a Type F stream by the City of Sammamish, and as a relatively permanent water (RWP) under the Clean Water Act. Zackuse Creek has a buffer of 150 feet from the OHWM per (SMC 21A.50.330).

In the study area, Zackuse Creek flows from 206th Avenue NE to a culvert underneath ELS Parkway, and daylights for approximately 45 linear feet before entering another culvert underneath ELS Trail. This lower reach of Zackuse Creek includes the transition from steeper to lower gradients

approaching the deposition zone nearest to the ELS Parkway in Wetland 2. The stream channel location has adjusted over time in this alluvial fan in response to high flows, fine sediment yields from upgradient stream reaches, and human modifications associated with both surrounding land uses and the impounding influence of the ELS Parkway road prism on the Zackuse system. An unnatural, 90-degree bend in the channel occurs approximately halfway between 206th Avenue NE and ELS Parkway that causes localized bank degradation. Downstream of this bend, the coarse substrates in the stream channel diminish and fine sediment is deposited across the floodplain/Wetland 2 complex (alluvial fan). The stream splits into multiple branches, flows subsurface, and surfaces again throughout this area, which is comprised primarily of silts and organic materials (e.g., leaf litter) at the surficial layers. Surface waters rejoin along east side of the ELS Parkway road embankment, and flow north in a roadside channel for approximately 100 feet before entering the culvert underneath the roadway.

Zackuse Creek is currently being studied to adequately size the replacement culvert under ELS Parkway and to design the channel restoration above ELS Parkway through Wetland 2 to improve sediment transport and spawning habitat for kokanee salmon. Zackuse Creek stream information is summarized in Table 3-4.

Table 3-4. Zackuse Creek

STREAM INFORMATION SUMMARY			
Location:	**Headwaters at Louis Thompson Rd NE, flowing westward and discharging into Lake Sammamish west of Shore Lane NE**		
		Stream Name	Zackuse Creek
		WRIA	8
		WA Stream Catalog #	08.0148
		Local Jurisdiction	City of Sammamish
		DNR Stream Type	F
		Local Stream Classification	F
		USACE Classification	RPW
		Buffer Width	150 feet (SMC 21A.50.330)
		Documented Fish Use	Currently has partial fish passage barriers, historical use by resident cutthroat trout, coho, and kokanee salmon.
Riparian Buffer Condition	The majority of the riparian buffer is in good condition, and is surrounded by upland forest, and PFO wetland habitat. The remaining buffer is impacted by ELS Parkway, ELS Trail, Shore Lane SE, and single family homes closer to Lake Sammamish.		
Flow Regime and Flow Path	Zackuse Creek flows into Lake Sammamish, a Traditional Navigable Water. Zackuse Creek is a fish bearing stream, and likely has a perennial flow regime during years of normal precipitation.		

3.4 Sensitive Plants, Fish, and Wildlife

WDFW's PHS on the Web online mapping tool lists two priority fish species within the Zackuse Creek: residential coastal cutthroat (*Oncorhynchus clarki*) and coho salmon (*Oncorhynchus kisutch*) (WDFW 2017). WDFW's SalmonScape online mapping tool also models presence of sockeye salmon (*Oncorhynchus nerka*), fall run chinook salmon (*Oncorhynchus tshawytscha*), and winter run steelhead trout (*Oncorhynchus mykiss*) (WDFW 2017a). Kokanee, a landlocked freshwater sockeye salmon species, have been documented in Zackuse Creek (King County 2013), and is the target fish species for this stream restoration project.

Lake Sammamish Kokanee were not considered by the U.S. Fish and Wildlife Service to meet the criteria as a Distinct Population Segment (DPS), and therefore the Lake Sammamish population not listed for protection under the Endangered Species Act (ESA) in 2011 (USFWS 2011). Zackuse Creek is not designated critical habitat for Puget Sound chinook salmon DPS and steelhead DPS (NOAA Fisheries 2017).

No sensitive plant species or natural heritage features are known to occur within the same surveyed land section as the study area (WDNR 2016).

3.5 Regulatory Summary

Wetlands and streams in the study area are regulated by federal (USACE), state (Ecology and WDFW), and local (City of Sammamish) agencies. Wetland and stream buffers are regulated by Ecology and City of Sammamish. Impacts to wetlands and streams and their buffers require prior authorization and coordination with regulatory agencies.

3.5.1 U.S. Army Corps of Engineers

The Environmental Protection Agency (EPA) and USACE regulate wetlands and other waters of the United States under Section 404 of the Clean Water Act (CWA). The 2006 Rapanos Supreme Court decision held that EPA and USACE maintain jurisdiction over traditional navigable waters (TNW), wetlands adjacent to or abutting TNW, non-navigable tributaries of TNW that are relatively permanent waters (RPW), and wetlands that abut such tributaries. For those wetlands associated with non-navigable tributaries that are not relatively permanent waters (non-RPW), the agencies will assert jurisdiction where they are found to have a significant nexus to a TNW.

Zackuse Creek and the associated wetlands in the study area meet the definition of Waters of the US per 33 Code of Federal Regulations (CFR) Part 328. Lake Sammamish is a TNW, and the wetlands in the study area abut Zackuse Creek. Discharge of fill material into Zackuse Creek and the associated wetlands is therefore regulated under Section 404 and 401 of the CWA.

3.5.2 Washington State Department of Fish and Wildlife

WDFW requires issuance of a Hydraulic Permit Approval (HPA) prior to any activities that may directly or indirectly affect streams or associated aquatic resources considered as waters of the state.

WDFW has jurisdiction over Zackuse Creek in the study area, and administers the HPA program under the state Hydraulic Code [Chapter 77.55 Revised Code of Washington (RCW)]. An HPA will be required for any work within and adjacent to the OHWM of Zackuse Creek, including both wetlands and uplands within the riparian corridor.

3.5.3 Washington State Department of Ecology

Ecology regulates activities in wetlands and streams under Section 401 of the CWA through the Water Quality Certification process. Ecology has authority over discharge into all wetlands and streams, and can impose buffers and compensatory mitigation for impacts under 90.48 RCW depending on the proposed project and amount of impacts to aquatic resources.

3.5.4 Local Jurisdiction – City of Sammamish

The City of Sammamish regulates critical areas (e.g., wetlands, streams and their buffers) per Chapter 21A.50 (Environmentally Critical Areas) of the SMC. All wetlands and streams within the study area are regulated by the City of Sammamish. Activities that modify wetlands, streams or their buffers requires authorization from the city, including a critical areas assessment report that adequately evaluates the proposed action and potential impacts to support any land use application (SMC 21A.50.110).

Chapter 4. Impacts and Mitigation Sequencing

The proposed project has been designed to comply with Washington State Department of Ecology mitigation sequencing generally, and specifically with City of Sammamish requirements for mitigation sequencing/avoiding impacts to critical areas (SMC 21A.50.135). Impacts associated with the project are identified below, followed by a mitigation sequence—derived from SMC 21A.50.135—in which impacts are addressed in each step and the project description and supporting rationale for appropriate mitigation sequencing is provided. Specific project-related information relative to permitted alteration to streams in the City of Sammamish (SMC 21A.50.340) is provided subsequent to the above.

4.1 Project Impacts

Impacts associated with the project include temporary and permanent impacts as follows:

- Temporary construction-related impacts to wetland habitat. Approximately 6,950 square feet of wetland habitat in Wetland 1 will be cleared during construction, and approximately 347 square feet of wetland habitat will be cleared in two small wetlands downstream of Wetland 1, delineated for King County (Parametrix, May 22 2017) and rated as Category IV wetlands.
- Temporary construction-related impacts to wetland and stream buffer habitat. Approximately 3,746 square feet of wetland buffer associated with Wetland 2 will be cleared during construction; approximately 6,281 square feet of clearing will occur in the buffers of the two small wetlands downstream of Wetland 1. Approximately 157 square feet of stream buffer habitat for Zackuse Creek will be cleared during construction.
- Permanent impacts to wetland habitat. Approximately 5,930 square feet of Wetland 2 will be converted to stream habitat. Approximately 399 square feet of Wetland 1 will be permanently filled due to installation of the proposed fish-passable culvert under East Lake Sammamish Parkway.
- Permanent impacts to stream habitat. A total of 487 SF of Zackuse Creek will be permanently impacted from re-grading the stream channel and installing habitat gravels for the three new culverts. Approximately 530 linear feet of Zackuse Creek will be abandoned and converted to wetland habitat, and 400 linear feet of new channel will be constructed.
- Permanent impacts to wetland and stream buffers. Approximately 156 square feet of wetland buffer habitat for Wetland 1 will be permanently impacted due to installation of the proposed fish-passable culvert under East Lake Sammamish Parkway. Approximately 777 square feet of wetland buffer habitat will be permanently impacted due to installation of the two downstream fish-passable culverts. Approximately 133 square feet of permanent stream buffer impact to Zackuse Creek will occur as a result of the installation of the proposed fish passable culvert under East Lake Sammamish Parkway.

- Permanent impacts are also anticipated to be beneficial in nature, per the following:
    - Improved fish passage for Kokanee in the proposed culverts as well as the proposed channel.
    - Improved spawning habitat conditions in the proposed channel.
    - Improved in-stream habitat complexity in the form of large wood and increased pool frequency/density.
    - Improved riparian habitat conditions based on removal of invasive vegetative species and installation of native species appropriate to the site.

4.2 Mitigation Sequencing

SMC 21A.50.135 provides a mitigation sequence for projects, allowing for avoidance, minimization and when necessary, mitigation for proposed activities or alterations of critical areas and/or their associated buffers. The following, as noted above, represents the mitigation sequence derived from SMC 21A.50.135 and describe impacts and provides the supporting rationale for an appropriate mitigation sequencing as it relates to the project.

SMC 21A.50.135 (1)(a) Avoiding the impact or hazard by not taking a certain action, or redesigning the proposal to eliminate the impact.
Avoidance of impacts to the project site, associated critical areas, and critical area buffers was implemented to the extent possible. However, the nature of the proposed culvert replacement and stream restoration work is such that completely avoiding impacts is not possible. Temporary impacts associated with replacement of the existing three culverts with fish-passable culverts are unavoidable impacts, as are impacts associated with permanent conversion of wetland habitat to stream habitat due to the realignment of Zackuse Creek.

The project has been designed to avoid impacts to most of Wetland 2, largely by siting the new stream channel to the north, avoiding impacts to the southern portion of Wetland 2, and utilizing an existing road and building pad for movement of construction equipment and staging of construction material.

SMC 21A.50.135 (1)((b) Minimizing the impact or hazard by limiting the degree or magnitude of the action or impact with appropriate technology or by changing the timing of the action.
The project was also designed to minimize potential impacts to the extent possible. As noted above, construction-related impacts to Wetland 2 will be avoided and minimized by utilizing an existing road and building pad for construction access and staging. The existing road and building pad are outside of Wetland 2, and represent previously disturbed habitat. Further disturbance to this area represents a minimization of potential disturbance associated with construction of the project compared to potetnail disturbances to Wetland 2 or relatively undisturbed buffer.

Additional minimization of potential impacts includes abandoning the existing Zackuse Creek after realignment rather than filling the channel, allowing it to convert to wetland and/or allow for some

off-channel habitat in the vicinity of the new channel. Best management practices (BMPs) will be incorporated into the construction sequence, further minimizing potential project impacts. BMPs may include practices to reduce adverse impacts from stormwater, pollution, and erosion during construction—e.g. filter fabric/silt fencing, sediment mats, quarry spalls at the construction roadway entrance/exit, sediment traps or ponds, temporary erosion and sediment control (TESC) plan, stormwater pollution prevention plan, a spill prevention, control, and countermeasure plan if necessary, eetc.

All in-water work will take place during the approved in-water work window, minimizing impacts to fish and other aquatic biota. The reaches of Zakcuse Creek in which the culvert replacements will take place will be physically isolated, fish removal will occur through a combination of seine netting and electrofishing, and the stream will be piped around the construction site in a conveyance system that allows for culvert installation to occur under de-watered conditions.

SMC 21A.50.135 (1)((c) Restoring the impacted critical areas by repairing, rehabilitating or restoring the affected critical area or its buffer.
As an important component of the project, installation of wetland and riparian native plant species will occur along the realigned stream channel and within the existing road bed once construction has been completed. All disturbed areas will be restored to original vegetated conditions or enhanced from existing conditions with additional native plantings. Enhancement will also include removal of non-native invasive plant species in portions of the project site where such species are currently especially dense.

SMC 21A.50.135 (1)(d) Minimizing or eliminating the hazard by restoring or stabilizing the hazard area through plantings, engineering or other methods.
The project site is not considered a hazard area. As noted above, installation of native plants will occur in the wetland and riparian areas of the realigned stream channel. The realigned channel has been engineered using parameters for stable channel design; such design parameters include appropriate stream sediment sizing for a stable stream bed, pool-riffle design elements for a stable channel, and placement of large wood and appropriate stream sinuousity for a stable lateral channel configuration. The proposed fish passable culverts have been designed and sized according to the WDFW preferred method of stream simulation design, and have been accordingly sized to pass 100-year storm events and any debris that may become entrained in Zackuse Creek

SMC 21A.50.135 (1)(e) Reducing or eliminating the impact or hazard over time by preservation or maintenance operations during the life of the development proposal, activity or alteration.
As noted above, the project site is not considered a hazard area. Impacts are associated with initial construction and resultant disturbances, and installation of native plants as well as the proposed stream realignment and culverts will help establish an enhanced stream and riparian system over time. The project has been designed to improve fish passage and spawning habitat for Kokanee salmon, and overall project impacts are expected to be beneficial, both in the short and long term.

SMC 21A.50.135(1)(f) Compensating for the adverse impact by enhancing critical areas and their buffers or creating substitute critical areas and their buffers as required in the SMC.
Project-related impacts are anticipated to be beneficial rather than adverse. Enhancement of critical areas and critical area buffers has been incorporated into the project design, and compensatory mitigation will not be required for this stream restoration project.

SMC 21A.50.135 (1)(g) Monitoring the impact, hazard or success of required mitigation and taking remedial action based upon findings over time.
The project is not a required mitigation project, and standard mitigation monitoring is not anticipated for the project. However, a monitoring plan that assesses stream and culvert performance may be required by WDFW and/or the Army Corps of Engineers as a condition of their respective permit requirements. Monitoring may also involve assessment of the abandoned channel of Zackuse Creek and its anticipated conversion to wetland or off-channel habitat. The project will provide a monitoring plan should the need arise, as a component of regulatory compliance and permitting requirements.

SMC 21A.50.135(2) In addition to the above steps, the specific development standards, permitted alteration requirements, and mitigation requirements of this chapter and elsewhere in the SMC apply.
As noted below, the project will comply with development standards and permitted alteration requirements for activities within wetland, stream, and buffer habitat per the SMC.

4.3 Permitted Alterations

Per the SMC, criteria associated with permitted alterations/activities within critical areas and critical area buffers must be demonstrated for approval of proposed projects. Portions of the culvert replacement activities may be exempt from the provisions of the cririca areas chapter of the SMC, per SMC 21A.50.050(3) for complete exemptions associated with maintenance, operation, repair, modification, or replacement of publicly improved streets within improved right-of-way. However, proposed project activites outside of the right-of-way also are allowed activites under the SMC. The project complies with the SMC permitted alteration criteria as follows.

21A.50.300 Wetlands – Permitted alterations.
Per SMC 21A.50.300(11) and (12), activities within wetlands and wetland buffers that are designed to restore or enhance wetlands and wetland-associated habitats are permitted alterations. Per SMC 21A.50.300(12)(c), permitted activities include activites (emphasis added) where:
The restoration is limited to revegetation of wetlands and their buffers ***and other specific fish and wildlife habitat improvements*** *that result in a net improvement to the functions of the wetland system;*

The proposed project is explicitly and specifically designed to provide fish and wildlife habitat improvements for Kokanee salmon. Improvements to fish passage, spawning habitat, and in-

stream habitat complexity are central to the project design. As such, the project represents a permitted alteration within wetland and wetland buffer habitat.

21A.50.340 Streams – Permitted alterations.

Portions of SMC 21A.50.340 relevant to the project are addressed below. Specifically, this includes SMC 21A.50.340(1), (8), (9), (10), (11), and (12).

21A.50.340(1) Alterations may only be permitted if based upon a critical areas study conducted in accordance with SMC 21A.50.130 that determines the proposed development will:

(a) Protect, restore or enhance the habitat, natural drainage, or other valuable functions of the stream resulting in a net improvement to the stream and stream buffer;

(b) Design, implement, maintain and monitor a restoration or enhancement plan prepared by a qualified professional;

(c) Perform the restoration or enhancement under the direction of a qualified professional; and

(d) Will otherwise be consistent with the purposes of this chapter.

The project has been designed as an enhancement and restoration project, and meets the criteria as such under this section of the SMC. All proposed project activities have been designed with input from qualified professionals to improve fish passage, improve spawning habitat for Kokanee, improve riparian and wetland vegetative communities, and improve in-stream habitat complexity for fish and other aquatic biota. The project meets the SMC criteria for 21A.50.340(1), per above.

21A.50.340 (8) Relocations. Stream relocations may be allowed only for:

(a) Type F, Np, and Ns streams as part of a public road, trail, or park project for which a public agency and utility exception is granted pursuant to SMC 21A.50.050; and

(b) Type F, Np and Ns streams for the purpose of enhancing resources in the stream if:

(i) Appropriate floodplain protection measures are used; and

(ii) The relocation occurs on site, except that relocation off site may be allowed if the applicant demonstrates that any on-site relocation is impracticable, the applicant provides all necessary easements and waivers from affected property owners and the off-site location is in the same drainage sub-basin as the original stream.

The project has been designed in anticipation of the receipt of a public agency and utility exception (PAUE) from the City of Sammamish, and complies with the above criteria. The proposed project is intended to enhance stream resources, based on improvments associated with fish passage, spawning habitat, riparian and wetland vegetative communities, and enhancement of in-stream habitat complexity. The project design provides appropriate floodplain measures based on two aspects of the project site: opportuinity for floodplain connectivity with the realigned channel and lack of structures and/or public safety concerns on the project site; and a stable channel design to allow for a relatively defined floodplain that will not migrate onto adjacent properties.

The stream relocation occurs on site, meeting the criterion in 21A.50.340(8)(b)(ii) above.

21A.50.340 (9) For any relocation allowed by this section, the applicant shall demonstrate, based on information provided by qualified professionals, including a civil engineer and a biologist, that:

(a) The equivalent base flood storage volume and function will be maintained;

(b) There will be no adverse impact to local groundwater;

(c) There will be no increase in velocity;

(d) There will be no interbasin transfer of water;

(e) There will be no increase in sediment load;

(f) Requirements set out in the mitigation plan are met;

(g) The relocation conforms to other applicable laws; and

(h) All work will be carried out under the direct supervision of a qualified biologist.

Hydrologic and hydraulic analyses were conducted for the project, and are included as supporting documentation in the various regulatory compliance processes permit applications required for the project. All work to date has indicated:

- Flood storage volume and function will remain at baseline, and potentially be improved due to channel realignment with enhanced floodplain connectivity. A two-dimensional HEC-RAS model was model was built to simulate the existing conditions in the project's stream realignment area, and indicated that wetland floodplain conditions would
- Local groundwater levels are seasonally high in the project area, manifesting as seeps and saturated soil conditions and persisting throughout the summer. Geotechnical assessments conducted in Wetland 2 indicated that saturated topsoil, underlain by saturated quaternary alluvium soils, represented typical conditions in the wetland.. The project will not impact groundwater quality, and no impact to the groundwater quantities that currently provide wetland hydrology are anticipated. Under existing conditions, groundwater expresses and supplies hydrology to Zackuse Creek, and the proposed channel realignment is not anticipated to affect the groundwater recharge of Zakcuse Creek.
- Stream flow velocities were modeled through the proposed culverts using a HEC-RAS model, Flows for the 90% exceedance criterion for the month of November—the peak in-migration month for Kokanee salmon—will not exceed the fish passage criterion of 4 fps through the proposed culverts. Flow velocities in the proposed stream channel realignment are anticipated to be less under the same conditions, due to channel sinuousity and roughness associated with large wood and vegetation.
- No interbasin transfer of water will occur as a result of the project—stream realignment occurs within the same drainage basin and in relatively close proximity to the existing stream alignment.

- Sediment load will not be increased as a result of the project. Under existing condtions, sediment loading into the Zackuse Creek system occurs as a result of erosion and upstream land use. This sediment load appears to aggrades in the downstream reaches near East Lake Sammamish Parkway. The proposed project has been designed to provide a realigned channel that is a transport reach, moving sediment through the reach and neither aggrading nor degrading the channel geometry. Additional sediment loading into Zackuse Creek will not occur as a result of the project, and potential reduction of sediment as a result of a decrease in erosional contributions is anticipated based on the realigned channel section. A sediment analysis and memo, prepared by Otak (August, 2017), provides a sediment assessment and supports the conclusion of the proposed channel design as representing a sediment transport reach.
- No compensatory mitigation plan is anticipated for the project. The project is anticipated to meet all of the goals and objectives associated with improvement of fish passage, spawning habitat, riparian and wetland vegetation communities, and in-stream habitat complextity. As noted above, the project will provide a monitoring plan should the need arise, as a component of regulatory compliance and permitting requirements.
- The project will conform to all other applicable laws and regulatory compliance requirements.
- All work will be conducted under the direct supervision of a qualified biologist.

21A.50.340 (10) A stream channel may be stabilized if:

(a) Movement of the stream channel threatens existing residential or commercial structures, public facilities or improvements, unique natural resources or the only existing access to property;

(b) The stabilization is done in compliance with the requirements of SMC 21A.50.230; and

(c) Soft-bank stabilization techniques are utilized unless the applicant demonstrates that soft-bank techniques are not a reasonable alternative due to site-specific soil, geologic and/or hydrologic conditions.

- The proposed project does not involve movement of the channel and associated threats to resididential, commercial, or public structures/facilities, and does not adversely impact either a unique natural resource nor preclude access to property.
- Stabilization of stream banks and bed has been designed in accordance with SMC 21A.50.230. The project area does not occur in an area mapped as a frequently flooded area by either the City of Sammamish or King County.
- Soft-bank stabilization has been incorporated into the project stream realignment design, utilizing a combination of large wood and native plantings.

21A.50.340 (11) Replacement of existing culverts to enhance stream habitat, not associated with any other development proposal, may be allowed if accomplished according to a plan for its design, implementation, maintenance, and monitoring prepared by qualified professionals, including a civil engineer and a biologist, and carried out under the direction of a qualified biologist.

Replacemement of the existing culverts with stream simulation designed, fish passable culverts is a project element that has been designed for enhancement of Zackuse Creek, and not associated with

any other development. Design, implementation, maintenance, and monitoring has been or will be conducted by qualified professionals. As noted above, the project will provide a monitoring plan should the need arise, as a component of regulatory compliance and permitting requirements.

21A.50.340 (12) Stream and habitat restoration or enhancement may be allowed if:

(a) The restoration is sponsored or approved by a public agency with a mandate to do such work;

(b) The restoration is unassociated with mitigation of a specific development proposal;

(c) The restoration is limited to placement of rock weirs, log controls, spawning gravel, and other specific habitat improvements for resident or anadromous fish including salmonids;

(d) The restoration only involves the use of hand labor and light equipment; or the use of helicopters and cranes that deliver supplies to the project site; provided, that they have no contact with critical areas or their buffers;

(e) The restoration is performed under the direction of qualified professionals; and

(f) Stream relocation, if proposed, may be approved pursuant to subsection (9) of this section as part of an approved restoration plan.

- The proposed project is both proposed and supported by the City of Sammamish. Numerous stakeholders, consolidated within the collaborative and umbrella Lake Sammamish Kokanee Work Group, also support the project—including local jurisdictional, tribal, state, and federal entities.
- The proposed project is not associated with a specific development proposal. The proposed project is specifically and explicitly designed to enhance fish passage conditions, spawning habitat, riparian and wetland vegetative communities, and in-stream habitat complexity.
- The proposed project is designed to attaine stream bank and bed stability through project elements that will include rock weirs, log controls, spawnoing gravels, large wood as in-stream habitat features, and installation of native plant species.
- In order to implement the project, hand labor and light equipment will be utilized to the extent possible. The culvert replacements will involve use of heavy equipment, located outside of the OHWM of Zackuse Creek in order to remove the existing culverts and replace them with the new, fish passable culverts. Use of heavy equipment will be necessary to excavate and grade the new, realigned channel. Note that this work will take place outside of the existing channel during construction of the new channel.
- Restoration construction will be performed under the direction of a qualified biologist/ecologist.
- Stream relocation will occur per SMC 21A.50.340 (9), as outlined above.

Chapter 5. References

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Appendix A — Methods and Tools

Table A-1. Methods and Tools Used to Prepare the Report.

Parameter	Method or Tool	Website	Reference
	Washington State Wetlands Identification and Delineation Manual	https://fortress.wa.gov/ecy/publications/publications/9694.pdf	Washington Department of Ecology. 1997. *Washington State Wetlands Identification and Delineation Manual.* Ecology Publication #96-94. Olympia, Washington.
	Corps of Engineers Wetlands Delineation Manual	http://el.erdc.usace.army.mil/elpubs/pdf/wlman87.pdf	**U.S. Army Corps of Engineers. 1987.** *Corps of Engineers Wetland Delineation Manuel*. Environmental Laboratory Wetlands Research Program Technical Report Y-87-1, U.S. Army Corps of Engineers, Engineer Waterways Experiment Station, Vicksburg, Mississippi.
	Regional Supplement to the Corps of Engineers Wetland Delineation Manual : WMVC	http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg_supp/west_mt_finalsupp.pdf	**U.S. Army Corps of Engineers**. **2010.** *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0),* ed. J.S. Wakely, R. W. Lichvar, and C.V. noble. ERDC/EL TR-10-3. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
	USFWS / Cowardin Classification System	http://www.fws.gov/nwi/Pubs_Reports/Class_Manual/class_titlepg.htm	**Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979**. Classification of wetlands and deepwater habitats of the United States. Government Printing Office, Washington, D.C.
	Hydrogeomorphic Classification (HGM) System	http://el.erdc.usace.army.mil/wetlands/pdfs/wrpde4.pdf	**Brinson, M. M. (1993).** "A hydrogeomorphic classification for wetlands," Technical Report WRP-DE-4, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. NTIS No. AD A270 053.
	Washington State Wetland Rating System: Western WA	http://www.ecy.wa.gov/biblio/0406025.html	**Hruby. 2014**. *Washington State Wetland Rating System for Western Washington –2014 Update*. Publication # 14-06-029.
	Sammamish Municipal Code	http://www.codepublishing.com/WA/Sammamish/	Website. Requires compliance with Sammamish Municipal Code (21A.50.290) and use of 2014 Ecology rating system and conversion charts.
	OHWM	http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/cwa_guide/app_h_rgl05-05.pdf	**U.S. Army Corps of Engineers**. Regulatory Guidance Letter No. 05-05. Ordinary High Water Mark Identification.
	OHWM	http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title33/33cfr328_main_02.tpl	Congressional Federal Register 33 Part 328 Definition of Waters of the United States.

Parameter	Method or Tool	Website	Reference
	OHWM	http://www.ecy.wa.gov/programs/sea/sma/st_guide/jurisdiction/ohwm.html	Washington State Department of Ecology. 2008. Determining the Ordinary High Water Mark on Streams in Washington State (Second Review Draft) – Revised March 2010. Ecology publication #08-06-001. Olympia, WA.
	Department of Natural Resources (DNR) Water Typing System	**Forest Practices Water Typing:** http://www.stage.dnr.wa.gov/forestpractices/watertyping/ **WAC 222-16-030:** http://apps.leg.wa.gov/WAC/default.aspx?cite=222-16-030 **Water Type Mapping:** http://www3.wadnr.gov/dnrapp5/website/fpars/viewer.htm	Washington Administrative Code (WAC) 222-16-030. DNR Water typing system.
	Sammamish Municipal Code	http://www.codepublishing.com/WA/Sammamish/	Sammamish Municipal Code 21A.50.330 (Streams- Development Standards)
Wetland Indicator Status	Western Mountains, Valleys, and Coast 2016 Regional Wetland Plant List	http://rsgisias.crrel.usace.army.mil/NWPL/	**Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin.** 2016. *Western Mountains, Valleys, and Coast: 2016 Regional Wetland Plant List.* Phytoneuron 2016-30: 1-17.
Plant Names	USDA PLANTS Database	http://plants.usda.gov/	Website
Report Preparation	Sammamish Municipal Code	http://www.codepublishing.com/WA/Sammamish/	Sammamish Municipal Code 21A.50.130 (Contents of critical areas study).
Soils Data	Soil Survey	**Web Soil Survey:** http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx **Soil Data Mart:** http://soildatamart.nrcs.usda.gov/	Websites
	Washington Natural Heritage Program	http://www.dnr.wa.gov/nhp/	**Washington Natural Heritage Program** (list updated September 2014). Endangered, threatened, and sensitive plants of Washington. Washington State Department of Natural Resources, Washington Natural Heritage Program, Olympia, WA
	Washington Priority Habitats and Species	http://wdfw.wa.gov/hab/phspage.htm	**Priority Habitats and Species (PHS) Program** – August 2008 Washington State

Parameter	Method or Tool	Website	Reference
Species (continued)			Priority Habitats and Species List. Website reviewed January 12, 2016.
	NOAA fisheries species list and maps	http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Index.cfm and http://www.nmfs.noaa.gov/pr/species/	Websites
	USFWS species list by state	http://ecos.fws.gov/ecp0/reports/species-listed-by-state-report?state=WA&status=listed	Website

Appendix B — Project Figures and Background Information

This appendix includes:

- Figure 1: Vicinity Map
- Figure 2: Study Area and Tax Parcel Map
- Figure 3: Topography Map
- Figure 4: NRCS Soils Map
- Figure 5: National Wetlands Inventory Map
- Figure 6: Local Critical Areas Map
- Figure 7: Delineated Wetlands and Streams Map

Figure 1
Vicinity Map

Zackuse Creek Fish Passage Project
City of Sammamish, WA

Legend
- Study Area
- Roads

1 inch = 1,000 feet

0 — 1,000 Feet

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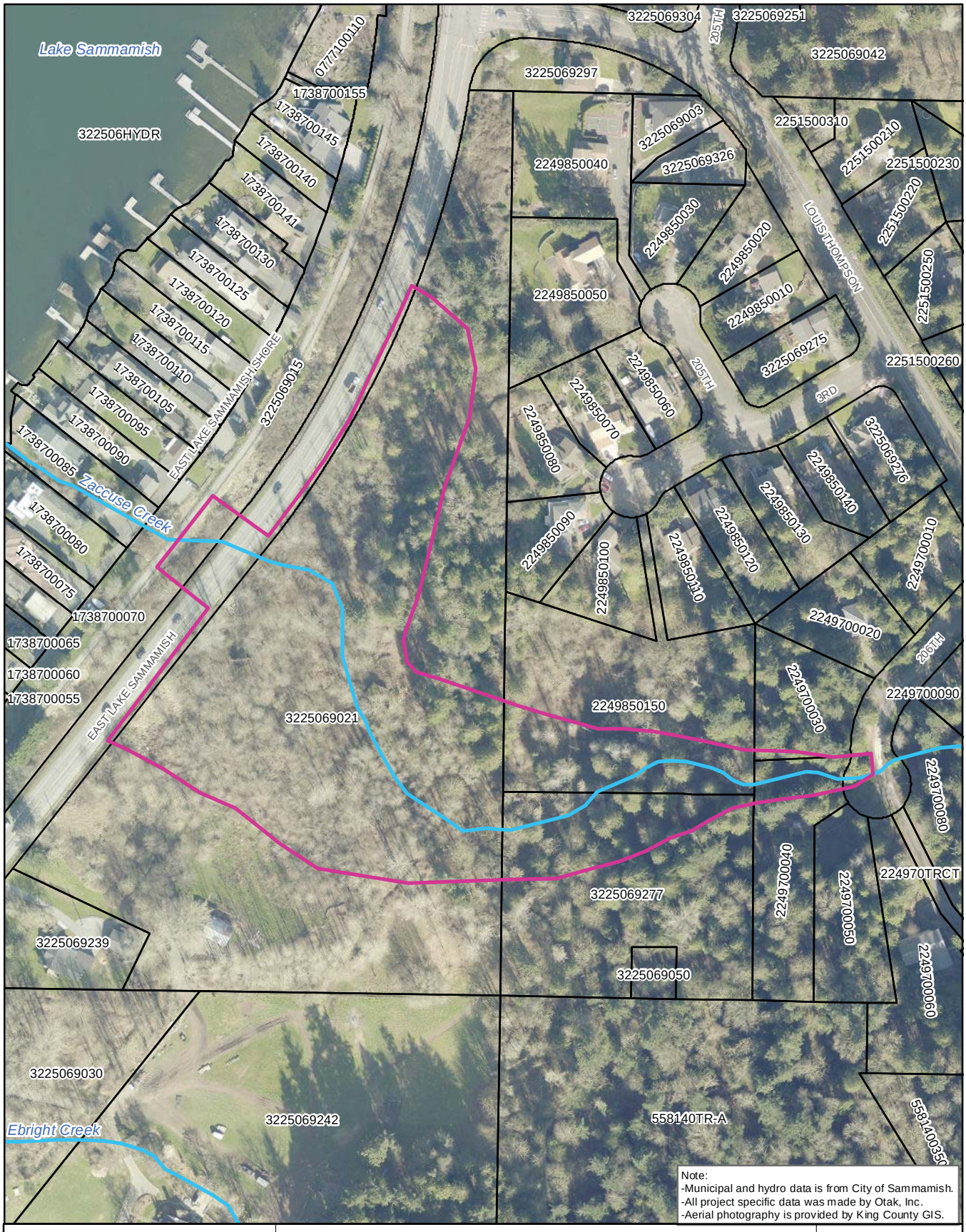
Date: 1/18/2017



Note:
-Municipal and hydro data is from City of Sammamish.
-All project specific data was made by Otak, Inc.
-Aerial photography is provided by King County GIS.

Figure 2
Study Area and Tax Parcel Map

Zackuse Creek Fish Passage Project
City of Sammamish, WA

Legend

- Streams
- Parcel
- Study Area

N

1 inch = 200 feet

0 200 Feet

City of Sammamish

otak
HanmiGlobal Partner

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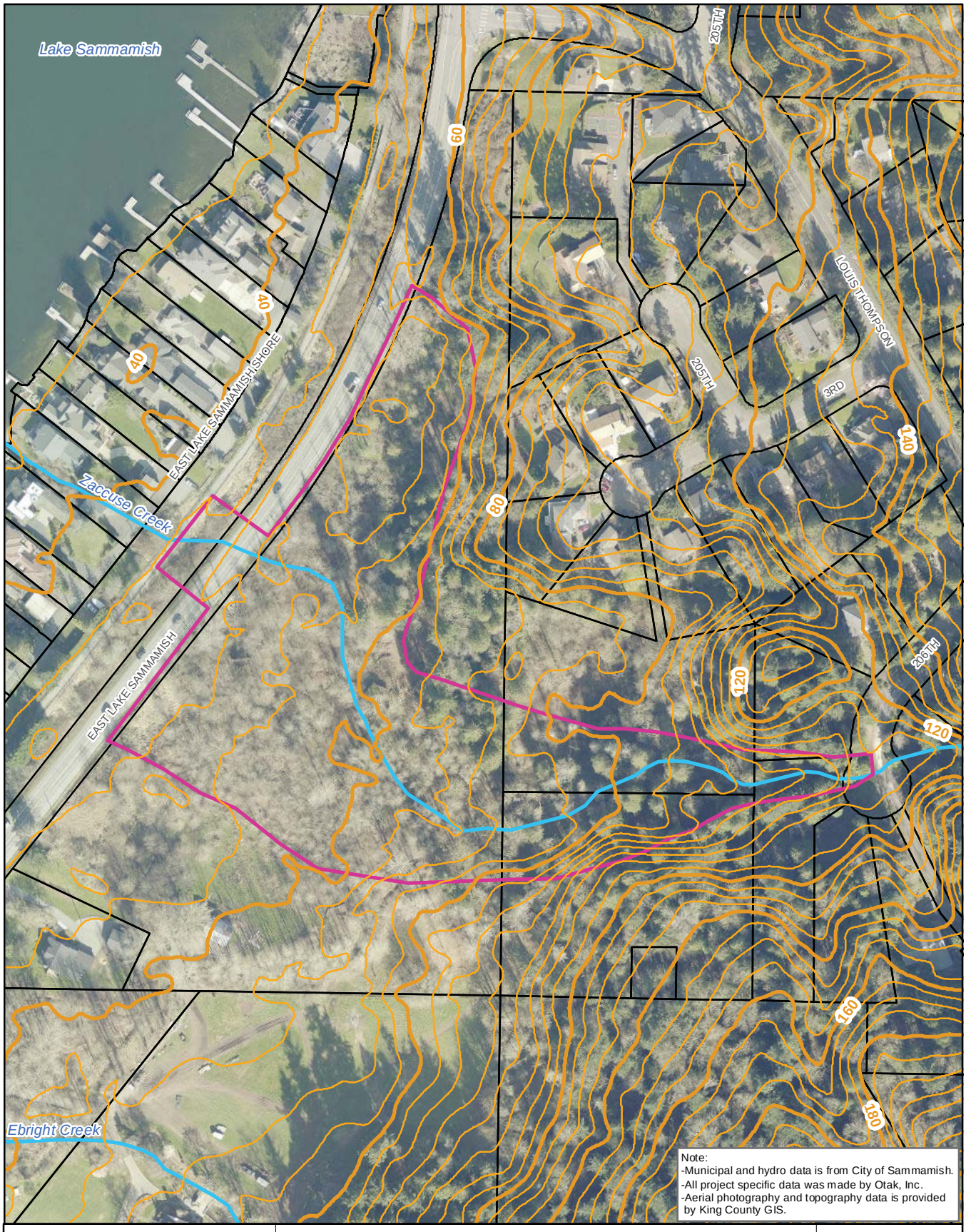

Figure 3
Topography Map

Zackuse Creek Fish Passage Project
City of Sammamish, WA

Legend

- Contour - 20ft
- Contour - 5ft
- Streams
- Parcel
- Study Area

1 inch = 200 feet

0 200 Feet

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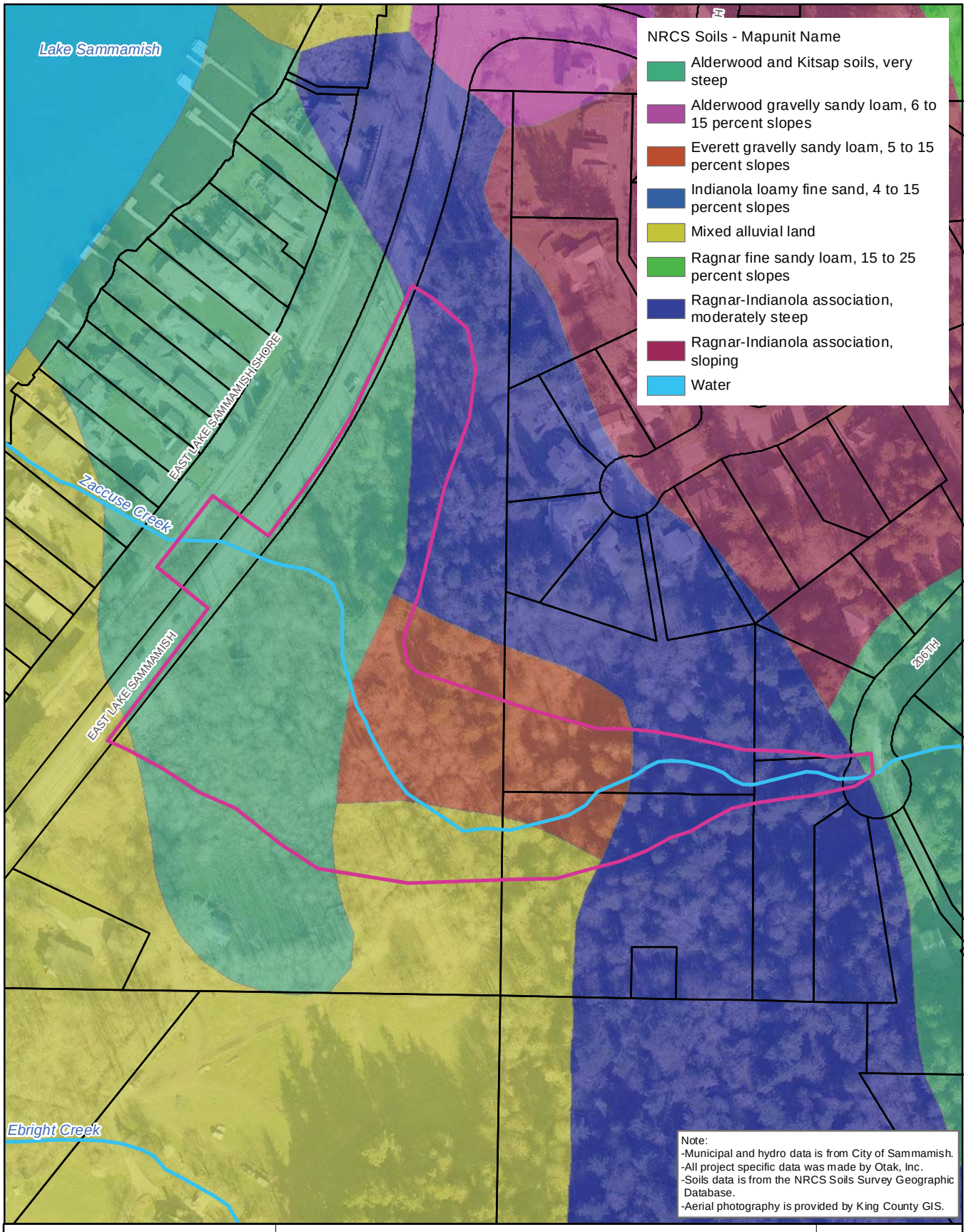

Figure 4
NRCS Soils Map

Zackuse Creek Fish Passage Project
City of Sammamish, WA

Legend
- Study Area
- Streams
- Parcel

N

1 inch = 200 feet

0 200 Feet

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Date: 1/18/2017

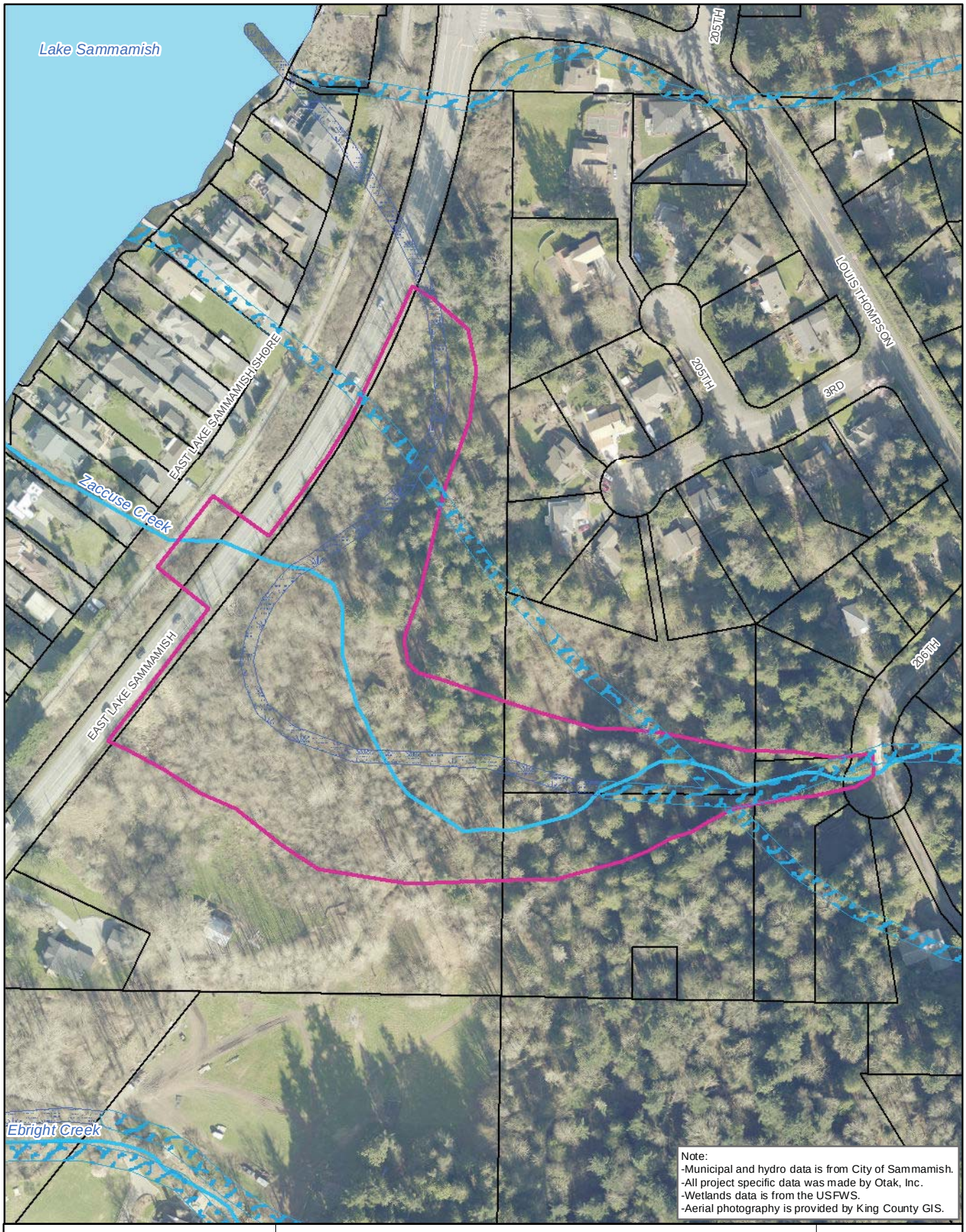

Figure 5
National Wetlands Inventory Map

Zackuse Creek Fish Passage Project
City of Sammamish, WA

Legend

National Wetlands Inventory
- Lake
- Freshwater Forested/Shrub Wetland
- Riverine

- Study Area
- Streams
- Parcel

1 inch = 200 feet

0 200 Feet

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Date: 1/18/2017

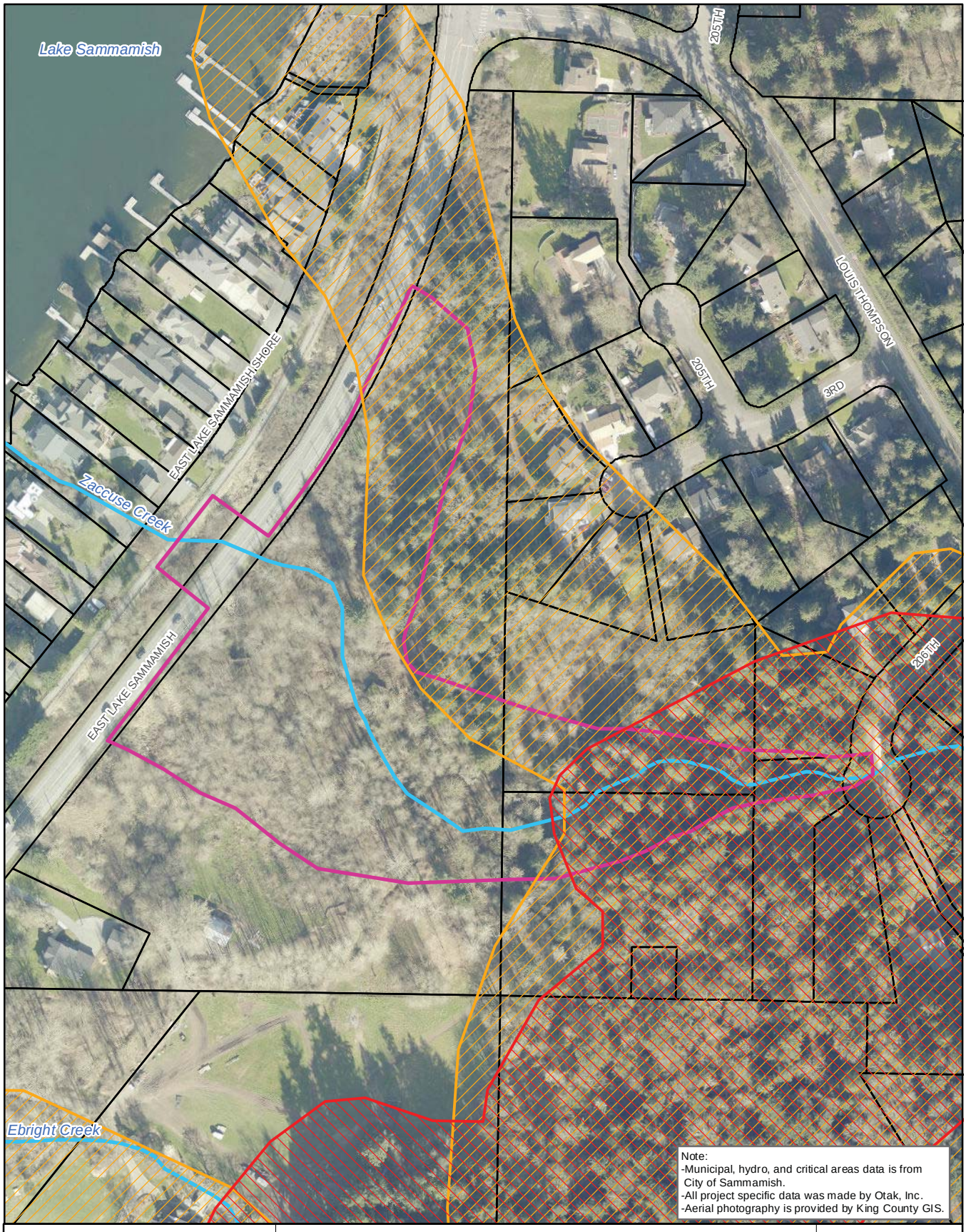

Figure 6
Local Critical Areas Map

Zackuse Creek Fish Passage Project
City of Sammamish, WA

Legend

- Landslide Hazard Area
- Erosion Hazard Area
- Study Area
- Streams
- Parcel

1 inch = 200 feet

0 200 Feet

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Date: 1/18/2017

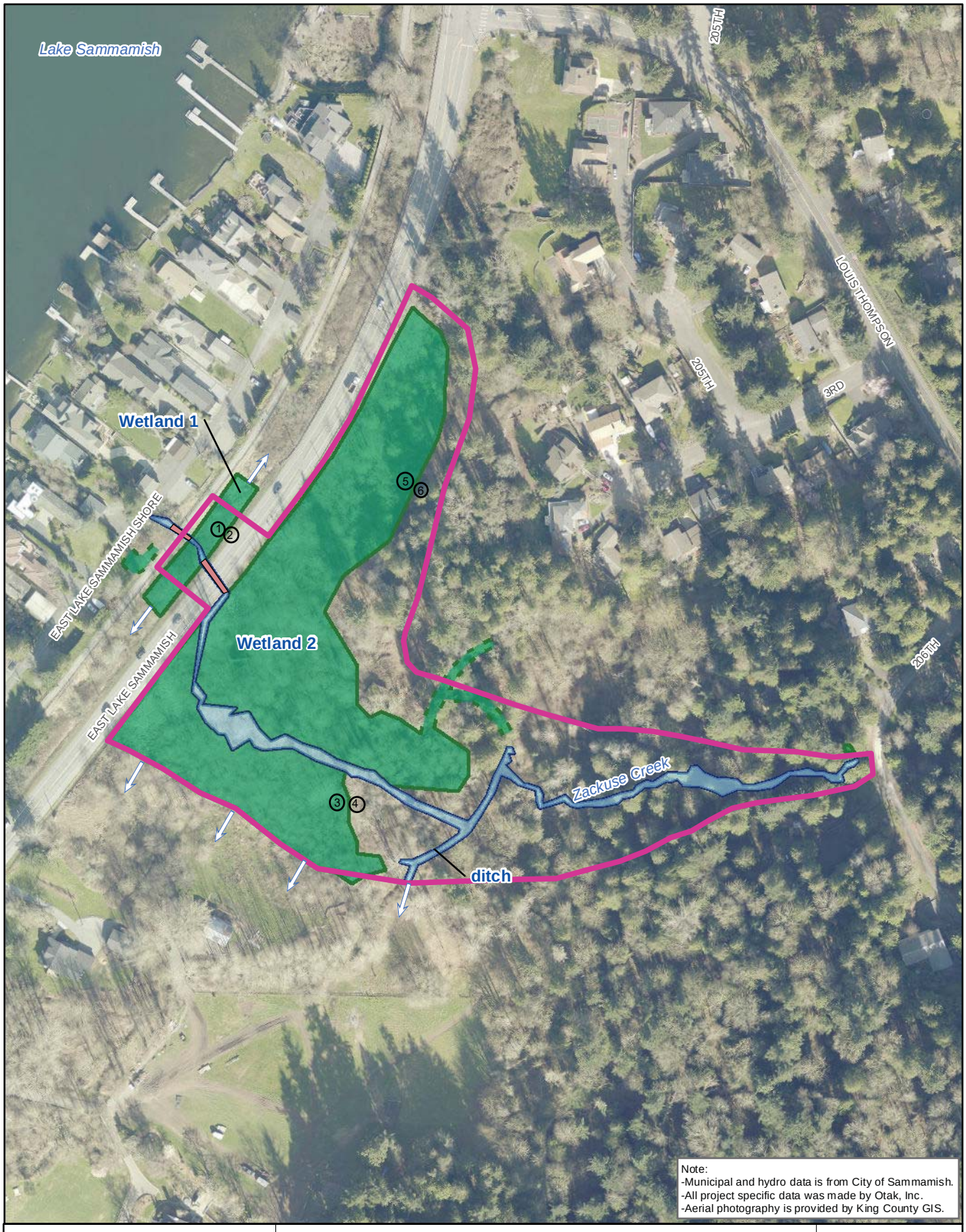


Figure 7
Delineated Wetlands and Streams Map

Zackuse Creek Fish Passage Project
City of Sammamish, WA

Study Area
Culvert
Stream
Ordinary High Water Mark

Wetland Boundary
Delineated
Approximate
Wetland
Wetland Continues
Data Point

N

1 inch = 200 feet

0 200 Feet

City of Sammamish

otak
HanmiGlobal Partner

K:\project\32700\32794\CADD\GIS\MXDs\Wetlands\Fig07_DelineatedWetlands.mxd

Date: 1/23/2017

Appendix C — Wetland Determination Data Forms

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

Project Site: Zackuse Creek Fish Passage Project City/County: Samammish/King Sampling Date: 11/18/16
Applicant/Owner: City of Sammamish/Pereyra State: WA Sampling Point: 1
Investigator(s): Jeff Gray and Kevin O'Brien Section, Township, Range: S32, T25N, R06E
Landform (hillslope, terrace, etc.): Roadside swale Local relief (concave, convex, none): concave Slope (%): 0-2
Subregion (LRR): A Lat: - Long: - Datum: -
Soil Map Unit Name: Alderwood and Kitsap soils, very steep 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	☐	
Hydric Soil Present?	Yes	☒	No	☐	**Is the Sampled Area within a Wetland?** **Yes** ☒ **No** ☐
Wetland Hydrology Present?	Yes	☒	No	☐	

Remarks: **All three wetland indicators present. Data point located in roadside wetland swale between trail and Samammish Parkway next to flag B-7.**

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 5'x10' belt)	Absolute % Cover	Dominant Species?	Indicator Status
1. -			
2.			
3.			
4.			
50% = , 20% =	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5'x10' belt)			
1. *Cornus alba*	35	yes	FACW
2. *Rosa nutkana*	55	yes	FAC
3. *Physocarpus capitatus*	3	no	FACW
4. *Rubus armeniacus*	5	no	FAC
5.			
50% = 49, 20% = 19.6	98	= Total Cover	
Herb Stratum (Plot size: 5' diam.)			
1. *Phalaris arundinacea*	45	yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = 22.5, 20% = 9		= Total Cover	
Woody Vine Stratum (Plot size: 5'x10' belt))			
1. -			
2.			
50% = , 20% =	0	= Total Cover	

% Bare Ground in Herb Stratum 55

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1 =	
FACW species		x2 =	
FAC species		x3 =	
FACU species		x4 =	
UPL species		x5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

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: Hydrophytic vegetation indicator present.

Project Site: Zackuse Creek Fish Passage Project

SOIL

Sampling Point: 1

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/1	100					silt loam	
12+	10YR 2/1	100					muck	mud, no profile

[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 Soils Present? **Yes** ☒ **No** ☐

Remarks: Hydric soils determined to be present due to hydrophytic vegetation community and shallow water table. Could not determine if redox features prevelant in soil profile after 12" because turned to mud.

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 Stresses 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):	12
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	8

Wetland Hydrology Present? **Yes** ☒ **No** ☐

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

Remarks: Wetland hydrology indicators present. Standing surface water approximately 4 feet away to the west.

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

Project Site: Zackuse Creek Fish Passage Project City/County: Samammish/King Sampling Date: 11/18/16
Applicant/Owner: City of Sammamish/Pereyra State: WA Sampling Point: 2
Investigator(s): Jeff Gray and Kevin O'Brien Section, Township, Range: S32, T25N, R06E
Landform (hillslope, terrace, etc.): Road embankment Local relief (concave, convex, none): none Slope (%): 45
Subregion (LRR): A Lat: - Long: - Datum: -
Soil Map Unit Name: Alderwood and Kitsap soils, very steep 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	☐	
Hydric Soil Present?	Yes	☐	No	☒	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒
Wetland Hydrology Present?	Yes	☐	No	☒	

Remarks: **Not all three wetland indicators present. Data point located in uplands on road embankment next to flag B-7.**

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 5'x10' belt)	Absolute % Cover	Dominant Species?	Indicator Status
1. -			
2.			
3.			
4.			
50% = , 20% =		= Total Cover	
Sapling/Shrub Stratum (Plot size: 5'x10' belt)			
1. *Rubus armeniacus*	15	yes	FAC
2. *Cornus alba*	10	yes	FACW
3.			
4.			
5.			
50% = 12.5, 20% = 5	25	= Total Cover	
Herb Stratum (Plot size: 5' diam.)			
1. *Holcus lanatus*	15	yes	FAC
2. *Poa pratensis*	15	yes	FAC
3. *Taraxacum officinale*	trace	no	FACU
4. *Phalaris arundinacea*	10	yes	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = 20, 20% = 8	40	= Total Cover	
Woody Vine Stratum (Plot size: 5'x10' belt)			
1. -			
2.			
50% = , 20% =		= Total Cover	

% Bare Ground in Herb Stratum 60 (some moss)

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	5	(A)
Total Number of Dominant Species Across All Strata:	5	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1 =	
FACW species		x2 =	
FAC species		x3 =	
FACU species		x4 =	
UPL species		x5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

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: Hydrophytic vegetation indicator present.

Project Site: Zackuse Creek Fish Passage Project

SOIL

Sampling Point: 2

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/2	100					loam	gravels abundant

[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 Soils Present? **Yes** ☐ **No** ☒

Remarks: No hydric soil indicator present.

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 Stresses 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: No wetland hydrology indicators present.

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

Project Site: Zackuse Creek Fish Passage Project City/County: Samammish/King Sampling Date: 11/18/16
Applicant/Owner: City of Sammamish/Pereyra State: WA Sampling Point: 3
Investigator(s): Jeff Gray and Kevin O'Brien Section, Township, Range: S32, T25N, R06E
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 2-5
Subregion (LRR): A Lat: - Long: - Datum: -
Soil Map Unit Name: Mixed alluvial land 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	☐	
Hydric Soil Present?	Yes	☒	No	☐	**Is the Sampled Area within a Wetland?** **Yes** ☒ **No** ☐
Wetland Hydrology Present?	Yes	☒	No	☐	

Remarks: **All three wetland indicators present. Data point located in forested wetland 15' west of flag D4.**

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30' diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus rubra*	45	yes	FAC
2.			
3.			
4.			
50% = 22.5, 20% = 9	45	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15' diam.)			
1. *Cornus alba*	35	yes	FACW
2. *Rubus spectabilis*	30	yes	FAC
3.			
4.			
5.			
50% = 32.5, 20% = 13	65	= Total Cover	
Herb Stratum (Plot size: 5' diam.)			
1. *Lysichiton americanus*	8	yes	OBL
2. *Athyrium cyclosorum*	5	yes	FAC
3. *Equisetum arvense*	trace		FAC
4. *Polystichum munitum*	4	no	UPL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = 8.5, 20% = 3.4	17	= Total Cover	
Woody Vine Stratum (Plot size: 15' diam.)			
1. *Hedera helix*	trace	n/a*	FACU
2.			
50% = _____, 20% = _____	0	= Total Cover	

% Bare Ground in Herb Stratum 83 (leaf litter)

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1 =	
FACW species		x2 =	
FAC species		x3 =	
FACU species		x4 =	
UPL species		x5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

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: Hydrophytic vegetation indicator present.

Project Site: Zackuse Creek Fish Passage Project

SOIL

Sampling Point: 3

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

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-18	10YR 2/1	100					silty loam	

[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 Soils Present? **Yes** ☒ **No** ☐

Remarks: Hydric soil indicator present.

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 Stresses 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):	7
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches):	0

Wetland Hydrology Present? **Yes** ☒ **No** ☐

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

Remarks: Wetland hydrology indicators present. Surface water adjacent to soil pit.

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

Project Site: Zackuse Creek Fish Passage Project City/County: Samammish/King Sampling Date: 11/18/16
Applicant/Owner: City of Sammamish/Pereyra State: WA Sampling Point: 4
Investigator(s): 4Jeff Gray and Kevin O'Brien Section, Township, Range: S32, T25N, R06E
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 2-5
Subregion (LRR): A Lat: - Long: - Datum: -
Soil Map Unit Name: Mixed alluvial land 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: **Not all three wetland indicators present. Data point located 15 feet east of flag D4 in upland forest.**

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30' diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus rubra*	65	yes	FAC
2.			
3.			
4.			
50% = 32.5, 20% = 13	65	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15' diam.)			
1. *Rubus spectabilis*	80	yes	FAC
2. *Rubus armeniacus*	5	no	FAC
3.			
4.			
5.			
50% = 42.5, 20% = 17	85	= Total Cover	
Herb Stratum (Plot size: 5' diam.)			
1. *Polystichum munitum*	8	yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = 4, 20% = 1.6	8	= Total Cover	
Woody Vine Stratum (Plot size: 15' diam.)			
1. *Herdera helix*	70	yes	FACU
2.			
50% = 35, 20% = 14	70	= Total Cover	

% Bare Ground in Herb Stratum 92

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	(A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x1 =	0
FACW species	0	x2 =	0
FAC species	150	x3 =	450
FACU species	78	x4 =	312
UPL species	0	x5 =	0
Column Totals:	228 (A)		762 (B)

Prevalence Index = B/A = 3.34

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: Hydrophytic vegetation indicator not present.

Project Site: Zackuse Creek Fish Passage Project

SOIL

Sampling Point: 4

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

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-18	10YR 2/1	100					loam	dry

[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 Soils Present? **Yes** ☐ **No** ☒

Remarks: No hydric soil indicator present. Soil dry. Soil pit located on ditch berm .

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 Stresses 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):	15

Wetland Hydrology Present? **Yes** ☐ **No** ☒

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

Remarks: No wetland hydrology indicators present.

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

Project Site: Zackuse Creek Fish Passage Project City/County: Samammish/King Sampling Date: 11/18/16
Applicant/Owner: City of Sammamish/Pereyra State: WA Sampling Point: 5
Investigator(s): Jeff Gray and Kevin O'Brien Section, Township, Range: S32, T25N, R06E
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 2-5
Subregion (LRR): A Lat: - Long: - Datum: -
Soil Map Unit Name: Everett gravelly sandy loam, 8 to 15 percent slopes 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	☐	
Hydric Soil Present?	Yes	☒	No	☐	**Is the Sampled Area within a Wetland?** **Yes** ☒ **No** ☐
Wetland Hydrology Present?	Yes	☒	No	☐	

Remarks: **All three wetland indicators present. Data point locatd 15' west of flag C16 in forested wetland.**

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30' diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus rubra*	10	yes	FAC
2. *Thuja plicata*	20	yes	FAC
3.			
4.			
50% = 15, 20% = 6	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15' diam.)			
1. *Rubus spectabilis*	75	yes	FAC
2. *Rubus armeniacus*	10	no	FAC
3.			
4.			
5.			
50% = 42.5, 20% = 17	85	= Total Cover	
Herb Stratum (Plot size: 5' diam.)			
1. *Athyrium cyclosorum*	45	yes	FAC
2. *Equisetum arvense*	15	yes	FAC
3. *Rubus ursinus*	3	no	
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = 31.5, 20% = 12.6	63	= Total Cover	
Woody Vine Stratum (Plot size: 15' diam.)			
1. -			
2.			
50% = _____, 20% = _____		= Total Cover	

% Bare Ground in Herb Stratum 37

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	5	(A)
Total Number of Dominant Species Across All Strata:	5	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1 =	
FACW species		x2 =	
FAC species		x3 =	
FACU species		x4 =	
UPL species		x5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

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: Hydrophytic vegetation indicator present.

Project Site: Zackuse Creek Fish Passage Project

SOIL

Sampling Point: 5

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
0-7	10YR 2/1	100					silt loam	
7-18	10YR 5/2	75	10YR 5/1	20	D	m	loam	
			7.5YR 4/6	5	C	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 Soils Present? **Yes** ☒ **No** ☐

Remarks: Hydric soil indicator present.

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 Stresses 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): 8
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches): 0

Wetland Hydrology Present? **Yes** ☒ **No** ☐

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

Remarks: Wetland hydrology indicators present.

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

Project Site: Zackuse Creek Fish Passage Project City/County: Samammish/King Sampling Date: 11/18/16
Applicant/Owner: City of Sammamish/Pereyra State: WA Sampling Point: 6
Investigator(s): Jeff Gray and Kevin O'Brien Section, Township, Range: S32, T25N, R06E
Landform (hillslope, terrace, etc.): hillside Local relief (concave, convex, none): none Slope (%): 2-5
Subregion (LRR): A Lat: - Long: - Datum: -
Soil Map Unit Name: Everett very gravelly sandy loam, 8 to 15 percent slopes 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: **Not all three wetland indicators present. Data point located in upland forest 15 feet east of flag C16.**

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30' diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Thuja plicata*	20	yes	FAC
2. *Acer macrophyllum*	15	yes	FACU
3.			
4.			
50% = 32.5, 20% = 7	35	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15' diam.)			
1. *Rubus armeniacus*	20	yes	FAC
2. *Rubus ursinus*	15	yes	FACU
3. *Oemleria cerrasiformis*	25	yes	FACU
4.			
5.			
50% = 30, 20% = 12	60	= Total Cover	
Herb Stratum (Plot size: 5' diam.)			
1. *Equisetum arvense*	20	yes	FAC
2. *Polystichum munitum*	20	yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = 20, 20% = 8	40	= Total Cover	
Woody Vine Stratum (Plot size: 15' diam.)			
1. -			
2.			
50% = _____, 20% = _____		= Total Cover	

% Bare Ground in Herb Stratum 60 (leaf litter)

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	7	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	43	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1 =	
FACW species		x2 =	
FAC species	60	x3 =	180
FACU species	85	x4 =	340
UPL species		x5 =	
Column Totals:	145 (A)		520 (B)

Prevalence Index = B/A = 3.59

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: No hydrophytic vegetation indicator present.

Project Site: Zackuse Creek Fish Passage Project

SOIL

Sampling Point: 6

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
0-15	10YR 2/2	100					loam	dry
15-19	10YR 2/2	95	10YR 4/6	5	c	m	loam	dry
19-23	10YR 4/2	90	10YR 4/6	10	c	m	loam	dry

[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 Soils Present? **Yes** ☐ **No** ☒

Remarks: No hydric soil indiactor present. Depleted layer starts to deep in soil profile.

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 Stresses 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: No wetland hydrology indicators present.

Appendix D — Ecology Wetland Rating Forms

Wetland name or number 1

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Zackuse Creek: Wetland 1 Date of site visit: 1/10/17

Rated by Stephanie Modjeski Trained by Ecology?__ Yes X No Date of training_____

HGM Class used for rating Depressional Wetland has multiple HGM classes?___Y ____N

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

Source of base aerial photo/map King County Aerial 2015 with labels

OVERALL WETLAND CATEGORY III (based on functions X or special characteristics___)

1. Category of wetland based on FUNCTIONS

_____**Category I** – Total score = 23 - 27

_____**Category II** – Total score = 20 - 22

__X__**Category III** – Total score = 16 - 19

_____**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	7	6	6	19

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
Estuarine	**I** **II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I** **II**
Interdunal	**I** **II** **III** **IV**
None of the above	

Wetland name or number 1

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	1
Hydroperiods	D 1.4, H 1.2	1
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	1
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	2
Map of the contributing basin	D 4.3, D 5.3	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	4
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	5
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	6

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
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)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number 1

HGM Classification of Wetlands in Western Washington

For questions 1-7, 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 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

   (NO) – go to 2 **YES** – the wetland class is **Tidal Fringe** – go to 1.1

   1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

   (NO) – go to 3 **YES** – The wetland class is **Flats**
   *If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
   ___The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ___At least 30% of the open water area is deeper than 6.6 ft (2 m).

   (NO) – go to 4 **YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. 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 5 **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 ft deep).

5. 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 2 years.

Wetland name or number 1

NO – go to 6 **YES** – The wetland class is **Riverine**

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

6. 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 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8 **YES** – The wetland class is **Depressional**

8. 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 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

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

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*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 1

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	1
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions).* Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^1/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^1/_{10}$ of area points = 0	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	0
Total for D 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*

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

Rating of Landscape Potential If score is: ___ **3 or 4 = H** **X** **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

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

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

Wetland name or number 1

DEPRESSIONAL AND FLATS WETLANDS

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

D 4.0. Does the site have the potential to reduce flooding and erosion?

D 4.1. Characteristics of surface water outflows from the wetland:

Wetland is a depression or flat depression with no surface water leaving it (no outlet)	points = 4	0
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet	points = 2	
Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch	points = 1	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 0	

D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.*

Marks of ponding are 3 ft or more above the surface or bottom of outlet	points = 7	3
Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet	points = 5	
Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet	points = 3	
The wetland is a "headwater" wetland	points = 3	
Wetland is flat but has small depressions on the surface that trap water	points = 1	
Marks of ponding less than 0.5 ft (6 in)	points = 0	

D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.*

The area of the basin is less than 10 times the area of the unit	points = 5	5
The area of the basin is 10 to 100 times the area of the unit	points = 3	
The area of the basin is more than 100 times the area of the unit	points = 0	
Entire wetland is in the Flats class	points = 5	

Total for D 4	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*

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

D 5.1. Does the wetland receive stormwater discharges?	Yes = 1 No = 0	1
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff?	Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	Yes = 1 No = 0	1
Total for D 5	Add the points in the boxes above	3

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

D 6.0. Are the hydrologic functions provided by the site valuable to society?

D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.*

The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds):		0
• Flooding occurs in a sub-basin that is immediately down-gradient of unit.	points = 2	
• Surface flooding problems are in a sub-basin farther down-gradient.	points = 1	
Flooding from groundwater is an issue in the sub-basin.	points = 1	
The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why* _____	points = 0	
There are no problems with flooding downstream of the wetland.	points = 0	

D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?	Yes = 2 No = 0	0
Total for D 6	Add the points in the boxes above	0

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

Wetland name or number 1

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

____	Aquatic bed	4 structures or more: points = 4
__X__	Emergent	3 structures: points = 2
__X__	Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
__X__	Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

____The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

2

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

____	Permanently flooded or inundated	4 or more types present: points = 3
____	Seasonally flooded or inundated	3 types present: points = 2
__X__	Occasionally flooded or inundated	2 types present: points = 1
__X__	Saturated only	1 type present: points = 0
__X__	Permanently flowing stream or river in, or adjacent to, the wetland	
____	Seasonally flowing stream in, or adjacent to, the wetland	
____	**Lake Fringe wetland**	**2 points**
____	**Freshwater tidal wetland**	**2 points**

2

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

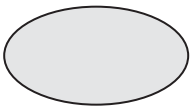
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted: > 19 species	points = 2
5 - 19 species	points = 1
< 5 species	points = 0

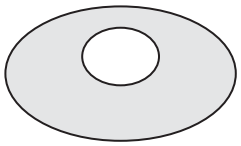
1

H 1.4. Interspersion of habitats

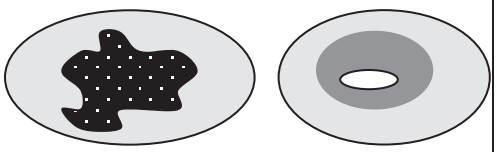
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points

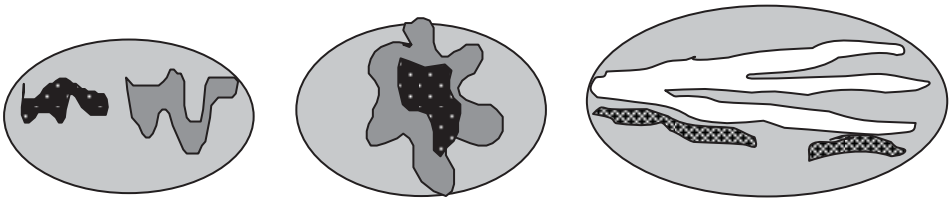


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3points



3

Wetland name or number 1

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ____Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ____Standing snags (dbh > 4 in) within the wetland ____Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* ____At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ____Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	0
Total for H 1 Add the points in the boxes above	8

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

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat .19 + [(% moderate and low intensity land uses)/2] 2.35 = 2.54 % If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1 km Polygon points = 2 10-19% of 1 km Polygon points = 1 < 10% of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat 15 + [(% moderate and low intensity land uses)/2] 2.35 = 17.35 % Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10-50% and in 1-3 patches points = 2 Undisturbed habitat 10-50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (- 2) ≤ 50% of 1 km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	-1

Rating of Landscape Potential If score is:___**4-6 = H** ___**1-3 = M** **X** **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: points = 2 **X** It has 3 or more priority habitats within 100 m (see next page) — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is mapped as a location for an individual WDFW priority 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 (listed on next page) within 100 m points = 1 Site does not meet any of the criteria above points = 0	2

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

Wetland name or number 1

WDFW Priority Habitats

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

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

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

— **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. 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 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*).

X **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

X **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.

— **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

— **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.

X **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

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

Wetland name or number 1

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt Yes –Go to **SC 1.1** (No) = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** (No) Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = **Category I** (No) = **Category II**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes – Go to **SC 2.2** (No) – Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes = **Category I** (No) = **Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes **– Contact WNHP/WDNR and go to SC 2.4** (No) = **Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes = **Category I** (No) = **Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** (No) – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit 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 3.3** (No) = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** (No) – Go to **SC 3.4** **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 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, 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 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** (No) = **Is not a bog**	**Cat. I**

Wetland name or number 1

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.*** — **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes = **Category I** (No) = **Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* Yes – Go to **SC 5.1** (No) = **Not a wetland in a coastal lagoon** SC 5.1. Does the wetland meet all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2) Yes = **Category I** (No) = **Category II**	**Cat. I** **Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** (No) = **not an interdunal wetland for rating** SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** (No) – Go to **SC 6.2** SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** (No) – Go to **SC 6.3** SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** (No) = **Category IV**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	Not Applicable

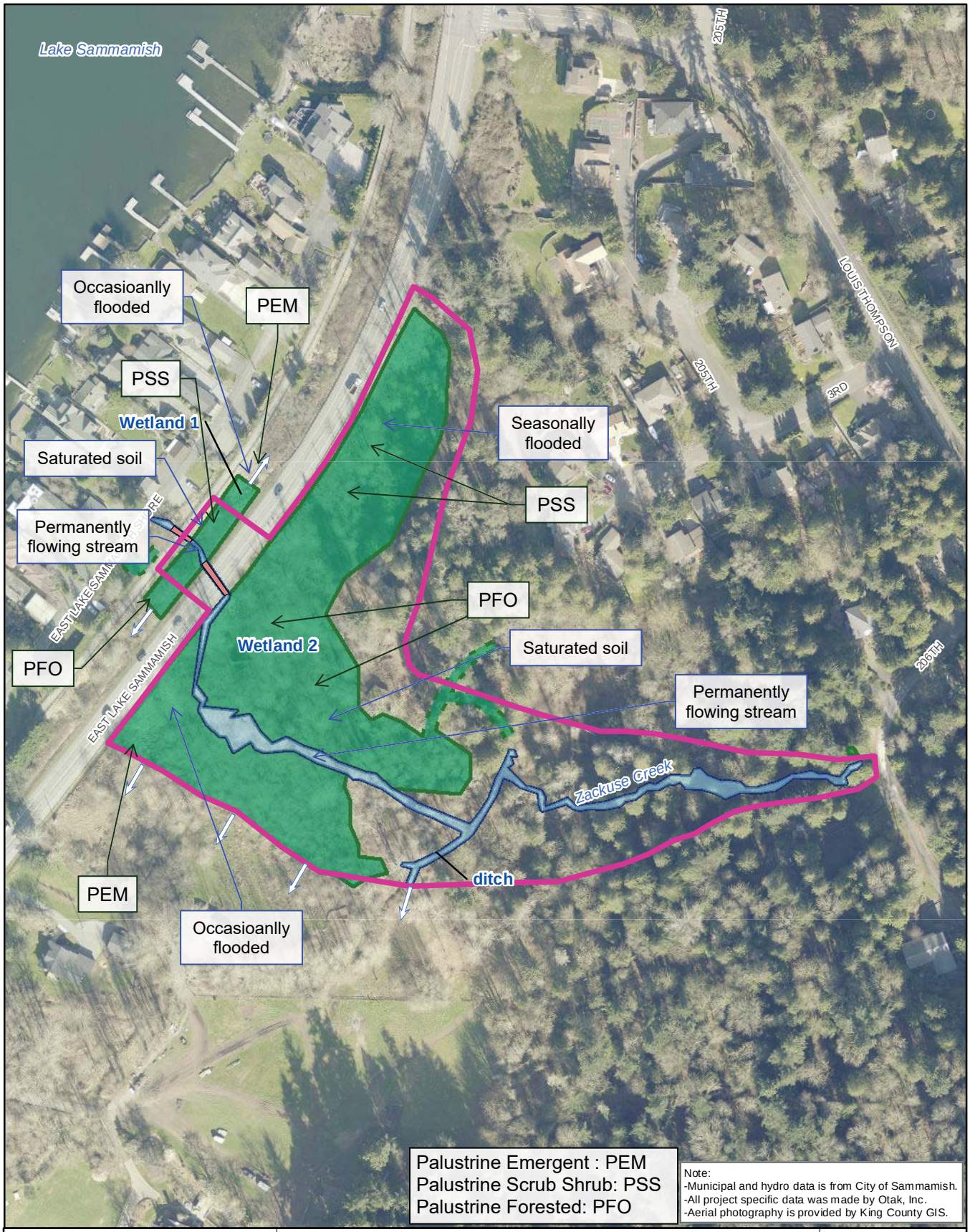


Figure 1
Cowardin Plant Classes
Hydroperiods
Location of Outlet
Zackuse Creek Fish Passage Project
City of Sammamish, WA

Study Area
Culvert
Stream
Ordinary High Water Mark
Wetland Boundary
Delineated
Approximate
Wetland
Wetland Continues

N

1 inch = 200 feet

0 200 Feet

K:\project\32700\32794\CADD\GIS\MXDs\Wetlands\Fig07_DelineatedWetlands.mxd

Date: 1/23/2017

Figure 2: 150-Foot Boundary

Date: 1/20/2017 Notes:

N

King County GIS Center

Figure 3: Contributing Basin

Date: 1/25/2017 Notes:

N

King County GIS Center

Figure 4: 1-Kilometer Boundary and Land Use

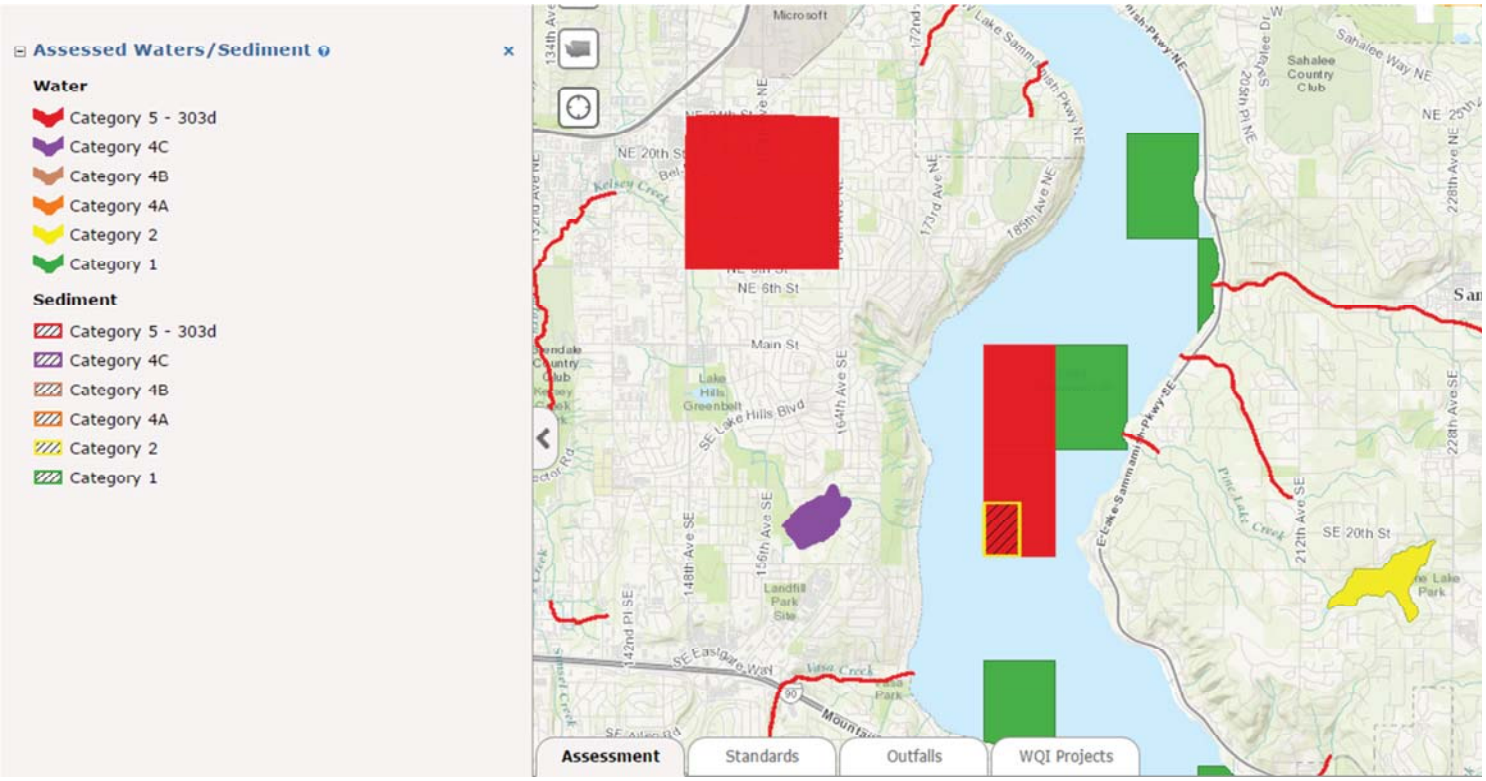


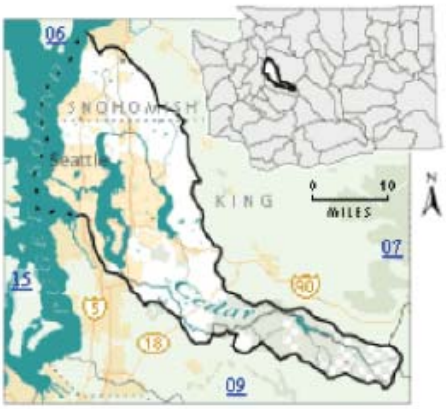
Figure 5: Screengrab of 303(d) listed waters in basin (Source: http://www.ecy.wa.gov/programs/wq/303d/currentassessmt.html)

Water Quality Improvement Projects (TMDLs)

Water Quality Improvement > Water Quality Improvement Projects by WRIA > WRIA 8: Cedar-Sammamish

WRIA 8: Cedar-Sammamish

The following table lists overview information for water quality improvement projects (including total maximum daily loads, or TMDLs) for this water resource inventory area (WRIA). Please use links (where available) for more information on a project.



Counties

- King
- Snohomish

Waterbody Name	Pollutants	Status**	TMDL Lead
Ballinger Lake	Total Phosphorus	Approved by EPA	Tricia Shoblom 425-649-7288
Bear-Evans Creek Basin	Fecal Coliform	Approved by EPA	Joan Nolan 425-649-4425
	Dissolved Oxygen Temperature	Approved by EPA	
Cottage Lake	Total Phosphorus	Approved by EPA Has an implementation plan	Tricia Shoblom 425-649-7288
Issaquah Creek Basin	Fecal Coliform	Approved by EPA	Joan Nolan 425-649-4425
Little Bear Creek Tributaries: Trout Stream Great Dane Creek Cutthroat Creek	Fecal Coliform	Approved by EPA	Ralph Svrjcek 425-649-7036
North Creek	Fecal Coliform	Approved by EPA Has an implementation plan	Ralph Svrjcek 425-649-7036
Pipers Creek	Fecal Coliform	Approved by EPA	Joan Nolan 425-649-4425
Sammamish River	Dissolved Oxygen Temperature	Field work starts summer 2015	Ralph Svrjcek 425-649-7036
Swamp Creek	Fecal Coliform	Approved by EPA Has an implementation plan	Ralph Svrjcek 425-649-7036

*** Status** will be listed as one of the following: Approved by EPA, Under Development or Implementation*

Figure 6. Screen grab of TMDLs in WRIA 8 Cedar-Sammamish (Source: http://www.ecy.wa.gov/programs/wq/tmdl/TMDLsbyWria/tmdl-wria08.html)

Wetland name or number 2

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Zackuse Creek: Wetland 2 Date of site visit: 1/10/17

Rated by Stephanie Modjeski Trained by Ecology? __ Yes X No Date of training _____

HGM Class used for rating Depressional Wetland has multiple HGM classes? X Y ____N

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

Source of base aerial photo/map King County Aerial 2015 with labels

OVERALL WETLAND CATEGORY II (based on functions X or special characteristics___)

1. Category of wetland based on FUNCTIONS

_____**Category I** – Total score = 23 - 27

__X__**Category II** – Total score = 20 - 22

_____**Category III** – Total score = 16 - 19

_____**Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality			Hydrologic			Habitat			TOTAL
	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	
Score Based on Ratings	8			6			8			22

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
Estuarine	**I** **II**
Wetland of High Conservation Value	**I**
Bog	**I**
Mature Forest	**I**
Old Growth Forest	**I**
Coastal Lagoon	**I** **II**
Interdunal	**I** **II** **III** **IV**
None of the above	

Wetland name or number 2

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	1
Hydroperiods	D 1.4, H 1.2	1
Location of outlet (*can be added to map of hydroperiods)*	D 1.1, D 4.1	1
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	2
Map of the contributing basin	D 4.3, D 5.3	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	4
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	5
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	6

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
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)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants (*can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

Wetland name or number 2

HGM Classification of Wetlands in Western Washington

For questions 1-7, 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 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

   NO – go to 2 **YES** – the wetland class is **Tidal Fringe** – go to 1.1

   1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**
   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

   NO – go to 3 **YES** – The wetland class is **Flats**
   *If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?
   ___The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
   ___At least 30% of the open water area is deeper than 6.6 ft (2 m).

   NO – go to 4 **YES –** The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. 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 5 **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 ft deep).

5. 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 2 years.

Wetland name or number 1

NO – go to 6 **YES** – The wetland class is **Riverine**

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

6. 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 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8 **YES** – The wetland class is **Depressional**

8. 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 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

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

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*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 2 has Riverine,Slope and Depressional HGM classes.

Wetland 2 is rated using Depressional HGM class.

Wetland name or number 2

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	1
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions)*. Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^1/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^1/_{10}$ of area points = 0	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	2
Total for D 1 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*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	1
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source Farm to south Yes = 1 No = 0	1
Total for D 2 Add the points in the boxes above	3

Rating of Landscape Potential If score is: **X** **3 or 4 = H** ___ **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

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

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

Wetland name or number 2

DEPRESSIONAL AND FLATS WETLANDS

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

D 4.0. Does the site have the potential to reduce flooding and erosion?

D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	0
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 The wetland is a "headwater" wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	3
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 Entire wetland is in the Flats class points = 5	3
Total for D 4 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*

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

D 5.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	1
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	1
Total for D 5 Add the points in the boxes above	3

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

D 6.0. Are the hydrologic functions provided by the site valuable to society?

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

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

Wetland name or number 2

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

____	Aquatic bed	4 structures or more: points = 4
__X__	Emergent	3 structures: points = 2
__X__	Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
__X__	Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

__X__ The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

4

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

____	Permanently flooded or inundated	4 or more types present: points = 3
__X__	Seasonally flooded or inundated	3 types present: points = 2
__X__	Occasionally flooded or inundated	2 types present: points = 1
__X__	Saturated only	1 type present: points = 0
__X__	Permanently flowing stream or river in, or adjacent to, the wetland	
____	Seasonally flowing stream in, or adjacent to, the wetland	
____	**Lake Fringe wetland**	**2 points**
____	**Freshwater tidal wetland**	**2 points**

3

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

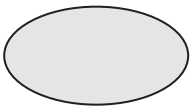
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted: > 19 species	points = 2
5 - 19 species	points = 1
< 5 species	points = 0

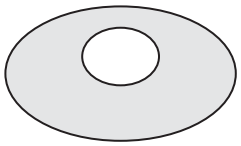
2

H 1.4. Interspersion of habitats

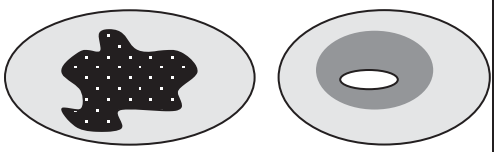
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



None = 0 points

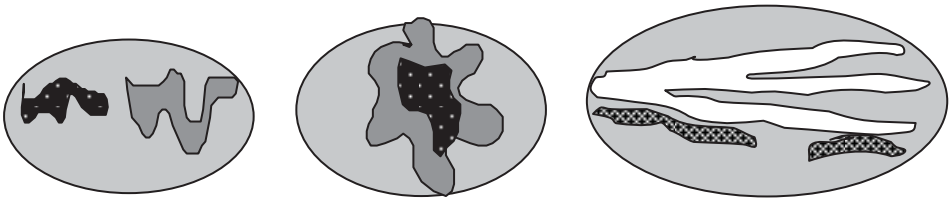


Low = 1 point



Moderate = 2 points

All three diagrams in this row are **HIGH** = 3points



3

Wetland name or number 2

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ____Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ____Standing snags (dbh > 4 in) within the wetland ____Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* ____At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ____Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	4
Total for H 1 Add the points in the boxes above	16

Rating of Site Potential If score is: X **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 the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat 5.39 + [(% moderate and low intensity land uses)/2] 2.33 = 7.72 % If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1 km Polygon points = 2 10-19% of 1 km Polygon points = 1 < 10% of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat 53.6 + [(% moderate and low intensity land uses)/2] 2.33 = 55.93 % Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10-50% and in 1-3 patches points = 2 Undisturbed habitat 10-50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	3
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (- 2) ≤ 50% of 1 km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	1

Rating of Landscape Potential If score is: ___**4-6 = H** X **1-3 = M** ___**< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: points = 2 X It has 3 or more priority habitats within 100 m (see next page) — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is mapped as a location for an individual WDFW priority 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 (listed on next page) within 100 m points = 1 Site does not meet any of the criteria above points = 0	2

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

Wetland name or number 2

WDFW Priority Habitats

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

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

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

— **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. 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 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*).

X — **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

X — **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.

— **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

— **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.

X — **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

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

Wetland name or number 2

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	Category
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt Yes –Go to **SC 1.1** (No) = **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** (No) Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = **Category I** (No) = **Category II**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes – Go to **SC 2.2** (No) – Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes = **Category I** (No) = **Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes – **Contact WNHP/WDNR and go to SC 2.4** (No) = **Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes = **Category I** (No) = **Not a WHCV**	**Cat. I**
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** (No) – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit 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 3.3** (No) = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** (No) – Go to **SC 3.4** **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 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, 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 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** (No) = **Is not a bog**	**Cat. I**

Wetland name or number 2

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.*** — **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes = **Category I** (No) = **Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* Yes – Go to **SC 5.1** (No) = **Not a wetland in a coastal lagoon** SC 5.1. Does the wetland meet all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2) Yes = **Category I** (No) = **Category II**	**Cat. I** **Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** (No) = **not an interdunal wetland for rating** SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** (No) – Go to **SC 6.2** SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** (No) – Go to **SC 6.3** SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** (No) = **Category IV**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	Not Applicable

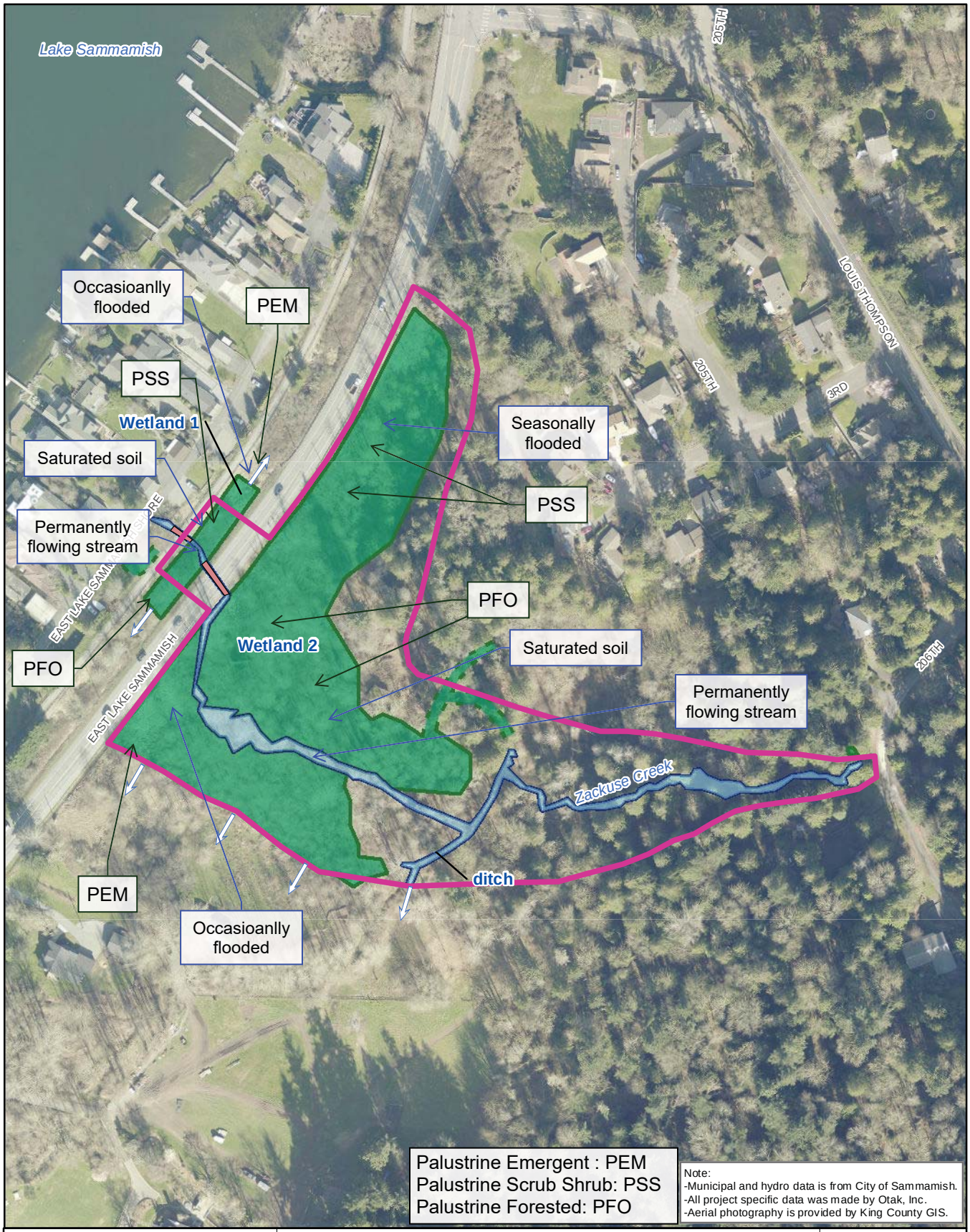


Figure 1
Cowardin Plant Classes
Hydroperiods
Location of Outlet
Zackuse Creek Fish Passage Project
City of Sammamish, WA

Study Area
Culvert
Stream
Ordinary High Water Mark
Wetland Boundary
Delineated
Approximate
Wetland
Wetland Continues

N

1 inch = 200 feet

0 200 Feet

K:\project\32700\32794\CADD\GIS\MXDs\Wetlands\Fig07_DelineatedWetlands.mxd

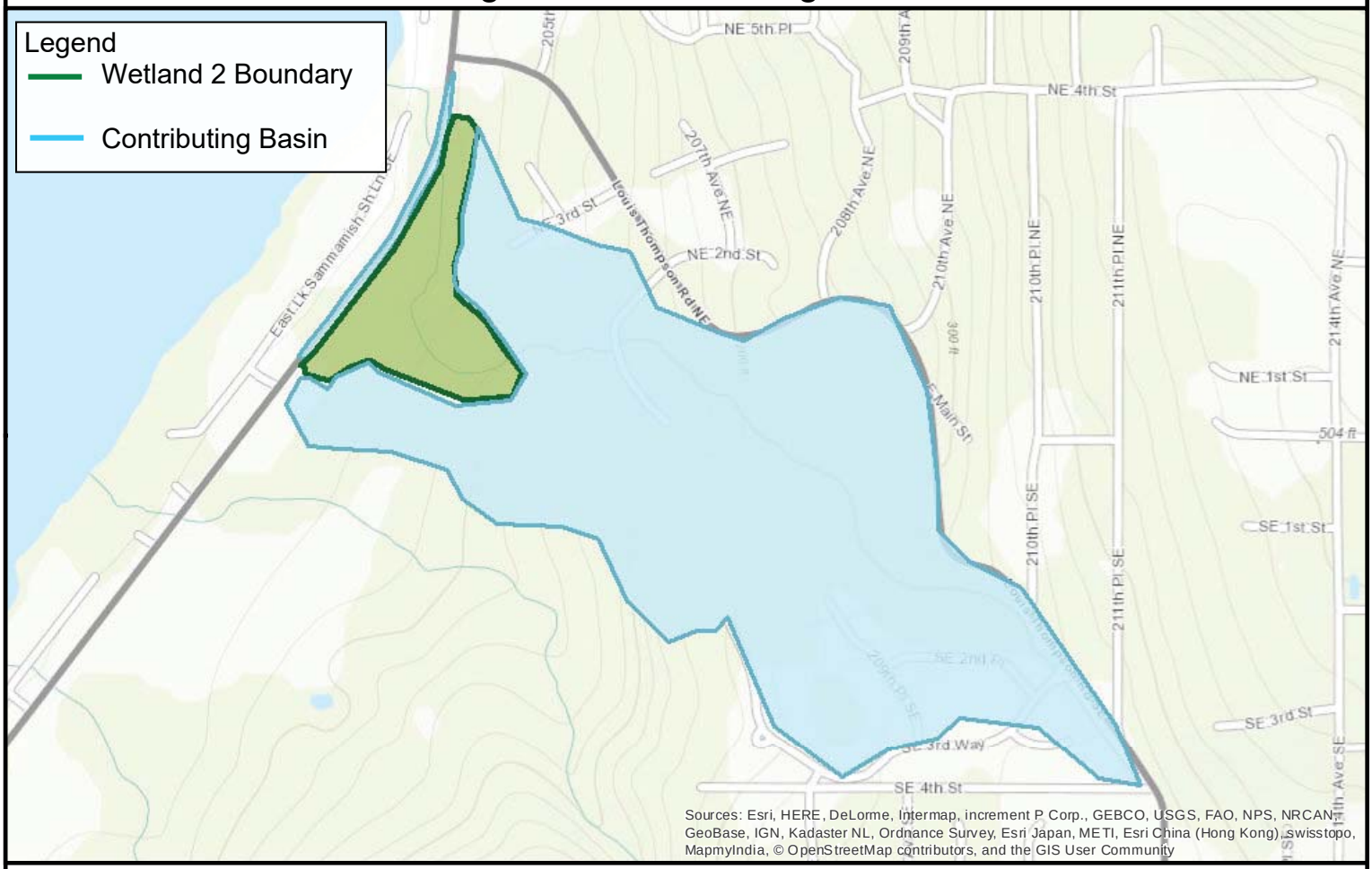
Date: 1/23/2017

Figure 2: 150-Foot Boundary

King County GIS Center

Date: 1/20/2017 Notes:

Figure 3: Contributing Basin

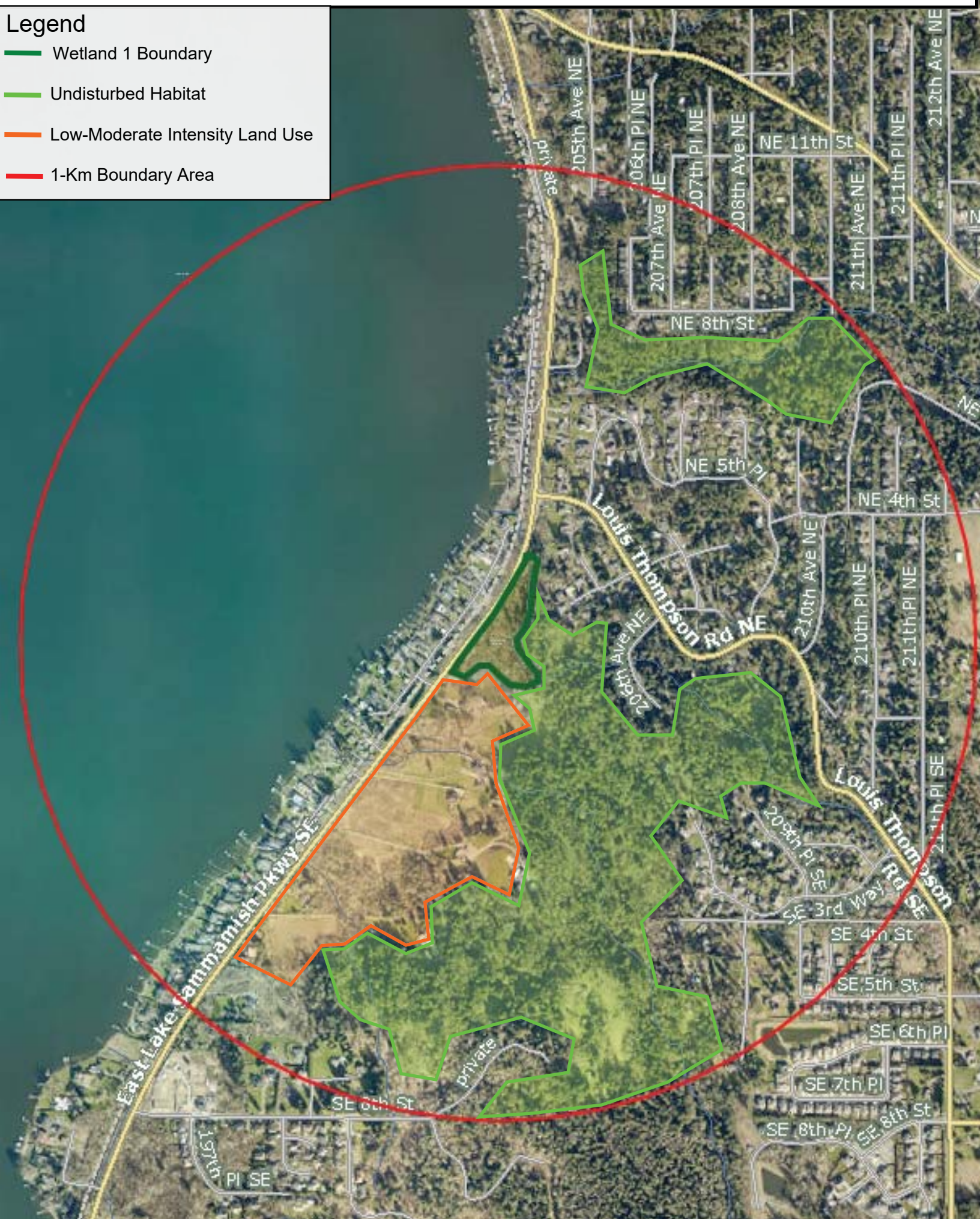


Date: 1/25/2017 Notes:

N

King County GIS Center

Figure 4: 1-Kilometer Boundary



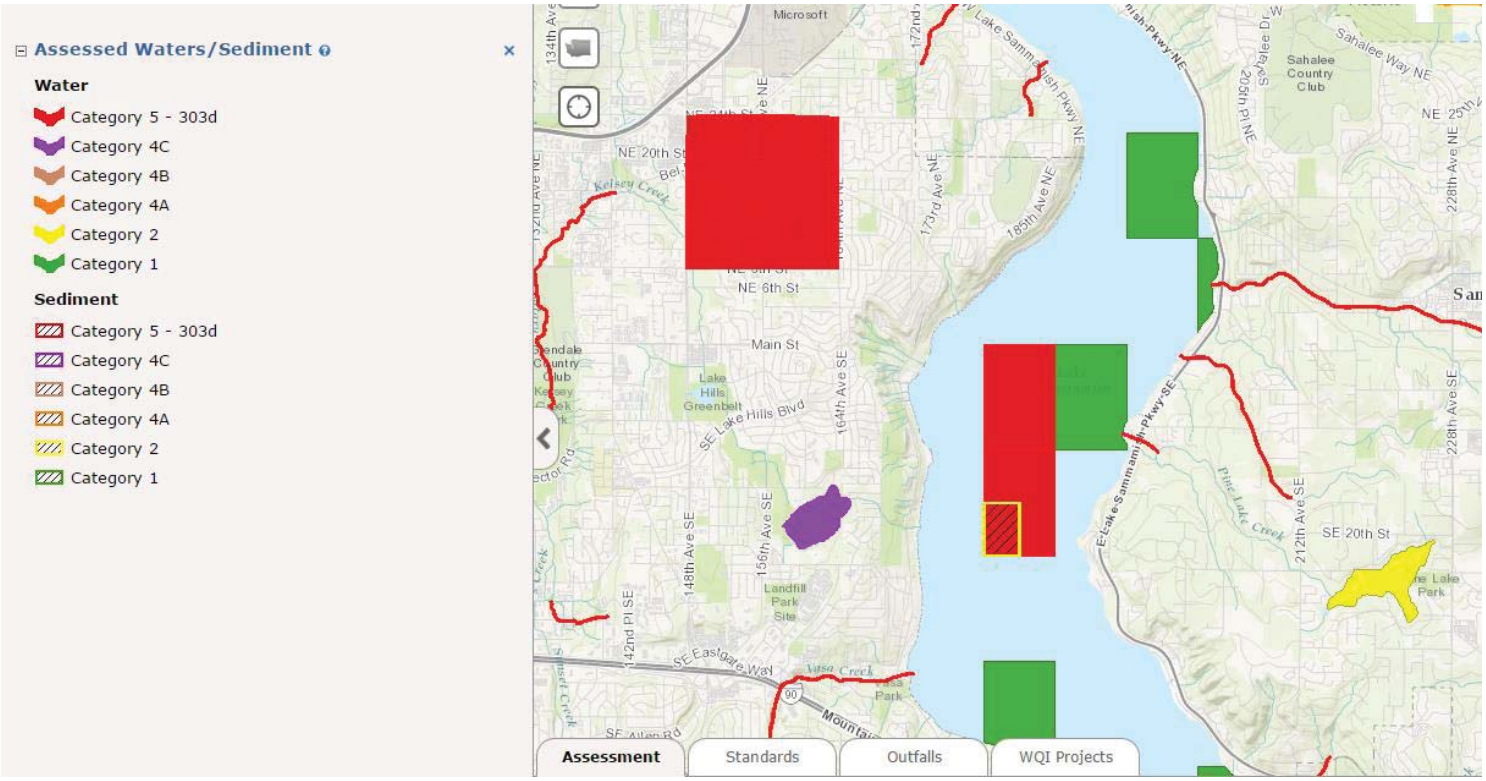


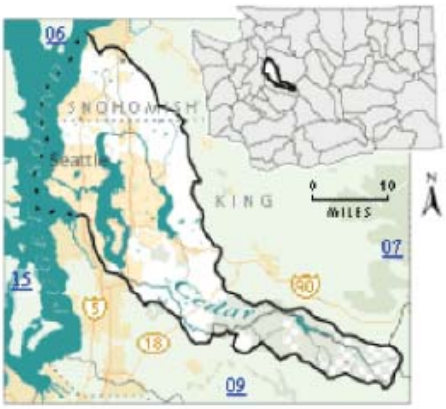
Figure 5: Screengrab of 303(d) listed waters in basin (Source: http://www.ecy.wa.gov/programs/wq/303d/currentassessmt.html)

Water Quality Improvement Projects (TMDLs)

Water Quality Improvement > Water Quality Improvement Projects by WRIA > WRIA 8: Cedar-Sammamish

WRIA 8: Cedar-Sammamish

The following table lists overview information for water quality improvement projects (including total maximum daily loads, or TMDLs) for this water resource inventory area (WRIA). Please use links (where available) for more information on a project.



Counties

- King
- Snohomish

Waterbody Name	Pollutants	Status**	TMDL Lead
Ballinger Lake	Total Phosphorus	Approved by EPA	Tricia Shoblom 425-649-7288
Bear-Evans Creek Basin	Fecal Coliform	Approved by EPA	Joan Nolan 425-649-4425
	Dissolved Oxygen Temperature	Approved by EPA	
Cottage Lake	Total Phosphorus	Approved by EPA Has an implementation plan	Tricia Shoblom 425-649-7288
Issaquah Creek Basin	Fecal Coliform	Approved by EPA	Joan Nolan 425-649-4425
Little Bear Creek Tributaries: Trout Stream Great Dane Creek Cutthroat Creek	Fecal Coliform	Approved by EPA	Ralph Svrjcek 425-649-7036
North Creek	Fecal Coliform	Approved by EPA Has an implementation plan	Ralph Svrjcek 425-649-7036
Pipers Creek	Fecal Coliform	Approved by EPA	Joan Nolan 425-649-4425
Sammamish River	Dissolved Oxygen Temperature	Field work starts summer 2015	Ralph Svrjcek 425-649-7036
Swamp Creek	Fecal Coliform	Approved by EPA Has an implementation plan	Ralph Svrjcek 425-649-7036

*** Status** will be listed as one of the following: Approved by EPA, Under Development or Implementation*

Figure 6. Screen grab of TMDLs in WRIA 8 Cedar-Sammamish (Source: http://www.ecy.wa.gov/programs/wq/tmdl/TMDLsbyWria/tmdl-wria08.html)

Appendix E — Plant Species Observed within the Study Area

Table E-1. Plant Species Observed within the Study Area

Genus	Species	Common Name	WIS*
Acer	macrophyllum	big-leaf maple	FACU
Agrostis	capillaris	bentgrass	FAC
Allaria	petiolata	garlic mustard	FACU
Alnus	rubra	red alder	FAC
Athyrium	filix-femina	lady fern	FAC
Cirsium	arvense	Canada thistle	FAC
Cornus	sericea	redstem dogwood	FACW
Dactylis	glomerata	orchard grass	FACU
Elymus	sp.	ryegrass, wheatgrass	NI
Epilobium	sp.	willowherb	FACU
Equisetum	arvense	field horsetail	FAC
Festuca	rubra	red fescue	FAC
Geum	macrophyllum	large-leaf avens	FAC
Hedera	helix	English ivy	FACU
Holcus	lanatus	common velvetgrass	FAC
Ilex	aquifolium	English holly	FACU
Juncus	effusus	soft rush	FACW
Lolium	perenne	perennial ryegrass	FAC
Malus	fusca	Pacific crabapple	FACW
Oemleria	cerasiformis	osoberry	FACU
Phalaris	arundinacea	reed canarygrass	FACW
Poa	pratensis	Kentucky bluegrass	FAC
Polystichum	munitum	sword fern	FACU
Populus	Trichocarpa	black cottonwood	FAC
Ranunculus	repens	creeping buttercup	FAC
Rorippa	Nasturtium-aquaticum	water-cress	OBL
Rosa	nutkana	Nootka rose	FAC
Rubus	armeniacus	Himalayan blackberry	FAC
Rubus	laciniatus	evergreen blackberry	FACU
Rubus	spectabilis	salmonberry	FAC
Rubus	ursinus	trailing blackberry	FACU
Rumex	crispus	curly dock	FAC
Salix	lasiandra	Pacific willow	FACW
Salix	sitchensis	Sitka willow	FACW
Sambucus	racemosa	red elderberry	FACU
Scirpus	microcarpus	small-fruited bulrush	OBL
Spiraea	douglasii	Douglas spirea	FACW
Stachys	cooleyae	Cooley hedgenettle	FACW

Symphoricarpos	albus	common snowberry	FACU
Taraxacum	officinale	common dandelion	FACU
Thuja	plicata	Western red cedar	FAC
Typha	latifolia	broad-leaved cattail	OBL
Urtica	dioica	stinging nettle	FAC
Veronica	americana	American brooklime	OBL

* Wetland Indicator Status (WIS) per Lichivar, et al. (2016):

OBL = occurs in wetlands > 99% of time
FACW = occurs in wetlands 67-99% of time
FAC = occurs in wetlands 34-66% of time
FACU =occurs in wetlands 1-33% of time
UPL =occurs in uplands > 99% of time
NI = no indicator

Appendix F — Additional Site Photographs

Photo 1: View facing south of Wetland 1 and the concrete culvert conveying Zackuse Creek under East Lake Sammamish Parkway.

Photo 2: Photo of Zackuse Creek along the east side East Lake Sammamish Parkway.

Photo 3: View facing east of PFO wetland habitat in Wetland 2; photo taken from the roadside near the Zackuse Creek culvert under East Lake Sammamish Parkway.

Photo 4: View facing northwest along wetland/upland boundary of Wetland 2 near flag C15. The blue line represents the wetland boundary. Wetlands are left of the blue line.

Photo 5: View facing west of Zackuse Creek as it flows within Wetland 2 upslope of the bottomland wetland where the creek loses its defined channel.

Photo 6: Photo of Zackuse Creek sheet flowing through the bottomland wetland (Wetland 2) in a poorly defined channel approximately 200 feet from East Lake Sammamish Parkway.

Photo 7: Photo of Zackuse Creek flowing out of Wetland 2 in poorly defined channels prior to running along the east side of Lake Sammamish Parkway (see Photo 2).

Photo 8: View facing east of PEM wetland habitat in Wetland 2 south of Zackuse Creek; photo taken from the east side of East Lake Sammamish Parkway.