TALASAEA
CONSULTANTS, INC.

23 April 2019

TAL-1727

Microsoft Corporation

REFERENCE: **Microsoft Red West South Fields** in Redmond, WA
SUBJECT: Critical Areas Existing Conditions Summary

To whom it may concern,

At your request, Talasaea Consultants has completed an evaluation of the Microsoft Red West South Fields property for the presence of critical areas that could impact future development. The property was originally evaluated by Talasaea in 2007 as part of a development application. Advanced mitigation for the project was signed off by the City of Redmond after five years of monitoring in 2017, although the proposed development was never built. The mitigation areas still require five additional years of monitoring beyond the City sign-off (through 2022) per the U.S. Army Corps of Engineers permit agreement (Reference: NWS-2008-831-NO).

PROPERTY LOCATION

The Microsoft Red West South Field property ("Site" hereafter) is an approximately 26.5-acre parcel located northeast of the intersection of 148th Avenue NE and NE 51st Street in Redmond, Washington. The Public Land Survey System location of the Project is the eastern ½ of Section 23 and the northwestern ¼ of Section 14, Township 25 North, Range 5 East, Willamette Meridian.

PROPERTY DESCRIPTION AND LAND USE

The Site is currently developed with a parking lot and a large lawn area that serves as open space. A gravel pedestrian path connects the parking lot to the south and east of the Site. Approximately nine acres in the northeastern area of the property are relatively undeveloped and contain a forested area dominated by native trees and shrubs. Four wetlands were delineated on the Site after monitoring year 5 (ca 2015). These are named Wetland B, D, F, and J for the purposes of this report.

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Some stormwater infrastructure exists in the current condition. The runoff from the project area that is to be developed is collected through a series of ditches, french drains, catch basins, and closed pipes and conveyed to Wetland F. This wetland contains an overflow pipe that discharges the excess stormwater to the SR520 conveyance system at the northeast corner of the site. The existing parking lot is part of this existing infrastructure and drains to a detention pond that was permitted in 2009. This detention pond provides flow control and water quality treatment for this parking area, and discharges into Wetland F as the existing condition along with the other drainages on the Site.

QUALIFICATIONS

Field investigations and evaluations were conducted by Talasaea staff, including: Ann Olsen, RLA, Senior Project Manager, Bill Shiels, Principal, and David Teesdale, PWS. Wetland mitigation design was prepared by Ann Olsen, RLA. Ann has over 25 years of experience in designing critical area mitigation plans. Bill Shiels has a Bachelor's Degree in Biology from Central Washington University and a Master's Degree in Biological Oceanography from the University of Alaska. He has over 40 years of experience in wetland delineations and mitigations. David Teesdale has a Bachelor's Degree in Biology from Grinnell College, Iowa, and a Master's Degree in Ecology from Illinois State University. He has 20 years of experience in wetland delineations and biological evaluations.

BACKGROUND INFORMATION

Background information from the following sources was reviewed prior to field investigations:

- US Fish and Wildlife Service (USFWS) Wetlands Online Mapper (National Wetlands Inventory, NWI) (www.wetlandsfws.er.usgs.gov/wtlnds/launch.html);
- Natural Resources Conservation Service (NRCS), Web Soil Survey (www.websoilsurvey.nrcs.usda.gov/app);
- King County Critical Areas Database (King County, 2018);
- Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) Database on the Web (wdfw.wa.gov/mapping/phs);
- Washington Department of Natural Resources (DNR) Natural Heritage GIS database, 2018;
- Fish usage data from SalmonScape (http://apps.wdfw.wa.gov/salmonscape/map.html) and StreamNet (http://www.streamnet.org/data/interactive-maps-and-gis-data/);

- Orthophotography from Earth Explorer (2018), Google Earth (2018); and Historic Aerials (www.historicaerials.com, 2018).

The USFWS NWI and WDFW PHS identify three wetlands as occurring onsite. Two wetlands are mapped as freshwater emergent systems and one wetland is mapped as a forested system. All wetlands are mapped as occurring at the western property boundary. These three mapped wetlands correspond to Wetland B identified by Talasaea Consultants during a previous delineation. NWI, Salmonscape, and King County Critical Area Database map a riverine system as occurring at the eastern property boundary flowing northward.
The NRCS maps the soils on the Site as Alderwood gravelly sandy loam with varying slopes. The Alderwood soil series is not considered a hydric soil by the National Technical Committee for Hydric Soils.

FIELD INVESTIGATIONS / MITIGATION AREAS

Talasaea evaluated the Site and prepared As-Built drawings for the advanced wetland mitigation in 2012. The routine approach described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (U.S. Army Corps of Engineers, 2010) was used as a baseline for evaluating the wetlands post-mitigation.

The location and size of the following wetlands and the width of their buffers are vested per the City of Redmond permit No. CPG-11-012 and Army Corps of Engineers permit (Reference: NWS-2008-831-NO). The extent of each wetland and their associated buffer is defined by critical areas fencing and associated signage (**Attachment 1**: As-Built Mitigation Overview Plan, Sheet AB1.0, dated 24 October 2012). Please refer to the *Critical Areas Report and Detailed Conceptual Wetland Mitigation Plan* prepared by Talasaea Consultants, Inc. on 21 November 2011 for wetland and mitigation details (**Attachment 2**). A summary of the wetlands on the Site are outlined below in **Table 1**.

Table 1. Feature Summary Table

Wetland	**Area (post-construction)**	**Category***
Wetland B	66,622 sf	Category III
Wetland D	7151 sf	Category IV
Wetland F	16,870 sf	Category IV
Wetland J	2,632 sf	Category III

*Wetland categories were determined during the As-built phase of construction per the 2004 wetland rating system required at that time.

Vegetation in the mitigated wetlands include: serviceberry (*Amelanchier alnifolia*), red-osier dogwood (*Cornus sericea*), black hawthorn (*Crataegus douglasii*), oceanspray (*Holodiscus discolor*), black twinberry (*Lonicera involucrata*), tall Oregongrape (*Mahonia aquifolium*), Indian plum (*Oemleria cerasiformis*), wild mock orange (*Philidelphus lewisii*), pacific ninebark (*Physocarpus capitatus*), red current (*Ribes sanguineum*), baldhip rose (*Rosa pisocarpa*), Nootka rose (*Rosa nootkana*), clustered wild rose (*Rosa gynocarpa*), thimbleberry (*Rubus parviflorus*), salmonberry (*Rubus spectabilis*), Scouler's willow (*Salix scouleriana*), Sitka willow (*Salix sitchensis*), red elderberry (*Sambucus racemosa*), common snowberry (*Symphoricarpos albus*), evergreen huckleberry (*Vaccinium ovatum*), high-bush cranberry (*Viburnum trilobum*), vine maple (*Acer circinatum*), big leaf maple (*Acer macrophyllum*), paper birch (*Betula papyrifera*), Pacific dogwood (*Cornus nuttallii*), western hazelnut (*Coryllus cornuta*), Oregon ash (*Fraxinus latifolia*), western crabapple (*Malus fusca*), Sitka spruce (*Picea sitchensis*), bitter cherry (*Prunus emarginata*), Douglas fir (*Pseudotsuga menziesii*), Western red cedar (*Thuja plicata*), Western hemlock (*Tsuga heterophylla*), cascara (*Frangula purshiana*), Pacific willow (*Salix lasiandra*), and Sitka mountain ash (*Sorbus sitchensis*).

WETLAND B

Wetland B is located along the western boundary of the Site. Wetland B was partially filled and enhanced for impacts due to providing Site access from NE 148th Street and from City of Redmond required pedestrian improvements.

Soils in Wetland B are a mucky loam. The soil color is generally black (10YR 3/1) with a gleyed matrix below the A horizon. Hydrology for Wetland B is supported by direct precipitation and groundwater.

Photo 1: Wetland B, typical conditions.

WETLAND D

Wetland D is located in the southwestern area of the Site. Soils in Wetland D are generally a grey silty loam (10YR 4/2) with a gleyed matrix (10YR 5/1) and mottles (10YR 4/6). Wetland D is a slope wetland fed by seeps and stormwater runoff from culverts on NE 51st Street.

Photo 2: Wetland D, typical conditions.

WETLAND F

Wetland F is located in the central portion of the east side of the Site. Soils in Wetland F are a dark brown (10YR 3/2) silt loam with reducing conditions, grey soils (10 YR 5/2) and mottles (10YR 4/6 and 10YR 3/3). Wetland F is a slope wetland fed by seeps, direct precipitation, and treated stormwater from the existing parking lot.

Photo 3: Wetland F, typical conditions.

WETLAND J

Wetland J is located in the northeastern corner of the property. Soils in Wetland J are a dark brown (10YR 3/3) sand with organic material with gleyed matrix below three inches (10Y 4/1) and mottles (10YR 4/4). Wetland J is slope wetland hydrologically supported by seeps and direct precipitation.

Photo 4: Wetland J, typical conditions.

TYPICAL UPLANDS

Uplands on the subject property are comprised primarily of grasses and paved areas. The plant community in the uplands consists mainly of grass species including colonial bentgrass (*Agrosits tenuis*), English fescue (*Festuca pratensis*), common velvet-grass (*Holcus lanatus*), white clover (*Trifolium repens*), and red fescue (*Festuca rubra*). These grasses are routinely mowed.

Photo 5: Typical upland conditions. Image from Google Maps 2018 (www.maps.google.com).

PROPOSED PROJECT

The Project proposes to add two artificial turf athletic fields over the existing grass area on the south side of the property as well as a basketball court and volleyball court. Associated site improvements include sidewalks and ADA access to the fields, a storm conveyance system, water quality systems, and site grading. The proposed work will only occur within the unencumbered portion of the Site. No impacts to wetlands, streams, or buffers are proposed as part of this project.

Storm water runoff from the developed site area will be collected and conveyed to either Wetland F or straight to the site outfall. On-site conveyance will consist of overland flow, catch basins, and underground pipes. Detention is not required for the project beyond the existing parking lot detention pond that will remain as existing. Water quality treatment facilities will be used to treat runoff from the artificial turf fields, which are considered pollution generating. Downstream of the water quality facilities, the project will use flow splitters to match developed wetland flows to existing wetland flows within guidelines set forth in the 2017 City of Redmond Stormwater Technical Notebook (STN) which reference Ecology's 2012 Stormwater Management Manual for Western Washington as amended in 2014 (2014 SWMMWW). The systems are described in further detail in the Drainage Report prepared by CPL.

SUMMARY

The Microsoft Red West South Athletic Field property is an approximately 26.5-acre parcel. Four wetlands (Wetland B, D, F and J) were previously mitigated for a project that was never completed. These wetlands and their associated buffers are located within established, fenced areas. The project does not propose to impact these critical areas or their buffers.

We trust that the information presented here sufficiently addresses your needs and that you will be able to move this project forward. If you have additional questions or require more information, please contact Bill Shiels or me at (425) 861-7550.

Thank you.

Sincerely,

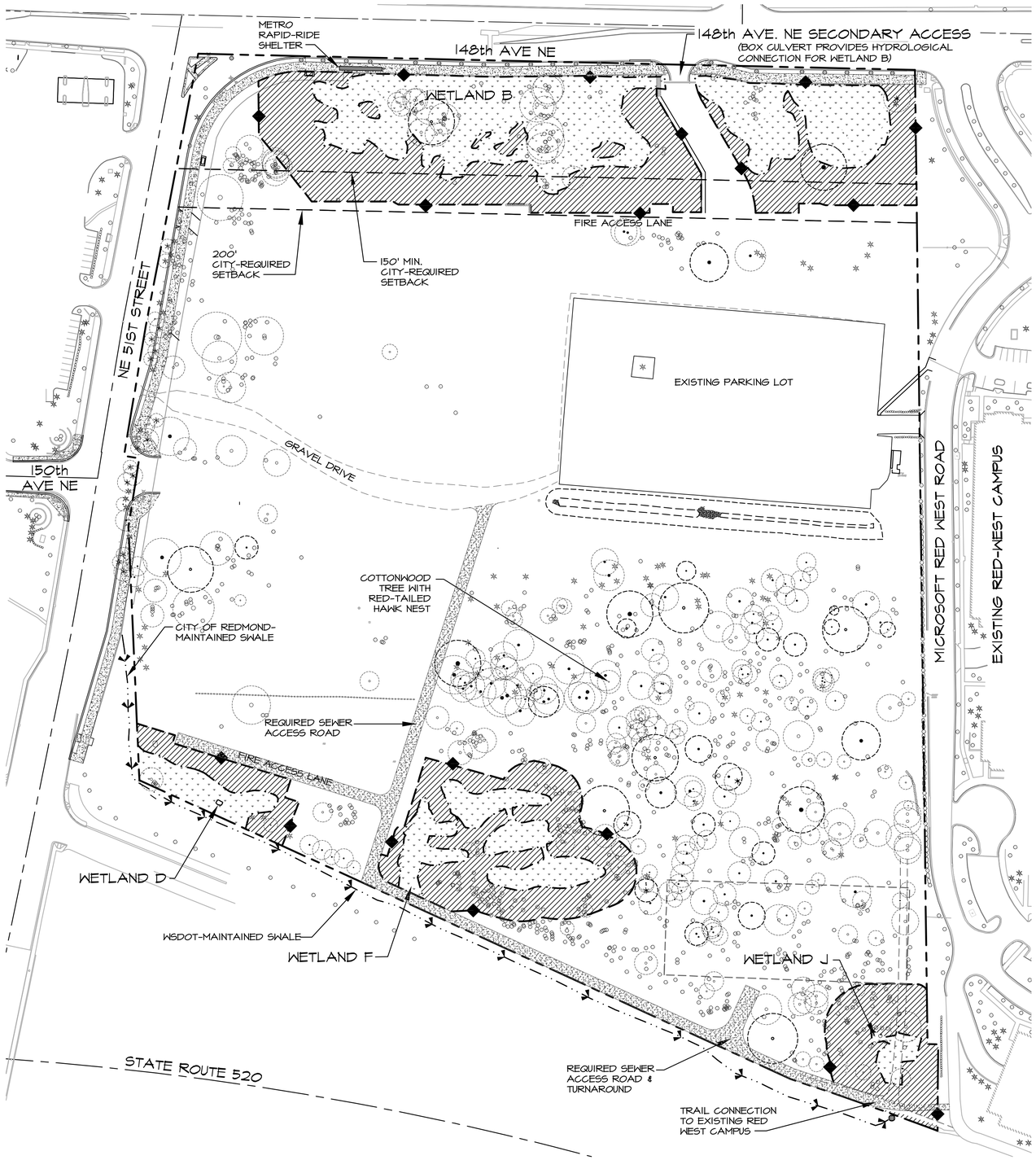
TALASAEA CONSULTANTS, INC.

Jennifer M. Marriott, PWS
Senior Ecologist

Attachment 1: As-Built Mitigation Overview Plan, Sheet AB1.0, dated 24 October 2012.

Attachment 2: Critical Areas Report and Detailed Conceptual Wetland Mitigation Plan, Microsoft Red West Phase II Advanced Mitigation.

NW 1/4, SECTION 14, TOWNSHIP 25 N, RANGE 5 E, W.M.



AS-BUILT MITIGATION OVERVIEW PLAN

GRAPHIC SCALE (IN FEET)
0 40' 80' 160'
SCALE: 1" = 80'
NORTH

CONTACTS

APPLICANT

NAME: MICROSOFT CORPORATION
ADDRESS: ONE MICROSOFT WAY
REDMOND, WA 98052

PHONE: (425) 705-5184
CONTACT: GID PALMER, SENIOR DEVELOPMENT MANAGER

ENVIRONMENTAL CONSULTANT

NAME: TALASAEA CONSULTANTS, INC.
ADDRESS: 15020 BEAR CREEK RD. NE
WOODINVILLE, WA 98077

PHONE: (425) 861-7550
CONTACT: ANN M. OLSEN, SENIOR PROJECT MANAGER
LISA RODGERS, ECOLOGIST

VICINITY MAP

NTS

SOURCE: http://maps.live.com: KING COUNTY

NORTH

SHEET INDEX

SHEET #	SHEET TITLE
AB1.0	AS-BUILT MITIGATION OVERVIEW PLAN
AB2.0	AS-BUILT PLANTING PLAN
AB2.1	AS-BUILT PLANTING PLAN & PLANT SCHEDULE
AB2.2	AS-BUILT PLANTING PLAN
AB2.3	AS-BUILT PLANTING PLAN
AB2.4	AS-BUILT PLANTING PLAN

AS-BUILT MITIGATION LEGEND

WETLANDS

POST-CONSTRUCTION WETLAND AREA 78,422 SF

BUFFER

POST-CONSTRUCTION BUFFER AREA 133,658 SF

PLAN LEGEND

PROPERTY LINE
POST-CONSTRUCTION WETLAND BOUNDARY
POST-CONSTRUCTION WETLAND BUFFER BOUNDARY/SPLIT-RAIL CRITICAL AREAS FENCE
CRITICAL AREAS SIGN
EXISTING RETAINED NON-SIGNIFICANT TREES
CONIFEROUS DECIDUOUS — EXISTING RETAINED SIGNIFICANT TREES W/ DRIPLINE
CONIFEROUS DECIDUOUS — EXISTING RETAINED LANDMARK TREES W/ DRIPLINE

NOTES

1. SURVEY PROVIDED BY WH PACIFIC, 33550 MONTE VILLA PARKWAY, BOTHELL, WA 98021, 425-451-4800.
2. SITE PLAN PROVIDED BY NBBJ ARCHITECTS, 223 YALE AVE. NORTH, SEATTLE, WA 98109, 206-621-2399.
3. SITE CIVIL PLANS PROVIDED BY COUGHLIN PORTER LUNDEEN; 413 PINE ST., STE. 300, SEATTLE, WA 98101; 206-343-0460.
4. FRONTAGE IMPROVEMENTS CIVIL PLANS PROVIDED BY TRANSPORTATION ENGINEERING NORTHWEST; 816 SIXTH ST. S, KIRKLAND, WA 98033; 425-531-0567.
5. SOURCE DRAWINGS HAVE BEEN MODIFIED BY TALASAEA CONSULTANTS FOR VISUAL ENHANCEMENT.
6. THIS PLAN IS AN AS-BUILT RECORD OF THE COMPLETED MITIGATION WORK.

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Microsoft

Red West
Phase II
Advanced Mitigation
14848 NE 51st ST
Redmond, WA 98052

Design Team

	AO
Design	ATD
Drawn	AO
Checked	10-24-12
Date	818D
Talasaea Project No.	
M.S. Project No.	

Approvals

CUSTOMER Date

OPERATIONS

Microsoft Mechanical/Engineer Date
Microsoft Cable Engineer
Microsoft Electrical Engineer
Engineering Manager
Security Manager
IT-IM

PROJECT MANAGEMENT

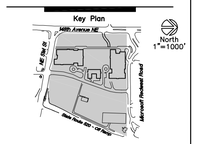
Project Planner Date
Project Manager
Senior Project Manager
Development Manager
Project Manager
Quality Control Reviewer
Quality Control FF&E

Revisions

No.	Date	Description

Registration

Key Plan



Bar Code

Sheet Title/Number

AS-BUILT MITIGATION OVERVIEW PLAN

AB1.0

CRITICAL AREAS REPORT and DETAILED CONCEPTUAL WETLAND MITIGATION PLAN

MICROSOFT RED WEST PHASE II ADVANCED MITIGATION REDMOND, WASHINGTON

Prepared For:

MICROSOFT CORPORATION
Redmond, Washington

Prepared By:

TALASAEA CONSULTANTS, INC.
Woodinville, Washington

20 November 2008
(revised 21 November 2011)

Critical Areas Report and
Detailed Conceptual Wetland Mitigation Plan

Microsoft Red West Phase II Advanced Mitigation
Redmond, Washington

Prepared for:

Microsoft Corporation
Microsoft Real Estate and Facilities
16771 NE 72nd Way
Redmond Town Center, Building 6, Office 1322
Redmond, WA 98052

Prepared by:

Talasaea Consultants, Inc.
15020 Bear Creek Road N.E.
Woodinville, WA 98077
(425) 861-7550

20 November 2008
(revised. 21 November 2011)

EXECUTIVE SUMMARY

PROJECT NAME: Microsoft Red West Phase II Advanced Mitigation

CLIENT: Microsoft Corporation, Gid Palmer, Senior Development Manager

PROJECT LOCATION: The approximately 26.4-acre site is composed of two tax parcels (#2182500120 and #2782500092) located north of NE 51st Street, east of 148th Ave NE, and west of State Route 520, in Redmond, Washington. The Public Land Survey System locator for this property is the NW ¼ of Section 14, Township 25 North, Range 5 East, W.M.

PROJECT STAFF: Bill Shiels, Principal; Ann Olsen, Senior Project Manager; Richard Tveten, Ecologist; David Teesdale, Ecologist; Adam DeWolfe, Landscape Designer

FIELD SURVEY: Field work conducted on 16 May and 2 June 2008

DETERMINATION: Eleven wetlands, Wetlands A, B, C, D, E, F, G, H, J, K, & L, were identified and delineated on the subject property.

- Wetland A is a very small (642 sf) wetland located in the north central portion of the site.
- Wetland B is a large (39,671 sf) wetland located along the western property boundary, adjacent to 148th Avenue NE.
- Wetland C is a small (1,894 sf), recently formed wetland located in the central portion of the property, directly east of the existing parking lot and constructed wet ponds. Wetland C developed due to a silt fence impounding water.
- Wetland D (10,508 sf, on-site) is located in the southeast corner of the property and extends off-site into a maintained roadside bioswale constructed for SR-520 by WSDOT.
- Wetland E is a very small (982 sf) wetland located slightly northwest of Wetland D.
- Wetland F (8,810 sf, on-site), is located north of Wetland E along the eastern property boundary. Wetland F also extends off-site into the WSDOT maintained bioswale for SR-520.
- Wetlands G (55 sf) and H (3,272 sf) are located in the south central portion of the property. These two wetlands recently formed following construction of the adjacent parking lot. Construction left mounds of dirt which trapped surface flows thereby allowing these two wetlands to develop.
- Wetland J (2,632 sf) is located in the very northeastern corner of the property.
- Wetland K is a very small (80 sf) depressional wetland, located slightly east of Wetland B.
- Wetland L is a small (352 sf) wetland located south of Wetland J.

All of the wetlands were rated according to the Washington State Department of Ecology Wetland Rating System for Western Washington – Version 2 (July 2006). According to the City of Redmond Zoning Code (RZC) 21.64.010(D)(1)(m), Category IV wetlands that are hydrologically isolated and less than 250 sf in area are not regulated; therefore, Wetland G is exempt from City jurisdiction. Also, according to RZC 21.64.010(D)(1)(l), Wetlands C and H are exempt features in the City of Redmond because they are artificially created wetlands formed from non-wetland sites as the result of construction activities. Wetland G is also an artificially created wetland formed from a non-wetland site. While Wetlands C, G and H are exempt in the City of Redmond, these features are regulated by the Army Corps of Engineers (Corps) and the Washington State Department of Ecology (DOE). Wetlands A, B, & J were rated as Category III wetlands requiring a standard 80-foot buffer. Wetlands D, E, F, K, & L were rated as Category IV wetlands requiring a standard 50-foot buffer. Wetlands C, G, & H were also rated as Category IV wetlands, and due to their exemption under RZC 21.64.010(D)(1)(m) and (l) no buffer is required.

HYDROLOGY:

- Wetlands A, E, F, J, and L are all slope wetlands fed by seeps.
- Wetland B is a depressional wetland that receives hydrologic support from direct precipitation and groundwater. It also receives stormwater runoff from the adjacent paved sidewalk along 148th Ave. NE. As part of the construction for widening 148th Ave. NE in 2001, an area drain was installed just south of Wetland B. This outlet discharges to the municipal stormwater system that crosses under 148th Ave. NE to the west.
- Wetland C receives hydrologic support from direct precipitation that is impounded by a silt fence that was left in place following construction of the adjacent parking lot and wetponds.
- Wetland D is a slope wetland fed by seeps and from the discharge of road runoff from NE 51st St. into

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a bioswale that was constructed for the SR-520/NE 51st St. interchange by WSDOT.

- Wetlands G and H are hydrologically supported by precipitation that is trapped behind dirt mounds that detain water.
- Wetland K is a depressional wetland that receives hydrologic support from direct precipitation and groundwater.

SOILS: The Natural Resources Conservation Service has mapped one soil type on the subject property. The western portion of the property is mapped as Alderwood gravelly sandy loam, 0 to 6 percent slopes. The eastern portion of the property is mapped as Alderwood gravelly sandy loam, 6 to 15 percent slopes. The Alderwood soil series is not on either the State or County hydric soil lists.

VEGETATION: Approximately three-quarters of the site have been routinely maintained by both the previous and current land owners for security purposes since the parking lot was constructed. The site is regularly mowed and various non-native species (e.g., Himalayan blackberry) are continually grubbed out to provide an open, non-threatening environment for people who park and walk through the site to access the Red West Main Campus located due north of the site. The south central portion of the property is vegetated with mowed grasses, and scattered clumps of primarily deciduous trees. The northeast and east-central portion of the property is forested with mature coniferous and deciduous trees and contains both native and non-native species in the understory. The far eastern portion of the site was previously disturbed for construction of a sewer line. Mainly red alder and Himalayan blackberry dominate this area with a few scattered pine trees along the fence line. The southwest corner of the property is grasses and scattered deciduous trees. Wetland B occupies the majority of the western edge of the property along 148th Ave NE and contains scattered deciduous trees, shrubs, and emergent species.

HABITAT AND SPECIES INFORMATION: The Washington Department of Fish and Wildlife Priority Habitats and Species (PHS), Washington State Natural Heritage Program, StreamNet, SalmonScape, and Washington Department of Natural Resources databases were reviewed for priority species and habitat information. The results of this search did not indicate any priority, threatened or endangered species or habitat on the project site. Critical habitat for federally listed threatened or endangered species is also not present on the project site. Puget Sound Chinook salmon, Puget Sound winter steelhead, and coastal-Puget Sound bull trout, all federally threatened species, are identified within the Sammamish River, the ultimate discharge location for site stormwater from the eastern sub-basin. Puget Sound coho salmon, identified within the Sammamish River, is listed as a species of concern. Puget Sound Chinook and coho salmon are also identified in Valley Creek, the discharge location for water originating in the site's undeveloped western sub-basin. ESA review provided by the Corps has determined that construction of the project in conjunction with the proposed conservation measures *may affect, but is not likely to adversely affect* (NLAA) Puget Sound Chinook salmon. They also concluded that the proposed project will have no effect on Puget Sound winter steelhead and coastal-Puget Sound bull trout. In addition and in accordance with the Essential Fish Habitat (EFH) requirements of the Magnuson-Stevens Fishery Conservation and Management Act, the Corps determined that the proposal would not adversely affect EFH utilized by Pacific salmon.

PROJECT TIMING: Microsoft Corporation purchased the subject property in 2007 with the intent to expand the current Red West Campus (Phase I) located directly north of the site to create additional office space in Redmond. The proposed expansion is described below in the Project Narrative. Due to the uncertainty of current market conditions, Microsoft currently does not have an anticipated construction date for the proposed expansion. In March 2009, Microsoft received an Army Corps of Engineers (Corps) Nationwide Permit 39 for the impacts associated with the proposed expansion. Every five years, the Corps commences a reauthorization process for all nationwide permits (NWPs). All of the currently authorized 2007 NWPs are schedule to be modified, reissued, or revoked prior to March 18, 2012. Under the reauthorization process, if a permit holder commences or is under contract to commence an activity authorized by a 2007 NWP before the date the relevant NWP expires, is modified or revoked, the permit holder has 12 months from the date of modification or revocation of the NWP (March 18, 2013) to complete the activity under the present terms and conditions of the NWP.

At this time, Microsoft is proposing to construct the wetland mitigation in advance for the wetland impacts as authorized under the 2007 NWPs and we are requesting to receive the necessary permits from the City of Redmond to perform these activities. The following project narrative is being presented to describe the components of the proposed expansion (Phase II) and associated critical area impacts. All

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wetlands proposed to be impacted will be filled and compensatory mitigation will be provided under this proposal.

PROJECT NARRATIVE: As currently designed, Phase II will include two office buildings (Building 244 and 245) that will be ~240,000 gross floor area (gfa) each), one café/multi-purpose room building ("Commons, Building 246") that will be ~41,000 gfa, a remote cooling tower plant, and an underground parking garage for 1,900+ cars. The site will be accessed with one primary entry located at the intersection of NE 51st St. and 150th Ave. NE and one secondary access from 148th Ave. NE. The expansion northward of 150th Ave. NE through the Phase II campus will connect to the existing perimeter road located on the Red West Main Campus (Phase I). Other site features will include a fire access lane, interior circulation routes, pedestrian pathways and bike routes, active outdoor recreation areas, and supporting utilities and stormwater facilities. In addition, the City of Redmond requires a 200-foot setback from 148th Ave. NE that must be maintained as open space; and a minimum 35% retention of native significant trees on the entire site. Within the 200-foot setback area, Microsoft will deed 2 acres to the City for a park as part of the Development Agreement (dated 03/06/2008) between Microsoft and the City of Redmond. As a condition of development, the City is also requiring off-site improvements to 148th Ave NE that will include adding a designated right turn lane from NE 51st St. onto 148th Ave. NE; and expanding the existing 4 ½'-foot planting strip and 5-foot sidewalk to a combination 12-foot wide bike lane/sidewalk and expanded 5-foot planting strip. Phase II will also include a potential third office building (Building 247) that will be ~225,000 gfa, an underground parking garage, and a fire access road in the southeast corner of the project site. Stormwater management facilities constructed during Phase II will be designed to accommodate the potential future Building 247 development. The proposed developable footprint will occupy approximately 62% of the site (impervious) and the remaining 38% (pervious) will be designated as City Park, open space, and critical areas (wetlands, buffers, and wildlife conservation areas).

ASSESSMENT OF DEVELOPMENT IMPACTS: The proposed site plan has been designed to minimize impacts to the critical areas on the project site to the extent possible while conforming to City of Redmond requirements, the Development Agreement, and regulations for high density office development and transportation needs. This proposal represents the expansion of an existing campus facility, and therefore, some impacts to critical areas are unavoidable in order to comply with City zoning and other building code requirements as well as other State and Federal agencies. The proposed wetland and buffer impacts are discussed below:

Direct Wetland Impacts: Phase II construction includes14,961 sf of direct impacts to Wetlands A, B, C, F, G, H, and L. These are:

- Wetland A: The proposed impact to Wetland A (642 sf) is a result of City requirements to extend 150th Avenue NE northward to the existing Red West Main Campus.
- Wetland B: The impacts to Wetland B are a result of the requested secondary access from 148th Ave NE (668 sf) and the necessary fire lane access (1,794 sf) for the two buildings. The secondary access from 148th Ave. NE will be constructed to maintain a hydrologic connection between the north and south portions of Wetland B. The additional direct impacts to Wetland B (918 sf) are the result of City of Redmond required pedestrian improvements to 148th Ave NE, including expanding the existing sidewalk to a combination 12-foot wide bike lane/sidewalk and increasing the width of the planting strip to 5 feet.
- Wetlands C, G, & H: Filling Wetland C (1,894 sf), Wetland G (55 sf), and Wetland H (3,272 sf) is necessary to construct the campus complex. These three Category IV wetlands all formed as a result of the construction of the parking lot and associated wetponds several years ago. While wetlands formed from construction activities from non-wetland areas are exempt from City regulation, these wetlands are still regulated by the Corps and therefore, the impacts to City exempt wetlands were considered in the mitigation planning and design and mitigation ratios. Wetland G is also exempt from City regulation because of its small size (<250 sf) and hydrologic isolation.
- Wetland F & L: A portion of Wetland F (5,366 sf) and all of Wetland L (352 sf) will also be filled for the required sewer access road and the connection to the sewer line from the site development as stated in the Development Agreement.
- Wetland J & K: No direct impacts are proposed for Wetlands J or K under Phase II.

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Indirect Wetland Impacts: Phase II construction also includes 4,660 sf of indirect impacts (paper fill wetland) in portions of Wetlands B (1,509 sf), F (3,148 sf) and J (3 sf). These are:

- Wetland B: The construction of the box culvert under the secondary access road from 148th Ave NE will also result in 94 sf of shading, but the hydrologic connection for the wetland will be maintained, and, the required fire lane access will result in 1,415 sf of impact.
- Wetlands F & J: Construction of the required sewer access road and the location of the future stormwater facility will indirectly impact 3,148 sf of Wetland F and 3 sf of Wetland J.

Mitigation will be provided for the paper fill portion of these wetlands by adhering to the mitigation ratios required by the City for direct wetland impacts.

Potential Future Building 247 Direct Wetland Impacts: Building 247 construction includes 3,959 sf of direct impacts to Wetlands D and E. These are:

- Wetland E: All of Wetland E (982 sf) will be filled for building construction.
- Wetland D: 2,977 sf of Wetland D will be filled for building construction, the underground parking garage, and the required fire access around the building.

Potential Future Building 247 Indirect Wetland Impacts: Building 247 construction also includes 2,532 sf of indirect impacts (paper fill) to Wetland D as a result of the required fire access lane and walk way around the building.

Buffer Reduction and Averaging:

- For Wetlands B and J, wetland buffer reduction is proposed in accordance with RZC 21.64.030(B)(5)(ii). Both of these wetlands have a habitat score less than 20 points and therefore the buffer width can be reduced to that required for moderate land use impacts. Site planning and mitigation measures have been applied to avoid and minimize impacts to the wetlands and buffers to the maximum extent practicable and considering the Best Available Science guidelines outlined by the Washington State Department of Ecology (Granger et. al, April 2005 and Sheldon et. al, March 2005).
- For Wetlands D and F, a combination of buffer reduction and buffer averaging is proposed in accordance with RZC 21.64.030(B)(5)(ii) and RZC 21.64.030(B)(6). Both of these wetlands have a habitat score less than 20 points and therefore the buffer width can be reduced to that required for moderate land use impacts. In buffer averaged areas, the total area contained within the buffer area after averaging equals that contained in the standard buffer and meets the buffer averaging criteria outlined in RZC 21.64.030(B)(6). Wetland buffers have not been reduced or averaged to less than 75% of the required standard buffer thus meeting the requirements of RZC 21.64.030(B)(7).

PROPOSED MITIGATION: The project is proposing a combination of wetland re-establishment (creation), wetland enhancement, wetland restoration, and buffer restoration/enhancement to mitigate for wetland and buffer functions lost through direct fill, paper fill, buffer reduction and/or averaging, or temporary impacts occurring from construction. All critical area impacts will be constructed in advance of site development activities and performance monitoring will commence following construction completion.

The proposed mitigation includes:

- Wetland Re-establishment (Creation): 32,137 sf
- Wetland Enhancement/Restoration: 39,192 sf
- Buffer Enhancement/Restoration: 133,658 sf
- Buffer Enhancement of “paper fill” wetland: 7,093 sf

The replacement ratios meet the criteria of RZC 21.64.030(C)(7).

In addition, a large majority of the forested habitat in the northeastern portion of the site will be retained, including an active red-tailed hawk nest located in a 48” dbh black cottonwood tree.

FINANCIAL ASSURANCES: Per RZC 21.64 Appendix 1(G)(11), The amount of the guarantees shall be based upon a detailed budget for implementation of the mitigation plan, including installation, monitoring, maintenance and contingency phases for a minimum of five years.

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1.0 INTRODUCTION

This report is the result of a critical areas study and wetland delineation conducted on the proposed Microsoft Red West – Phase II site located in the City of Redmond, Washington (**Figure 1**). The site is the location of a proposed commercial office development. The purpose of this report is to identify and describe critical areas and habitats on and adjacent to the property, including wetlands, streams, and fish and wildlife conservation areas, and to report possible impacts to these areas from the proposed development. This Report has been prepared to meet the requirements of the City of Redmond Zoning Code (RZC), Chapter 21.64 - Critical Area Regulations, and requirements set forth by the Army Corps of Engineers (Corps) relating to Section 404 permitting and Department of Ecology (DOE) Section 401 permitting. Information presented in this report will be utilized by the City of Redmond Planning Department to assist in their evaluation of impacts from the proposed project on critical areas on or in the vicinity of the site.

This report will provide and describe:

- General Property Description,
- Wetland Methodology, Field Investigations, Results, and Regulatory Considerations,
- Fish and Wildlife Conservation Areas,
- Proposed Development,
- Assessment of Development Impacts,
- Mitigation Approach,
- Proposed Mitigation Site Plan Design,
- Site Specific Goals, Objectives, and Performance Standards,
- Project Effects on Federally Listed Species,
- Wetland Functions
- Construction Sequencing,
- Site Protection,
- Monitoring Plan, and
- Maintenance and Contingency Plans

The project participants are as follows:

Property Owner:
Microsoft Corporation
Microsoft Real Estate and Facilities
16771 NE 72nd Way
Redmond Town Center, Building 6, Office 1322
Redmond, WA 98052

Gid Palmer, Senior Development Manager

Project Wetland Ecologist:
Talasaea Consultants, Inc.,
15020 Bear Creek Road NE
Woodinville, WA 98077

William Shiels, Principal Ecologist
Ann Olsen, Senior Project Manager

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2.0 GENERAL PROPERTY DESCRIPTION AND LAND USE

The site consists of the following two (2) parcels: #2182500120 and #2782500092. The parcels are located immediately north of NE 51st Street, west of SR 520, east of 148th Ave NE and south of the existing Microsoft Red West Campus at address 5600 148th Ave NE. The Public Land Survey System locator for this property is the NW ¼ of Section 14, Township 25 North, Range 5 East, W.M.

The total area of the two adjoining parcels is approximately 26.4 acres. The majority of the site is currently undeveloped except for a parking lot and associated wetponds that, according to aerial photographs, were constructed between 1998 and 2000 (King County Maps) and retrofitted in 2004 and 2009. The site consists of two sub-basins. The western sub-basin occupies approximately 200 feet along 148th Ave. NE. This area is mainly flat sloping only slightly from north to south. The eastern sub-basin occupies the remaining areas of the site and slopes down from west to east. Vegetation types on the property include forested, shrub, emergent and regularly mowed grass areas. The grasses on the site have been routinely maintained by the previous and current owners for security purposes since the parking lot was constructed. This was done to provide an open, non-threatening environment for people who park and walk through the site to access the Red West Campus.

Surrounding land uses include: Microsoft Red-West Campus to the north, a paved trail and State Route 520 to the east, 148th Ave NE and a golf course to the west, and NE 51st Street, commercial and office complexes to the south.

3.0 METHODOLOGY

The wetland analysis of the site involved a two-part effort. The first part consisted of a preliminary assessment of the site and its immediate surroundings using published information about local environmental conditions. This information included: 1) wetland and soil maps from resource agencies, 2) critical areas maps from the City of Redmond and King County GIS databases, 3) orthophotography, and 4) any relevant studies completed or ongoing in the vicinity of the project site. The second part involved a field survey in which direct observations and measurements of soils, hydrology, and vegetation were made to determine whether wetlands were present, the type of wetlands present, and the extent of their boundaries (see **Section 3.2 - Field Investigation** below).

3.1 Background Data Reviewed

Background information was reviewed prior to field investigations and included the following:

- US Fish and Wildlife Service, Wetlands Online Mapper (http://wetlandsfws.er.usgs.gov/wtlnds/launch.html);
- Natural Resource Conservation Service, Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/);
- Natural Resources Conservation Service, National Hydric Soils List by State (2008)
- King County Maps (http://www.metrokc.gov/gis/Mapportal/iMAP_main.htm);
- City of Redmond Critical Areas Maps (http://www.ci.redmond.wa.us/cityservices/citymaps.asp);
- StreamNet (www.streamnet.org) and SalmonScape databases (http://wdfw.wa.gov/mapping/salmonscape/databases);
- Current Pacific Coast Salmon Species Listed as Protected Under the Federal Endangered Species Act (http://www.nwr.noaa.gov/ESA-Salmon-Listings/upload/snapshot0607.pdf)
- Federally-Listed Endangered, Threatened, Proposed, and Candidate Species, Critical Habitat, and Species Of Concern In Western Washington (http://www.fws.gov/westwafwo/se/SE_List/species%20list_Aug2007.pdf)

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- Priority Habitats and Species (PHS) Database, Washington Department of Fish and Wildlife (WFDW) 2008, and
- Natural Heritage Database, Washington Department of Natural Resources (WDNR) 2008.

3.2 Field Investigation

Talasaea Consultants evaluated the subject property for several months at the onset of the growing season for years 2007 and 2008 to gain an overall impression of the existing environment and current land uses. Observations were made of the general plant communities, wildlife habitats, and the locations of potential wetland areas. Present and past land use practices were also noted, as were significant geological and hydrological features.

During our on-site investigations, we used the general methodology for routine wetland delineations as described in the Washington State Wetlands Identification and Delineations Manual (1997), which is based principally on the Army Corps of Engineers Wetland Delineation Manual (1987). This methodology utilizes three parameters to make a wetland determination. These parameters include existing vegetation types, existence of hydric or hydrologically modified soils, and general hydrologic conditions. The wetland delineation was conducted on 16 May and 2 June 2008.

Plant species were identified according to the taxonomy of Hitchcock and Cronquist (1973), and the wetland status of plant species was assigned according to the list of plant species that occur in wetlands for Region 9, published by the U.S. Fish and Wildlife Service (Reed 1988, 1993). Wetland classes were determined with the U.S. Fish and Wildlife Service's system of wetland classification (Cowardin, et al., 1979). Vegetation was considered hydrophytic if greater than 50% of the dominant plant species had a wetland indicator status of facultative or wetter (i.e., facultative, facultative wetland, or obligate wetland).

Soil on the site was considered hydric if one or more of the following characteristics were present:

- organic soils or soils with a histic epipedon (i.e., organic surface layer);
- matrix chroma just below the A-horizon (or 10 inches, whichever is less) of 1 or less in unmottled soils, or 2 or less if mottles were present, or
- gleying immediately below the A-horizon.

Indicators of wetland hydrology may include, but are not necessarily limited to: drainage patterns, drift lines, sediment deposition, watermarks, stream gauge data and flood predictions, historic records, visual observation of saturated soils, and visual observation of inundation.

An evaluation of the vegetation, soils, and hydrology was made at various locations along the interface of wetland and upland. Wetland boundary points were then determined from this information, marked with flagging and subsequently field-surveyed. **Appendix A** contains data forms prepared by Talasaea for representative locations in both upland and wetland areas. These data forms document the vegetation, soils, and hydrology information that aided in the wetland boundary determination.

Sightings and indirect observations of birds, mammals, reptiles, and amphibians were recorded during site visits. Indirect observations include tracks, scat, nests, burrows, feeding signs, or vocalizations. Trees were inspected for nests and feeding cavities; the presence of droppings and pellets (a sign of raptor activity) on the ground around trees or possible feeding perches was also noted. Birds were identified using the taxonomy of Sibley (2000). Mammals were identified using the taxonomy of Burt and Grossenheider (1976). Reptiles and amphibians were identified using the taxonomy of Nussbaum, Brodie, and Storm (1983). Habitat units on the project site were classified according to Johnson and O'Neill (2001).

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4.0 Results

4.1 Analysis of Existing Information

4.1.1 National Wetlands Inventory

The National Wetland Inventory (http://wetlandsfws.er.usgs.gov/wtlnds/launch.html) maps one palustrine scrub-shrub temporarily flooded (PSSA), and two palustrine emergent temporarily flooded (PEMA) (Cowardin et. al., 1979) wetlands on the project site (**Figure 2**). The wetlands are mapped adjacent to 148th Ave NE. One palustrine unconsolidated bottom permanently flooded diked impounded (PUBHh) wetland is mapped west of 148th Ave NE in the vicinity of the project site. One additional palustrine emergent temporarily flooded (PEMA) wetland is mapped northwest of the project site at approximately 147th Ave NE and NE 61st Street.

4.1.2 Natural Resources Conservation Service

The Natural Resource Conservation Service, Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/) maps one soil series on the subject property (**Figure 3**). The western portion of the property is mapped as Alderwood gravelly sandy loam, 0 to 6 percent slopes. The eastern portion of the property is mapped as Alderwood gravelly sandy loam, 6 to 15 percent slopes. The Alderwood soil series is not on either the State or County hydric soil lists.

4.1.3 King County GIS Database

The King County GIS Sensitive Areas database (http://www.metrokc.gov/gis/Mapportal/iMAP_main.htm) does not map any critical areas on, or in the vicinity of, the subject property.

4.1.4 City of Redmond Critical Areas Maps

The City of Redmond (http://www.ci.redmond.wa.us/cityservices/citymaps.asp) does not map any critical areas on, or in the vicinity of, the subject property.

4.1.5 Fish, Wildlife, Plant Species, and Habitats

The WDFW PHS Database was reviewed for priority habitats and species in the vicinity of Section 14, Township 25, Range 5 East (WDFW, 2008). The report depicts a few small polygons, all described as: "A variety of wetland types associated either directly with the lake, or with smaller tributary streams. Most of this area is heavily developed as urban housing and/or industrial. Some of these have an open water component." The wetland polygons in the vicinity of the project site are located west of 148th Ave NE, within the City of Bellevue golf course parcels. No additional priority habitat or species was documented on, or in the vicinity of, the subject parcel. The WDNR Natural Heritage Database was reviewed for information relevant to the project site; no natural heritage data was recorded for the subject parcel, or any other locations in the vicinity of the project area (WDNR, 2008).

4.2 Analysis of Field Conditions

During field investigations, eleven wetlands were identified and delineated on the project site. Existing conditions maps are provided on **Figure 4** and on **Sheet W1-00** in **Appendix F**). The wetland features are described in more detail below and they are also summarized on the City of Redmond's Wetland Summary Sheet in **Appendix B**. All wetlands were rated according to the Washington State Wetland Rating System for Western Washington (Hruby, 2004, rev. 2006). Wetland rating forms are included in **Appendix C**. Habitat conservation areas were also identified on the project site and the data is presented in **Section 5.0 – Fish and Wildlife Habitat Conservation Areas.**

Wetland A

Wetland A, approximately 642 sf, is a palustrine scrub-shrub wetland (Cowardin *et al.*, 1979). Wetland A is located in the north-central portion of the site. Wetland A has two classes of vegetation, including emergent and scrub-shrub. Dominant vegetation in Wetland A includes lady fern (*Athyrium filix-femina*), stinging nettle (*Urtica dioica)*, and creeping buttercup

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(*Ranunculus repens*). The plant community in the uplands surrounding Wetland A consists largely of a young red alder (*Alnus rubra*) forest with an understory of Himalayan blackberry (*Rubus armeniacus*) and red elderberry (*Sambucus racemosa*).

Soils in Wetland A are loam and silty gravelly loam. The soil color is dark brown (10 YR 3/2 and 10 YR 5/2) with variable mottles. Wetland A is a slope wetland and hydrology is provided by seeps and direct precipitation.

According to RZC 21.64.030(A)(1)(c), Wetland A is a Category III wetland because it scores between 30 to 50 points on the Western Washington Rating System form, and does not meet the criteria of a Category I wetland. Category III wetlands that do not meet the criteria for a moderate level of habitat function (habitat score 19), and with a proposed high impact land use require a standard buffer of 80 feet.

Wetland B

Wetland B, approximately 39,671 sf is a palustrine forested, scrub-shrub, emergent, temporarily flooded wetland (Cowardin et al., 1979). Wetland B is located along the western property boundary, adjacent to 148th Ave NE. Wetland B has three classes of vegetation, including emergent, scrub-shrub, and forested. Dominant vegetation in Wetland B includes jointed rush (*Juncus articulatus*), water foxtail (*Alopecurus geniculatus*), marsh speedwell (*Veronica scutellata*), soft rush (*Juncus effusus*), and reed canarygrass (*Phalaris arundinacea*) with scattered clumps of Douglas spirea (*Spiraea douglasii*) and black cottonwood (*Populus balsamifera*) The plant community in the uplands surrounding Wetland B consists mainly of grass species including colonial bentgrass (*Agrostis tenuis*),English fescue (*Festuca pratensis*), common velvet-grass *(Holcus lanatus)*, white clover (*Trifolium repens*), and red fescue (*Festuca rubra*). The grasses in and around Wetland B are routinely mowed.

Soils in Wetland B are a mucky loam. The soil color is generally black (10 YR 3/1) with a gleyed matrix below the A horizon. Wetland B is a depressional wetland and hydrology is provided from groundwater, direct precipitation, and runoff from the adjacent sidewalk on 148th Ave. NE. Overflows from Wetland B are collected in an area drain that was installed just south of the wetland when 148th Ave. NE was widened. This outlet discharges to the municipal stormwater system.

According to RZC 21.64.030(A)(1)(c), Wetland B is a Category III wetland because it scores between 30 to 50 points on the Western Washington Rating System form, and does not meet the criteria of a Category I wetland. Category III wetlands that do not meet the criteria for a moderate level of habitat function (habitat score 16), and with a proposed high impact land use require a standard buffer of 80 feet.

Wetland C

Wetland C, approximately 1,894 sf, is a palustrine emergent wetland (Cowardin *et al.*, 1979). Wetland C is located in the north central portion of the project site and appears to have been created by a silt fence left in place for an extended period of time, contributing to formation of a depressional wetland. Dominant vegetation in Wetland C is creeping buttercup, birdsfoot trefoil (*Lotus corniculatus*), common velvetgrass, colonial bentgrass, and soft rush. The plant community in the uplands surrounding Wetland C consists largely of Himalayan blackberry and perennial ryegrass (*Lolium perenne*).

Soils in Wetland C are a dark brown gravelly loam (10 YR 3/2) with a gleyed horizon (10 YR 6/1), mottles and a cemented till layer at approximately 11 inches below soil surface. Hydrology for Wetland C is mainly from direct precipitation that has been trapped by a silt fence left in place following construction of the adjacent parking lot and associated wetponds.

According to RZC 21.64.030(A)(1)(d), Wetland C is a Category IV wetland because it scores less than 30 points on the Western Washington Rating System form. According to RZC 21.64.010(D)(1)(m), Wetland C is an exempt wetland in the City of Redmond because it is an

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artificially created wetland formed from a non-wetland site following construction activities. Wetland C formed following construction of the existing parking lot and associated wetponds.

Wetland D

Wetland D, approximately 10,508 sf (on-site), is a palustrine emergent wetland (Cowardin *et al.,* 1979). Wetland D is located in the southeastern corner of the property and extends off-site into a roadside swale. Dominant vegetation in Wetland D is fowl bluegrass (*Poa palustris),* meadow foxtail, birdsfoot trefoil, and soft rush. The plant community in the uplands surrounding Wetland D consists mainly of grass species including red fescue, sweet vernal grass (*Anthoxanthum odoratum*), and white clover.

Soils in Wetland D are generally a grey silty loam (10 YR 4/2) with a gleyed matrix (10 YR 5/1) and mottles (10 YR 4/6). Wetland D is a slope wetland fed by seeps and stormwater runoff from culverts on NE 51st Street.

According to RZC 21.64.030(A)(1)(d), Wetland D is a Category IV wetland because it scores less than 30 points on the Western Washington Rating System form. Category IV wetlands with a proposed high impact land use require a standard buffer of 50 feet.

Wetland E

Wetland E, approximately 982 sf, is a palustrine emergent wetland (Cowardin *et al.,* 1979). Wetland E is located in the southeastern portion of the project site. Dominant vegetation in Wetland E is dandelion (*Taraxacum officinale*), English fescue, and meadow buttercup (*Ranunculus acris*). The plant community in the uplands surrounding Wetland E consists mainly of grass species including red and English fescues.

Soils in Wetland E are dark brown silt loam (10 YR 3/2) with reducing conditions and mottles (10 YR 3/3 and 10 YR 6/6). There is a cemented till layer at approximately 14 inches. Wetland E is a slope wetland fed by seeps and direct precipitation.

According to RZC 21.64.030(A)(1)(d), Wetland E is a Category IV wetland because it scores less than 30 points on the Western Washington Rating System form. Category IV wetlands with a proposed high impact land use require a standard buffer of 50 feet.

Wetland F

Wetland F, approximately 8,810 sf (on-site), is a palustrine emergent wetland (Cowardin *et al.,* 1979). Wetland F is located in the southeastern portion of the project site. Dominant vegetation in Wetland F is English fescue, birdsfoot trefoil, common velvetgrass, and soft rush. The plant community in the uplands surrounding Wetland F consists mainly of grass species including English fescue and white clover.

Soils in Wetland F are a dark brown (10 YR 3/2) silt loam with reducing conditions, grey soils (10 YR 5/2) and mottles (10 YR 4/6 and 10 YR 3/3). Wetland F is a slope wetland fed by seeps and direct precipitation.

According to RZC 21.64.030(A)(1)(d), Wetland F is a Category IV wetland because it scores less than 30 points on the Western Washington Rating System form. Category IV wetlands with a proposed high impact land use, require a standard buffer of 50 feet.

Wetland G

Wetland G (55 sf) is a palustrine scrub-shrub wetland (Cowardin *et al.,* 1979) located in the south central portion of the property directly south of the existing parking lot. Wetlands G and H recently formed following construction of the adjacent parking lot. Construction left mounds of dirt which trapped surface flows thereby allowing these two wetlands to develop. Dominant vegetation in Wetland G and the surrounding upland areas is reed canarygrass. There is one domestic apple tree rooted in the wetland.

Soils in Wetland G are a dark brown loam (10 YR 3/2) with mottles (10 YR 3/6). Wetland G is hydrologically supported by direct precipitation.

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According to RZC 21.64.030(A)(1)(d), Wetland G is a Category IV wetland because it scores less than 30 points on the Western Washington Rating System form. According to RZC 21.64.010(D)(1)(l) and RZC 21.64.010(D)(1)(m), Wetland G is exempt from the provisions of RZC 21.64, because it is less than 250 sf in size, hydrologically isolated, and it is an artificially created wetland formed from a non-wetland site following construction activities. Wetland G formed following construction of the existing parking lot.

Wetland H

Wetland H (3,272 sf) is a palustrine emergent wetland (Cowardin *et al.,* 1979) located directly south Wetland G, behind a dirt mound. Wetland H is a slope wetland. Dominant vegetation in Wetland H is meadow foxtail, English fescue, common velvetgrass, and red fescue. The surrounding upland grasses consist of the same species.

Soils in Wetland H are a dark brown loam (10 YR 3/2) with mottles (10 YR 3/6). Wetland H is hydrologically supported by direct precipitation.

According to RZC 21.64.030(A)(1)(d), Wetland H is a Category IV wetland because it scores less than 30 points on the Western Washington Rating System form. According to RZC 21.64.010(D)(1)(m), Wetland H is an exempt wetland in the City of Redmond because it is an artificially created wetland formed from a non-wetland site following construction activities. Wetland H formed following construction of the existing parking lot.

Wetland J

Wetland J, approximately 2,632 sf, is a palustrine forested wetland (Cowardin *et. al.,* 1979) located in the northeast corner of the project site. Wetland J is a slope wetland with three vegetation classes, including emergent, scrub-shrub and forested. Dominant vegetation in Wetland J includes creeping buttercup, Sitka willow (*Salix sitchensis*), horsetail (*Equisetum arvense*), large-leaved avens (*Geum macrophyllum*), small-fruited bulrush (*Scirpus microcarpus*), common rush, and red alder. The plant community in the uplands surrounding Wetland J consists largely of black cottonwood, Himalayan blackberry, and a non-native hawthorn (*Crataegus monogyna*).

Soils in Wetland J are a dark brown (10 YR 3/3) sand with organic material with gleyed matrix below three inches (4/10Y) and mottles (10 YR 4/4). Wetland J is slope wetland hydrologically supported by seeps and direct precipitation.

According to RZC 21.64.030(A)(1)(c), Wetland J is a Category III wetland because it scores between 30 to 50 points on the Western Washington Rating System form, and does not meet the criteria of a Category I wetland. Category III wetlands that do not meet the criteria for a moderate level of habitat function (habitat score 14), and with a proposed high impact land use, require a standard buffer of 80 feet.

Wetland K

Wetland K, approximately 80 sf, is a palustrine emergent wetland (Cowardin *et al.,* 1979) located directly east of a tip of Wetland B, in the western portion of the project site. Wetland K is a closed depressional wetland with an emergent vegetation class. Wetland K is hydrologically supported by direct precipitation.

According to RZC 21.64.030(A)(1)(d), Wetland K is a Category IV wetland because it scores less than 30 points on the Western Washington Rating System form. Although Wetland K is less than 250 sf in size, it is close to Wetland B and probably hydrologically connected to and influenced by Wetland B. Therefore, it is not exempt from regulation by the City of Redmond. Category IV wetlands with a proposed high impact land use, require a standard buffer of 50 feet.

Wetland L

Wetland L, approximately 352 sf, is a palustrine scrub-shrub wetland (Cowardin *et. al.,* 1979). Wetland L is a slope wetland with two vegetation classes, including scrub-shrub and emergent vegetation. The scrub-shrub layer is dominated by Himalayan blackberry (*Rubus* discolor).

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Dominant vegetation in Wetland L includes creeping buttercup, Himalayan blackberry, red alder, and European bittersweet (*Solanum dulcamera*).

Soils in Wetland L are a dark brown (10 YR 3/2) silt loam with organics and mottles (10 YR 3/6). Wetland L is a slope wetland hydrologically supported by seeps and direct precipitation

According to RZC 21.64.030(A)(1)(d), Wetland L is a Category IV wetland because it scores less than 30 points on the Western Washington Rating System form. Category IV wetlands with a proposed high impact land use, require a standard buffer of 50 feet.

4.3 Wetland Regulatory Considerations

A comparison of the City of Redmond (City) and DOE critical area regulations was performed to develop a detailed conceptual mitigation plan. Both the City and DOE rate the wetlands according to the Washington State Wetland Rating System for Western Washington (Hruby, 2004, rev. 2006). The wetland buffers provided by the City and DOE both assume high impact land use (commercial development) and low habitat scores (less than 20 points). Recommended buffers for Category III wetlands with high impact land uses is 80 feet, and Category IV wetlands with high impact land uses is 50 feet. The only difference between the City and DOE standard buffers is for Wetlands C, G and H. The City exempts hydrologically isolated Category IV wetlands less than 250 sf (Wetland G is 55 sf) and therefore the City would not impose a buffer for Wetland G. In addition, the City of Redmond exempts artificially created wetlands formed from non-wetland sites during construction activities. Wetlands C, G, and H were all formed following the construction of the existing parking lot and associated wetponds.

The City's recommended mitigation ratios for wetland alteration are slightly different from the DOE guidelines provided in *Wetland Mitigation in Washington State, Part 1: Agency Policies and Guidance* (WDOE, 2006). Therefore, we have prepared two (2) wetland regulatory summary tables that describe the required mitigation ratios for the City (**Table 1**) and DOE (**Table 2**).

Table 1: Wetland Regulatory Considerations - City of Redmond

Wetland	Category[1]	Buffer[2]	Cowardin Class	Mitigation Ratios[2]	
				Creation or Re-establishment	Creation & Enhancement
Wetland A (642 sf)	Category III	80 feet Habitat Score19	PSS	2:1	1:1 C & 2:1 E
Wetland B (39,671 sf)	Category III	80 feet Habitat Score 16	PFO/PSS/ PEM	2:1	1:1 C & 2:1 E
Wetland C (1,894 sf)	Category IV	none	PEM	exempt per RZC 21.64.010(D)(1)(m)	
Wetland D (10,508 sf, on-site)	Category IV	50 feet Habitat Score 9	PEM	1.5:1	1:1 C & 2:1 E
Wetland E (982 sf)	Category IV	50 feet Habitat Score 7	PEM	1.5:1	1:1 C & 2:1 E
Wetland F (8,810 sf, on-site)	Category IV	50 feet Habitat Score 11	PEM	1.5:1	1:1 C & 2:1 E
Wetland G (55 sf)	Category IV	none	PSS	exempt per RZC 21.64.010(D)(1)(l) and (m)	
Wetland H (3,272 sf)	Category IV	none	PEM	exempt per RZC 21.64.010(D)(1)(m)	
Wetland J (2,632 sf)	Category III	80 feet Habitat Score14	PFO	2:1	1:1 C & 2:1 E
Wetland K (80 sf)	Category IV	50 feet Habitat Score6	PEM	1.5:1	1:1 C & 2:1 E
Wetland L (352 sf)	Category IV	50 feet Habitat Score10	PSS	1.5:1	1:1 C & 2:1 E

1. Based on the 2006 Department of Ecology Wetland Rating Form – Western Washington.
2. Based on RZC 21.64.030(C)(7).

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Table 2: Wetland Regulatory Considerations - DOE

Wetland	Category[1]	Buffer[2]	Cowardin Class	Mitigation Ratios[2] Establishment/ Rehabilitation	Creation & Enhancement
Wetland A (642 sf)	Category III	80 feet Habitat Score19	PSS	2:1	1:1 C & 4:1 E
Wetland B (39,671 sf)	Category III	80 feet Habitat Score 16	PFO/PSS/ PEM	2:1	1:1 C & 4:1 E
Wetland C (1,894 sf)	Category IV	50 feet Habitat Score 8	PEM	1.5:1	1:1 C & 2:1 E
Wetland D (10,508 sf, on-site)	Category IV	50 feet Habitat Score 9	PEM	1.5:1	1:1 C & 2:1 E
Wetland E (982 sf)	Category IV	50 feet Habitat Score 7	PEM	1.5:1	1:1 C & 2:1 E
Wetland F (8,810 sf, on-site)	Category IV	50 feet Habitat Score 11	PEM	1.5:1	1:1 C & 2:1 E
Wetland G (55 sf)	Category IV	50 feet Habitat Score 9	PSS	1.5:1	1:1 C & 2:1 E
Wetland H (3,272 sf)	Category IV	50 feet Habitat Score 9	PEM	1.5:1	1:1 C & 2:1 E
Wetland J (2,632 sf)	Category III	80 feet Habitat Score14	PFO	2:1	1:1 C & 4:1 E
Wetland K (80 sf)	Category IV	50 feet Habitat Score6	PEM	1.5:1	1:1 C & 2:1 E
Wetland L (352 sf)	Category IV	50 feet Habitat Score10	PSS	1.5:1	1:1 C & 2:1 E

1. Based on the 2006 Department of Ecology Wetland Rating Form – Western Washington.
2. Based on Wetland Mitigation in Washington State, Part 1: Agency Policies and Guidance, 2006.

5.0 FISH AND WILDLIFE HABITAT CONSERVATION AREAS

5.1 Habitat Units

The project area was separated into habitat units to characterize vegetation cover types, plant communities, and wildlife-habitat associations. The habitat units were classified according to *Wildlife-Habitat Relationships in Oregon and Washington* (Johnson and O'Neil, 2001). The primary habitat unit is: Medium-Density Urban/Mixed Environs with mosaic components of Westside Lowlands Conifer-Hardwood Forest, Westside Grasslands, and Westside Riparian-Wetlands (**Figure 5)**. One quality habitat area, the forested Westside Lowlands Conifer-Hardwood Forest habitat component, was identified in the northeast portion of the project site.

5.2 Wildlife-Habitat Relationships

The habitat components identified in the project area - Westside Lowlands Conifer-Hardwood Forest, Westside Grasslands, and Westside Riparian-Wetlands (Johnson and O'Neil 2001), were assessed as existing and potential habitat for Species of Concern and Species of Local Importance. Per RZC 21.64.020, **Table 3** summarizes any Species of Concern (http://wdfw.wa.gov/wlm/diversty/soc/soc.htm) and/or Species of Local Importance with a primary association to a habitat component within the project area. The species list was generated from the habitat-wildlife associations defined by *Wildlife Habitat Relationships in Oregon and Washington* (Johnson and O'Neil, 2001), the WDFW listing of Species of Concern in Washington State, and the City of Redmond designation of Species of Local Importance. The WDFW Species of Concern list includes those species listed as State Endangered, State Threatened, State Sensitive, or State Candidate, as well as species listed or proposed for listing by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service. **Appendix D** contains the City of Redmond Habitat Unit Assessment Forms.

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Table 3: Habitat-Wildlife Associations

SPECIES	Urban and Mixed Environs	Westside Lowlands Conifer-Hardwood Forest	Westside Grasslands	Wetlands	Status[1]	Likelihood of Presence within the Project Area
Great Blue Heron[2]	X	X	X	X	Local Species of Importance	**Potential -** Critical overwintering habitat on the Westside.
Bald Eagle	X	X	X		FCo/ST	**Potential**
Merlin	X	X	X		SC	**Potential** - Merlins breed in rugged terrain that provides both trees for nests and open areas for hunting. During migration and winter, they are found in more diverse habitats, including coastal areas, estuaries, agricultural lands, and suburban towns.
Townsend's Big-eared Bat		X			FCo/SC	**Potential –** Abundant in steppe and a variety of forest types, chiefly at low elevation; can forage in almost any habitat and prefers upland over water.
Vaux's Swift	X	X			SC	**Potential** – Needs large hollow trees and snags for nesting and roosting.

[1] FE = Federal Endangered Species; FT = Federal Threatened Species; FC = Federal Candidate Species; FCo = Federal Species of Concern; SE = State Endangered Species; ST = State Threatened Species; SC = State Candidate Species; SS = State Sensitive Species
[2] Species of Local Importance

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5.3 Snag Survey

A snag survey was conducted on 15 August 2008 at the project site. Fourteen snags were identified on the project site all were concentrated in the Westside Lowlands Conifer-Hardwood Forest area in the northeast section of the project site. A summary of the snag survey is provided in **Table 4** and the snag locations are depicted on **Figure 5**.

Table 4: Snag Survey

Snag	Species	Location (within the northeast section of the project site)	Description
1	Alnus rubra	West central	Small foraging holes
2	Pseudotsuga menziesii	Northwest	Larger foraging holes – could be pileated
3	Alnus rubra	Northwest	Dead trunks of live tree
4	Alnus rubra	Northwest	Group of small diameter alders
5	Pseudotsuga menziesii	North central	Very large diameter – dead top can be seen in aerial photograph; in early stages of decay; signs of foraging; greater than 100' tall
6	Thuja plicata	Northeast	Stump; very large diameter; in late stages of decay; nurse stump
7	Alnus rubra	East central	Located on fence line; foraging holes
8	Alnus rubra	South central	Late stages of decay; medium diameter; moss and lichen
9	Alnus rubra	Center	Large diameter alder with foraging holes
10	Alnus rubra	Center	Group of medium diameter alders
11	Alnus rubra	Center	
12	Alnus rubra	Center	
13	Alnus rubra	Center	
14	Tsuga heterophylla	West central	Young snag

5.4 Wildlife Survey

Wildlife observations were recorded during all of the site investigation visits. The site contains moderate value wildlife habitat, although mammal usage is restricted due to adjacent major roads and developments. The property has several interspersed habitat types including forested, shrub, and grassy areas. Both wetland and upland areas are also present. The combination of the edge effect of the interspersion of habitat types and the variety of plant communities provide habitat for a moderate variety of wildlife. Due to the urban character of surrounding properties, most observed wildlife species were birds. A red-tailed hawk (*Buteo jamaicensis*) was observed soaring over the property and likely utilizes the open grassy areas for foraging. A red-tailed hawk nest was identified in a 48-inch dbh black cottonwood tree located in the Westside Lowlands Conifer-Hardwood Forest area of the project site. Additional evidence of wildlife usage included pileated woodpecker (*Dryocopus pileatus*) foraging holes in a snag located northeast of the parking lot adjacent to the wetponds. No evidence of Federally-listed threatened or endangered species was observed on or in the immediate vicinity of the subject property.

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6.0 PROPOSED DEVELOPMENT AND CRITICAL AREA IMPACTS

6.1 Project Timing

Microsoft Corporation purchased the subject property in 2007 with the intent to expand the current Red West Campus (Phase I) located directly north of the site to create additional office space in Redmond. The proposed expansion is described below in the Project Narrative. Due to the uncertainty of current market conditions, Microsoft currently does not have an anticipated construction date for the proposed expansion. In March 2009, Microsoft received an Army Corps of Engineers (Corps) Nationwide Permit 39 for the impacts associated with the proposed expansion. Every five years, the Corps commences a reauthorization process for all nationwide permits (NWPs). All of the currently authorized 2007 NWPs are schedule to be modified, reissued, or revoked prior to March 18, 2012. Under the reauthorization process, if a permit holder commences or is under contract to commence an activity authorized by a 2007 NWP before the date the relevant NWP expires, is modified or revoked, the permit holder has 12 months from the date of modification or revocation of the NWP (March 18, 2013) to complete the activity under the present terms and conditions of the NWP.

At this time, Microsoft is proposing to construct the wetland mitigation in advance for the wetland impacts as authorized under the 2007 NWPs and we are requesting to receive the necessary permits from the City of Redmond to perform these activities. The following project narrative is being presented to describe the components of the proposed expansion (Phase II) and associated critical area impacts. All wetlands proposed to be impacted will be filled and compensatory mitigation will be provided under this proposal.

6.2 Project Narrative

Microsoft Corporation purchased the vacant 26.4-acre property with the intent to expand the current Red West Campus located directly north of the site (**Sheet W1-01** in **Appendix F**). The proposed location is the sole readily available location for Campus expansion given the transportation requirements of the City of Redmond and Washington State. The proposed location, south of the existing Microsoft Red West Campus (Phase 1), would allow for additional office space serving Microsoft's projected growth. At this time, we are presenting the project description and critical area impacts for the Phase II development.

As currently designed, Phase II will include two office buildings (Building 244 and 245) that will be ~240,000 gross floor area (gfa) each), one café/multi-purpose room building ("Commons, Building 246") that will be ~41,000 gfa, a remote cooling tower plant, and an underground parking garage for 1,900+ cars. The site will be accessed with one primary entry located at the intersection of NE 51st St. and 150th Ave. NE and one secondary access from 148th Ave. NE. The expansion northward of 150th Ave. NE through the Phase II campus will connect to the existing perimeter road located on the Red West Main Campus (Phase I). Other site features will include a fire access lane, interior circulation routes, pedestrian pathways and bike routes, active outdoor recreation areas, and supporting utilities and stormwater facilities.

Primary access to the site will be provided via a traffic signal at the intersection of 150th Ave NE and NE 51st Street. This access point is documented in the City of Redmond's Comprehensive Plan and is outlined as "Redmond BROTS Project 085" (Redmond, 2006). Secondary access will be provided to the site via a right-in, right-out only driveway located on 148th Ave. NE. Redmond Municipal Code requires driveway locations to be sited a minimum of 150 feet from adjacent intersections or other driveways.

In addition, the City of Redmond requires a 200-foot setback from 148th Ave. NE that must be maintained as open space; and a minimum 35% retention of native significant trees on the entire site. Within the 200-foot setback area, Microsoft will deed 2 acres to the City for a park as part of the Development Agreement (dated 03/06/2008) between Microsoft and the City of Redmond. As a condition of development, the City is also requiring off-site improvements to 148th Ave NE that will include adding a designated right turn lane from NE 51st St. onto 148th

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Ave. NE; and expanding the existing 4 ½'-foot planting strip and 5-foot sidewalk to a combination 12-foot wide bike lane/sidewalk and expanded 5-foot planting strip.

Phase II will also include a potential third office building (Building 247) that will be ~225,000 gfa, an underground parking garage, and a fire access road in the southeast corner of the project site. Stormwater management facilities constructed during Phase II will be designed to accommodate the potential future Building 247 development.

The proposed developable footprint will occupy approximately 62% of the site (impervious) and the remaining 38% (pervious) will be designated as City Park, open space, and critical areas (wetlands, buffers, and wildlife conservation areas).

6.2.1 Stormwater Management

The project stormwater plan will be designed to meet the requirements of the City of Redmond and the 2005 Department of Ecology Stormwater Management Manual. The project proposes one large stormwater pond designed for the site's developed eastern sub-basin (22.6 acres). The pond will be located in the northeastern portion of the project site. Stormwater from the pond will discharge to the WSDOT conveyance system located in the SR 520 right-of-way, which discharges to a regional storm drainage pond prior to discharge to the Sammamish River.

The western sub-basin (3.8 acres), consisting of enhanced and created wetlands and enhanced buffer areas, will not require stormwater treatment or detention. The western sub-basin currently discharges via a 6-inch diameter pipe located near the southwest corner of the site. Overflows from the wetland are conveyed to an existing City of Redmond storm catch basin located within the ROW of 148th Avenue NE. This municipal system discharges to the Valley Creek basin in the vicinity of the City of Bellevue municipal golf course (CoughlinPorterLundeen, 2008). Valley Creek eventually converges with Kelsey Creek, which discharges to Lake Washington in the vicinity of Mercer Slough.

6.3 Assessment of Development Impacts

The proposed site plan has been designed to minimize impacts to the critical areas on the project site to the extent possible while conforming to City of Redmond requirements, the Development Agreement, and regulations for high density office development and transportation needs. This proposal represents the expansion of an existing campus facility, and therefore, some impacts to critical areas are unavoidable in order to comply with City zoning and other building code requirements as well as other State and Federal agencies. The proposed wetland and buffer impacts are discussed below:

6.3.1 Direct Wetland Impacts

Phase II construction includes14,961 sf of direct impacts to Wetlands A, B, C, F, G, H, and L. These are:

- Wetland A: The proposed impact to Wetland A (642 sf) is a result of City requirements to extend 150th Avenue NE northward to the existing Red West Main Campus.
- Wetland B: The impacts to Wetland B are a result of the requested secondary access from 148th Ave NE (668 sf) and the necessary fire lane access (1,794 sf) for the two buildings. The secondary access from 148th Ave. NE will be constructed to maintain a hydrologic connection between the north and south portions of Wetland B. The additional direct impacts to Wetland B (918 sf) are the result of City of Redmond required pedestrian improvements to 148th Ave NE, including expanding the existing sidewalk to a combination 12-foot wide bike lane/sidewalk and increasing the width of the planting strip to 5 feet.
- Wetlands C, G, & H: Filling Wetland C (1,894 sf), Wetland G (55 sf), and Wetland H (3,272 sf) is necessary to construct the campus complex. These three Category IV wetlands all formed as a result of the construction of the parking lot and associated wetponds several years ago. While wetlands formed from construction activities from

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non-wetland areas are exempt from City regulation, these wetlands are still regulated by the Corps and therefore, the impacts to City exempt wetlands were considered in the mitigation planning and design and mitigation ratios. Wetland G is also exempt from City regulation because of its small size (<250 sf) and hydrologic isolation.

- Wetlands F & L: A portion of Wetland F (5,366 sf) and all of Wetland L (352 sf) will be filled for the required sewer access road and the connection to the sewer line from the site development as stated in the Development Agreement. Section 12 - Public Utilities, of the Development Agreement requires City access to the existing sanitary sewer line and manholes. The City is requiring a 14-foot wide gravel access road, including a "hammerhead" turn-around for City use.
- Wetlands J & K: No direct impacts are proposed for Wetlands J or K under Phase II.

The potential Future Building 247 will directly impact 3,959 sf of Wetlands D and E. These are:

- Wetland E: All of Wetland E (982 sf) will be filled for building construction.
- Wetland D: 2,977 sf of Wetland D will be filled for building construction, the underground parking garage, and the required fire access around the building.

6.3.2 Indirect Wetland Impacts

Phase II construction also includes 4,660 sf of indirect impacts (paper fill wetland) in portions of Wetlands B (1,509 sf), F (3,148 sf) and J (3 sf). These are:

- Wetland B: The construction of the box culvert under the secondary access road from 148th Ave NE will also result in 94 sf of shading, but the hydrologic connection for the wetland will be maintained, and, the required fire lane access will result in 1,415 sf of impact.
- Wetlands F & J: Construction of the required sewer access road and the location of the future stormwater facility will indirectly impact 3,148 sf of Wetland F and 3 sf of Wetland J.

The potential Future Building 247 will result in 2,532 sf of indirect wetland impacts (paper fill wetland) to Wetland D as a result of the required fire access lane and walk way around the building.

Mitigation will be provided for the paper fill portion of all of the wetlands by adhering to the mitigation ratios required by the City for direct wetland impacts.

Table 5: Critical Area Impacts

Wetland	Area (sf)	Category	Direct Wetland Impacts	Indirect Wetland Impacts (Paper Fill)	Percent Impacted
Wetland A	642	III	642 sf	0	100%
Wetland B	39,671	III	3,380 sf sf	1,509 sf	12%
Wetland C	1,894	IV	1,894 sf	0	100%
Wetland D	10,508	IV	2,977 sf	2,532 sf	52%
Wetland E	982	IV	982 sf	0	100%
Wetland F	8,810	IV	5,366 sf	3,148 sf	97%
Wetland G	55	IV	55 sf	0	100%
Wetland H	3,272	IV	3,272 sf	0	100%
Wetland J	2,632	III	0	3 sf	0%
Wetland K	80	IV	0	0	0%
Wetland L	352	IV	352 sf	0	100%
TOTAL			**18,920 sf**	**7,192 sf**	

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6.3.3 Buffer Reduction and Buffer Averaging

Wetland buffer reduction and a combination of wetland buffer reduction and averaging is proposed for the mitigation wetland areas post-construction. Existing wetland buffers on the project site all show evidence of past disturbances. On-site buffers have limited functions and values and consist mainly of either mowed non-native grass species (i.e. lawn) or dense stands of young alder and cottonwood trees. Invasive species such as blackberries and ivy are heavily present in some of the buffer areas. Buffer reduction and averaging is not expected to reduce wetland functions and values of any of the wetlands following mitigation.

Wetlands B and J

Wetland buffer reduction is proposed for Wetlands B and J in accordance with RZC 21.64.030(B)(5) which states that "The Department may allow the standard wetland buffer width to be reduced in accordance with the best available science on a case-by-case basis when it is determined that a smaller area is adequate to protect the wetland functions and values based on site-specific characteristics." In addition, RZC 21.64.030(B)(5)(ii) states that "For wetlands that score less than 20 points for habitat, the buffer width can be reduced to that required for moderate land use impacts if measures to minimize the impacts of different land uses on wetlands, such as those developed by the Department of Ecology under BAS are applied." Both of these wetlands have a habitat score less than 20 points and the current buffers are either mowed lawn or young alder with an understory of blackberry. Therefore the site plan proposes to reduce the buffers for Wetlands B and J to that required for moderate land use impacts: from 80 feet to 60 feet (**Sheet W1-10**). Site planning and mitigation measures have been applied to avoid and minimize impacts to the wetlands and buffers to the extent practicable considering the Best Available Science guidelines outlined by the Washington State Department of Ecology (Granger et. al , April 2005 and Sheldon et. al, March 2005).

The total buffer area provided for Wetland B is 74,270 sf and for Wetland J is 17,424 sf.

Wetlands D and F

A combination of wetland buffer reduction and averaging, is requested for Wetlands D and F. Buffers for Wetlands D and F are proposed to be reduced from 50 feet to 40 feet in accordance with RZC 21.64.030(B)(5)(ii), and then averaged in accordance with:

> RZC 21.64.030(B)(6): Wetland buffers widths may be modified by averaging buffer widths as set forth herein. The Department may allow modification of the standard wetland buffer width in accordance with the best available science on a case-by-case basis by averaging buffer widths. Averaging buffer widths may only be allowed where a qualified wetland professional demonstrates that 1) the averaging will not reduce the functions or values of the wetland, 2) the wetland would benefit from a wider buffer in places and would not be adversely impacted by a narrower buffer in other places, 3) the total area contained in the buffer area after averaging is no less than that which would be contained within the standard buffer, and 4) the buffer width is not reduced more than 25% of the width or 50 feet, whichever is less, except for buffers between Category IV wetlands and low- to moderate land uses.
>
> RZC 21.64.030(B)(7): Buffers widths may be reduced by buffer width reduction or buffer width averaging as stated (under the codes cited above). However, the use of either of these mechanisms or a combination of these mechanisms shall not result in a buffer width less than 75 percent of the standard buffer required as identified in subsection (2) of this Section.

For Category IV wetlands 75 percent of the standard buffer of 50 feet is 37.5 feet, therefore the minimum buffer depicted on the proposed site plan is 37.5 feet for these two wetlands. The total buffer provided within the averaged area of Wetland D is 10,431 sf; which exceeds the required buffer area of 10,294 sf (after buffer reduction applied). The total buffer provided within the averaged area of Wetland F is 38,626 sf; which exceeds the required buffer area of 37,853

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sf (after buffer reduction applied). A total of 140,751 sf of wetland buffer will be restored/enhanced as part of the advanced mitigation project.

7.0 WETLAND MITIGATION PLAN

7.1 Agency Policies and Guidance

The proposed mitigation plan was designed in accordance with the policies and guidance provided in the following documents:

- Redmond Zoning Code, Article IV, Chapter 21.64 – Appendix 1;
- The Washington State Department of Ecology (DOE) Publication #06-06-011a, *Wetland Mitigation in Washington State – Part 1: Agency Policy and Guidance,* and *Part 2: Developing Mitigation Plans (Version 1)*, dated March 2006; and
- The *Federal Compensatory Mitigation for Losses of Aquatic Resources Final Rule* (33 CFR Parts 325 and 332, April 10, 2008), effective June 9, 2008.

7.2 Mitigation Approach

According to the regulatory policies and guidance noted above, and as stated in RZC 21.64.010(I)(1), General Mitigation Standard, "All significant adverse impacts to critical areas functions and values shall be mitigated. Mitigation actions by an applicant or property owner shall occur in the following sequence:

1. Avoiding the impact altogether by not taking a certain action or parts of actions;
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps, such as project redesign, relocation, or timing, to avoid or reduce impacts;
3. Rectifying the impact to the critical area by repairing, rehabilitating, or restoring the affected environment to the conditions existing at the time of the initiation of the project;
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;
5. Compensating for the impact by replacing or providing substitute resources or environments; and/or
6. Monitoring the hazard or other required mitigation and taking remedial action when necessary.

The proposed site plan avoids where possible, and minimizes direct impacts to wetlands and associated buffers and habitat conservation areas to the greatest extent possible all the while adhering to requirements set forth in the Development Agreement for zoning densities and traffic improvements, while still providing an economically viable development. The proposed plan reflects the minimum amount of impacts necessary while incorporating the following design factors:

- Required extension of 150th Ave. NE through the project site including a 12-foot sidewalk/bike lane and planting strip,
- Improvements to 51st Ave. NE including an additional lane and widened sidewalk,
- Required 14-foot wide access road along the sewer line in the eastern half of the project site,
- Required off-site improvements to 148th Ave NE including adding a designated right turn lane from NE 51st St. onto 148th Ave. NE and expanding the existing 4 ½'-foot planting strip and 5-foot sidewalk to a combination 12-foot wide bike lane/sidewalk and expanded 5-foot planting strip,
- A required 200-foot "no-build" setback from 148th Ave. NE that must be maintained as open space, and
- Retention of 35 percent of all significant trees on site.

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The proposed site plan avoids where possible, and minimizes direct impacts to the higher quality wetlands and habitat conservation areas to the greatest extent possible by concentrating new development in previously disturbed areas of the project site. The central portion of the project site is currently developed with a surface parking lot, a gravel road bisecting the site in a north-south orientation, two constructed wetponds, and grassy areas with scattered tree clumps. The southeast corner of the site has remnants of a dispersion trench and stormwater pond that were abandoned in 2004 when the wetponds for the parking lot were retrofitted. In addition, the majority of the areas proposed for development show evidence of previous disturbance and is routinely mowed for safety reasons.

Additional considerations factored in the current site design including providing required transportation connections with existing road alignments, adequate vehicular circulation and accessibility for fire and emergency vehicles within the development. The future stormwater facility is located in the northeast corner of the site where elevations are lowest. The main campus was sited after required road grades were determined for the extension of 150th Avenue NE.

Requirements in the Development Agreement, traffic improvements, road connections, and pedestrian improvements along 148th Avenue NE resulted in all of the proposed impacts to Wetlands A, D, E, F, and L; and part of the impacts to Wetland B. These impacts could not be avoided, minimized, rectified, or reduced or eliminated over time.

7.2.1 Mitigation Sequencing for Phase II

Mitigation sequencing measures, as outlined in RZC 21.64.010(I)(1), were employed for the remainder of the wetland impacts on site as follows:

Avoidance

All impacts to Wetland K were avoided. Direct impacts to Wetland J were avoided. Approximately 3 sf of Wetland J will be indirectly impacted with a reduced buffer from the siting of the adjacent future stormwater facility. This is a reduction of 394 sf from initial impact calculations resulting from the final sizing of the pond. The cooling towers were sited to avoid the highest quality forest habitat present in the habitat conservation area. All buildings and roads have been located away from the red-tailed hawk nest tree (minimum distance is approximately 80 feet). Due to the 200-foot setback restriction along 148th Ave. NE, 88 percent of Wetland B, the largest and one of the highest quality wetlands on the site, was avoided and will be significantly enhanced as mitigation for impacts to wetlands on the site.

Minimization

The required pedestrian improvements along 148th Ave. NE resulted in 918 sf of impact to Wetland B. The original design concept was to build the widened planting strip/sidewalk in the most economical way with a fill slope that would have impacted ~5,700 sf of Wetland B. The team collaborated and reviewed four design options for feasibility and costs and eventually determined to use a concrete retaining wall under the edge of the 12-foot sidewalk thereby minimizing the wetland fill. Additional Wetland B impacts for the secondary site access from 148th Ave. NE and fire lane access have been minimized to the maximum possible extent. The original location for the secondary access road entered the site approximately 15 feet to the north, which more than tripled the current amount of wetland fill (668 sf). Through team planning, the road was moved south to enter the site at the narrowest portion of Wetland B thereby minimizing the impact. The road width for secondary access is the minimum allowed under code. The direct impacts to Wetland B due to the required fire lane are a result of the location of the extension of 150th Ave. NE and the required 200-foot setback from 148th Ave. NE. Connecting 150th Ave. NE to the existing campus to the north determined the final locations of the buildings, parking garage, and the fire lane due to grades and the minimum size the buildings needed to be to meet zoning requirements.

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Rectifying
Any temporary impacts to wetlands and buffers occurring during project construction will be rectified by fully restoring impacted areas.

Reducing or Eliminating Impacts Over Time
Reducing or eliminating impacts to critical areas over time does not apply to this project.

Compensating for Impacts
All of the wetland and buffer impacts occurring during Phase II will be mitigated through a combination of wetland re-establishment (creation), wetland enhancement and buffer restoration and enhancement (**Sheet W1-02** and **Table 6,** below**)**. Per City of Redmond staff (personal comm. Cathy Beam), impacts to Wetlands C, G, and H are exempt from the provisions of RZC 21.64 because they were unintentionally created after the construction of a parking lot (RZC 21.64.010(D)(1)(m). While wetlands formed from construction activities from non-wetland areas are exempt from City regulation, these wetlands are still regulated by the Corps and therefore, the impacts to City-exempt wetlands were considered in the mitigation planning, design and mitigation ratios to address losses of Wetlands C, G, and H.

Monitoring
A project monitoring program and contingency plan as required under RZC 21.64.010(P) and Appendix 1(G)(9) that details the goals, objectives, and performance standards and provides a post-construction performance monitoring schedule are provided at the end of this report.

7.2.2 Mitigation Sequencing for Future Building 247

Mitigation sequencing measures, as outlined in RZC 21.64.010(I)(1), were also employed for the future Building 247 project which consists of one building, a parking garage, entry road, and required fire access around the building in the southeast corner of the site. The construction of Building 247 depends entirely on the City revising the BROTS limits for office space and WSDOT improvements to SR-520 for traffic. The potential location for the building was sited, in part, to take advantage of the proximity to the stormwater facility to be constructed with Phase II construction. The stormwater pond will be designed to accommodate the future Building 247 development. In addition, the location of the extended 150th Ave. NE road through the site, the improvements to 51st Ave. NE, and the location of the required sewer connection line and access road were all factors that determined the location and size of the future building. The building is reduced in size due to the limited amount of space available in the southeast corner of the project site given that the design team exerted significant effort to avoid and minimize wetland impacts from the building while balancing the probable economic viability of the existing added wetland impact on GFA.

Avoidance
All of the impacts to Wetlands D and E are a result of the factors noted above. These impacts could not be avoided in order to construct a viable economically feasible project.

Minimization
The building footprint proposed for Building 247 is constricted by many elements, including: 1) a required 10-foot setback from the south property line; 2) three (3) landmark trees located in the southwest quadrant of this area; 3) the sanitary sewer line connection to the north; 4) required emergency fire access on the east; and 5) required site entry, handicap parking, and fire truck turn-around on the west side. The building footprint is 32,500 gross floor area smaller than the two Phase II buildings and is the minimum size necessary to achieve the office space Microsoft will need to accommodate future growth. During initial site planning efforts, the building footprint was adjusted three times to take into account the restrictions noted above and we believe that it represents the minimal amount of impact to critical areas necessary in order to achieve the desired floor plan. Impacts to Wetland D (2,977 sf) and Wetland E (982 sf) will be mitigated in advance.

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Rectifying
Any temporary impacts to wetlands and buffers occurring during project construction will be rectified by fully restoring impacted areas.

Reducing or Eliminating Impacts Over Time
Reducing or eliminating impacts to critical areas over time does not apply to this project.

Compensating for Impacts
All of the wetland and buffer impacts will be mitigated through a combination of wetland re-establishment (creation), wetland enhancement and buffer restoration and enhancement (**Sheet W1-02** and **Table 6,** below**)**. All impacts resulting from the future Building 247 construction will be mitigated in advance.

Monitoring
A project monitoring program and contingency plan as required under RZC 21.64.010(P) and Appendix 1(G)(9) that details the goals, objectives, and performance standards and provides a post-construction performance monitoring schedule are provided at the end of this report. .

7.3 Proposed Mitigation Site Plan/Design

7.3.1 Proposed Mitigation Areas

Wetland Re-establishment/Enhancement
All wetland impacts will be mitigated on the project site (**Sheet W1-02**). As stated in **Table 1**, the RZC requires Category III wetlands be mitigated at a 2:1 creation ratio or a combination of 1:1 creation and 2:1 enhancement ratio and that Category IV wetlands be replaced either at a 1.5:1 creation ratio or 1:1 creation and 2:1 enhancement ratio. Whereas, ratios for impacts to wetlands as noted in **Table 2** by the DOE suggests that Category III wetlands be replaced either at a 2:1 creation ratio or 1:1 creation and 4:1 enhancement ratio and Category IV wetlands be replaced either at a 1.5:1 creation ratio or 1:1 creation and 2:1 enhancement ratio. The primary differences between these agency requirements are: 1) The combination of wetlands creation and enhancement for Category III wetlands, and 2) Wetlands C, G, and H are exempt wetlands in the City of Redmond. **Table 6** represents the City's mitigation requirements, and **Table 7** represents DOE's mitigation requirements.

In order to satisfy the more stringent of these ratios (DOE), we are proposing the mitigation ratios represented in **Table 7**.

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Table 6: Proposed Wetland Mitigation – City Requirements

Wetland (rating)	Direct Wetland Impacts	Indirect Wetland Impacts (Paper Fill)	Proposed Mitigation Ratio[1]	Re-establishment (creation)	Enhancement
Wetland A (III) 642 sf	642 sf	0	2:1 C	1,284 sf	0
Wetland B (III) 39,671 sf	3,380 sf	1,509 sf*	2:1 C	9,778 sf	0
Wetland C (IV) 1,894 sf	1,894 sf	0	Wetland C is exempt per RZC 21.64.010(D)(1)(m)		
Wetland D (IV) 10,508 sf	2,977 sf	2,532 sf	1:1 C & 2:1 E	5,509sf	11,018 sf
Wetland E (IV) 982 sf	982 sf	0	1.5:1 C	1,473 sf	0
Wetland F (IV) 8,810 sf	5,366 sf	3,148 sf	1:1 C & 2:1 E	8,514 sf	17,028 sf
Wetland G (IV) 55 sf	55 sf	0	Wetland G is exempt per RZC 21.64.010(D)(1)(m) & (l)		
Wetland H (IV) 3,272 sf	3,272 sf	0	Wetland H is exempt per RZC 21.64.010(D)(1)(m)		
Wetland J (III) 2,632 sf	0	3 sf	2:1 C	6 sf	0
Wetland K (IV) 80 sf	0	0	N/A	N/A	N/A
Wetland L (IV) 352 sf	352 sf	0	1:1 C & 2:1 E	352 sf	704 sf
TOTAL	**18,920 sf**	**7,192 sf**		**26,916 sf**	**28,750 sf**

[1] Based on RZC 21.64.030(C)(7).

Table 7: Proposed Wetland Mitigation - DOE Requirements

Wetland (rating)	Direct Wetland Impacts	Indirect Wetland Impacts (Paper Fill)	Proposed Mitigation Ratio[1]	Establishment/ Rehabilitation	Enhancement
Wetland A (III) 642 sf	642 sf	0	2:1 C	1,284 sf	0
Wetland B (III) 39,671 sf	3,380 sf	1,509 sf	2:1 C	9,778 sf	0
Wetland C (IV) 1,894 sf	1,894 sf	0	1:1 C & 2:1 E	1,894 sf	3,788 sf
Wetland D (IV) 10,508 sf	2,977 sf	2,532 sf	1:1 C & 2:1 E	5,509 sf	11,018sf
Wetland E (IV) 982 sf	982 sf	0	1.5:1 C	1,473 sf	0
Wetland F (IV) 8,810 sf	5,366 sf	3,148 sf	1:1 C & 2:1 E	8,514 sf	17,028 sf
Wetland G (IV) 55 sf	55 sf	0	1:1 C & 2:1 E	55 sf	110 sf
Wetland H (IV) 3,272 sf	3,272 sf	0	1:1 C & 2:1 E	3,272 sf	6,544 sf
Wetland J (III) 2,632 sf	0	3 sf	2:1 C	6 sf	0
Wetland K (IV) 80 sf	0	0	N/A	N/A	N/A
Wetland L (IV) 352 sf	352 sf	0	1:1 C & 2:1 E	352 sf	704 sf
TOTAL	**18,920 sf**	**7,192 sf**		**32,137 sf**	**39,192 sf**

[1] Based on Wetland Mitigation in Washington State, Part 1: Agency Policies and Guidance, 2006.

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By adhering to the more stringent mitigation ratios suggested by DOE, we are proposing:

- Wetland Re-establishment (Creation): 32,137 sf
- Wetland Enhancement/Restoration: 39,192 sf

The mitigation will enhance/restore all of the remaining wetlands on the site beyond the 39,192 sf required to satisfy the mitigation ratios. An additional 3,594 sf of non-compensatory wetland enhancement will occur. In addition, the following mitigation for the buffers associated with the wetland mitigation areas are:

- Buffer Enhancement/Restoration: 133,658 sf
- Buffer Enhancement of "paper fill" wetland: 7,093 sf

These totals include all buffer areas temporarily disturbed during construction (see **Sheet W1-02)**.

The mitigation plan proposes four areas on the site to either re-establish wetland or enhance existing degraded wetlands. The proposed mitigation measures will include:

1) clearing and grubbing all of the exotic and invasive, non-native weedy species in the existing and proposed wetland areas,
2) grading to connect the new wetland areas with the existing wetlands to achieve the desired hydrologic wetland regime, including: intermittently exposed, semipermanently flooded, seasonally flooded/saturated, seasonally flooded, and saturated,
3) the placement and installation of large woody material (weirs, snags, rootwads, tethered logs, down logs, and stumps), and
4) installing bird boxes on snags, and
5) planting a variety of native tree, shrub, and emergent species to increase the structural diversity of the wetland system.

To determine whether no net loss of wetland functions or values is likely to occur, we performed a wetlands function assessment comparing existing conditions to post-construction conditions without mitigation and post-construction conditions with mitigation. The results of these analyses are provided in **Section 8.0** and strongly indicate that the proposed mitigation design will provide a higher level of function over the existing functions of the wetlands post-construction. .

Wetland Buffer Restoration/Enhancement

Approximately 133,658 sf of wetland buffer areas will be restored and enhanced to provide protective functions to the wetland mitigation areas. The buffer areas are depicted as hatch patterns on **Sheet W1-02**. Existing wetland buffers on the project site all show evidence of past disturbances. On-site buffers have limited functions and values and consist mainly of either mowed non-native grass species (i.e. lawn) or dense stands of young alder and cottonwood trees. Invasive species such as blackberries and ivy are also present in the buffer areas. Buffer restoration/enhancement measures will include:

1) clearing and grubbing all of the exotic and invasive weedy species in the buffers,
2) debris removal,
3) minor grading to create berms and varying topography adjacent to the mitigation wetland areas (no large trees will be removed),
4) placement of topsoil,
5) placement of habitat features (snags, down logs and stumps),
6) providing 3-inches of bark mulch in all cleared, grubbed, and graded buffer areas, and
7) planting a variety of native deciduous and evergreen tree, shrub, and groundcover species.

Newly planted vegetation in non-graded portions of the enhanced buffer areas will be integrated with the existing trees that will be retained. Native plantings will create more diverse plant communities and provide enhanced wildlife forage and cover habitats and water quality

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protection to the wetland system. The placement of down woody material, snags, and stumps will further increase the natural biological support, overall habitat, and specific habitat functions.

7.4 Mitigation Design Elements

As described in the cultural resources report prepared by Historical Research Associates, Inc. (HRA) *Historic Properties Survey for Microsoft Red West Phase 2, November 2008*, and aerial photo research conducted by Talasaea Consultants, the project site has been historically manipulated by previous land owners for over eight years. The site used to be forested, but urbanization has impacted the site. The goal of the mitigation design is to restore the previously disturbed wetland and buffer areas by way of increasing the hydroperiod of the wetlands and restoring the woody vegetative structure that previously existed on the project site.

Wetland B

The design for Wetland B includes the installation of 3 log weirs (**Sheet W2-01-W2-02**). The weirs are intended to impound water thereby extending the hydroperiod for the existing wetland, provide the necessary water to create additional wetland area, and increase the obligate plant community. As discussed earlier, the majority of Wetland B is mowed lawn and there are three pockets of forested/scrub-shrub vegetation. The natural topography for Wetland B slopes to the south, decreasing in elevation from 347.0 down to 344.0. The weirs were located at strategic elevations so as to maintain the current forest/scrub-shrub plant communities but at the same time, they will increase the depth of ponded water areas which will allow a greater quantity of emergent species to exist. All regraded wetland and buffer areas will be planted with a large variety of native trees, shrubs, groundcovers, and emergent species (**Sheet W3-01-W3-02**). .

Wetland D

The design for Wetland D is to expand the plant community and remove non-native species (**Sheet W2-03**). Minor grading in the wetland will allow for three areas to hold water at depth of approximately ¾ of a foot which will allow the increase in emergent species to exist. The remaining areas of the wetland will be planted with a mix of trees and shrubs (**Sheet W3-03**). .

Wetland F

The design for Wetland F includes the installation of 3 log weirs (**Sheet W2-04**). The weirs are intended to impound water thereby extending the hydroperiod for the existing wetland and provide the necessary water to create additional wetland area. This area has been previously cleared and the current vegetation community is red alder, Himalayan blackberry, and non-native grasses. The topography is sloped in this area and it will require three levels of pond construction to create wetland in this area. The wetland ponds will terrace down the hillside and an overflow structure will be installed in the lowest pond to allow any excess water to leave to be piped to the WSDOT swale. All regraded wetland and buffer areas will be planted with a large variety of native trees, shrubs, groundcovers, and emergent species (**Sheet W3-04**). .

Wetland J

The restoration design for Wetland J will include clearing and grubbing of all invasive, weedy vegetation in the wetland and its buffer, removing the overland storm pipe previously installed through the wetland to discharge treated water from the wetponds for the parking lot, and relocating the existing trail out of the wetland (**Sheet W2-05**). An unofficial walking trail has been established by Microsoft employees along the north and east boundary of the Red West Phase II site. Every time we have been at the site we have encountered people walking along this route. As part of Microsoft's efforts to establish a campus wide trail system, we are proposing to utilize the gravel sewer access road as part of the trail route and we will extend the trail from the end of the required road to connect with the Phase I Red West campus. Some minor grading will be required to soften the grades up to the Phase I site due to an existing steep slope. All disturbed wetland and buffer areas will be restored with native plantings (**Sheet W3-05**).

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7.4.1 Grading Plan

Grading

Prior to grading, areas of significant native vegetation will be flagged in the field so that the selected plants can be saved. All proposed graded areas will be cleared and grubbed to a depth of 6-9 inches to remove the roots/rhizomes and seed bank of the non-native grasses (e.g., reed canarygrass), Himalayan blackberry, and other undesirable species. All cleared and grubbed vegetation will be exported from the project site to an approved dump location. The mitigation areas will then be graded per plan (**Sheets W2-01-W2-07**).

The mitigation areas will be excavated to depths ranging from 0.75 feet to 2.5 feet to create a more diverse hydrologic regimes. Prior to grading operations, hydric soils will be stripped from the existing wetland areas and temporarily stockpiled. Subsoil material will then be removed to the required depth in the excavated depressions. Once subgrades are complete and approved, stockpiled topsoil will be spread over the graded areas to achieve final grades. All graded wetland areas will be hydroseeded with a wetland seed mix to prevent erosion.

7.4.2 Hydrological Support with Site Development

Wetland B Complex

The new mitigation Wetland B complex will be hydrologically supported from groundwater and direct precipitation. Proposed additional hydrology to support the new Wetland B complex will include groundwater collected in internal footing drains for the proposed parking garage, along with an internal sub-slab drainage system will be conveyed to a central sump pump located in the lowest level of the parking garage. The sump pump will pump groundwater to a storm manhole situated in the northeast side of the buffer for Wetland B. The pumped groundwater will then be gravity fed to a natural stream-like open channel on the north side of Wetland B (see **Sheet W2-02**). According to preliminary soil reports by the project geotechnical engineer, the expected groundwater collection system will pump at a rate of 30 to 35 GPM and can supply roughly 50,000 gallons of water (gpm) per day. Geotechnical studies have indicated that groundwater will need to be pumped from the internal footing drains and sub-slab of the parking garage whether or not we use it for additional hydrological support to the wetlands. We believe that this additional support will maintain healthy wetland conditions and overflows will provide additional flows to Valley Creek, west of 148th Ave. NE.

Wetland D Complex

The wetland mitigation area proposed for Wetland D will be hydrologically supported from groundwater seeps and runoff from culverts off of 51st Ave. NE. Proposed additional hydrology to support Wetland D will be provided from clean water from the rooftop of Building 247. A dedicated clean water conveyance system from the building roof top will be routed toward the wetland. The system would include a high flow bypass structure that would limit the clean runoff draining towards the wetland to a 2-year 24-hour maximum storm event. To avoid flooding the wetland area, peak flows exceeding the 2-year storm event will be bypassed and routed to the stormwater pond constructed during Phase II.

Wetland F Complex

The new mitigation Wetland F complex will be hydrologically supported from groundwater and direct precipitation. Proposed additional hydrology to support the new Wetland F complex will include clean water from the Phase II office building roof tops. A dedicated clean water conveyance system from the building roof tops will be routed to the wetland via a pipe conveyance. Discharge will occur high on the slope to re-hydrate the wetland. The system would include a high flow bypass structure that would limit the clean runoff draining towards the wetland to a 2-year 24-hour maximum storm event. To avoid flooding the wetland areas, peak flows exceeding the 2-year storm event will be bypassed and routed to the proposed stormwater pond. Excess flows will exit the wetland in two locations: 1) a wood weir will evenly distribute water across the lower portion of the existing Wetland F area where a gravel lens will allow surface flows under the required sewer access road and into the existing swale located in the

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SR-520 ROW, and 2) a control structure will be located in the lowest pond of the complex fitted with a debris cage and any excess flows will be diverted to the stormwater pond for required controlled release.

Wetland J

Proposed hydrology to support Wetland J will be provided by surface runoff from the undisturbed portion of the tree retention area and from controlled release of treated stormwater from the stormwater pond. Stormwater from the pond will discharge to a dispersal trench located in the outer 25% portion of the buffer for Wetland J. Any excess overland flows will exit the site to the Washington State Department of Transportation (WSDOT) conveyance system located in the SR 520 right-of-way, which discharges to a regional storm drainage pond prior to discharge to the Sammamish River.

7.4.3 Hydrological Support without Site Development

Wetland B Complex

The new Wetland B mitigation complex will continue to be hydrologically supported from groundwater and direct precipitation. Talasaea has evaluated the Wetland B area for the last five years. Wetland B can support itself without any additional hydrology. The wetland is located in a low spot on the west side of the development and water tends to pond in this area for over six months of the year. The construction of 148th Ave NE caused the wetland to develop over time and currently prohibits water from exiting. As part of the construction for widening 148th Ave. NE in 2001, a 6-inch pipe was installed at the southern end of Wetland B. This outlet discharges to the municipal stormwater system that crosses under 148th Ave. NE to the west and eventually to Valley Creek, as it historically did.

Wetland D Complex

Wetland D is a slope wetland fed by groundwater seeps, direct precipitation and from the discharge of road runoff from NE 51st St. The wetland mitigation area proposed for Wetland D will continue to be hydrologically supported in this manner. We have monitored the hydrology of Wetland D for the last several years. Groundwater naturally seeps in this area and the additional support from the adjacent swale will provide sufficient hydrology to support this wetland until the Phase II development is constructed.

Wetland F Complex

Wetland F is a slope wetland fed by natural seeps. The new Wetland F mitigation complex will continue to be hydrologically supported from groundwater seeps and direct precipitation. Proposed additional hydrology to support the new Wetland F complex will include treated stormwater from the wetponds adjacent to the existing parking lot. Discharge will occur high on the slope to re-hydrate the wetland. Excess flows will exit the wetland in two locations: 1) a wood weir will evenly distribute water across the lower portion of the existing Wetland F area where a gravel lens will allow surface flows under the required sewer access road and into the existing swale located in the SR-520 ROW, and 2) a control structure will be located in the lowest pond of the complex fitted with a debris cage and any excess flows will be piped to the SR520 swale.

Wetland J

Wetland J is a slope wetland. The wetland will continue to be hydrologically supported by surface runoff from the undisturbed portion of the tree retention area and direct precipitation as it always has.

7.4.4 Planting Plan

As mentioned above, all excavated hydric soils will be re-spread over the graded wetland areas before seeding and planting occurs. The existing hydric soils will provide healthy base for the new wetland plants to become established. We expect that these soils contain a host of dormant seeds that will establish in addition to the installed mitigation plants.

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In addition, the surrounding mixed deciduous and coniferous forest areas will contribute to the planting palette at the mitigation site. We expect that seeds and berries from adjacent native species will be recruited by natural forces (wind, rain, birds) into the mitigation areas and will assist in achieving the performance standards for species diversity and cover. The performance standards limit the percentage cover of any single species of tree or shrub in the mitigation area. If a single native species becomes too prolific in naturally establishing itself in the mitigation area, its coverage will be reduced as required by the performance standards.

A Plant Communities Plan depicts the proposed locations for the three plant communities (Upland Buffer, Forested/Scrub-shrub Wetland, and Emergent/Marsh Wetland) proposed for the site (**Sheets W3-01-W3-05**). Plant materials will consist of a combination of cuttings, ball and burlapped, bare-root specimens, and container plants. A preliminary Plant Schedule with the proposed plant species including size and spacing is provided on **Sheet W3-00**. Plant species were chosen for a variety of qualities, including: adaptation to specific water regimes, value to wildlife, value as a physical or visual barrier, pattern of growth (structural diversity), and aesthetic values. Native tree, shrub, and herbaceous species were chosen to increase both the structural and species diversity of the mitigation areas, thereby increasing the value of the area to wildlife for food and cover.

7.4.5 Habitat Features

Snags, tethered and ramp logs, down logs, rootwads, and stumps, will be incorporated into the mitigation areas to provide ecologically important habitat features for wildlife. All down woody material shall be coniferous species (western red cedar, Douglas fir, western hemlock, or Sitka spruce).

Snags provide perching, feeding and nesting sites for a variety of native birds. Cavity nesting bird species, such as tree swallows, violet-green swallows, chickadees, and woodpeckers, would be expected to utilize such features. A bird-nesting box will be attached to each created snag to initially augment the natural habitat for swallow species. Tethered and ramp logs provide access into and out of the wetland ponds as well as nesting sites protected from land based predators. Tethered logs will be anchored in the deepest portions of the open water areas in the mitigation area and ramp logs will be buried into the slopes adjacent to the ponded areas. Down logs and stumps provide the slow release of nutrients as the wood decays, and also provide cover for amphibians, small mammals, and other wildlife. Boulders recovered from site excavation (if available) will be placed in small piles throughout the mitigation area. These piles can provide habitat for reptiles and small mammals.

7.4.6 Temporary Irrigation System

An above ground temporary irrigation system capable of full head to head coverage of all planted areas will be provided for the mitigation areas. The temporary irrigation system shall either utilize controller and point of connection (POC) from the site irrigation system or shall include a separate POC and controller with a backflow prevention device per water jurisdiction inspection and approval. The system shall be zoned to provide optimal pressure and uniformity of coverage, as well as separation for areas of full sun or shade and slopes in excess of 5%.

The system shall be operational by June 15 (or at time of planting) and winterized by October 15. Irrigation shall be provided for the first 2 years of the monitoring period. The irrigation system shall be programmed to provide 1/2" of water per week (one cycle with two start times per week or every three days). A chart describing the location of all installed or open zones and corresponding controller numbers shall be placed inside the controller and given to the owner's representative. Prior to release of the bond at the end of the City required five-year monitoring period, all components of the above-ground temporary irrigation system shall be removed from the all of the mitigation areas.

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In addition to the temporary irrigation system, a soil moisture retention agent will be incorporated into the backfill of planting pits to minimize the potential for plant desiccation in the mitigation areas.

7.5 Goals, Objectives, and Performance Standards

The primary goal of the mitigation is to replace the functions and values lost through directly impacting 18,920 sf and indirectly impacting 7,192 sf of wetlands. The secondary goal is to restore and enhance reduced and averaged wetland buffer areas. To accomplish these goals, the proposed project will provide:

- Re-establish 32,137 sf of new wetland contiguous with Wetlands B and F,
- Enhance and Restore 39,192 sf of Wetlands B, D, F, J and K,
- Restore and Enhance 133,658 sf of degraded buffer areas, and
- Restore and Enhance 7,093 sf of "paper fill" wetland as buffer.

Mitigation actions will be evaluated through the following objectives and performance standards. See **Section 12.2** for a full description of the monitoring methods that will be used to evaluate the approved performance standards. Mitigation monitoring will be performed by a qualified biologist.

Objective A: Following construction, the re-established and enhanced wetland areas must exhibit wetland hydrology. Wetland conditions will be verified by the presence of hydrologic indicators.

Performance Standard A: *After construction, the mitigation wetlands areas shall exhibit 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 in a normal year of rainfall for at least three out of five years during the monitoring period. Evidence of wetland hydrology may include evidence of saturated soil conditions (i.e., signs of ponding, a water table near the surface, water marks, water-stained leaves, or oxidized rhizomes). In addition, a combination of native or naturalized woody and herbaceous vegetation that is predominantly FAC or wetter will cover the wetland areas.*

Objective B: Create structural and plant species diversity in the mitigation areas.

Performance Standard B1*: At least 15 species of desirable native plants will be present in the mitigation wetland and buffer areas during the monitoring period. Percent survival of planted woody species must be at least 100% at the end of Year 1 (per contactor warranty), and at least 80% for each subsequent year of the monitoring period.*

Performance Standard B2: *Herbaceous coverage of vegetation in the wetland areas shall be at least 30% by the end of Year 1, 50% by the end of Year 2, and 80% by the end of Years 5, 7, and 10, excluding those areas of the site that may have sparse herbaceous vegetation due to dense shade from woody species coverage.*

Performance Standard B3: *Total percent aerial woody plant coverage must be at least 35% by Year 4, 50% by Year 5, 55% by Year 7, and 65% by Year 10. Woody coverage may be comprised of both planted and recolonized native species; however, to maintain species diversity, at no time shall a recolonized species (i.e., red alder) comprise more than 35% of the total woody coverage. There must be at least three native species providing at least 20% each, or four native species providing at least 15% each, or five native species providing at least 10% of the total aerial woody plant coverage.*

Objective C: Increase the overall habitat functions of the mitigation wetland and buffer areas by incorporating habitat features (i.e., bird nest boxes, snags, ramp logs, tethered logs, rootwads, down logs, stumps, and boulder piles, as appropriate) into the wetland and buffer.

Performance Standard C: *After construction and for the entirety of the monitoring period, the mitigation area will contain at least 30 habitat features per acre (1 piece/2,500 sf) including down woody material (logs, rootwads, etc.) and snags. Down logs and ramp logs shall be a*

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minimum of 18 feet in length and 15" diameter at breast height, with or without roots. Stumps to be either well-decayed relocated stumps, or cut live rootwads with a minimum of 3 feet of trunk. Stumps will be placed both upright and lying down. Additional habitat features can be placed within the mitigation areas only after specified quantities and sizes have been met. There will also be a bird nest box installed on each snag.

Objective D: Limit the amount of invasive and exotic species within the mitigation area.

Performance Standard D1*: After construction and following every monitoring event for a period of ten years, exotic and invasive plant species will be maintained at levels below 20% total cover throughout the mitigation area. These species include Scot's broom, Himalayan and evergreen blackberry, reed canarygrass, purple loosestrife, hedge bindweed, and creeping nightshade.*

Performance Standard D2: *Per Corps requirements, after construction and following every monitoring event for a period of ten years, Japanese knotweed will be completely removed from the mitigation area, if found. There will be 0% total cover of this species.*

7.6 Fish and Wildlife Conservation Area Performance Standards

As previously described in **Section 5.0, Fish and Wildlife Habitat Conservation Areas,** one quality habitat area meeting the requirements of RZC 21.64.020, was identified in the northeast portion of the project site. The current site plan preserves the majority of this quality habitat area by concentrating development outside of the habitat area and retaining one contiguous block of forested open space. According to RZC 21.64.020, Classification and Rating of Fish and Wildlife Habitat Conservation Areas, all potential development sites are assessed for quality habitat areas based upon size, community diversity, interspersion (spatial patterns), continuity, forest vegetation layers, forest age, and invasive plants. Quality habitat areas should be protected by imposition of the performance standards outlined in RZC 21.64.020(G), so long as there is no significant adverse economic impact to the developer, and to provide incentives to preserve such quality habitat.

Site planning for the quality forested habitat area in the northeast portion of the project site was initiated during July 2008. The initial site planning anticipated a number of site improvements for this area including:

- A paved and lighted trail system with fitness stations throughout the forest;
- A climbing wall;
- A large event gathering area with a fire pit;
- Three covered pavilion structures;
- A trail and boardwalk through the Wetland F mitigation area in the southeast corner of the forest; and
- A raised boardwalk through a portion of the forest.

After further environmental site analysis and input from the City of Redmond in 2008, improvements are proposed to reduce impacts to the quality habitat area and increase existing habitat functions and values. The design is intended to meet the performance standards outlined in RZC 21.64.020(G). The proposed design includes:

- Removal of all invasive non-native plant material without damage to surrounding mature trees. This will be accomplished by hand removal and by small soft-tired equipment and mini excavators to minimize impact on native tree roots;
- Re-plant bare areas resulting from invasive plant removal with site-specific native plants to create a heterogenous plant community. Species to be planted include salal, huckleberry, tall Oregongrape, snowberry, vine maple, native ferns, and salmonberry;
- Provide two covered pavilion structures as small picnic shelters with potential green roof design;

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- Provide a trail system as 6-foot wide gravel surface. Preserve a small portion of paved trails to allow limited ADA access into the west edge of the forest next to the main campus roadway;
- No trails and boardwalks in wetland mitigation areas;
- Provide fitness stations and athletic courts in the proposed habitat area design;
- Daylight portions of the site stormwater system in open stream channels through the trees for infiltration.

The proposed design of the quality habitat area incorporates the performance standards outlined in RZC 21.64.020(G) -Fish and Wildlife Habitat Conservation Areas. The performance standards include considering habitat quality as the overriding factor in site design and planning, preserving the quality habitat area in a contiguous block, landscaping with native species, enhancing existing habitat and buffer areas, increasing plant structure and diversity, removing non-native plants, and preserving significant trees. The habitat area design provides for a native buffer around the existing 48-inch dbh tree with a red-tailed hawk nest, and retention of the majority of existing snags.

8.0 WETLAND FUNCTIONS AND VALUES

8.1 Wetland Characterization

Wetlands were characterized using the *Wetland Rating System for Western Washington* (Hruby, Revised 2006). Individual wetlands were provided a total score based upon the combination of the wetland's potential and opportunity to improve water quality, hydrologic, and habitat functions (**Appendix C**). In accordance with RZC 21.64 Appendix 1(C)(3)(c)(iii), the following characterization includes analysis of each wetland's ability to provide wildlife, plant, and fisheries habitat, moderate runoff volume and flow rates, reduce sediment, chemical nutrient, and toxic pollutants, provide shading to maintain desirable water temperatures, reduce erosion, and reduce groundwater and surface water pollution. **Table 8** summarizes the wetland ratings.

Table 8: Wetland Rating Characterization

Wetland	Wetland HGM Class	Wetland Rating	Total Functions Score	Water Quality Function	Hydrologic Functions	Habitat Functions
A	Slope	III	32	7	6	19
B	Slope	III	36	10	12	16
C	Depressional	IV	17	6	3	8
D	Slope	IV	17	2	6	9
E	Slope	IV	14	1	6	7
F	Slope	IV	20	1	8	11
G	Depressional	IV	23	8	6	9
H	Slope	IV	19	2	8	9
J	Slope	III	32	8	10	14
K	Depressional	IV	17	7	4	6
L	Slope	IV	28	6	12	10

8.2 Wetland Functions Assessment – Existing Conditions

Wetlands, in general, provide many valuable ecological and social functions, including: stormwater storage, water quality maintenance, groundwater recharge and discharge, erosion and shoreline protection, fish and wildlife habitat, and recreation. Due to the variability within individual wetlands, a wetland functions assessment was conducted for each wetland on the project site. The purpose of the assessment was to gain a general understanding of the existence and relative importance of specific wetland functions for each wetland, including water quality functions, water quantity functions, and habitat suitability functions.

The functions of wetlands on the property were evaluated using the *Washington State Wetland Function Assessment Methods (WFAM)* (Hruby *et. al.,* 1999). The results of the WFAM provide

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a numerical index of the potential level of performance (water quality and quantity functions) or habitat suitability (habitat functions) and a subjective rating of the opportunity for a function to be performed. The numeric index represents the potential level of performance of a function on a scale of 0 to 10; a higher score indicates the wetland has a greater potential to perform the subject function. The existing wetland functions are summarized in **Table 9.** Data forms are included in **Appendix E-1**. Wetlands A, B, D, E, F, H, J, and L were assessed as *depresssional open* wetlands for the purpose of assessing wetland functions. Wetlands C, G, and K were assessed as *depressional closed* wetlands.

Table 9: Wetland Functions - Existing Conditions

Assessment Unit (Wetland)	A	B	C	D	E	F	G	H	J	K	L
WATER QUALITY FUNCTIONS											
Potential for Removing Sediment	4	4	10	3	3	3	10	3	4	10	3
Potential for Removing Nutrients	1	3	5	1	1	1	5	1	1	8	1
Potential for Removing Heavy Metals and Toxic Organics	3	5	3	3	3	3	3	3	3	6	3
WATER QUANTITY FUNCTIONS											
Potential for Reducing Peak Flows	0	3	10	2	0	2	10	0	1	10	1
Potential for Decreasing Downstream Erosion	2	4	10	2	0	2	10	0	3	10	2
Potential for Groundwater Recharge	3	6	3	4	3	4	5	3	4	7	4
HABITAT SUITABILITY FUNCTIONS											
General Habitat Suitability	3	5	1	2	0	2	3	1	4	1	2
Habitat Suitability for Invertebrates	2	5	1	2	0	1	3	1	3	1	2
Habitat Suitability for Amphibians	2	4	1	2	1	1	1	1	2	1	2
Habitat Suitability for Anadromous Fish	0	2	NA	0	0	0	NA	0	1	NA	1
Habitat Suitability for Resident Fish	1	4	NA	1	0	1	NA	1	2	NA	2
Habitat Suitability for Wetland Associated Birds	3	4	3	3	1	3	4	2	4	2	3
Habitat Suitability for Wetland Associated Mammals	1	1	1	1	1	1	1	1	1	1	1
Native Plant Richness	1	4	0	1	1	0	1	0	3	0	1
Primary Production and Export	6	6	NA	5	4	5	NA	4	6	NA	5

Table 9 provides a comparison of existing water quality, water quantity and habitat suitability functions for the on-site wetland areas. Wetlands C, G, and K, the *depressional closed* wetlands, are all given the highest rating (in comparison to other wetland types) for the potential to remove sediment, potential to reduce peak flows, and potential to decrease downstream erosion. This high score is somewhat subjective because all *depressional closed* wetlands are provided the highest quantitative score for these individual functions due to lack of a surface outlet. Therefore, while Wetlands C, G, and K may have a high potential for accomplishing these functions, in general, their opportunity (a qualitative rating) would be *low* in comparison to other wetlands. Wetlands C, G, and K are all very small, lack hydrogeormorphic (HGM) diversity, lack plant diversity, and do not have an incoming water source from a stream, ditch, or storm drain. Wetlands C, G, and K score low to very low for habitat potential.

Due to its size, multiple hydrogeomorphic (HGM) classes, interspersion of Cowardin classes, and high native plant index, Wetland B scores equivalent or higher than all other *depressional open* wetlands for its potential to accomplish individual functions. Due to their limited inundation regimes (saturated only), low native plant index, and low interspersion of Cowardin classes, Wetlands D, E, F, H and L score very low for the potential to remove nutrients, reduce peak flows, decrease downstream erosion and habitat suitability for wetland adapted species. This assessment of existing wetland functions provides a quantitative analysis for avoidance of

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higher quality wetlands. In addition, it contributes to development of a mitigation plan that will increase specific wetland functions that may be low or nonexistent in mitigation areas.

8.3 Wetland Functions Assessment – Post-Development without Mitigation

An evaluation of wetland function conditions post-development without application of a mitigation plan as required by RZC 21.64 Appendix 1(C)(3)(c)(iii) is provided in **Table 10.** Data forms are included in **Appendix E-2**. Post-development without mitigation data forms are not provided for Wetlands A, C, E, G, H, and L because these wetlands are proposed to be filled and would not provide any functions.

Table 10: Wetland Functions – Post-Development Without Mitigation

Assessment Unit (Wetland)	A*	B	C*	D	E*	F	G*	H*	J	K	L*
WATER QUALITY FUNCTIONS											
Potential for Removing Sediment	0	4	0	3	0	3	0	0	4	10	0
Potential for Removing Nutrients	0	3	0	1	0	1	0	0	1	8	0
Potential for Removing Heavy Metals and Toxic Organics	0	5	0	3	0	3	0	0	3	6	0
WATER QUANTITY FUNCTIONS											
Potential for Reducing Peak Flows	0	3	0	1	0	1	0	0	1	10	0
Potential for Decreasing Downstream Erosion	0	4	0	2	0	1	0	0	3	10	0
Potential for Groundwater Recharge	0	6	0	4	0	4	0	0	4	7	0
HABITAT SUITABILITY FUNCTIONS											
General Habitat Suitability	0	4	0	1	0	2	0	0	4	1	0
Habitat Suitability for Invertebrates	0	5	0	2	0	1	0	0	3	1	0
Habitat Suitability for Amphibians	0	3	0	1	0	0	0	0	2	1	0
Habitat Suitability for Anadromous Fish	0	2	0	0	0	0	0	0	1	NA	0
Habitat Suitability for Resident Fish	0	3	0	1	0	1	0	0	2	NA	0
Habitat Suitability for Wetland Associated Birds	0	4	0	2	0	3	0	0	4	1	0
Habitat Suitability for Wetland Associated Mammals	0	1	0	0	0	0	0	0	1	0	0
Native Plant Richness	0	4	0	1	0	0	0	0	3	0	0
Primary Production and Export	0	6	0	5	0	5	0	0	6	NA	0

* Post-development without mitigation data forms are not provided for Wetlands A, C, E, G, H and L because these wetlands are proposed to be filled and would not provide any functions post-development.

The **Table 10** summary of ***wetland functions post-development without mitigation*** and **Table 9** summary of ***existing wetland functions*** provide a comparison of the potential for individual wetlands to provide water quality, water quantity and habitat functions. The proposed fill of Wetlands A, C, E, G, H, and L results in the loss of potential for these wetlands to provide any water quality, water quantity or habitat functions. Development of the site without mitigation will reduce the existing undisturbed buffers and corridors that contribute to greater potential for wetland areas to provide functions. As the result of post-development (without mitigation) buffer widths, Wetlands B, D, F, and J demonstrate decreases in habitat suitability functions. There were no changes to Wetland K functions.

8.4 Predicted Post-Mitigation Functions and Values

The post-development with mitigation functions and values of Wetlands B, D, F, K, and J are expected to significantly increase post-mitigation (**Table 11). Table 11** provides a summary comparison to the existing wetland functions and values that were provided in **Table 9**. Data sheets for the post-development with mitigation functions may be found in **Appendix E-3**.

The post-development with mitigation functions and values are expected to generally increase for all the remaining wetlands on the site. In general, mitigation will increase hydrologic regimes

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in the wetlands, increase vegetation structure and diversity, and provide habitat features, including snags and stumps. Wetland J and Wetland K exhibit the least amount of change in functions because there is no significant grading planned for these wetland areas. The decrease in habitat suitability for wetland associated birds in Wetland J results from the post-development decrease in undisturbed buffer area (due to the stormwater facility construction). However, the general habitat suitability index for Wetland J is equivalent to existing conditions. Wetlands B, D, F, and K all exhibit an increase in the general habitat suitability index. This results from removal of non-native, invasive plants, increased plant structure and diversity, additional hydrologic regimes, and new habitat features.

Table 11: Wetland Functions – Post-Development with Mitigation

Assessment Unit (Wetland)	Wetland B	Wetland D	Wetland F	Wetland J	Wetland K
WATER QUALITY FUNCTIONS					
Potential for Removing Sediment	4*/7**	3/4	3/6	4/4	10/10
Potential for Removing Nutrients	3/5	1/1	1/4	1/2	8/8
Potential for Removing Heavy Metals and Toxic Organics	5/6	3/4	3/5	3/4	6/8
WATER QUANTITY FUNCTIONS					
Potential for Reducing Peak Flows	3/5	2/2	2/4	1/1	10/10
Potential for Decreasing Downstream Erosion	4/7	2/4	2/6	3/3	10/10
Potential for Groundwater Recharge	6/8	4/7	4/7	4/5	7/10
HABITAT SUITABILITY FUNCTIONS					
General Habitat Suitability	5/8	2/5	2/7	4/4	1/4
Habitat Suitability for Invertebrates	5/8	2/6	1/6	3/4	1/3
Habitat Suitability for Amphibians	4/4	2/3	1/4	2/2	1/1
Habitat Suitability for Anadromous Fish	2/7	0/2	0/3	1/1	NA
Habitat Suitability for Resident Fish	4/9	1/4	1/6	2/2	NA
Habitat Suitability for Wetland Associated Birds	4/8	3/6	3/6	4/2	2/4
Habitat Suitability for Wetland Associated Mammals	1/3	1/1	1/1	1/1	1/1
Native Plant Richness	4/6	1/3	0/3	3/3	0/3
Primary Production and Export	6/7	5/6	5/8	6/8	NA

* Existing Conditions Score
**Post-Development with Mitigation Score

9.0 PROJECT EFFECTS ON FEDERALLY LISTED SPECIES

The Washington Department of Fish and Wildlife Priority Habitats and Species (PHS), Washington State Natural Heritage Program, StreamNet, SalmonScape, and Washington Department of Natural Resources databases were reviewed for priority species and habitat information. The results of this search did not indicate any priority, threatened or endangered species or habitat on the project site. Critical habitat for federally listed threatened or endangered species is not present on the project site. Puget Sound Chinook salmon, Puget Sound winter steelhead, and coastal-Puget Sound bull trout, all federally threatened species, are identified within the Sammamish River, the ultimate discharge location for site stormwater from the eastern sub-basin. Puget Sound coho salmon, identified within the Sammamish River, is listed as a species of concern. Puget Sound Chinook and coho salmon are also identified in Valley Creek, the discharge location for water originating in the site's undeveloped western sub-basin.

Stormwater from the eastern sub-basin of the project site will be conveyed to the WSDOT conveyance system located in the SR 520 right-of-way, which discharges to a regional storm

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drainage pond prior to discharge to the Sammamish River. Stormwater from the western sub-basin is conveyed via a 6-inch pipe to an existing City of Redmond storm catch basin located within the right-of-way of 148th Avenue NE. This municipal system discharges to the Valley Creek basin in the vicinity of the City of Bellevue municipal golf course (CoughlinPorterLundeen, 2008). Valley Creek eventually converges with Kelsey Creek, which discharges to Lake Washington in the vicinity of Mercer Slough.

Endangered Species Act (ESA) review provided by the Corps has determined that construction of the project in conjunction with the proposed conservation measures (see **Section 6.2.1**) may affect, but is **Not Likely to Adversely Affect (NLAA)** Puget Sound Chinook salmon. They also concluded that the proposed project will have **no effect** on Puget Sound winter steelhead and Coastal-Puget Sound bull trout. Bull trout was determined to have no critical habitat in the project area (**Table 12**).

In addition and in accordance with the Essential Fish Habitat (EFH) requirements of the Magnuson-Stevens Fishery Conservation and Management Act, the Corps determined that the proposal would not adversely affect EFH utilized by Pacific salmon.

Table 12: Analysis of Listed Species and Effects

Species	ESA Status	Project Effects
Puget Sound Chinook Salmon *(Oncorhynchus tshawytscha)*	Species and habitat may be present in downstream receiving waters. Threatened 6/28/05 (70FR37160)	"Not Likely to Adversely Affect" species or critical habitat with appropriate project design and mitigation.
Coastal-Puget Sound Bull Trout *(Salvelinus confluentus)*	There is no critical habitat in the project area. Threatened 9/26/05 (70FR56212)	"No Effect"
Puget Sound Coho Salmon *(Oncorhynchus kitusch)*	Species and habitat may be present in downstream receiving waters. Species of Concern 4/15/04 (69FR19975)	"Not Likely to Adversely Affect" species or critical habitat with appropriate project design and mitigation.
Puget Sound Steelhead *(Oncorhynchus mykiss)*	Species and habitat may be present in downstream receiving waters. Threatened 5/11/07 (72FR26722)	"No Effect" species or critical habitat with appropriate project design and mitigation.

10.0 CONSTRUCTION SEQUENCING

10.1 Mitigation Construction Sequence

The following provides the general sequence of activities anticipated to be necessary to complete this mitigation project. Some of these activities may be conducted concurrently as the project progresses.

1. Conduct a site meeting between the Contractor, Talasaea Consultants, and the Owner's Representative to review the project plans, staging/stockpile areas, and material disposal areas.
2. Survey clearing limits.
3. Install silt fence and any other erosion and sedimentation control BMPs necessary for work in the project areas.
4. Clear and grub earthwork areas.
5. Survey earthwork areas and set grade stakes as required.

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6. Complete the excavation of mitigation areas to proposed grades.
7. Install snags.
8. Place topsoil and till into existing soil (if necessary, see Grading Specifications).
9. Place habitat features, including down logs and rootwads.
10. Mulch all graded buffer areas and seed all graded wetland areas.
11. Complete site cleanup and install plant material as indicated on the Mitigation Planting Plan (see Planting Specifications).
12. Install critical area signs.

10.2 Post-Construction Approval

Following construction completion of the grading portion of the mitigation areas, Talasaea Consultants shall request in writing a final inspection by the City of Redmond, to review and approve, and to provide an acceptance for the initial construction work, in writing to the Owner and to Talasaea, when the inspector deems the work to be complete and in conformance with this report.. Following City acceptance of the grading, planting will occur. Talasaea Consultants shall notify the City in writing when the planting is completed for a final site inspection and subsequent review and approval.

10.3 Post-Construction Assessment

Once construction is approved by the agencies, a qualified wetland ecologist from Talasaea Consultants shall conduct a post-construction assessment. The purpose of this assessment will be to establish baseline conditions at Year 0 of the required monitoring period. A Baseline Assessment report including “as-built” drawings will be submitted to all of the required agencies. The as-built plan set will identify and describe any changes in grading, planting or other constructed features in relation to the original approved plan.

11.0 MONITORING PLAN

Performance monitoring of the mitigation areas will be conducted according to RZC 21.64 Appendix 1(G)(9) for a minimum of five years for the City of Redmond and a minimum of ten years for the Corps. Monitoring will be conducted according to the schedule presented in **Table 13**. Monitoring will be performed by a qualified biologist from Talasaea Consultants, Inc.

11.1 Reports

Each monitoring report will adhere to the requirements of RZC 21.64.010(P) and will also utilize the Corps document titled: “*Annual Monitoring Report Format Requirements*”, (USACE Regulatory Guidance Letter No. 08-03, OCT 2008). The reports will include: 1) Project Overview, 2) Requirements, 3) Summary Data, 4) Maps and Plans, and 5) Conclusions. If the performance criteria are met, monitoring for the City will cease at the end of year five, unless objectives are met at an earlier date and the City accepts the mitigation project as successfully completed. Monitoring will continue for the Corps through year ten.

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Table 13. Projected Calendar for Performance Monitoring and Maintenance Events

Year	Date	Maintenance Review	Performance Monitoring	Report Due to Agencies
Year 0, As-built and Baseline Assessment	Fall 2012	X	X	X
1	Spring 2013	X	X	
	Fall 2013	X	X	X
2	Spring 2014	X	X	X
	Fall 2014	X	X	X
3	Spring 2015	X		
	Fall 2015	X	X	X
4	Spring 2016	X		
	Fall 2016	X	X	X
5	Spring 2017	X		
	Fall 2017	X	X	X*
6	Spring 2018	X		
	Fall 2018			
7	Spring 2019	X		
	Fall 2019		X	X
8	Spring 2020	X		
	Fall 2020			
9	Spring 2021	X		
	Fall 2021			
10	Spring 2022	X		
	Fall 2022	X	X	X**

*Obtain final approval to facilitate bond release from the City of Redmond (presumes performance criteria are met).
***Obtain final approval from the Corps (presumes performance criteria are met).

11.2 Monitoring Methods

The following monitoring methods will be used to evaluate the approved performance standards.

Hydrology

During each monitoring event, an assessment will be made of the hydrologic regime within the established (created) wetland area to ensure that proper hydrological conditions exist. Evidence of wetland hydrology may include evidence of saturated soil conditions (i.e., signs of ponding, a water table near the surface, water marks, water-stained leaves, or oxidized rhizomes). In addition, a combination of native or naturalized woody and herbaceous vegetation that is predominantly FAC or wetter will cover the wetland areas. The presence of any or all of these indicators in the established wetland area for 14 or more consecutive days during the growing season is required to meet the hydrology requirement in Objective A.

Vegetation

Vegetation monitoring shall be conducted according to RZC 21.64 Appendix 1(G)(9)(a)(i) and will include counts, photopoints, random sampling, sampling plots, transect, visual inspection, and/or other means deemed appropriate by the City. Vegetation monitoring components shall include general appearance, health, mortality, colonization rates, percent cover, percent survival, volunteer plant species, and invasive weeds.

Permanent vegetation sampling plots or transects will be established at selected locations to incorporate all of the representative plant communities in the mitigation areas. A minimum of eight (8) transects will be used, and each transect will be 100 feet in length and 10 feet wide. Four (4) quadrats will be established along the two (2) of the transect lines to measure percent coverage of herbaceous and emergent species within this habitat.

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Percent areal cover of trees and shrubs will be evaluated through the use of point-intercept sampling methodology. Using this methodology, a tape will be extended between two permanent markers established 25 feet apart. Trees and shrubs intercepted by the tape will be identified, and the intercept distance recorded. Percent cover by species will then be calculated by adding the intercept distances and then expressed as a total proportion of the tape length.

Percent survival of shrubs and trees will be evaluated in a 10-foot belt along the established transect. The species and location of shrubs and trees within this belt will be recorded, and will be evaluated during each monitoring event to determine percent survival.

The established vegetation sampling locations will be monitored and compared to the baseline data during each performance monitoring event to aid in determining the success of plant establishment. Vegetation will be recorded on the basis of relative percent cover of the dominant species within the vegetative strata (per the applicable performance standards). A qualified wetland ecologist will conduct all monitoring.

Soils

At each monitoring event, soils within the established wetland area will be assessed for the presence of hydric soil characteristics. Assessment of hydric soil characteristics will utilize one or more of the following methods of evaluation: Munsell soil color, pH, particle size, redox potential, organic content, microbial activity, time and duration of saturation or ponding, and alkalinity. Evaluation criteria for hydric soils need to take into account the fact that some hydric soil characteristics, such as redoximorphic features (mottles), can take time to develop, and may not be present during the early years of the mitigation project. As such, several hydric soil evaluation criteria shall be used at each monitoring event, and different criteria may be used throughout the monitoring period as conditions change.

11.3 Photo Documentation

Locations will be established within the mitigation area from which panoramic photographs will be taken throughout the monitoring period. These photographs will document general appearance and relative changes within the plant community. Review of the photos over time will provide a semi-quantitative representation of success of the planting plan. Vegetation sampling plot and photo-point locations will be shown on a map and submitted with the baseline assessment report and yearly performance monitoring reports.

11.4 Wildlife

Birds, mammals, reptiles, amphibians, and invertebrates observed in the wetland and buffer areas (either by direct or indirect means) will be identified and recorded during scheduled monitoring events, and at any other times observations are made. Direct observations include actual sightings, while indirect observations include tracks, scat, nests, song, or other indicative signs. The kinds and locations of the habitat with greatest use by each species will be noted, as will any breeding or nesting activities.

11.5 Water Quality and Site Stability

Water quality will be assessed qualitatively; unless it is evident there is a serious problem. In such an event, water quality samples will be taken and analyzed in a laboratory for suspected parameters. Qualitative assessments of water quality include:

- oil sheen or other surface films,
- abnormal color or odor of water,
- stressed or dead vegetation or aquatic fauna,
- turbidity, and
- absence of aquatic fauna.

Observations will be made on the stability of slopes in the mitigation areas. Any erosion or slumping of the slopes will be recorded and corrective measures will be taken.

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12.0 MAINTENANCE (M) AND CONTINGENCY (C)

Maintenance reviews will be performed according to schedule presented in **Table 13** to address any conditions that could jeopardize the success of the mitigation area. Established performance standards for the project will be compared to the monitoring results to judge the success of the mitigation project. If there is a significant problem with achieving the performance standards, the Bondee shall work with the City to develop a Contingency Plan. Contingency plans can include, but are not limited to: additional plant installation, erosion control, modifications to hydrology, and plant substitutions of type, size, quantity, and location. Such Contingency Plan shall be submitted to City by December 31st of any year when deficiencies are discovered. Contingency will include but are not limited to some of the items listed below and would be utilized to implement Contingency Plan(s) if the performance standards are not met. Maintenance and remedial action on the site will be implemented within ten (10) business days upon completion and submission of the monitoring event (unless otherwise specifically indicated below) to the appropriate agencies.

- During year one, replace all dead woody plant material (M).
- Water all plantings at a rate of 1" of water every week between June 15 – October 15 during the first year after installation, and for the first year after any replacement plantings (C & M).
- Replace dead plants with the same species or a substitute species that meets the goal and objectives of the enhancement plan, subject to Talasaea and agency approval (C).
- Re-plant area after reason for failure has been identified (e.g., moisture regime, poor plant stock, disease, shade/sun conditions, wildlife damage, etc.) (C).
- After consulting with City staff, minor excavations, if deemed to be more beneficial to the existing conditions than currently exists, will be made to correct surface drainage patterns (C).
- Remove/control weedy or exotic invasive plants (e.g., Scot's broom, reed canarygrass, Himalayan blackberry, purple loosestrife, Japanese knotweed, etc.) by manual or chemical means approved by The City of Redmond. Use of herbicides or pesticides within the mitigation area would only be implemented if other measures failed or were considered unlikely to be successful, and would require prior agency approval. All non-native vegetation must be removed and disposed of off-site. (C & M).
- Weed all trees and shrubs to the dripline and provide mulch rings to a depth of three inches 24" in diameter for shrubs and 36" in diameter for trees (M).
- Remove trash and other debris from the mitigation areas twice a year (M)
- Selectively prune woody plants to meet the mitigation plan's goal and objectives (e.g., thinning and removal of dead or diseased portions of trees/shrubs) (M).
- Repair or replace damaged structures including: footbridge, weirs, signs, or bird boxes (M).

13.0 FINANCIAL ASSURANCES

Per RZC 21.64 Appendix 1(G)(11), The amount of the guarantees shall be based upon a detailed budget for implementation of the mitigation plan, including installation, monitoring, maintenance and contingency phases for a minimum of five years.

14.0 SUMMARY

A wetland study was completed for a 26.4-acre site located in the City of Redmond, Washington. Eleven wetlands were identified and delineated on the site. Evidence of routine maintenance and construction of a parking lot with associated wetponds has resulted in the formation of three small wetland areas (Wetland C, Wetland G and Wetland H).

Microsoft Corporation purchased the subject property in 2007 with the intent to expand the current Red West Campus (Phase I) located directly north of the site to create additional office

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space in Redmond. Due to the uncertainty of current market conditions, Microsoft currently does not have an anticipated construction date for the proposed expansion.

At this time, Microsoft is proposing to construct the wetland mitigation in advance for the wetland impacts as authorized under the Corps of Engineers 2007 NWPs. The project has been designed to minimize impacts to the site critical areas discussed in this report. The primary alterations to wetlands and buffers are unavoidable in order to provide required transportation connections with existing road alignments, adequate vehicular circulation and accessibility for fire and emergency vehicles within the development, and pedestrian improvements along 148th Ave. The project proposes to directly impact 18,920 sf of wetlands and indirectly impact 7,192 sf of wetland area. All wetlands proposed to be impacted will be filled and compensatory mitigation will be provided under this proposal.

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APPENDIX A

Wetland Delineation Data Sheets, Talasaea Consultants, 2008

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ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Wetland A Transect ID: Plot ID: TP A-1

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Ranunculus repens	H		FACW				
Urtica dioica	H		FAC				

* Dominant Percent of dominant species that are OBL, FACW, or FAC 100%

Criterion Met? Yes	Rationale/Remarks:

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water	NA
Depth to free water	13 in
Depth to saturated soil	0 in

Is it the growing season? ☒ Yes ☐ No

Based on: ☐ Soil temp (record temp)

☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☒ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-11	10 YR 3/2			Loam
11-16	10 YR 5/2	10 YR 5/6	Variable	Silty, gravelly loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? Yes	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? Yes	Remarks:	Is this sampling point within a wetland? Yes

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Upland near wetland A Transect ID: Plot ID: TP A-2

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Alnus rubra	T		FAC	*Urtica dioica*	H		FAC
Sambucus racemosa	S		FACU	*Athyrium filix-femina*	H		FACW
Rubus discolor	S		FACU				
Tellima grandiflora	H		NL				
Ranunculus repens	H		FACW				
* Dominant Percent of dominant species that are OBL, FACW, or FAC 87%							
Criterion Met? Yes	Rationale/Remarks:						

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water NA in
Depth to saturated soil 6 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? Yes

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-16	10 YR 3/2			Loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? No	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? No	Remarks:	Is this sampling point within a wetland? No

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Wetland C Transect ID: Plot ID: TP C-1

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Ranunculus repens	H		FACW	*Alopecurus pratensis*	H		FAC
Lotus corniculatus	H		FAC				
Holcus lanatus	H		FAC				
Agrostis tenuis	H		FAC				
Juncus effusus	H		FACW				
* Dominant Percent of dominant species that are OBL, FACW, or FAC 100%							
Criterion Met? Yes	Rationale/Remarks:						

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water NA in
Depth to saturated soil 1 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks: Nearly cemented till at 9" – pit was 11" deep

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-9	10 YR 3/2			Gravelly loam
9-11	10 YR 6/1	10 YR 4/6	5% bright	Cemented till

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☒ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? Yes	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? Yes	Remarks:	Is this sampling point within a wetland? Yes

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) Yes (upland is a sw pond berm) Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Upland near Wetland C Transect ID: Plot ID: TP C-2

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Perennial ryegrass	H		FACU				
Lotus corniculatus	H		FAC				
White clover	H		FAC				

* Dominant Percent of dominant species that are OBL, FACW, or FAC 67%

Criterion Met? Yes	Rationale/Remarks:

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water NA in
Depth to saturated soil > 6 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☐ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? No	Rationale/Remarks: Berm constructed of soil containing rip-rap and asphalt rubble. Could not dig deeper than 6" – soil presumed to be not saturated due to elevation

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-6	10 YR 4/2			Loam with rip-rap and asphalt rubble

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? No	Rationale/Remarks: Berm soil contains rip-rap and asphalt rubble – presumed to be the same throughout the top 12"

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? No Hydric soils present? No	Remarks:	Is this sampling point within a wetland? No

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Wetland C Transect ID: Plot ID: TP C-3

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Lotus corniculatus	H		FAC				
Ranunculus repens	H		FACW				
Rubus discolor	H		FACU				
Agrostis tenuis	H		FAC				

* Dominant Percent of dominant species that are OBL, FACW, or FAC 75%

Criterion Met? Yes	Rationale/Remarks:

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water NA
Depth to saturated soil > 15 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☐ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks: Hydrology not present on 5/16/08 but well monitoring data from well#1 – 7' to the SW indicates hydrology was met earlier in the year

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-11	10 YR 3/3			Gravelly loam
11-15	10 YR 6/1	10 YR 4/6	10% Bright	Gravelly sandy loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☒ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? Yes	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? Yes	Remarks:	Is this sampling point within a wetland? Yes

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Upland near Wetland C Transect ID: Plot ID: TP C-4

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Rubus discolor	S		FACU				

* Dominant Percent of dominant species that are OBL, FACW, or FAC 0%

Criterion Met? No	Rationale/Remarks:

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water NA
Depth to saturated soil >16 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☐ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☒ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? Yes

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-16	10 YR 3/3			Gravelly loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? No	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? No Wetland hydrology present? No Hydric soils present? No	Remarks:	Is this sampling point within a wetland? No

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Upland near Wetland D Transect ID: Plot ID: TP D-1

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Sweet vernal grass	H		FACU				
Red fescue	H		FAC				
Holcus lanatus	H		FAC				
Poa palustris	H		FAC				
* Dominant Percent of dominant species that are OBL, FACW, or FAC 75%							
Criterion Met? Yes	Rationale/Remarks:						

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water NA
Depth to saturated soil 16 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☐ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? No	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-9	10 YR 3/2			Silt loam
9-10	10 YR 4/4			Loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? No	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? No Wetland hydrology present? No Hydric soils present? No	Remarks:	Is this sampling point within a wetland? No

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Wetland D Transect ID: Plot ID: TP D-2

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Ranunculus acris	H		FACW-	*Carex stellata*	H		NL
Red fescue	H		FAC				
Poa palustris	H		FAC				
Lotus corniculatus	H		FAC				
Juncus effusus	H		FACW				

* Dominant Percent of dominant species that are OBL, FACW, or FAC 84%

Criterion Met? Yes	Rationale/Remarks:

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water 15 in
Depth to saturated soil 5 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-9	10 YR 3/2			Loam
9-20	10 YR 4/4			Silt loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? No	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? No	Remarks:	Is this sampling point within a wetland? No

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Wetland D Transect ID: Plot ID: TP D-3

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Meadow foxtail	H		FACW				
Lotus corniculatus	H		FAC				
Poa palustris	H		FAC				
Juncus effusus	H		FACW				
Carex stellata	H		NL				

* Dominant Percent of dominant species that are OBL, FACW, or FAC 80%

Criterion Met? Yes	Rationale/Remarks:

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water 13 in
Depth to saturated soil 0 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-4	10 YR 4/2	10 YR 4/4	5% variable	Silty loam
4-16	10 YR 4/2	10 YR 4/6	20% sharp	Silty loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☒ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? Yes	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? Yes	Remarks:	Is this sampling point within a wetland? Yes

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Upland near Wetland D Transect ID: Plot ID: TP D-4

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Poa palustris	H		FACW				
Dandelion	H		FAC				
White clover	H		FAC				
Red clover	H		FACU				
Red fescue	H		FAC				
* Dominant	Percent of dominant species that are OBL, FACW, or FAC			100%			
Criterion Met? Yes	Rationale/Remarks:						

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water NA
Depth to saturated soil >18 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☐ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes | Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? Yes

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-8	10 YR 3/3			Loam
8-18	10 YR 5/1	10 YR 4/6		Gravelly loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☒ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? Yes | Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? No Hydric soils present? Yes	Remarks:	Is this sampling point within a wetland? No

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Wetland D Transect ID: Plot ID: TP D-5

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Meadow foxtail	H		FACW				
White clover	H		FAC				
Ranunculus acris	H		FAC				
Poa palustris	H		FAC				
Juncus effusus	H		FAC				
* Dominant Percent of dominant species that are OBL, FACW, or FAC 100%							
Criterion Met? Yes	Rationale/Remarks:						

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water NA
Depth to saturated soil 6 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes | Rationale/Remarks: 6" NW of Well #12

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-5	10 YR 3/2			Silt loam
5-15	10 YR 4/3	10 YR 3/6	10% - variable	Loam
15-18	10 YR 5/1	10 YR 4.6	10% - variable	Loamy sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☒ Aquic moisture regime
- ☒ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? Yes | Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? Yes	Remarks:	Is this sampling point within a wetland? Yes

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Wetland D Transect ID: Plot ID: TP D-6

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Meadow foxtail	H		FACW	*Holcus lanatus*	H		FAC
White clover	H		FAC				
Ranunculus acris	H		FACW-				
Poa palustris	H		FAC				
Juncus effusus	H		FACW				
* Dominant	Percent of dominant species that are OBL, FACW, or FAC			100%			

Criterion Met? Yes	Rationale/Remarks:

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water	NA
Depth to free water	NA
Depth to saturated soil	2 in

Is it the growing season? ☒ Yes ☐ No

Based on: ☐ Soil temp (record temp)

☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-5	10 YR 4/1			Silty loam
5-16	10 YR 5/1	10 YR 4/6	50% - variable	Loam
16-20	10 YR 4/2	10 YR 3/6	40% - variable	Silty loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☒ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? Yes	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? Yes	Remarks:	Is this sampling point within a wetland? Yes

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Wetland E Transect ID: Plot ID: TP E-1

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Dandelion	H		FAC				
English fescue	H		FAC				
Ranunculus acris	H		FAC				

* Dominant Percent of dominant species that are OBL, FACW, or FAC 100%

Criterion Met? Yes	Rationale/Remarks:

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water	NA
Depth to free water	NA
Depth to saturated soil	7 in

Is it the growing season? ☒ Yes ☐ No

Based on: ☐ Soil temp (record temp)

☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-5	10 YR 3/2			Silt loam
5-12	10 YR 4/2	10 YR 3/3		Silt loam
12-14	10 YR 6/2	10 YR 6/6		Cemented till

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☒ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? Yes	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? Yes	Remarks: **Soils and vegetation disturbed during recent utility installation**	Is this sampling point within a wetland? Yes

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Upland near Wetland E Transect ID: Plot ID: TP E-2

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
English fescue	H		FAC				
Dandelion	H		FAC				
Juncus effusus	H		FACW				
Red fescue	H		FAC				
* Dominant Percent of dominant species that are OBL, FACW, or FAC 100%							

Criterion Met? Yes	Rationale/Remarks:

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water NA
Depth to saturated soil 14 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☐ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☒ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? No	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? Yes

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-5	10 YR 3/2			Gravelly loam
5-13	10 YR 4/3	10 YR 5/6		Gravelly loam
13-15	10 YR 6/2			Hardened till

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? No	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? No Hydric soils present? No	Remarks:	Is this sampling point within a wetland? No

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Upland near Wetland F Transect ID: Plot ID: TP F-1

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
English fescue	H		FAC				
Dandelion	H		FAC				
Ranunculus acris	H		FAW-				
White clover	H		FAC				
* Dominant Percent of dominant species that are OBL, FACW, or FAC 100%							

Criterion Met? Yes	Rationale/Remarks:

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water NA
Depth to saturated soil >16 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☐ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? No	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-3	10 YR 6/2	10 YR 5/4		Silt loam
3-13	10 YR 3/2			Loam
13-16	10 YR 5/1	10 YR 5/4	5% - faint	Silt loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? No	Rationale/Remarks: Disturbed soil on surface and low chroma soils >12" down

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? No Hydric soils present? No	Remarks: **Recently disturbed by utility installation work**	Is this sampling point within a wetland? No

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Wetland F Transect ID: Plot ID: TP F-2

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
English fescue	H		FAC				
Lotus corniculatus	H		FAC				
Holcus lanatus	H		FAC				
Juncus effusus	H		FACW				
Red fescue	H		FAC				
* Dominant	Percent of dominant species that are OBL, FACW, or FAC			100%			
Criterion Met? Yes	Rationale/Remarks:						

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water	NA
Depth to free water	NA
Depth to saturated soil	1 in

Is it the growing season? ☒ Yes ☐ No

Based on: ☐ Soil temp (record temp)

☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-5	10 YR 3/2			Silt loam
5-12	10 YR 5/2	10 YR 4/6	10% - variable	Sandy loam
12-16	10 YR 6/2	10 YR 3/3	5% - variable	Silty sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☒ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? Yes	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? Yes	Remarks:	Is this sampling point within a wetland? Yes

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Wetland H Transect ID: Plot ID: TP H-1

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Meadow foxtail	H		FACW				
English fescue	H		FAC				
Holcus lanatus	H		FAC				
Red fescue	H		FAC				

* Dominant Percent of dominant species that are OBL, FACW, or FAC 100%

Criterion Met? Yes	Rationale/Remarks:

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water	NA
Depth to free water	NA
Depth to saturated soil	1 in

Is it the growing season? ☒ Yes ☐ No

Based on: ☐ Soil temp (record temp)

☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-5	10 YR 3/2	10 YR 3/6	5% - faint	Loam
5-16	10 YR 4/3	10 YR 3/6	5% - variable	Loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☒ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? Yes	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? Yes	Remarks:	Is this sampling point within a wetland? Yes

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Upland near Wetland H Transect ID: Plot ID: TP H-2

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Meadow foxtail	H		FACW				
English fescue	H		FAC				
Poa palustris	H		FACW				
Holcus lanatus	H		FAC				
Agrostis tenuis	H		FAC				
* Dominant	Percent of dominant species that are OBL, FACW, or FAC			100%			
Criterion Met? Yes	Rationale/Remarks:						

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water NA
Depth to saturated soil 1 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☒ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes | Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-9	10 YR 3/2			Gravelly loam
9-16	10 YR 4/3			Gravelly loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? No | Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? No	Remarks:	Is this sampling point within a wetland? No

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Wetland B Transect ID: Plot ID: TP B-1

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Phalaris arundinacea	H		FACW				
Juncus articulatus	H		FACW				

* Dominant Percent of dominant species that are OBL, FACW, or FAC 100%

Criterion Met? Yes	Rationale/Remarks:

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water	NA
Depth to free water	2”
Depth to saturated soil	0 in

Is it the growing season? ☒ Yes ☐ No

Based on: ☐ Soil temp (record temp)

☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-10	10 YR 3/2			Silty loam
10-16	10 YR 5/2	10 YR 5/6	10% - variable	Silty sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☒ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? Yes	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? Yes	Remarks: **Drainage problems recently corrected**	Is this sampling point within a wetland? Yes

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Upland near Wetland B Transect ID: Plot ID: TP B-2

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Agrostis tenuis	H		FAC				
Juncus articulatus	H		OBL				
Phalaris arundinacea	H		FACW				
Veronica scutellata	H		OBL				
* Dominant Percent of dominant species that are OBL, FACW, or FAC 100%							
Criterion Met? Yes	Rationale/Remarks:						

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water 10 in
Depth to saturated soil 3 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-10	10 YR 2/2			Loam
10-16	10 YR 5/3			Sandy gravelly loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? Yes	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? No	Remarks: **Drainage problems recently fixed**	Is this sampling point within a wetland? No

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Wetland B Transect ID: Plot ID: TP B-3

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Water foxtail	H		OBL				
Juncus articulatus	H		OBL				
Veronica scutellata	H		OBL				

* Dominant Percent of dominant species that are OBL, FACW, or FAC 100%

Criterion Met? Yes | Rationale/Remarks:

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water 10 in
Depth to saturated soil 1 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes | Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-10	10 YR 3/1			Loam (mucky)
10-12	10 YR 5/3			Silty sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☒ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? Yes | Rationale/Remarks: Could not dig beyond 12" – soil is semi-cemented till

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? Yes	Remarks: **Drainage problems recently fixed**	Is this sampling point within a wetland? Yes

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Upland near Wetland B Transect ID: Plot ID: TP B-4

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
English fescue	H		FAC	*Red fescue*	H		FAC
Holcus lanatus	H		FAC	*Agrostis tenuis*	H		FAC
Trefoil lotus	H		FAC				
White clover	H		FAC				
Dandelion	H		FAC				
* Dominant	Percent of dominant species that are OBL, FACW, or FAC			100%			
Criterion Met? Yes	Rationale/Remarks:						

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water NA
Depth to saturated soil 10 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes | Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? Yes

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-9	10 YR 2/2			Gravelly loam
9-16	10 YR 3/3			Gravelly loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? No | Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? No	Remarks: **Drainage problems recently fixed**	Is this sampling point within a wetland? No

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Wetland B Transect ID: Plot ID: TP B-5

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Carex stellata	H		NL	*Water foxtail*	H		OBL
Veronica scutellata	H		OBL				
Spirea douglasii	S		FACW				
Populus balsamifera	T		FAC				
Juncus articulatus	H		OBL				
* Dominant Percent of dominant species that are OBL, FACW, or FAC 84%							
Criterion Met? Yes	Rationale/Remarks:						

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water	NA
Depth to free water	11 in
Depth to saturated soil	<1 in

Is it the growing season? ☒ Yes ☐ No

Based on: ☐ Soil temp (record temp)

☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-10	10 YR 3/2			Loam
10-16	10 YR 5/1	10 YR 3/6	20% - strong	Gravelly sand

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☒ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? Yes	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? Yes	Remarks:	Is this sampling point within a wetland? Yes

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Upland near Wetland B Transect ID: Plot ID: TP B-6

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Red fescue	H		FAC				
Holcus lanatus	H		FAC				
Cats ear	H		FACU				
Plantago lanceolata	H		FAC				
Trefoil	H		FAC				
* Dominant	Percent of dominant species that are OBL, FACW, or FAC			80%			
Criterion Met? Yes	Rationale/Remarks:						

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water	NA
Depth to free water	NA
Depth to saturated soil	7 in

Is it the growing season? ☒ Yes ☐ No

Based on: ☐ Soil temp (record temp)

☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-6	10 YR 3/3			Loam
6-10	5 YR ¾			Loam
10-16	10 YR 3/3			Loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? No	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? No	Remarks:	Is this sampling point within a wetland? No

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Wetland B Transect ID: Plot ID: TP B-7

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Water foxtail	H		OBL				
English fescue	H		FAC				
Jointed rush	H		OBL				
Veronica scutellata	H		OBL				

* Dominant Percent of dominant species that are OBL, FACW, or FAC 100%

Criterion Met? Yes | Rationale/Remarks:

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water NA
Depth to saturated soil <1 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes | Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-9	10 YR 2/1.5			Loam
9-16	10 YR 5/3	10 YR 4/6	10% - variable	Silt loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☒ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? Yes | Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? Yes	Remarks: **Drainage problems recently fixed**	Is this sampling point within a wetland? Yes

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Upland near Wetland B Transect ID: Plot ID: TP B-8

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Red fescue	H		FAC				
Agrostis tenuis	H		FAC				
Dandelion	H		FAC				
Cat's ear	H		FACU				
Holcus lanatus	H		FAC				
* Dominant	Percent of dominant species that are OBL, FACW, or FAC			80%			

Criterion Met? Yes	Rationale/Remarks:

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water NA
Depth to saturated soil 10 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-9	10 YR 3/3			Loam
9-16	10 YR 4/6			Loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? No	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? No	Remarks: **Drainage problem recently fixed**	Is this sampling point within a wetland? No

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Wetland B Transect ID: Plot ID: TP B-9

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Juncus effusus	H		FACW				
Water foxtail	H		OBL				
Veronica scutellata	H		OBL				

* Dominant Percent of dominant species that are OBL, FACW, or FAC 100%

Criterion Met? Yes	Rationale/Remarks:

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water 13 in
Depth to saturated soil 0 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-10	10 YR 2/2			Loam
10-16	10 YR 5/2	10 YR 5/4	10% - variable	Silt

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? Yes	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? Yes	Remarks: **Drainage problem recently fixed**	Is this sampling point within a wetland? Yes

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Upland near Wetland B Transect ID: Plot ID: TP B-10

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Red fescue	H		FAC				
Agrostis tenuis	H		FAC				
Holcus lanatus	H		FAC				
Poa palustris	H		FAC				
Trefoil lotus	H		FAC				
* Dominant	Percent of dominant species that are OBL, FACW, or FAC			100%			
Criterion Met? Yes	Rationale/Remarks:						

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water	NA
Depth to free water	NA
Depth to saturated soil	8 in

Is it the growing season? ☒ Yes ☐ No

Based on: ☐ Soil temp (record temp)

☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? No

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-9	10 YR 3/2			Loam
9-16	10 YR 3/3			Loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? No	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? No	Remarks: **Drainage problem recently fixed**	Is this sampling point within a wetland? No

ROUTINE WETLAND DETERMINATION DATA FORM 1 *(Revised)*

Project/Site: 818c Applicant/Owner: Microsoft Investigators: Richard Tveten	Date: 5-16-08 County: King State: WA
Do normal circumstances exist on the site? Yes Is the site significantly disturbed (Atypical Situation?) No Is the area a potential Problem Area (If needed, explain on reverse)? No	Community ID: Upland near Wetland G Transect ID: Plot ID: TP G-1

VEGETATION

Plant species	Stratum	% Cover	Indicator Status	Plant species	Stratum	% Cover	Indicator Status
Phalaris arundinacea	H		FACW				

* Dominant Percent of dominant species that are OBL, FACW, or FAC 100%

Criterion Met? Yes	Rationale/Remarks:

Check all Hydrophytic Vegetation Indicators that apply and explain:

- ☐ Plant growing in areas of prolonged inundation/saturation
- ☐ Morphological adaptations
- ☐ Technical literature
- ☐ Physiological/reproductive adaptations
- ☐ Wetland plant database
- ☐ Personal knowledge of regional plant communities
- ☐ Other (explain)

HYDROLOGY

Field Observations:

Depth of surface water NA
Depth to free water NA
Depth to saturated soil 8 in

Is it the growing season? ☒ Yes ☐ No
Based on: ☐ Soil temp (record temp)
☐ Other (explain): May 16, 2008

Primary Wetland Hydrology Indicators:

- ☐ Inundated
- ☒ Saturated in upper 12in/30cm
- ☐ Water marks
- ☐ Drift lines
- ☐ Sediment deposits
- ☐ Drainage patterns in wetland

Secondary Wetland Hydrology Indicators (minimum 2 required):

- ☐ Oxidized root channels in upper 12in/30cm
- ☐ Water-stained leaves
- ☐ Local soil survey data
- ☐ FAC-neutral test
- ☐ Other

Criterion Met? Yes	Rationale/Remarks:

SOILS

Map unit name Alderwood sandy gravelly loam (Series and phase) Taxonomy (subgroup)	Drainage class moderately well drained Field Observations confirm mapped type? Yes

Profile Description: Depth	Matrix colors (Munsell moist)	Mottle colors (Munsell moist)	Mottle abundance/contrast	Texture, concretions, structure, etc
0-8	10 YR 2/2			Sandy gravelly loam
8-16	10 YR 3/3			Sandy gravelly loam

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Gleyed or low chroma (=1) matrix
- ☐ Matrix chroma ≤2 with mottles
- ☐ Mg or FE concretions
- ☐ High organic content in surface layer in sandy soils
- ☐ Listed on National Hydric Soils List
- ☐ Other ( )

Criterion Met? No	Rationale/Remarks:

WETLAND DETERMINATION

Wetland vegetation present? Yes Wetland hydrology present? Yes Hydric soils present? No	Remarks:	Is this sampling point within a wetland? No

APPENDIX B

City of Redmond Wetland Summary Forms

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WETLAND SUMMARY SHEET

Wetland Summary			Buffer Summary				Wetland Impacts		Mitigation Summary		
Label[1]	Category[2]	Size[3]	Required[4]	Proposed[5]	Increase[6] Reduce[7]	Averaging[8]	Fill[9]	Paper Fill[10]	Ratio[11]	Area[12]	Location[13]
A	III	642	80	∅			642	∅	2:1 creation	1284	WL B
B	III	39,671	80	60	20		3380	1509	2:1 creation	9,778	WL B
C	IV	1,894	∅	∅			1894	∅			
D	IV	13,052	50	40	10	40	2977	2532	1:1 C + 2:1 E	2,103 +11,018	WL F WL B/D
E	IV	982	50	∅			982	∅	1.5:1 creation	1,473	WL F

[1] Wetland A, B, C, etc.
[2] Wetland category per City wetland classification system.
[3] Area of wetland.
[4] Required buffer width in feet per RCDG.
[5] Proposed buffer width in feet.
[6] Does the uniqueness of the wetland require an increased buffer? If so, what is the width in feet.
[7] Is there a request to reduce the buffer width? If so, what is the width in feet.
[8] Is buffer averaging being used? If so, what is the average buffer width in feet.
[9] Amount of wetland fill.
[10] Amount of paper fill.
[11] Required ratio for wetland mitigation per RCDG.
[12] Size of mitigation area.
[13] Note location of mitigation area (keyed to the mitigation map).

WETLAND SUMMARY SHEET

Wetland Summary			Buffer Summary				Wetland Impacts		Mitigation Summary		
Label[1]	Category[2]	Size[3]	Required[4]	Proposed[5]	Increase[6] Reduce[7]	Averaging[8]	Fill[9]	Paper Fill[10]	Ratio[11]	Area[12]	Location[13]
F	IV	8,810	50	40	10	40	5366	3148	1:1 C + 2:1 E	8514 17,028	WLB
G	IV	55	∅				55				
H	IV	3,272	∅				3272				
J	III	2,632	80	60	20		∅	3	2:1 creation	6	WLB
K	IV	80	50	50			∅	∅			

[1] Wetland A, B, C, etc.
[2] Wetland category per City wetland classification system.
[3] Area of wetland.
[4] Required buffer width in feet per RCDG.
[5] Proposed buffer width in feet.
[6] Does the uniqueness of the wetland require an increased buffer? If so, what is the width in feet.
[7] Is there a request to reduce the buffer width? If so, what is the width in feet.
[8] Is buffer averaging being used? If so, what is the average buffer width in feet.
[9] Amount of wetland fill.
[10] Amount of paper fill.
[11] Required ratio for wetland mitigation per RCDG.
[12] Size of mitigation area.
[13] Note location of mitigation area (keyed to the mitigation map).

WETLAND SUMMARY SHEET

Wetland Summary			Buffer Summary				Wetland Impacts		Mitigation Summary		
Label[1]	Category[2]	Size[3]	Required[4]	Proposed[5]	Increase[6] Reduce[7]	Averaging[8]	Fill[9]	Paper Fill[10]	Ratio[11]	Area[12]	Location[13]
L	IV	352	50	Ø			352	Ø	1:1 C + 2:1 E	352 704	WL F WL B

[1] Wetland A, B, C, etc.
[2] Wetland category per City wetland classification system.
[3] Area of wetland.
[4] Required buffer width in feet per RCDG.
[5] Proposed buffer width in feet.
[6] Does the uniqueness of the wetland require an increased buffer? If so, what is the width in feet.
[7] Is there a request to reduce the buffer width? If so, what is the width in feet.
[8] Is buffer averaging being used? If so, what is the average buffer width in feet.
[9] Amount of wetland fill.
[10] Amount of paper fill.
[11] Required ratio for wetland mitigation per RCDG.
[12] Size of mitigation area.
[13] Note location of mitigation area (keyed to the mitigation map).

APPENDIX C

Washington State Department of Ecology Wetland Rating System for Western Washington, Version 2 (July 2006)

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Wetland name or number A

TAC 818 C

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated June 2006 to increase accuracy and reproducibility among users

Name of wetland (if known): Wetland A Date of site visit: _____

Rated by PS Trained by Ecology? Yes✓ No___ Date of training 06

SEC: ___ TWNSHP: ____ RNGE: ____ Is S/T/R in Appendix D? Yes___ No___

Map of wetland unit: Figure ____ Estimated size 11,000 sf

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III___ IV___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	7
Score for Hydrologic Functions	6
Score for Habitat Functions	19
TOTAL score for Functions	32

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ **Does not Apply**___

Final Category (choose the "highest" category from above) III

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		**Wetland HGM Class used for Rating**	
Estuarine		**Depressional**	
Natural Heritage Wetland		**Riverine**	
Bog		**Lake-fringe**	
Mature Forest		**Slope**	✓
Old Growth Forest		**Flats**	
Coastal Lagoon		**Freshwater Tidal**	
Interdunal			
None of the above		Check if unit has multiple HGM classes present	☐

Wetland name or number A

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered* ***animal or plant*** *species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		✓
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered* ***animal*** *species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		✓
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		✓
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		✓

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number A

S	**Slope Wetlands** WATER QUALITY FUNCTIONS - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
S	**S 1. Does the wetland unit have the potential to improve water quality?**	*(see p.64)*
S	S 1.1 Characteristics of average slope of unit: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation for every 100 ft horizontal distance)* points = 3 Slope is 1% - 2% points = 2 Slope is 2% - 5% points = 1 Slope is greater than 5% points = 0 A%	1
S	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES = 3 points NO = 0 points	0
S	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.* Dense, uncut, herbaceous vegetation > 90% of the wetland area points = 6 Dense, uncut, herbaceous vegetation > 1/2 of area points = 3 Dense, woody, vegetation > ½ of area points = 2 Dense, uncut, herbaceous vegetation > 1/4 of area points = 1 Does not meet any of the criteria above for vegetation points = 0 Aerial photo or map with vegetation polygons	Figure ___ 6
S	**Total for S 1** *Add the points in the boxes above*	7
S	**S 2. Does the wetland unit have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150ft — Untreated stormwater discharges to wetland — Tilled fields, logging, or orchards within 150 feet of wetland — Residential, urban areas, or golf courses are within 150 ft upslope of wetland * — Other_____ YES multiplier is **2** NO multiplier is **1**	*(see p.67)* multiplier 1
S	**TOTAL - Water Quality Functions** Multiply the score from S1 by S2 ***Add score to table on p. 1***	7

Comments

* SW Pond intercepts all surface flows

Wetland name or number A

		Points (only 1 score per box)
S	**Slope Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream erosion	
	S 3. Does the wetland unit have the potential to reduce flooding and stream erosion?	*(see p. 68)*
S	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. *Choose the points appropriate for the description that best fit conditions in the wetland. (stems of plants should be thick enough (usually > 1/8in), or dense enough, to remain erect during surface flows)* Dense, uncut, **rigid** vegetation covers > 90% of the area of the wetland. points = 6 Dense, uncut, **rigid** vegetation > 1/2 area of wetland points = 3 Dense, uncut, **rigid** vegetation > 1/4 area points = 1 More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid points = 0	6
S	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows: The slope wetland has small surface depressions that can retain water over at least 10% of its area. YES points = 2 NO points = 0	0
S	*Add the points in the boxes above*	6
S	**S 4. Does the wetland have the opportunity to reduce flooding and erosion?** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* — Wetland has surface runoff that drains to a river or stream that has flooding problems — Other_____ *(Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam)* YES multiplier is **2** NO multiplier is **1**	*(see p. 70)* multiplier 1
S	TOTAL - **Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	6

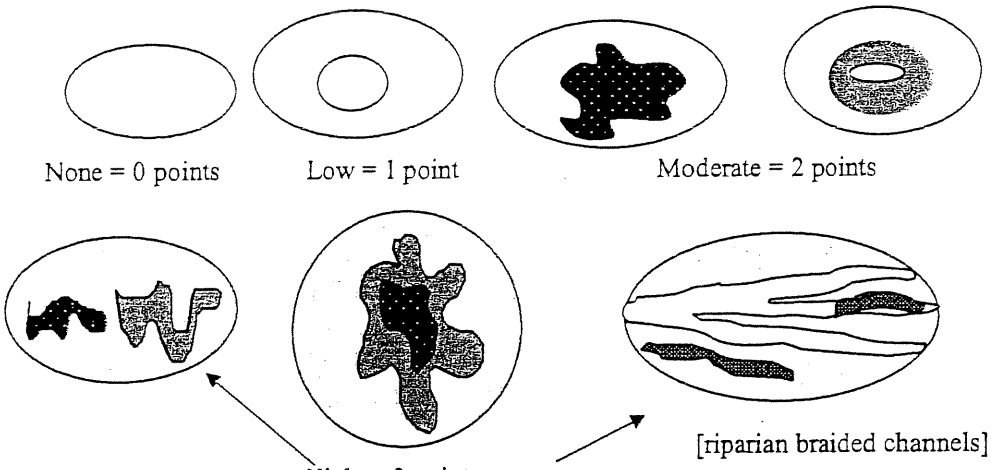
Comments

Wetland name or number A

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure *(see p. 72)* *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____Aquatic bed ____Emergent plants __✓__Scrub/shrub (areas where shrubs have >30% cover) __✓__Forested (areas where trees have >30% cover) *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 *Add the number of vegetation structures that qualify. If you have:* 4 structures or more — points = 4 3 structures — points = 2 2 structures — points = 1 1 structure — points = 0 Map of Cowardin vegetation classes	Figure ___ 2
H 1.2. Hydroperiods *(see p. 73)* *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 acre 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 __✓__Occasionally flooded or inundated — 2 types present — point = 1 __✓__Saturated only — 1 type present — points = 0 ____ 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** Map of hydroperiods	Figure ___ 1
H 1.3. Richness of Plant Species *(see p. 75)* Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species — points = 2 5 - 19 species — points = 1 < 5 species — points = 0 *List species below if you want to:*	1

Total for page 4

Wetland name or number A

	Figure ___
H 1.4. Interspersion of habitats *(see p. 76)* Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points Low = 1 point Moderate = 2 points [riparian braided channels] High = 3 points NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes	2
H 1.5. Special Habitat Features: *(see p. 77)* *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ✓ Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). ✓ Standing snags (diameter at the bottom > 4 inches) in the wetland ____Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ____At least ¼ acre of thin-stemmed persistent vegetation 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 each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	2
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	8

Comments

Wetland name or number A

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** ✓ 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0.** — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	Figure ___ 3
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	1

Total for page 4

Wetland name or number A

H 2.3 Near or adjacent to other priority habitats listed by WDFW *(see p. 82)* Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* *These are DFW definitions. Check with your local DFW biologist if there are any questions.* ____**Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ____**Aspen Stands:** Pure or mixed stands of aspen greater than 0.8 ha (2 acres). ____**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ✓ **Old-growth 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 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. ✓ **Mature forests:** Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 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. ____**Prairies:** Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community. ____**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ____**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages ____**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%. ✓ **Urban Natural Open Space**: A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development. ____**Estuary/Estuary-like:** Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5ppt. during the period of average annual low flow. Includes both estuaries and lagoons. ____**Marine/Estuarine Shorelines**: Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control). If wetland has 3 **or more** priority habitats = **4 points** If wetland has 2 priority habitats = **3 points** If wetland has 1 priority habitat = **1 point** No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	4 or 3

Wetland name or number A

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	11
TOTAL for H 1 from page 14	8
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	19

Wetland name or number B

TAL 818C

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated June 2006 to increase accuracy and reproducibility among users

Name of wetland (if known): Wetland B Date of site visit: _____

Rated by BS Trained by Ecology? Yes ✓ No___ Date of training 06

SEC: ___ TWNSHP: ____ RNGE: ____ Is S/T/R in Appendix D? Yes___ No___

Map of wetland unit: Figure ____ Estimated size 2.1 ac 91,200 sf

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III___ IV___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	10
Score for Hydrologic Functions	12
Score for Habitat Functions	16
TOTAL score for Functions	36

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ **Does not Apply**___

Final Category (choose the "highest" category from above) III

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		**Wetland HGM Class used for Rating**	
Estuarine		**Depressional**	✓
Natural Heritage Wetland		**Riverine**	
Bog		**Lake-fringe**	
Mature Forest		**Slope**	
Old Growth Forest		**Flats**	
Coastal Lagoon		**Freshwater Tidal**	
Interdunal			
None of the above		Check if unit has multiple HGM classes present	

Wetland name or number B

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered* ***animal or plant*** *species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered* ***animal*** *species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number B

		Points (only 1 score per box)
D	**Depressional and Flats Wetlands** **WATER QUALITY FUNCTIONS** - Indicators that the wetland unit functions to improve water quality	
D	**D 1. Does the wetland unit have the potential to improve water quality?**	*(see p.38)*
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) points = 3 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 1 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing"*) Provide photo or drawing	Figure ___ 2
D	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES points = 4 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation > = 95% of area points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure ___ 1
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* 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 Map of Hydroperiods	Figure ___ 2
D	**Total for D 1** *Add the points in the boxes above*	5
D	**D 2. Does the wetland unit have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ✓ Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other_____ YES multiplier is **2** NO multiplier is 1	*(see p. 44)* multiplier 2
D	**TOTAL - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	10

Wetland name or number B

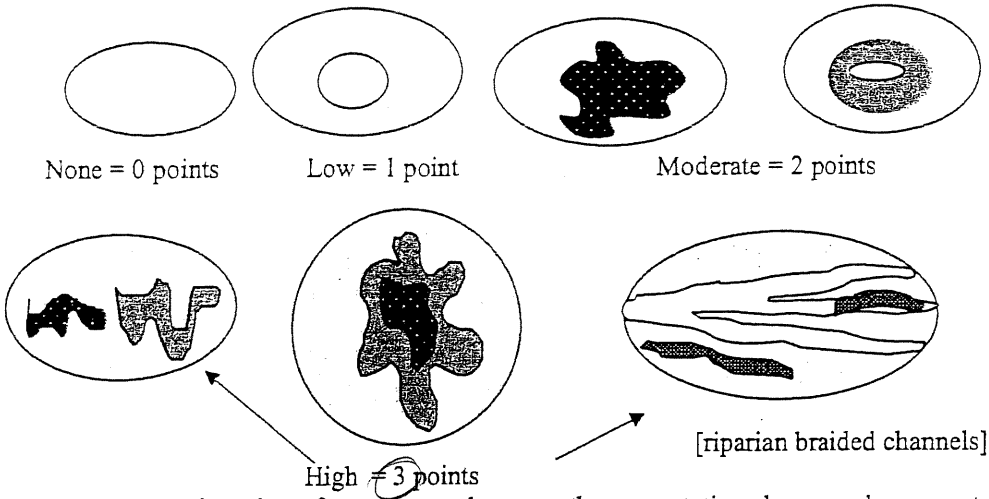
D	**Depressional and Flats Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream degradation	**Points** (only 1 score per box)
	D 3. Does the wetland unit have the <u>potential</u> to reduce flooding and erosion?	*(see p.46)*
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) points = 3 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 *(If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 0	2
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 The wetland is a "headwater" wetland" points = 5 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 Unit is flat (yes to Q. 2 or Q. 7 on key) but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft points = 0	5
D	D 3.3 Contribution of wetland unit 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 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 unit is in the FLATS class points = 5	5
D	**Total for D 3** *Add the points in the boxes above*	12
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following indicators of opportunity apply.* — Wetland is in a headwater of a river or stream that has flooding problems — Wetland drains to a river or stream that has flooding problems — Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems — Other_____ YES multiplier is 2 NO multiplier is 1	*(see p. 49)* multiplier 1
D	TOTAL - **Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	12

Wetland name or number B

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure *(see p. 72)* *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____Aquatic bed ✓ Emergent plants ✓ Scrub/shrub (areas where shrubs have >30% cover) ____Forested (areas where trees have >30% cover) *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 *Add the number of vegetation structures that qualify. If you have:* 4 structures or more — points = 4 3 structures — points = 2 (2) structures — points = 1 1 structure — points = 0 Map of Cowardin vegetation classes	Figure ___ 1
H 1.2. Hydroperiods *(see p. 73)* *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 acre 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 ____Occasionally flooded or inundated — (2) types present — point = 1 ✓ Saturated only — 1 type present — points = 0 ____ 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** Map of hydroperiods	Figure ___ 1
H 1.3. Richness of Plant Species *(see p. 75)* Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species — points = 2 *List species below if you want to:* → 5 - 19 species — points = (1) < 5 species — points = 0	1

Total for page 3

Wetland name or number B

	Figure ___
H 1.4. Interspersion of habitats *(see p. 76)* Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points Low = 1 point Moderate = 2 points High = 3 points [riparian braided channels] NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes	3
H 1.5. Special Habitat Features: *(see p. 77)* *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ____Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). ____Standing snags (diameter at the bottom > 4 inches) in the wetland ____Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ✓ At least ¼ acre of thin-stemmed persistent vegetation 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 each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	2
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	6

Comments

Wetland name or number B

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** ✓ No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0.** — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	Figure ___ 2
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	1

Total for page 3

Wetland name or number B

H 2.3 Near or adjacent to other priority habitats listed by WDFW *(see p. 82)* Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* *These are DFW definitions. Check with your local DFW biologist if there are any questions.* ____**Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ____**Aspen Stands:** Pure or mixed stands of aspen greater than 0.8 ha (2 acres). ____**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ____**Old-growth 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 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. ____**Mature forests:** Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 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. ____**Prairies:** Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community. ____**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ____**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages ____**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%. ____**Urban Natural Open Space**: A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development. ____**Estuary/Estuary-like:** Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5ppt. during the period of average annual low flow. Includes both estuaries and lagoons. ____**Marine/Estuarine Shorelines**: Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control). If wetland has **3 or more** priority habitats = **4 points** If wetland has **2** priority habitats = **3 points** If wetland has **1** priority habitat = **1 point** No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	0

Wetland name or number B

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	5
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	8
TOTAL for H 1 from page 14	8
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	16

Wetland name or number C

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users

Name of wetland (if known): TAL ~ 8/8C Wetland C Date of site visit: 05-08-09

Rated by DRT Trained by Ecology? Yes✓ No___ Date of training 10-05

SEC: 14 TWNSHP: 25 RNGE: 5 Is S/T/R in Appendix D? Yes___ No___

Map of wetland unit: Figure ____ Estimated size _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III___ IV✓

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	6
Score for Hydrologic Functions	3
Score for Habitat Functions	8
TOTAL score for Functions	17

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ Does not Apply✓

Final Category (choose the "highest" category from above) IV

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		Depressional	✓
Natural Heritage Wetland		Riverine	
Bog		Lake-fringe	
Mature Forest		Slope	
Old Growth Forest		Flats	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above	✓	Check if unit has multiple HGM classes present	☐

Wetland name or number C

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered* ***animal or plant*** *species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered* ***animal*** *species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		
SP4. *Does the wetland unit have a local significance in addition to its functions*? For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number C

Classification of Wetland Units in Western Washington

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 (i.e. except during floods)?
NO – go to 2 **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe NO – Saltwater Tidal Fringe (Estuarine)**

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 rated as an* ***Estuarine*** *wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

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 both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (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**?
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 <3ft diameter and less than 1 foot deep).*
NO - go to 5 **YES** – The wetland class is **Slope**

Wetland name or number C

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 two years.

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

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

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 clases. 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 your wetland. 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 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	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

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

Wetland name or number C

D	**Depressional and Flats Wetlands** **WATER QUALITY FUNCTIONS** - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
D	**D 1. Does the wetland unit have the <u>potential</u> to improve water quality?**	*(see p.38)*
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) points = 3 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 1 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing"*) Provide photo or drawing	Figure ___ 1
D	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES points = 4 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation > = 95% of area points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure ___ 5
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* 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 Map of Hydroperiods	Figure ___ 0
D	**Total for D 1** *Add the points in the boxes above*	6
D	**D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 44)* multiplier 1
D	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	6

Wetland name or number C

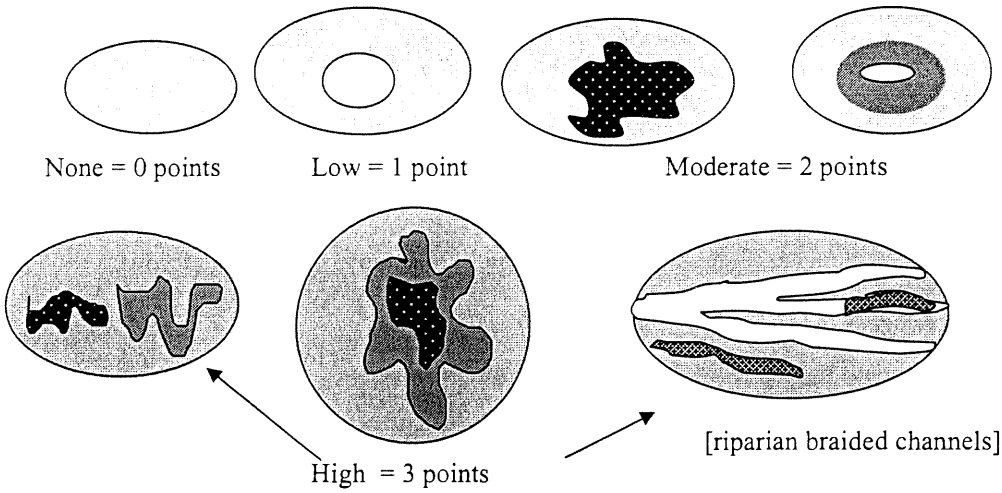
D	**Depressional and Flats Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream degradation	**Points** (only 1 score per box)
	D 3. Does the wetland unit have the <u>potential</u> to reduce flooding and erosion?	*(see p.46)*
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) points = 4 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 *(If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)* points = 0	0
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 The wetland is a "headwater" wetland" points = 5 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 Unit is flat (yes to Q. 2 or Q. 7 on key) but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft points = 0	0
D	D 3.3 Contribution of wetland unit 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 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 unit is in the FLATS class points = 5	3
D	**Total for D 3** *Add the points in the boxes above*	3
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following indicators of opportunity apply.* — Wetland is in a headwater of a river or stream that has flooding problems — Wetland drains to a river or stream that has flooding problems — Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems — Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 49)* multiplier ____
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	3

Wetland name or number C

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?	
H 1.1 <u>Vegetation structure</u> ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____Aquatic bed _X_Emergent plants ____Scrub/shrub (areas where shrubs have >30% cover) ____Forested (areas where trees have >30% cover) *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 *Add the number of vegetation structures that qualify. If you have:* 4 structures or more — points = 4 3 structures — points = 2 2 structures — points = 1 1 structure — points = 0 Map of Cowardin vegetation classes	Figure ___ 0
H 1.2. <u>Hydroperiods</u> ***(see p. 73)*** *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 acre 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 ____Occasionally flooded or inundated — 2 types present — point = 1 _X_Saturated only — 1 type present — points = 0 ____ 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** Map of hydroperiods	Figure ___ 0
H 1.3. <u>Richness of Plant Species</u> ***(see p. 75)*** Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species — points = 2 *List species below if you want to:* 5 - 19 species — points = 1 < 5 species — points = 0	0

Total for page 0

Wetland name or number C

	Figure ___
H 1.4. Interspersion of habitats *(see p. 76)* Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points Low = 1 point Moderate = 2 points High = 3 points [riparian braided channels] NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes	1
H 1.5. Special Habitat Features: *(see p. 77)* *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ____Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). ____Standing snags (diameter at the bottom > 4 inches) in the wetland ____Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ____At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated. *(structures for egg-laying by amphibians)* __Y__ Invasive plants cover less than 25% of the wetland area in each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	1
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	2

Comments

Wetland name or number C

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** Y 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0.** — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	Figure ___ 3
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	0

Total for page 3

Wetland name or number C

H 2.3 Near or adjacent to other priority habitats listed by WDFW *(see p. 82)* Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* *These are DFW definitions. Check with your local DFW biologist if there are any questions.* ____**Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ____**Aspen Stands:** Pure or mixed stands of aspen greater than 0.8 ha (2 acres). ____**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ____**Old-growth 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 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. ____**Mature forests:** Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 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. ____**Prairies:** Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community. ____**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ____**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages ____**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%. ____**Urban Natural Open Space**: A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development. ____**Estuary/Estuary-like:** Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5ppt. during the period of average annual low flow. Includes both estuaries and lagoons. ____**Marine/Estuarine Shorelines**: Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control). If wetland has **3 or more** priority habitats = **4 points** If wetland has **2** priority habitats = **3 points** If wetland has **1** priority habitat = **1 point** No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	0

Wetland name or number C

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	6
TOTAL for H 1 from page 14	2
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	8

Wetland name or number C

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

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 *(see p. 86)* Does the wetland unit 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 X	
SC 1.1 Is the wetland unit 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 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — 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 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

Wetland name or number E

SC 2.0 Natural Heritage Wetlands *(see p. 87)* Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)* S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site ___ YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO X SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? YES = Category I NO X not a Heritage Wetland	**Cat. I**
SC 3.0 Bogs *(see p. 87)* Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2 2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes - go to Q. 3 No - Is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Is a bog for purpose of rating No - go to Q. 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" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. *1.* Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?* 2. YES = Category I No X Is not a bog for purpose of rating	**Cat. I**

Wetland name or number C

SC 4.0 Forested Wetlands *(see p. 90)* Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the 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/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. — **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. YES = Category I NO X not a forested wetland with special characteristics	**Cat. I**
SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)* 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 surface 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 X not a wetland in a coastal lagoon SC 5.1 Does the wetland meets 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 invasive plant species (see list of invasive species on p. 74). — 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 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

Wetland name or number C

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO X not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its 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 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	NA

Wetland name or number 10

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users

Name of wetland (if known): TAL-SEC Wetland 10 Date of site visit: 05-05-05

Rated by DMW Trained by Ecology? Yes X No___ Date of training 11-05

SEC: 16 TWNSHP: 25 RNGE: 5 Is S/T/R in Appendix D? Yes___ No___

Map of wetland unit: Figure ____ Estimated size _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III___ IV X

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	2
Score for Hydrologic Functions	6
Score for Habitat Functions	9
TOTAL score for Functions	17

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ Does not Apply X

Final Category **(choose the "highest" category from above)** IV

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		Depressional	
Natural Heritage Wetland		Riverine	
Bog		Lake-fringe	
Mature Forest		Slope	X
Old Growth Forest		Flats	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	

Wetland name or number D

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered* ***animal or plant*** *species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered* ***animal*** *species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		
SP4. *Does the wetland unit have a local significance in addition to its functions*? For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number D

Classification of Wetland Units in Western Washington

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 (i.e. except during floods)?
NO – go to 2 **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe** **NO – Saltwater Tidal Fringe (Estuarine)**

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 rated as an* ***Estuarine*** *wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

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 both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (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?
X The wetland is on a slope (*slope can be very gradual*),
X 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.
X The water leaves the wetland **without being impounded**?
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 <3ft diameter and less than 1 foot deep).*
NO - go to 5 **YES** – The wetland class is **Slope**

Wetland name or number D

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 two years.

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

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

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 clases. 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 your wetland. 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 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	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still 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

S	**Slope Wetlands** WATER QUALITY FUNCTIONS - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
S	**S 1. Does the wetland unit have the <u>potential</u> to improve water quality?**	*(see p.64)*
S	S 1.1 Characteristics of average slope of unit: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation for every 100 ft horizontal distance)* points = 3 Slope is 1% - 2% points = 2 Slope is 2% - 5% points = 1 Slope is greater than 5% points = 0	1
S	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES = 3 points NO = 0 points	0
S	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.* Dense, uncut, herbaceous vegetation > 90% of the wetland area points = 6 Dense, uncut, herbaceous vegetation > 1/2 of area points = 3 Dense, woody, vegetation > ½ of area points = 2 Dense, uncut, herbaceous vegetation > 1/4 of area points = 1 Does not meet any of the criteria above for vegetation points = 0 Aerial photo or map with vegetation polygons	Figure ___ 3
S	**Total for S 1** *Add the points in the boxes above*	4
S	**S 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150ft — Untreated stormwater discharges to wetland — Tilled fields, logging, or orchards within 150 feet of wetland — Residential, urban areas, or golf courses are within 150 ft upslope of wetland — Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p.67)* multiplier ____
S	**TOTAL - Water Quality Functions** Multiply the score from S1 by S2 ***Add score to table on p. 1***	4

Comments

Wetland name or number D

S	**Slope Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream erosion	**Points** (only 1 score per box)
	S 3. Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	*(see p.68)*
S	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. *Choose the points appropriate for the description that best fit conditions in the wetland. (stems of plants should be thick enough (usually > 1/8in), or dense enough, to remain erect during surface flows)* Dense, uncut, **rigid** vegetation covers > 90% of the area of the wetland. points = 6 Dense, uncut, **rigid** vegetation > 1/2 area of wetland points = 3 Dense, uncut, **rigid** vegetation > 1/4 area points = 1 More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid points = 0	6
S	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows: The slope wetland has small surface depressions that can retain water over at least 10% of its area. YES points = 2 NO points = 0	0
S	*Add the points in the boxes above*	6
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* — Wetland has surface runoff that drains to a river or stream that has flooding problems — Other_____ *(Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam)* **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 70)* multiplier ____
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	6

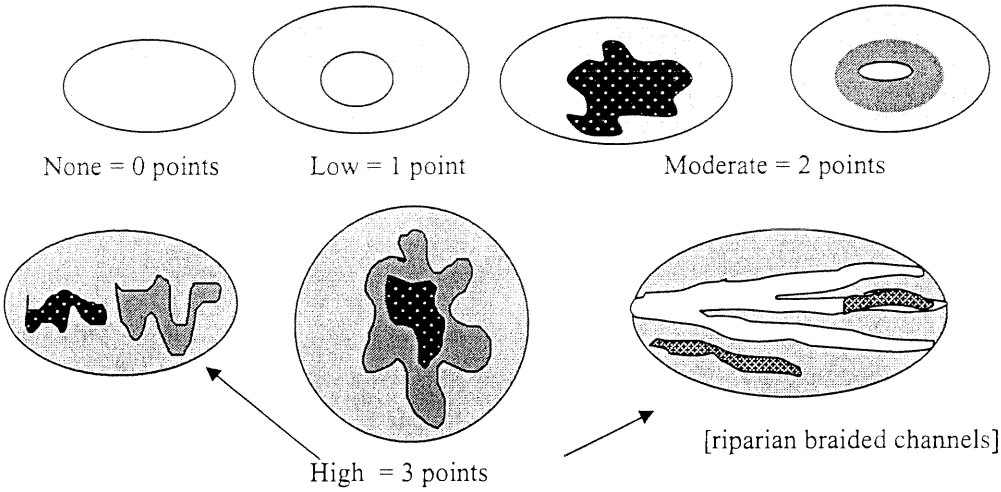
Comments

Wetland name or number 1

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____Aquatic bed _X_Emergent plants _/_Scrub/shrub (areas where shrubs have >30% cover) ____Forested (areas where trees have >30% cover) *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 *Add the number of vegetation structures that qualify. If you have:* 4 structures or more — points = 4 3 structures — points = 2 2 structures — points = 1 1 structure — points = 0 Map of Cowardin vegetation classes	Figure ___ 0
H 1.2. Hydroperiods ***(see p. 73)*** *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 acre 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 ____Occasionally flooded or inundated — 2 types present — point = 1 _X_Saturated only — 1 type present — points = 0 ____ 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** Map of hydroperiods	Figure ___ 1
H 1.3. Richness of Plant Species ***(see p. 75)*** Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species — points = 2 *List species below if you want to:* 5 - 19 species — points = 1 < 5 species — points = 0 Raac Tyla	1

Total for page 2

Wetland name or number D

H 1.4. Interspersion of habitats *(see p. 76)* Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points Low = 1 point Moderate = 2 points High = 3 points [riparian braided channels] NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes	Figure ___ 1
H 1.5. Special Habitat Features: *(see p. 77)* *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ____Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). ____Standing snags (diameter at the bottom > 4 inches) in the wetland ____Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ____At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated. *(structures for egg-laying by amphibians)* _Y_ Invasive plants cover less than 25% of the wetland area in each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	1
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	4

Comments

Wetland name or number D

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** X No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0.** — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	Figure ___ 2
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	0

Total for page 2

Wetland name or number ____

H 2.3 Near or adjacent to other priority habitats listed by WDFW *(see p. 82)* Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* *These are DFW definitions. Check with your local DFW biologist if there are any questions.* ____**Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ____**Aspen Stands:** Pure or mixed stands of aspen greater than 0.8 ha (2 acres). ____**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ____**Old-growth 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 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. ____**Mature forests:** Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 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. ____**Prairies:** Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community. ____**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ____**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages ____**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%. ____**Urban Natural Open Space**: A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development. ____**Estuary/Estuary-like:** Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5ppt. during the period of average annual low flow. Includes both estuaries and lagoons. ____**Marine/Estuarine Shorelines**: Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control). If wetland has **3 or more** priority habitats = **4 points** If wetland has **2** priority habitats = **3 points** If wetland has **1** priority habitat = **1 point** No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	

Wetland name or number D

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	5
TOTAL for H 1 from page 14	4
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	9

Wetland name or number 1

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

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 *(see p. 86)* Does the wetland unit 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 ✓	
SC 1.1 Is the wetland unit 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 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — 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 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

Wetland name or number ___

SC 2.0 Natural Heritage Wetlands *(see p. 87)* Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)* S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site ___ YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO ___ SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? YES = Category I NO X not a Heritage Wetland	**Cat. I**
SC 3.0 Bogs *(see p. 87)* Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2 2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes - go to Q. 3 No - Is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Is a bog for purpose of rating No - go to Q. 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" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. *1.* Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?* 2. YES = Category I No X Is not a bog for purpose of rating	**Cat. I**

Wetland name or number D

SC 4.0 Forested Wetlands *(see p. 90)* Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the 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/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. — **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. YES = Category I NO X not a forested wetland with special characteristics	**Cat. I**
SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)* 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 surface 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 X not a wetland in a coastal lagoon SC 5.1 Does the wetland meets 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 invasive plant species (see list of invasive species on p. 74). — 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 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

Wetland name or number D

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO X not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its 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 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	NA

Wetland name or number E

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users

Name of wetland (if known): TAL-816C Wetland E Date of site visit: 05-05-08

Rated by DRT Trained by Ecology? Yes X No___ Date of training 10-05

SEC: 14 TWNSHP: 25 RNGE: 5 Is S/T/R in Appendix D? Yes___ No___

Map of wetland unit: Figure ____ Estimated size _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III___ IV X

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	1
Score for Hydrologic Functions	6
Score for Habitat Functions	7
TOTAL score for Functions	14

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ Does not Apply X

Final Category (choose the "highest" category from above) IV

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		Depressional	
Natural Heritage Wetland		Riverine	
Bog		Lake-fringe	
Mature Forest		Slope	X
Old Growth Forest		Flats	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	

Wetland name or number E

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered* ***animal or plant*** *species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered* ***animal*** *species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		
SP4. *Does the wetland unit have a local significance in addition to its functions*? For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number B

Classification of Wetland Units in Western Washington

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 (i.e. except during floods)?
NO – go to 2 **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe NO – Saltwater Tidal Fringe (Estuarine)**

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 rated as an* ***Estuarine*** *wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

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 both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (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**?
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 <3ft diameter and less than 1 foot deep).*
NO - go to 5 **YES** – The wetland class is **Slope**

Wetland name or number E

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 two years.

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

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

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 clases. 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 your wetland. 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 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	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still 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 13

S	**Slope Wetlands** WATER QUALITY FUNCTIONS - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
S	**S 1. Does the wetland unit have the potential to improve water quality?**	*(see p.64)*
S	S 1.1 Characteristics of average slope of unit: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation for every 100 ft horizontal distance)* points = 3 Slope is 1% - 2% points = 2 Slope is 2% - 5% points = 1 Slope is greater than 5% points = 0	1
S	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES = 3 points NO = 0 points	0
S	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.* Dense, uncut, herbaceous vegetation > 90% of the wetland area points = 6 Dense, uncut, herbaceous vegetation > 1/2 of area points = 3 Dense, woody, vegetation > ½ of area points = 2 Dense, uncut, herbaceous vegetation > 1/4 of area points = 1 Does not meet any of the criteria above for vegetation points = 0 Aerial photo or map with vegetation polygons	Figure ___ 0
S	**Total for S 1** *Add the points in the boxes above*	1
S	**S 2. Does the wetland unit have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150ft — Untreated stormwater discharges to wetland — Tilled fields, logging, or orchards within 150 feet of wetland — Residential, urban areas, or golf courses are within 150 ft upslope of wetland — Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p.67)* multiplier 1
S	**TOTAL - Water Quality Functions** Multiply the score from S1 by S2 ***Add score to table on p. 1***	1

Comments

Wetland name or number B

S	**Slope Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream erosion	**Points** (only 1 score per box)
	S 3. Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	*(see p.68)*
S	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. *Choose the points appropriate for the description that best fit conditions in the wetland. (stems of plants should be thick enough (usually > 1/8in), or dense enough, to remain erect during surface flows)* Dense, uncut, **rigid** vegetation covers > 90% of the area of the wetland. points = 6 Dense, uncut, **rigid** vegetation > 1/2 area of wetland points = 3 Dense, uncut, **rigid** vegetation > 1/4 area points = 1 More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid points = 0	6
S	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows: The slope wetland has small surface depressions that can retain water over at least 10% of its area. YES points = 2 NO points = 0	0
S	*Add the points in the boxes above*	6
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* — Wetland has surface runoff that drains to a river or stream that has flooding problems — Other_____ *(Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam)* **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 70)* multiplier ____
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	6

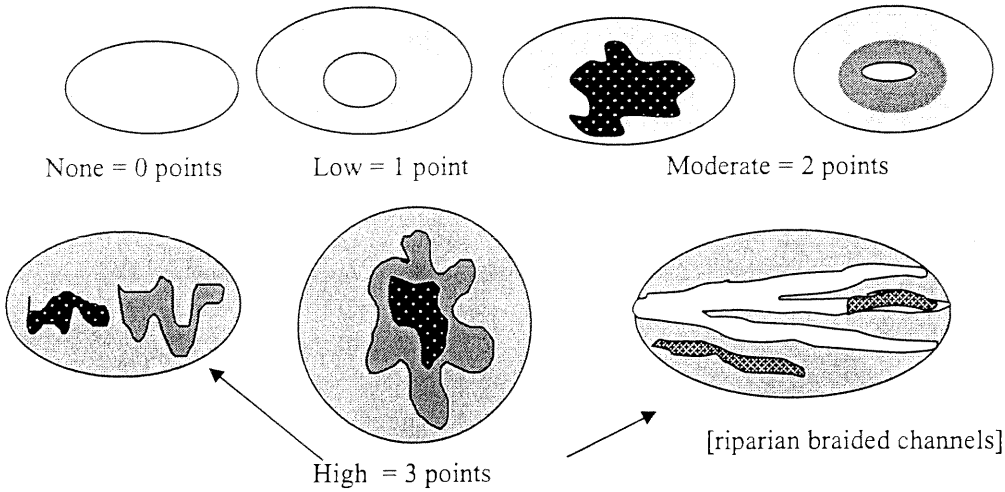
Comments

Wetland name or number B

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure *(see p. 72)* *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____Aquatic bed _X_Emergent plants ____Scrub/shrub (areas where shrubs have >30% cover) ____Forested (areas where trees have >30% cover) *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 *Add the number of vegetation structures that qualify. If you have:* 4 structures or more — points = 4 3 structures — points = 2 2 structures — points = 1 1 structure — points = 0 Map of Cowardin vegetation classes	Figure ___ 0
H 1.2. Hydroperiods *(see p. 73)* *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 acre 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 ____Occasionally flooded or inundated — 2 types present — point = 1 _X_Saturated only — 1 type present — points = 0 ____ 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** Map of hydroperiods	Figure ___ 0
H 1.3. Richness of Plant Species *(see p. 75)* Count the number of plant species in the wetland that cover at least 10 ft^2. *(different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species — points = 2 *List species below if you want to:* 5 - 19 species — points = 1 < 5 species — points = 0	1

Total for page 1

Wetland name or number B

	Figure ___
H 1.4. Interspersion of habitats *(see p. 76)* Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points Low = 1 point Moderate = 2 points High = 3 points [riparian braided channels] NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes	0
H 1.5. Special Habitat Features: *(see p. 77)* *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ____Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). ____Standing snags (diameter at the bottom > 4 inches) in the wetland ____Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ____At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated. *(structures for egg-laying by amphibians)* X Invasive plants cover less than 25% of the wetland area in each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	1
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	2

Comments

Wetland name or number B

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** X No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0**. — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	Figure ___ 2
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	0

Total for page 2

Wetland name or number B

H 2.3 Near or adjacent to other priority habitats listed by WDFW *(see p. 82)* Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* *These are DFW definitions. Check with your local DFW biologist if there are any questions.* ____**Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ____**Aspen Stands:** Pure or mixed stands of aspen greater than 0.8 ha (2 acres). ____**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ____**Old-growth 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 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. ____**Mature forests:** Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 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. ____**Prairies:** Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community. ____**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ____**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages ____**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%. ____**Urban Natural Open Space**: A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development. ____**Estuary/Estuary-like:** Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5ppt. during the period of average annual low flow. Includes both estuaries and lagoons. ____**Marine/Estuarine Shorelines**: Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control). If wetland has **3 or more** priority habitats = **4 points** If wetland has **2** priority habitats = **3 points** If wetland has **1** priority habitat = **1 point** No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	0

Wetland name or number B

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	5
TOTAL for H 1 from page 14	2
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	7

Wetland name or number B

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

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 *(see p. 86)* Does the wetland unit 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 X	
SC 1.1 Is the wetland unit 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 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — 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 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

Wetland name or number B

SC 2.0 Natural Heritage Wetlands *(see p. 87)* Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)* S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site ___ YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO ___ SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? YES = Category I NO X not a Heritage Wetland	**Cat. I**
SC 3.0 Bogs *(see p. 87)* Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2 2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes - go to Q. 3 No - Is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Is a bog for purpose of rating No - go to Q. 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" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. *1.* Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?* 2. YES = Category I No X Is not a bog for purpose of rating	**Cat. I**

Wetland name or number B

SC 4.0 Forested Wetlands *(see p. 90)* Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the 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/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. — **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. YES = Category I NO X not a forested wetland with special characteristics	**Cat. I**
SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)* 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 surface 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 X not a wetland in a coastal lagoon SC 5.1 Does the wetland meets 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 invasive plant species (see list of invasive species on p. 74). — 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 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

Wetland name or number E

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO X not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its 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 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	N/A

Wetland name or number F

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users

Name of wetland (if known): TAL - 9180 Wetland F Date of site visit: 05-05-08

Rated by DMW Trained by Ecology? Yes X No___ Date of training 10-05

SEC: 14 TWNSHP: 25 RNGE: 5 Is S/T/R in Appendix D? Yes___ No___

Map of wetland unit: Figure ____ Estimated size _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III___ IV X

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	1
Score for Hydrologic Functions	8
Score for Habitat Functions	11
TOTAL score for Functions	20

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ Does not Apply X

Final Category (choose the "highest" category from above) IV

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		Depressional	
Natural Heritage Wetland		Riverine	
Bog		Lake-fringe	
Mature Forest		Slope	X
Old Growth Forest		Flats	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	

Wetland name or number F

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered* ***animal or plant*** *species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered* ***animal*** *species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number F

Classification of Wetland Units in Western Washington

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 (i.e. except during floods)?

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

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe** **NO – Saltwater Tidal Fringe (Estuarine)**

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 rated as an* ***Estuarine*** *wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

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 both** of the following criteria?

___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (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**?

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 <3ft diameter and less than 1 foot deep).*

NO - go to 5 **YES** – The wetland class is **Slope**

Wetland name or number F

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 two years.

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

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

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 clases. 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 your wetland. 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 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	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still 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 F

S	**Slope Wetlands** WATER QUALITY FUNCTIONS - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
S	**S 1. Does the wetland unit have the <u>potential</u> to improve water quality?**	*(see p.64)*
S	S 1.1 Characteristics of average slope of unit: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation for every 100 ft horizontal distance)* points = 3 Slope is 1% - 2% points = 2 Slope is 2% - 5% points = 1 Slope is greater than 5% points = 0	1
S	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES = 3 points NO = 0 points	0
S	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.* Dense, uncut, herbaceous vegetation > 90% of the wetland area points = 6 Dense, uncut, herbaceous vegetation > 1/2 of area points = 3 Dense, woody, vegetation > ½ of area points = 2 Dense, uncut, herbaceous vegetation > 1/4 of area points = 1 Does not meet any of the criteria above for vegetation points = 0 Aerial photo or map with vegetation polygons	Figure ___ 0
S	**Total for S 1** *Add the points in the boxes above*	1
S	**S 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150ft — Untreated stormwater discharges to wetland — Tilled fields, logging, or orchards within 150 feet of wetland — Residential, urban areas, or golf courses are within 150 ft upslope of wetland — Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p.67)* multiplier ____
S	**TOTAL - Water Quality Functions** Multiply the score from S1 by S2 ***Add score to table on p. 1***	1

Comments

Wetland name or number F

S	**Slope Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream erosion	**Points** (only 1 score per box)
	S 3. Does the wetland unit have the potential to reduce flooding and stream erosion?	*(see p.68)*
S	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. *Choose the points appropriate for the description that best fit conditions in the wetland. (stems of plants should be thick enough (usually > 1/8in), or dense enough, to remain erect during surface flows)* Dense, uncut, **rigid** vegetation covers > 90% of the area of the wetland. points = 6 Dense, uncut, **rigid** vegetation > 1/2 area of wetland points = 3 Dense, uncut, **rigid** vegetation > 1/4 area points = 1 More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid points = 0	6
S	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows: The slope wetland has small surface depressions that can retain water over at least 10% of its area. YES points = 2 NO points = 0	2
S	*Add the points in the boxes above*	8
S	**S 4. Does the wetland have the opportunity to reduce flooding and erosion?** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* — Wetland has surface runoff that drains to a river or stream that has flooding problems — Other_____ *(Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam)* **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 70)* multiplier ____
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	8

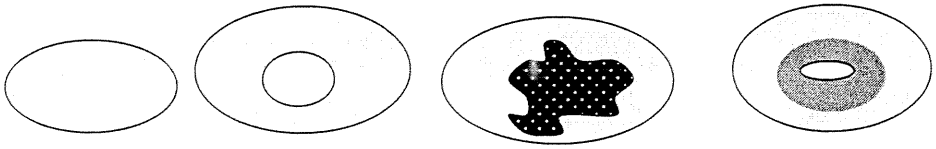
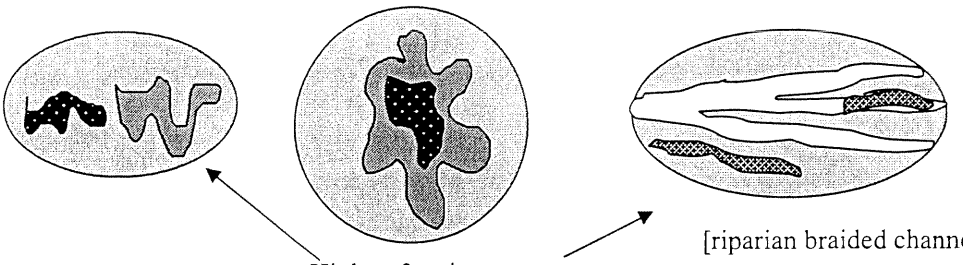
Comments

Wetland name or number F

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____Aquatic bed _X_Emergent plants ____Scrub/shrub (areas where shrubs have >30% cover) ____Forested (areas where trees have >30% cover) *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 *Add the number of vegetation structures that qualify. If you have:* 4 structures or more — points = 4 3 structures — points = 2 2 structures — points = 1 1 structure — points = 0 Map of Cowardin vegetation classes	Figure ___ 0
H 1.2. Hydroperiods ***(see p. 73)*** *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 acre 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 ____Occasionally flooded or inundated — 2 types present — point = 1 _X_Saturated only — 1 type present — points = 0 ____ 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** Map of hydroperiods	Figure ___ 1
H 1.3. Richness of Plant Species ***(see p. 75)*** Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species — points = 2 *List species below if you want to:* 5 - 19 species — points = 1 < 5 species — points = 0	1

Total for page 2

Wetland name or number F

H 1.4. Interspersion of habitats *(see p. 76)* Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points Low = 1 point Moderate = 2 points  High = 3 points [riparian braided channels] NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes	Figure ___ 2
H 1.5. Special Habitat Features: *(see p. 77)* *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ____Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). ____Standing snags (diameter at the bottom > 4 inches) in the wetland ____Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ____At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated. *(structures for egg-laying by amphibians)* _X_ Invasive plants cover less than 25% of the wetland area in each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	1
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	5

Comments

Wetland name or number F

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** X 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0.** — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	Figure ___ 3
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	6

Total for page 3

Wetland name or number F

H 2.3 Near or adjacent to other priority habitats listed by WDFW *(see p. 82)* Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* *These are DFW definitions. Check with your local DFW biologist if there are any questions.* ____**Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ____**Aspen Stands:** Pure or mixed stands of aspen greater than 0.8 ha (2 acres). ____**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ____**Old-growth 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 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. ____**Mature forests:** Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 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. ____**Prairies:** Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community. ____**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ____**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages ____**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%. ____**Urban Natural Open Space**: A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development. ____**Estuary/Estuary-like:** Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5ppt. during the period of average annual low flow. Includes both estuaries and lagoons. ____**Marine/Estuarine Shorelines**: Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control). If wetland has **3 or more** priority habitats = **4 points** If wetland has **2** priority habitats = **3 points** If wetland has **1** priority habitat = **1 point** No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	0

Wetland name or number E

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	6
TOTAL for H 1 from page 14	5
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	11

Wetland name or number F

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

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 *(see p. 86)* Does the wetland unit 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 X	
SC 1.1 Is the wetland unit 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 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — 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 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

Wetland name or number E

SC 2.0 Natural Heritage Wetlands *(see p. 87)* Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)* S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site ___ YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO ___ SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? YES = Category I NO _X_ not a Heritage Wetland	**Cat. I**
SC 3.0 Bogs *(see p. 87)* Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2 2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes - go to Q. 3 No - Is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Is a bog for purpose of rating No - go to Q. 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" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. *1.* Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?* 2. YES = Category I No_X_ Is not a bog for purpose of rating	**Cat. I**

Wetland name or number F

SC 4.0 Forested Wetlands *(see p. 90)* Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the 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/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. — **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. YES = Category I NO X not a forested wetland with special characteristics	**Cat. I**
SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)* 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 surface 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 X not a wetland in a coastal lagoon SC 5.1 Does the wetland meets 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 invasive plant species (see list of invasive species on p. 74). — 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 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

Wetland name or number E

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO X not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its 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 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	E

Wetland name or number G

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users

Name of wetland (if known): TAL-BRC Wetland G Date of site visit: 05-05-08

Rated by DMT Trained by Ecology? Yes X No___ Date of training 10-05

SEC: 14 TWNSHP: 25 RNGE: 5 Is S/T/R in Appendix D? Yes___ No___

Map of wetland unit: Figure ____ Estimated size _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III___ IV X

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	8
Score for Hydrologic Functions	6
Score for Habitat Functions	9
TOTAL score for Functions	23

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ Does not Apply X

Final Category (choose the "highest" category from above) IV

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		**Wetland HGM Class used for Rating**	
Estuarine		**Depressional**	X
Natural Heritage Wetland		**Riverine**	
Bog		**Lake-fringe**	
Mature Forest		**Slope**	
Old Growth Forest		**Flats**	
Coastal Lagoon		**Freshwater Tidal**	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	

Wetland name or number G

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered* ***animal or plant*** *species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered* ***animal*** *species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number G

Classification of Wetland Units in Western Washington

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 (i.e. except during floods)?
NO – go to 2 **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe** **NO – Saltwater Tidal Fringe (Estuarine)**

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 rated as an* ***Estuarine*** *wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

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 both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (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**?
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 <3ft diameter and less than 1 foot deep).*
NO - go to 5 **YES** – The wetland class is **Slope**

Wetland name or number G

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 two years.

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

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

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 clases. 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 your wetland. 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 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	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still 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 7

D	**Depressional and Flats Wetlands** **WATER QUALITY FUNCTIONS** - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
D	**D 1. Does the wetland unit have the potential to improve water quality?**	*(see p.38)*
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) points = 3 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 1 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing"*) Provide photo or drawing	Figure ___ 1
D	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES points = 4 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation > = 95% of area points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure ___ 3
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* 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 Map of Hydroperiods	Figure ___ 4
D	**Total for D 1** *Add the points in the boxes above*	8
D	**D 2. Does the wetland unit have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 44)* multiplier _____
D	**TOTAL - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	8

Wetland name or number G

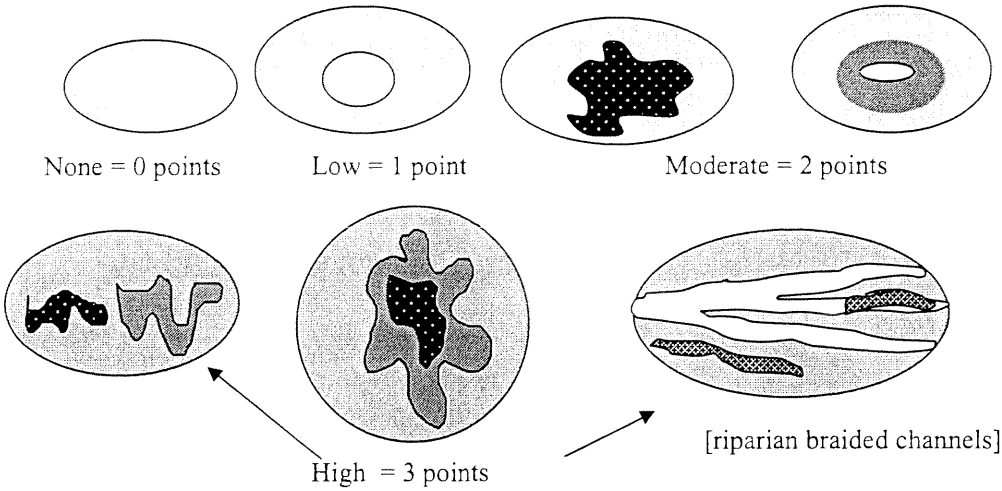
D	**Depressional and Flats Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream degradation	**Points** (only 1 score per box)
	D 3. Does the wetland unit have the <u>potential</u> to reduce flooding and erosion?	*(see p.46)*
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) points = 4 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 *(If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)* points = 0	0
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 The wetland is a "headwater" wetland" points = 5 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 Unit is flat (yes to Q. 2 or Q. 7 on key) but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft points = 0	3
D	D 3.3 Contribution of wetland unit 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 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 unit is in the FLATS class points = 5	3
D	**Total for D 3** *Add the points in the boxes above*	6
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following indicators of opportunity apply.* — Wetland is in a headwater of a river or stream that has flooding problems — Wetland drains to a river or stream that has flooding problems — Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems — Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 49)* multiplier ____
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	6

Wetland name or number 7

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____Aquatic bed _X_Emergent plants _X_Scrub/shrub (areas where shrubs have >30% cover) ____Forested (areas where trees have >30% cover) *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 *Add the number of vegetation structures that qualify. If you have:* 4 structures or more — points = 4 3 structures — points = 2 2 structures — points = 1 1 structure — points = 0 Map of Cowardin vegetation classes	Figure ___ 1
H 1.2. Hydroperiods ***(see p. 73)*** *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 acre 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 ____Occasionally flooded or inundated — 2 types present — point = 1 _X_Saturated only — 1 type present — points = 0 ____ 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** Map of hydroperiods	Figure ___ 1
H 1.3. Richness of Plant Species ***(see p. 75)*** Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species — points = 2 *List species below if you want to:* 5 - 19 species — points = 1 < 5 species — points = 0	1

Total for page 3

Wetland name or number G

H 1.4. Interspersion of habitats *(see p. 76)* Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points Low = 1 point Moderate = 2 points High = 3 points [riparian braided channels] NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes	Figure ___ 1
H 1.5. Special Habitat Features: *(see p. 77)* *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ____Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). ____Standing snags (diameter at the bottom > 4 inches) in the wetland ____Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ____At least ¼ acre of thin-stemmed persistent vegetation 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 each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	4

Comments

Wetland name or number G

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** X No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0**. — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	Figure ___ 2
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	0

Total for page 2

Wetland name or number G

H 2.3 Near or adjacent to other priority habitats listed by WDFW *(see p. 82)* Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* *These are DFW definitions. Check with your local DFW biologist if there are any questions.* ____**Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ____**Aspen Stands:** Pure or mixed stands of aspen greater than 0.8 ha (2 acres). ____**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ____**Old-growth 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 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. ____**Mature forests:** Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 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. ____**Prairies:** Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community. ____**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ____**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages ____**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%. ____**Urban Natural Open Space**: A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development. ____**Estuary/Estuary-like:** Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5ppt. during the period of average annual low flow. Includes both estuaries and lagoons. ____**Marine/Estuarine Shorelines**: Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control). If wetland has **3 or more** priority habitats = **4 points** If wetland has **2** priority habitats = **3 points** If wetland has **1** priority habitat = **1 point** No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	0

Wetland name or number G

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	5
TOTAL for H 1 from page 14	4
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	9

Wetland name or number G

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

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 *(see p. 86)* Does the wetland unit 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 X	
SC 1.1 Is the wetland unit 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 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — 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 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

Wetland name or number G

SC 2.0 Natural Heritage Wetlands *(see p. 87)* Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)* S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site ___ YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO ___ SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? YES = Category I NO X not a Heritage Wetland	**Cat. I**
SC 3.0 Bogs *(see p. 87)* Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2 2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes - go to Q. 3 No - Is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Is a bog for purpose of rating No - go to Q. 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" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. *1.* Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?* 2. YES = Category I No X Is not a bog for purpose of rating	**Cat. I**

Wetland name or number G

SC 4.0 Forested Wetlands *(see p. 90)* Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the 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/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. — **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. YES = Category I NO X not a forested wetland with special characteristics	**Cat. I**
SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)* 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 surface 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 X not a wetland in a coastal lagoon SC 5.1 Does the wetland meets 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 invasive plant species (see list of invasive species on p. 74). — 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 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

Wetland name or number G

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO X not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its 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 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	NA

Wetland name or number H

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users

Name of wetland (if known): IAL-8/8C Wetland H Date of site visit: 05-05-06

Rated by DMW Trained by Ecology? Yes X No___ Date of training 10-05

SEC: 14 TWNSHP: 25 RNGE: 5 Is S/T/R in Appendix D? Yes___ No___

Map of wetland unit: Figure ____ Estimated size _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III___ IV X

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	2
Score for Hydrologic Functions	8
Score for Habitat Functions	9
TOTAL score for Functions	19

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ Does not Apply X

Final Category (choose the "highest" category from above) IV

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		Depressional	
Natural Heritage Wetland		Riverine	
Bog		Lake-fringe	
Mature Forest		Slope	X
Old Growth Forest		Flats	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	

Wetland name or number H

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered* ***animal or plant*** *species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered* ***animal*** *species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number H

Classification of Wetland Units in Western Washington

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 (i.e. except during floods)?
NO – go to 2 **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe** **NO – Saltwater Tidal Fringe (Estuarine)**

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 rated as an* ***Estuarine*** *wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

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 both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (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**?
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 <3ft diameter and less than 1 foot deep).*
NO - go to 5 **YES** – The wetland class is **Slope**

Wetland name or number H

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 two years.

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

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

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 clases. 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 your wetland. 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 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	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still 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 H

S	**Slope Wetlands** WATER QUALITY FUNCTIONS - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
S	**S 1. Does the wetland unit have the potential to improve water quality?**	*(see p.64)*
S	S 1.1 Characteristics of average slope of unit: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation for every 100 ft horizontal distance)* points = 3 Slope is 1% - 2% points = 2 Slope is 2% - 5% points = 1 Slope is greater than 5% points = 0	2
S	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES = 3 points NO = 0 points	0
S	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.* Dense, uncut, herbaceous vegetation > 90% of the wetland area points = 6 Dense, uncut, herbaceous vegetation > 1/2 of area points = 3 Dense, woody, vegetation > ½ of area points = 2 Dense, uncut, herbaceous vegetation > 1/4 of area points = 1 Does not meet any of the criteria above for vegetation points = 0 Aerial photo or map with vegetation polygons	Figure ___ 0
S	**Total for S 1** *Add the points in the boxes above*	2
S	**S 2. Does the wetland unit have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150ft — Untreated stormwater discharges to wetland — Tilled fields, logging, or orchards within 150 feet of wetland — Residential, urban areas, or golf courses are within 150 ft upslope of wetland — Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p.67)* multiplier ____
S	**TOTAL - Water Quality Functions** Multiply the score from S1 by S2 ***Add score to table on p. 1***	2

Comments

Wetland name or number H

S	**Slope Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream erosion	**Points** (only 1 score per box)
	S 3. Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	*(see p.68)*
S	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. *Choose the points appropriate for the description that best fit conditions in the wetland. (stems of plants should be thick enough (usually > 1/8in), or dense enough, to remain erect during surface flows)* Dense, uncut, **rigid** vegetation covers > 90% of the area of the wetland. points = 6 Dense, uncut, **rigid** vegetation > 1/2 area of wetland points = 3 Dense, uncut, **rigid** vegetation > 1/4 area points = 1 More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid points = 0	6
S	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows: The slope wetland has small surface depressions that can retain water over at least 10% of its area. YES points = 2 NO points = 0	2
S	*Add the points in the boxes above*	8
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* — Wetland has surface runoff that drains to a river or stream that has flooding problems — Other_____ *(Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam)* **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 70)* multiplier ____
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	8

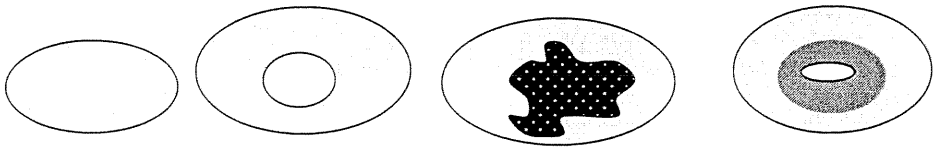
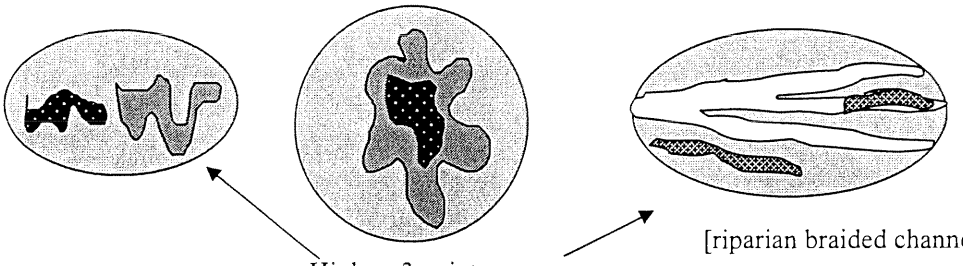
Comments

Wetland name or number 14

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?	
H 1.1 <u>Vegetation structure</u> ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____Aquatic bed _X_Emergent plants ____Scrub/shrub (areas where shrubs have >30% cover) ____Forested (areas where trees have >30% cover) *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 *Add the number of vegetation structures that qualify. If you have:* 4 structures or more — points = 4 3 structures — points = 2 2 structures — points = 1 1 structure — points = 0 Map of Cowardin vegetation classes	Figure ___ 0
H 1.2. <u>Hydroperiods</u> ***(see p. 73)*** *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 acre 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 ____Occasionally flooded or inundated — 2 types present — point = 1 _X_Saturated only — 1 type present — points = 0 ____ 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** Map of hydroperiods	Figure ___ 2
H 1.3. <u>Richness of Plant Species</u> ***(see p. 75)*** Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species — points = 2 *List species below if you want to:* 5 - 19 species — points = 1 < 5 species — points = 0	1

Total for page 3

Wetland name or number H

	Figure ___
H 1.4. Interspersion of habitats *(see p. 76)* Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points Low = 1 point Moderate = 2 points  High = 3 points [riparian braided channels] NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes	0
H 1.5. Special Habitat Features: *(see p. 77)* *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ____Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). ____Standing snags (diameter at the bottom > 4 inches) in the wetland ____Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ____At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated. *(structures for egg-laying by amphibians)* X Invasive plants cover less than 25% of the wetland area in each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	1
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	4

Comments

Wetland name or number 14

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** X No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0.** — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	Figure ___ 2
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	0

Total for page 2

Wetland name or number H

H 2.3 Near or adjacent to other priority habitats listed by WDFW *(see p. 82)* Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* *These are DFW definitions. Check with your local DFW biologist if there are any questions.* ____**Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ____**Aspen Stands:** Pure or mixed stands of aspen greater than 0.8 ha (2 acres). ____**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ____**Old-growth 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 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. ____**Mature forests:** Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 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. ____**Prairies:** Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community. ____**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ____**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages ____**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%. ____**Urban Natural Open Space**: A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development. ____**Estuary/Estuary-like:** Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5ppt. during the period of average annual low flow. Includes both estuaries and lagoons. ____**Marine/Estuarine Shorelines**: Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control). If wetland has **3 or more** priority habitats = **4 points** If wetland has **2** priority habitats = **3 points** If wetland has **1** priority habitat = **1 point** No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	0

Wetland name or number H

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	5
TOTAL for H 1 from page 14	4
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	9

Wetland name or number H

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

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 *(see p. 86)* Does the wetland unit 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 X	
SC 1.1 Is the wetland unit 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 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — 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 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

Wetland name or number H

SC 2.0 Natural Heritage Wetlands *(see p. 87)* Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)* S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site ___ YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO ___ SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? YES = Category I NO X not a Heritage Wetland	**Cat. I**
SC 3.0 Bogs *(see p. 87)* Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2 2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes - go to Q. 3 No - Is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Is a bog for purpose of rating No - go to Q. 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" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. *1.* Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?* 2. YES = Category I No X Is not a bog for purpose of rating	**Cat. I**

Wetland name or number H

SC 4.0 Forested Wetlands *(see p. 90)* Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the 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/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. — **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. YES = Category I NO Y not a forested wetland with special characteristics	**Cat. I**
SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)* 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 surface 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 X not a wetland in a coastal lagoon SC 5.1 Does the wetland meets 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 invasive plant species (see list of invasive species on p. 74). — 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 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

Wetland name or number 14

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO X not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its 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 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	NA

Wetland name or number J

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users

Name of wetland (if known): TAL-818C Wetland J Date of site visit: 06-02-08

Rated by DAT Trained by Ecology? Yes X No___ Date of training 10-05

SEC: ___ TWNSHP: ____ RNGE: ____ Is S/T/R in Appendix D? Yes___ No___

Map of wetland unit: Figure ____ Estimated size _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III X IV___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	8
Score for Hydrologic Functions	10
Score for Habitat Functions	14
TOTAL score for Functions	32

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ Does not Apply X

Final Category (choose the "highest" category from above) III

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		Depressional	
Natural Heritage Wetland		Riverine	
Bog		Lake-fringe	
Mature Forest		Slope	X
Old Growth Forest		Flats	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	

Wetland name or number J

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered* ***animal or plant*** *species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered* ***animal*** *species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number J

Classification of Wetland Units in Western Washington

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 (i.e. except during floods)?
NO – go to 2 **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe** **NO – Saltwater Tidal Fringe (Estuarine)**

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 rated as an* ***Estuarine*** *wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

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 both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (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**?
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 <3ft diameter and less than 1 foot deep).*
NO - go to 5 **YES** – The wetland class is **Slope**

Wetland name or number J

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 two years.

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

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

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 clases. 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 your wetland. 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 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	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still 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 J

S	**Slope Wetlands** WATER QUALITY FUNCTIONS - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
S	**S 1. Does the wetland unit have the <u>potential</u> to improve water quality?**	*(see p.64)*
S	S 1.1 Characteristics of average slope of unit: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation for every 100 ft horizontal distance)* points = 3 Slope is 1% - 2% points = 2 Slope is 2% - 5% points = 1 Slope is greater than 5% points = 0	1
S	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES = 3 points NO = 0 points	0
S	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.* Dense, uncut, herbaceous vegetation > 90% of the wetland area points = 6 Dense, uncut, herbaceous vegetation > 1/2 of area points = 3 Dense, woody, vegetation > ½ of area points = 2 Dense, uncut, herbaceous vegetation > 1/4 of area points = 1 Does not meet any of the criteria above for vegetation points = 0 Aerial photo or map with vegetation polygons	Figure ___ 3
S	**Total for S 1** *Add the points in the boxes above*	4
S	**S 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150ft — Untreated stormwater discharges to wetland — Tilled fields, logging, or orchards within 150 feet of wetland — Residential, urban areas, or golf courses are within 150 ft upslope of wetland — Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p.67)* multiplier 2
S	**TOTAL - Water Quality Functions** Multiply the score from S1 by S2 *Add score to table on p. 1*	8

Comments

Wetland name or number J

S	**Slope Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream erosion	**Points** (only 1 score per box)
	S 3. Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	*(see p.68)*
S	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. *Choose the points appropriate for the description that best fit conditions in the wetland. (stems of plants should be thick enough (usually > 1/8in), or dense enough, to remain erect during surface flows)* Dense, uncut, **rigid** vegetation covers > 90% of the area of the wetland. points = 6 Dense, uncut, **rigid** vegetation > 1/2 area of wetland points = 3 Dense, uncut, **rigid** vegetation > 1/4 area points = 1 More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid points = 0	3
S	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows: The slope wetland has small surface depressions that can retain water over at least 10% of its area. YES points = 2 NO points = 0	2
S	*Add the points in the boxes above*	5
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* — Wetland has surface runoff that drains to a river or stream that has flooding problems X Other Upstream of Samamish River *(Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam)* **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 70)* multiplier 2
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	10

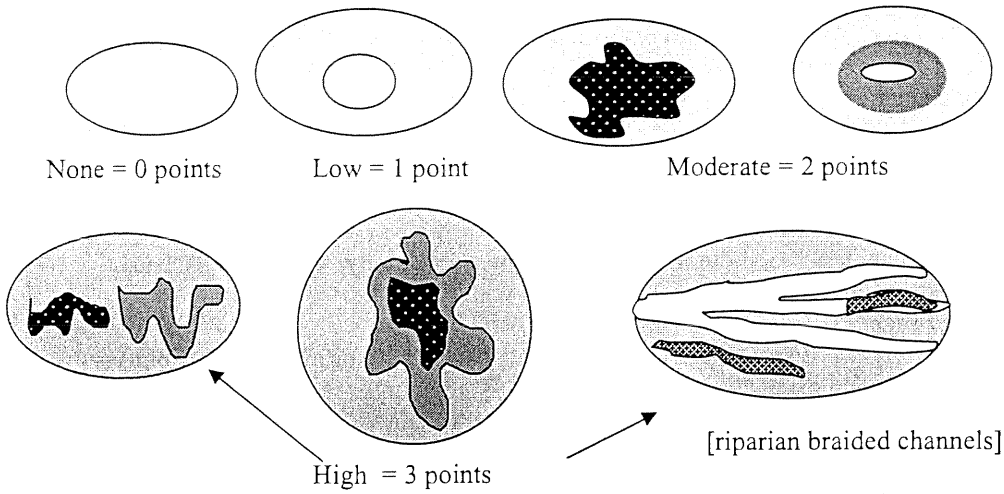
Comments

Wetland name or number J

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?	
H 1.1 <u>Vegetation structure</u> ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____Aquatic bed _Y_Emergent plants _Y_Scrub/shrub (areas where shrubs have >30% cover) _Y_Forested (areas where trees have >30% cover) *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 *Add the number of vegetation structures that qualify. If you have:* 4 structures or more — points = 4 3 structures — points = 2 2 structures — points = 1 1 structure — points = 0 Map of Cowardin vegetation classes	Figure ___ 2
H 1.2. <u>Hydroperiods</u> ***(see p. 73)*** *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 acre 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 ____Occasionally flooded or inundated — 2 types present — point = 1 _X_Saturated only — 1 type present — points = 0 ____ 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** Map of hydroperiods	Figure ___ 1
H 1.3. <u>Richness of Plant Species</u> ***(see p. 75)*** Count the number of plant species in the wetland that cover at least 10 ft^2. *(different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species — points = 2 5 - 19 species — points = 1 < 5 species — points = 0 *List species below if you want to:* Hlra Scmi Rarc Poba Vcam Egar Sasi Gema Rudi Rusp Atfi Pote Juef Cemo Jude	2

Total for page 5

Wetland name or number J

H 1.4. Interspersion of habitats *(see p. 76)* Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points Low = 1 point Moderate = 2 points High = 3 points [riparian braided channels] NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes	Figure ___ 2
H 1.5. Special Habitat Features: *(see p. 77)* *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* X Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). ____Standing snags (diameter at the bottom > 4 inches) in the wetland ____Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ____At least ¼ acre of thin-stemmed persistent vegetation 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 each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	1
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	8

Comments

Wetland name or number J

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** X 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0.** — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	Figure ___ 3
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	0

Total for page 3

Wetland name or number 5

H 2.3 Near or adjacent to other priority habitats listed by WDFW *(see p. 82)* Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* *These are DFW definitions. Check with your local DFW biologist if there are any questions.* ____**Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ____**Aspen Stands:** Pure or mixed stands of aspen greater than 0.8 ha (2 acres). ____**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ____**Old-growth 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 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. ____**Mature forests:** Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 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. ____**Prairies:** Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community. ____**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ____**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages ____**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%. ____**Urban Natural Open Space**: A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development. ____**Estuary/Estuary-like:** Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5ppt. during the period of average annual low flow. Includes both estuaries and lagoons. _____**Marine/Estuarine Shorelines**: Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control). If wetland has **3 or more** priority habitats = **4 points** If wetland has **2** priority habitats = **3 points** If wetland has **1** priority habitat = **1 point** No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	0

Wetland name or number 5

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	6
TOTAL for H 1 from page 14	8
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	14

Wetland name or number J

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

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 *(see p. 86)* Does the wetland unit 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 X	
SC 1.1 Is the wetland unit 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 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — 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 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

Wetland name or number J

SC 2.0 Natural Heritage Wetlands *(see p. 87)* Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)* S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site ___ YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO ___ SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? YES = Category I NO X not a Heritage Wetland	**Cat. I**
SC 3.0 Bogs *(see p. 87)* Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2 2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes - go to Q. 3 No - Is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Is a bog for purpose of rating No - go to Q. 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" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. *1.* Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?* 2. YES = Category I No X Is not a bog for purpose of rating	**Cat. I**

Wetland name or number J

SC 4.0 Forested Wetlands *(see p. 90)* Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the 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/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. — **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. YES = Category I NO X not a forested wetland with special characteristics	**Cat. I**
SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)* 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 surface 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 X not a wetland in a coastal lagoon SC 5.1 Does the wetland meets 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 invasive plant species (see list of invasive species on p. 74). — 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 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

Wetland name or number J

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO ✓ not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its 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 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	NA

Wetland name or number K

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users

Name of wetland (if known): TAL-818C Wetland K Date of site visit: 06-02

Rated by DRT Trained by Ecology? Yes X No___ Date of training 10-05

SEC: 14 TWNSHP: 25N RNGE: 05E Is S/T/R in Appendix D? Yes___ No X

Map of wetland unit: Figure ____ Estimated size _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III___ IV X

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	7
Score for Hydrologic Functions	4
Score for Habitat Functions	6
TOTAL score for Functions	17

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ Does not Apply X

Final Category (choose the "highest" category from above) IV

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		Depressional	X
Natural Heritage Wetland		Riverine	
Bog		Lake-fringe	
Mature Forest		Slope	
Old Growth Forest		Flats	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	

Wetland name or number K

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered* ***animal or plant*** *species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered* ***animal*** *species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number K

Classification of Wetland Units in Western Washington

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 (i.e. except during floods)?
NO – go to 2 **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe NO – Saltwater Tidal Fringe (Estuarine)**

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 rated as an* ***Estuarine*** *wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

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 both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (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**?
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 <3ft diameter and less than 1 foot deep).*
NO - go to 5 **YES** – The wetland class is **Slope**

Wetland name or number 11

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 two years.

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

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

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 clases. 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 your wetland. 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 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	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still 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 K

D	**Depressional and Flats Wetlands** **WATER QUALITY FUNCTIONS** - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
D	**D 1. Does the wetland unit have the potential to improve water quality?**	*(see p.38)*
D	D 1.1 Characteristics of surface water flows out of the wetland: Unit is a depression with no surface water leaving it (no outlet) points = 3 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 1 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing"*) Provide photo or drawing	Figure ___ 3
D	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES points = 4 NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) Wetland has persistent, ungrazed, vegetation > = 95% of area points = 5 Wetland has persistent, ungrazed, vegetation > = 1/2 of area points = 3 Wetland has persistent, ungrazed vegetation > = 1/10 of area points = 1 Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	Figure ___ 0
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* 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 Map of Hydroperiods	Figure ___ 4
D	**Total for D 1** *Add the points in the boxes above*	7
D	**D 2. Does the wetland unit have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150 ft — Untreated stormwater discharges to wetland — Tilled fields or orchards within 150 ft of wetland — A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging — Residential, urban areas, golf courses are within 150 ft of wetland — Wetland is fed by groundwater high in phosphorus or nitrogen — Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 44)* multiplier ____
D	**TOTAL - Water Quality Functions** Multiply the score from D1 by D2 *Add score to table on p. 1*	7

Wetland name or number k

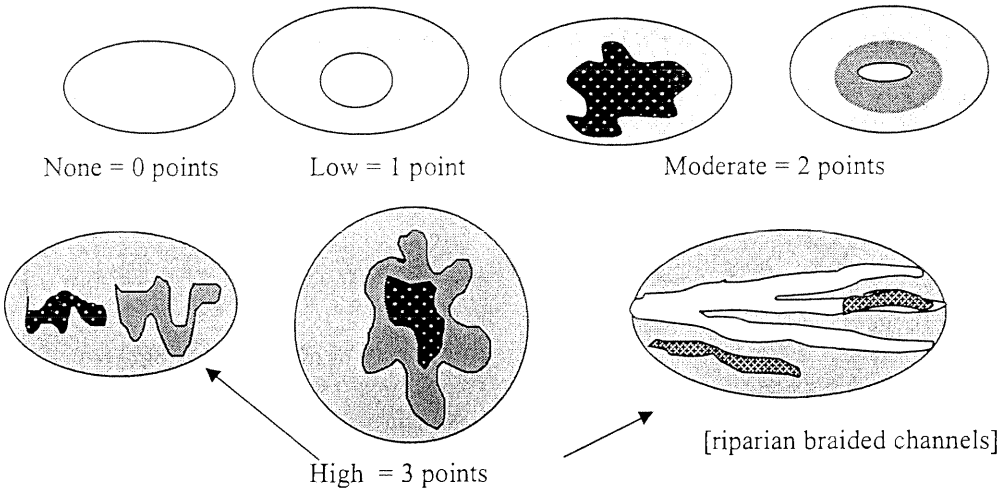
D	**Depressional and Flats Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream degradation	**Points** (only 1 score per box)
	D 3. Does the wetland unit have the <u>potential</u> to reduce flooding and erosion?	*(see p.46)*
D	D 3.1 Characteristics of surface water flows out of the wetland unit Unit is a depression with no surface water leaving it (no outlet) points = 4 Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 *(If ditch is not permanently flowing treat unit as "intermittently flowing")* Unit has an unconstricted, or slightly constricted, surface outlet *(permanently flowing)* points = 0	4
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 The wetland is a "headwater" wetland" points = 5 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 Unit is flat (yes to Q. 2 or Q. 7 on key) but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft points = 0	0
D	D 3.3 Contribution of wetland unit 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 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 unit is in the FLATS class points = 5	0
D	**Total for D 3** *Add the points in the boxes above*	4
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following indicators of opportunity apply.* — Wetland is in a headwater of a river or stream that has flooding problems — Wetland drains to a river or stream that has flooding problems — Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems — Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 49)* multiplier ____
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	4

Wetland name or number K

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure *(see p. 72)* *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____Aquatic bed _X_Emergent plants ____Scrub/shrub (areas where shrubs have >30% cover) ____Forested (areas where trees have >30% cover) *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 *Add the number of vegetation structures that qualify. If you have:* 4 structures or more — points = 4 3 structures — points = 2 2 structures — points = 1 1 structure — points = 0 Map of Cowardin vegetation classes	Figure ___ 0
H 1.2. Hydroperiods *(see p. 73)* *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 acre 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 — point = 1 _X_Saturated only — 1 type present — points = 0 ____ 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** Map of hydroperiods	Figure ___ 1
H 1.3. Richness of Plant Species *(see p. 75)* Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species — points = 2 *List species below if you want to:* 5 - 19 species — points = 1 < 5 species — points = 0	0

Total for page 1

Wetland name or number K

	Figure ___
H 1.4. Interspersion of habitats *(see p. 76)* Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points Low = 1 point Moderate = 2 points High = 3 points [riparian braided channels] NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes	0
H 1.5. Special Habitat Features: *(see p. 77)* *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ____Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). ____Standing snags (diameter at the bottom > 4 inches) in the wetland ____Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ____At least ¼ acre of thin-stemmed persistent vegetation 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 each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	1

Comments

Wetland name or number K

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** ✓ No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0**. — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	Figure ___ 2
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	0

Total for page 2

Wetland name or number K

H 2.3 Near or adjacent to other priority habitats listed by WDFW *(see p. 82)* Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* *These are DFW definitions. Check with your local DFW biologist if there are any questions.* ____**Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ____**Aspen Stands:** Pure or mixed stands of aspen greater than 0.8 ha (2 acres). ____**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ____**Old-growth 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 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. ____**Mature forests:** Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 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. ____**Prairies:** Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community. ____**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ____**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages ____**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%. ____**Urban Natural Open Space**: A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development. ____**Estuary/Estuary-like:** Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5ppt. during the period of average annual low flow. Includes both estuaries and lagoons. ____**Marine/Estuarine Shorelines**: Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control). If wetland has **3 or more** priority habitats = **4 points** If wetland has **2** priority habitats = **3 points** If wetland has **1** priority habitat = **1 point** No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	0

Wetland name or number K

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	5
TOTAL for H 1 from page 14	1
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	6

Wetland name or number K

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

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 *(see p. 86)* Does the wetland unit 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 X	
SC 1.1 Is the wetland unit 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 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — 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 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

Wetland name or number 1K

SC 2.0 Natural Heritage Wetlands *(see p. 87)* Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)* S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site ___ YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO ___ SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? YES = Category I NO ✓ not a Heritage Wetland	**Cat. I**
SC 3.0 Bogs *(see p. 87)* Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2 2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes - go to Q. 3 No - Is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Is a bog for purpose of rating No - go to Q. 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" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. *1.* Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?* 2. YES = Category I No ✓ Is not a bog for purpose of rating	**Cat. I**

Wetland name or number K

SC 4.0 Forested Wetlands *(see p. 90)* Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the 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/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. — **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. YES = Category I NO ✓ not a forested wetland with special characteristics	**Cat. I**
SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)* 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 surface 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 meets 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 invasive plant species (see list of invasive species on p. 74). — 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 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

Wetland name or number K

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO X not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its 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 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	NA

Wetland name or number L

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users

Name of wetland (if known): TAL-8190 Wetland L Date of site visit: 06-02-08

Rated by DRA Trained by Ecology? Yes X No___ Date of training 10-05

SEC: ___ TWNSHP: ____ RNGE: ____ Is S/T/R in Appendix D? Yes___ No___

Map of wetland unit: Figure ____ Estimated size _____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III___ IV X

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	6
Score for Hydrologic Functions	12
Score for Habitat Functions	10
TOTAL score for Functions	28

Category based on SPECIAL CHARACTERISTICS of wetland

I___ II___ Does not Apply X

Final Category (choose the "highest" category from above) IV

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		Depressional	
Natural Heritage Wetland		Riverine	
Bog		Lake-fringe	
Mature Forest		Slope	X
Old Growth Forest		Flats	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	

Wetland name or number L

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered* ***animal or plant*** *species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered* ***animal*** *species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number L

Classification of Wetland Units in Western Washington

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 (i.e. except during floods)?
NO – go to 2 **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe NO – Saltwater Tidal Fringe (Estuarine)**

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 rated as an* ***Estuarine*** *wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

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 both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (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**?
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 <3ft diameter and less than 1 foot deep).*
NO - go to 5 **YES** – The wetland class is **Slope**

Wetland name or number L

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 two years.

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

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

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 clases. 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 your wetland. 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 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	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still 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 L

S	**Slope Wetlands** WATER QUALITY FUNCTIONS - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
S	**S 1. Does the wetland unit have the potential to improve water quality?**	*(see p.64)*
S	S 1.1 Characteristics of average slope of unit: Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation for every 100 ft horizontal distance)* points = 3 Slope is 1% - 2% points = 2 Slope is 2% - 5% points = 1 Slope is greater than 5% points = 0	3
S	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES = 3 points NO = 0 points	0
S	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.* Dense, uncut, herbaceous vegetation > 90% of the wetland area points = 6 Dense, uncut, herbaceous vegetation > 1/2 of area points = 3 Dense, woody, vegetation > ½ of area points = 2 Dense, uncut, herbaceous vegetation > 1/4 of area points = 1 Does not meet any of the criteria above for vegetation points = 0 Aerial photo or map with vegetation polygons	Figure ___ 3
S	**Total for S 1** *Add the points in the boxes above*	6
S	**S 2. Does the wetland unit have the opportunity to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* — Grazing in the wetland or within 150ft — Untreated stormwater discharges to wetland — Tilled fields, logging, or orchards within 150 feet of wetland — Residential, urban areas, or golf courses are within 150 ft upslope of wetland — Other_____ **YES** multiplier is **2** **NO** multiplier is **1**	*(see p.67)* multiplier 1
S	**TOTAL - Water Quality Functions** Multiply the score from S1 by S2 *Add score to table on p. 1*	6

Comments

Wetland name or number L

S	**Slope Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream erosion	**Points** (only 1 score per box)
	S 3. Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	*(see p.68)*
S	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. *Choose the points appropriate for the description that best fit conditions in the wetland. (stems of plants should be thick enough (usually > 1/8in), or dense enough, to remain erect during surface flows)* Dense, uncut, **rigid** vegetation covers > 90% of the area of the wetland. points = 6 Dense, uncut, **rigid** vegetation > 1/2 area of wetland points = 3 Dense, uncut, **rigid** vegetation > 1/4 area points = 1 More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid points = 0	6
S	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows: The slope wetland has small surface depressions that can retain water over at least 10% of its area. YES points = 2 NO points = 0	0
S	*Add the points in the boxes above*	6
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* — Wetland has surface runoff that drains to a river or stream that has flooding problems X Other Upgradient of Sammamish River *(Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam)* **YES** multiplier is **2** **NO** multiplier is **1**	*(see p. 70)* multiplier 2
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	12

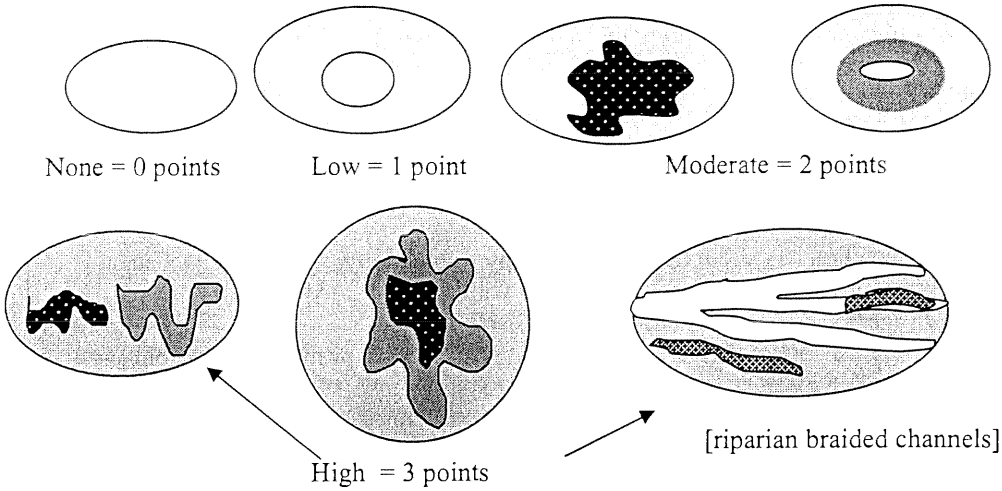
Comments

Wetland name or number L

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ____Aquatic bed _X_Emergent plants _X_Scrub/shrub (areas where shrubs have >30% cover) ____Forested (areas where trees have >30% cover) *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 *Add the number of vegetation structures that qualify. If you have:* 4 structures or more — points = 4 3 structures — points = 2 2 structures — points = 1 1 structure — points = 0 Map of Cowardin vegetation classes	Figure ___ 2
H 1.2. Hydroperiods ***(see p. 73)*** *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 acre 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 ____Occasionally flooded or inundated — 2 types present — point = 1 _X_Saturated only — 1 type present — points = 0 ____ 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** Map of hydroperiods	Figure ___ 0
H 1.3. Richness of Plant Species ***(see p. 75)*** Count the number of plant species in the wetland that cover at least 10 ft^2. *(different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: > 19 species — points = 2 5 - 19 species — points = 1 < 5 species — points = 0 *List species below if you want to:* Red Alnu Ath Rare	1

Total for page 3

Wetland name or number L

H 1.4. Interspersion of habitats *(see p. 76)* Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  None = 0 points Low = 1 point Moderate = 2 points High = 3 points [riparian braided channels] NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes	Figure ___ 1
H 1.5. Special Habitat Features: *(see p. 77)* *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ____Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). ____Standing snags (diameter at the bottom > 4 inches) in the wetland ____Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) ____Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ____At least ¼ acre of thin-stemmed persistent vegetation 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 each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	4

Comments

Wetland name or number L

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers *(see p. 80)* *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer. (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** X 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — Heavy grazing in buffer. **Points = 1** — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0**. — Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	Figure ___ 3
H 2.2 Corridors and Connections *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). YES = **4 points** (*go to H 2.3*) NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? YES = **2 points** (*go to H 2.3*) NO = H 2.2.3 H 2.2.3 Is the wetland: within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? YES = **1 point** NO = **0 points**	0

Total for page 3

Wetland name or number L

H 2.3 Near or adjacent to other priority habitats listed by WDFW *(see p. 82)* Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* *These are DFW definitions. Check with your local DFW biologist if there are any questions.* ____**Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ____**Aspen Stands:** Pure or mixed stands of aspen greater than 0.8 ha (2 acres). ____**Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ____**Old-growth 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 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. ____**Mature forests:** Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 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. ____**Prairies:** Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community. ____**Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ____**Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages ____**Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%. ____**Urban Natural Open Space**: A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development. ____**Estuary/Estuary-like:** Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5ppt. during the period of average annual low flow. Includes both estuaries and lagoons. _____**Marine/Estuarine Shorelines**: Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control). If wetland has **3 or more** priority habitats = **4 points** If wetland has **2** priority habitats = **3 points** If wetland has **1** priority habitat = **1 point** No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	0

Wetland name or number L

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	6
TOTAL for H 1 from page 14	4
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	10

Wetland name or number L

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

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 *(see p. 86)* Does the wetland unit 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 X	
SC 1.1 Is the wetland unit 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 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — 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 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

Wetland name or number L

SC 2.0 Natural Heritage Wetlands *(see p. 87)* Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)* S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site ___ YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO X SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? YES = Category I NO X not a Heritage Wetland	**Cat. I**
SC 3.0 Bogs *(see p. 87)* Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2 2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes - go to Q. 3 No - Is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Is a bog for purpose of rating No - go to Q. 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" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. *1.* Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?* 2. YES = Category I No X Is not a bog for purpose of rating	**Cat. I**

Wetland name or number L

SC 4.0 Forested Wetlands *(see p. 90)* Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the 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/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. — **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. YES = Category I NO X not a forested wetland with special characteristics	**Cat. I**
SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)* 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 surface 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 X not a wetland in a coastal lagoon SC 5.1 Does the wetland meets 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 invasive plant species (see list of invasive species on p. 74). — 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 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

Wetland name or number L

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO X not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its 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 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	Nt

APPENDIX D

City of Redmond Habitat Unit Assessment Forms

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CITY OF REDMOND
HABITAT UNIT ASSESSMENT FORM

HABITAT UNIT: Westside Grasslands
LOCATION: South / South Central / Western Project Site - 818 d
TOTAL SCORE: 10/27

Habitat Parameter	Scoring Criteria	Habitat Unit Score
Size	• >50 acres = 3 points • 10-50 acres = 2 points • 0-10 acres = 1 point	1
Vegetation Community Types	• ≥ 4 types = 3 points • 2-3 types = 2 points • 1 type = 1 point • None = 0 points	2
Community Interspersion	• High = 3 points - adjacent to forest / wetlands • Medium = 2 points • Low = 1 point - no open H_2O • None = 0 points	2
Priority Species Presence	• Threatened & Endangered Species = 3 points • Candidate Species = 2 points • Monitor Species = 1 point GBH • None = 0 points could use area	1
Priority Species Habitat Use	• Breeding = 3 points • Roosting = 2 points • Foraging = 1 point • None = 0 points	1
Habitat Continuity	• Links protected habitats = 3 points • Links unprotected habitats = 2 points • Extends habitat corridor = 1 point • None = 0 points Adjacent to roads	1
Forest Vegetation Layers	• 3 layers = 3 points • 2 layers = 2 points • 1 layers = 1 point • None = 0 points no forested area	0
Forest Age	• Mature = 3 points • Pole = 2 points • Seedling/Shrub = 1 point • None = 0 points	0
Invasive Species Presence	• 0-25% = 3 points non-native grasses / invasive species • 26-50% = 2 points • 51-75% = 1 point • 75-100% = 0 points	2

10/27

CITY OF REDMOND
HABITAT UNIT ASSESSMENT FORM

HABITAT UNIT: Westside Lowlands Conifer-Hardwood Forest
LOCATION: NE Corner of Project Site - 818d
TOTAL SCORE: 19/27

Habitat Parameter	Scoring Criteria	Habitat Unit Score
Size	• >50 acres = 3 points • 10-50 acres = 2 points • 0-10 acres = (1) point	1
Vegetation Community Types	≥ 4 types = (3) points • 2-3 types = 2 points • 1 type = 1 point • None = 0 points wetland shrub conifer deciduous emergent	3
Community Interspersion	• High = 3 points (•) Medium = (2) points • Low = 1 point • None = 0 points No open water component	2
Priority Species Presence	• Threatened & Endangered Species = 3 points possible pileated habitat • Candidate Species = (2) points • Monitor Species = 1 point • None = 0 points	2
Priority Species Habitat Use	• Breeding = 3 points • Roosting = 2 points • Foraging = (1) point • None = 0 points	1
Habitat Continuity	• Links protected habitats = 3 points • Links unprotected habitats = 2 points • Extends habitat corridor = (1) point • None = 0 points Red-West wetlands	1
Forest Vegetation Layers	• 3 layers = (3) points • 2 layers = 2 points • 1 layers = 1 point • None = 0 points	3
Forest Age	• Mature = (3) points • Pole = 2 points • Seedling/Shrub = 1 point • None = 0 points	3
Invasive Species Presence	• 0-25% = (3) points • 26-50% = 2 points • 51-75% = 1 point • 75-100% = 0 points	3

19/27

CITY OF REDMOND
HABITAT UNIT ASSESSMENT FORM

HABITAT UNIT: Westside Riparian Wetlands
LOCATION: West Project Site - 8180d
TOTAL SCORE: 15/27

Habitat Parameter	Scoring Criteria	Habitat Unit Score
Size	• >50 acres = 3 points • 10-50 acres = 2 points • 0-10 acres = 1 point	1
Vegetation Community Types	≥ 4 types = 3 points emergent • 2-3 types = 2 points shrub forest • 1 type = 1 point • None = 0 points	2
Community Interspersion	• High = 3 points • Medium = 2 points open water / wetlands • Low = 1 point • None = 0 points	3
Priority Species Presence	• Threatened & Endangered Species = 3 points • Candidate Species = 2 points • Monitor Species = 1 point GBH? • None = 0 points	1
Priority Species Habitat Use	• Breeding = 3 points • Roosting = 2 points • Foraging = 1 point • None = 0 points	1
Habitat Continuity	• Links protected habitats = 3 points • Links unprotected habitats = 2 points • Extends habitat corridor = 1 point • None = 0 points isolated	0
Forest Vegetation Layers	• 3 layers = 3 points • 2 layers = 2 points shrub/tree • 1 layers = 1 point • None = 0 points	2
Forest Age	• Mature = 3 points • Pole = 2 points • Seedling/Shrub = 1 point • None = 0 points	2
Invasive Species Presence	• 0-25% = 3 points • 26-50% = 2 points • 51-75% = 1 point • 75-100% = 0 points	3

15/27

818d

CITY OF REDMOND
HABITAT UNIT ASSESSMENT FORM
Westside Grasslands

VEGETATION COMMUNITY TYPES:

Emergent grassland - small patches of deciduous trees

INVASIVE PLANTS:

reed canarygrass
himalayan blackberry

HABITAT FEATURES (snags, perches, downed logs, etc):

rock piles

WILDLIFE OBSERVATIONS (direct or indirect):

Killdeer

THREATS TO HABITAT INTEGRITY:

Edge habitat is major freeway/roads

OTHER NOTES:

818d

CITY OF REDMOND
HABITAT UNIT ASSESSMENT FORM

Westside Riparian Wetlands

VEGETATION COMMUNITY TYPES:

Scrub-shrub wetland
Emergent wetland

INVASIVE PLANTS:

Reed canarygrass

HABITAT FEATURES (snags, perches, downed logs, etc):

Open water
Downed logs

WILDLIFE OBSERVATIONS (direct or indirect):

Killdeer

THREATS TO HABITAT INTEGRITY:

Adjacent roads/development

OTHER NOTES:

APPENDIX E-1

Washington State Wetland Function Assessment Methods (WFAM) Data Sheets – Existing Conditions

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Western Washington Wetland Classification Key

Wetland Name: Wetland A - 818c

AU ID #: A - 818c **Date:** 5/22/08

1) Water levels in AU usually controlled by tides
   No – go to 2 Yes – **Tidal Fringe**

2) Topography is flat and precipitation is only source (>90%) of water to the AU
   No – go to 3 Yes – **Flat**

3) AU is contiguous with >8 ha open water, and water is deeper than 2 m over 30% of open water area
   No – go to 4 Yes – **Lacustrine Fringe**

4) Open water is <8 ha and >2 m deep, but AU is a fringe narrower than ½ the radius of open water
   No – go to 5 Yes – **Lacustrine Fringe**

5) Water flow in AU ~~is unidirectional~~ on a slope, water is not impounded in the AU
   No – go to 6 Yes – **Slope**

6) AU is located in a topographic valley with stream or river in the middle
   No – go to 9 Yes – go to 7

7) Have data showing area flooded more than once every 2 yrs.; or indicators of flooding are present:
   - ☐ Scour marks common
   - ☐ Recent sediment deposition
   - ☐ Vegetation that is damaged or bent in one direction
   - ☐ Soils have alternating deposits
   - ☐ Vegetation along bank edge has flood marks

   No for all indicators – go to 9 Yes for any indicator – go to 8

8) Flood waters retained
   No – **Riverine Flow-through**
   Yes – **Riverine Impounding**
   - ☐ Depression in floodplain
   - ☐ Constricted outlet
   - ☐ Permanent water

9) Has surface water outflow – **Depressional Outflow**
   Has no surface outflow – **Depressional Closed**

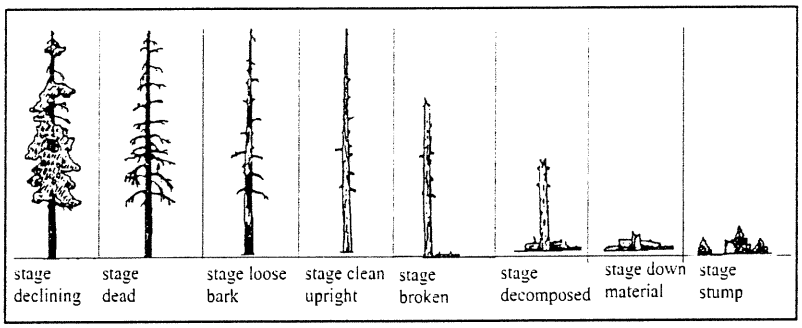
Rationale for Choices:
Assessed as depressional outflow wetland to rate functions...

Single-Page Sheet for Snags, Large Woody Debris, and Aquatic Bed Vegetation

Wetland Name: Wetland A - 81ec

AU ID #: A **Date:** 5/22/08

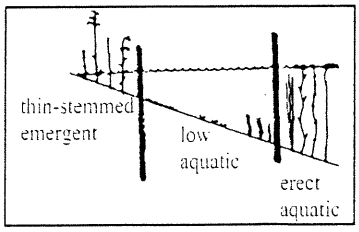
0 [0-8] D31 Snags (record number of snags present)
Circle the categories present; min DBH of snag = 10 cm (4")



3 [1-1] D44 Number of categories of large woody debris in AU **outside of perm. water**
Freshly cut stumps are not included

Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")	✓	✓	✓	
21-50cm	(8-20")				
>50 cm	(>20")				

0 [1-3] D25 Number of plant structure categories present in aquatic bed vegetation



Wetland Name: Wetland A - 818c AU ID#: A
Location: T/S/R:
Data Collector: e. schau Date: 5/22/00

Use this data sheet for:
***DEPRESSIONAL OUTFLOW** or **RIVERINE IMPOUNDING** wetlands*
in the Lowlands of Western Washington
- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

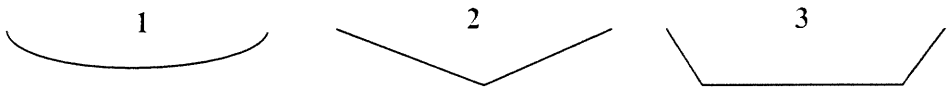
Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.005	ha	**D1**	Area of AU
3.304	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
0	0/1	**D4**	Channels, ditches, or streams in AU
0	0/1	*D4.1*	Channels, ditches, or streams in AU have permanently flowing water *(you see water flowing)*
		D4.2	
0	0/1	*D4.3*	The only surface outflow from the AU is through a culvert (<60 cm) or vertical siphon
		D5	
		D6	
		D7	
		D8	Inundation
0	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
0	0/1	*D9.2*	Seasonally flooded (>1 month)
0	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
0	m	**D10**	Average height of annual flooding above lowest point of outlet or surface of permanent stream at outlet (round to 0.3 m)

By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

Wetland Name: **AU ID#:** A - 816c

		D11	Cross section of AU in areas of seasonal inundation (record a 1 next to cross section that best fits)
0	0/1	*D11.1*	Cross section 1
0	0/1	*D11.2*	Cross section 2
0	0/1	*D11.3*	Cross section 3



		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
0	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

		D13	Constriction of outlet
1	0/1	*D13.1*	Unconstricted or only slightly constricted
0	0/1	*D13.2*	Moderately constricted
0	0/1	*D13.3*	Severely constricted
0	0/1	*D13.4*	*Riverine Impounding only* – Completely constricted (no surface outlet)

If the AU has multiple outlets, judge the constriction as if all the outlets were combined into one large one.

VEGETATION

		D14	Cowardin Classes (as % area of AU)
0	%	*D14.1*	Forest - evergreen
25	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
50	%	*D14.4*	Scrub-shrub - deciduous
25	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed
1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
100	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
100	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

		D18	
		D19	Plant Richness
5	#	*D19.1*	Record number of native plant species found in AU
2	#	*D19.2*	Record number of non- native plant species found in AU
1	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
3	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
1	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

A stratum must have 20% cover in assemblage

Wetland Name: **AU ID#:** A - 8i 8c

0 0/1 **D22** Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

D23 Sphagnum bogs

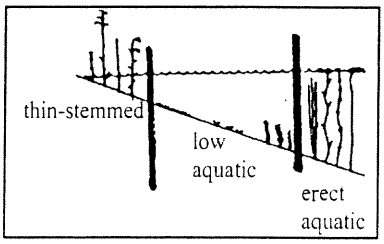
0 0/1 *D23.1* % area of Sphagnum bogs >75%
0 0/1 *D23.2* % area of Sphagnum bogs = 50-75%
0 0/1 *D23.3* % area of Sphagnum bogs = 25-49%
0 0/1 *D23.4* % area of Sphagnum bogs = 1-24%
0 0/1 *D23.5* % area of Sphagnum bogs = 0%

D24 Dominance by non-native plant species

0 0/1 *D24.1* % area of non-native species >75%
0 0/1 *D24.2* % area of non-native species = 50-75%
0 0/1 *D24.3* %area of non-native species = 25-49%
1 0/1 *D24.4* % area of non-native species = 1-24%
0 0/1 *D24.5* % area of non-natives = 0%

HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



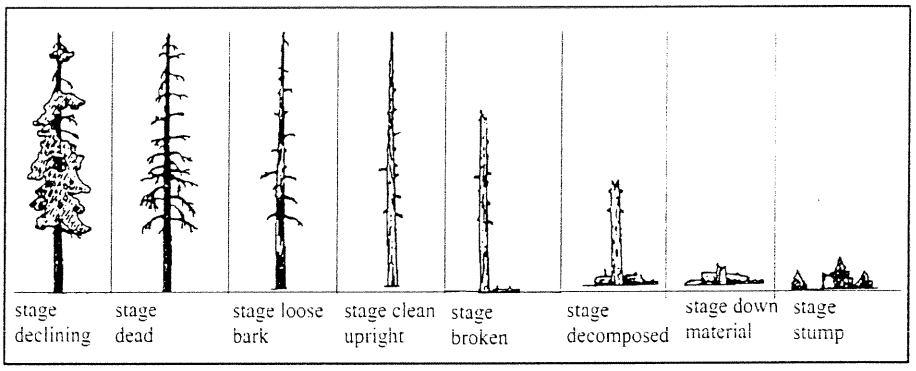
D26 pH

7 [4-9] *D26.1* pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
[4-9] *D26.2* pH of open or standing water *(record the lowest pH. if you cannot measure record a [7])*
0 0/1 **D27** Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1 0/1 **D28** Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0 0/1 **D29** Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0 0/1 **D30** Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

Wetland Name: **AU ID#:** A - 8/8c

0 [0-8] **D31** Snags (record # of stages)

Circle the categories present: minimum DBH of snag = 10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

0 0/1 **D32** Overhanging vegetation, extending out for 1 m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

0 0/1 **D34** Undercut banks present for at least 2 m (6.6 ft.)

0 [0-4] **D35** Key for rating egg-laying structures for amphibians

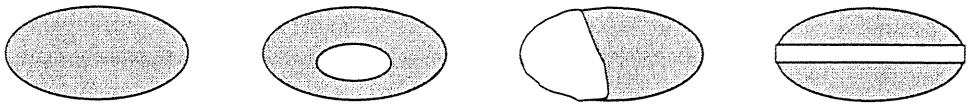
1. Does the AU have thin-stemmed vegetation or thin branches **(<8 mm)** in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – **Score = 0** YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

Wetland Name: **AU ID#:** A - 818c

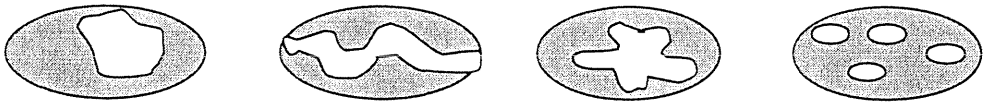
0 0/1 **D36** Tannins in surface waters >10% of water surface

0 0/1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

0 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



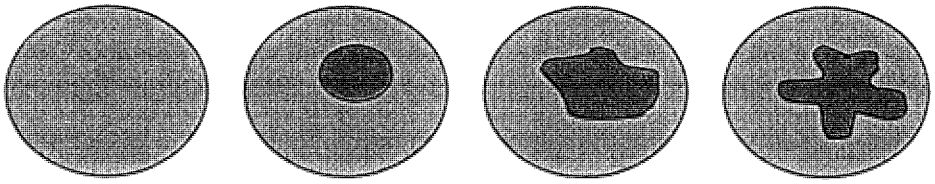
None [0] Low [1] Low [1] Low [1]



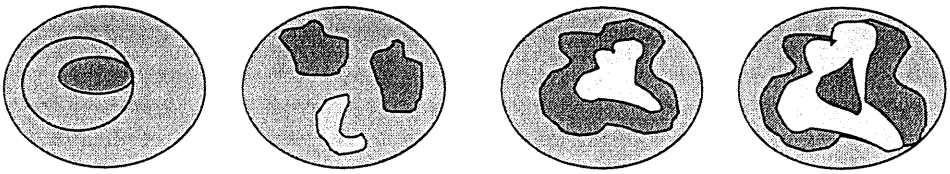
Moderate [2] Moderate [2] High [3] High [3]

2 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate[2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



None [0] Low [1] Low [1] Moderate [2]



Moderate [2] High [3] High [3] High [3]

Wetland Name:	**AU ID#:** A - 818c

D40

3 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

3 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

(3) 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

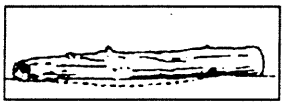
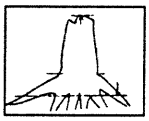
Wetland Name: **AU ID#:** A - 818c

1 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is ~~the AU~~ part of a riparian corridor *(see text for definitions)*
   NO **go to 5** YES **go to 2**
2. Is the wetland part of riparian corridor > 50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] **YES = [1]**

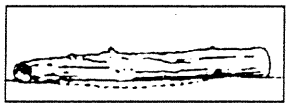
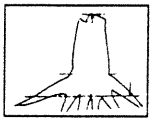
3 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included

Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")	✓	✓	✓	
21-50cm	(8-20")				
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)

Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

Wetland Name: **AU ID#:** A - 818c

SOILS and SUBSTRATES

		D46	Composition of AU surface
1	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
0	0/1	*D46.6*	Exposed sand
0	0/1	*D46.7*	Exposed silt
0	0/1	*D46.8*	Exposed clay

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

		D47	Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
0	[0-3]	*D47.1*	Peat
0	[0-3]	*D47.2*	Organic Muck
3	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)

Record the least permeable layer if there are several down to 60 cm.

		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
0	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	Substrate of streams
0	0/1	*D49.1*	Substrate **of permanent stream** or river in AU has at least 1 square meter of gravel
0	0/1	*D49.2*	Substrate **of permanent stream** or river in AU has at least 1 square meter of cobbles
		D49.3	

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

Western Washington Wetland Classification Key

Wetland Name: Wetland B
AU ID #: 8Bc-B **Date:** 5/22/08

1) Water levels in AU usually controlled by tides
   (No) – go to 2 Yes – **Tidal Fringe**

2) Topography is flat and precipitation is only source (>90%) of water to the AU
   (No) – go to 3 Yes – **Flat**

3) AU is contiguous with >8 ha open water, and water is deeper than 2 m over 30% of open water area
   (No) – go to 4 Yes – **Lacustrine Fringe**

4) Open water is <8 ha and >2 m deep, but AU is a fringe narrower than ½ the radius of open water
   (No) – go to 5 Yes – **Lacustrine Fringe**

5) Water flow in AU is unidirectional on a slope, water is not impounded in the AU
   (No) – go to 6 Yes – **Slope**

6) AU is located in a topographic valley with stream or river in the middle
   (No) – go to 9 Yes – go to 7

7) Have data showing area flooded more than once every 2 yrs.; or indicators of flooding are present:
   - ❒ Scour marks common
   - ❒ Recent sediment deposition
   - ❒ Vegetation that is damaged or bent in one direction
   - ❒ Soils have alternating deposits
   - ❒ Vegetation along bank edge has flood marks

   (No) for all indicators – go to 9 Yes for any indicator – go to 8

8) Flood waters retained
   No – **Riverine Flow-through**
   NA Yes – **Riverine Impounding**
   - ❒ Depression in floodplain
   - ❒ Constricted outlet
   - ❒ Permanent water

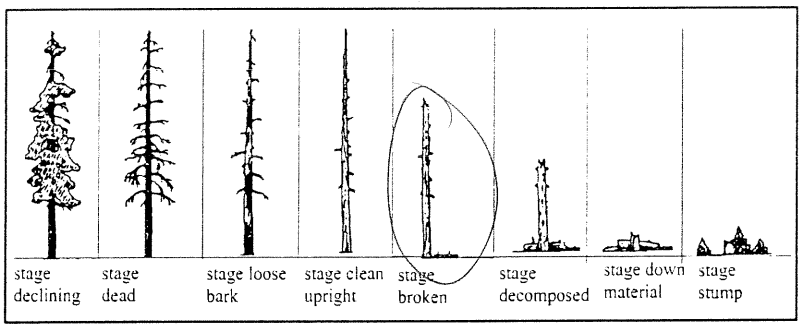
9) Has surface water outflow – **Depressional Outflow**
   Has no surface outflow – **Depressional Closed**

Rationale for Choices:
The wetland unit is located in a topographic depression. Hydrologic input is groundwater, precipitation, some sidewalk runoff. The unit has surface outflow.

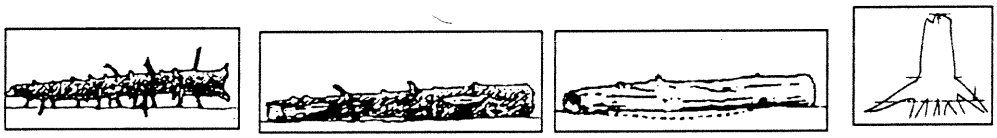
Single-Page Sheet for Snags, Large Woody Debris, and Aquatic Bed Vegetation

Wetland Name: Wetland B
AU ID #: 818c - B **Date:** 5/22/08

1 [0-8] D31 Snags (record number of snags present)
Circle the categories present: min DBH of snag = 10 cm (4")

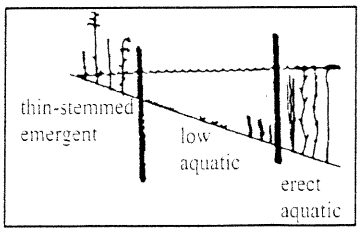


6 [1-1] D44 Number of categories of large woody debris in AU **outside of perm. water**
Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")	1	1	1	
21-50cm	(8-20")	1	1	1	
>50 cm	(>20")				

0 [1-3] D25 Number of plant structure categories present in aquatic bed vegetation



Wetland Name:	**AU ID#:** B-818c

SOILS and SUBSTRATES

		D46	Composition of AU surface
1	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
1	0/1	*D46.6*	Exposed sand
1	0/1	*D46.7*	Exposed silt
1	0/1	*D46.8*	Exposed clay
		D47	Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
0	[0-3]	*D47.1*	Peat
1	[0-3]	*D47.2*	Organic Muck
2	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)
		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
1	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	Substrate of streams
0	0/1	*D49.1*	Substrate **of permanent stream** or river in AU has at least 1 square meter of gravel
0	0/1	*D49.2*	Substrate **of permanent stream** or river in AU has at least 1 square meter of cobbles
		D49.3	

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

Record the least permeable layer if there are several down to 60 cm.

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

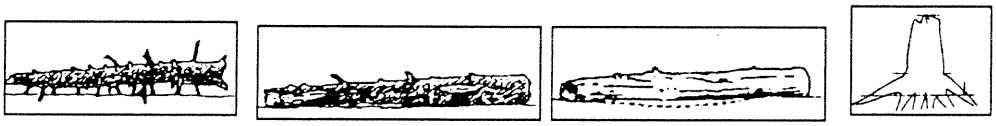
Wetland Name: **AU ID#:** B - 81Bc

1 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO go to 5 YES go to 2
2. Is the wetland part of riparian corridor > 50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 YES = [3]
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 YES = [2]
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 YES = [1]
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 YES = [3]
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 YES = [2]
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 YES = [2]
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] YES = [1]

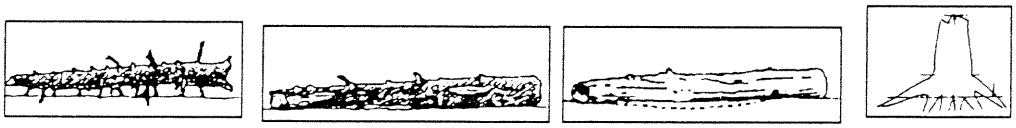
6 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")	1	1	1	
21-50cm	(8-20")	1	1	1	
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

Wetland Name:	**AU ID#:** B - 8182

D40

2 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

✓2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

2 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

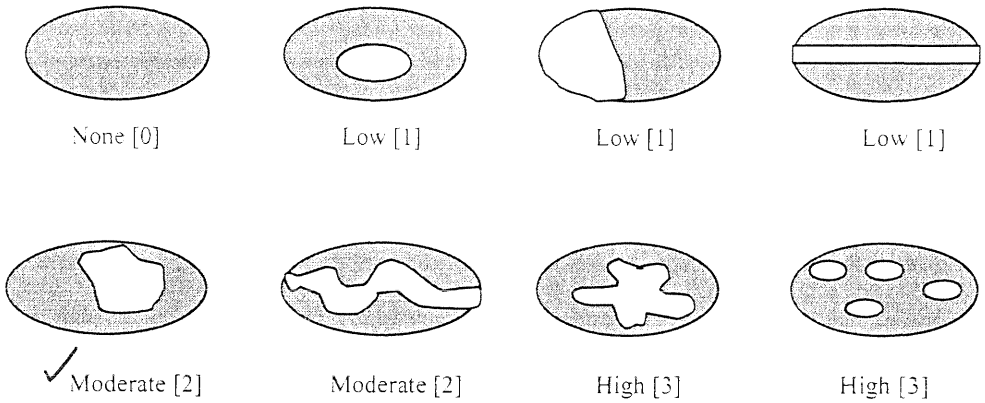
2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

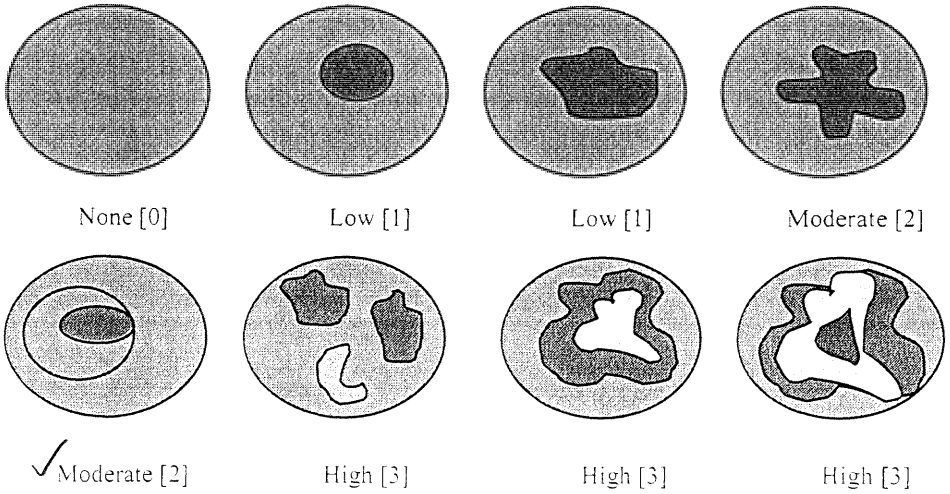
Wetland Name:	**AU ID#:** B-818c

	0 1	**D36**	Tannins in surface waters >10% of water surface
0	0 1	**D37**	Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*
2	[0-3]	**D38**	Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



2	[0-3]	**D39**	Interspersion between Cowardin vegetation classes

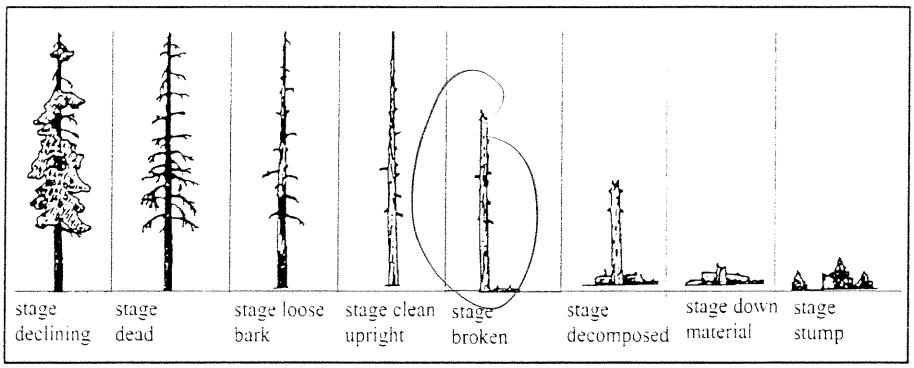
**AUs with only 2 classes can only score a moderate[2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



Wetland Name:	**AU ID#:** B-818c

1 [0-8] **D31** Snags (record # of stages)

Circle the categories present: minimum DBH of snag = 10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

0 0/1 **D32** Overhanging vegetation, extending out for 1 m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

0 0/1 **D34** Undercut banks present for at least 2 m (6.6 ft.)

3 [0-4] **D35** Key for rating egg-laying structures for amphibians

1. Does the AU have thin-stemmed vegetation or thin branches **(<8 mm)** in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 ✓YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   ✓NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 ✓YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 ✓**YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

Wetland Name:	**AU ID#:** B - 818c

1 0/1 **D22** Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
X *Populus balsamifera* (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

D23 Sphagnum bogs

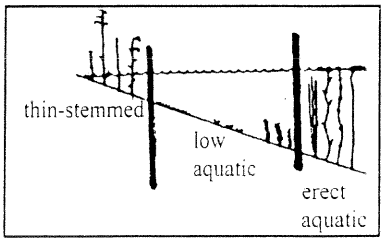
0 0/1 *D23.1* % area of Sphagnum bogs >75%
0 0/1 *D23.2* % area of Sphagnum bogs = 50-75%
0 0/1 *D23.3* % area of Sphagnum bogs = 25-49%
0 0/1 *D23.4* % area of Sphagnum bogs = 1-24%
0 0/1 *D23.5* % area of Sphagnum bogs = 0%

D24 Dominance by non-native plant species

0 0/1 *D24.1* % area of non-native species >75%
0 0/1 *D24.2* % area of non-native species = 50-75%
0 0/1 *D24.3* %area of non-native species = 25-49%
1 0/1 *D24.4* % area of non-native species = 1-24%
0 0/1 *D24.5* % area of non-natives = 0%

HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents

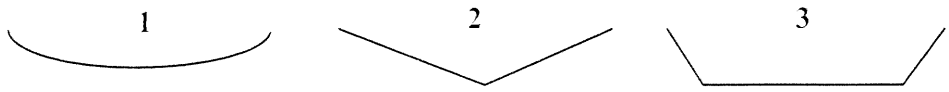


D26 pH

[4-9] *D26.1* pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
[4-9] *D26.2* pH of open or standing water *(record the lowest pH, if you cannot measure record a [7])*
0 0/1 **D27** Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1 0/1 **D28** Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0 0/1 **D29** Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0 0/1 **D30** Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

Wetland Name:	**AU ID#:** B-818c

		D11	Cross section of AU in areas of seasonal inundation (record a 1 next to cross section that best fits)
1	0/1	*D11.1*	Cross section 1
0	0/1	*D11.2*	Cross section 2
0	0/1	*D11.3*	Cross section 3



		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
1	0/1	*D12.1*	1-20 cm (<8 in)
1	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

		D13	Constriction of outlet
1	0/1	*D13.1*	Unconstricted or only slightly constricted
0	0/1	*D13.2*	Moderately constricted
0	0/1	*D13.3*	Severely constricted
0	0/1	*D13.4*	*Riverine Impounding only* – Completely constricted (no surface outlet)

If the AU has multiple outlets, judge the constriction as if all the outlets were combined into one large one.

VEGETATION

		D14	Cowardin Classes (as % area of AU)
0	%	*D14.1*	Forest - evergreen
21	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
19	%	*D14.4*	Scrub-shrub - deciduous
60	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
40.	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
28	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
19	#	*D19.1*	Record number of native plant species found in AU
2	#	*D19.2*	Record number of non- native plant species found in AU RUG, IVY
3	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
3	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
0	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

A stratum must have 20% cover in assemblage

populus balsamifera
juncus effusus
spirea douglasii
salix
athyrium
rubus ursinus

Wetland Name: Wetland B – Redwest South AU ID#: B-818c
Location: T/S/R:
Data Collector: Erin Schau Date: 5/22/08

Use this data sheet for:
***DEPRESSIONAL OUTFLOW** or **RIVERINE IMPOUNDING** wetlands*
in the Lowlands of Western Washington
- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.37	ha	**D1**	Area of AU 39,450 ft
3.304	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
1	0/1	**D4**	Channels, ditches, or streams in AU
0	0/1	*D4.1*	Channels, ditches, or streams in AU have permanently flowing water *(you see water flowing)*
		D4.2	
0	0/1	*D4.3*	The only surface outflow from the AU is through a culvert (<60 cm) or vertical siphon
		D5	
		D6	
		D7	
		D8	Inundation
36	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
8	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
1	0/1	*D9.1*	Permanently flooded (include vegetated areas)
1	0/1	*D9.2*	Seasonally flooded (>1 month)
0	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
0.15	m	**D10**	Average height of annual flooding above lowest point of outlet or surface of permanent stream at outlet (round to 0.3 m)

By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

Western Washington Wetland Classification Key

Wetland Name: Wetland C

AU ID #: 818c **Date:** 6/9/08

1) Water levels in AU usually controlled by tides
   No – go to 2 Yes – **Tidal Fringe**

2) Topography is flat and precipitation is only source (>90%) of water to the AU
   No – go to 3 Yes – **Flat**

3) AU is contiguous with >8 ha open water, and water is deeper than 2 m over 30% of open water area
   No – go to 4 Yes – **Lacustrine Fringe**

4) Open water is <8 ha and >2 m deep, but AU is a fringe narrower than ½ the radius of open water
   No – go to 5 Yes – **Lacustrine Fringe**

5) Water flow in AU is unidirectional on a slope, water is not impounded in the AU
   No – go to 6 Yes – **Slope**

6) AU is located in a topographic valley with stream or river in the middle
   No – go to 9 Yes – go to 7

7) Have data showing area flooded more than once every 2 yrs.; or indicators of flooding are present:
   - ❒ Scour marks common
   - ❒ Recent sediment deposition
   - ❒ Vegetation that is damaged or bent in one direction
   - ❒ Soils have alternating deposits
   - ❒ Vegetation along bank edge has flood marks

   No for all indicators – go to 9 Yes for any indicator – go to 8

8) Flood waters retained
   No – **Riverine Flow-through**
   Yes – **Riverine Impounding**
   - ❒ Depression in floodplain
   - ❒ Constricted outlet
   - ❒ Permanent water

9) Has surface water outflow – **Depressional Outflow**
   Has no surface outflow – **Depressional Closed**

Rationale for Choices:

Wetland Name: Wetland C

AU ID#: 81Rc-C

Location:

T/S/R:

Data Collector:

Date: 6/9/08

Use this data sheet for:
***DEPRESSIONAL CLOSED** wetlands*
in the Lowlands of Western Washington

- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	D0	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.0184	ha	D1	Area of AU 1976
3.3	ha	D2	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water

			WATER REGIME
		D4	
		D4.1	
		D4.2	
		D4.3	
		D5	
		D6	
		D7	
		D8	Inundation
0	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
0	0/1	*D9.2*	Seasonally flooded (>1 month)
0	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
	m	**D10**	

By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

Wetland Name:	AU ID#: 816 c - 6

		D11	
	0/1	*D11.1*	
	0/1	*D11.2*	
	0/1	*D11.3*	
		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
0	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)
		D13	
		D13.1	
		D13.2	
		D13.3	
		D13.4	

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

VEGETATION

		D14	Cowardin Classes (as % area of AU)
0	%	*D14.1*	Forest - evergreen
0	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
0	%	*D14.4*	Scrub-shrub - deciduous
100	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed
1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
0	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
0	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
1	#	*D19.1*	Record number of native plant species found in AU
3	#	*D19.2*	Record number of non- native plant species found in AU
2	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
1	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
1	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

A stratum must have 20% cover in assemblage

0	0/1	**D22**	Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

Wetland Name: **AU ID#:** 818c - G

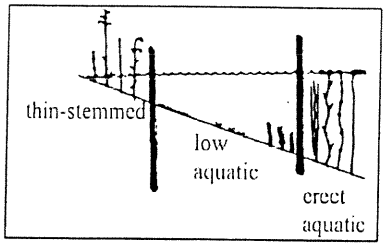
		D23	Sphagnum bogs
0	0/1	*D23.1*	% area of Sphagnum bog >75%
0	0/1	*D23.2*	% area of Sphagnum bog = 50-75%
0	0/1	*D23.3*	% area of Sphagnum bog = 25-49%
0	0/1	*D23.4*	% area of Sphagnum bog = 1-24%
1	0/1	*D23.5*	% area of Sphagnum bog = 0%
		D24	Dominance by non-native plant species
1	0/1	*D24.1*	% area of non-native species >75%
0	0/1	*D24.2*	% area of non-native species = 50-75%
0	0/1	*D24.3*	%area of non-native species = 25-49%
0	0/1	*D24.4*	% area of non-native species = 1-24%
0	0/1	*D24.5*	% area of non-natives = 0%

HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation

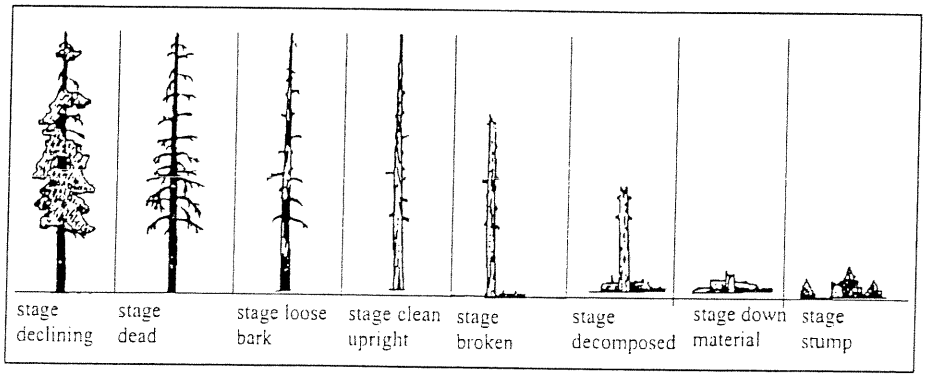
Applies only to aquatic bed species

DO NOT count persistent emergents



		D26	pH
7	[4-9]	*D26.1*	pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
	[4-9]	*D26.2*	pH of open or standing water (*record the lowest pH, if you cannot measure record a [7])*
0	0/1	**D27**	Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1	0/1	**D28**	Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0	0/1	**D29**	Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0	0/1	**D30**	Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU
0	[0-8]	**D31**	Snags (record # of stages)

Circle the categories present; minimum DBH of snag = 10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

Wetland Name:	AU ID#: 818c – C

0 0/1 D32 Overhanging vegetation, extending out for 1m, for at least 10 m (33 ft) over stream or open water.

0 0/1 D33 Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

D34

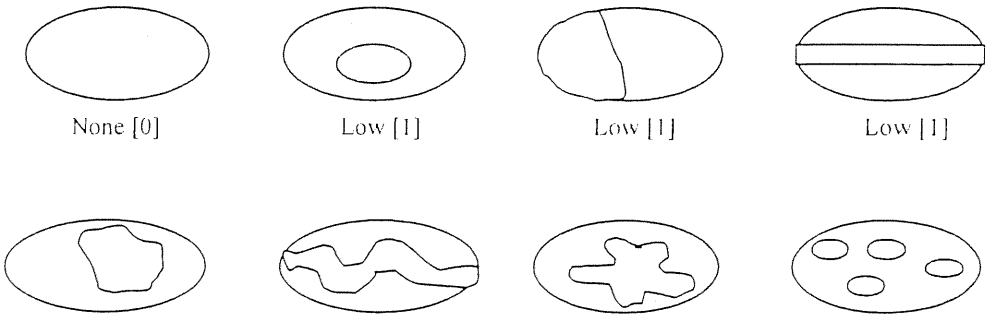
0 [0-4] D35 Key for rating egg-laying structures for amphibians

1. Does the AU have thin-stemmed vegetation or thin branches (**<8 mm**) in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 3 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

0 0/1 **D36** Tannins in surface waters >10% of water surface

0 0/1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

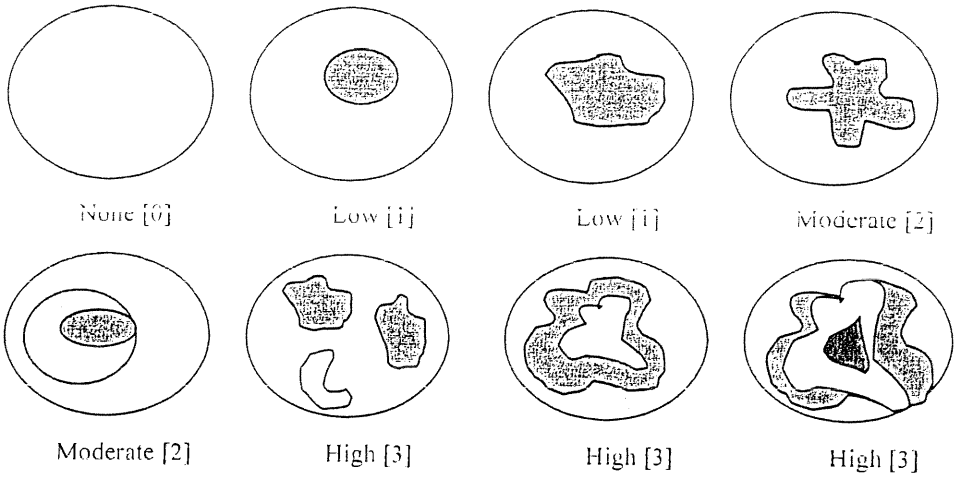
0 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



Wetland Name:	AU ID#: 818c - C

0 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate [2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



D40

2 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

Wetland Name:	AU ID#: 818 c - C

3 [0-5] D42 Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference. OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

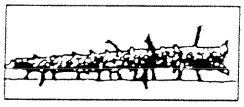
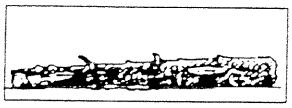
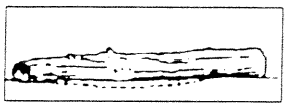
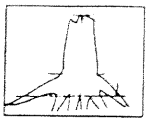
1 [0-3] D43 Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO go to 5 **YES go to 2**
2. Is the wetland part of riparian corridor >50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] **YES = [1]**

Wetland Name: AU ID#: 818c - C

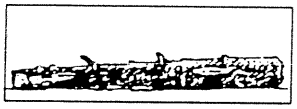
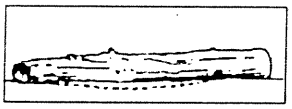
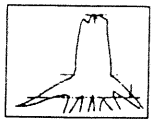
0 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included

Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)

Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

SOILS and SUBSTRATES

D46 Composition of AU surface

1	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
0	0/1	*D46.6*	Exposed sand
0	0/1	*D46.7*	Exposed silt
0	0/1	*D46.8*	Exposed clay

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

D47 Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)

0	[0-3]	*D47.1*	Peat
0	[0-3]	*D47.2*	Organic Muck
3	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)

Record the least permeable layer if there are several down to 60 cm.

Wetland Name:			AU ID#:
		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
0	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	
		D49.1	
		D49.2	
		D49.3	

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

Western Washington Wetland Classification Key

Wetland Name: Wetland D

AU ID #: 818c - D **Date:** 6/3/08

1) Water levels in AU usually controlled by tides
   No – go to 2 Yes – **Tidal Fringe**

2) Topography is flat and precipitation is only source (>90%) of water to the AU
   No – go to 3 Yes – **Flat**

3) AU is contiguous with >8 ha open water, and water is deeper than 2 m over 30% of open water area
   No – go to 4 Yes – **Lacustrine Fringe**

4) Open water is <8 ha and >2 m deep, but AU is a fringe narrower than ½ the radius of open water
   No – go to 5 Yes – **Lacustrine Fringe**

5) Water flow in AU is unidirectional on a slope, water is not impounded in the AU
   No – go to 6 Yes – **Slope**

6) AU is located in a topographic valley with stream or river in the middle
   No – go to 9 Yes – go to 7

7) Have data showing area flooded more than once every 2 yrs.; or indicators of flooding are present:
   - ☐ Scour marks common
   - ☐ Recent sediment deposition
   - ☐ Vegetation that is damaged or bent in one direction
   - ☐ Soils have alternating deposits
   - ☐ Vegetation along bank edge has flood marks

   No for all indicators – go to 9 Yes for any indicator – go to 8

8) Flood waters retained
   No – **Riverine Flow-through**
   Yes – **Riverine Impounding**
   - ☐ Depression in floodplain
   - ☐ Constricted outlet
   - ☐ Permanent water

9) Has surface water outflow – **Depressional Outflow**
   Has no surface outflow – **Depressional Closed**

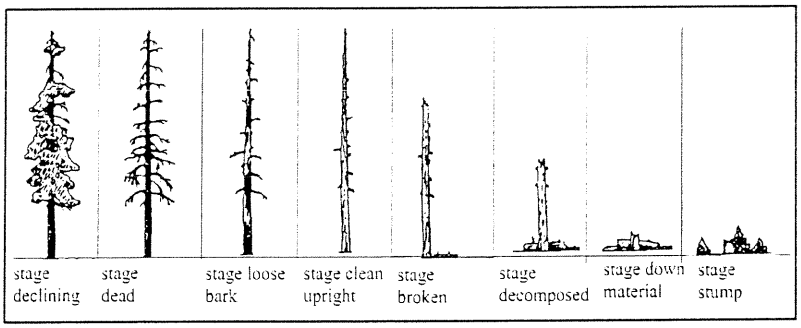
Rationale for Choices:
Wetland rated as depressional outflow for functions assessment purposes.

Single-Page Sheet for Snags, Large Woody Debris, and Aquatic Bed Vegetation

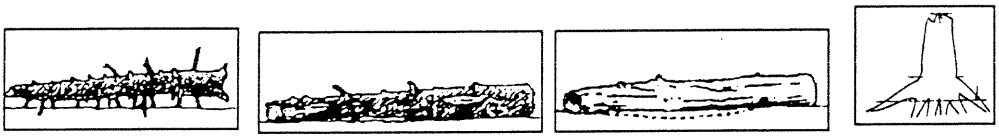
Wetland Name: _____

AU ID #: _____ **Date:** _____

_____ [0-8] D31 Snags (record number of snags present)
Circle the categories present; min DBH of snag = 10 cm (4")

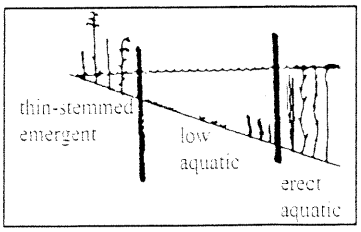


_____ [1-1] D44 Number of categories of large woody debris in AU **outside of perm. water**
Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

_____ [1-3] D25 Number of plant structure categories present in aquatic bed vegetation



Wetland Name: Wetland D - 818c
AU ID#: D - 818c
Location:
T/S/R:
Data Collector: Erin Schau
Date: 5/22/08

Use this data sheet for:
***DEPRESSIONAL OUTFLOW** or **RIVERINE IMPOUNDING** wetlands*
in the Lowlands of Western Washington
- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

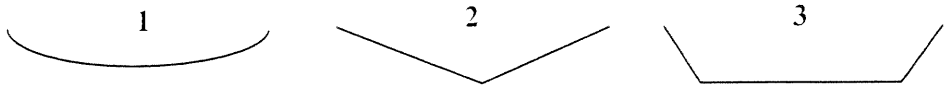
Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.099	ha	**D1**	Area of AU 10,640 sf
	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
0	0/1	**D4**	Channels, ditches, or streams in AU
0	0/1	*D4.1*	Channels, ditches, or streams in AU have permanently flowing water *(you see water flowing)*
		D4.2	
0	0/1	*D4.3*	The only surface outflow from the AU is through a culvert (<60 cm) or vertical siphon
		D5	
		D6	
		D7	
		D8	Inundation
0	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
1	0/1	*D9.2*	Seasonally flooded (>1 month)
0	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
0	m	**D10**	Average height of annual flooding above lowest point of outlet or surface of permanent stream at outlet (round to 0.3 m)

By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

Wetland Name: **AU ID#:** D-818c

		D11	Cross section of AU in areas of seasonal inundation (record a 1 next to cross section that best fits)
1	0/1	*D11.1*	Cross section 1
0	0/1	*D11.2*	Cross section 2
0	0/1	*D11.3*	Cross section 3



		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
1	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

		D13	Constriction of outlet
1	0/1	*D13.1*	Unconstricted or only slightly constricted
0	0/1	*D13.2*	Moderately constricted
0	0/1	*D13.3*	Severely constricted
0	0/1	*D13.4*	*Riverine Impounding only* – Completely constricted (no surface outlet)

If the AU has multiple outlets, judge the constriction as if all the outlets were combined into one large one.

VEGETATION

		D14	Cowardin Classes (as % area of AU)
0	%	*D14.1*	Forest - evergreen
0	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
0	%	*D14.4*	Scrub-shrub - deciduous
100	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed
1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
0	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
0	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
3	#	*D19.1*	Record number of native plant species found in AU
2	#	*D19.2*	Record number of non- native plant species found in AU
1	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
1	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
0	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

A stratum must have 20% cover in assemblage

Wetland Name:	**AU ID#:** D - 818c

0 | 0 1 | **D22** | Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

D23 Sphagnum bogs

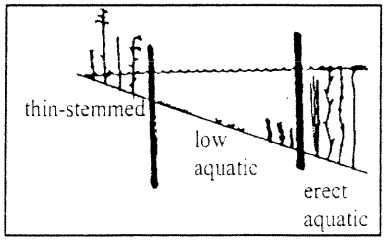
0	0/1	*D23.1*	% area of Sphagnum bogs >75%
0	0/1	*D23.2*	% area of Sphagnum bogs = 50-75%
0	0/1	*D23.3*	% area of Sphagnum bogs = 25-49%
0	0/1	*D23.4*	% area of Sphagnum bogs = 1-24%
0	0/1	*D23.5*	% area of Sphagnum bogs = 0%

D24 Dominance by non-native plant species

0	0/1	*D24.1*	% area of non-native species >75%
0	0/1	*D24.2*	% area of non-native species = 50-75%
1	0/1	*D24.3*	%area of non-native species = 25-49%
0	0/1	*D24.4*	% area of non-native species = 1-24%
0	0/1	*D24.5*	% area of non-natives = 0%

HABITAT CHARACTERISTICS

0 | [0-3] | **D25** | Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



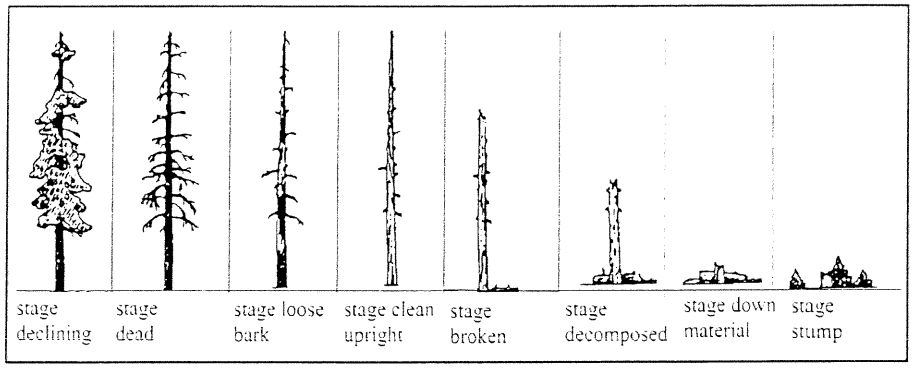
D26 pH

7	[4-9]	*D26.1*	pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
	[4-9]	*D26.2*	pH of open or standing water (*record the lowest pH. if you cannot measure record a [7])*
0	0 1	**D27**	Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1	0 1	**D28**	Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0	0 1	**D29**	Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0	0 1	**D30**	Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

Wetland Name:	**AU ID#:** D-818c

0 [0-8] **D31** Snags (record # of stages)

Circle the categories present: minimum DBH of snag = 10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

0 0/1 **D32** Overhanging vegetation, extending out for 1 m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

0 0/1 **D34** Undercut banks present for at least 2 m (6.6 ft.)

2 [0-4] **D35** Key for rating egg-laying structures for amphibians

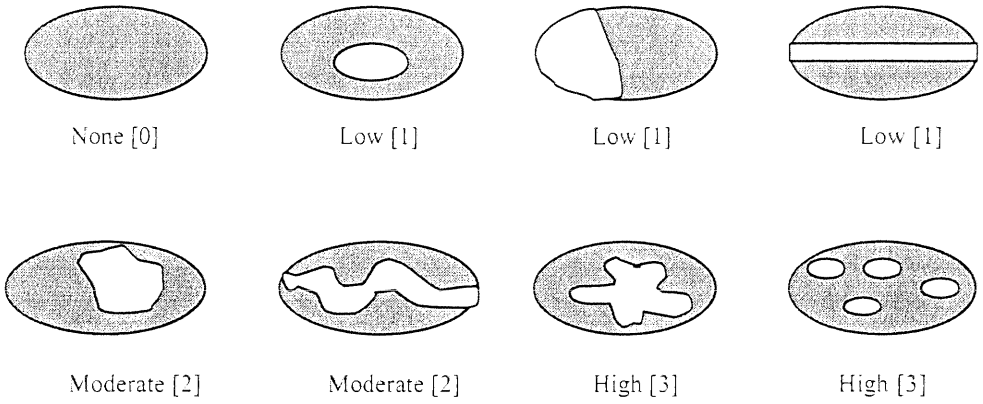
1. Does the AU have thin-stemmed vegetation or thin branches **(<8 mm)** in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – **Score = 2** **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

Wetland Name:	**AU ID#:** D - 818 c

0 | 0 1 **D36** Tannins in surface waters >10% of water surface

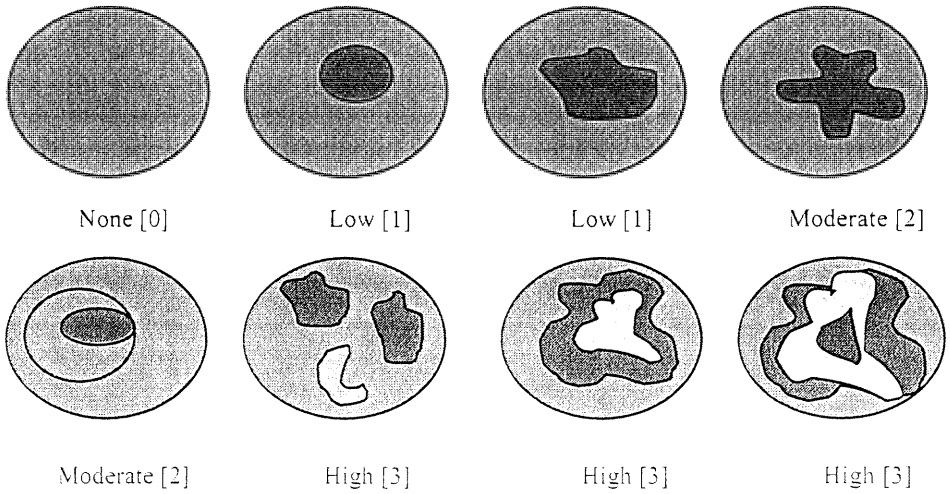
0 | 0 1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

0 | [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



1 | [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate[2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



Wetland Name:	AU ID#: D-818c

D40

1 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

3 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference. OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

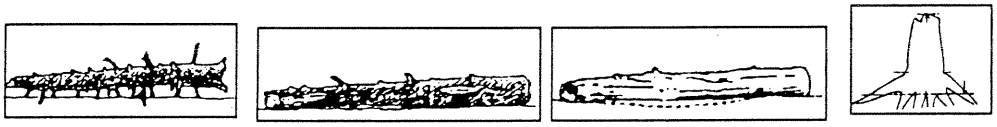
Wetland Name: **AU ID#:** D - 818c

1 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is the AU part of a riparian corridor *(see text for definitions)*
   (NO) **go to 5** **YES go to 2**
2. Is the wetland part of riparian corridor > 50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   (NO) go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   (NO) go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   (NO) go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] (YES) = [1]

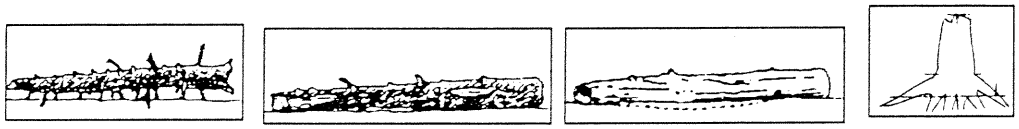
0 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

Wetland Name: **AU ID#:** D-618c

SOILS and SUBSTRATES

		D46	Composition of AU surface
1	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
0	0/1	*D46.6*	Exposed sand
0	0/1	*D46.7*	Exposed silt
0	0/1	*D46.8*	Exposed clay

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

		D47	Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
0	[0-3]	*D47.1*	Peat
0	[0-3]	*D47.2*	Organic Muck
3	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)

Record the least permeable layer if there are several down to 60 cm.

		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
0	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	Substrate of streams
0	0/1	*D49.1*	Substrate **of permanent stream** or river in AU has at least 1 square meter of gravel
0	0/1	*D49.2*	Substrate **of permanent stream** or river in AU has at least 1 square meter of cobbles
		D49.3	

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

Western Washington Wetland Classification Key

Wetland Name: Wetland E
AU ID #: 8Bc - E **Date:** 6/3/08

1) Water levels in AU usually controlled by tides
   No – go to 2 Yes – **Tidal Fringe**

2) Topography is flat and precipitation is only source (>90%) of water to the AU
   No – go to 3 Yes – **Flat**

3) AU is contiguous with >8 ha open water, and water is deeper than 2 m over 30% of open water area
   No – go to 4 Yes – **Lacustrine Fringe**

4) Open water is <8 ha and >2 m deep, but AU is a fringe narrower than ½ the radius of open water
   No – go to 5 Yes – **Lacustrine Fringe**

5) Water flow in AU is unidirectional on a slope, water is not impounded in the AU
   No – go to 6 Yes – **Slope**

6) AU is located in a topographic valley with stream or river in the middle
   No – go to 9 Yes – go to 7

7) Have data showing area flooded more than once every 2 yrs.; or indicators of flooding are present:
   - ☐ Scour marks common
   - ☐ Recent sediment deposition
   - ☐ Vegetation that is damaged or bent in one direction
   - ☐ Soils have alternating deposits
   - ☐ Vegetation along bank edge has flood marks

   No for all indicators – go to 9 Yes for any indicator – go to 8

8) Flood waters retained
   No – **Riverine Flow-through**
   Yes – **Riverine Impounding**
   - ☐ Depression in floodplain
   - ☐ Constricted outlet
   - ☐ Permanent water

9) Has surface water outflow – **Depressional Outflow**
   Has no surface outflow – **Depressional Closed**

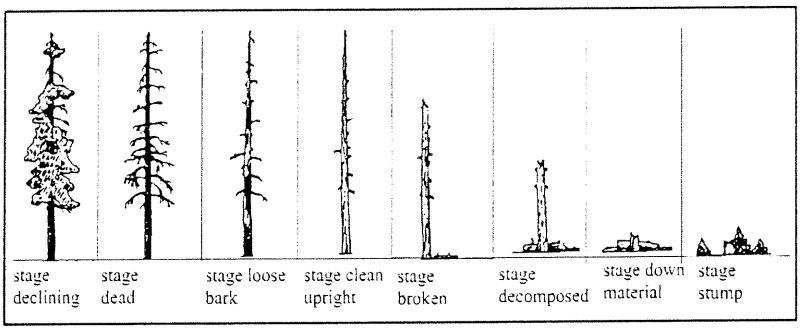
Rationale for Choices:
Wetland rated as depressional outflow for functions assessment purposes.

Single-Page Sheet for Snags, Large Woody Debris, and Aquatic Bed Vegetation

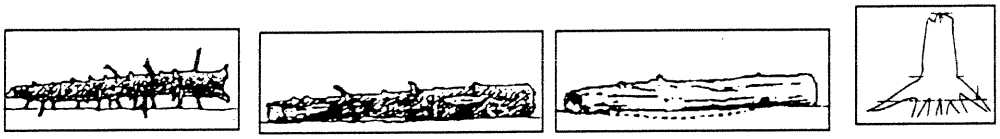
Wetland Name: _____

AU ID #: _____ **Date:** _____

_____ [0-8] D31 Snags (record number of snags present)
Circle the categories present; min DBH of snag = 10 cm (4")

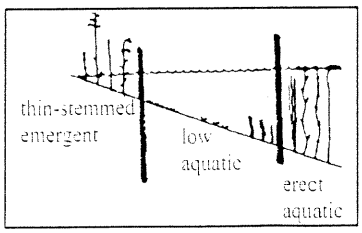


_____ [1-1] D44 Number of categories of large woody debris in AU **outside of perm. water**
Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

_____ [1-3] D25 Number of plant structure categories present in aquatic bed vegetation



Wetland Name: Wetland E

AU ID#: E - 818c

Location:

T/S/R:

Data Collector:

Date: 6/3/00

Use this data sheet for:
***DEPRESSIONAL OUTFLOW** or **RIVERINE IMPOUNDING** wetlands*
in the Lowlands of Western Washington

- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

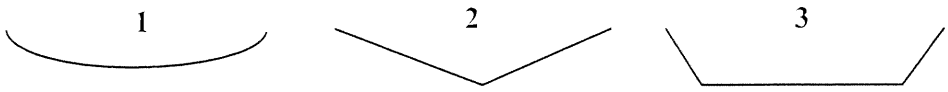
Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.009	ha	**D1**	Area of AU 9647
3.3	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
0	0/1	**D4**	Channels, ditches, or streams in AU
0	0/1	*D4.1*	Channels, ditches, or streams in AU have permanently flowing water *(you see water flowing)*
		D4.2	
0	0/1	*D4.3*	The only surface outflow from the AU is through a culvert (<60 cm) or vertical siphon
		D5	
		D6	
		D7	
		D8	Inundation
0	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
0	0/1	*D9.2*	Seasonally flooded (>1 month)
0	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
0	m	**D10**	Average height of annual flooding above lowest point of outlet or surface of permanent stream at outlet (round to 0.3 m)

By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

Wetland Name: **AU ID#:** E - 818c

		D11	Cross section of AU in areas of seasonal inundation (record a 1 next to cross section that best fits)
0	0/1	*D11.1*	Cross section 1
0	0/1	*D11.2*	Cross section 2
0	0/1	*D11.3*	Cross section 3



		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
0	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)
		D13	Constriction of outlet
1	0/1	*D13.1*	Unconstricted or only slightly constricted
0	0/1	*D13.2*	Moderately constricted
0	0/1	*D13.3*	Severely constricted
0	0/1	*D13.4*	*Riverine Impounding only* – Completely constricted (no surface outlet)

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

If the AU has multiple outlets, judge the constriction as if all the outlets were combined into one large one.

VEGETATION

		D14	Cowardin Classes (as % area of AU)
0	%	*D14.1*	Forest - evergreen
0	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
0	%	*D14.4*	Scrub-shrub - deciduous
100	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed
1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
0	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
0	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
3	#	*D19.1*	Record number of native plant species found in AU
2	#	*D19.2*	Record number of non- native plant species found in AU
1	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
1	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
0	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

A stratum must have 20% cover in assemblage

Wetland Name: **AU ID#:** E-818c

0 0/1 **D22** Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

D23 Sphagnum bogs

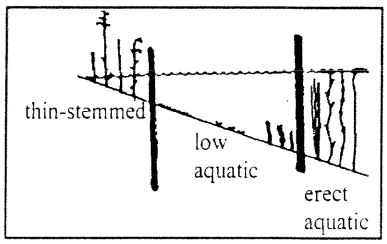
0 0/1 *D23.1* % area of Sphagnum bogs >75%
0 0/1 *D23.2* % area of Sphagnum bogs = 50-75%
0 0/1 *D23.3* % area of Sphagnum bogs = 25-49%
0 0/1 *D23.4* % area of Sphagnum bogs = 1-24%
0 0/1 *D23.5* % area of Sphagnum bogs = 0%

D24 Dominance by non-native plant species

0 0/1 *D24.1* % area of non-native species >75%
0 0/1 *D24.2* % area of non-native species = 50-75%
0 0/1 *D24.3* %area of non-native species = 25-49%
1 0/1 *D24.4* % area of non-native species = 1-24%
0 0/1 *D24.5* % area of non-natives = 0%

HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



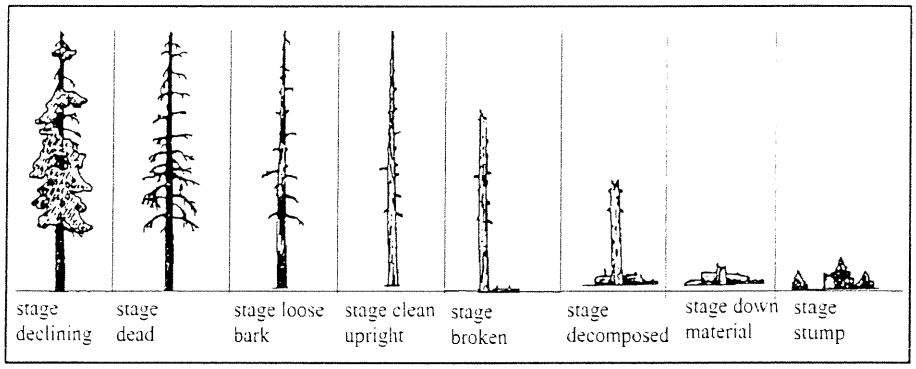
D26 pH

7 [4-9] *D26.1* pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
[4-9] *D26.2* pH of open or standing water *(record the lowest pH. if you cannot measure record a [7])*
0 0/1 **D27** Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1 0/1 **D28** Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0 0/1 **D29** Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0 0/1 **D30** Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

Wetland Name:	**AU ID#:** E-8(8 c

0 [0-8] **D31** Snags (record # of stages)

Circle the categories present: minimum DBH of snag = 10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

0 0/1 **D32** Overhanging vegetation, extending out for 1 m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

0 0/1 **D34** Undercut banks present for at least 2 m (6.6 ft.)

0 [0-4] **D35** Key for rating egg-laying structures for amphibians

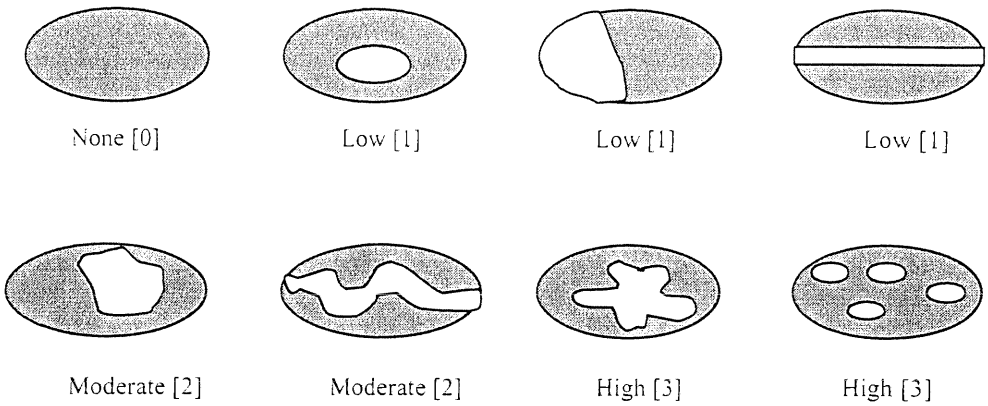
1. Does the AU have thin-stemmed vegetation or thin branches **(<8 mm)** in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

Wetland Name: **AU ID#:** E - 818 c

0 0/1 **D36** Tannins in surface waters >10% of water surface

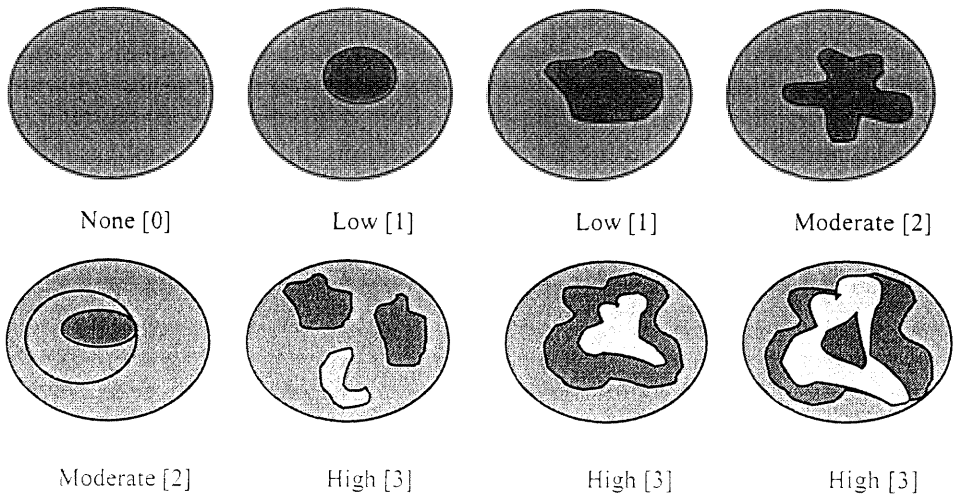
0 0/1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

0 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



0 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate[2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



Wetland Name:	**AU ID#:** E-318c

D40

0 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

(0) There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

2 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference. OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

(2) No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

Wetland Name: **AU ID#:** E-818c

1 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

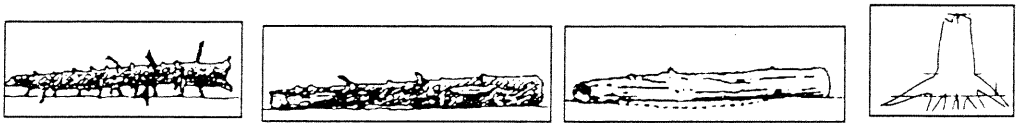
1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO **go to 5** YES **go to 2**
2. Is the wetland part of riparian corridor > 50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] **YES = [1]**

0 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included

Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

Wetland Name:	**AU ID#:** E-818c

SOILS and SUBSTRATES

		D46	Composition of AU surface
0	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
0	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
0	0/1	*D46.6*	Exposed sand
0	0/1	*D46.7*	Exposed silt
0	0/1	*D46.8*	Exposed clay
		D47	Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
0	[0-3]	*D47.1*	Peat
0	[0-3]	*D47.2*	Organic Muck
3	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)
		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
0	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
1	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	Substrate of streams
0	0/1	*D49.1*	Substrate **of permanent stream** or river in AU has at least 1 square meter of gravel
0	0/1	*D49.2*	Substrate **of permanent stream** or river in AU has at least 1 square meter of cobbles
		D49.3	

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

Record the least permeable layer if there are several down to 60 cm.

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

Western Washington Wetland Classification Key

Wetland Name: Wetland F

AU ID #: 818c - F **Date:** 6/3/08

1) Water levels in AU usually controlled by tides
   No – go to 2 Yes – **Tidal Fringe**

2) Topography is flat and precipitation is only source (>90%) of water to the AU
   No – go to 3 Yes – **Flat**

3) AU is contiguous with >8 ha open water, and water is deeper than 2 m over 30% of open water area
   No – go to 4 Yes – **Lacustrine Fringe**

4) Open water is <8 ha and >2 m deep, but AU is a fringe narrower than ½ the radius of open water
   No – go to 5 Yes – **Lacustrine Fringe**

5) Water flow in AU is unidirectional on a slope, water is not impounded in the AU
   No – go to 6 Yes – **Slope**

6) AU is located in a topographic valley with stream or river in the middle
   No – go to 9 Yes – go to 7

7) Have data showing area flooded more than once every 2 yrs.; or indicators of flooding are present:
   - ☐ Scour marks common
   - ☐ Recent sediment deposition
   - ☐ Vegetation that is damaged or bent in one direction
   - ☐ Soils have alternating deposits
   - ☐ Vegetation along bank edge has flood marks

   No for all indicators – go to 9 Yes for any indicator – go to 8

8) Flood waters retained
   No – **Riverine Flow-through**
   Yes – **Riverine Impounding**
   - ☐ Depression in floodplain
   - ☐ Constricted outlet
   - ☐ Permanent water

9) Has surface water outflow – **Depressional Outflow**
   Has no surface outflow – **Depressional Closed**

Rationale for Choices:
Wetland rated as depressional outflow for functions assessment purposes.

Wetland Name: Wetland F

AU ID#: F-818c

Location:

T/S/R:

Data Collector:

Date: 6/3/08

Use this data sheet for:
***DEPRESSIONAL OUTFLOW** or **RIVERINE IMPOUNDING** wetlands*
in the Lowlands of Western Washington

- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

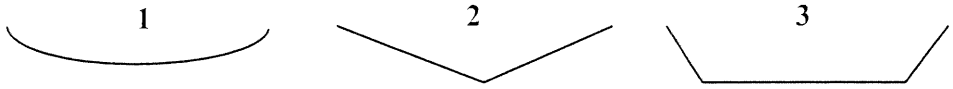
Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.082	ha	**D1**	Area of AU 87907
3.3	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
0	0/1	**D4**	Channels, ditches, or streams in AU
0	0/1	*D4.1*	Channels, ditches, or streams in AU have permanently flowing water *(you see water flowing)*
		D4.2	
0	0/1	*D4.3*	The only surface outflow from the AU is through a culvert (<60 cm) or vertical siphon
		D5	
		D6	
		D7	
		D8	Inundation
10	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
1	0/1	*D9.2*	Seasonally flooded (>1 month)
0	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
0	m	**D10**	Average height of annual flooding above lowest point of outlet or surface of permanent stream at outlet (round to 0.3 m)

By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

Wetland Name: **AU ID#:** F-818 c

		D11	Cross section of AU in areas of seasonal inundation (record a 1 next to cross section that best fits)
1	0/1	*D11.1*	Cross section 1
0	0/1	*D11.2*	Cross section 2
0	0/1	*D11.3*	Cross section 3



		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
1	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

		D13	Constriction of outlet
1	0/1	*D13.1*	Unconstricted or only slightly constricted
0	0/1	*D13.2*	Moderately constricted
0	0/1	*D13.3*	Severely constricted
0	0/1	*D13.4*	*Riverine Impounding only* – Completely constricted (no surface outlet)

If the AU has multiple outlets, judge the constriction as if all the outlets were combined into one large one.

VEGETATION

		D14	Cowardin Classes (as % area of AU)
0	%	*D14.1*	Forest - evergreen
0	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
0	%	*D14.4*	Scrub-shrub - deciduous
100	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
0	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
0	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
4	#	*D19.1*	Record number of native plant species found in AU
3	#	*D19.2*	Record number of non- native plant species found in AU
1	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
1	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
0	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

A stratum must have 20% cover in assemblage

Wetland Name: **AU ID#:** F-818e

0 0/1 **D22** Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

D23 Sphagnum bogs

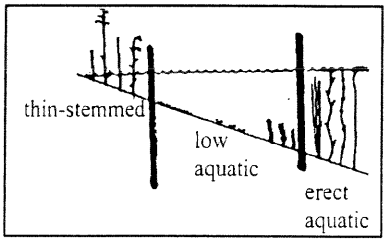
0 0/1 *D23.1* % area of Sphagnum bogs >75%
0 0/1 *D23.2* % area of Sphagnum bogs = 50-75%
0 0/1 *D23.3* % area of Sphagnum bogs = 25-49%
0 0/1 *D23.4* % area of Sphagnum bogs = 1-24%
1 0/1 *D23.5* % area of Sphagnum bogs = 0%

D24 Dominance by non-native plant species

0 0/1 *D24.1* % area of non-native species >75%
0 0/1 *D24.2* % area of non-native species = 50-75%
0 0/1 *D24.3* %area of non-native species = 25-49%
1 0/1 *D24.4* % area of non-native species = 1-24%
0 0/1 *D24.5* % area of non-natives = 0%

HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



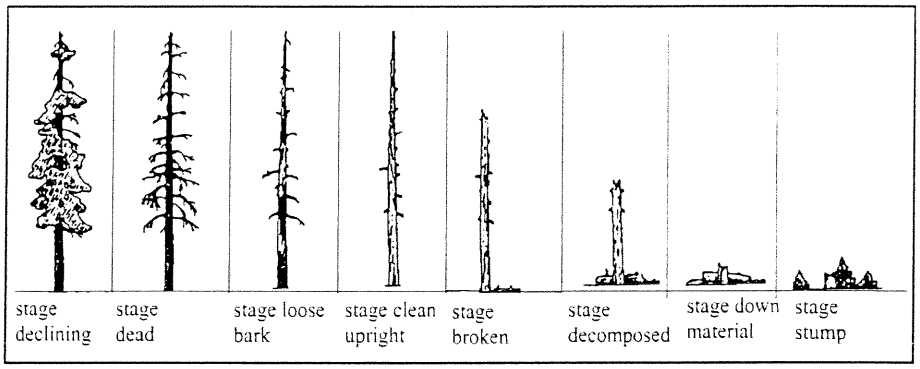
D26 pH

7 [4-9] *D26.1* pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
[4-9] *D26.2* pH of open or standing water *(record the lowest pH, if you cannot measure record a [7])*
0 0/1 **D27** Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1 0/1 **D28** Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0 0/1 **D29** Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0 0/1 **D30** Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

Wetland Name: **AU ID#:** F-818 c

0 [0-8] **D31** Snags (record # of stages)

Circle the categories present: minimum DBH of snag = 10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

0 0/1 **D32** Overhanging vegetation, extending out for 1 m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

0 0/1 **D34** Undercut banks present for at least 2 m (6.6 ft.)

0 [0-4] **D35** Key for rating egg-laying structures for amphibians

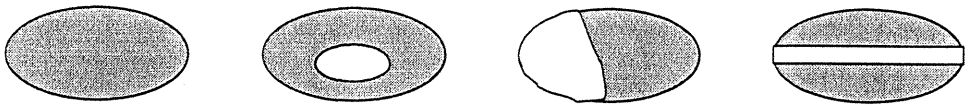
1. Does the AU have thin-stemmed vegetation or thin branches **(<8 mm)** in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

Wetland Name: **AU ID#:** F-818c

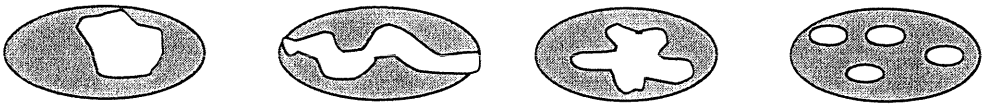
0 0/1 **D36** Tannins in surface waters >10% of water surface

0 0/1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

0 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



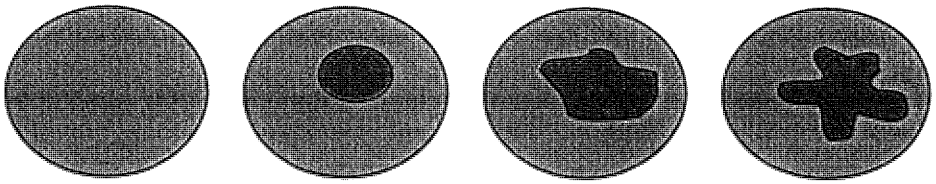
None [0] Low [1] Low [1] Low [1]



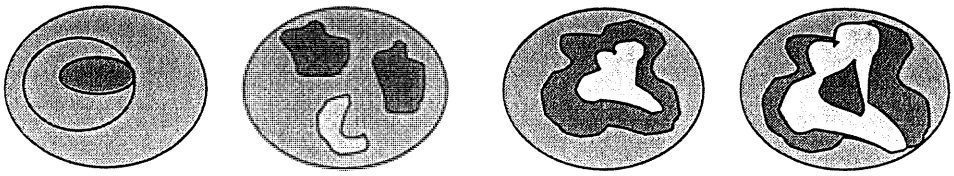
Moderate [2] Moderate [2] High [3] High [3]

2 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate[2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



None [0] Low [1] Low [1] Moderate [2]



Moderate [2] High [3] High [3] High [3]

Wetland Name: **AU ID#:** F-818 c

D40

2 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

(2) There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

3 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

(3) 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

Wetland Name: **AU ID#:** F - 818 c

1 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

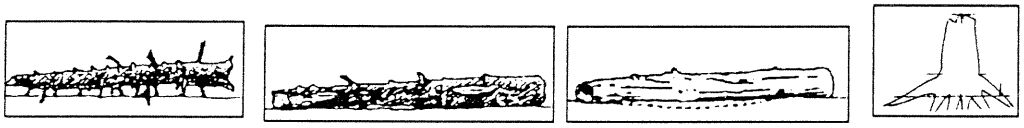
1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO **go to 5** YES **go to 2**
2. Is the wetland part of riparian corridor > 50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] **YES = [1]**

0 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included

Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

Wetland Name: **AU ID#:** F-818

SOILS and SUBSTRATES

		D46	Composition of AU surface
0	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
0	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
0	0/1	*D46.6*	Exposed sand
0	0/1	*D46.7*	Exposed silt
0	0/1	*D46.8*	Exposed clay

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

		D47	Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
0	[0-3]	*D47.1*	Peat
0	[0-3]	*D47.2*	Organic Muck
3	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)

Record the least permeable layer if there are several down to 60 cm.

		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
1	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	Substrate of streams
0	0/1	*D49.1*	Substrate **of permanent stream** or river in AU has at least 1 square meter of gravel
0	0/1	*D49.2*	Substrate **of permanent stream** or river in AU has at least 1 square meter of cobbles
		D49.3	

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

Western Washington Wetland Classification Key

Wetland Name: Wetland G

AU ID #: 818c-G **Date:** 6/9/08

1) Water levels in AU usually controlled by tides
   No – go to 2 Yes – **Tidal Fringe**

2) Topography is flat and precipitation is only source (>90%) of water to the AU
   No – go to 3 Yes – **Flat**

3) AU is contiguous with >8 ha open water, and water is deeper than 2 m over 30% of open water area
   No – go to 4 Yes – **Lacustrine Fringe**

4) Open water is <8 ha and >2 m deep, but AU is a fringe narrower than ½ the radius of open water
   No – go to 5 Yes – **Lacustrine Fringe**

5) Water flow in AU is unidirectional on a slope, water is not impounded in the AU
   No – go to 6 Yes – **Slope**

6) AU is located in a topographic valley with stream or river in the middle
   No – go to 9 Yes – go to 7

7) Have data showing area flooded more than once every 2 yrs.; or indicators of flooding are present:
   - ☐ Scour marks common
   - ☐ Recent sediment deposition
   - ☐ Vegetation that is damaged or bent in one direction
   - ☐ Soils have alternating deposits
   - ☐ Vegetation along bank edge has flood marks

   No for all indicators – go to 9 Yes for any indicator – go to 8

8) Flood waters retained
   No – **Riverine Flow-through**
   Yes – **Riverine Impounding**
   - ☐ Depression in floodplain
   - ☐ Constricted outlet
   - ☐ Permanent water

9) Has surface water outflow – **Depressional Outflow**
   Has no surface outflow – **Depressional Closed**

Rationale for Choices:

Wetland Name: Wetland G

Location:

Data Collector:

AU ID#: 818c - G

T/S/R:

Date: 6/9/08

Use this data sheet for:
DEPRESSIONAL CLOSED wetlands
in the Lowlands of Western Washington

- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	D0	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.0006	ha	D1	Area of AU 60ft
3.3	ha	D2	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
		D4	
		D4.1	
		D4.2	
		D4.3	
		D5	
		D6	
		D7	
		D8	Inundation
25	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
1	0/1	*D9.2*	Seasonally flooded (>1 month)
0	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
	m	**D10**	

By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

Wetland Name: AU ID#: 818c - 6

		D11	
	0/1	*D11.1*	
	0/1	*D11.2*	
	0/1	*D11.3*	
		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
1	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)
		D13	
		D13.1	
		D13.2	
		D13.3	
		D13.4	

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

VEGETATION

		D14	Cowardin Classes (as % area of AU)
0	%	*D14.1*	Forest - evergreen
0	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
25	%	*D14.4*	Scrub-shrub - deciduous
75	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed
1	0/1	D15	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
25	%	D16	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
25	%	D17	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
1	#	*D19.1*	Record number of native plant species found in AU
3	#	*D19.2*	Record number of non- native plant species found in AU
2	#	D20	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
2	[1-6]	D21	Strata: The maximum # of strata present in any plant assemblage
1	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?
0	0/1	D22	Mature trees in AU

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

A stratum must have 20% cover in assemblage

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

Wetland Name: AU ID#: 818c - G

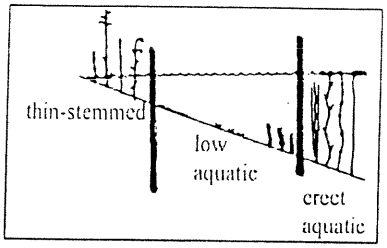
		D23	Sphagnum bogs
0	0/1	*D23.1*	% area of Sphagnum bog >75%
0	0/1	*D23.2*	% area of Sphagnum bog = 50-75%
0	0/1	*D23.3*	% area of Sphagnum bog = 25-49%
0	0/1	*D23.4*	% area of Sphagnum bog = 1-24%
1	0/1	*D23.5*	% area of Sphagnum bog = 0%
		D24	Dominance by non-native plant species
0	0/1	*D24.1*	% area of non-native species >75%
0	0/1	*D24.2*	% area of non-native species = 50-75%
1	0/1	*D24.3*	%area of non-native species = 25-49%
0	0/1	*D24.4*	% area of non-native species = 1-24%
0	0/1	*D24.5*	% area of non-natives = 0%

HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation

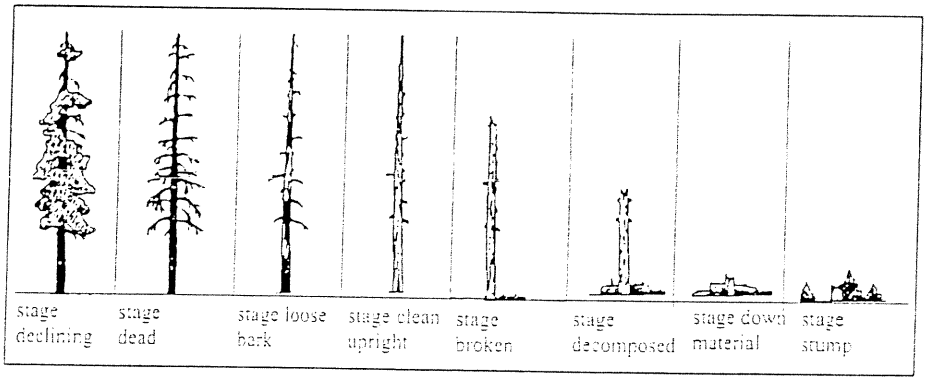
Applies only to aquatic bed species

DO NOT count persistent emergents



		D26	pH
7	[4-9]	*D26.1*	pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
	[4-9]	*D26.2*	pH of open or standing water (*record the lowest pH, if you cannot measure record a [7]*)
0	0/1	**D27**	Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1	0/1	**D28**	Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0	0/1	**D29**	Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0	0/1	**D30**	Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU
1	[0-8]	**D31**	Snags (record # of stages)

Circle the categories present; minimum DBH of snag =10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

Wetland Name:	AU ID#: 818c-G

0 0/1 D32 Overhanging vegetation, extending out for 1m, for at least 10 m (33 ft) over stream or open water.

0 0/1 D33 Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

D34

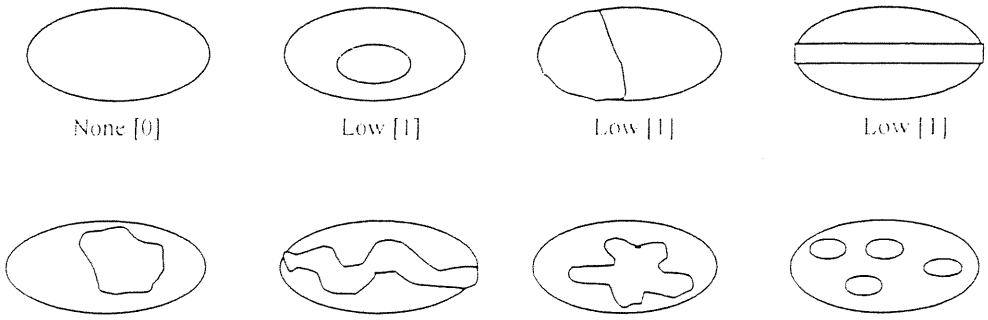
0 [0-4] D35 Key for rating egg-laying structures for amphibians

1. Does the AU have thin-stemmed vegetation or thin branches (<8 mm) in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, 1-4 mm in diameter?
   NO go to 3 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 YES - Score = 4
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 YES – Score = 3 STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, 1-4 mm?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 YES – Score = 3
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 YES – Score = 2

0 0/1 D36 Tannins in surface waters >10% of water surface

0 0/1 D37 Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

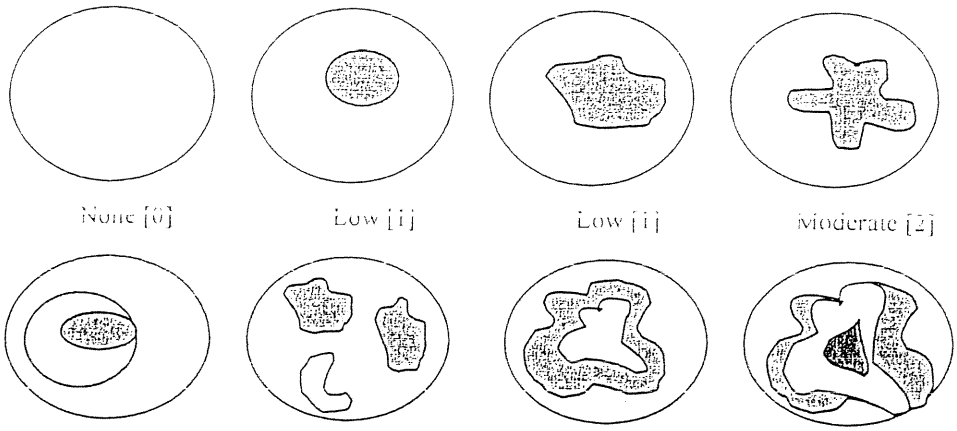
0 [0-3] D38 Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



Wetland Name: AU ID#: 818c - G

1 [0-3] D39 Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate [2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



None [0] Low [1] Low [1] Moderate [2]

Moderate [2] High [3] High [3] High [3]

D40

3 [0-3] D41 Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

Wetland Name:	AU ID#: 81Bc-G

3 [0-5] D42 Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference. OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

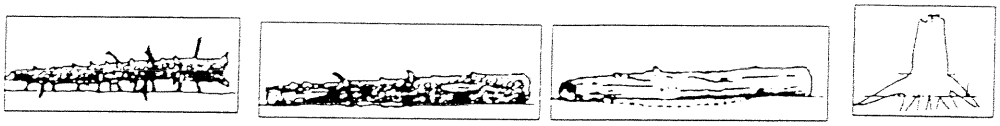
1 [0-3] D43 Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO go to 5 **YES go to 2**
2. Is the wetland part of riparian corridor >50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] YES = [1]

Wetland Name: AU ID#: 818 c – G

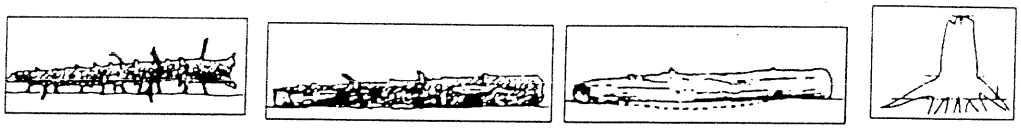
2 [0-12] D44 # of categories of large woody debris in AU outside of perm. water

Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

0 [0-12] D45 # of categories of large woody debris in permanent water of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

SOILS and SUBSTRATES

D46 Composition of AU surface

1	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
0	0/1	*D46.6*	Exposed sand
0	0/1	*D46.7*	Exposed silt
0	0/1	*D46.8*	Exposed clay

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

D47 Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)

0	[0-3]	*D47.1*	Peat
0	[0-3]	*D47.2*	Organic Muck
3	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)

Record the least permeable layer if there are several down to 60 cm.

Wetland Name:	AU ID#: 818C-G

		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
0	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	
		D49.1	
		D49.2	
		D49.3	

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

Western Washington Wetland Classification Key

Wetland Name: Wetland H

AU ID #: 818c-H **Date:** 6/9/08

1) Water levels in AU usually controlled by tides
   No – go to 2 Yes – **Tidal Fringe**

2) Topography is flat and precipitation is only source (>90%) of water to the AU
   No – go to 3 Yes – **Flat**

3) AU is contiguous with >8 ha open water, and water is deeper than 2 m over 30% of open water area
   No – go to 4 Yes – **Lacustrine Fringe**

4) Open water is <8 ha and >2 m deep, but AU is a fringe narrower than ½ the radius of open water
   No – go to 5 Yes – **Lacustrine Fringe**

5) Water flow in AU is unidirectional on a slope, water is not impounded in the AU
   No – go to 6 Yes – **Slope**

6) AU is located in a topographic valley with stream or river in the middle
   No – go to 9 Yes – go to 7

7) Have data showing area flooded more than once every 2 yrs.; or indicators of flooding are present:
   - ☐ Scour marks common
   - ☐ Recent sediment deposition
   - ☐ Vegetation that is damaged or bent in one direction
   - ☐ Soils have alternating deposits
   - ☐ Vegetation along bank edge has flood marks

   No for all indicators – go to 9 Yes for any indicator – go to 8

8) Flood waters retained
   No – **Riverine Flow-through**
   Yes – **Riverine Impounding**
   - ☐ Depression in floodplain
   - ☐ Constricted outlet
   - ☐ Permanent water

9) Has surface water outflow – **Depressional Outflow**
   Has no surface outflow – **Depressional Closed**

Rationale for Choices:
Assessed as depressional outflow

Wetland Name: Wetland H **AU ID#:** 818c-H
Location: **T/S/R:**
Data Collector: e.schau **Date:** 6/9/08

Use this data sheet for:
***DEPRESSIONAL OUTFLOW** or **RIVERINE IMPOUNDING** wetlands*
in the Lowlands of Western Washington
- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

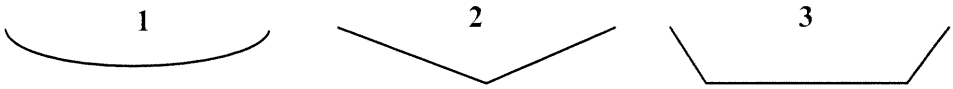
Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.0302	ha	**D1**	Area of AU 3,253 ft
3.3	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
0	0/1	**D4**	Channels, ditches, or streams in AU
0	0/1	*D4.1*	Channels, ditches, or streams in AU have permanently flowing water *(you see water flowing)*
		D4.2	
0	0/1	*D4.3*	The only surface outflow from the AU is through a culvert (<60 cm) or vertical siphon
		D5	
		D6	
		D7	
		D8	Inundation
0	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
0	0/1	*D9.2*	Seasonally flooded (>1 month)
0	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
0	m	**D10**	Average height of annual flooding above lowest point of outlet or surface of permanent stream at outlet (round to 0.3 m)

By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

Wetland Name: **AU ID#:** 818c-11

		D11	Cross section of AU in areas of seasonal inundation (record a 1 next to cross section that best fits)
0	0/1	*D11.1*	Cross section 1
0	0/1	*D11.2*	Cross section 2
0	0/1	*D11.3*	Cross section 3



		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
0	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

		D13	Constriction of outlet
1	0/1	*D13.1*	Unconstricted or only slightly constricted
0	0/1	*D13.2*	Moderately constricted
0	0/1	*D13.3*	Severely constricted
0	0/1	*D13.4*	*Riverine Impounding only* – Completely constricted (no surface outlet)

If the AU has multiple outlets, judge the constriction as if all the outlets were combined into one large one.

VEGETATION

		D14	Cowardin Classes (as % area of AU)
6	%	*D14.1*	Forest - evergreen
0	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
0	%	*D14.4*	Scrub-shrub - deciduous
100	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
0	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
0	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
4	#	*D19.1*	Record number of native plant species found in AU
4	#	*D19.2*	Record number of non- native plant species found in AU
1	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
1	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
0	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

A stratum must have 20% cover in assemblage

Wetland Name: **AU ID#:** 8|8c - H

0 0/1 **D22** Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

D23 Sphagnum bogs

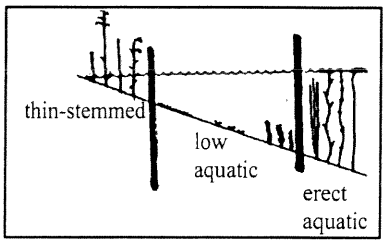
0 0/1 *D23.1* % area of Sphagnum bogs >75%
0 0/1 *D23.2* % area of Sphagnum bogs = 50-75%
0 0/1 *D23.3* % area of Sphagnum bogs = 25-49%
0 0/1 *D23.4* % area of Sphagnum bogs = 1-24%
1 0/1 *D23.5* % area of Sphagnum bogs = 0%

D24 Dominance by non-native plant species

1 0/1 *D24.1* % area of non-native species >75%
0 0/1 *D24.2* % area of non-native species = 50-75%
0 0/1 *D24.3* %area of non-native species = 25-49%
0 0/1 *D24.4* % area of non-native species = 1-24%
0 0/1 *D24.5* % area of non-natives = 0%

HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



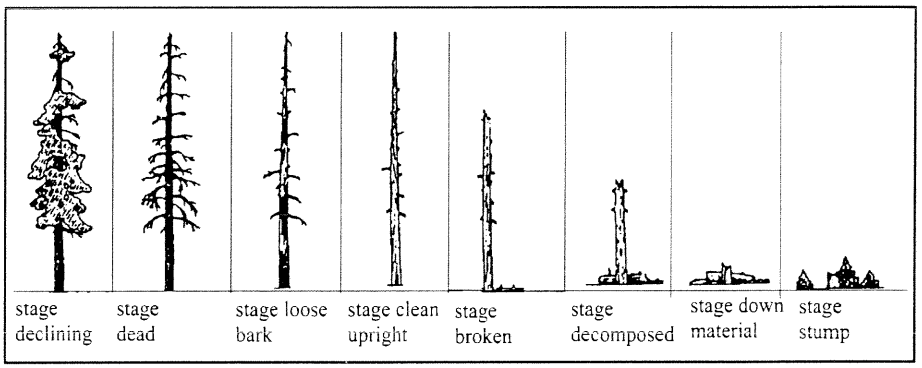
D26 pH

7 [4-9] *D26.1* pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
[4-9] *D26.2* pH of open or standing water (*record the lowest pH, if you cannot measure record a [7]*)
0 0/1 **D27** Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1 0/1 **D28** Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0 0/1 **D29** Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0 0/1 **D30** Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

Wetland Name: **AU ID#:** 818c-H

0 [0-8] **D31** Snags (record # of stages)

Circle the categories present; minimum DBH of snag =10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

0 0/1 **D32** Overhanging vegetation, extending out for 1 m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

0 0/1 **D34** Undercut banks present for at least 2 m (6.6 ft.)

0 [0-4] **D35** Key for rating egg-laying structures for amphibians

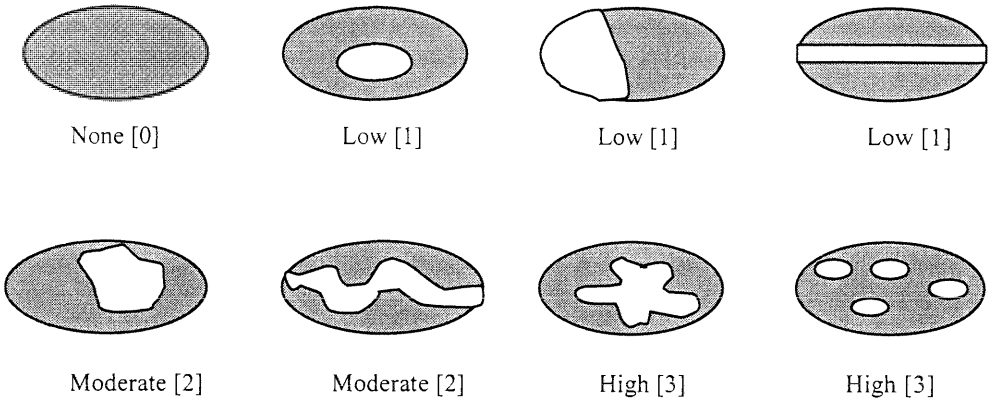
1. Does the AU have thin-stemmed vegetation or thin branches **(<8 mm)** in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

Wetland Name: **AU ID#:** 818c-H

0 0/1 **D36** Tannins in surface waters >10% of water surface

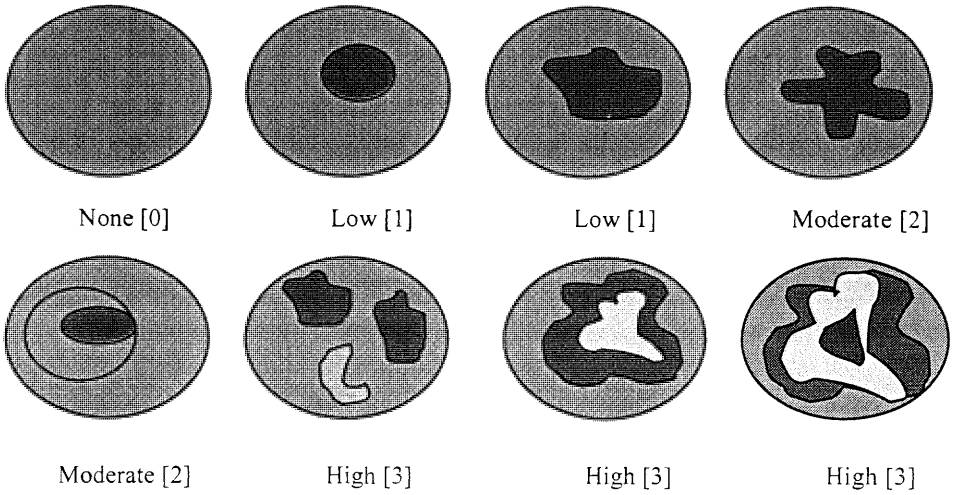
0 0/1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

0 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



0 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate[2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



Wetland Name: **AU ID#:** 818c-H

D40

1 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

3 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

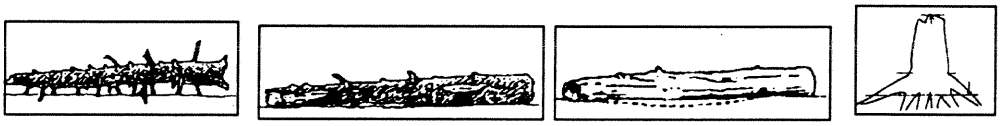
Wetland Name: **AU ID#:** 818c-H

1 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO go to 5 **YES go to 2**
2. Is the wetland part of riparian corridor > 50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] **YES = [1]**

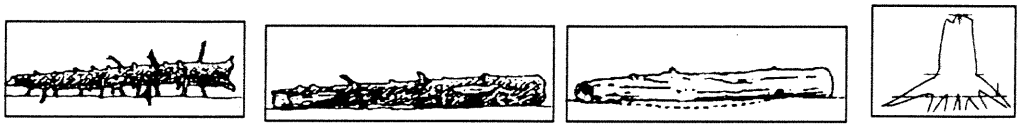
0 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

Wetland Name: **AU ID#:** 818c-H

SOILS and SUBSTRATES

		D46	Composition of AU surface
0	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
0	0/1	*D46.6*	Exposed sand
0	0/1	*D46.7*	Exposed silt
0	0/1	*D46.8*	Exposed clay
		D47	Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
0	[0-3]	*D47.1*	Peat
0	[0-3]	*D47.2*	Organic Muck
3	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)
		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
0	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	Substrate of streams
0	0/1	*D49.1*	Substrate **of permanent stream** or river in AU has at least 1 square meter of gravel
0	0/1	*D49.2*	Substrate **of permanent stream** or river in AU has at least 1 square meter of cobbles
		D49.3	

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

Record the least permeable layer if there are several down to 60 cm.

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

Western Washington Wetland Classification Key

Wetland Name: Wetland J

AU ID #: _____ **Date:** 5/22/08

1) Water levels in AU usually controlled by tides
   No – go to 2 Yes – **Tidal Fringe**

2) Topography is flat and precipitation is only source (>90%) of water to the AU
   No – go to 3 Yes – **Flat**

3) AU is contiguous with >8 ha open water, and water is deeper than 2 m over 30% of open water area
   No – go to 4 Yes – **Lacustrine Fringe**

4) Open water is <8 ha and >2 m deep, but AU is a fringe narrower than ½ the radius of open water
   No – go to 5 Yes – **Lacustrine Fringe**

5) Water flow in AU is unidirectional on a slope, water is not impounded in the AU
   No – go to 6 Yes – **Slope**

6) AU is located in a topographic valley with stream or river in the middle
   No – go to 9 Yes – go to 7

7) Have data showing area flooded more than once every 2 yrs.; or indicators of flooding are present:
   - ☐ Scour marks common
   - ☐ Recent sediment deposition
   - ☐ Vegetation that is damaged or bent in one direction
   - ☐ Soils have alternating deposits
   - ☐ Vegetation along bank edge has flood marks

   No for all indicators – go to 9 Yes for any indicator – go to 8

8) Flood waters retained
   No – **Riverine Flow-through**
   Yes – **Riverine Impounding**
   - ☐ Depression in floodplain
   - ☐ Constricted outlet
   - ☐ Permanent water

9) Has surface water outflow – **Depressional Outflow**
   Has no surface outflow – **Depressional Closed**

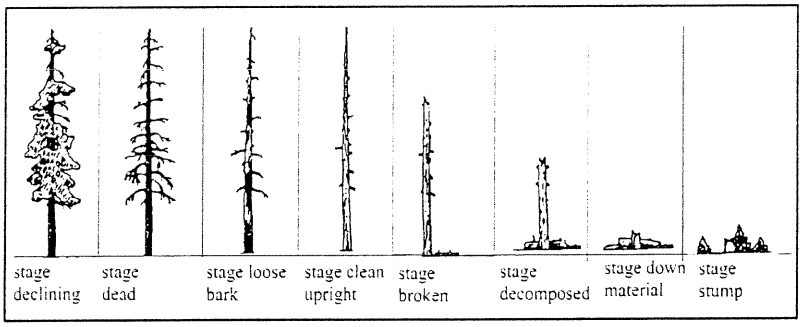
Rationale for Choices:

Single-Page Sheet for Snags, Large Woody Debris, and Aquatic Bed Vegetation

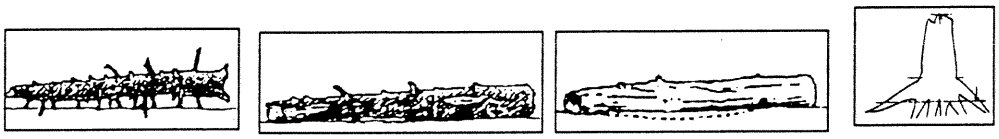
Wetland Name: _____

AU ID #: _____ **Date:** _____

_____ [0-8] D31 Snags (record number of snags present)
Circle the categories present: min DBH of snag = 10 cm (4")

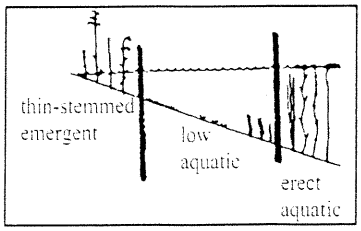


_____ [1-1] D44 Number of categories of large woody debris in AU **outside of perm. water**
Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

_____ [1-3] D25 Number of plant structure categories present in aquatic bed vegetation



Wetland Name: Wetland J- 818c AU ID#: J- 818c
Location: T/S/R:
Data Collector: Date: 5/22/00

Use this data sheet for:
***DEPRESSIONAL OUTFLOW** or **RIVERINE IMPOUNDING** wetlands*
in the Lowlands of Western Washington
- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

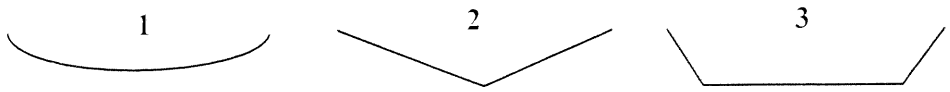
Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.025	ha	**D1**	Area of AU 2,643 ft
3.3	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
40	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
0	0/1	**D4**	Channels, ditches, or streams in AU
0	0/1	*D4.1*	Channels, ditches, or streams in AU have permanently flowing water *(you see water flowing)*
		D4.2	
0	0/1	*D4.3*	The only surface outflow from the AU is through a culvert (<60 cm) or vertical siphon
		D5	
		D6	
		D7	
		D8	Inundation
0	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
1	0/1	*D9.2*	Seasonally flooded (>1 month)
0	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
0.10	m	**D10**	Average height of annual flooding above lowest point of outlet or surface of permanent stream at outlet (round to 0.3 m)

By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1.4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

Wetland Name: **AU ID#:** J-818c

		D11	Cross section of AU in areas of seasonal inundation (record a 1 next to cross section that best fits)
1	0/1	*D11.1*	Cross section 1
0	0/1	*D11.2*	Cross section 2
0	0/1	*D11.3*	Cross section 3



		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
1	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

		D13	Constriction of outlet
1	0/1	*D13.1*	Unconstricted or only slightly constricted
0	0/1	*D13.2*	Moderately constricted
0	0/1	*D13.3*	Severely constricted
0	0/1	*D13.4*	*Riverine Impounding only* – Completely constricted (no surface outlet)

If the AU has multiple outlets, judge the constriction as if all the outlets were combined into one large one.

VEGETATION

		D14	Cowardin Classes (as % area of AU)
0	%	*D14.1*	Forest - evergreen
25	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
25	%	*D14.4*	Scrub-shrub - deciduous
50	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed
1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
100	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
50	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
19	#	*D19.1*	Record number of native plant species found in AU
2	#	*D19.2*	Record number of non- native plant species found in AU
3	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
3	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
1	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

A stratum must have 20% cover in assemblage

Wetland Name:	**AU ID#:** J- 818c

0 0/1 **D22** Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

D23 Sphagnum bogs

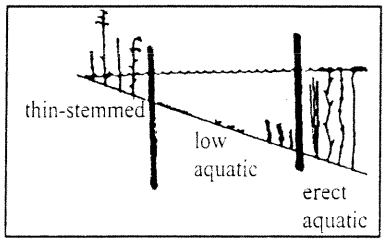
0 0/1 *D23.1* % area of Sphagnum bogs >75%
0 0/1 *D23.2* % area of Sphagnum bogs = 50-75%
0 0/1 *D23.3* % area of Sphagnum bogs = 25-49%
0 0/1 *D23.4* % area of Sphagnum bogs = 1-24%
1 0/1 *D23.5* % area of Sphagnum bogs = 0%

D24 Dominance by non-native plant species

0 0/1 *D24.1* % area of non-native species >75%
0 0/1 *D24.2* % area of non-native species = 50-75%
0 0/1 *D24.3* %area of non-native species = 25-49%
1 0/1 *D24.4* % area of non-native species = 1-24%
0 0/1 *D24.5* % area of non-natives = 0%

HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



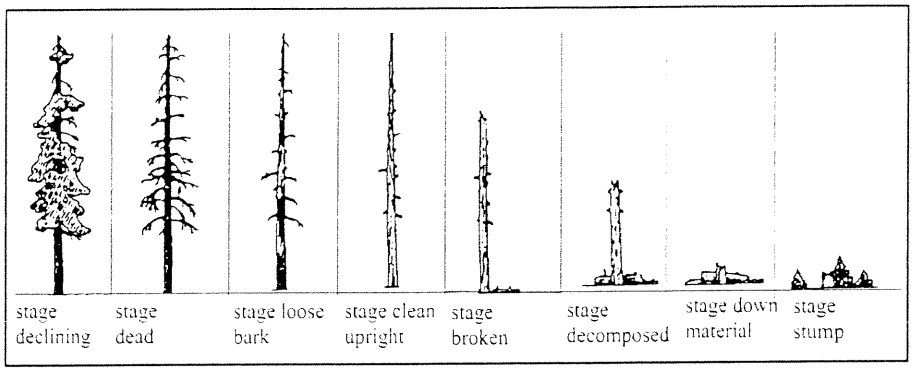
D26 pH

7 [4-9] *D26.1* pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
[4-9] *D26.2* pH of open or standing water *(record the lowest pH, if you cannot measure record a [7])*
0 0/1 **D27** Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1 0/1 **D28** Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0 0/1 **D29** Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0 0/1 **D30** Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

Wetland Name:	**AU ID#:** J - 818c

0 [0-8] **D31** Snags (record # of stages)

Circle the categories present: minimum DBH of snag =10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

0 0/1 **D32** Overhanging vegetation, extending out for 1 m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

0 0/1 **D34** Undercut banks present for at least 2 m (6.6 ft.)

0 [0-4] **D35** Key for rating egg-laying structures for amphibians

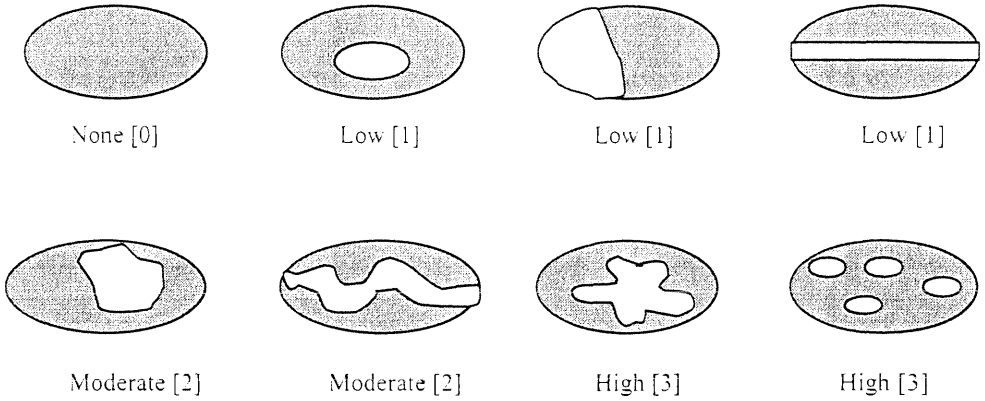
1. Does the AU have thin-stemmed vegetation or thin branches **(<8 mm)** in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – **Score = 0** YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

Wetland Name:	**AU ID#:** 5-818c

0 0 1 **D36** Tannins in surface waters >10% of water surface

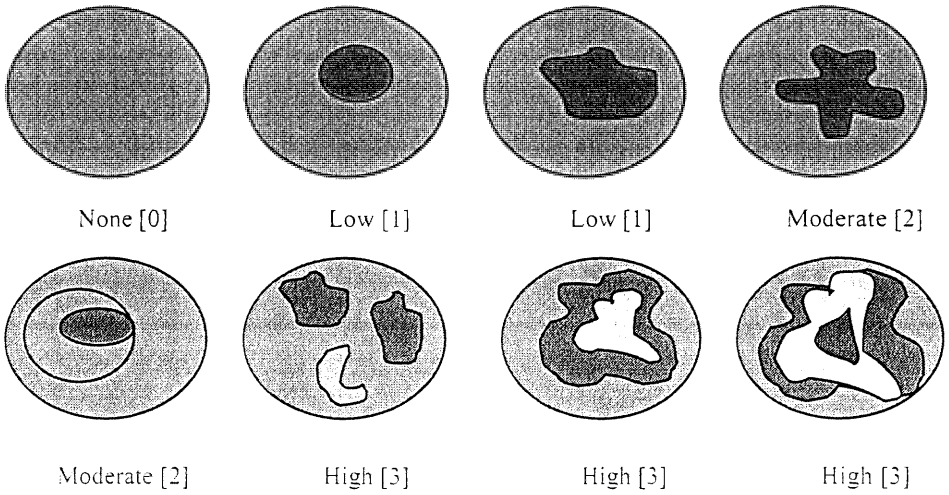
0 0 1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

0 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



2 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate[2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



Wetland Name:	AU ID#: J-818c

D40

3 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

3 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

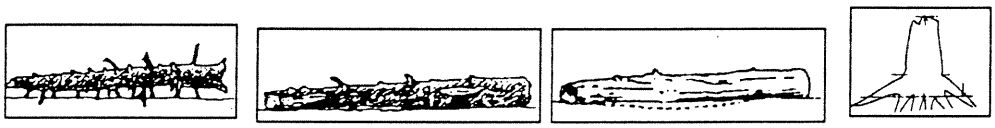
Wetland Name: **AU ID#:** J-818c

1 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO go to 5 YES go to 2
2. Is the wetland part of riparian corridor > 50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 YES = [3]
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 YES = [2]
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 YES = [1]
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 YES = [3]
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 YES = [2]
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 YES = [2]
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] YES = [1]

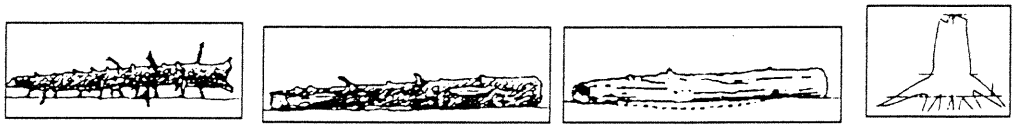
3 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")	1	1	1	
21-50cm	(8-20")				
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

Wetland Name:	**AU ID#:** J-818 c

SOILS and SUBSTRATES

		D46	Composition of AU surface
1	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
0	0/1	*D46.6*	Exposed sand
0	0/1	*D46.7*	Exposed silt
0	0/1	*D46.8*	Exposed clay

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

		D47	Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
0	[0-3]	*D47.1*	Peat
0	[0-3]	*D47.2*	Organic Muck
3	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)

Record the least permeable layer if there are several down to 60 cm.

		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
1	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	Substrate of streams
0	0/1	*D49.1*	Substrate **of permanent stream** or river in AU has at least 1 square meter of gravel
0	0/1	*D49.2*	Substrate **of permanent stream** or river in AU has at least 1 square meter of cobbles
		D49.3	

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

Western Washington Wetland Classification Key

Wetland Name: Wetland K
AU ID #: 818c - K **Date:** 6/5/08

1) Water levels in AU usually controlled by tides
   No – go to 2 Yes – **Tidal Fringe**

2) Topography is flat and precipitation is only source (>90%) of water to the AU
   No – go to 3 Yes – **Flat**

3) AU is contiguous with >8 ha open water, and water is deeper than 2 m over 30% of open water area
   No – go to 4 Yes – **Lacustrine Fringe**

4) Open water is <8 ha and >2 m deep, but AU is a fringe narrower than ½ the radius of open water
   No – go to 5 Yes – **Lacustrine Fringe**

5) Water flow in AU is unidirectional on a slope, water is not impounded in the AU
   No – go to 6 Yes – **Slope**

6) AU is located in a topographic valley with stream or river in the middle
   No – go to 9 Yes – go to 7

7) Have data showing area flooded more than once every 2 yrs.; or indicators of flooding are present:
   - ❒ Scour marks common
   - ❒ Recent sediment deposition
   - ❒ Vegetation that is damaged or bent in one direction
   - ❒ Soils have alternating deposits
   - ❒ Vegetation along bank edge has flood marks

   No for all indicators – go to 9 Yes for any indicator – go to 8

8) Flood waters retained
   No – **Riverine Flow-through**
   Yes – **Riverine Impounding**
   - ❒ Depression in floodplain
   - ❒ Constricted outlet
   - ❒ Permanent water

9) Has surface water outflow – **Depressional Outflow**
   Has no surface outflow – **Depressional Closed**

Rationale for Choices:

Wetland Name:	Wetland K	**AU ID#:**	818c
Location:		**T/S/R:**	
Data Collector:	e. schau	**Date:**	6/5/08

Use this data sheet for:
DEPRESSIONAL CLOSED *wetlands*
in the Lowlands of Western Washington
- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.005	ha	**D1**	Area of AU
3.304	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
		D4	
		D4.1	
		D4.2	
		D4.3	
		D5	
		D6	
		D7	
		D8	Inundation
50	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
1	0/1	*D9.2*	Seasonally flooded (>1 month)
0	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0.12	0/1	*D9.6*	Intermittently flowing stream
	m	**D10**	

By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

Wetland Name: **AU ID#:** 818c-K

		D11	
	0/1	*D11.1*	
	0/1	*D11.2*	
	0/1	*D11.3*	
		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
1	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)
		D13	
		D13.1	
		D13.2	
		D13.3	
		D13.4	

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

VEGETATION

		D14	Cowardin Classes (as % area of AU)
0	%	*D14.1*	Forest - evergreen
0	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
0	%	*D14.4*	Scrub-shrub - deciduous
100	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed
1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
0	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
0	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
5	#	*D19.1*	Record number of native plant species found in AU
3	#	*D19.2*	Record number of non- native plant species found in AU
1	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
1	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
0	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?
0	0/1	**D22**	Mature trees in AU

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

A stratum must have 20% cover in assemblage

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

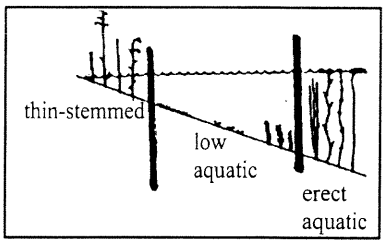
Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

Wetland Name: **AU ID#:** K-818c

		D23	Sphagnum bogs
0	0/1	*D23.1*	% area of Sphagnum bog >75%
0	0/1	*D23.2*	% area of Sphagnum bog = 50-75%
0	0/1	*D23.3*	% area of Sphagnum bog = 25-49%
0	0/1	*D23.4*	% area of Sphagnum bog = 1-24%
1	0/1	*D23.5*	% area of Sphagnum bog = 0%
		D24	Dominance by non-native plant species
1	0/1	*D24.1*	% area of non-native species >75%
0	0/1	*D24.2*	% area of non-native species = 50-75%
0	0/1	*D24.3*	%area of non-native species = 25-49%
0	0/1	*D24.4*	% area of non-native species = 1-24%
0	0/1	*D24.5*	% area of non-natives = 0%

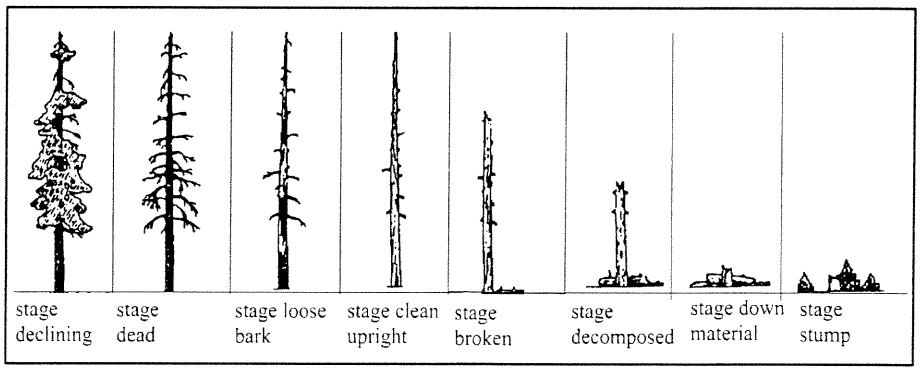
HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



		D26	pH
7	[4-9]	*D26.1*	pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
	[4-9]	*D26.2*	pH of open or standing water (*record the lowest pH, if you cannot measure record a [7])*
0	0/1	**D27**	Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1	0/1	**D28**	Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0	0/1	**D29**	Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0	0/1	**D30**	Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

0 [0-8] **D31** Snags (record # of stages)
Circle the categories present; minimum DBH of snag =10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

Wetland Name: **AU ID#:** 818c-K

0 0/1 **D32** Overhanging vegetation, extending out for 1m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

D34

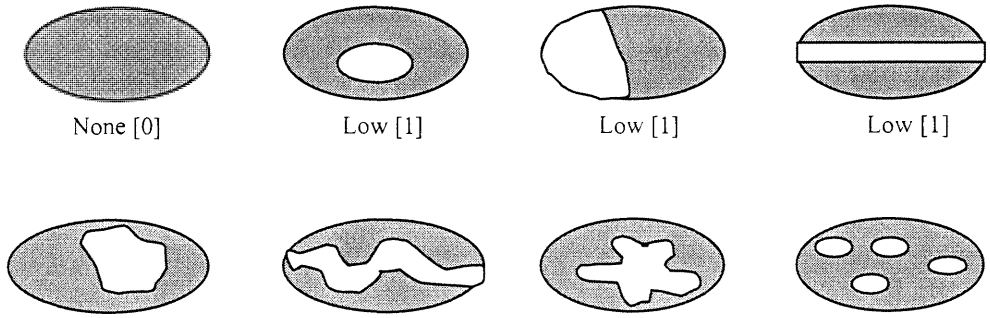
0 [0-4] **D35** Key for rating egg-laying structures for amphibians

1. Does the AU have thin-stemmed vegetation or thin branches **(<8 mm)** in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

0 0/1 **D36** Tannins in surface waters >10% of water surface

0 0/1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

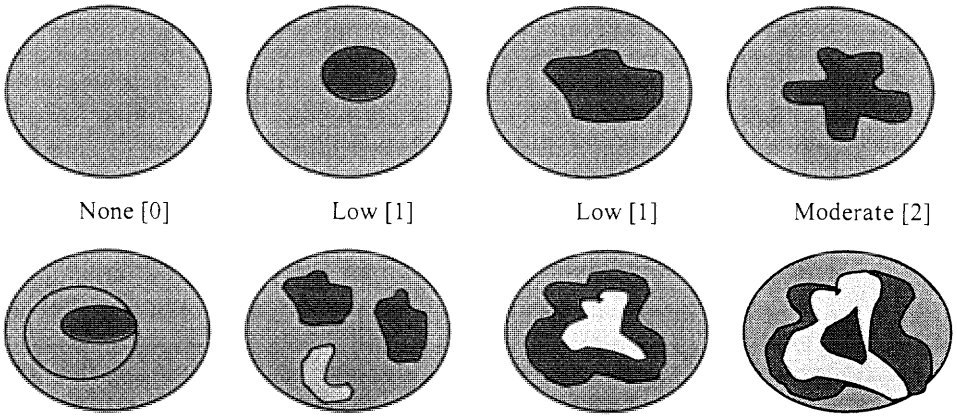
0 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



Wetland Name: **AU ID#:** 818c-K

0 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate [2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



D40

0 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity.** Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

Wetland Name: **AU ID#:** 818c - K

2 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

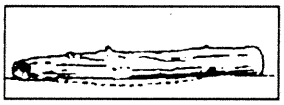
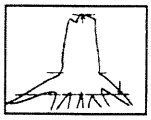
1 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO go to 5 **YES go to 2**
2. Is the wetland part of riparian corridor >50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] **YES = [1]**

Wetland Name: **AU ID#:** 818c-K

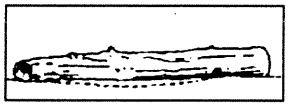
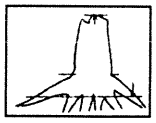
0 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included

Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)

Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

SOILS and SUBSTRATES

D46 Composition of AU surface

0	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
0	0/1	*D46.6*	Exposed sand
0	0/1	*D46.7*	Exposed silt
0	0/1	*D46.8*	Exposed clay

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

D47 Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)

0	[0-3]	*D47.1*	Peat
1	[0-3]	*D47.2*	Organic Muck
2	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)

Record the least permeable layer if there are several down to 60 cm.

Wetland Name:			**AU ID#:** 818c-K
		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
1	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	
		D49.1	
		D49.2	
		D49.3	

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

Western Washington Wetland Classification Key

Wetland Name: Wetland L - 81Rc

AU ID #: L **Date:** 6/3/08

1) Water levels in AU usually controlled by tides
   No – go to 2 Yes – **Tidal Fringe**

2) Topography is flat and precipitation is only source (>90%) of water to the AU
   No – go to 3 Yes – **Flat**

3) AU is contiguous with >8 ha open water, and water is deeper than 2 m over 30% of open water area
   No – go to 4 Yes – **Lacustrine Fringe**

4) Open water is <8 ha and >2 m deep, but AU is a fringe narrower than ½ the radius of open water
   No – go to 5 Yes – **Lacustrine Fringe**

5) Water flow in AU is unidirectional on a slope, water is not impounded in the AU
   No – go to 6 Yes – **Slope**

6) AU is located in a topographic valley with stream or river in the middle
   No – go to 9 Yes – go to 7

7) Have data showing area flooded more than once every 2 yrs.; or indicators of flooding are present:
   - ☐ Scour marks common
   - ☐ Recent sediment deposition
   - ☐ Vegetation that is damaged or bent in one direction
   - ☐ Soils have alternating deposits
   - ☐ Vegetation along bank edge has flood marks

   No for all indicators – go to 9 Yes for any indicator – go to 8

8) Flood waters retained
   No – **Riverine Flow-through**
   Yes – **Riverine Impounding**
   - ☐ Depression in floodplain
   - ☐ Constricted outlet
   - ☐ Permanent water

9) Has surface water outflow – **Depressional Outflow**
   Has no surface outflow – **Depressional Closed**

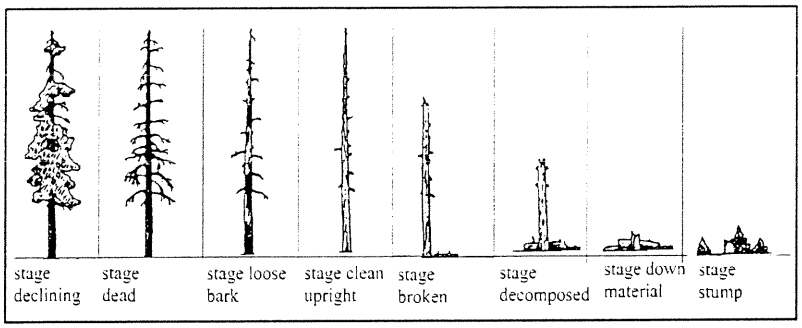
Rationale for Choices:
Assessed as depressional outflow wetland for functions assessment purpose.

Single-Page Sheet for Snags, Large Woody Debris, and Aquatic Bed Vegetation

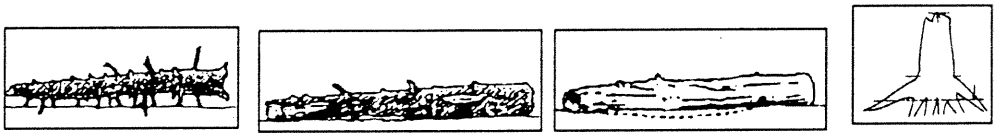
Wetland Name: Wetland L- 818c

AU ID #: L **Date:** 6/3/06

0 [0-8] D31 Snags (record number of snags present)
Circle the categories present: min DBH of snag = 10 cm (4")

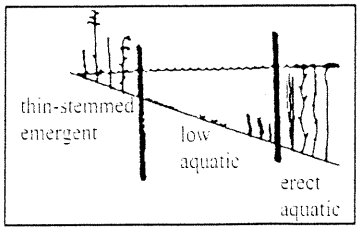


0 [1-1] D44 Number of categories of large woody debris in AU **outside of perm. water**
Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

0 [1-3] D25 Number of plant structure categories present in aquatic bed vegetation



Wetland Name: Wetland L - 818c AU ID#: L
Location: T/S/R:
Data Collector: Date: 5/22/08

Use this data sheet for:
***DEPRESSIONAL OUTFLOW** or **RIVERINE IMPOUNDING** wetlands*
in the Lowlands of Western Washington
- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

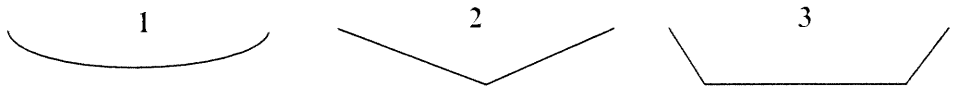
Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.003	ha	**D1**	Area of AU 334 sf
3.3	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
0	0/1	**D4**	Channels, ditches, or streams in AU
0	0/1	*D4.1*	Channels, ditches, or streams in AU have permanently flowing water *(you see water flowing)*
		D4.2	
0	0/1	*D4.3*	The only surface outflow from the AU is through a culvert (<60 cm) or vertical siphon
		D5	
		D6	
		D7	
		D8	Inundation
0	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
0	0/1	*D9.2*	Seasonally flooded (>1 month)
0	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
0	m	**D10**	Average height of annual flooding above lowest point of outlet or surface of permanent stream at outlet (round to 0.3 m)

By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

Wetland Name: **AU ID#:** L - 818e

		D11	Cross section of AU in areas of seasonal inundation (record a 1 next to cross section that best fits)
0	0/1	*D11.1*	Cross section 1
0	0/1	*D11.2*	Cross section 2
0	0/1	*D11.3*	Cross section 3



		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
0	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

		D13	Constriction of outlet
1	0/1	*D13.1*	Unconstricted or only slightly constricted
0	0/1	*D13.2*	Moderately constricted
0	0/1	*D13.3*	Severely constricted
0	0/1	*D13.4*	*Riverine Impounding only* – Completely constricted (no surface outlet)

If the AU has multiple outlets, judge the constriction as if all the outlets were combined into one large one.

VEGETATION

		D14	Cowardin Classes (as % area of AU)
0	%	*D14.1*	Forest - evergreen
0	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
25	%	*D14.4*	Scrub-shrub - deciduous
75	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed
1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
75	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
75	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
5	#	*D19.1*	Record number of native plant species found in AU
2	#	*D19.2*	Record number of non- native plant species found in AU
2	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
2	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
1	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

A stratum must have 20% cover in assemblage

Wetland Name: **AU ID#:** L - 81Bc

0 0/1 **D22** Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

D23 Sphagnum bogs

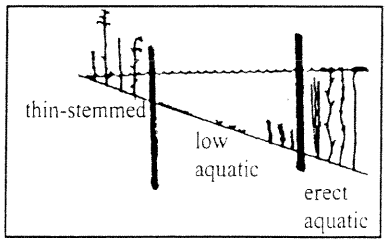
0 0/1 *D23.1* % area of Sphagnum bogs >75%
0 0/1 *D23.2* % area of Sphagnum bogs = 50-75%
0 0/1 *D23.3* % area of Sphagnum bogs = 25-49%
0 0/1 *D23.4* % area of Sphagnum bogs = 1-24%
1 0/1 *D23.5* % area of Sphagnum bogs = 0%

D24 Dominance by non-native plant species

0 0/1 *D24.1* % area of non-native species >75%
0 0/1 *D24.2* % area of non-native species = 50-75%
1 0/1 *D24.3* %area of non-native species = 25-49%
0 0/1 *D24.4* % area of non-native species = 1-24%
0 0/1 *D24.5* % area of non-natives = 0%

HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



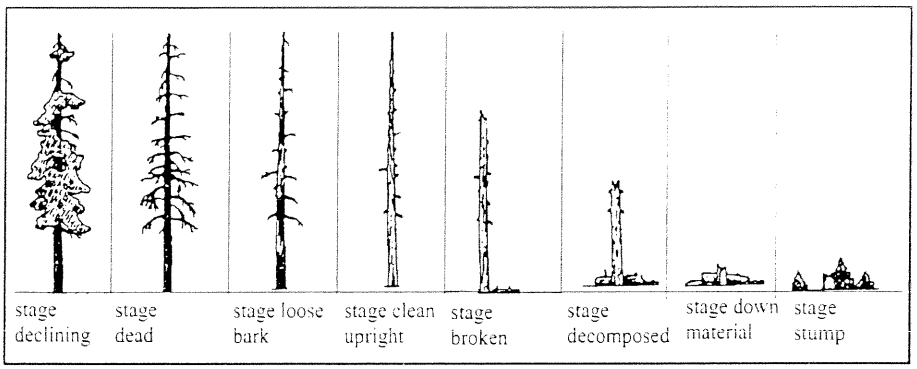
D26 pH

7 [4-9] *D26.1* pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
[4-9] *D26.2* pH of open or standing water *(record the lowest pH. if you cannot measure record a [7])*
0 0/1 **D27** Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1 0/1 **D28** Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0 0/1 **D29** Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0 0/1 **D30** Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

Wetland Name:	**AU ID#:** C-818C

0 [0-8] **D31** Snags (record # of stages)

Circle the categories present: minimum DBH of snag = 10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

0 0/1 **D32** Overhanging vegetation, extending out for 1 m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

0 0/1 **D34** Undercut banks present for at least 2 m (6.6 ft.)

0 [0-4] **D35** Key for rating egg-laying structures for amphibians

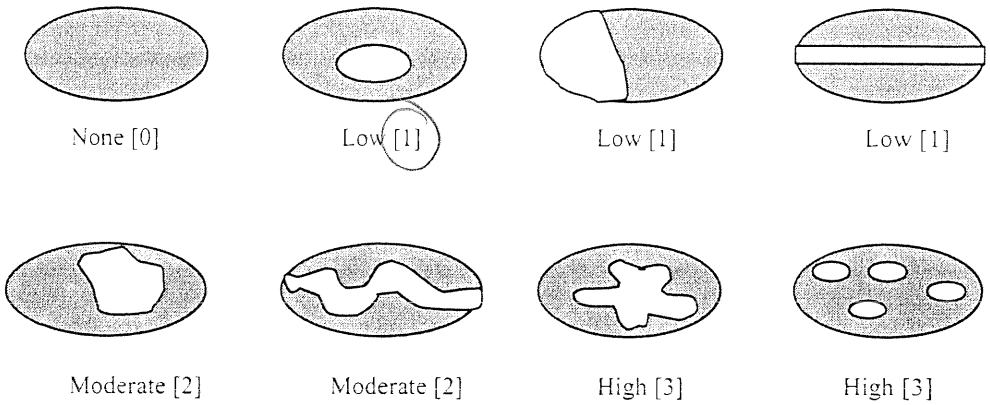
1. Does the AU have thin-stemmed vegetation or thin branches **(<8 mm)** in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches. **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

Wetland Name: **AU ID#:** L-818c

0 0/1 **D36** Tannins in surface waters >10% of water surface

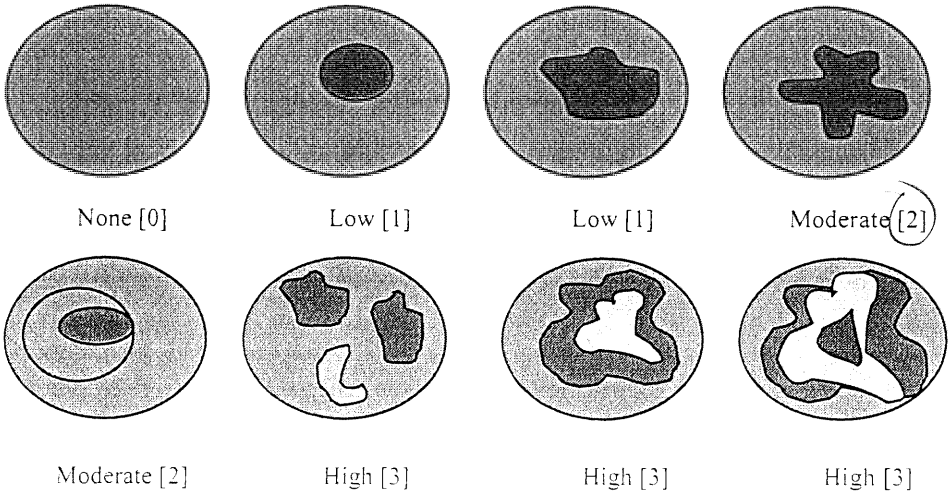
0 0/1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

1 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



2 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate[2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



Wetland Name:	**AU ID#:** L - 81BC

D40

2 [0-3] D41 Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

(2) There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

3 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

(3) 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

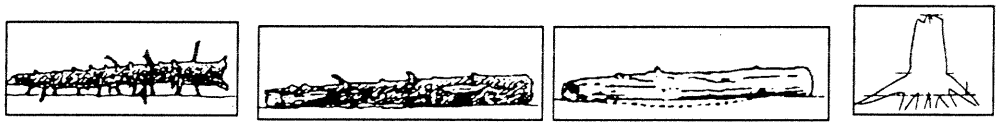
Wetland Name: **AU ID#:** L - 812 c

1 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO go to 5 YES go to 2
2. Is the wetland part of riparian corridor > 50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 YES = [3]
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 YES = [2]
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 YES = [1]
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 YES = [3]
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 YES = [2]
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 YES = [2]
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] YES = [1]

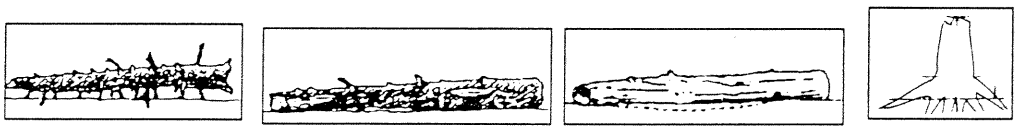
0 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

Wetland Name: **AU ID#:** L - 018C

SOILS and SUBSTRATES

		D46	Composition of AU surface
1	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
0	0/1	*D46.6*	Exposed sand
0	0/1	*D46.7*	Exposed silt
0	0/1	*D46.8*	Exposed clay
		D47	Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
0	[0-3]	*D47.1*	Peat
0	[0-3]	*D47.2*	Organic Muck
1	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)
		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
1	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	Substrate of streams
0	0/1	*D49.1*	Substrate **of permanent stream** or river in AU has at least 1 square meter of gravel
0	0/1	*D49.2*	Substrate **of permanent stream** or river in AU has at least 1 square meter of cobbles
		D49.3	

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

Record the least permeable layer if there are several down to 60 cm.

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

APPENDIX E-2

Washington State Wetland Function Assessment Methods (WFAM) Data Sheets – Post-Development without Mitigation

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Wetland Name: Wetland B - Post-dev. **AU ID#:** 818d - B
Location: Redmond, WA **T/S/R:**
Data Collector: E. Schall **Date:** 8/25/08

Use this data sheet for:
***DEPRESSIONAL OUTFLOW** or **RIVERINE IMPOUNDING** wetlands*
in the Lowlands of Western Washington
- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.28	ha	**D1**	Area of AU
3.3	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
1	0/1	**D4**	Channels, ditches, or streams in AU
0	0/1	*D4.1*	Channels, ditches, or streams in AU have permanently flowing water *(you see water flowing)*
		D4.2	
0	0/1	*D4.3*	The only surface outflow from the AU is through a culvert (<60 cm) or vertical siphon
		D5	
		D6	
		D7	
		D8	Inundation
36	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
8	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
1	0/1	*D9.1*	Permanently flooded (include vegetated areas)
1	0/1	*D9.2*	Seasonally flooded (>1 month)
0	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
0.15	m	**D10**	Average height of annual flooding above lowest point of outlet or surface of permanent stream at outlet (round to 0.3 m)

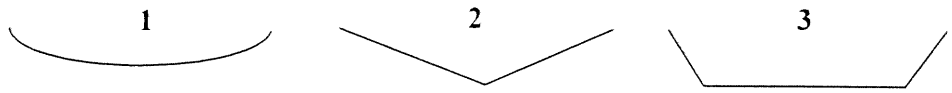
By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

DEPRESSIONAL OUTFLOW or RIVERINE IMPOUNDING

Wetland Name: Wetland B **AU ID#:** 818d - B

		D11	Cross section of AU in areas of seasonal inundation (record a 1 next to cross section that best fits)
1	0/1	*D11.1*	Cross section 1
0	0/1	*D11.2*	Cross section 2
0	0/1	*D11.3*	Cross section 3



		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
1	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)
		D13	Constriction of outlet
1	0/1	*D13.1*	Unconstricted or only slightly constricted
0	0/1	*D13.2*	Moderately constricted
0	0/1	*D13.3*	Severely constricted
	0/1	*D13.4*	*Riverine Impounding only* – Completely constricted (no surface outlet)

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

If the AU has multiple outlets, judge the constriction as if all the outlets were combined into one large one.

VEGETATION

		D14	Cowardin Classes (as % area of AU)
0	%	*D14.1*	Forest - evergreen
21	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
19	%	*D14.4*	Scrub-shrub - deciduous
60	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed
1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
40	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
28	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
9	#	*D19.1*	Record number of native plant species found in AU
2	#	*D19.2*	Record number of non- native plant species found in AU
3	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
3	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
0	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

A stratum must have 20% cover in assemblage

Wetland Name: Wetland B **AU ID#:** 618d-B

1 0/1 **D22** Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

D23 Sphagnum bogs

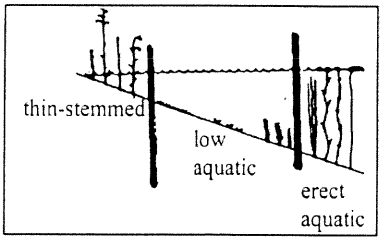
0 0/1 *D23.1* % area of Sphagnum bogs >75%
0 0/1 *D23.2* % area of Sphagnum bogs = 50-75%
0 0/1 *D23.3* % area of Sphagnum bogs = 25-49%
0 0/1 *D23.4* % area of Sphagnum bogs = 1-24%
1 0/1 *D23.5* % area of Sphagnum bogs = 0%

D24 Dominance by non-native plant species

0 0/1 *D24.1* % area of non-native species >75%
0 0/1 *D24.2* % area of non-native species = 50-75%
0 0/1 *D24.3* %area of non-native species = 25-49%
1 0/1 *D24.4* % area of non-native species = 1-24%
0 0/1 *D24.5* % area of non-natives = 0%

HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



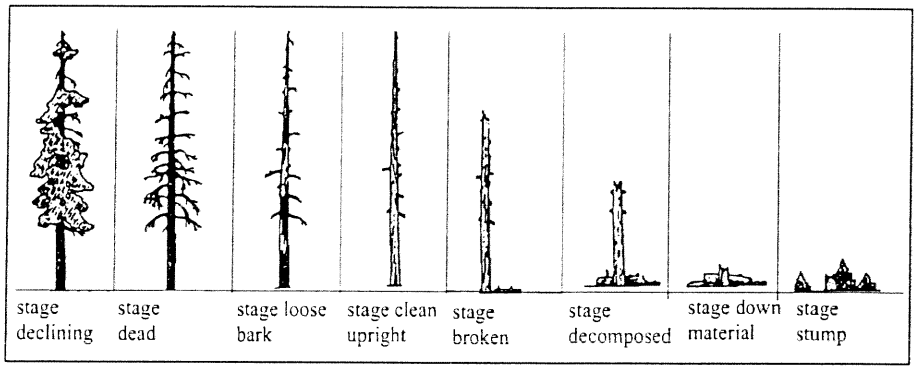
D26 pH

___ [4-9] *D26.1* pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
___ [4-9] *D26.2* pH of open or standing water (*record the lowest pH, if you cannot measure record a [7])*
0 0/1 **D27** Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1 0/1 **D28** Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0 0/1 **D29** Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0 0/1 **D30** Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

Wetland Name: Wetland B **AU ID#:** 818d - B

1 [0-8] **D31** Snags (record # of stages)

Circle the categories present; minimum DBH of snag = 10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

0 0/1 **D32** Overhanging vegetation, extending out for 1 m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

0 0/1 **D34** Undercut banks present for at least 2 m (6.6 ft.)

3 [0-4] **D35** Key for rating egg-laying structures for amphibians

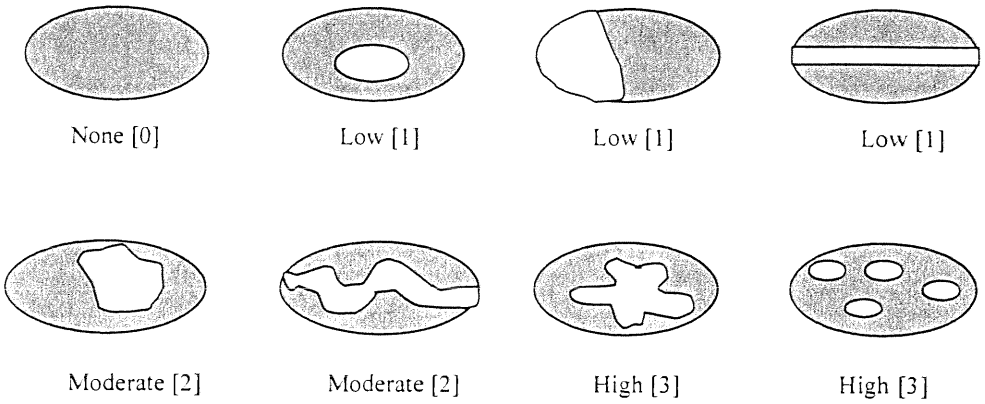
1. Does the AU have thin-stemmed vegetation or thin branches (**<8 mm**) in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

Wetland Name: Wetland B **AU ID#:** 818d - B

0 0/1 **D36** Tannins in surface waters >10% of water surface

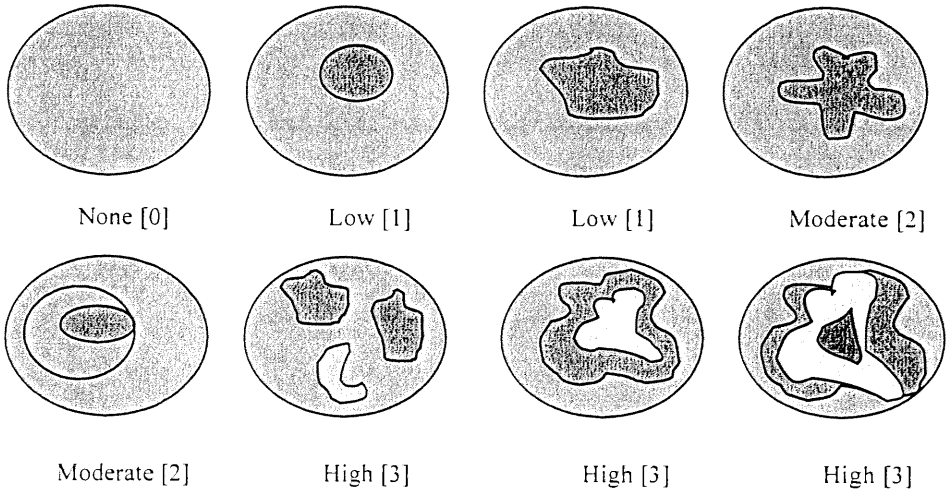
0 0/1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

1 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



2 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate[2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



Wetland Name: Wetland B **AU ID#:** 818d-B

D40

2 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

1 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

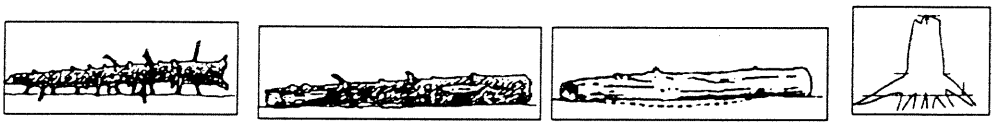
Wetland Name: Wetland B **AU ID#:** 818d-B

0 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO go to 5 **YES go to 2**
2. Is the wetland part of riparian corridor > 50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] **YES = [1]**

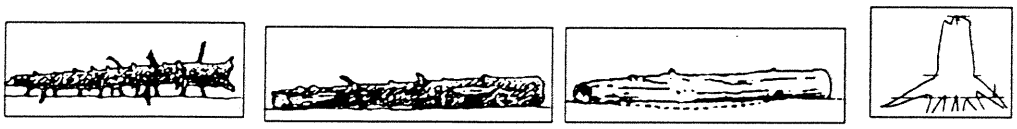
6 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

Wetland Name: Wetland B **AU ID#:** 818d-B

SOILS and SUBSTRATES

		D46	Composition of AU surface
1	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
1	0/1	*D46.6*	Exposed sand
1	0/1	*D46.7*	Exposed silt
1	0/1	*D46.8*	Exposed clay
		D47	Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
0	[0-3]	*D47.1*	Peat
1	[0-3]	*D47.2*	Organic Muck
2	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)
		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
1	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	Substrate of streams
0	0/1	*D49.1*	Substrate **of permanent stream** or river in AU has at least 1 square meter of gravel
0	0/1	*D49.2*	Substrate **of permanent stream** or river in AU has at least 1 square meter of cobbles
		D49.3	

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

Record the least permeable layer if there are several down to 60 cm.

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

Wetland Name: Wetland D - Post-dev. **AU ID#:** 818d - D
Location: Redmond, WA **T/S/R:**
Data Collector: E. Schaal **Date:** 8/25/08

Use this data sheet for:
***DEPRESSIONAL OUTFLOW** or **RIVERINE IMPOUNDING** wetlands*
in the Lowlands of Western Washington
- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.034	ha	**D1**	Area of AU
3.3	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
0	0/1	**D4**	Channels, ditches, or streams in AU
0	0/1	*D4.1*	Channels, ditches, or streams in AU have permanently flowing water *(you see water flowing)*
		D4.2	
0	0/1	*D4.3*	The only surface outflow from the AU is through a culvert (<60 cm) or vertical siphon
		D5	
		D6	
		D7	
		D8	Inundation
10	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
1	0/1	*D9.2*	Seasonally flooded (>1 month)
0	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
0.12	m	**D10**	Average height of annual flooding above lowest point of outlet or surface of permanent stream at outlet (round to 0.3 m)

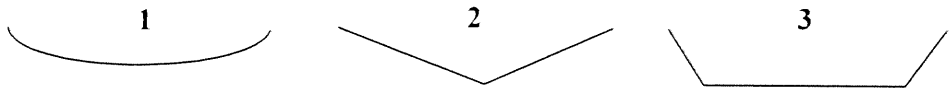
By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

DEPRESSIONAL OUTFLOW or RIVERINE IMPOUNDING

Wetland Name: Wetland D **AU ID#:** 818d-D

		D11	Cross section of AU in areas of seasonal inundation (record a 1 next to cross section that best fits)
1	0/1	*D11.1*	Cross section 1
0	0/1	*D11.2*	Cross section 2
0	0/1	*D11.3*	Cross section 3



		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
1	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

		D13	Constriction of outlet
1	0/1	*D13.1*	Unconstricted or only slightly constricted
0	0/1	*D13.2*	Moderately constricted
0	0/1	*D13.3*	Severely constricted
	0/1	*D13.4*	*Riverine Impounding only* – Completely constricted (no surface outlet)

If the AU has multiple outlets, judge the constriction as if all the outlets were combined into one large one.

VEGETATION

		D14	Cowardin Classes (as % area of AU)
0	%	*D14.1*	Forest - evergreen
0	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
0	%	*D14.4*	Scrub-shrub - deciduous
100	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed
1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
0	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
0	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
3	#	*D19.1*	Record number of native plant species found in AU
2	#	*D19.2*	Record number of non- native plant species found in AU
1	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
1	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
0	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

A stratum must have 20% cover in assemblage

Wetland Name: Wetland D **AU ID#:** 818d - D

0 0/1 **D22** Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

D23 Sphagnum bogs

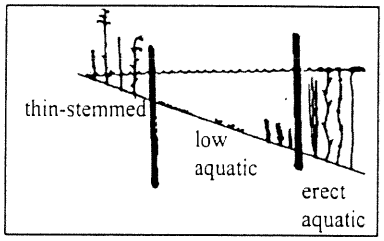
0 0/1 *D23.1* % area of Sphagnum bogs >75%
0 0/1 *D23.2* % area of Sphagnum bogs = 50-75%
0 0/1 *D23.3* % area of Sphagnum bogs = 25-49%
0 0/1 *D23.4* % area of Sphagnum bogs = 1-24%
1 0/1 *D23.5* % area of Sphagnum bogs = 0%

D24 Dominance by non-native plant species

0 0/1 *D24.1* % area of non-native species >75%
0 0/1 *D24.2* % area of non-native species = 50-75%
1 0/1 *D24.3* %area of non-native species = 25-49%
0 0/1 *D24.4* % area of non-native species = 1-24%
0 0/1 *D24.5* % area of non-natives = 0%

HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



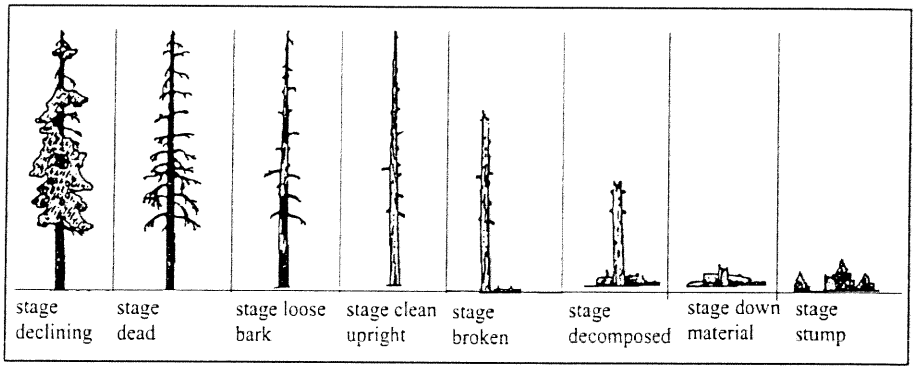
D26 pH

7 [4-9] *D26.1* pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
[4-9] *D26.2* pH of open or standing water (*record the lowest pH, if you cannot measure record a [7])*
0 0/1 **D27** Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1 0/1 **D28** Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0 0/1 **D29** Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0 0/1 **D30** Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

Wetland Name: Wetland D **AU ID#:** 818d - D

0 [0-8] **D31** Snags (record # of stages)

Circle the categories present; minimum DBH of snag = 10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

0 0/1 **D32** Overhanging vegetation, extending out for 1 m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

0 0/1 **D34** Undercut banks present for at least 2 m (6.6 ft.)

2 [0-4] **D35** Key for rating egg-laying structures for amphibians

1. Does the AU have thin-stemmed vegetation or thin branches **(<8 mm)** in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

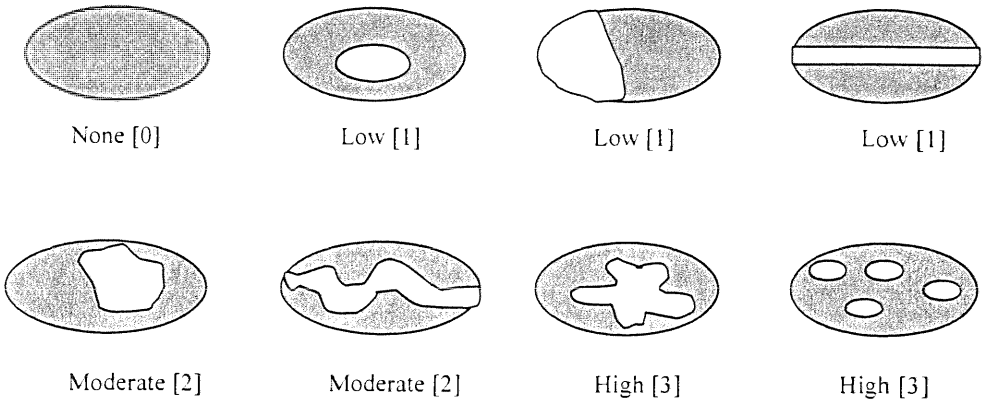
DEPRESSIONAL OUTFLOW or RIVERINE IMPOUNDING

Wetland Name: Wetland D **AU ID#:** 818d - D

0 0/1 **D36** Tannins in surface waters >10% of water surface

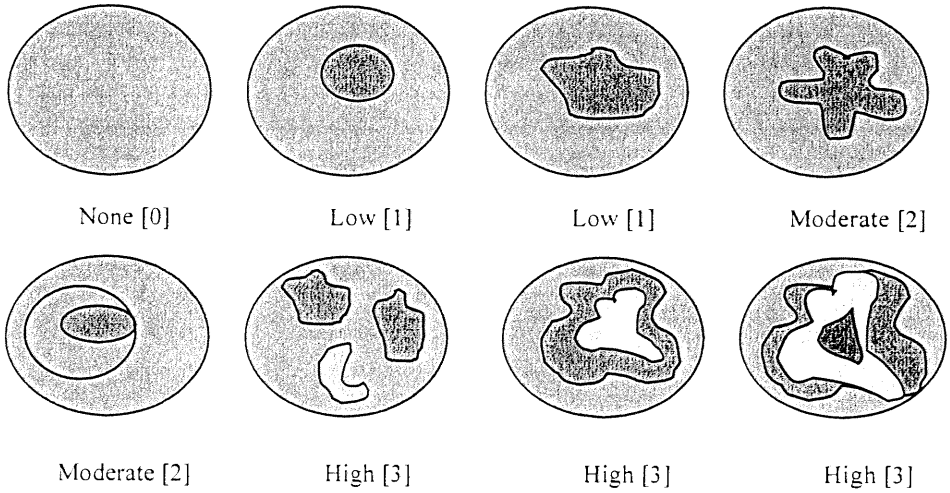
0 0/1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

0 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



1 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate[2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



Wetland Name: Wetland D **AU ID#:** 8182-D

D40

0 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

1 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

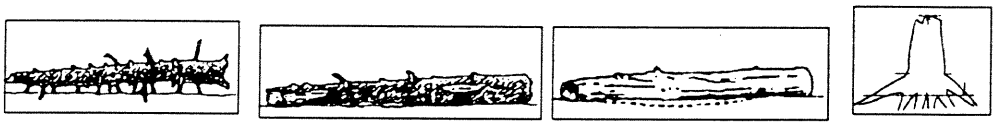
Wetland Name: Wetland D **AU ID#:** B1Bd - D

0 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO go to 5 **YES go to 2**
2. Is the wetland part of riparian corridor > 50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] **YES = [1]**

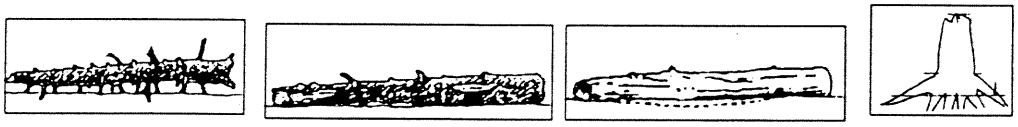
0 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

Wetland Name: Wetland D **AU ID#:** 818d-D

SOILS and SUBSTRATES

		D46	Composition of AU surface
1	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
0	0/1	*D46.6*	Exposed sand
0	0/1	*D46.7*	Exposed silt
0	0/1	*D46.8*	Exposed clay

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

		D47	Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
0	[0-3]	*D47.1*	Peat
0	[0-3]	*D47.2*	Organic Muck
3	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)

Record the least permeable layer if there are several down to 60 cm.

		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
0	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	Substrate of streams
____	0/1	*D49.1*	Substrate **of permanent stream** or river in AU has at least 1 square meter of gravel
____	0/1	*D49.2*	Substrate **of permanent stream** or river in AU has at least 1 square meter of cobbles
		D49.3	

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

Wetland Name: Wetland F - Post-dev. **AU ID#:** 818d-F
Location: Redmond, WA **T/S/R:**
Data Collector: E. Schau **Date:** 8/25/08

Use this data sheet for:
***DEPRESSIONAL OUTFLOW** or **RIVERINE IMPOUNDING** wetlands*
in the Lowlands of Western Washington
- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.007	ha	**D1**	Area of AU
3.3	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
0	0/1	**D4**	Channels, ditches, or streams in AU
0	0/1	*D4.1*	Channels, ditches, or streams in AU have permanently flowing water *(you see water flowing)*
		D4.2	
0	0/1	*D4.3*	The only surface outflow from the AU is through a culvert (<60 cm) or vertical siphon
		D5	
		D6	
		D7	
		D8	Inundation
10	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
1	0/1	*D9.2*	Seasonally flooded (>1 month)
0	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
0.12	m	**D10**	Average height of annual flooding above lowest point of outlet or surface of permanent stream at outlet (round to 0.3 m)

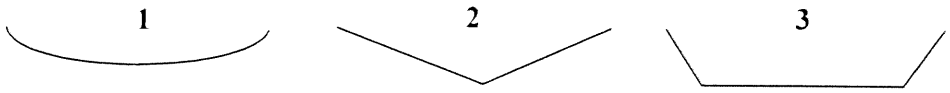
By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

DEPRESSIONAL OUTFLOW or RIVERINE IMPOUNDING

Wetland Name: Wetland F **AU ID#:** 818D-F

		D11	Cross section of AU in areas of seasonal inundation (record a 1 next to cross section that best fits)
1	0/1	*D11.1*	Cross section 1
0	0/1	*D11.2*	Cross section 2
0	0/1	*D11.3*	Cross section 3



		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
1	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)
		D13	Constriction of outlet
1	0/1	*D13.1*	Unconstricted or only slightly constricted
0	0/1	*D13.2*	Moderately constricted
0	0/1	*D13.3*	Severely constricted
	0/1	*D13.4*	*Riverine Impounding only* – Completely constricted (no surface outlet)

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

If the AU has multiple outlets, judge the constriction as if all the outlets were combined into one large one.

VEGETATION

		D14	Cowardin Classes (as % area of AU)
0	%	*D14.1*	Forest - evergreen
0	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
0	%	*D14.4*	Scrub-shrub - deciduous
100	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed
1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
0	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
0	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
4	#	*D19.1*	Record number of native plant species found in AU
3	#	*D19.2*	Record number of non- native plant species found in AU
1	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
1	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
1	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

A stratum must have 20% cover in assemblage

Wetland Name: Wetland F **AU ID#:** 818d-F

0 0/1 **D22** Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

D23 Sphagnum bogs

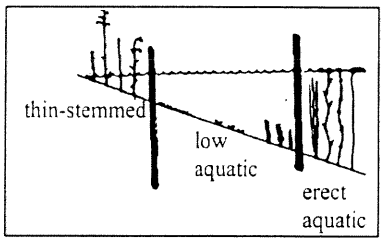
0 0/1 *D23.1* % area of Sphagnum bogs >75%
0 0/1 *D23.2* % area of Sphagnum bogs = 50-75%
0 0/1 *D23.3* % area of Sphagnum bogs = 25-49%
0 0/1 *D23.4* % area of Sphagnum bogs = 1-24%
1 0/1 *D23.5* % area of Sphagnum bogs = 0%

D24 Dominance by non-native plant species

0 0/1 *D24.1* % area of non-native species >75%
0 0/1 *D24.2* % area of non-native species = 50-75%
0 0/1 *D24.3* %area of non-native species = 25-49%
1 0/1 *D24.4* % area of non-native species = 1-24%
0 0/1 *D24.5* % area of non-natives = 0%

HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



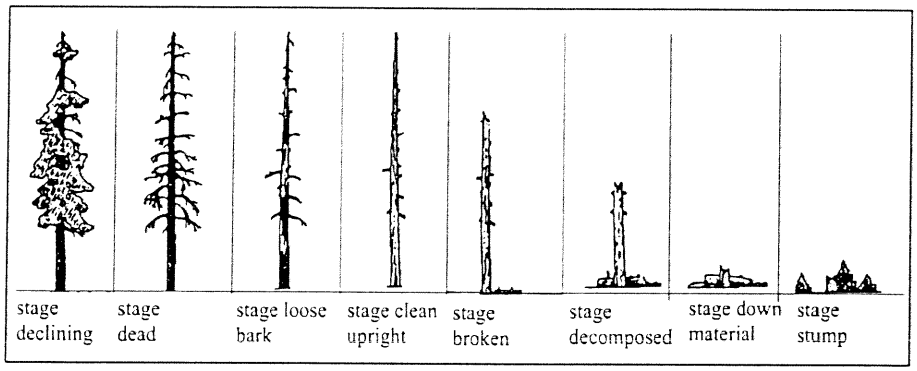
D26 pH

7 [4-9] *D26.1* pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
[4-9] *D26.2* pH of open or standing water (*record the lowest pH, if you cannot measure record a [7])*
0 0/1 **D27** Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1 0/1 **D28** Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0 0/1 **D29** Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0 0/1 **D30** Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

Wetland Name: Wetland F **AU ID#:** 818d-F

0 [0-8] **D31** Snags (record # of stages)

Circle the categories present; minimum DBH of snag = 10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

0 0/1 **D32** Overhanging vegetation, extending out for 1 m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

0 0/1 **D34** Undercut banks present for at least 2 m (6.6 ft.)

0 [0-4] **D35** Key for rating egg-laying structures for amphibians

1. Does the AU have thin-stemmed vegetation or thin branches (**<8 mm**) in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

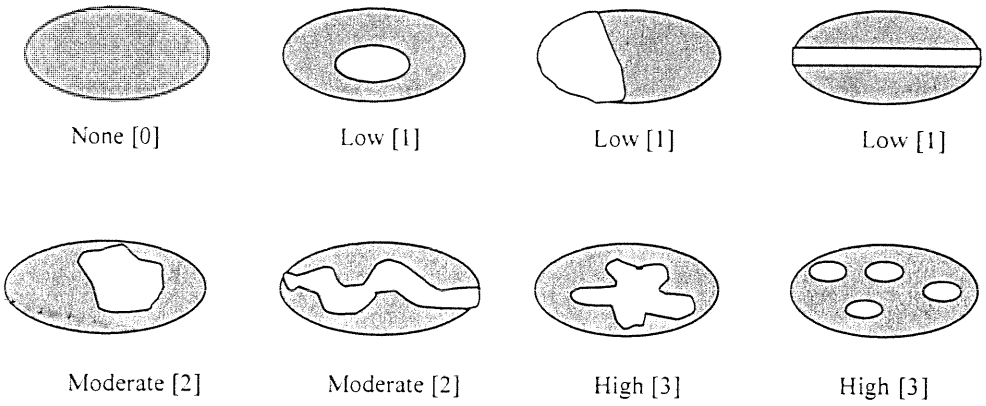
DEPRESSIONAL OUTFLOW or RIVERINE IMPOUNDING

Wetland Name: Wetland F **AU ID#:** 818d - F

0 0/1 **D36** Tannins in surface waters >10% of water surface

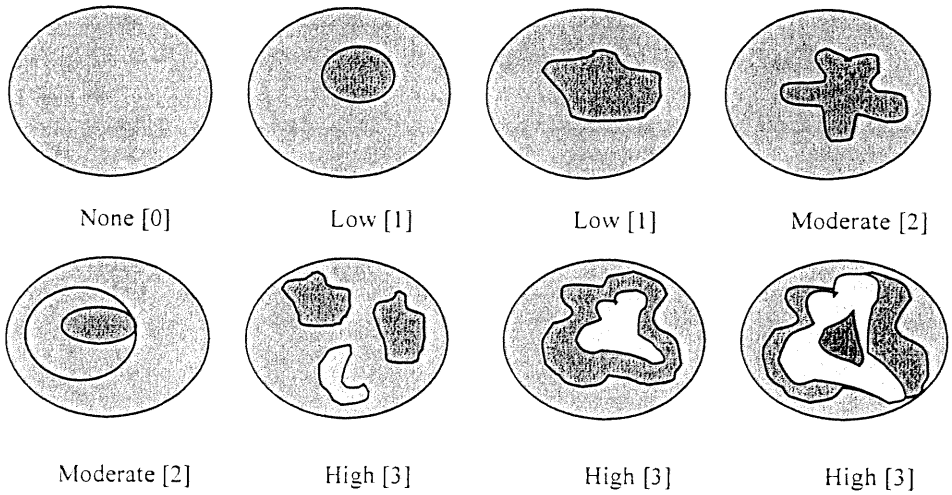
0 0/1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

0 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



2 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate[2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



Wetland Name: Wetland F	**AU ID#:** 818d - F

D40

2 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

1 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

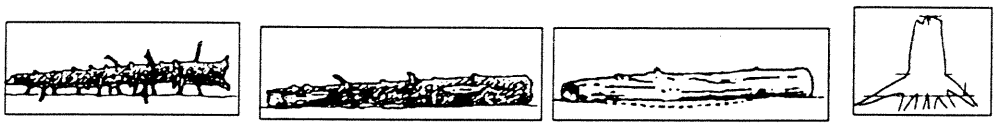
Wetland Name: Wetland F **AU ID#:** 818d - F

0 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO go to 5 **YES go to 2**
2. Is the wetland part of riparian corridor > 50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] **YES = [1]**

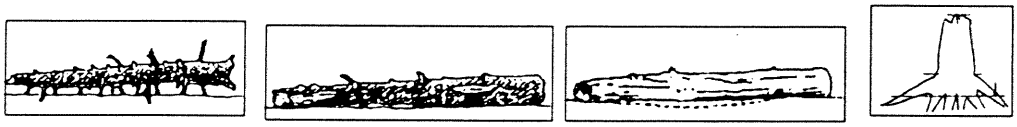
0 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

Wetland Name: Wetland F **AU ID#:** 818d-F

SOILS and SUBSTRATES

		D46	Composition of AU surface
0	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
0	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
0	0/1	*D46.6*	Exposed sand
0	0/1	*D46.7*	Exposed silt
0	0/1	*D46.8*	Exposed clay
		D47	Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
0	[0-3]	*D47.1*	Peat
0	[0-3]	*D47.2*	Organic Muck
3	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)
		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
1	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	Substrate of streams
	0/1	*D49.1*	Substrate **of permanent stream** or river in AU has at least 1 square meter of gravel
	0/1	*D49.2*	Substrate **of permanent stream** or river in AU has at least 1 square meter of cobbles
		D49.3	

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

Record the least permeable layer if there are several down to 60 cm.

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

Wetland Name: Wetland J
Location: Redmond, WA
Data Collector: E Schau

AU ID#: 818d - J
T/S/R:
Date: 8/25/08

Use this data sheet for:
***DEPRESSIONAL OUTFLOW** or **RIVERINE IMPOUNDING** wetlands*
in the Lowlands of Western Washington
- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.025	ha	**D1**	Area of AU
3.3	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
0	0/1	**D4**	Channels, ditches, or streams in AU
0	0/1	*D4.1*	Channels, ditches, or streams in AU have permanently flowing water *(you see water flowing)*
		D4.2	
0	0/1	*D4.3*	The only surface outflow from the AU is through a culvert (<60 cm) or vertical siphon
		D5	
		D6	
		D7	
		D8	Inundation
5	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
1	0/1	*D9.2*	Seasonally flooded (>1 month)
0	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
0.1	m	**D10**	Average height of annual flooding above lowest point of outlet or surface of permanent stream at outlet (round to 0.3 m)

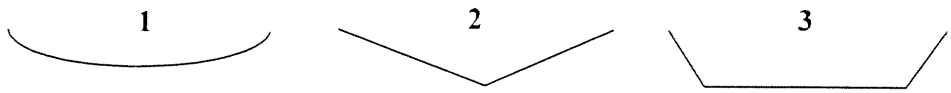
By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

DEPRESSIONAL OUTFLOW or RIVERINE IMPOUNDING

Wetland Name: ~~Westta~~ Wetland J **AU ID#:** 818d - J

		D11	Cross section of AU in areas of seasonal inundation (record a 1 next to cross section that best fits)
1	0/1	*D11.1*	Cross section 1
0	0/1	*D11.2*	Cross section 2
0	0/1	*D11.3*	Cross section 3



		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
1	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

		D13	Constriction of outlet
1	0/1	*D13.1*	Unconstricted or only slightly constricted
0	0/1	*D13.2*	Moderately constricted
0	0/1	*D13.3*	Severely constricted
	0/1	*D13.4*	*Riverine Impounding only* – Completely constricted (no surface outlet)

If the AU has multiple outlets, judge the constriction as if all the outlets were combined into one large one.

VEGETATION

		D14	Cowardin Classes (as % area of AU)
0	%	*D14.1*	Forest - evergreen
25	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
25	%	*D14.4*	Scrub-shrub - deciduous
50	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed
1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
100	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
50	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
19	#	*D19.1*	Record number of native plant species found in AU
2	#	*D19.2*	Record number of non- native plant species found in AU
3	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
3	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
1	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

A stratum must have 20% cover in assemblage

Wetland Name: Wetland J **AU ID#:** 818d-J

0 0/1 **D22** Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

D23 Sphagnum bogs

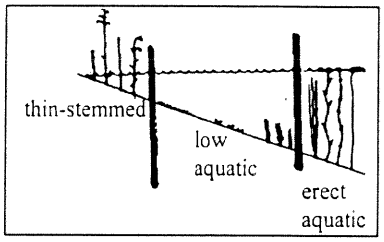
0 0/1 *D23.1* % area of Sphagnum bogs >75%
0 0/1 *D23.2* % area of Sphagnum bogs = 50-75%
0 0/1 *D23.3* % area of Sphagnum bogs = 25-49%
0 0/1 *D23.4* % area of Sphagnum bogs = 1-24%
1 0/1 *D23.5* % area of Sphagnum bogs = 0%

D24 Dominance by non-native plant species

0 0/1 *D24.1* % area of non-native species >75%
0 0/1 *D24.2* % area of non-native species = 50-75%
0 0/1 *D24.3* %area of non-native species = 25-49%
1 ~~0~~ 0/1 *D24.4* % area of non-native species = 1-24%
0 ~~1~~ 0/1 *D24.5* % area of non-natives = 0%

HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



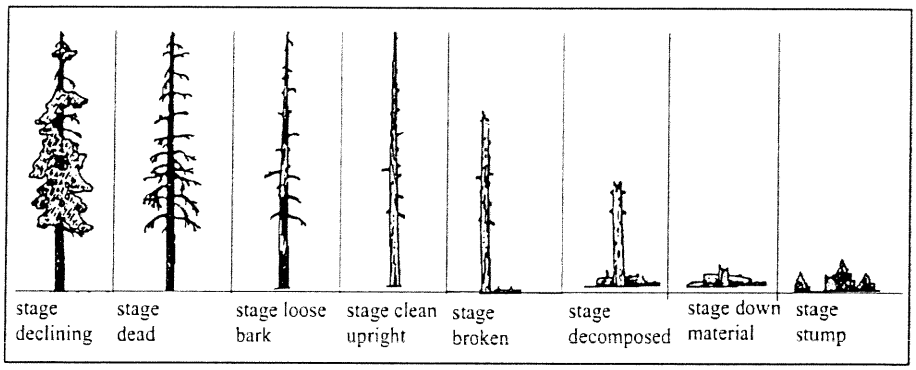
D26 pH

7 [4-9] *D26.1* pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
[4-9] *D26.2* pH of open or standing water (*record the lowest pH, if you cannot measure record a [7])*
0 0/1 **D27** Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1 0/1 **D28** Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0 0/1 **D29** Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0 0/1 **D30** Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

Wetland Name: Wetland J **AU ID#:** 8182 - J

0 [0-8] **D31** Snags (record # of stages)

Circle the categories present; minimum DBH of snag =10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

0 0/1 **D32** Overhanging vegetation, extending out for 1 m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

0 0/1 **D34** Undercut banks present for at least 2 m (6.6 ft.)

0 [0-4] **D35** Key for rating egg-laying structures for amphibians

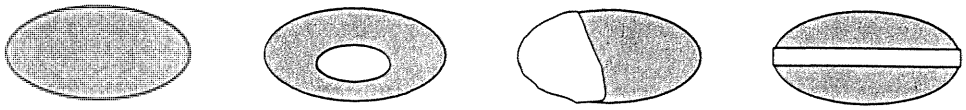
1. Does the AU have thin-stemmed vegetation or thin branches (**<8 mm**) in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

Wetland Name: Wetland J **AU ID#:** 818d-J

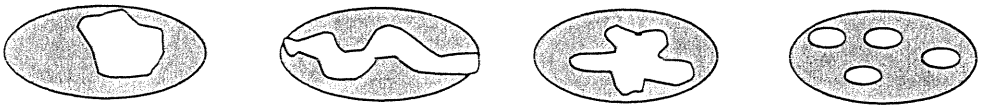
0 0/1 **D36** Tannins in surface waters >10% of water surface

0 0/1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

0 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



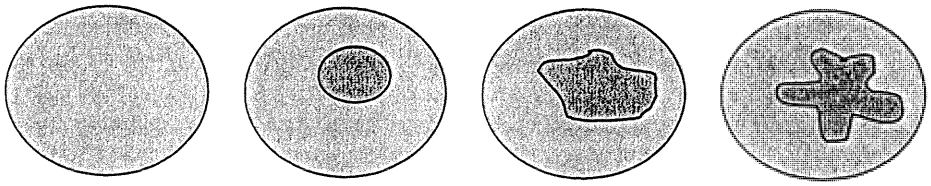
None [0] Low [1] Low [1] Low [1]



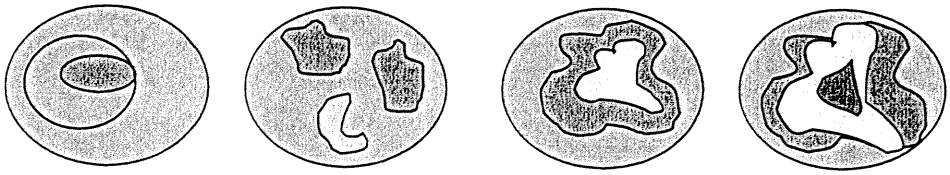
Moderate [2] Moderate [2] High [3] High [3]

2 3 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate [2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



None [0] Low [1] Low [1] Moderate [2]



Moderate [2] High [3] High [3] High [3]

Wetland Name: Wetland J **AU ID#:** 818d-J

D40

3 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

1 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

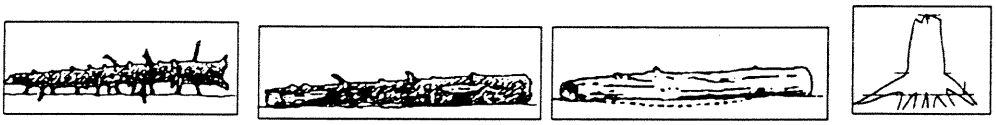
Wetland Name: Wetland J **AU ID#:** 818d - J

0 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO go to 5 **YES go to 2**
2. Is the wetland part of riparian corridor > 50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] **YES = [1]**

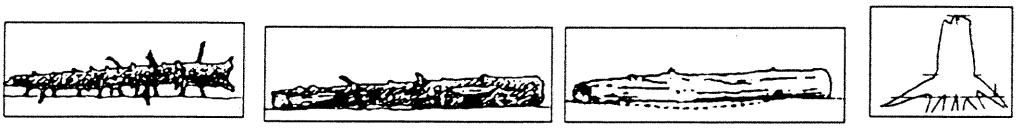
3 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

Wetland Name: Wetland J **AU ID#:** 818d - J

SOILS and SUBSTRATES

		D46	Composition of AU surface
1	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
0	0/1	*D46.6*	Exposed sand
0	0/1	*D46.7*	Exposed silt
0	0/1	*D46.8*	Exposed clay
		D47	Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
0	[0-3]	*D47.1*	Peat
0	[0-3]	*D47.2*	Organic Muck
3	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)
		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
1	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	Substrate of streams
	0/1	*D49.1*	Substrate **of permanent stream** or river in AU has at least 1 square meter of gravel
	0/1	*D49.2*	Substrate **of permanent stream** or river in AU has at least 1 square meter of cobbles
		D49.3	

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

Record the least permeable layer if there are several down to 60 cm.

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

Wetland Name: Wetland K- post-devt. **AU ID#:** 818d-K
Location: Redmond, WA **T/S/R:**
Data Collector: E. Schaal **Date:** 8/25/08

Use this data sheet for:
DEPRESSIONAL CLOSED *wetlands*
in the Lowlands of Western Washington
- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

Estimate, Score/ or Rating			
			LANDSCAPE DATA
0 ~~0.0005~~	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.0005 ~~3.304~~	ha	**D1**	Area of AU
3.304	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
		D4	
		D4.1	
		D4.2	
		D4.3	
		D5	
		D6	
		D7	
		D8	Inundation
50	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
1	0/1	*D9.2*	Seasonally flooded (>1 month)
0	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
	m	**D10**	

By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

Wetland Name: Wetland K **AU ID#:** 818d-K

		D11	
	0/1	*D11.1*	
	0/1	*D11.2*	
	0/1	*D11.3*	
		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
1	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)
		D13	
		D13.1	
		D13.2	
		D13.3	
		D13.4	

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

VEGETATION

		D14	Cowardin Classes (as % area of AU)
0	%	*D14.1*	Forest - evergreen
0	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
0	%	*D14.4*	Scrub-shrub - deciduous
100	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed
1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
0	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
0	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
5	#	*D19.1*	Record number of native plant species found in AU
3	#	*D19.2*	Record number of non- native plant species found in AU
1	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
1	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
0	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?
0	0/1	**D22**	Mature trees in AU

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

A stratum must have 20% cover in assemblage

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

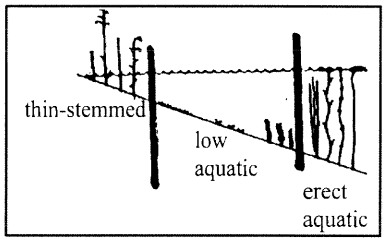
Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

Wetland Name: Wetland K **AU ID#:** 818d-K

		D23	Sphagnum bogs
0	0/1	*D23.1*	% area of Sphagnum bog >75%
0	0/1	*D23.2*	% area of Sphagnum bog = 50-75%
0	0/1	*D23.3*	% area of Sphagnum bog = 25-49%
0	0/1	*D23.4*	% area of Sphagnum bog = 1-24%
1	0/1	*D23.5*	% area of Sphagnum bog = 0%
		D24	Dominance by non-native plant species
1	0/1	*D24.1*	% area of non-native species >75%
0	0/1	*D24.2*	% area of non-native species = 50-75%
0	0/1	*D24.3*	%area of non-native species = 25-49%
0	0/1	*D24.4*	% area of non-native species = 1-24%
0	0/1	*D24.5*	% area of non-natives = 0%

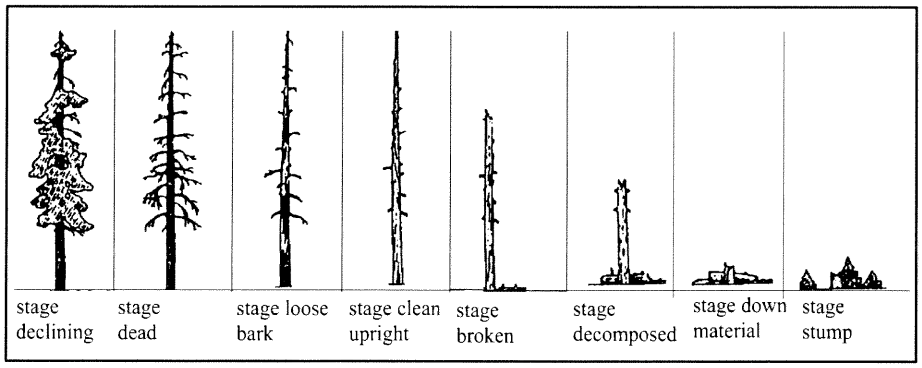
HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



		D26	pH
7	[4-9]	*D26.1*	pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
	[4-9]	*D26.2*	pH of open or standing water (*record the lowest pH, if you cannot measure record a [7])*
0	0/1	**D27**	Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1	0/1	**D28**	Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0	0/1	**D29**	Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0	0/1	**D30**	Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU
0	[0-8]	**D31**	Snags (record # of stages)

Circle the categories present; minimum DBH of snag =10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

Wetland Name: Wetland K **AU ID#:** 818d-K

0 0/1 **D32** Overhanging vegetation, extending out for 1m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

D34

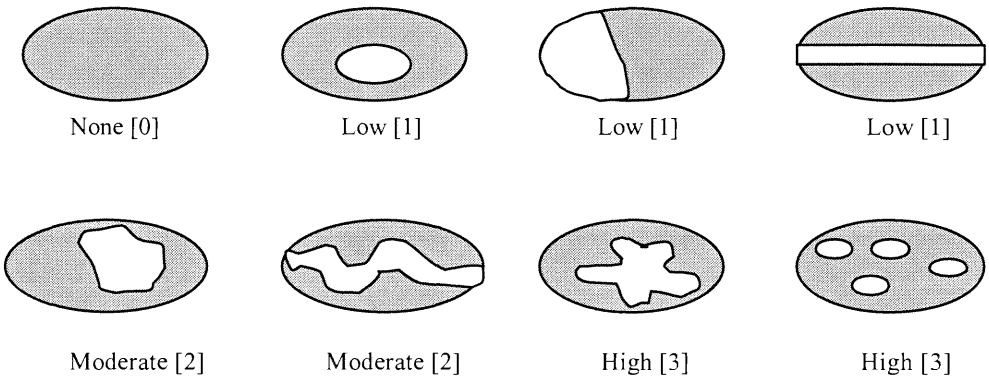
0 [0-4] **D35** Key for rating egg-laying structures for amphibians

1. Does the AU have thin-stemmed vegetation or thin branches **(<8 mm)** in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

0 0/1 **D36** Tannins in surface waters >10% of water surface

0 0/1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

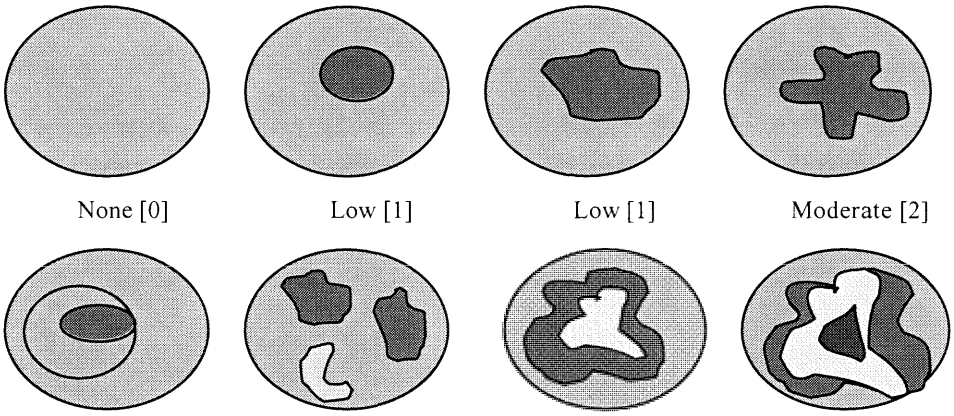
0 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



Wetland Name: Wetland K **AU ID#:** 818d-K

0 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate [2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



None [0] | Low [1] | Low [1] | Moderate [2]

Moderate [2] | High [3] | High [3] | High [3]

D40

0 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

Wetland Name: Wetland K **AU ID#:** 818d-K

1 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

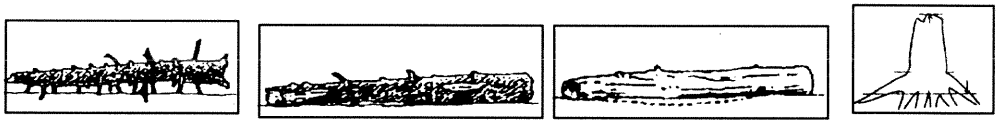
0 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO go to 5 **YES go to 2**
2. Is the wetland part of riparian corridor >50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] **YES = [1]**

Wetland Name: Wetland K **AU ID#:** 818d-K

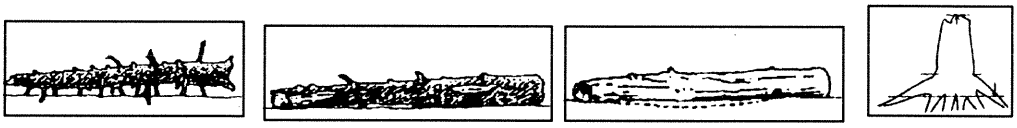
0 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

SOILS and SUBSTRATES

D46 Composition of AU surface

0	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
0	0/1	*D46.6*	Exposed sand
0	0/1	*D46.7*	Exposed silt
0	0/1	*D46.8*	Exposed clay

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

D47 Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)

0	[0-3]	*D47.1*	Peat
1	[0-3]	*D47.2*	Organic Muck
2	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)

Record the least permeable layer if there are several down to 60 cm.

Wetland Name: Wetland K	**AU ID#:** 81Bd-K

		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
1	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	
		D49.1	
		D49.2	
		D49.3	

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

APPENDIX E-3

Washington State Wetland Function Assessment Methods (WFAM) Data Sheets – Post-Development with Mitigation

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Wetland Name:	Wetland B (Post-Mit)	**AU ID#:**	B-818d
Location:	818d - Microsoft	**T/S/R:**	
Data Collector:	E. Schaw	**Date:**	10-18-08

Use this data sheet for:
***DEPRESSIONAL OUTFLOW** or **RIVERINE IMPOUNDING** wetlands*
in the Lowlands of Western Washington

- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

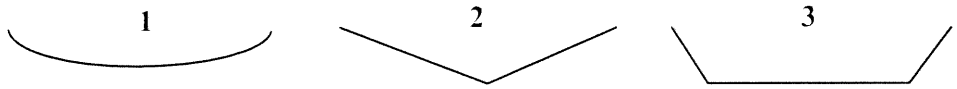
Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.607	ha	**D1**	Area of AU
3.3	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
1	0/1	**D4**	Channels, ditches, or streams in AU
1	0/1	*D4.1*	Channels, ditches, or streams in AU have permanently flowing water *(you see water flowing)*
		D4.2	
1	0/1	*D4.3*	The only surface outflow from the AU is through a culvert (<60 cm) or vertical siphon
		D5	
		D6	
		D7	
		D8	Inundation
45	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
10	%	*D8.2*	Percent of AU with permanent standing or moving water
20	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
1	0/1	*D9.1*	Permanently flooded (include vegetated areas)
1	0/1	*D9.2*	Seasonally flooded (>1 month)
1	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
1	0/1	*D9.6*	Intermittently flowing stream
0.15	m	**D10**	Average height of annual flooding above lowest point of outlet or surface of permanent stream at outlet (round to 0.3 m)

By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

Wetland Name: B **AU ID#:** B - 81&1 (post-mit)

		D11	Cross section of AU in areas of seasonal inundation (record a 1 next to cross section that best fits)
0	0/1	*D11.1*	Cross section 1
0	0/1	*D11.2*	Cross section 2
1	0/1	*D11.3*	Cross section 3



		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
1	0/1	*D12.1*	1-20 cm (<8 in)
1	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)
		D13	Constriction of outlet
0	0/1	*D13.1*	Unconstricted or only slightly constricted
1	0/1	*D13.2*	Moderately constricted
0	0/1	*D13.3*	Severely constricted
	0/1	*D13.4*	*Riverine Impounding only* – Completely constricted (no surface outlet)

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

If the AU has multiple outlets, judge the constriction as if all the outlets were combined into one large one.

VEGETATION

		D14	Cowardin Classes (as % area of AU)
15	%	*D14.1*	Forest - evergreen
35	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
20	%	*D14.4*	Scrub-shrub - deciduous
30	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed
1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
100	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
60	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
35	#	*D19.1*	Record number of native plant species found in AU
0	#	*D19.2*	Record number of non- native plant species found in AU
3	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
3	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
0	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

A stratum must have 20% cover in assemblage

Wetland Name: B **AU ID#:** B - 8182 (post - mit)

1 0/1 **D22** Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

D23 Sphagnum bogs

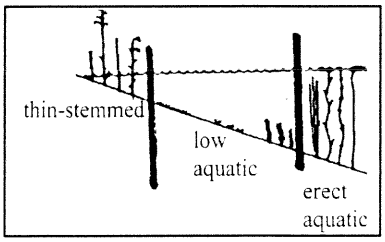
0 0/1 *D23.1* % area of Sphagnum bogs >75%
0 0/1 *D23.2* % area of Sphagnum bogs = 50-75%
0 0/1 *D23.3* % area of Sphagnum bogs = 25-49%
0 0/1 *D23.4* % area of Sphagnum bogs = 1-24%
1 0/1 *D23.5* % area of Sphagnum bogs = 0%

D24 Dominance by non-native plant species

0 0/1 *D24.1* % area of non-native species >75%
0 0/1 *D24.2* % area of non-native species = 50-75%
0 0/1 *D24.3* %area of non-native species = 25-49%
0 0/1 *D24.4* % area of non-native species = 1-24%
1 0/1 *D24.5* % area of non-natives = 0%

HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



D26 pH

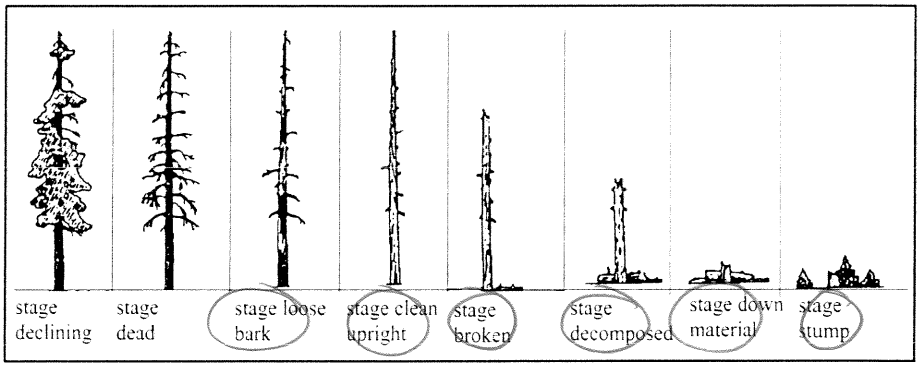
[4-9] *D26.1* pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
[4-9] *D26.2* pH of open or standing water (*record the lowest pH, if you cannot measure record a [7])*

0 0/1 **D27** Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1 0/1 **D28** Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0 0/1 **D29** Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0 0/1 **D30** Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

Wetland Name: B **AU ID#:** 818d - B (post-mt)

6 [0-8] **D31** Snags (record # of stages)

Circle the categories present: minimum DBH of snag = 10 cm (4")



1 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

0 0/1 **D32** Overhanging vegetation, extending out for 1 m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

0 0/1 **D34** Undercut banks present for at least 2 m (6.6 ft.)

1 [0-4] **D35** Key for rating egg-laying structures for amphibians

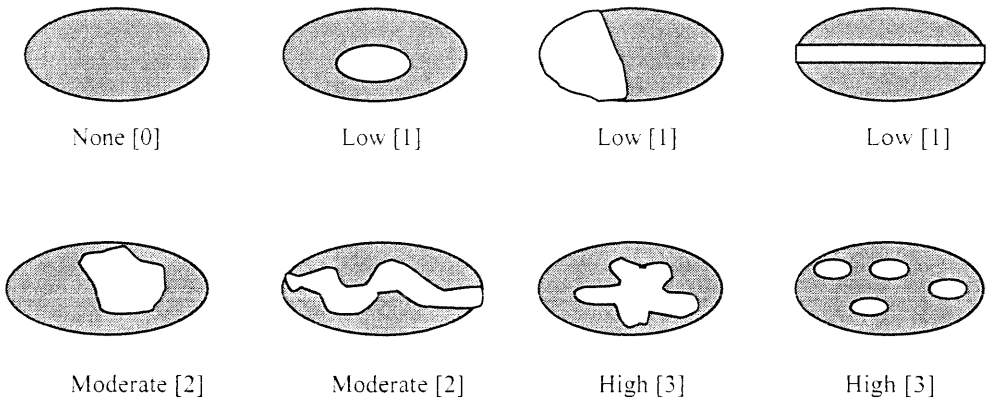
1. Does the AU have thin-stemmed vegetation or thin branches **(<8 mm)** in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – **Score = 1** YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

Wetland Name: B **AU ID#:** 818d - B(post-mit)

0 0 1 **D36** Tannins in surface waters >10% of water surface

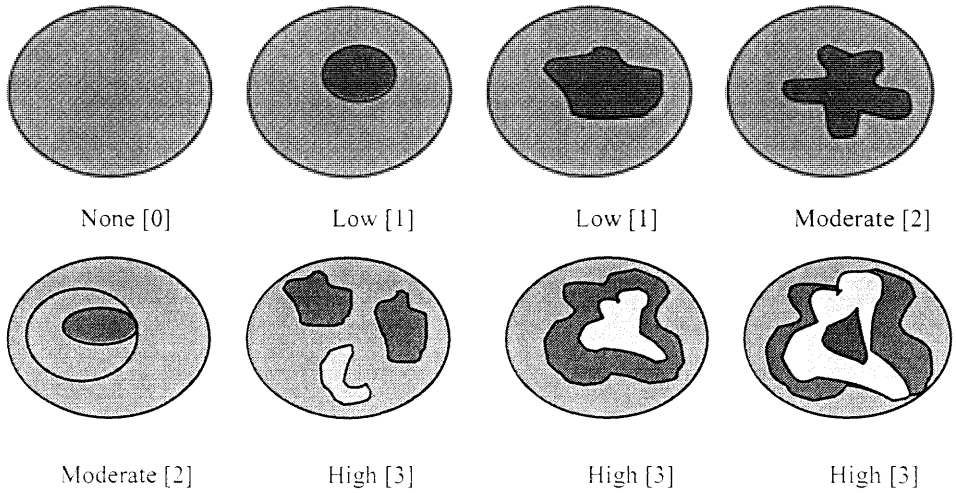
0 0 1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

3 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



3 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate[2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



Wetland Name: B	**AU ID#:** 818d-B (post-mit)

D40

3 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

1 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

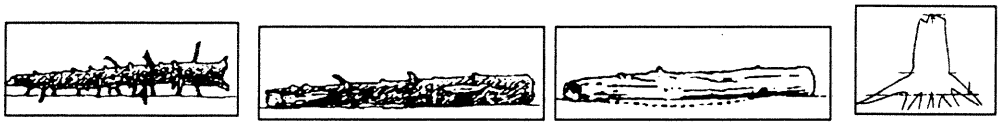
Wetland Name: B **AU ID#:** 8108-B(post-mit)

0 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO go to 5 **YES go to 2**
2. Is the wetland part of riparian corridor > 50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] **YES = [1]**

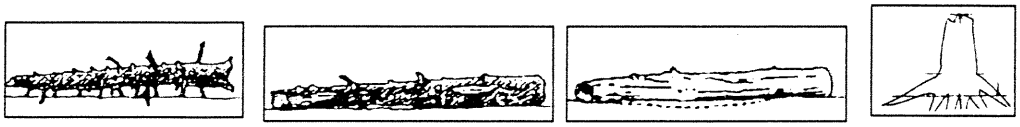
7 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")	X	X	X	
21-50cm	(8-20")	X	X	X	X
>50 cm	(>20")				

6 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")	X	X	X	
21-50cm	(8-20")	X	X	X	
>50 cm	(>20")				

Wetland Name: B **AU ID#:** 818d-B(post-mit)

SOILS and SUBSTRATES

		D46	Composition of AU surface
1	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
1	0/1	*D46.4*	Exposed cobbles
1	0/1	*D46.5*	Exposed gravel
1	0/1	*D46.6*	Exposed sand
1	0/1	*D46.7*	Exposed silt
1	0/1	*D46.8*	Exposed clay

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

		D47	Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
0	[0-3]	*D47.1*	Peat
1	[0-3]	*D47.2*	Organic Muck
2	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)

Record the least permeable layer if there are several down to 60 cm.

		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
1	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
1	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	Substrate of streams
0	0/1	*D49.1*	Substrate **of permanent stream** or river in AU has at least 1 square meter of gravel
0	0/1	*D49.2*	Substrate **of permanent stream** or river in AU has at least 1 square meter of cobbles
		D49.3	

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

Wetland Name: Wetland D (Post - Mit) **AU ID#:** 818d - D (post-mit)
Location: 818d - Microsoft **T/S/R:**
Data Collector: E. Schau **Date:** 10-18-08

Use this data sheet for:
***DEPRESSIONAL OUTFLOW** or **RIVERINE IMPOUNDING** wetlands*
in the Lowlands of Western Washington
- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

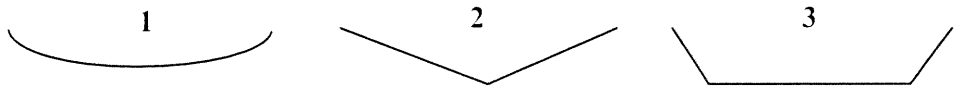
Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.084	ha	**D1**	Area of AU 9,126 ft² = 0.21 acres
3.3	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
0	0/1	**D4**	Channels, ditches, or streams in AU
0	0/1	*D4.1*	Channels, ditches, or streams in AU have permanently flowing water *(you see water flowing)*
		D4.2	
0	0/1	*D4.3*	The only surface outflow from the AU is through a culvert (<60 cm) or vertical siphon
		D5	
		D6	
		D7	
		D8	Inundation 715 ft
7.8	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
1	0/1	*D9.2*	Seasonally flooded (>1 month)
1	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
	m	**D10**	Average height of annual flooding above lowest point of outlet or surface of permanent stream at outlet (round to 0.3 m)

By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

Wetland Name: D **AU ID#:** 818d-D(post-mit)

		D11	Cross section of AU in areas of seasonal inundation (record a 1 next to cross section that best fits)
1	0/1	*D11.1*	Cross section 1
0	0/1	*D11.2*	Cross section 2
0	0/1	*D11.3*	Cross section 3



		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
1	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)
		D13	Constriction of outlet
1	0/1	*D13.1*	Unconstricted or only slightly constricted
0	0/1	*D13.2*	Moderately constricted
0	0/1	*D13.3*	Severely constricted
	0/1	*D13.4*	*Riverine Impounding only* – Completely constricted (no surface outlet)

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

If the AU has multiple outlets, judge the constriction as if all the outlets were combined into one large one.

VEGETATION

		D14	Cowardin Classes (as % area of AU)
D	%	*D14.1*	Forest - evergreen
15	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
55	%	*D14.4*	Scrub-shrub - deciduous
30	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed
1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
100	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
70	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
20	#	*D19.1*	Record number of native plant species found in AU
0	#	*D19.2*	Record number of non- native plant species found in AU
3	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
3	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
0	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

A stratum must have 20% cover in assemblage

Wetland Name: D **AU ID#:** 818-d - D(pest-mit)

0 0/1 **D22** Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

D23 Sphagnum bogs

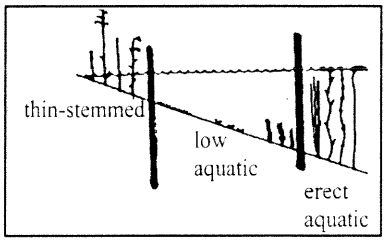
0 0/1 *D23.1* % area of Sphagnum bogs >75%
0 0/1 *D23.2* % area of Sphagnum bogs = 50-75%
0 0/1 *D23.3* % area of Sphagnum bogs = 25-49%
0 0/1 *D23.4* % area of Sphagnum bogs = 1-24%
1 0/1 *D23.5* % area of Sphagnum bogs = 0%

D24 Dominance by non-native plant species

0 0/1 *D24.1* % area of non-native species >75%
0 0/1 *D24.2* % area of non-native species = 50-75%
0 0/1 *D24.3* %area of non-native species = 25-49%
0 0/1 *D24.4* % area of non-native species = 1-24%
1 0/1 *D24.5* % area of non-natives = 0%

HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



D26 pH

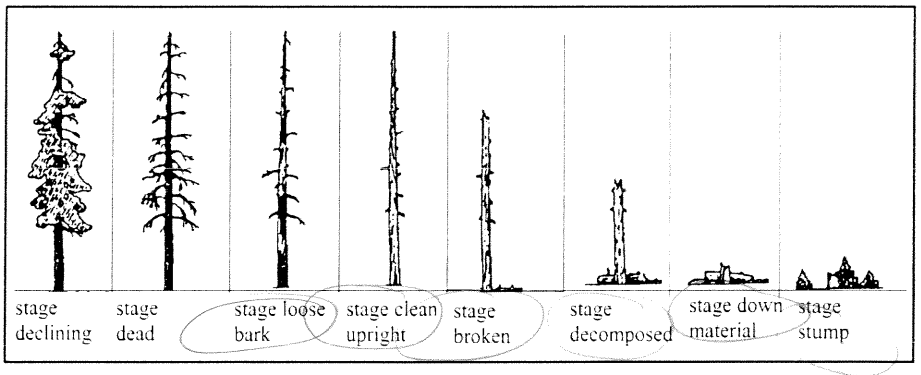
[4-9] *D26.1* pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
[4-9] *D26.2* pH of open or standing water (*record the lowest pH. if you cannot measure record a [7])*

0 0/1 **D27** Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1 0/1 **D28** Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0 0/1 **D29** Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0 0/1 **D30** Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

Wetland Name: D **AU ID#:** 8d - D (post-mit)

6 [0-8] **D31** Snags (record # of stages)

Circle the categories present; minimum DBH of snag = 10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

0 0/1 **D32** Overhanging vegetation, extending out for 1 m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

0 0/1 **D34** Undercut banks present for at least 2 m (6.6 ft.)

1 [0-4] **D35** Key for rating egg-laying structures for amphibians

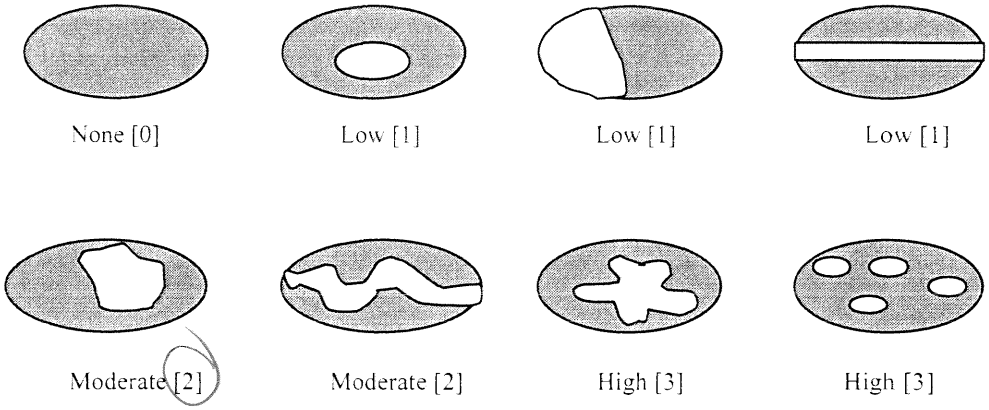
1. Does the AU have thin-stemmed vegetation or thin branches **(<8 mm)** in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

Wetland Name: 818d - D **AU ID#:** 818d-D (post-mit)

0 0 1 **D36** Tannins in surface waters >10% of water surface

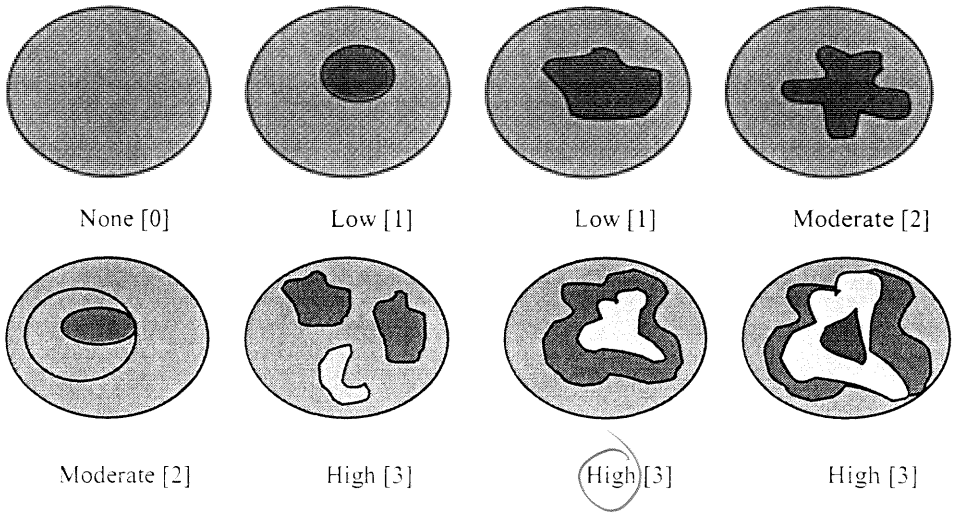
0 0 1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

2 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



3 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate[2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



Wetland Name: D **AU ID#:** 8182 - D(post-mit)

D40

2 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

1 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

Wetland Name: D **AU ID#:** 818d - D (post-mit)

0 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

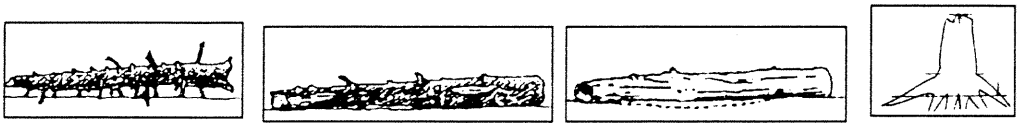
1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO go to 5 **YES go to 2**
2. Is the wetland part of riparian corridor > 50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] **YES = [1]**

8 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included

Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")	X	X	X	X
21-50cm	(8-20")	X	X	X	X
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

Wetland Name: D **AU ID#:** 81Bd-D(post-mit)

SOILS and SUBSTRATES

		D46	Composition of AU surface
1	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
1	0/1	*D46.4*	Exposed cobbles
1	0/1	*D46.5*	Exposed gravel
1	0/1	*D46.6*	Exposed sand
1	0/1	*D46.7*	Exposed silt
0	0/1	*D46.8*	Exposed clay

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

		D47	Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
0	[0-3]	*D47.1*	Peat
0	[0-3]	*D47.2*	Organic Muck
3	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)

Record the least permeable layer if there are several down to 60 cm.

		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
1	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
0	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	Substrate of streams
0	0/1	*D49.1*	Substrate **of permanent stream** or river in AU has at least 1 square meter of gravel
0	0/1	*D49.2*	Substrate **of permanent stream** or river in AU has at least 1 square meter of cobbles
		D49.3	

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

Wetland Name:	Wetland F (Post-Mit)	**AU ID#:**	818d-F (post-mit)
Location:	818d – Microsoft	**T/S/R:**	
Data Collector:	E Schau	**Date:**	10-18-08

Use this data sheet for:
***DEPRESSIONAL OUTFLOW** or **RIVERINE IMPOUNDING** wetlands*
in the Lowlands of Western Washington

- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

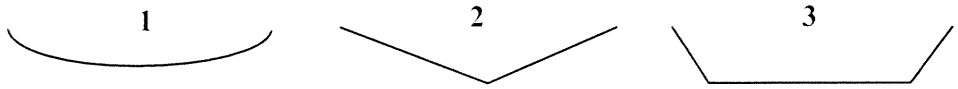
Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.13	ha	**D1**	Area of AU 13,639 sf = 0.313 acres
3.3	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
0	0/1	**D4**	Channels, ditches, or streams in AU
0	0/1	*D4.1*	Channels, ditches, or streams in AU have permanently flowing water *(you see water flowing)*
		D4.2	
1	0/1	*D4.3*	The only surface outflow from the AU is through a culvert (<60 cm) or vertical siphon
		D5	
		D6	
		D7	
		D8	Inundation 13,639 sf / 6,528 sf =
48	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
1	0/1	*D9.2*	Seasonally flooded (>1 month)
1	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
	m	**D10**	Average height of annual flooding above lowest point of outlet or surface of permanent stream at outlet (round to 0.3 m)

By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

Wetland Name: F **AU ID#:** 818d-F (post-mit)

		D11	Cross section of AU in areas of seasonal inundation (record a 1 next to cross section that best fits)
1	0/1	*D11.1*	Cross section 1
0	0/1	*D11.2*	Cross section 2
0	0/1	*D11.3*	Cross section 3



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1	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)
		D13	Constriction of outlet
0	0/1	*D13.1*	Unconstricted or only slightly constricted
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	0/1	*D13.4*	*Riverine Impounding only* – Completely constricted (no surface outlet)

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

If the AU has multiple outlets, judge the constriction as if all the outlets were combined into one large one.

VEGETATION

		D14	Cowardin Classes (as % area of AU)
10	%	*D14.1*	Forest - evergreen
15	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
25	%	*D14.4*	Scrub-shrub - deciduous
50	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed
1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
100	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
50	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
25	#	*D19.1*	Record number of native plant species found in AU
0	#	*D19.2*	Record number of non- native plant species found in AU
3	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
3	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
0	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

A stratum must have 20% cover in assemblage

Wetland Name: F **AU ID#:** 818d- F (post-mit)

0 0/1 **D22** Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
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0 0/1 *D23.2* % area of Sphagnum bogs = 50-75%
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0 0/1 *D23.4* % area of Sphagnum bogs = 1-24%
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D24 Dominance by non-native plant species

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0 0/1 *D24.3* %area of non-native species = 25-49%
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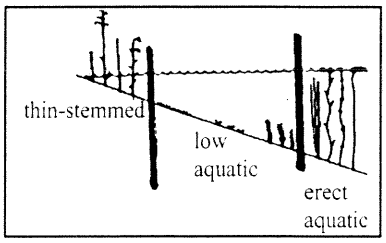
HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



D26 pH

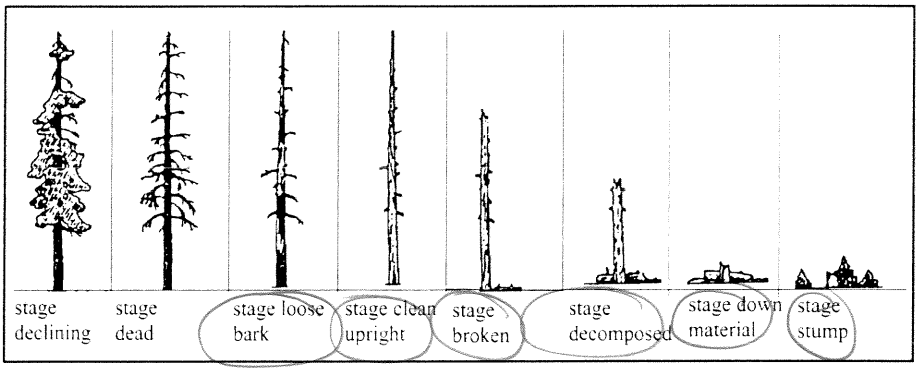
[4-9] *D26.1* pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
[4-9] *D26.2* pH of open or standing water (*record the lowest pH. if you cannot measure record a [7])*

0 0/1 **D27** Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1 0/1 **D28** Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0 0/1 **D29** Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0 0/1 **D30** Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

Wetland Name: F **AU ID#:** 818d-F (post-mit)

6 [0-8] **D31** Snags (record # of stages)

Circle the categories present: minimum DBH of snag =10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

0 0/1 **D32** Overhanging vegetation, extending out for 1 m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

0 0/1 **D34** Undercut banks present for at least 2 m (6.6 ft.)

1 [0-4] **D35** Key for rating egg-laying structures for amphibians

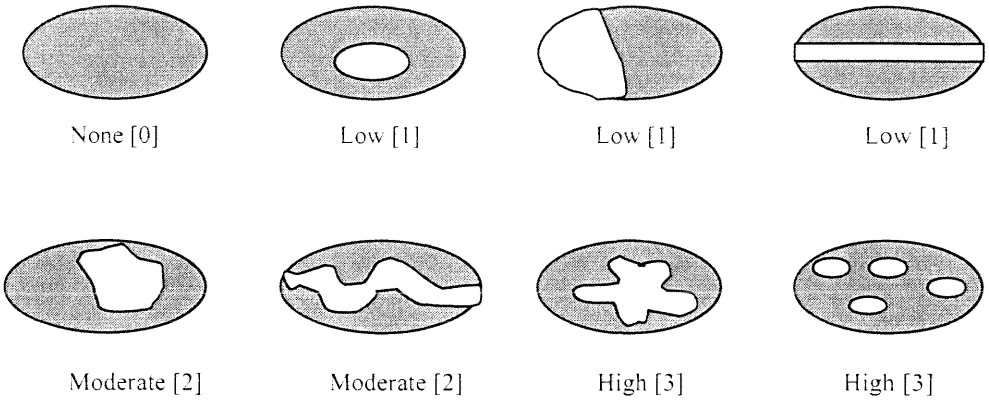
1. Does the AU have thin-stemmed vegetation or thin branches **(<8 mm)** in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

Wetland Name: F **AU ID#:** 818d-F (post-mit)

0 0/1 **D36** Tannins in surface waters >10% of water surface

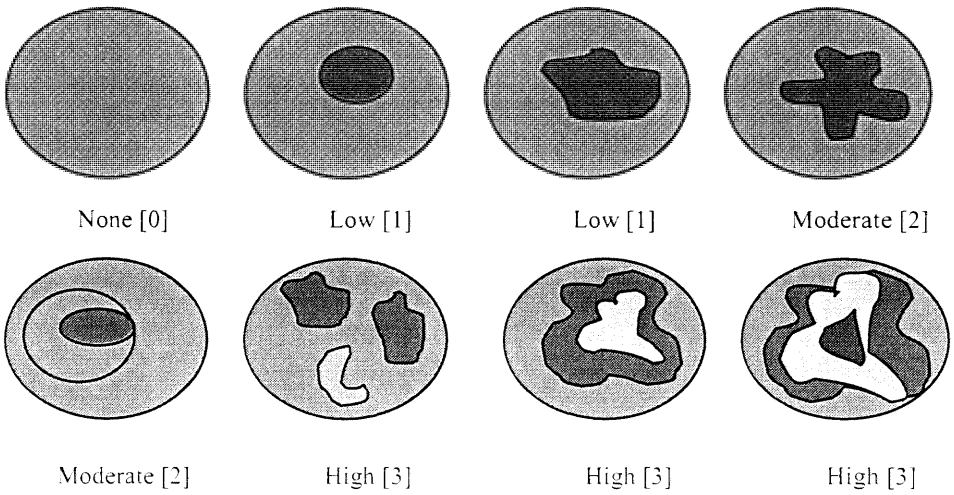
0 0/1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

3 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



3 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate[2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



Wetland Name: F **AU ID#:** 818 d-F (post-mit)

D40

3 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

1 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

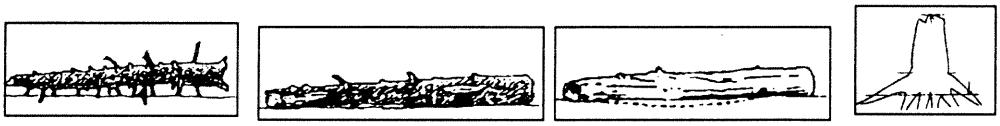
Wetland Name: Wetland F **AU ID#:** 818d - F (Post-mit)

0 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO go to 5 **YES go to 2**
2. Is the wetland part of riparian corridor > 50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] **YES = [1]**

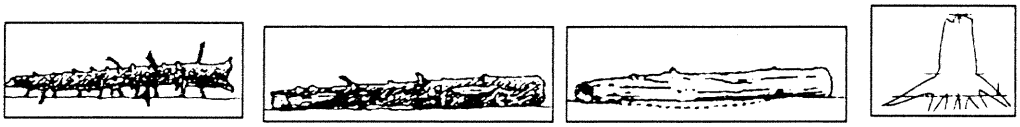
8 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")	X	X	X	X
21-50cm	(8-20")	X	X	X	X
>50 cm	(>20")				

8 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")	X	X	X	X
21-50cm	(8-20")	X	X	X	X
>50 cm	(>20")				

Wetland Name: Wetland F **AU ID#:** 818d-F (post-mit)

SOILS and SUBSTRATES

		D46	Composition of AU surface
1	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
1	0/1	*D46.4*	Exposed cobbles
1	0/1	*D46.5*	Exposed gravel
1	0/1	*D46.6*	Exposed sand
1	0/1	*D46.7*	Exposed silt
1	0/1	*D46.8*	Exposed clay

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

		D47	Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
0	[0-3]	*D47.1*	Peat
0	[0-3]	*D47.2*	Organic Muck
3	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)

Record the least permeable layer if there are several down to 60 cm.

		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
1	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	Substrate of streams
0	0/1	*D49.1*	Substrate **of permanent stream** or river in AU has at least 1 square meter of gravel
0	0/1	*D49.2*	Substrate **of permanent stream** or river in AU has at least 1 square meter of cobbles
		D49.3	

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

Wetland Name: Wetland J (Post-Mit) AU ID#: 818d-J (post-mit)
Location: 818d - Microsoft T/S/R:
Data Collector: E. Schan Date: 10-18-08

Use this data sheet for:
***DEPRESSIONAL OUTFLOW** or **RIVERINE IMPOUNDING** wetlands*
in the Lowlands of Western Washington
- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

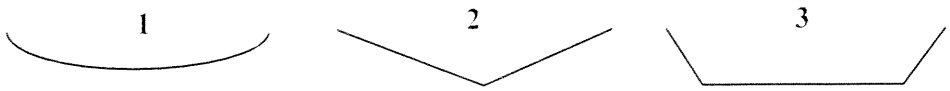
Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.025	ha	**D1**	Area of AU
3.3	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
10	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
0	0/1	**D4**	Channels, ditches, or streams in AU
0	0/1	*D4.1*	Channels, ditches, or streams in AU have permanently flowing water *(you see water flowing)*
		D4.2	
0	0/1	*D4.3*	The only surface outflow from the AU is through a culvert (<60 cm) or vertical siphon
		D5	
		D6	
		D7	
		D8	Inundation
25	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
1	0/1	*D9.2*	Seasonally flooded (>1 month)
1	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
	m	**D10**	Average height of annual flooding above lowest point of outlet or surface of permanent stream at outlet (round to 0.3 m)

By definition:
D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

Wetland Name: J **AU ID#:** 818d - J (post-mt)

		D11	Cross section of AU in areas of seasonal inundation (record a 1 next to cross section that best fits)
1	0/1	*D11.1*	Cross section 1
0	0/1	*D11.2*	Cross section 2
0	0/1	*D11.3*	Cross section 3



		D12	Categories of water depths in AU, areas permanently or seasonally inundated/flooded
1	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)

Record a 1 for each category present if >0.1 ha (1.4 acre) or 10% of area

		D13	Constriction of outlet
1	0/1	*D13.1*	Unconstricted or only slightly constricted
0	0/1	*D13.2*	Moderately constricted
0	0/1	*D13.3*	Severely constricted
	0/1	*D13.4*	*Riverine Impounding only* – Completely constricted (no surface outlet)

If the AU has multiple outlets, judge the constriction as if all the outlets were combined into one large one.

VEGETATION

		D14	Cowardin Classes (as % area of AU)
15	%	*D14.1*	Forest - evergreen
35	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
35	%	*D14.4*	Scrub-shrub - deciduous
15	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed
1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
100	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
80	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

		D18	
		D19	Plant Richness
20	#	*D19.1*	Record number of native plant species found in AU
0	#	*D19.2*	Record number of non- native plant species found in AU
3	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1.4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
3	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
0	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

A stratum must have 20% cover in assemblage

Wetland Name: J **AU ID#:** 81Bd-J (post-mit)

D 0 1 **D22** Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

D23 Sphagnum bogs

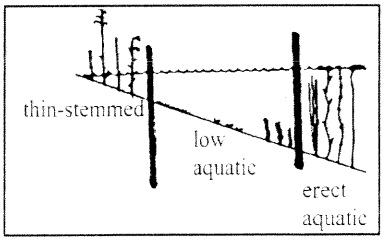
0 0 1 *D23.1* % area of Sphagnum bogs >75%
0 0 1 *D23.2* % area of Sphagnum bogs = 50-75%
0 0 1 *D23.3* % area of Sphagnum bogs = 25-49%
0 0 1 *D23.4* % area of Sphagnum bogs = 1-24%
1 0 1 *D23.5* % area of Sphagnum bogs = 0%

D24 Dominance by non-native plant species

0 0 1 *D24.1* % area of non-native species >75%
0 0 1 *D24.2* % area of non-native species = 50-75%
0 0 1 *D24.3* %area of non-native species = 25-49%
0 0 1 *D24.4* % area of non-native species = 1-24%
1 0 1 *D24.5* % area of non-natives = 0%

HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



D26 pH

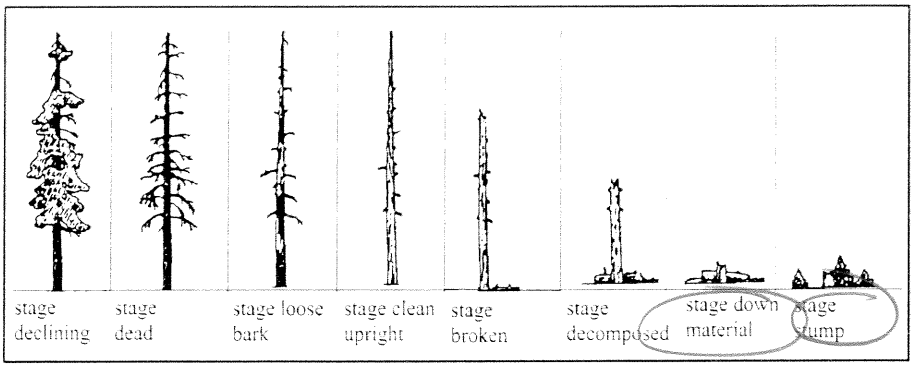
[4-9] *D26.1* pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
[4-9] *D26.2* pH of open or standing water *(record the lowest pH. if you cannot measure record a [7])*

0 0 1 **D27** Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1 0 1 **D28** Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0 0 1 **D29** Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0 0 1 **D30** Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

Wetland Name: J	**AU ID#:** 818d-J (post-mit)

2 [0-8] **D31** Snags (record # of stages)

Circle the categories present: minimum DBH of snag = 10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

0 0/1 **D32** Overhanging vegetation, extending out for 1 m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

0 0/1 **D34** Undercut banks present for at least 2 m (6.6 ft.)

1 [0-4] **D35** Key for rating egg-laying structures for amphibians

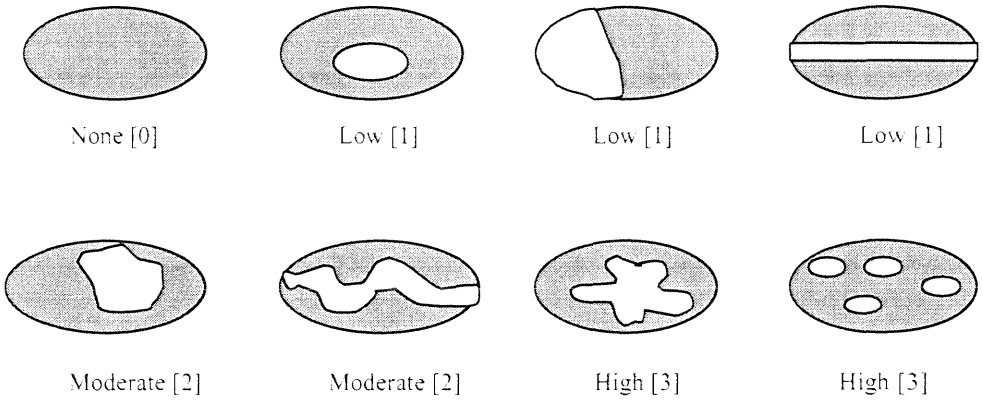
1. Does the AU have thin-stemmed vegetation or thin branches **(<8 mm)** in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

Wetland Name: J **AU ID#:** 818d-J (post-mit)

0 0 1 **D36** Tannins in surface waters >10% of water surface

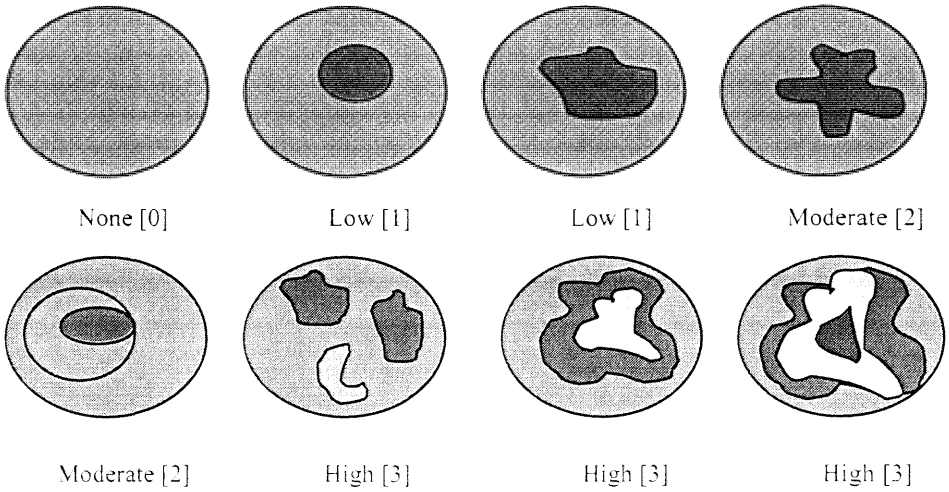
0 0 1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

0 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



2 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate[2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



Wetland Name: J **AU ID#:** 818d -J(post-mt)

D40

2 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

1 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

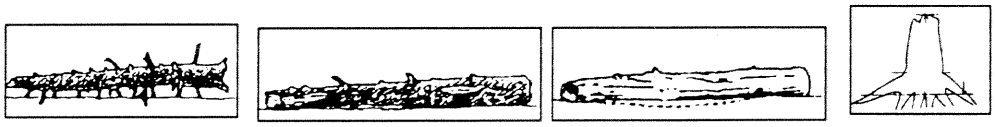
Wetland Name: J **AU ID#:** 818d-J (post mit)

0 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO go to 5 **YES go to 2**
2. Is the wetland part of riparian corridor > 50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] **YES = [1]**

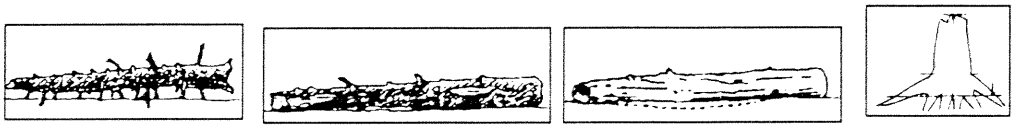
8 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")	X	X	X	X
21-50cm	(8-20")	X	X	X	X
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

Wetland Name: J **AU ID#:** 818d - J (postmit)

SOILS and SUBSTRATES

		D46	Composition of AU surface
1	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
0	0/1	*D46.6*	Exposed sand
1	0/1	*D46.7*	Exposed silt
0	0/1	*D46.8*	Exposed clay

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

		D47	Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
0	[0-3]	*D47.1*	Peat
0	[0-3]	*D47.2*	Organic Muck
3	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)

Record the least permeable layer if there are several down to 60 cm.

		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
0	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	Substrate of streams
0	0/1	*D49.1*	Substrate **of permanent stream** or river in AU has at least 1 square meter of gravel
0	0/1	*D49.2*	Substrate **of permanent stream** or river in AU has at least 1 square meter of cobbles
		D49.3	

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

Wetland Name:	Wetland K (Post-Mit)	**AU ID#:**	818d-K (post-mit)
Location:	818d - Microsoft	**T/S/R:**	
Data Collector:	E Schau	**Date:**	10-18-00

Use this data sheet for: CLOSED
DEPRESSIONAL ~~OUTFLOW~~ *or* ***RIVERINE ~~IMPOUNDING~~*** *wetlands in the Lowlands of Western Washington*

- *Use in conjunction with the written guidance provided in Parts 1 and 2*
- *Record only numbers, yes/no answers are recorded as a [1] or [0]*

Estimate, Score/ or Rating			
			LANDSCAPE DATA
0	1/0	**D0**	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
0.005	ha	**D1**	Area of AU
3.3	ha	**D2**	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
11	%	*D3.1*	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
16	%	*D3.2*	Agriculture (tilled fields and pastures; includes golf courses)
0	%	*D3.3*	Clear-cut logging (<5 years since clearing)
18	%	*D3.4*	Urban/commercial (any developed areas not identified as residential)
48	%	*D3.5*	High density residential (>1 residence/acre)
12	%	*D3.6*	Low density residential (<= 1 residence/acre)
1	%	*D3.7*	Undeveloped areas, shrubland, other wetlands, and open water
			WATER REGIME
	0/1	**D4**	Channels, ditches, or streams in AU
NA	0/1	*D4.1*	Channels, ditches, or streams in AU have permanently flowing water *(you see water flowing)*
		D4.2	
	0/1	*D4.3*	The only surface outflow from the AU is through a culvert (<60 cm) or vertical siphon
		D5	
		D6	
		D7	
		D8	Inundation
100	%	*D8.1*	Percent of AU that is ponded or inundated for >1 month
0	%	*D8.2*	Percent of AU with permanent standing or moving water
0	%	*D8.3*	Percent of AU with permanent open water *(without aquatic bed vegetation)*
0	%	*D8.4*	Percent of AU with unvegetated bars or mudflats
0	0/1	*D8.5*	Unvegetated bars or mudflats at least 100 square meters in size
		D9	Inundation regimes
0	0/1	*D9.1*	Permanently flooded (include vegetated areas)
1	0/1	*D9.2*	Seasonally flooded (>1 month)
1	0/1	*D9.3*	Occasionally flooded (<= 1 month)
1	0/1	*D9.4*	Saturated but seldom inundated
0	0/1	*D9.5*	Permanently flowing stream
0	0/1	*D9.6*	Intermittently flowing stream
NA	m	**D10**	Average height of annual flooding above lowest point of outlet or surface of permanent stream at outlet (round to 0.3 m)

By definition:
D8.1 >= D8.2 >= D8.3

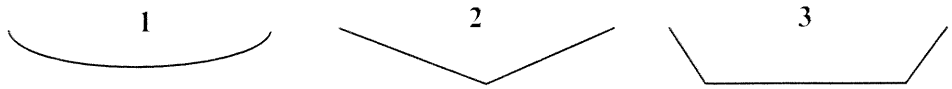
Chose all that apply that meet size criteria: area >0.1 ha (1/4 acre) or > 10% of AU if AU smaller than 1 ha (2.5 acres)

CLOSED

DEPRESSIONAL ~~OUTFLOW or RIVERINE IMPOUNDING~~

Wetland Name: K	**AU ID#:** K-81Bd-post-mit

		D11	Cross section of AU in areas of seasonal inundation (record a 1 next to cross section that best fits)
	0/1	*D11.1*	Cross section 1
NA	0/1	*D11.2*	Cross section 2
	0/1	*D11.3*	Cross section 3



		D12	Categories of water depths in AU: areas permanently or seasonally inundated/flooded
1	0/1	*D12.1*	1-20 cm (<8 in)
0	0/1	*D12.2*	20-100 cm (8-40 in)
0	0/1	*D12.3*	>100 cm (>40 in)

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

		D13	Constriction of outlet
	0/1	*D13.1*	Unconstricted or only slightly constricted
	0/1	*D13.2*	Moderately constricted
NA	0/1	*D13.3*	Severely constricted
	0/1	*D13.4*	*Riverine Impounding only* – Completely constricted (no surface outlet)

If the AU has multiple outlets, judge the constriction as if all the outlets were combined into one large one.

VEGETATION

		D14	Cowardin Classes (as % area of AU)
0	%	*D14.1*	Forest - evergreen
0	%	*D14.2*	Forest -deciduous
0	%	*D14.3*	Scrub-shrub - evergreen
50	%	*D14.4*	Scrub-shrub - deciduous
50	%	*D14.5*	Emergent
0	%	*D14.6*	Aquatic bed

- *Include forest only if trees are rooted in AU.*
- ***If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.***
- ***If vegetation classes are patchy, add the patches together for each class to get a total.***
- *To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU*

1	0/1	**D15**	Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? **If not, give reason.**
100	%	**D16**	% area of herbaceous understory **in forest and shrub areas** (not % area in entire AU)
50	%	**D17**	% area of AU with >75% closure of canopy *(SS, FO classes > 1 m high)*
		D18	
		D19	Plant Richness
20	#	*D19.1*	Record number of native plant species found in AU
0	#	*D19.2*	Record number of non- native plant species found in AU
2	#	**D20**	The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha *(if more than 12 record a 12)*
2	[1-6]	**D21**	Strata: The maximum # of strata present in any plant assemblage
0	0/1	*D21.1*	Is vine stratum dominated by non-native blackberries?

A stratum must have 20% cover in assemblage

Wetland Name: K **AU ID#:** 818d-K (post-mit)

6 0/1 **D22** Mature trees in AU

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

Tsuga heterophylla (western hemlock) >45 cm (18")
Thuja plicata (western red cedar) >45 cm (18")
Pseudotsuga menziesii (Douglas fir) >45 cm (18")
Picea sitchensis (Sitka spruce) >45 cm (18")
Populus balsamifera (black cottonwood) >45 cm (18")
Acer macrophyllum (big-leaf maple) >45 cm (18")
Alnus rubra (red alder) >30 cm (12")
Fraxinus latifolia (Oregon ash) >30 cm (12")
Pinus contorta (lodgepole pine) >30 cm (12")
Salix lucida (Pacific willow) >30 cm (12")

D23 Sphagnum bogs

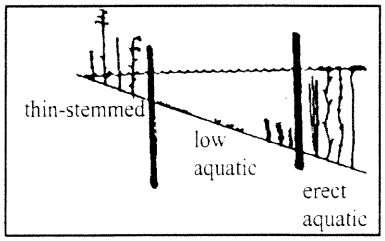
0 0/1 *D23.1* % area of Sphagnum bogs >75%
0 0/1 *D23.2* % area of Sphagnum bogs = 50-75%
0 0/1 *D23.3* % area of Sphagnum bogs = 25-49%
0 0/1 *D23.4* % area of Sphagnum bogs = 1-24%
1 0/1 *D23.5* % area of Sphagnum bogs = 0%

D24 Dominance by non-native plant species

0 0/1 *D24.1* % area of non-native species >75%
0 0/1 *D24.2* % area of non-native species = 50-75%
0 0/1 *D24.3* %area of non-native species = 25-49%
0 0/1 *D24.4* % area of non-native species = 1-24%
1 0/1 *D24.5* % area of non-natives = 0%

HABITAT CHARACTERISTICS

0 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



D26 pH

[4-9] *D26.1* pH of interstitial water *(measure immediately after digging hole in non-inundated areas)*
[4-9] *D26.2* pH of open or standing water *(record the lowest pH. if you cannot measure record a [7])*

0 0/1 **D27** Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
1 0/1 **D28** Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
0 0/1 **D29** Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
0 0/1 **D30** Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU

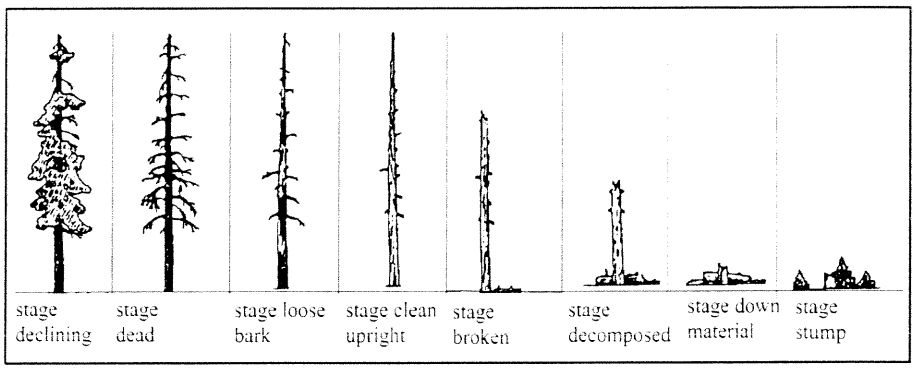
CLOSED

DEPRESSIONAL ~~OUTFLOW~~ or ~~RIVERINE IMPOUNDING~~

Wetland Name: K **AU ID#:** 818d-K (post-mit)

0 [0-8] **D31** Snags (record # of stages)

Circle the categories present: minimum DBH of snag =10 cm (4")



0 0/1 *D31.1* At least one of the snags above has a DBH greater than 30 cm (12").

0 0/1 **D32** Overhanging vegetation, extending out for 1 m, for at least 10 m (33 ft) over stream or open water.

0 0/1 **D33** Upland islands of at least 10 square meters (100 square ft.) within AU boundary

Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)

0 0/1 **D34** Undercut banks present for at least 2 m (6.6 ft.)

1 [0-4] **D35** Key for rating egg-laying structures for amphibians

1. Does the AU have thin-stemmed vegetation or thin branches **(<8 mm)** in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
   NO – Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm** in diameter?
   NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 4 **YES - Score = 4**
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 2 **YES – Score = 3** STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, **1-4 mm**?
   NO – Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water)?
   NO go to 7 **YES – Score = 3**
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
   NO – Score = 1 **YES – Score = 2**

CLOSED

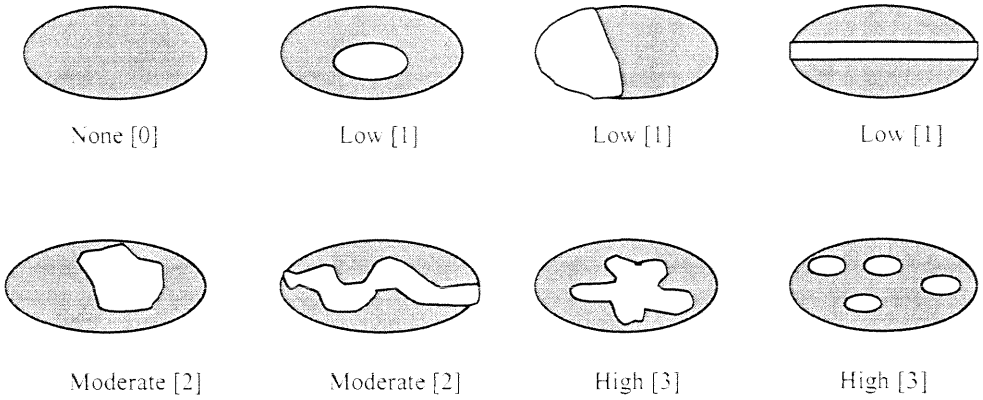
DEPRESSIONAL ~~OUTFLOW~~ or ~~RIVERINE IMPOUNDING~~

Wetland Name: K	**AU ID#:** 818d-K(post-mit)

0 0 1 **D36** Tannins in surface waters >10% of water surface

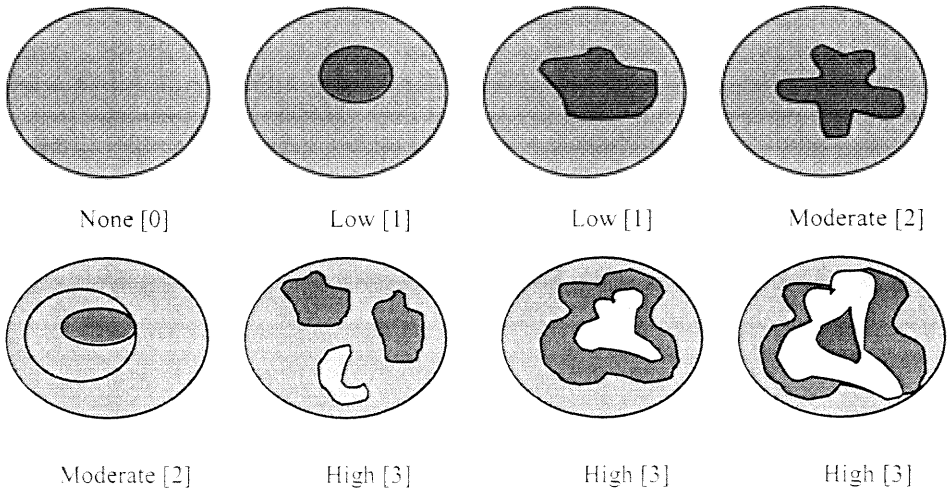
0 0 1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) *(may be a dike)*

0 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



2 [0-3] **D39** Interspersion between Cowardin vegetation classes

**AUs with only 2 classes can only score a moderate[2] or lower*
**AUs with 4 vegetation classes score a high [3]*
**AUs with 3 classes can score a moderate (2) or a high (3)*



Wetland Name: K	**AU ID#:** 818d-K(post-mit)

D40

3 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.

Choose the description that best fits the characteristics of the AU edge:

0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**. Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.

1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest

2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.

2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight: record a [2]**. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous: record a [3]**. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.

2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight: record a [2]**

3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous: record a [3]**

2 [0-5] **D42** Buffer of AU: Choose the description that best represents condition of AU buffer

> * *Open water or adjacent wetlands are considered part of the buffer*
> * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.

4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.

3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.

2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference

0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference

1 Does not meet any of the criteria above

CLOSED

DEPRESSIONAL ~~OUTFLOW~~ or ~~RIVERINE IMPOUNDING~~

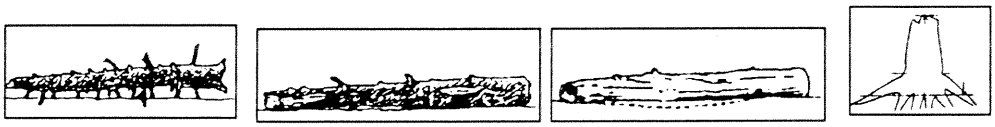
Wetland Name: K **AU ID#:** 818 d-K (post-mit)

0 [0-3] **D43** Corridors of AU: Rate corridors using following key *(record rating of 0, 1, 2, or 3)*

1. Is the AU part of a riparian corridor *(see text for definitions)*
   NO go to 5 **YES go to 2**
2. Is the wetland part of riparian corridor > 50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
   NO go to 3 **YES = [3]**
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
   NO go to 4 **YES = [2]**
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
   NO go to 5 **YES = [1]**
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
   NO go to 6 **YES = [3]**
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
   NO go to 7 **YES = [2]**
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
   NO go to 8 **YES = [2]**
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
   NO = [0] **YES = [1]**

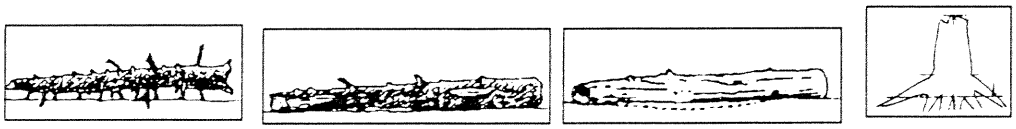
0 [0-12] **D44** # of categories of large woody debris in AU **outside of perm. water**

Freshly cut stumps are not included



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

0 [0-12] **D45** # of categories of large woody debris **in permanent water** of AU (may include aquatic bed areas)



Diameter		Log Class 1	Log Class 2	Log Class 3	Stump
10-20cm	(4-8")				
21-50cm	(8-20")				
>50 cm	(>20")				

CLOSED

DEPRESSIONAL ~~OUTFLOW~~ or ~~RIVERINE IMPOUNDING~~

Wetland Name: K **AU ID#:** 818d-K (post-mt)

SOILS and SUBSTRATES

		D46	Composition of AU surface
1	0/1	*D46.1*	Deciduous, broad-leaved, leaf litter
1	0/1	*D46.2*	Other plant litter
1	0/1	*D46.3*	Decomposed organic
0	0/1	*D46.4*	Exposed cobbles
0	0/1	*D46.5*	Exposed gravel
0	0/1	*D46.6*	Exposed sand
0	0/1	*D46.7*	Exposed silt
0	0/1	*D46.8*	Exposed clay
		D47	Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
0	[0-3]	*D47.1*	Peat
1	[0-3]	*D47.2*	Organic Muck
2	[0-3]	*D47.3*	Mineral with clay fraction <30%
0	[0-3]	*D47.4*	Clay (clay fraction >30%)
		D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
0	0/1	*D48.1*	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
1	0/1	*D48.2*	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
1	0/1	*D48.3*	Slow - muck, peat, or loams (except sandy loam), silts, and clays
		D49	Substrate of streams
0	0/1	*D49.1*	Substrate **of permanent stream** or river in AU has at least 1 square meter of gravel
0	0/1	*D49.2*	Substrate **of permanent stream** or river in AU has at least 1 square meter of cobbles
		D49.3	

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

Record the least permeable layer if there are several down to 60 cm.

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	*Functions*
_____	Removing Sediments
_____	Removing Nutrients
_____	Removing Toxic Metals and Organics
_____	Reducing Peak Flows
_____	Reducing Downstream Erosion
_____	Recharging Groundwater
_____	General Habitat
_____	Anadromous Fish Habitat

APPENDIX F

Detailed Conceptual Wetland Mitigation Plans

Sheet W1-00: Existing Conditions Plan
Sheet W1-10: Assessment of Development Impacts
Sheet W1-11 Proposed Mitigation
Sheet W2-01: Grading Plan
Sheet W2-02: Grading Plan
Sheet W2-03: Grading Plan
Sheet W2-04: Grading Plan
Sheet W2-05: Grading Plan
Sheet W2-06: Grading Details
Sheet W2-07: Grading Details
Sheet W3-00 Plant Communities Schedule and Details
Sheet W3-01: Plant Communities Plan
Sheet W3-02: Plant Communities Plan
Sheet W3-03: Plant Communities Plan
Sheet W3-04: Plant Communities Plan
Sheet W3-05: Plant Communities Plan

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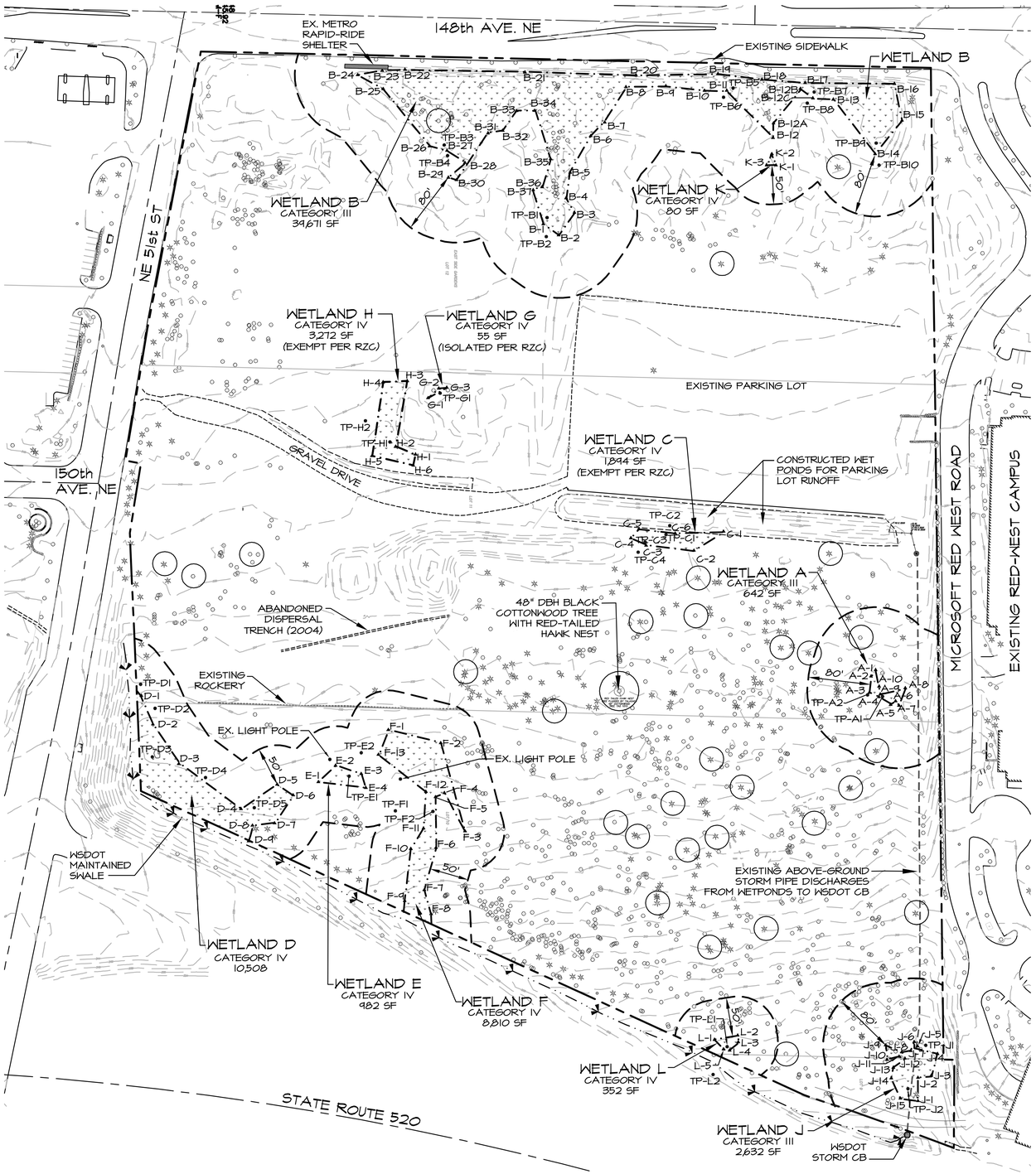
NW 1/4, SECTION 14, TOWNSHIP 25 N, RANGE 5 E, W.M.



EXISTING CONDITIONS PLAN

GRAPHIC SCALE (IN FEET)
0 40 80 160
SCALE: 1"=80'

NORTH

CONTACTS

APPLICANT
NAME: MICROSOFT CORPORATION
ADDRESS: ONE MICROSOFT WAY, REDMOND, WA 98052

PHONE: (425) 705-5189
CONTACT: GID PALMER, SENIOR DEVELOPMENT MANAGER

SURVEYOR
NAME: WH PACIFIC
ADDRESS: 12100 NE 195TH ST, SUITE 300
BOTHELL, WA 98011

PHONE: 425-951-4800
CONTACT: CHARLES CORNWALL

SITE CIVIL ENGINEER
NAME: COUGHLIN PORTER LUNDEEN
ADDRESS: 413 PINE ST., SUITE 300 SEATTLE, WA 98101

PHONE: 206-343-0460
CONTACTS: JEFF PETERSON, P.E.

TRAFFIC ENGINEER
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PHONE: 425-531-0567
CONTACT: GLEN DUBREUIL, PE

FRONTAGE IMPROVEMENTS CIVIL ENGINEER
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ADDRESS: 11711 SE 8TH ST, SUITE 303
BELLEVUE, WA 98005
PHONE: 425-453-9501
CONTACT: SCOTT BORGESON, PE

LANDSCAPE ARCHITECT
NAME: BRUMBAUGH & ASSOCIATES
ADDRESS: 600 N 85TH ST., SUITE 102, SEATTLE, WA 98103
PHONE: 206-782-3650
CONTACT: MARK BRUMBAUGH, RLA

ENVIRONMENTAL CONSULTANT
NAME: TALASAEA CONSULTANTS, INC.
ADDRESS: 15020 BEAR CREEK RD. NE
WOODINVILLE, WA 98077
PHONE: (425) 861-7550
CONTACT: ANN M. OLSEN, RLA

VICINITY MAP

NTS

SOURCE: http://maps.live.com: KING COUNTY

NORTH

SHEET INDEX

SHEET #	SHEET TITLE
W1-00	EXISTING CONDITIONS PLAN
W1-01	ASSESSMENT OF DEVELOPMENT IMPACTS
W1-02	PROPOSED MITIGATION
W2-01	GRADING PLAN
W2-02	GRADING PLAN
W2-03	GRADING PLAN
W2-04	GRADING PLAN
W2-05	GRADING PLAN
W2-06	GRADING DETAILS
W2-07	GRADING DETAILS
W3-00	PLANT COMMUNITIES SCHEDULE & DETAILS
W3-01	PLANT COMMUNITIES PLAN
W3-02	PLANT COMMUNITIES PLAN
W3-03	PLANT COMMUNITIES PLAN
W3-04	PLANT COMMUNITIES PLAN
W3-05	PLANT COMMUNITIES PLAN

NOTES

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PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND
- EXISTING WETLAND BUFFER
- 342 EXISTING CONTOUR
- EXISTING TREES
- EXISTING LANDMARK TREE PER CITY OF REDMOND
- ▲ A-# WETLAND FLAG
- ● TP-# SOIL TEST PIT

NOT FOR CONSTRUCTION

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APPROVED FOR CONSTRUCTION

FOR: WILLIAM J CAMPBELL
INTERIM DIRECTOR OF PUBLIC WORKS
CITY OF REDMOND

PLAN CHECK ENGR.
STORM DRAIN ENGR.
UTILITY ENGR.
FIRE DEPT.
TRANSPORTATION ENGR.
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Microsoft

Red West
Phase II
Advanced Mitigation

14848 NE 51st ST
Redmond, WA 98052

Design Team

Design	AO
Drawn	ATD
Checked	AO
Date	11-22-11
Talasaea Project No.	818D
MJS. Project No.	

Approvals

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OPERATIONS
Microsoft Mechanical Engineer — Date
Microsoft Cable Engineer
Microsoft Electrical Engineer
Engineering Manager
Security Manager
IT-NE
PROJECT MANAGEMENT
Project Planner — Date
Project Manager
Senior Project Manager
Development Manager
Project Manager
Quality Control Reviewer
Quality Control FF&E

Revisions

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01	11-22-11	PERMIT SUBMITTAL

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STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT
ANN MARIE OLSEN
CERTIFICATE NO. 771
EXPIRES 4/1/12

Key Plan

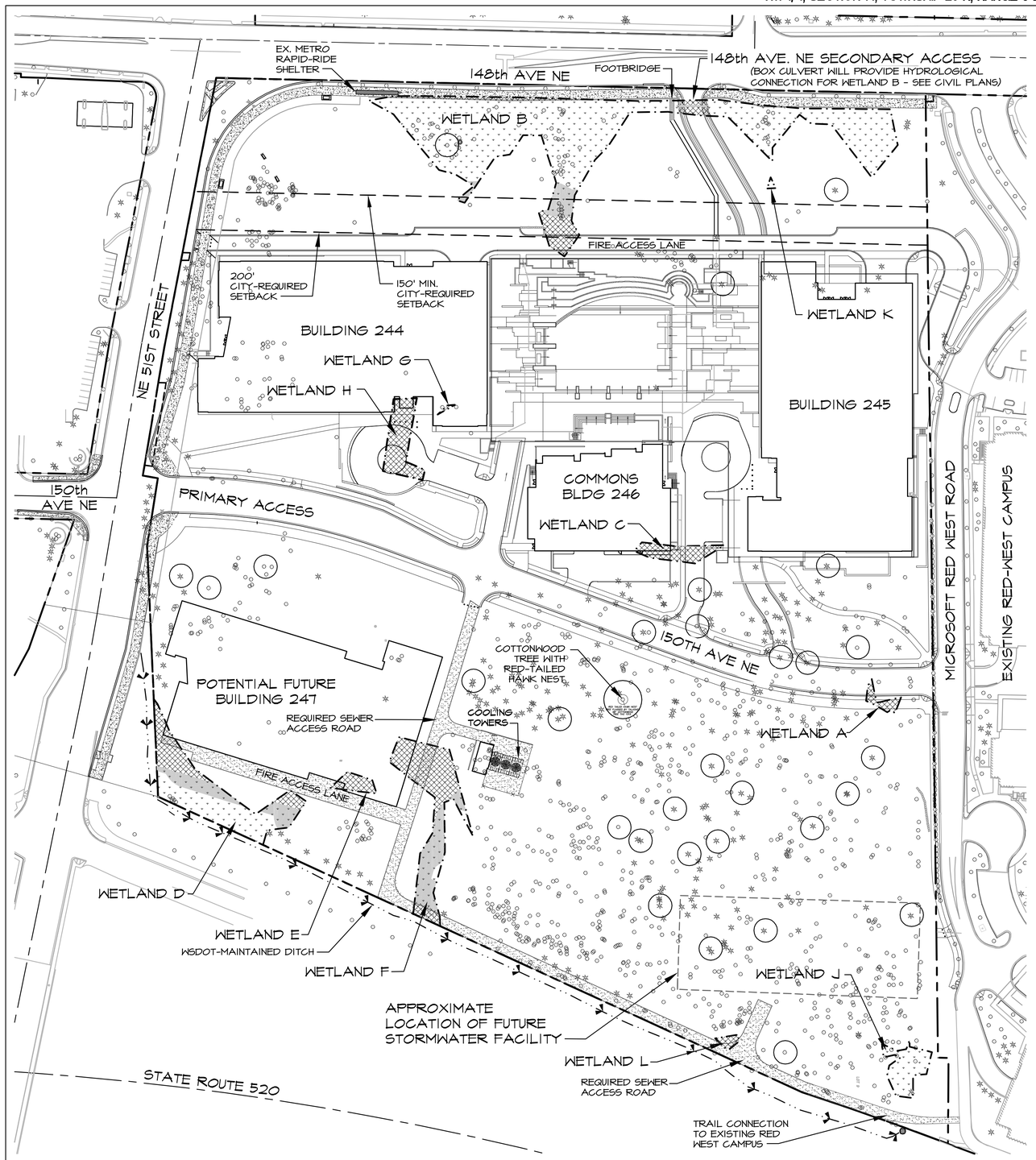
Bar Code

Sheet Title/Number

EXISTING CONDITIONS PLAN

W1-00

NW 1/4, SECTION 14, TOWNSHIP 25 N, RANGE 5 E, W.M.



ASSESSMENT OF DEVELOPMENT IMPACTS

GRAPHIC SCALE (IN FEET)

0 40' 80' 160'

SCALE: 1" = 80'

NORTH

IMPACTS LEGEND

DIRECT WETLAND IMPACTS

FILLED WETLAND

CATEGORY III WETLANDS

WETLAND A -- 150th AVE NE EXTENSION	642 SF
WETLAND B -- SECONDARY ACCESS FROM 148th AVE NE	668 SF
WETLAND B -- REQUIRED FIRE LANE ACCESS	1,794 SF
WETLAND B -- REQUIRED 12' SIDEWALK ON 148TH	918 SF
TOTAL CATEGORY III IMPACTS	4,022 SF

CATEGORY IV WETLANDS

WETLAND C* -- BUILDING CAMPUS	1,894 SF
WETLAND F -- REQUIRED SEWER ACCESS ROAD	5,366 SF
WETLAND G* -- BUILDING CAMPUS	55 SF
WETLAND H* -- BUILDING CAMPUS	3,272 SF
WETLAND L -- REQUIRED SEWER ACCESS ROAD	352 SF
TOTAL CATEGORY IV IMPACTS	10,939 SF

*WETLANDS C,G&H ARE EXEMPT PER RZC 20D

TOTAL FILLED WETLAND: 14,961 SF

INDIRECT WETLAND IMPACTS

PAPER FILLED WETLAND

CATEGORY III WETLANDS

WETLAND B -- SHADING DUE TO CULVERT UNDER SECONDARY ACCESS FROM 148th AVE NE	94 SF
WETLAND B -- REQUIRED FIRE LANE ACCESS	1,415 SF
WETLAND J -- FUTURE STORMWATER FACILITY	3 SF
TOTAL CATEGORY III IMPACTS	1,512 SF

CATEGORY IV WETLANDS

WETLAND F -- REQUIRED SEWER ACCESS ROAD	3,148 SF
TOTAL CATEGORY IV IMPACTS	3,148 SF

TOTAL PAPER FILLED WETLAND: 4,660 SF

POTENTIAL FUTURE BUILDING 247 IMPACTS LEGEND

DIRECT WETLAND IMPACTS

FILLED WETLAND

CATEGORY IV WETLANDS

WETLAND D -- SITE BUILDING & REQUIRED FIRE ACCESS	2,977 SF
WETLAND E -- SITE BUILDING	982 SF
TOTAL CATEGORY IV IMPACTS	3,959 SF

TOTAL FILLED WETLAND: 3,959 SF

INDIRECT WETLAND IMPACTS

PAPER FILLED WETLAND

CATEGORY IV WETLANDS

WETLAND D - SITE BUILDING & FIRE ACCESS	2,532 SF
TOTAL CATEGORY IV IMPACTS	2,532 SF

TOTAL PAPER FILLED WETLAND: 2,532 SF

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- EXISTING TREES
- EXISTING LANDMARK TREE PER CITY OF REDMOND

NOTES

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Redmond, WA 98052

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Design	AO
Drawn	ATD
Checked	AO
Date	11-22-11
Talasaea Project No.	818D
M.S. Project No.	

Approvals

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OPERATIONS

Microsoft Mechanical Engineer Date
Microsoft Cable Engineer
Microsoft Electrical Engineer
Engineering Manager
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FF&E

PROJECT MANAGEMENT

Project Planner Date
Project Manager
Senior Project Manager
Development Manager
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ANN MARIE OLSEN
CERTIFICATE NO. 771
EXPIRES 4/1/12

Key Plan

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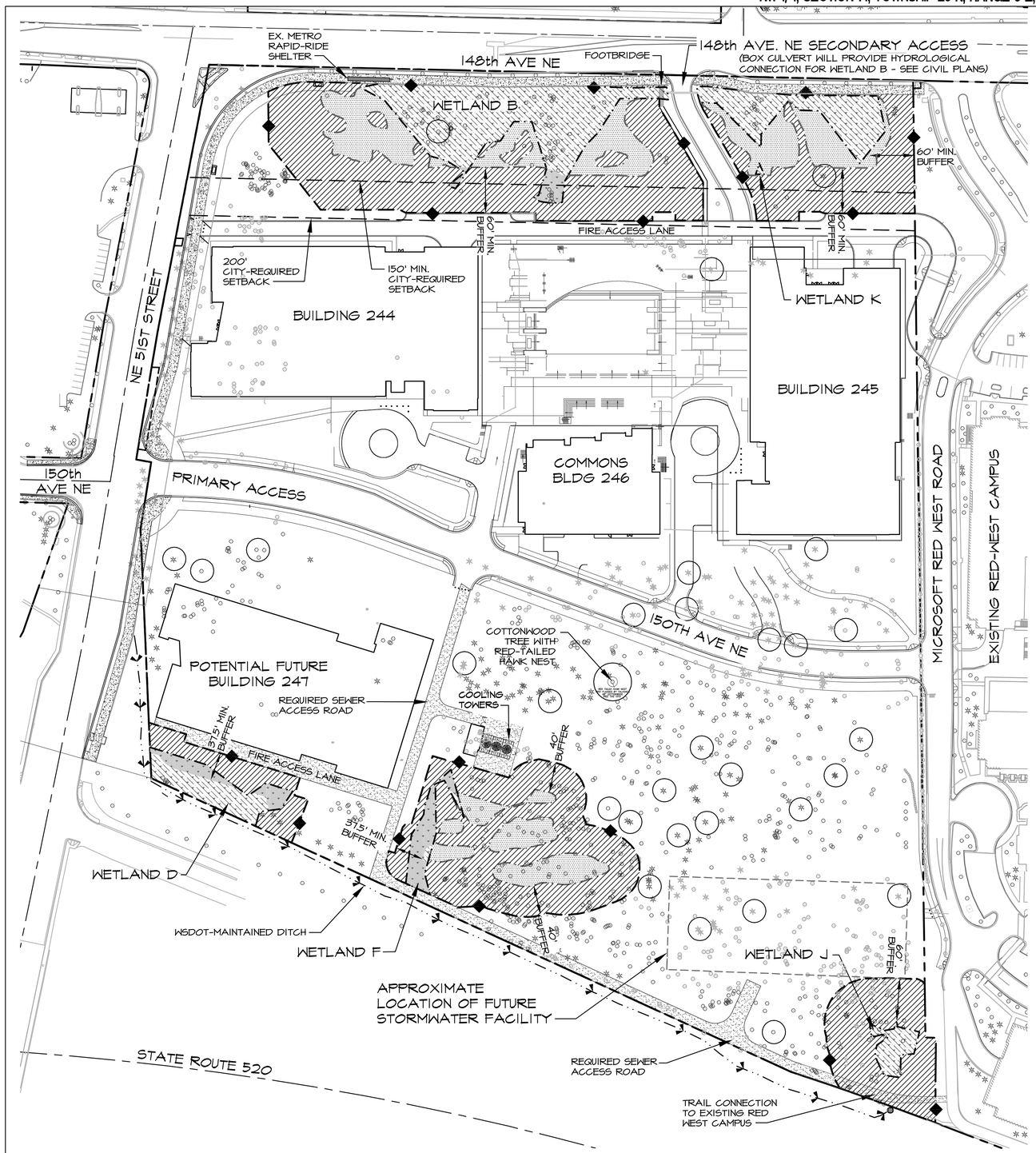
W1-01

NW 1/4, SECTION 14, TOWNSHIP 25 N, RANGE 5 E, W.M.



PROPOSED MITIGATION

GRAPHIC SCALE (IN FEET)

0 40' 80' 160'

SCALE: 1' = 80'

NORTH

MITIGATION LEGEND (FOR ALL IMPACTS)*

WETLANDS

WETLAND ESTABLISHMENT (CREATION)	32,137 SF
WETLAND ENHANCEMENT/RESTORATION (ENHANCEMENT MEASURES INCLUDE: REMOVAL OF INVASIVE SPECIES, MINOR GRADING, LARGE WOODY MATERIAL, & PLANTING)	39,192 SF

BUFFER

RESTORED/ENHANCED TEMPORARILY DISTURBED BUFFER AREAS AND FILLED WETLAND AREAS FUNCTIONING AS BUFFER	133,658 SF
RESTORED/ENHANCED PAPER FILLED WETLAND AREAS FUNCTIONING AS BUFFER	7,093 SF

* SEE TABLE 1 BELOW FOR COMPLETE BREAKDOWN OF MITIGATION REQUIRED FOR EACH WETLAND

PROPOSED MITIGATION (DOE REQUIREMENTS)

Wetland (rating)	Direct Wetland Impacts	Indirect Wetland Impacts (Paper Fill)	Proposed Mitigation Ratio[1]	Establishment/ Rehabilitation	Enhancement
Wetland A (III) 642 sf	642 sf	0	2:1 C	1,284 sf	0
Wetland B (III) 39,671 sf	3,380 sf	1,509 sf	2:1 C	9,778 sf	0
Wetland C (IV) 1,894 sf	1,894 sf	0	1:1 C & 2:1 E	1,894 sf	3,788 sf
Wetland D (IV) 10,508 sf	2,977 sf	2,532 sf	1:1 C & 2:1 E	5,509 sf	11,018sf
Wetland E (IV) 982 sf	982 sf	0	1.5:1 C	1,473 sf	0
Wetland F (IV) 8,810 sf	5,366 sf	3,148 sf	1:1 C & 2:1 E	8,514 sf	17,028 sf
Wetland G (IV) 55 sf	55 sf	0	1:1 C & 2:1 E	55 sf	110 sf
Wetland H (IV) 3,272 sf	3,272 sf	0	1:1 C & 2:1 E	3,272 sf	6,544 sf
Wetland J (III) 2,632 sf	0	3 sf	2:1 C	6 sf	0
Wetland K (IV) 80 sf	0	0	N/A	N/A	N/A
Wetland L (IV) 352 sf	352 sf	0	1:1 C & 2:1 E	352 sf	704 sf
TOTAL	**18,920 sf**	**7,192 sf**		**32,137 sf**	**39,192 sf**

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY (POST-CONSTRUCTION)
- CREATED WETLAND BOUNDARY
- EXISTING TREES
- EXISTING LANDMARK TREE PER CITY OF REDMOND
- POST-MITIGATION BUFFER LINE (THIS LINE IS ALSO THE LOCATION OF THE CRITICAL AREAS FENCE)
- CRITICAL AREAS SIGN

NOTES

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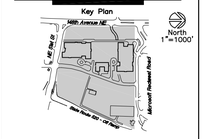


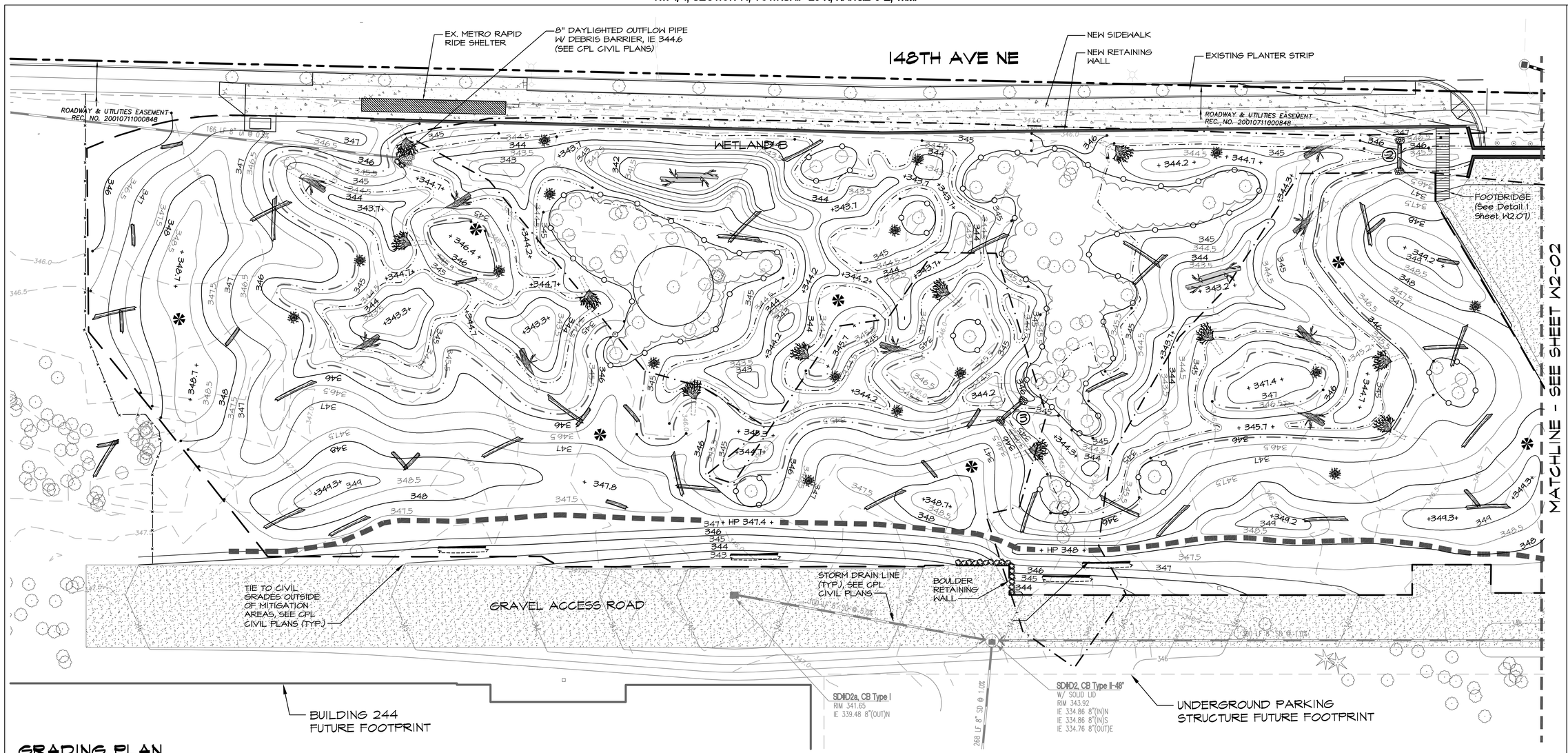
Bar Code

Sheet Title/Number

PROPOSED MITIGATION

W1-02

NW 1/4, SECTION 14, TOWNSHIP 25 N, RANGE 5 E, W.M.



GRADING PLAN

GRAPHIC SCALE (IN FEET)
0 10' 20' 40'
SCALE: 1" = 20'
NORTH

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- EXISTING TREES
- EXISTING SIGNIFICANT TREE PER CITY OF REDMOND

LOG WEIR NOTCH LEGEND

WEIR (2) LOW-FLOW NOTCH EL. 346.2
WEIR (3) LOW-FLOW NOTCH EL. 345.4

GRADING LEGEND

- CREATED WETLAND BOUNDARY
- PROPOSED WATER LEVEL
- CLEARING LIMITS / SILT FENCE - SEE DETAIL (5/W2.06)
- TREE PRESERVATION FENCE
- 100 EXISTING CONTOUR
- + 312.5 + PROPOSED SPOT ELEVATION
- 100 PROPOSED CONTOUR
- LOG WEIR - SEE DETAIL (1/W2.06)
- SNAG W/ SWALLOW NEST BOX - SEE DETAIL (7/W2.06)
- WOODY DEBRIS (LONG & SHORT DOWN LOGS)
- STUMP (SET UPRIGHT)--SEE DETAIL (4/W2.06)
- BURIED RAMP LOG
- BURIED ROOTWAD (LAYING ON SIDE)
- TETHERED LOG--SEE DETAIL (2/W2.06)
- BANK LOG (6/W2.06)
- POST-CONSTRUCTION WETLAND BUFFER
- CLAY DAM--SEE DETAIL (9/W2.06)

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2. SURVEY CLEARING LIMITS.
3. INSTALL SILT FENCE AND ANY OTHER EROSION AND SEDIMENTATION CONTROL BMPS NECESSARY FOR WORK IN THE PROJECT AREAS.
4. CLEAR AND GRUB EARTHWORK AREAS.
5. SURVEY EARTHWORK AREAS AND SET GRADE STAKES AS REQUIRED.
6. COMPLETE THE EXCAVATION OF MITIGATION AREAS TO PROPOSED GRADES.
7. INSTALL SNAGS.
8. PLACE TOPSOIL AND TILL INTO EXISTING SOIL (IF NECESSARY, SEE GRADING SPECIFICATIONS).
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10. MULCH ALL GRADED BUFFER AREAS AND SEED ALL GRADED WETLAND AREAS.
11. COMPLETE SITE CLEANUP AND INSTALL PLANT MATERIAL AS INDICATED ON THE MITIGATION PLANTING PLAN (SEE PLANTING SPECIFICATIONS).
12. INSTALL CRITICAL AREA SIGNS.

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APPROVED FOR CONSTRUCTION

FOR: WILLIAM J CAMPBELL
INTERIM DIRECTOR OF PUBLIC WORKS
CITY OF REDMOND

PLAN CHECK ENGR._____
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Bus (425) 861-7550 - Fax (425) 861-7549

Microsoft

Red West Phase II Advanced Mitigation
14848 NE 51st ST
Redmond, WA 98052

Design Team

	AO
Design	ATD
Drawn	AO
Checked	11-22-11
Date	
TALASAEA Project No.	818D
M.S. Project No.	

Approvals

CUSTOMER — Date
OPERATIONS
Microsoft Mechanical/Engineer — Date
Microsoft Cable Engineer
Microsoft Electrical Engineer
Engineering Manager
Security Manager
FF&E
PROJECT MANAGEMENT
Project Planner — Date
Project Manager
Senior Project Manager
Development Manager
Project Manager
Quality Control Reviewer
Quality Control FF&E

Revisions

No.	Date	Description
01	11-22-11	PERMIT SUBMITTAL

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STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT
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CERTIFICATE NO. 771
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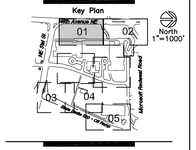
Key Plan

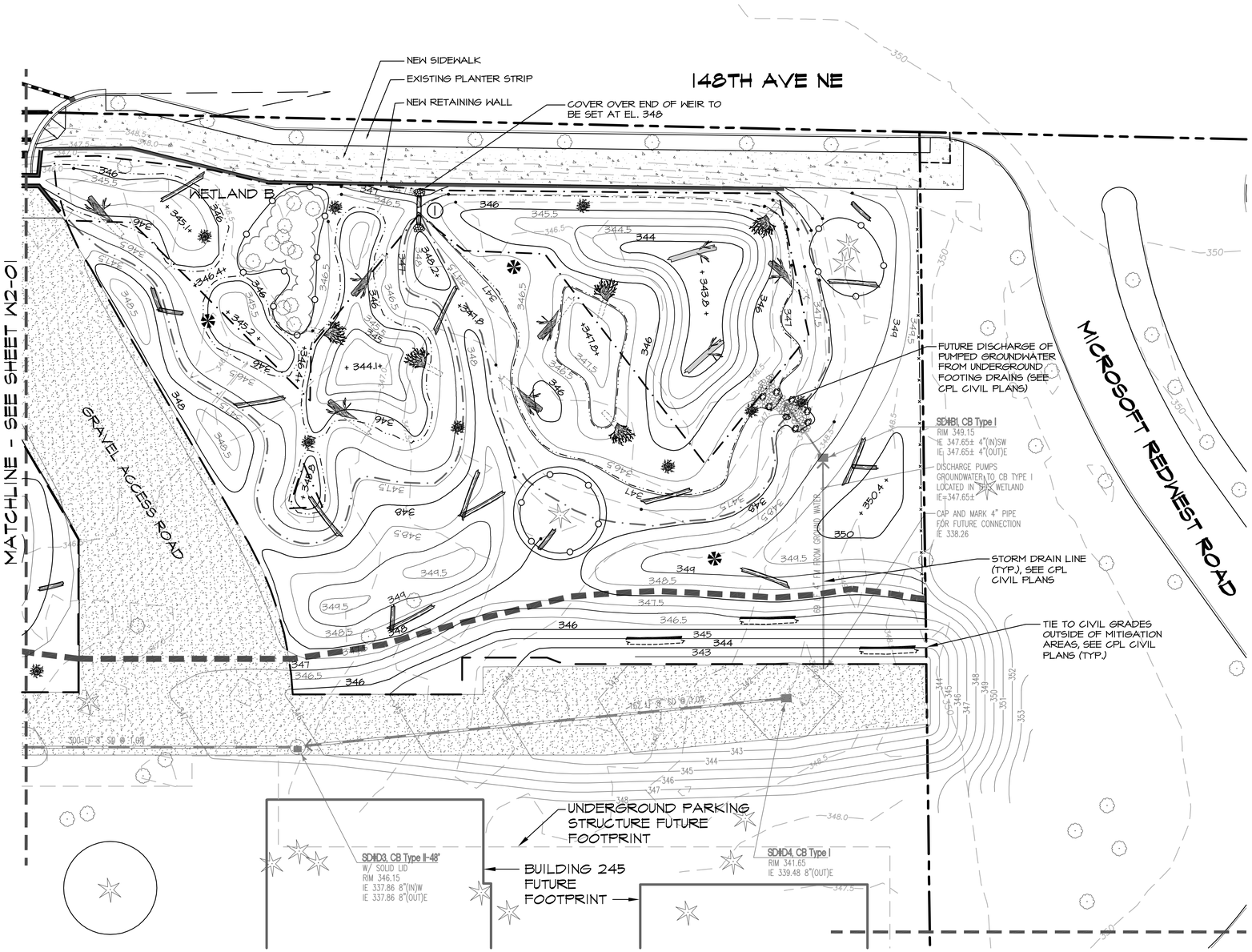


Bar Code

Sheet Title/Number

GRADING PLAN

W2-01



GRADING PLAN

GRAPHIC SCALE (IN FEET)
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NORTH

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
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GRADING LEGEND

- CREATED WETLAND BOUNDARY
- PROPOSED WATER LEVEL
- CLEARING LIMITS / SILT FENCE - SEE DETAIL 5/C2.06
- TREE PRESERVATION FENCE
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- + 312.5 + PROPOSED SPOT ELEVATION
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LOG WEIR NOTCH LEGEND

WEIR 1 LOW-FLOW NOTCH EL. 347.0

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Engineering Manager
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TFME

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Project Planner Date
Project Manager
Senior Project Manager
Development Manager
Project Manager
Quality Control Reviewer
Quality Control FFAE

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ANN MARIE OLSEN
CERTIFICATE NO. 771
EXPIRES 4/1/12

Key Plan

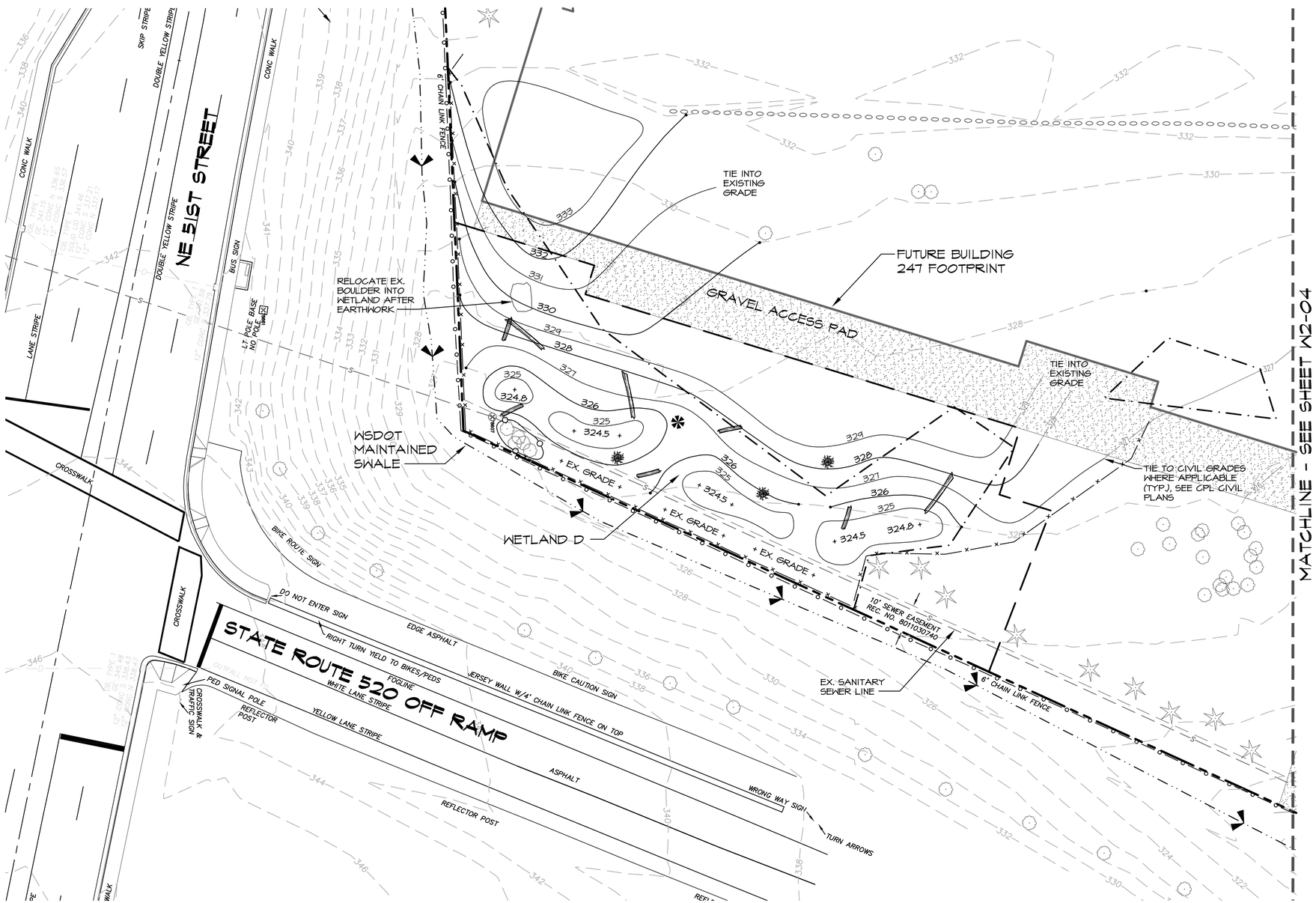
Bar Code

Sheet Title/Number

GRADING PLAN

W2-02

NW 1/4, SECTION 14, TOWNSHIP 25 N, RANGE 5 E, W.M.



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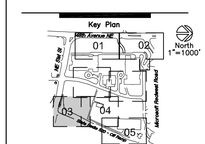
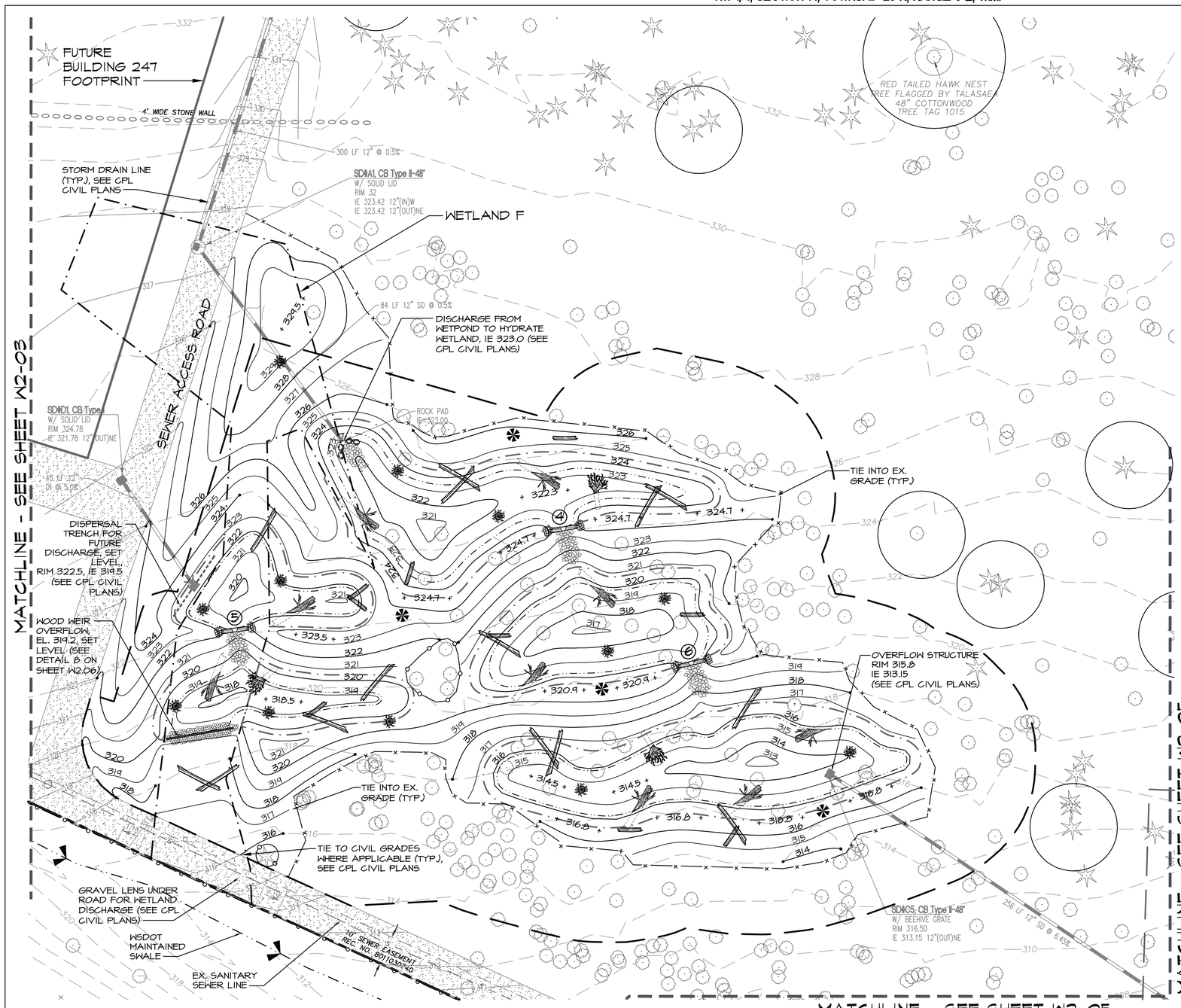


Bar Code

Sheet Title/Number

GRADING PLAN

W2-03



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0 10' 20' 40'
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NORTH

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GRADING LEGEND

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- PROPOSED WATER LEVEL
- CLEARING LIMITS / SILT FENCE - SEE DETAIL 9/W2.06
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NOTES FOR INVASIVE SPECIES GRUBBING IN NON-GRADED WETLAND BUFFER AREAS

1. CONTRACTOR SHALL GRUB OUT ALL INVASIVE AND NOXIOUS WEED SPECIES FROM ALL NON-GRADED WETLAND BUFFER AREAS. INVASIVE SPECIES TO BE GRUBBED INCLUDE HIMALAYAN AND EVERGREEN BLACKBERRY, REED CANARYGRASS, JAPANESE KNOTWEED, HEDGE BINDWEED (MORNING GLORY), CREEPING NIGHTSHADE, SCOT'S BROOM, ENGLISH IVY, HOLLY (ILEX SP.) PURPLE LOOSTRIFE, AND CANADA THISTLE. TALASAEA CONSULTANTS MAY DESIGNATE OTHER INVASIVE SPECIES TO BE REMOVED AS NECESSARY.
2. ROOT SYSTEMS OF INVASIVE SPECIES SHALL BE REMOVED TO THE MAXIMUM EXTENT POSSIBLE.
3. GRUBBING WORK SHALL BE PERFORMED SO AS TO MINIMIZE DISTURBANCE AND DAMAGE TO THE ROOT SYSTEMS OF ADJACENT DESIRABLE NATIVE VEGETATION TO REMAIN. ALL GRUBBING WORK IN CLOSE PROXIMITY TO NATIVE VEGETATION SHALL BE DONE BY HAND TO MINIMIZE DISTURBANCE. A LIMITED AMOUNT OF GRUBBING BY SMALL MACHINE MAY BE ALLOWED IN AREAS WHERE EXISTING NATIVE VEGETATION IS NOT LIKELY TO BE DISTURBED. TALASAEA CONSULTANTS SHALL DESIGNATE AREAS WITHIN EXISTING NON-GRADED BUFFER AREAS APPROVED FOR MACHINE ACCESS.
4. GRUBBING WORK SHALL BE PERFORMED DURING THE DRY SEASON TO MINIMIZE EROSION POTENTIAL.
5. ALL VEGETATIVE DEBRIS FROM GRUBBING WORK SHALL BE DISPOSED OF APPROPRIATELY IN AN APPROVED OFF-SITE LOCATION.

NOTES

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APPROVED FOR CONSTRUCTION

FOR: WILLIAM J CAMPBELL
INTERIM DIRECTOR OF PUBLIC WORKS
CITY OF REDMOND

PLAN CHECK ENGR.
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Microsoft

Red West Phase II Advanced Mitigation
14848 NE 51st ST
Redmond, WA 98052

Design Team

	AO
Design	ATD
Drawn	AO
Checked	11-22-11
Date	
TALASAEA Project No.	818D
M.S. Project No.	

Approvals

CUSTOMER — Date

OPERATIONS

Microsoft Mechanical Engineer — Date
Microsoft Cable Engineer
Microsoft Electrical Engineer
Engineering Manager
Security Manager
FF&E

PROJECT MANAGEMENT

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Project Manager
Senior Project Manager
Development Manager
Project Manager
Quality Control Reviewer
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ANN MARIE OLSEN
CERTIFICATE NO. 771
EXPIRES 4/1/12

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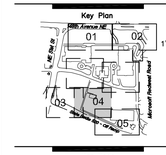


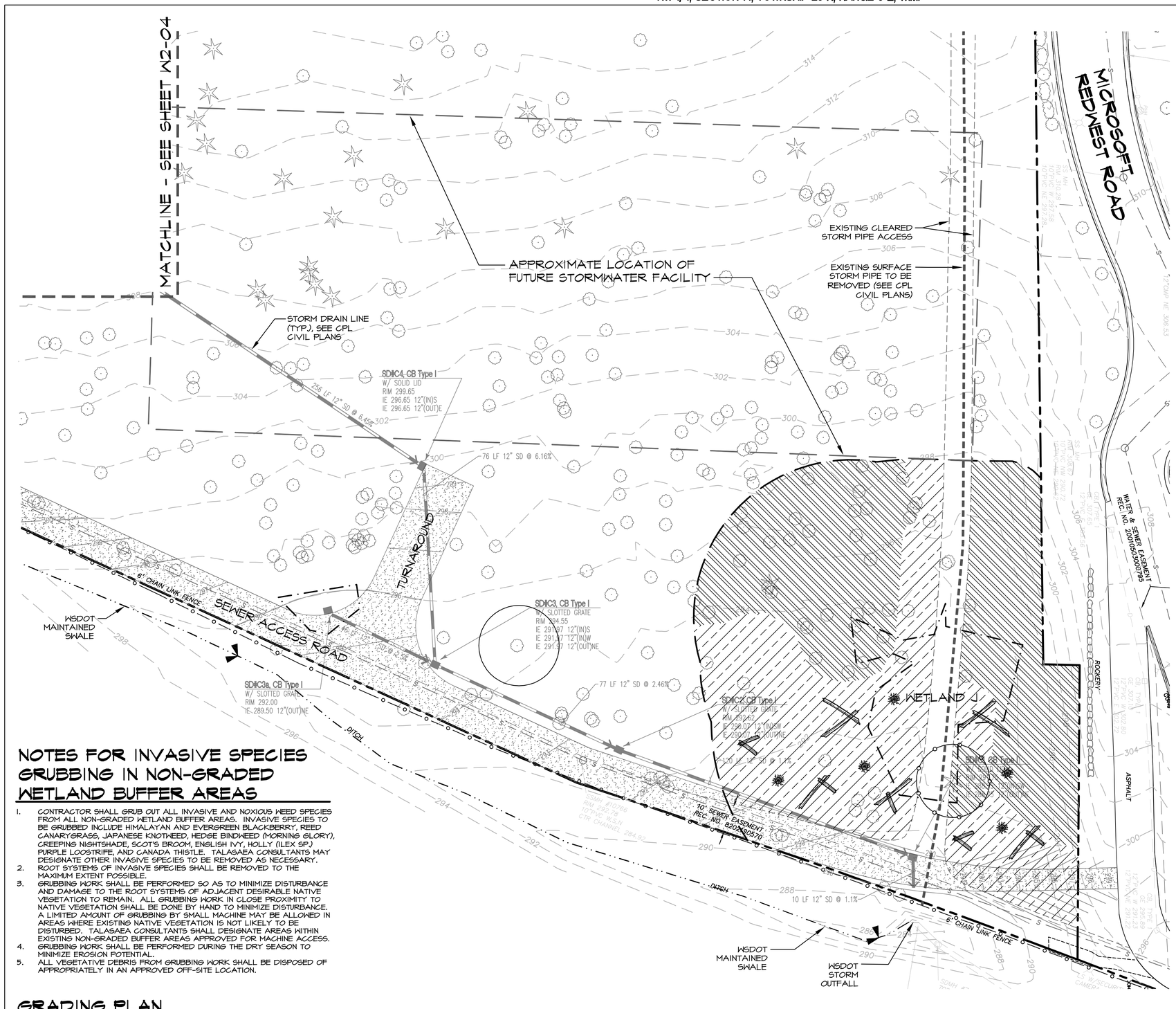
Bar Code

Sheet Title/Number

GRADING PLAN

W2-04

NW 1/4, SECTION 14, TOWNSHIP 25 N, RANGE 5 E, W.M.



PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- EXISTING TREES
- EXISTING SIGNIFICANT TREE PER CITY OF REDMOND

GRADING LEGEND

- CREATED WETLAND BOUNDARY
- PROPOSED WATER LEVEL
- CLEARING LIMITS / SILT FENCE - SEE DETAIL 5/G2.06
- TREE PRESERVATION FENCE
- 100 EXISTING CONTOUR
- + 312.5 + PROPOSED SPOT ELEVATION
- 100 PROPOSED CONTOUR
- LOG WEIR - SEE DETAIL 1/G2.06
- SNAG W/ SWALLOW NEST BOX - SEE DETAIL 1/G2.06
- WOODY DEBRIS (LONG & SHORT DOWN LOGS)
- STUMP (SET UPRIGHT)--SEE DETAIL 4/G2.06
- BURIED RAMP LOG
- BURIED ROOTWAD (LAYING ON SIDE)
- TETHERED LOG--SEE DETAIL 2/G2.06
- BANK LOG 6/G2.06
- POST-CONSTRUCTION WETLAND BUFFER

CLEARING & GRUBBING LEGEND

- BLACKBERRY REMOVAL W/ HEAVY EQUIPMENT (SEE NOTES THIS SHEET)
- BLACKBERRY REMOVAL BY HAND (SEE NOTES THIS SHEET)

NOTES FOR INVASIVE SPECIES GRUBBING IN NON-GRADED WETLAND BUFFER AREAS

1. CONTRACTOR SHALL GRUB OUT ALL INVASIVE AND NOXIOUS WEED SPECIES FROM ALL NON-GRADED WETLAND BUFFER AREAS. INVASIVE SPECIES TO BE GRUBBED INCLUDE HIMALAYAN AND EVERGREEN BLACKBERRY, REED CANARYGRASS, JAPANESE KNOTWEED, HEDGE BINDWEED (MORNING GLORY), CREEPING NIGHTSHADE, SCOT'S BROOM, ENGLISH IVY, HOLLY (ILEX SP.) PURPLE LOOSTRIFE, AND CANADA THISTLE. TALASAEA CONSULTANTS MAY DESIGNATE OTHER INVASIVE SPECIES TO BE REMOVED AS NECESSARY.
2. ROOT SYSTEMS OF INVASIVE SPECIES SHALL BE REMOVED TO THE MAXIMUM EXTENT POSSIBLE.
3. GRUBBING WORK SHALL BE PERFORMED SO AS TO MINIMIZE DISTURBANCE AND DAMAGE TO THE ROOT SYSTEMS OF ADJACENT DESIRABLE NATIVE VEGETATION TO REMAIN. ALL GRUBBING WORK IN CLOSE PROXIMITY TO NATIVE VEGETATION SHALL BE DONE BY HAND TO MINIMIZE DISTURBANCE. A LIMITED AMOUNT OF GRUBBING BY SMALL MACHINE MAY BE ALLOWED IN AREAS WHERE EXISTING NATIVE VEGETATION IS NOT LIKELY TO BE DISTURBED. TALASAEA CONSULTANTS SHALL DESIGNATE AREAS WITHIN EXISTING NON-GRADED BUFFER AREAS APPROVED FOR MACHINE ACCESS.
4. GRUBBING WORK SHALL BE PERFORMED DURING THE DRY SEASON TO MINIMIZE EROSION POTENTIAL.
5. ALL VEGETATIVE DEBRIS FROM GRUBBING WORK SHALL BE DISPOSED OF APPROPRIATELY IN AN APPROVED OFF-SITE LOCATION.

GRADING PLAN

GRAPHIC SCALE (IN FEET)

0 10' 20' 40'

SCALE: 1' = 20'

NORTH

NOT FOR CONSTRUCTION

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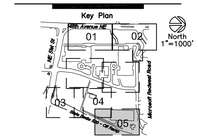
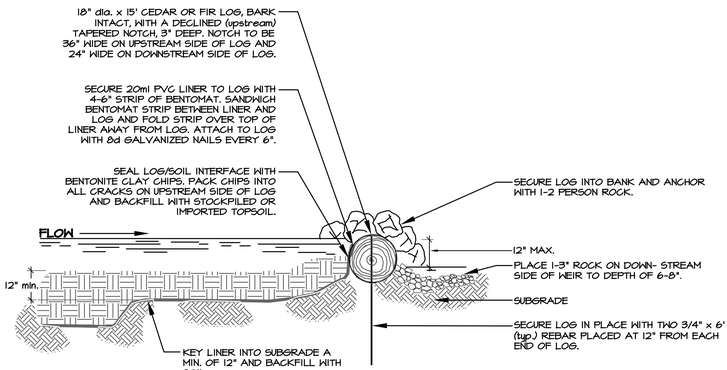


Bar Code

Sheet Title/Number

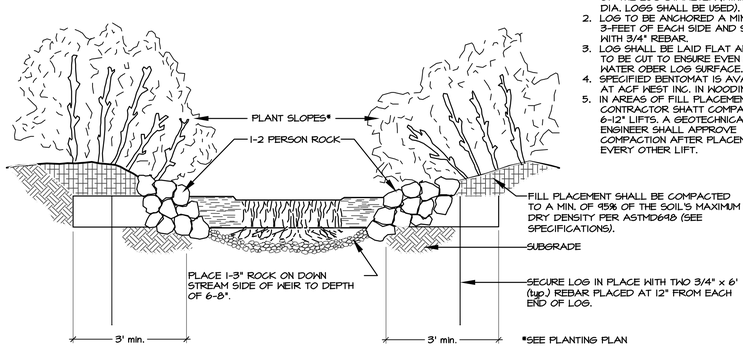
GRADING PLAN

W2-05

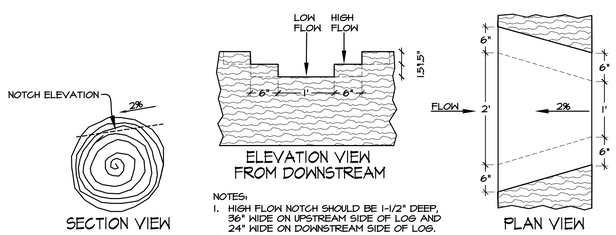


CROSS SECTION
N.T.S.

NOTES:
1. LOG WEIRS SHALL BE ANCHORED INTO SUBGRADE A MINIMUM DEPTH OF 40% OF THE LOG DIAMETER (MINIMUM 18" DIA. LOGS SHALL BE USED).
2. LOG TO BE ANCHORED A MINIMUM OF 3-FEET OF EACH SIDE AND SECURED WITH 3/4" REBAR.
3. LOG SHALL BE LAID FLAT AND NOTCH TO BE CUT TO ENSURE EVEN FLOW OF WATER OBER LOG SURFACE.
4. SPECIFIED BENTOMAT IS AVAILABLE AT AGF WEST INC. IN WOODINVILLE.
5. IN AREAS OF FILL PLACEMENT, CONTRACTOR SHATT COMPACT SOIL IN 6-12" LIFTS. A GEOTECHNICAL ENGINEER SHALL APPROVE COMPACTION AFTER PLACEMENT OF EVERY OTHER LIFT.



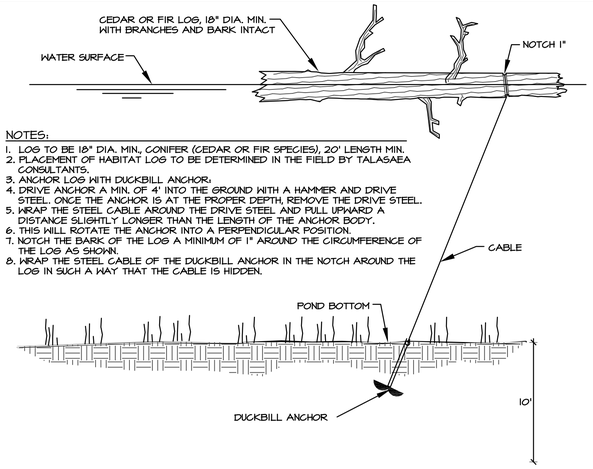
LONGITUDINAL SECTION
N.T.S.



NOTES:
1. HIGH FLOW NOTCH SHOULD BE 1-1/2" DEEP, 36" WIDE ON UPSTREAM SIDE OF LOG AND 24" WIDE ON DOWNSTREAM SIDE OF LOG.
2. LOW FLOW NOTCH SHOULD BE 1-1/2" DEEP, 24" WIDE ON UPSTREAM SIDE OF LOG AND 12" WIDE ON DOWNSTREAM SIDE OF LOG.

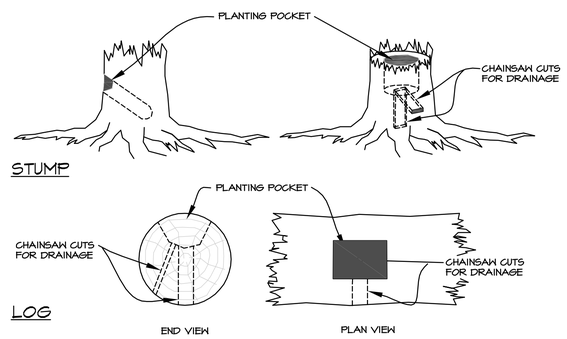
TAPERED NOTCH DETAIL
N.T.S

1 LOG WEIR DETAIL
N.T.S.

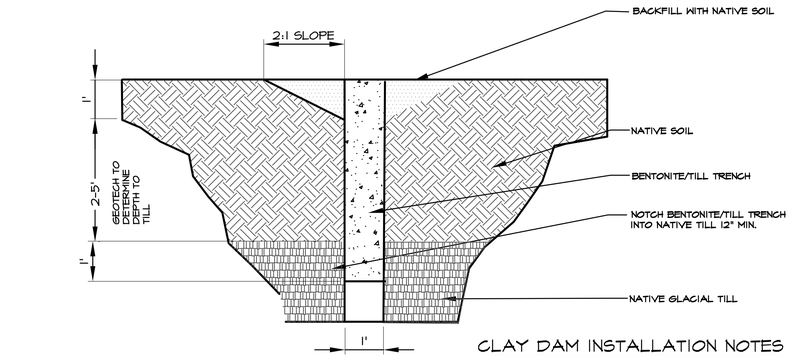


NOTES:
1. LOG TO BE 18" DIA. MIN., CONIFER (CEDAR OR FIR SPECIES), 20' LENGTH MIN.
2. PLACEMENT OF HABITAT LOG TO BE DETERMINED IN THE FIELD BY TALASAEA CONSULTANTS.
3. ANCHOR LOG WITH DUCKBILL ANCHOR:
4. DRIVE ANCHOR A MIN. OF 4' INTO THE GROUND WITH A HAMMER AND DRIVE STEEL. ONCE THE ANCHOR IS AT THE PROPER DEPTH, REMOVE THE DRIVE STEEL.
5. WRAP THE STEEL CABLE AROUND THE DRIVE STEEL AND PULL UPWARD A DISTANCE SLIGHTLY LONGER THAN THE LENGTH OF THE ANCHOR BODY.
6. THIS WILL ROTATE THE ANCHOR INTO A PERPENDICULAR POSITION.
7. NOTCH THE BARK OF THE LOG A MINIMUM OF 1" AROUND THE CIRCUMFERENCE OF THE LOG AS SHOWN.
8. WRAP THE STEEL CABLE OF THE DUCKBILL ANCHOR IN THE NOTCH AROUND THE LOG IN SUCH A WAY THAT THE CABLE IS HIDDEN.

2 LOG TETHER DETAIL
N.T.S.

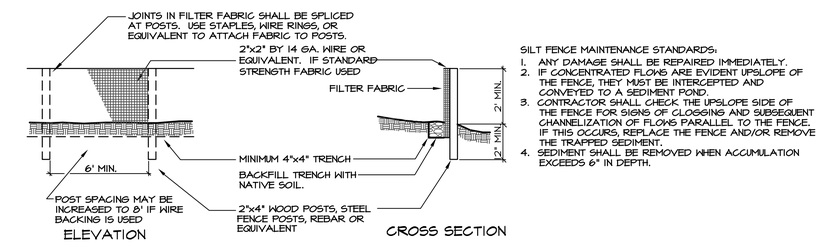


4 STUMP WITH PLANTING POCKETS DETAIL
1"=1'



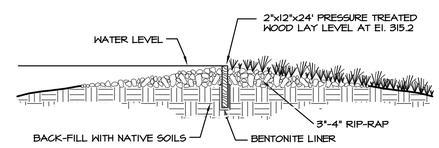
CLAY DAM INSTALLATION NOTES
1. EXISTING SITE SOILS AND TRENCH LOCATION TO BE APPROVED BY GEOTECH PRIOR TO INSTALLATION
2. GEOTECH TO DETERMINE QUALITY OF NATIVE SOIL AND IF BETONITE WILL BE ADDED TO THE SOIL
3. TRENCH SHALL BE COMPACTED PER GEOTECH RECOMENDATIONS

3 BENTONITE CLAY DAM & TRENCH DETAIL
N.T.S.



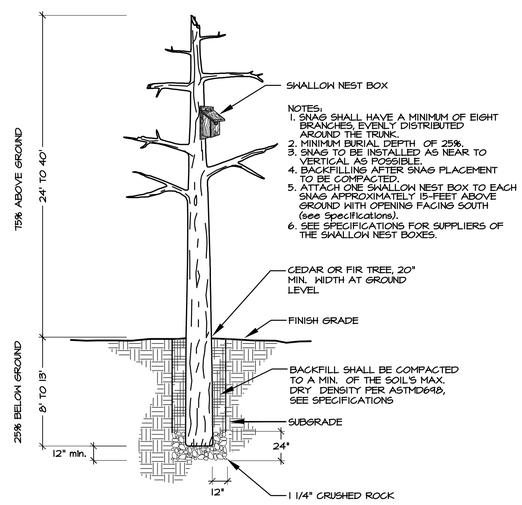
SILT FENCE MAINTENANCE STANDARDS:
1. ANY DAMAGE SHALL BE REPAIRED IMMEDIATELY.
2. IF CONCENTRATED FLOWS ARE EVIDENT UPSLOPE OF THE FENCE, THEY MUST BE INTERCEPTED AND CONVEYED TO A SEDIMENT POND.
3. CONTRACTOR SHALL CHECK THE UPSLOPE SIDE OF THE FENCE FOR SIGNS OF CLOGGING AND SUBSEQUENT CHANNELIZATION OF FLOWS PARALLEL TO THE FENCE. IF THIS OCCURS, REPLACE THE FENCE AND/OR REMOVE THE TRAPPED SEDIMENT.
4. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATION EXCEEDS 6" IN DEPTH.

5 SILT FENCE
SCALE: NTS



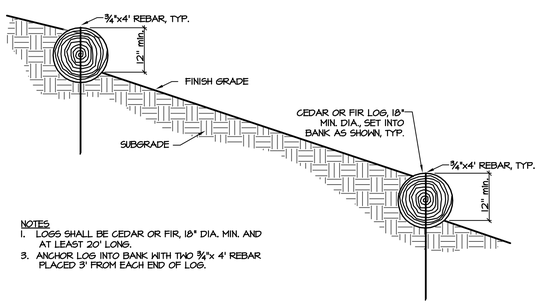
WOOD WEIR INSTALLATION NOTES
1. PREPARE SUBGRADE PER GRADING PLAN ON SHEET W2.04. TALASAEA SHALL APPROVE OF SUBGRADE PRIOR TO WOOD WEIR CONSTRUCTION.
2. EXCAVATE A TRENCH LARGE ENOUGH TO LAY 2"x12"x24' PRESSURE TREATED WOOD.
3. PLACE 4" OF BENTONITE GRANULES INTO TRENCH (WORK AREA MUST BE DRY PRIOR PLACEMENT OF BENTONITE).
4. SET WEIR BOARD ON TOP OF BENTONITE GRANULES AND PRESS FIRMLY INTO PLACE. VERIFY LEVEL OF WEIR BOARD AND CORRECT ELEVATION. HYDRATE BENTONITE WITH WATER AND LET SWELL.
5. PLACE RIP-RAP ON EITHER SIDE OF WEIR BOARD AND
6. PRESS FIRMLY INTO PLACE.

8 WOOD WEIR OVERFLOW
N.T.S.



NOTES:
1. SNAG SHALL HAVE A MINIMUM OF EIGHT BRANCHES, EVENLY DISTRIBUTED AROUND THE TRUNK.
2. MINIMUM BURIAL DEPTH OF 25%.
3. SNAG TO BE INSTALLED AS NEAR TO VERTICAL AS POSSIBLE.
4. BACKFILLING AFTER SNAG PLACEMENT TO BE COMPACTED.
5. ATTACH ONE SHALLOW NEST BOX TO EACH SNAG APPROXIMATELY 15-FEET ABOVE GROUND WITH OPENING FACING SOUTH (see Specifications).
6. SEE SPECIFICATIONS FOR SUPPLIERS OF THE SHALLON NEST BOXES.

7 SNAG WITH NEST BOX (TYP.)
SCALE: NTS



NOTES
1. LOGS SHALL BE CEDAR OR FIR, 18" DIA. MIN. AND AT LEAST 20' LONG.
3. ANCHOR LOG INTO BANK WITH TWO 3/4"x 4' REBAR PLACED 3' FROM EACH END OF LOG.

6 BANK LOG DETAIL TYP.
N.T.S.

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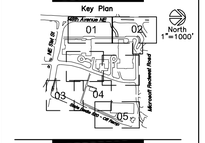
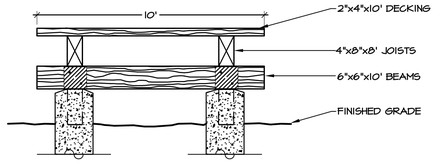


Bar Code

Sheet Title/Number

GRADING DETAILS

W2-06



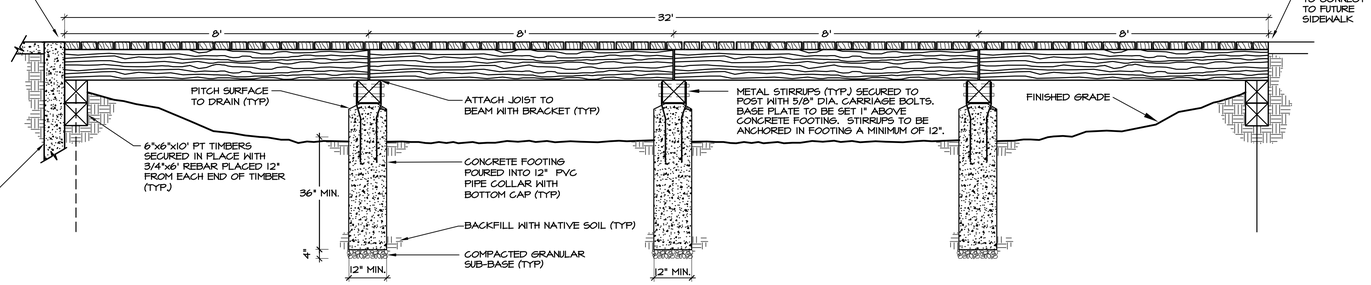
SECTION

TIE FOOTBRIDGE INTO NEW RETAINING WALL ADJACENT TO NEW SIDEWALK USING ONE OF THE FOLLOWING METHODS:

METHOD 1:
PLACE 6x6 FOOTBRIDGE FOUNDATION TIMBERS AGAINST RETAINING WALL AND SECURE AS SHOWN BELOW

METHOD 2:
ATTACH FOOTBRIDGE DIRECTLY TO NEW RETAINING WALL USING 6"x10" PT HEADER BOARD. HEADER BOARD TO BE SECURED TO RETAINING WALL USING THREADED ANCHOR BOLTS INSERTED INTO HOLES DRILLED INTO FACE OF WALL AND SECURED WITH HILTI EPOXY OR EQUIVALENT. END OF BRIDGE JOIST SHALL REST ON TOP OF HEADER BOARD, FLUSH WITH TOP SURFACE OF WALL, AND BE SECURED TO HEADER BOARD WITH BRACKETS.

NEW RETAINING WALL

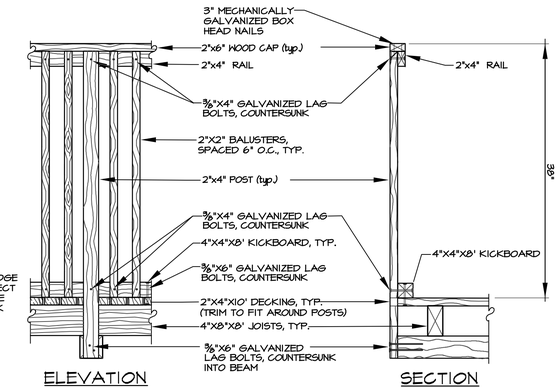


ELEVATION

FOOTBRIDGE TO CONNECT TO FUTURE SIDEWALK

CONSTRUCTION NOTES

1. ALL WOOD TO BE PRESSURE TREATED (PT) DOUGLAS FIR.
2. ALL FASTENERS TO BE MECHANICALLY GALVANIZED STEEL.
3. DECKING TO BE ATTACHED USING (2) 3" GALVANIZED BOX HEAD NAILS AT EACH CONNECTION POINT.
4. KICKBOARD TO BE ATTACHED TO DECKING WITH 6" LAG BOLTS 12" FROM EACH END, COUNTERSUNK.
5. METAL BRACKETS, STRAPS AND FASTENERS SHALL BE ATTACHED WITH GALVANIZED LAG BOLTS.
6. PILING DEPTH TO BE FIELD DETERMINED; WITH A MINIMUM OF 36" INTO BEARING SOIL.
7. ATTACH HANDRAIL TO FOOTBRIDGE PER HANDRAIL DETAIL.



ELEVATION SECTION

HANDRAIL DETAIL

1 FOOTBRIDGE WITH HANDRAIL OVER WETLAND DETAIL (TYP.)

N.T.S.

NOTES

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APPROVED FOR CONSTRUCTION

FOR: WILLIAM J CAMPBELL
INTERIM DIRECTOR OF PUBLIC WORKS
CITY OF REDMOND

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Drawn	ATD
Checked	AO
Date	11-22-11
TALASAEA Project No.	818D
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ANN MARIE OLSEN
CERTIFICATE NO. 771
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Key Plan

Bar Code

Sheet Title/Number

GRADING DETAILS

W2-07

PLANT SCHEDULE

WETLAND AREAS

FOREST & SCRUB-SHRUB COMMUNITIES

SYMBOL	SCIENTIFIC NAME	COMMON NAME	WL STATUS	SPACING	QTY.	SIZE (MIN.)	NOTES
	CORNUS SERICEA	RED-OSIER DOGWOOD	FACW	3' O.C.	TBD	18" HT.	MULTI-CANE (3 MIN.)
	CRATAEGUS DOUGLASII	BLACK HAWTHORN	FAC	5' O.C.	TBD	24" HT.	MULTI-CANE (3 MIN.)
	FRAXINUS LATIFOLIA	OREGON ASH	FACW	AS SHOWN	TBD	5-6' HT.	SINGLE TRUNK, WELL BRANCHED
	LONICERA INVOLUCRATA	BLACK TWIN-BERRY	FAC+	3' O.C.	TBD	18" HT.	MULTI-CANE (3 MIN.)
	MALUS FUSCA	WESTERN CRABAPPLE	FAC+	AS SHOWN	TBD	4-5' HT.	SINGLE TRUNK, WELL BRANCHED
	PHYSOCARPUS CAPITATUS	PACIFIC NINEBARK	FACW-	5' O.C.	TBD	24" HT.	MULTI-CANE (3 MIN.)
	PICEA SITCHENSIS	SITKA SPRUCE	FAC	AS SHOWN	TBD	4-5' HT.	B&B, FULL & BUSHY
	RHAMNUS PURSHIANA	CASCARA	FAC-	AS SHOWN	TBD	4-5' HT.	SINGLE TRUNK, WELL BRANCHED
	ROSA NUTKANA	NOOTKA ROSE	FAC	3' O.C.	TBD	18" HT.	MULTI-CANE (3 MIN.)
	ROSA PISOCARPA	CLUSTERED WILD ROSE	FAC	3' O.C.	TBD	18" HT.	MULTI-CANE (3 MIN.)
	RUBUS SPECTABILIS	SALMONBERRY	FAC+	3' O.C.	TBD	18" HT.	MULTI-CANE (3 MIN.)
	SALIX LASIANDRA*	PACIFIC WILLOW	FACW+	3 PER SYMBOL	TBD	4' HT. CUTTING	1/2" DIA. MIN, BARK INTACT
	SALIX SCOULERIANA*	SCOULER WILLOW	FAC	3 PER SYMBOL	TBD	4' HT. CUTTING	1/2" DIA. MIN., BARK INTACT
	SALIX SITCHENSIS*	SITKA WILLOW	FACW	3 PER SYMBOL	TBD	4' HT. CUTTING	1/2" DIA. MIN., BARK INTACT
	THUJA PLICATA	WESTERN RED CEDAR	FAC	AS SHOWN	TBD	4-5' HT.	B&B, FULL & BUSHY

* WILLOW CUTTINGS SHALL BE PLANTED IN GROUPS OF 3, BUT ONLY ONE (1) CUTTING REQUIRED FOR PERFORMANCE STANDARDS

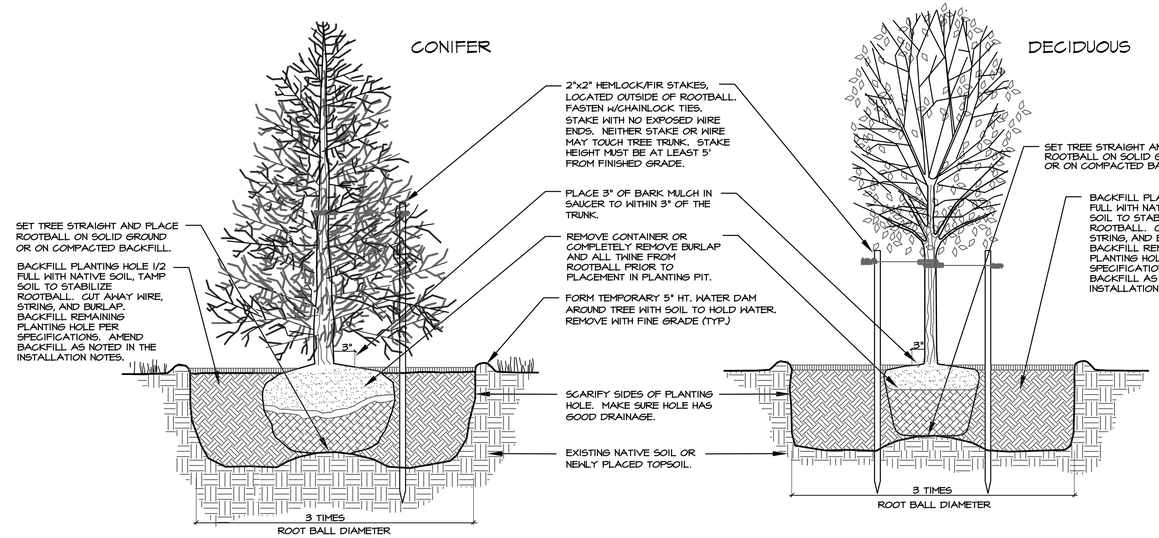
EMERGENT COMMUNITY

SYMBOL	SCIENTIFIC NAME	COMMON NAME	WL STATUS	SPACING	QTY.	SIZE (MIN.)
	CAREX OBNUPTA	SLOUGH SEDGE	OBL	18" O.C.	TBD	4" HT. CLUMP DIV.
	DESCHAMPSIA CESPITOSA	TUFTED HAIRGRASS	FACW	18" O.C.	TBD	4" HT. CLUMP DIV.
	ELEOCHARIS PALUSTRIS	COMMON SPIKERUSH	OBL	18" O.C.	TBD	4" HT. CLUMP DIV.
	GLYCERIA ELATA	TALL MANNAGRASS	FACW+	18" O.C.	TBD	4" HT. CLUMP DIV.
	JUNCUS ENSIFOLIUS	DAGGER-LEAF RUSH	FACW	18" O.C.	TBD	4" HT. CLUMP DIV.
	LYSICHITUM AMERICANUM	SKUNK CABBAGE	OBL	18" O.C.	TBD	1 GAL. OR BARE-ROOT RHIZOME
	OENANTHE SARMENTOSA	PACIFIC WATER PARSLEY	OBL	18" O.C.	TBD	4" HT. CLUMP DIV.
	SAGGITARIA LATIFOLIA	ARROWHEAD	OBL	18" O.C.	TBD	TUBER
	SCIRPUS CYPERINUS	WOOL GRASS	OBL	18" O.C.	TBD	4" HT. CLUMP DIV.
	SCIRPUS MICROCARPUS	SMALL-FRUITED BULRUSH	OBL	18" O.C.	TBD	4" HT. CLUMP DIV.

BUFFER AREAS

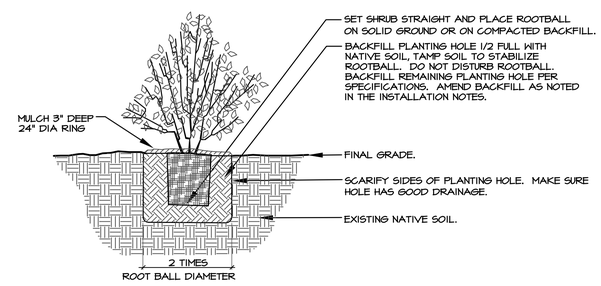
FOREST COMMUNITY

SYMBOL	SCIENTIFIC NAME	COMMON NAME	WL STATUS	SPACING	QTY.	SIZE (MIN.)	NOTES
	ACER CIRCINATUM	VINE MAPLE	FACU-	AS SHOWN	TBD	4' HT.	MULTI-STEM (3 MIN.)
	ACER MACROPHYLLUM	BIG LEAF MAPLE	FACU	AS SHOWN	TBD	5-6' HT.	SINGLE TRUNK, WELL BRANCHED
	CORNUS NUTTALLII	PACIFIC DOGWOOD	NL	AS SHOWN	TBD	4-5' HT.	SINGLE TRUNK, WELL BRANCHED
	CORYLUS CORNUTA	WESTERN HAZELNUT	FACU	AS SHOWN	TBD	4-5' HT.	MULTI-STEM (3 MIN.)
	GAULTHERIA SHALLON	SALAL	FACU	24" O.C.	TBD	1 GAL.	FULL & BUSHY
	MAHONIA AQUIFOLIUM	TALL OREGONGRAPE	NL	3' O.C.	TBD	18" HT.	FULL & BUSHY
	MAHONIA NERVOSA	LONGLEAF OREGONGRAPE	NL	18" O.C.	TBD	1 GAL.	FULL & BUSHY
	OEMLERIA CERASIFORMIS	INDIAN PLUM	FACU	5' O.C.	TBD	24" HT.	MULTI-CANE (3 MIN.)
	POLYSTICHUM MUNITUM	SWORD FERN	FACU	24" O.C.	TBD	1 GAL.	FULL & BUSHY
	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	FACU	AS SHOWN	TBD	4-5' HT.	B&B, FULL & BUSHY
	RIBES SANGUINEUM	RED CURRANT	NL	5' O.C.	TBD	24" HT.	MULTI-CANE (3 MIN.)
	ROSA NUTKANA	NOOTKA ROSE	FAC	3' O.C.	TBD	18" HT.	MULTI-CANE (3 MIN.)
	RUBUS PARVIFLORUS	THIMBLEBERRY	FAC-	3' O.C.	TBD	18" HT.	MULTI-CANE (3 MIN.)
	RUBUS SPECTABILIS	SALMONBERRY	FAC+	3' O.C.	TBD	18" HT.	MULTI-CANE (3 MIN.)
	SAMBUCUS RACEMOSA	RED ELDERBERRY	FACU	5' O.C.	TBD	24" HT.	MULTI-CANE (3 MIN.)
	SYMPHORICARPOS ALBUS	COMMON SNOWBERRY	FACU	3' O.C.	TBD	18" HT.	MULTI-CANE (3 MIN.)
	THUJA PLICATA	WESTERN RED CEDAR	FAC	AS SHOWN	TBD	4-5' HT.	B&B, FULL & BUSHY
	TSUGA HETEROPHYLLA	WESTERN HEMLOCK	FACU-	AS SHOWN	TBD	4-5' HT.	B&B, FULL & BUSHY
	VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	NL	3' O.C.	TBD	18" HT.	FULL & BUSHY



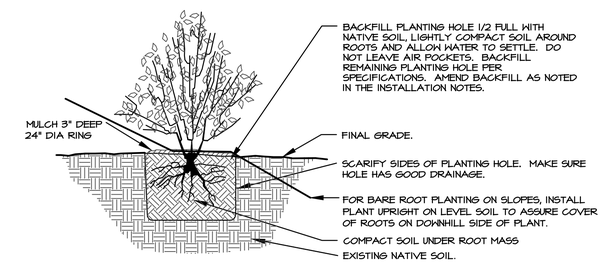
1 B&B TREE PLANTING (TYP.)

SCALE: NTS



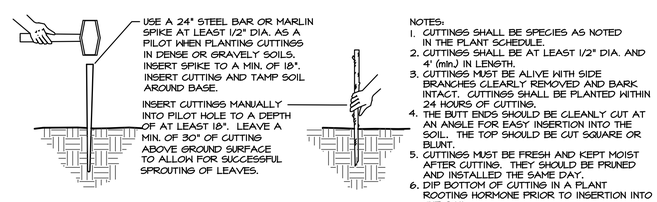
2 CONTAINER SHRUB PLANTING (TYP.)

SCALE: NTS



3 BARE-ROOT SHRUB PLANTING (TYP.)

SCALE: NTS



NOTES:
1. CUTTINGS SHALL BE SPECIES AS NOTED IN THE PLANT SCHEDULE.
2. CUTTINGS SHALL BE AT LEAST 1/2" DIA. AND 4' (min.) IN LENGTH.
3. CUTTINGS MUST BE ALIVE WITH SIDE BRANCHES CLEARLY REMOVED AND BARK INTACT. CUTTINGS SHALL BE PLANTED WITHIN 24 HOURS OF CUTTING.
4. THE BUTT ENDS SHOULD BE CLEANLY CUT AT AN ANGLE FOR EASY INSERTION INTO THE SOIL. THE TOP SHOULD BE CUT SQUARE OR BLUNT.
5. CUTTINGS MUST BE FRESH AND KEPT MOIST AFTER CUTTING. THEY SHOULD BE PRUNED AND INSTALLED THE SAME DAY.
6. DIP BOTTOM OF CUTTING IN A PLANT ROOTING HORMONE PRIOR TO INSERTION INTO THE SOIL.

4 CUTTING INSTALLATION (TYP.)

SCALE: NTS

NOTES

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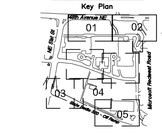

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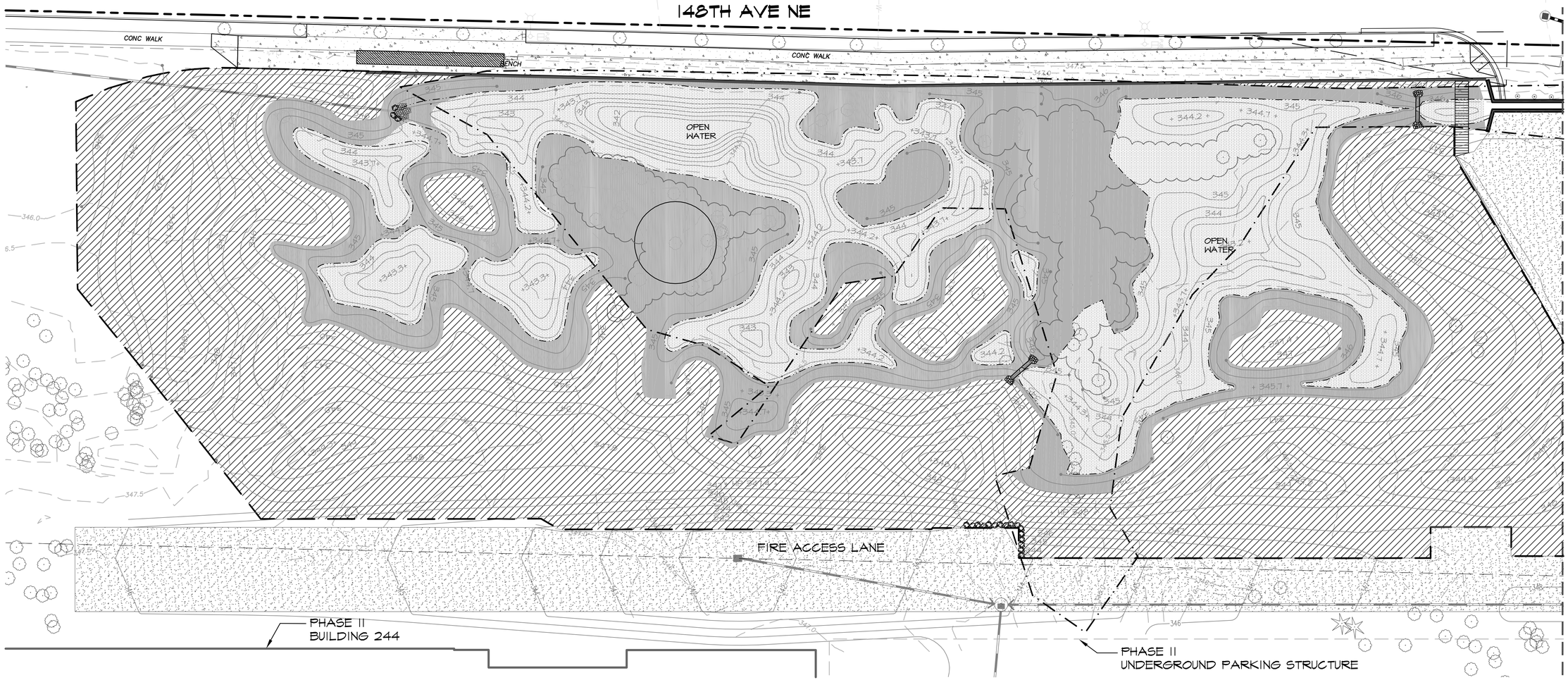
PLANT SCHEDULE & DETAILS

W3-00

NW 1/4, SECTION 14, TOWNSHIP 25 N, RANGE 5 E, W.M.



PLANT COMMUNITIES PLAN

GRAPHIC SCALE (IN FEET)
0 10' 20' 40'
SCALE: 1" = 20'

NORTH

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- EXISTING TREES
- EXISTING SIGNIFICANT TREE PER CITY OF REDMOND

PLANT COMMUNITIES LEGEND

WETLAND AREAS

- FOREST & SCRUB-SHRUB COMMUNITIES
- EMERGENT COMMUNITY

BUFFER AREAS

- FOREST COMMUNITY

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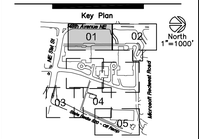

Bar Code

Sheet Title/Number

PLANT COMMUNITIES PLAN

W3-01

NW 1/4, SECTION 14, TOWNSHIP 25 N, RANGE 5 E, W.M.

PLANT COMMUNITIES PLAN

GRAPHIC SCALE (IN FEET)

0 10' 20' 40'

SCALE: 1" = 20'

NORTH

PLANT COMMUNITIES LEGEND

WETLAND AREAS

- FOREST & SCRUB-SHRUB COMMUNITIES
- EMERGENT COMMUNITY

BUFFER AREAS

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Checked	AO
Date	11-22-11
TALASAEA Project No.	818D
M.S. Project No.	

Approvals

CUSTOMER — Date

OPERATIONS

Microsoft Mechanical/ Engineer — Date
Microsoft Cable Engineer
Microsoft Electrical Engineer
Engineering Manager
Security Manager
IT-MI

PROJECT MANAGEMENT

Project Planner — Date
Project Manager
Senior Project Manager
Development Manager
Project Manager
Quality Control Reviewer
Quality Control FP&E

Revisions

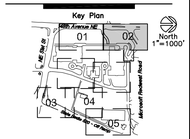
No.	Date	Description
01	11-22-11	PERMIT SUBMITTAL

Registration

STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT

ANN MARIE OLSEN
CERTIFICATE NO. 771
EXPIRES 4/1/12

Key Plan



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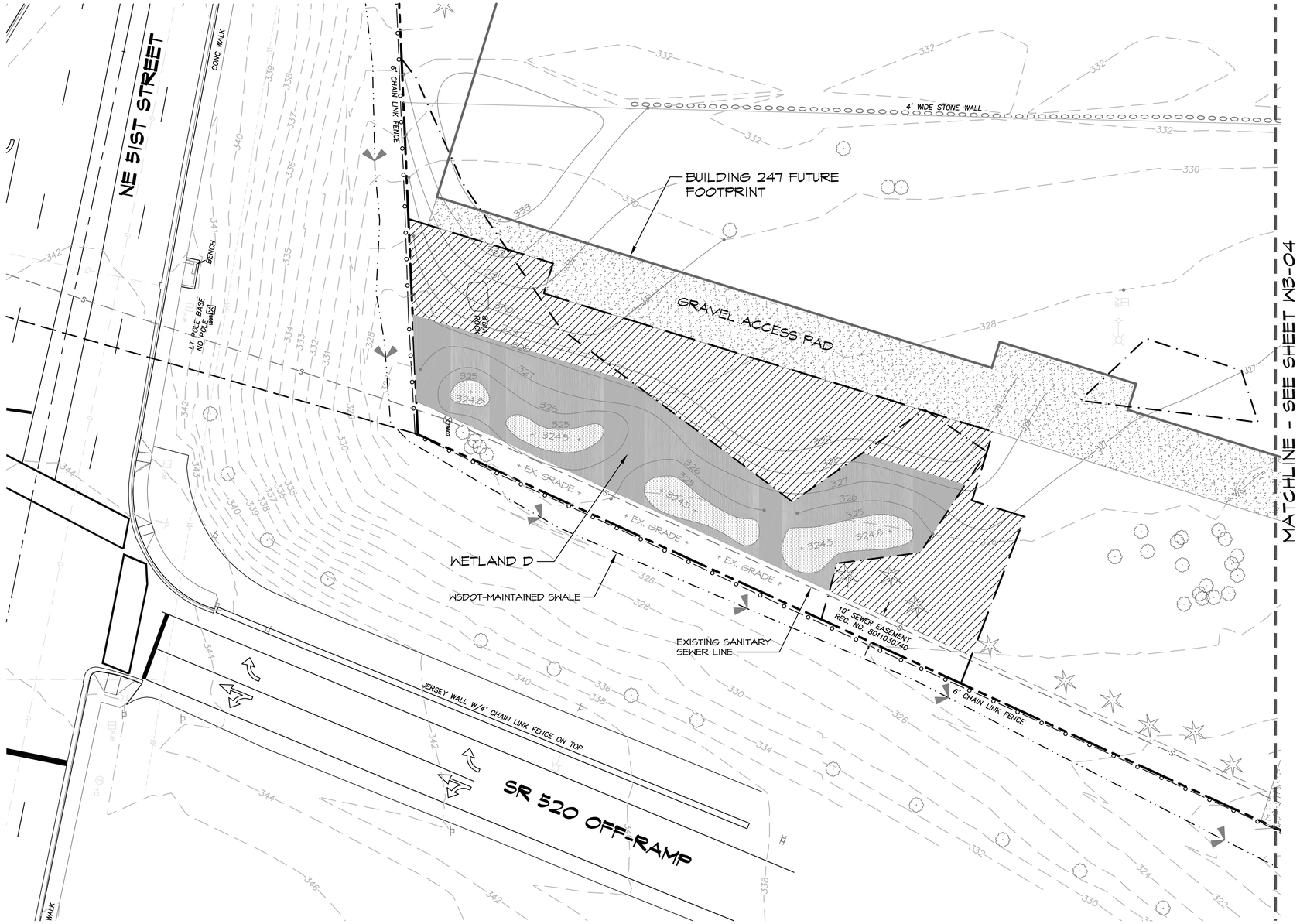
Sheet Title/Number

PLANT COMMUNITIES PLAN

W3-02

NW 1/4, SECTION 14, TOWNSHIP 25 N, RANGE 5 E, W.M.



PLANT COMMUNITIES PLAN

GRAPHIC SCALE (IN FEET)

0 10' 20' 40'

SCALE: 1' = 20'

NORTH

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- EXISTING TREES
- EXISTING SIGNIFICANT TREE PER CITY OF REDMOND

PLANT COMMUNITIES LEGEND

WETLAND AREAS

- FOREST & SCRUB-SHRUB COMMUNITIES
- EMERGENT COMMUNITY

BUFFER AREAS

- FOREST COMMUNITY

NOTES

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3. FRONTAGE IMPROVEMENTS CIVIL PLANS PROVIDED BY TRANSPORTATION ENGINEERING NORTHWEST; 816 SIXTH ST. S, KIRKLAND, WA 98033; 425-531-0567.
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APPROVED FOR CONSTRUCTION

FOR: WILLIAM J CAMPBELL
INTERIM DIRECTOR OF PUBLIC WORKS
CITY OF REDMOND

PLAN CHECK ENGR.
STORM DRAIN ENGR.
UTILITY ENGR.
FIRE DEPT.
TRANSPORTATION ENGR.
PLANNING DEPT.

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TALASAEA CONSULTANTS, INC.
Resource and Environmental Planning
15025 Bear Creek Road Northeast
Woodinville, Washington 98077
Bus (425) 861-7550 – Fax (425) 861-7549

Microsoft

Red West Phase II Advanced Mitigation

14848 NE 51st ST
Redmond, WA 98052

Design Team

Design	AO
Drawn	ATD
Checked	AO
Date	11-22-11
TALASAEA Project No.	818D
M.S. Project No.	

Approvals

CUSTOMER — Date

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Microsoft Electrical Engineer
Engineering Manager
Security Manager
FF&E

PROJECT MANAGEMENT

Project Planner — Date
Project Manager
Senior Project Manager
Development Manager
Project Manager
Quality Control Reviewer
Quality Control FF&E

Revisions

No.	Date	Description
01	11-22-11	PERMIT SUBMITTAL

Registration

STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT

ANN MARIE OLSEN
CERTIFICATE NO. 771
EXPIRES 4/7/12

Key Plan

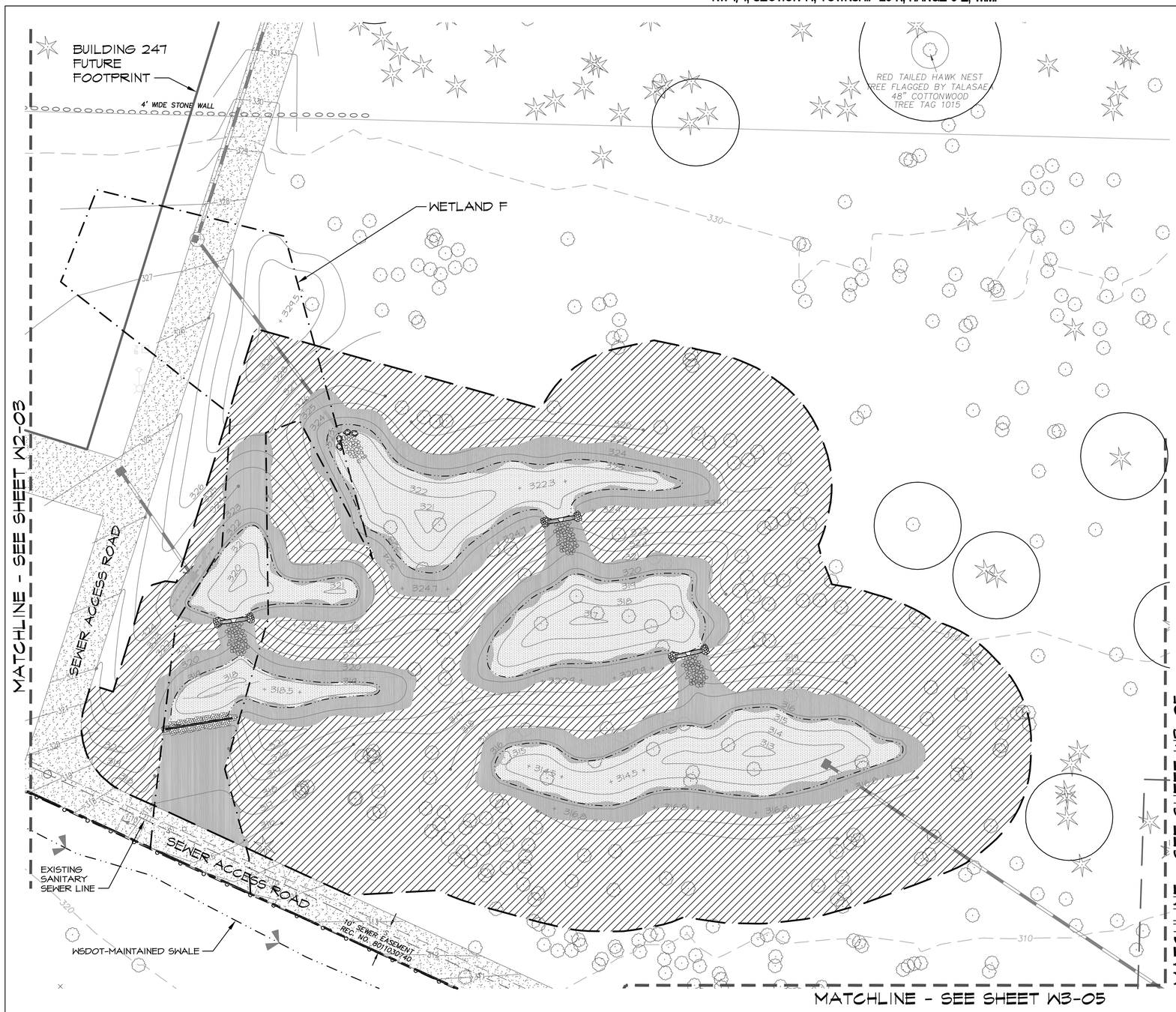
Bar Code

Sheet Title/Number

PLANT COMMUNITIES PLAN

W3-03

NW 1/4, SECTION 14, TOWNSHIP 25 N, RANGE 5 E, W.M.



PLANT COMMUNITIES LEGEND

WETLAND AREAS

- FOREST & SCRUB-SHRUB COMMUNITIES
- EMERGENT COMMUNITY

BUFFER AREAS

- FOREST COMMUNITY

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PLANT COMMUNITIES PLAN

GRAPHIC SCALE (IN FEET)
0 10' 20' 40'
SCALE: 1" = 20'

NORTH

PLAN LEGEND

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INTERIM DIRECTOR OF PUBLIC WORKS
CITY OF REDMOND

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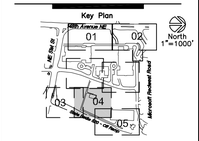

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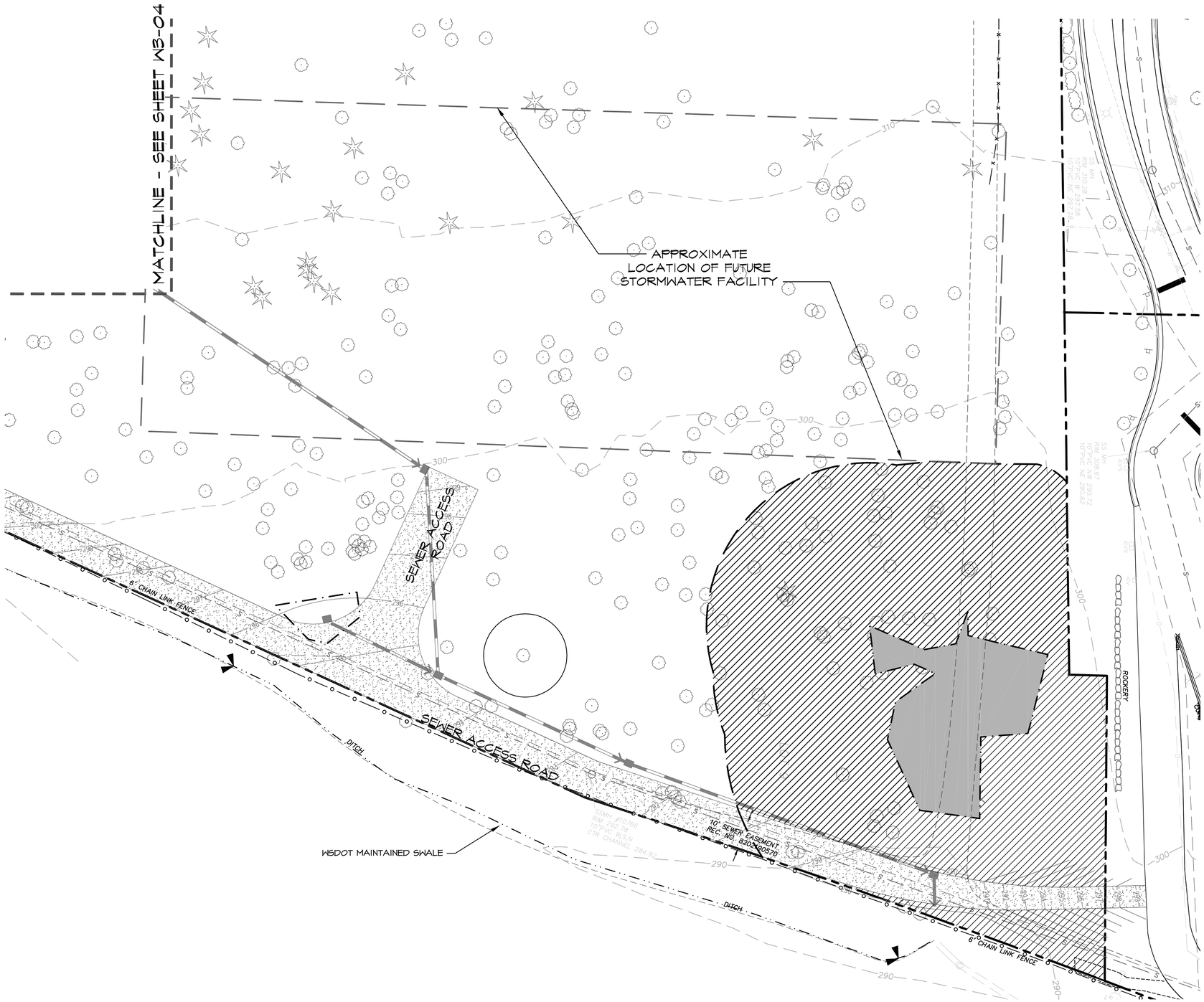
Sheet Title/Number

PLANT COMMUNITIES PLAN

W3-04

NW 1/4, SECTION 14, TOWNSHIP 25 N, RANGE 5 E, W.M.



PLANT COMMUNITIES LEGEND

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PLANT COMMUNITIES PLAN

GRAPHIC SCALE (IN FEET)
0 10' 20' 40'
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NORTH

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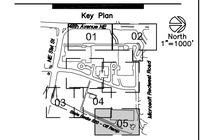


Bar Code

Sheet Title/Number

PLANT COMMUNITIES PLAN

W3-05

TALASAEA
CONSULTANTS, INC.

TECHNICAL MEMORANDUM

WETLAND HYDROLOGY ANALYSIS

24 April 2019

PROJECT: Microsoft Red West South Fields Project TAL-1727

LOCATION: Redmond, WA

We have prepared this analysis of the potential effect of the proposed changes to stormwater discharge to existing wetlands for the Microsoft Red West South Fields project (referred to as "Project" hereinafter) based on information provided to us by Coughlin Porter Lundeen (CPL). The Microsoft Redwest South Field property ("Site" hereafter) is an approximately 26.5-acre parcel located northeast of the intersection of 148th Avenue NE and NE 51st Street in Redmond, Washington. The Public Land Survey System location of the Project is the eastern ½ of Section 23 and the northwestern ¼ of Section 14, Township 25 North, Range 5 East, Willamette Meridian.

The Site is currently developed with a parking lot and a large lawn area that serves as open space. A gravel pedestrian path connects the parking lot to the south and east of the Site. Approximately nine acres in the northeastern area of the property are relatively undeveloped and contain a forested area dominated by native trees and shrubs. Four wetlands were delineated on the Site after monitoring year 5 (ca 2015). These are named Wetland B, D, F, and J for the purposes of this report, though only Wetland F is discussed in further detail in this memo. The other wetlands will not be affected by the proposed project.

Wetland F is a Category IV wetland that was previously impacted with full mitigation completed for the City of Redmond. The location and size of Wetland F and its buffer are vested per the City of Redmond permit No. CPG-11-012 and Army Corps of Engineers permit (Reference: NWS-2008-831-NO). The extent of Wetland F and its associated buffer is defined by critical areas fencing and associated signage (**Attachments 1 and 2** of the **Existing Conditions Memo**, As-Built Mitigation Overview Plan, Sheet AB1.0, dated 24 October 2012 and *Critical Areas Report and Detailed Conceptual Wetland Mitigation Plan* prepared by Talasaea Consultants, Inc. on 21 November 2011).

Wetland F was designed as a slope wetland (with an approximately 6% gradient across the wetland complex) with a series of pools separated by log weirs that control the various pop-off elevations as water moves through this wetland complex. Wetland F currently contains one rock pad outfall (labeled as West Outfall to Wetland F, POC 1) and one level spreader (labeled as East Outfall to Wetland F, POC 2) that discharge runoff to the wetland at elevations 323 feet and 319.5 feet respectively. This water flows through these designed pools before leaving the

wetland either through an existing overflow in the northeast corner or sheetflow to the east towards the SR 520 conveyance system (swale). The existing overflow drain system (invert elevation of 313.5 feet) on the northeast side of Wetland F carries excess water from the wetland to the SR 520 swale just south of Wetland J (located in the far northeast corner of this Site). This existing overflow drain is reflected on Grading Plan Sheet W2-04 of the *Critical Areas Report and Detailed Conceptual Wetland Mitigation Plan* prepared by Talasaea Consultants, Inc. on 21 November 2011 (**Attachment 2** of the **Existing Conditions Memo**, page 454). Work has been completed to maintain and repair this overflow drain system as excessively high-water levels within Wetland F have damaged this overflow drain system in recent years.

The existing parking lot and surrounding undeveloped lawn areas are divided into three (3) smaller basins that are identified by color on the attached graphic (**Figure 1, Existing Wetland F Basins** by CPL). There are two outfall locations currently - the West Outfall (POC 1) and the East Outfall (POC 2). These two outfalls both discharge into Wetland F at two (2) different locations of the wetland system, which are both noted on **Figure 1**. The aforementioned color coding shown in **Figure 1** is defined as follows:

- Purple – The area outlined in purple is collected and sent to the West Outfall (POC 1) undetained.
- Blue – The area outlined in blue is the existing parking lot, which is routed through a detention pond for treatment before discharging to POC 1.
- Orange – The area outlined in orange is collected and sent undetained to the East Outfall (POC 2).

A breakdown of the basin areas from existing stormwater contributions to Wetland F is provided in **Table 1** below. The remainder of the approximately 26.5-acre Site is contained within the wetlands and buffers along the western boundary of the Site and the relatively undisturbed forested area in the northeast corner of the Site.

Table 1. Summary of Existing Wetland F Basins*

Basin Areas	Impervious Area (acres)	Pervious Area (acres)	Total Basin Area
West Outfall (POC 1)			
Undetained to POC 1 (Purple)	0.71	4.69	5.40
Detained from Parking Lot (Blue)	2.28	0	2.28
Subtotal	**2.99**	**4.69**	**7.68**
East Outfall (POC 2)			
Undetained to POC 2 (Orange)	0.24	3.70	
Subtotal	**0.24**	**3.70**	**3.94**
Total			***11.62***

*POC 1 is the West Outfall, POC 2 is the East Outfall, both to Wetland F

The Project proposes to add two artificial turf athletic fields over the existing grass area on the south side of the property as well as a basketball court and volleyball court. Associated site improvements include sidewalks and ADA access to the fields, a storm conveyance system, water quality systems, and site grading.

Stormwater runoff from the developed site area for the proposed artificial turf fields will be collected and conveyed to either Wetland F or straight to the site outfall into the SR 520 swale. On-site conveyance will consist of overland flow, catch basins, and underground pipes. Detention is not required for the project beyond the existing parking lot detention pond that will remain as existing. Water quality treatment facilities will be used to treat runoff from the artificial turf fields, which are considered to be pollution generating surfaces. Downstream of the water quality facilities, the project will use flow splitters to match developed wetland flows to existing wetland flows, which are based on an engineered environment to begin with, within guidelines set forth in the 2017 City of Redmond Stormwater Technical Notebook (STN), which reference the Washington State Department of Ecology (DOE) 2012 Stormwater Management Manual for Western Washington as amended in 2014 (2014 SWMMWW). The stormwater management systems for the proposed Site redevelopment are described in further detail in the Drainage Report for this project prepared by CPL (April 2019).

Wetland F will not be used as treatment or a flow control BMP/facility, nor is any work proposed within the buffer for Wetland F. However, modifications are being proposed to the areas that currently discharge into Wetland F in order to route the required surfaces through water quality treatment facilities. As a result, some modification to the flows into Wetland F are anticipated as a result of the proposed project (**Figure 2, Proposed Wetland F Basins** by CPL). A summary of the proposed Wetland F Basins and the change in basin sizes is provided in **Table 2**, below.

Table 2. Summary of Proposed Wetland F Basins*

Basin Areas	**Impervious Area (acres)** **(basin size change)**	**Pervious Area (acres)** **(basin size change)**	**Total Basin Area** **(basin size change)**
West Outfall (POC 1)			
Undetained to POC 1 (Purple)	0.61 (-0.10)	1.44 (-3.25)	
Detained from Parking Lot (Blue)	2.28 (0)	0 (0)	
Subtotal	**2.89 (-0.10)**	**1.44 (-3.25)**	**4.33 (-3.35)**
East Outfall (POC 2)			
Undetained to POC 2 (Orange)	0.24 (0)	0.77 (-2.93)	
Subtotal	**0.24 (0)**	**0.77 (-2.93)**	**1.01 (-2.93)**
Total			***5.34 (-6.28)***

*Change in basin areas are shown in acres, (-) numbers mean a reduction of area. The reduced area from the basin will be routed through water treatment facilities prior to any downstream discharge. Flow splitters will be used to route discharges as determined appropriate.

Release of stormwater from both basins must address two criteria: 1) the total volume release of stormwater per month does not exceed existing thresholds based on the drainage models, and 2) the flow rate of released stormwater does not create or exacerbate downstream erosion problems. The post-project flows to Wetland F will match existing flow volumes within the prescribed tolerances (20% daily, 15% monthly). The existing parking lot detention pond, most of the existing gravel paths, and some of the existing pasture area will continue to flow directly to the existing Wetland F outfalls through the existing storm systems. The project will route some of the clean runoff from pervious areas and impervious walkways directly to the existing wetland outfalls though the existing storm systems as well. The turf field area must be treated for water quality before routing to the wetland and flow must be limited within the tolerances described by the DOE. To accomplish this, the turf field area and some surrounding area will be routed through the water quality facilities. Flow splitters will be used to direct only the required volume of runoff to each Wetland F outfall. The excess runoff from the flow splitters will be directed to a conveyance system installed with a previous Hackathon project that will route the water around Wetland F to an existing storm system that connects to the site outfall.

The full design of the flow splitters and post-project wetland volumes will be completed in the CCR process after the site plan is closer to being finalized.

In summary, the Microsoft Red West South Fields Project will modify the existing stormwater management system that flows into Wetland F as a result of routing runoff from the new artificial turf fields through water quality treatment facilities. Flow splitters will be used to ensure post-development flows into Wetland F fall within the required DOE thresholds to avoid hydrologic impacts to Wetland F.

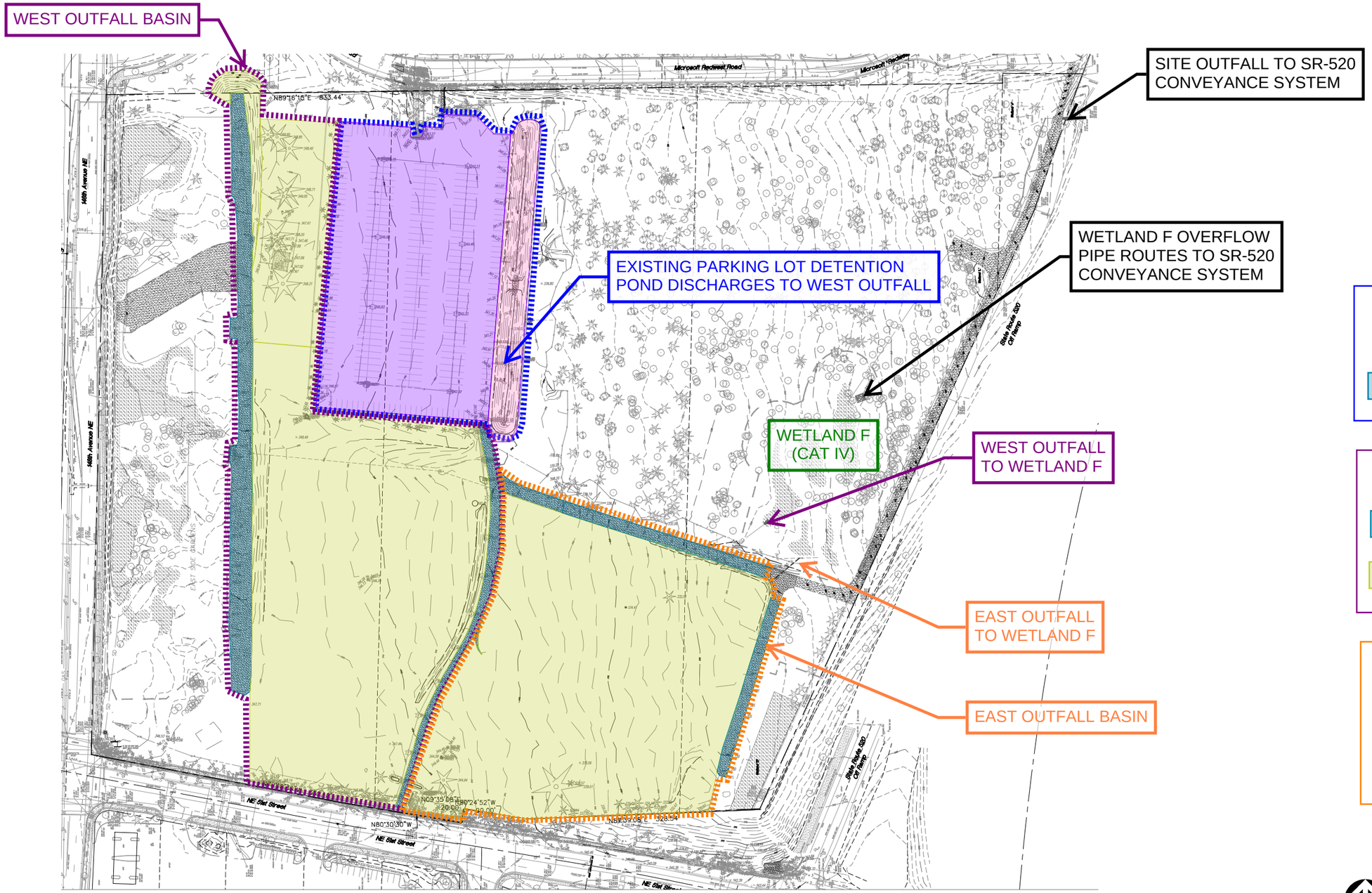
We trust that this letter provides sufficient information to allow the City of Redmond to complete its review of the stormwater drainage system for the Microsoft Red West South Fields Project. If you have any questions or require additional information, please contact Bill Shiels or me at (425) 861-7550.

Sincerely,

TALASAEA CONSULTANTS, INC.

Jennifer M. Marriott, PWS
Senior Ecologist

Attachments – Figure 1 – Existing Wetland F Basin
Figure 2 – Proposed Wetland F Basin



PARKING LOT DETENTION FLOWING TO WEST OUTFALL

Description	Quantity
Impervious Area	2.28 Acres

WEST OUTFALL BASIN

Description	Quantity
Impervious Area	0.71 Acres
Pervious Area	4.69 Acres

EAST OUTFALL BASIN

Description	Quantity
Impervious Area	0.24 Acres
Pervious Area	3.70 Acres

Scale: 1"=150'
0' 75' 150'

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Project: Microsoft Red West South Fields

Project No: C182071-04 Date: 04/23/2019

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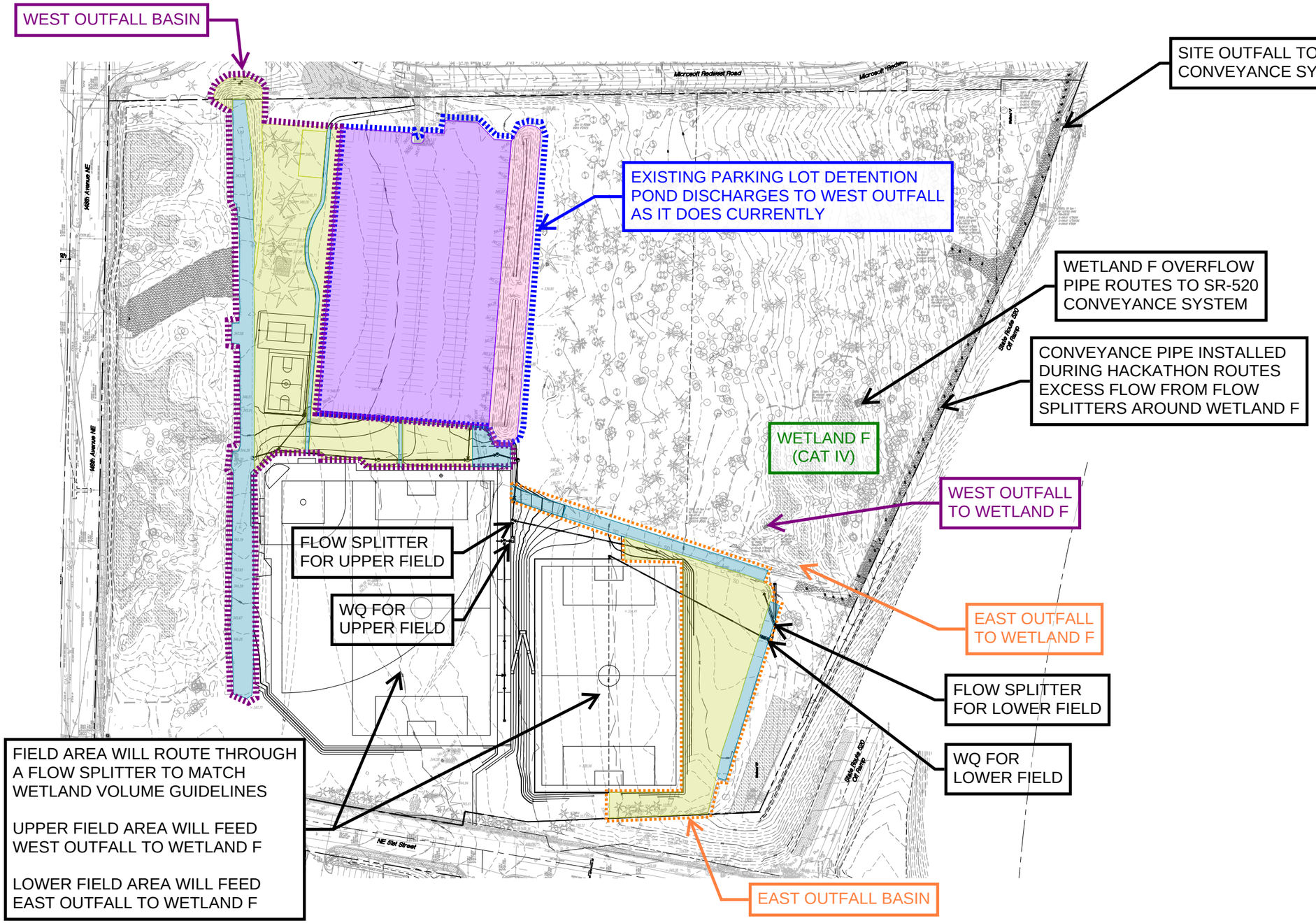
EXISTING WETLAND F BASINS

FIGURE 1



FLOW SPLITTER DESIGN AND WETLAND VOLUME CALCULATIONS TO BE SUBMITTED WITH CCR

PARKING LOT DETENTION POND FLOWING TO WEST OUTFALL

Description	Quantity
Ex Parking Lot to Remain	2.28 Acres
Ex Parking Lot Det Pond to Remain	0.26 Acres

WEST OUTFALL BASIN

Description	Quantity
Impervious Area	0.61 Acres
Pervious Area	1.44 Acres

EAST OUTFALL BASIN

Description	Quantity
Impervious Area	0.24 Acres
Pervious Area	0.77 Acres

Scale: 1"=150'
0' 75' 150'

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Project: Microsoft Red West South Fields

Project No: C182071-04 Date: 04/23/2019

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PROPOSED WETLAND F BASINS

FIGURE 2

TALASAEA
CONSULTANTS, INC.

TECHNICAL MEMORANDUM

WETLAND HYDROLOGY ANALYSIS

24 April 2019

PROJECT: Microsoft Red West South Fields Project TAL-1727

LOCATION: Redmond, WA

We have prepared this analysis of the potential effect of the proposed changes to stormwater discharge to existing wetlands for the Microsoft Red West South Fields project (referred to as "Project" hereinafter) based on information provided to us by Coughlin Porter Lundeen (CPL). The Microsoft Redwest South Field property ("Site" hereafter) is an approximately 26.5-acre parcel located northeast of the intersection of 148th Avenue NE and NE 51st Street in Redmond, Washington. The Public Land Survey System location of the Project is the eastern ½ of Section 23 and the northwestern ¼ of Section 14, Township 25 North, Range 5 East, Willamette Meridian.

The Site is currently developed with a parking lot and a large lawn area that serves as open space. A gravel pedestrian path connects the parking lot to the south and east of the Site. Approximately nine acres in the northeastern area of the property are relatively undeveloped and contain a forested area dominated by native trees and shrubs. Four wetlands were delineated on the Site after monitoring year 5 (ca 2015). These are named Wetland B, D, F, and J for the purposes of this report, though only Wetland F is discussed in further detail in this memo. The other wetlands will not be affected by the proposed project.

Wetland F is a Category IV wetland that was previously impacted with full mitigation completed for the City of Redmond. The location and size of Wetland F and its buffer are vested per the City of Redmond permit No. CPG-11-012 and Army Corps of Engineers permit (Reference: NWS-2008-831-NO). The extent of Wetland F and its associated buffer is defined by critical areas fencing and associated signage (**Attachments 1 and 2** of the **Existing Conditions Memo**, As-Built Mitigation Overview Plan, Sheet AB1.0, dated 24 October 2012 and *Critical Areas Report and Detailed Conceptual Wetland Mitigation Plan* prepared by Talasaea Consultants, Inc. on 21 November 2011).

Wetland F was designed as a slope wetland (with an approximately 6% gradient across the wetland complex) with a series of pools separated by log weirs that control the various pop-off elevations as water moves through this wetland complex. Wetland F currently contains one rock pad outfall (labeled as West Outfall to Wetland F, POC 1) and one level spreader (labeled as East Outfall to Wetland F, POC 2) that discharge runoff to the wetland at elevations 323 feet and 319.5 feet respectively. This water flows through these designed pools before leaving the

wetland either through an existing overflow in the northeast corner or sheetflow to the east towards the SR 520 conveyance system (swale). The existing overflow drain system (invert elevation of 313.5 feet) on the northeast side of Wetland F carries excess water from the wetland to the SR 520 swale just south of Wetland J (located in the far northeast corner of this Site). This existing overflow drain is reflected on Grading Plan Sheet W2-04 of the *Critical Areas Report and Detailed Conceptual Wetland Mitigation Plan* prepared by Talasaea Consultants, Inc. on 21 November 2011 (**Attachment 2** of the **Existing Conditions Memo**, page 454). Work has been completed to maintain and repair this overflow drain system as excessively high-water levels within Wetland F have damaged this overflow drain system in recent years.

The existing parking lot and surrounding undeveloped lawn areas are divided into three (3) smaller basins that are identified by color on the attached graphic (**Figure 1, Existing Wetland F Basins** by CPL). There are two outfall locations currently - the West Outfall (POC 1) and the East Outfall (POC 2). These two outfalls both discharge into Wetland F at two (2) different locations of the wetland system, which are both noted on **Figure 1**. The aforementioned color coding shown in **Figure 1** is defined as follows:

- Purple – The area outlined in purple is collected and sent to the West Outfall (POC 1) undetained.
- Blue – The area outlined in blue is the existing parking lot, which is routed through a detention pond for treatment before discharging to POC 1.
- Orange – The area outlined in orange is collected and sent undetained to the East Outfall (POC 2).

A breakdown of the basin areas from existing stormwater contributions to Wetland F is provided in **Table 1** below. The remainder of the approximately 26.5-acre Site is contained within the wetlands and buffers along the western boundary of the Site and the relatively undisturbed forested area in the northeast corner of the Site.

Table 1. Summary of Existing Wetland F Basins*

Basin Areas	Impervious Area (acres)	Pervious Area (acres)	Total Basin Area
West Outfall (POC 1)			
Undetained to POC 1 (Purple)	0.71	4.69	5.40
Detained from Parking Lot (Blue)	2.28	0	2.28
Subtotal	**2.99**	**4.69**	**7.68**
East Outfall (POC 2)			
Undetained to POC 2 (Orange)	0.24	3.70	
Subtotal	**0.24**	**3.70**	**3.94**
Total			***11.62***

*POC 1 is the West Outfall, POC 2 is the East Outfall, both to Wetland F

The Project proposes to add two artificial turf athletic fields over the existing grass area on the south side of the property as well as a basketball court and volleyball court. Associated site improvements include sidewalks and ADA access to the fields, a storm conveyance system, water quality systems, and site grading.

Stormwater runoff from the developed site area for the proposed artificial turf fields will be collected and conveyed to either Wetland F or straight to the site outfall into the SR 520 swale. On-site conveyance will consist of overland flow, catch basins, and underground pipes. Detention is not required for the project beyond the existing parking lot detention pond that will remain as existing. Water quality treatment facilities will be used to treat runoff from the artificial turf fields, which are considered to be pollution generating surfaces. Downstream of the water quality facilities, the project will use flow splitters to match developed wetland flows to existing wetland flows, which are based on an engineered environment to begin with, within guidelines set forth in the 2017 City of Redmond Stormwater Technical Notebook (STN), which reference the Washington State Department of Ecology (DOE) 2012 Stormwater Management Manual for Western Washington as amended in 2014 (2014 SWMMWW). The stormwater management systems for the proposed Site redevelopment are described in further detail in the Drainage Report for this project prepared by CPL (April 2019).

Wetland F will not be used as treatment or a flow control BMP/facility, nor is any work proposed within the buffer for Wetland F. However, modifications are being proposed to the areas that currently discharge into Wetland F in order to route the required surfaces through water quality treatment facilities. As a result, some modification to the flows into Wetland F are anticipated as a result of the proposed project (**Figure 2, Proposed Wetland F Basins** by CPL). A summary of the proposed Wetland F Basins and the change in basin sizes is provided in **Table 2**, below.

Table 2. Summary of Proposed Wetland F Basins*

Basin Areas	**Impervious Area (acres)** **(basin size change)**	**Pervious Area (acres)** **(basin size change)**	**Total Basin Area** **(basin size change)**
West Outfall (POC 1)			
Undetained to POC 1 (Purple)	0.61 (-0.10)	1.44 (-3.25)	
Detained from Parking Lot (Blue)	2.28 (0)	0 (0)	
Subtotal	**2.89 (-0.10)**	**1.44 (-3.25)**	**4.33 (-3.35)**
East Outfall (POC 2)			
Undetained to POC 2 (Orange)	0.24 (0)	0.77 (-2.93)	
Subtotal	**0.24 (0)**	**0.77 (-2.93)**	**1.01 (-2.93)**
Total			***5.34 (-6.28)***

*Change in basin areas are shown in acres, (-) numbers mean a reduction of area. The reduced area from the basin will be routed through water treatment facilities prior to any downstream discharge. Flow splitters will be used to route discharges as determined appropriate.

Release of stormwater from both basins must address two criteria: 1) the total volume release of stormwater per month does not exceed existing thresholds based on the drainage models, and 2) the flow rate of released stormwater does not create or exacerbate downstream erosion problems. The post-project flows to Wetland F will match existing flow volumes within the prescribed tolerances (20% daily, 15% monthly). The existing parking lot detention pond, most of the existing gravel paths, and some of the existing pasture area will continue to flow directly to the existing Wetland F outfalls through the existing storm systems. The project will route some of the clean runoff from pervious areas and impervious walkways directly to the existing wetland outfalls though the existing storm systems as well. The turf field area must be treated for water quality before routing to the wetland and flow must be limited within the tolerances described by the DOE. To accomplish this, the turf field area and some surrounding area will be routed through the water quality facilities. Flow splitters will be used to direct only the required volume of runoff to each Wetland F outfall. The excess runoff from the flow splitters will be directed to a conveyance system installed with a previous Hackathon project that will route the water around Wetland F to an existing storm system that connects to the site outfall.

The full design of the flow splitters and post-project wetland volumes will be completed in the CCR process after the site plan is closer to being finalized.

In summary, the Microsoft Red West South Fields Project will modify the existing stormwater management system that flows into Wetland F as a result of routing runoff from the new artificial turf fields through water quality treatment facilities. Flow splitters will be used to ensure post-development flows into Wetland F fall within the required DOE thresholds to avoid hydrologic impacts to Wetland F.

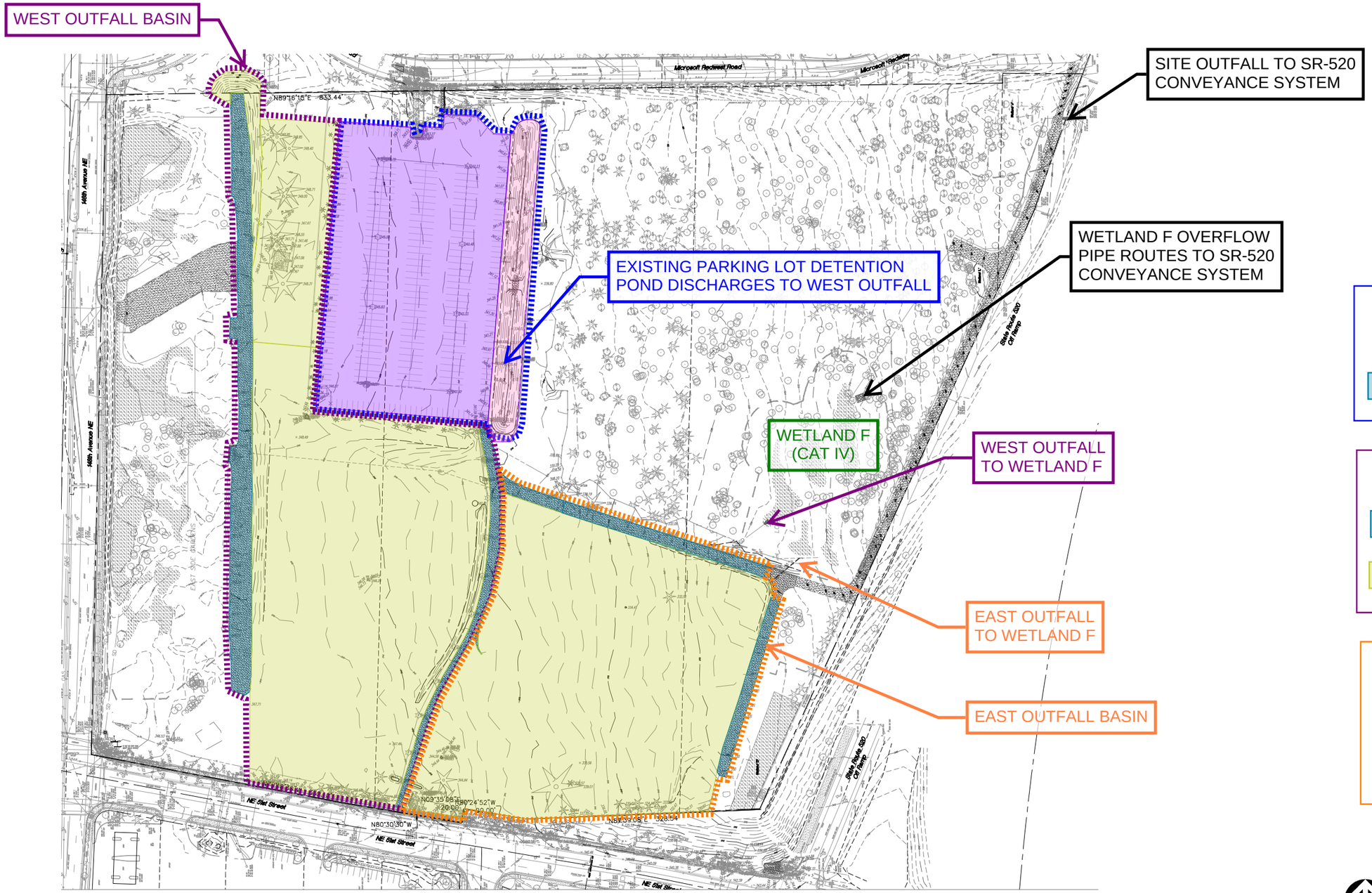
We trust that this letter provides sufficient information to allow the City of Redmond to complete its review of the stormwater drainage system for the Microsoft Red West South Fields Project. If you have any questions or require additional information, please contact Bill Shiels or me at (425) 861-7550.

Sincerely,

TALASAEA CONSULTANTS, INC.

Jennifer M. Marriott, PWS
Senior Ecologist

Attachments – Figure 1 – Existing Wetland F Basin
Figure 2 – Proposed Wetland F Basin



PARKING LOT DETENTION FLOWING TO WEST OUTFALL

Description	Quantity
Impervious Area	2.28 Acres

WEST OUTFALL BASIN

Description	Quantity
Impervious Area	0.71 Acres
Pervious Area	4.69 Acres

EAST OUTFALL BASIN

Description	Quantity
Impervious Area	0.24 Acres
Pervious Area	3.70 Acres

Scale: 1"=150'
0' 75' 150'

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Project: Microsoft Red West South Fields

Project No: C182071-04 Date: 04/23/2019

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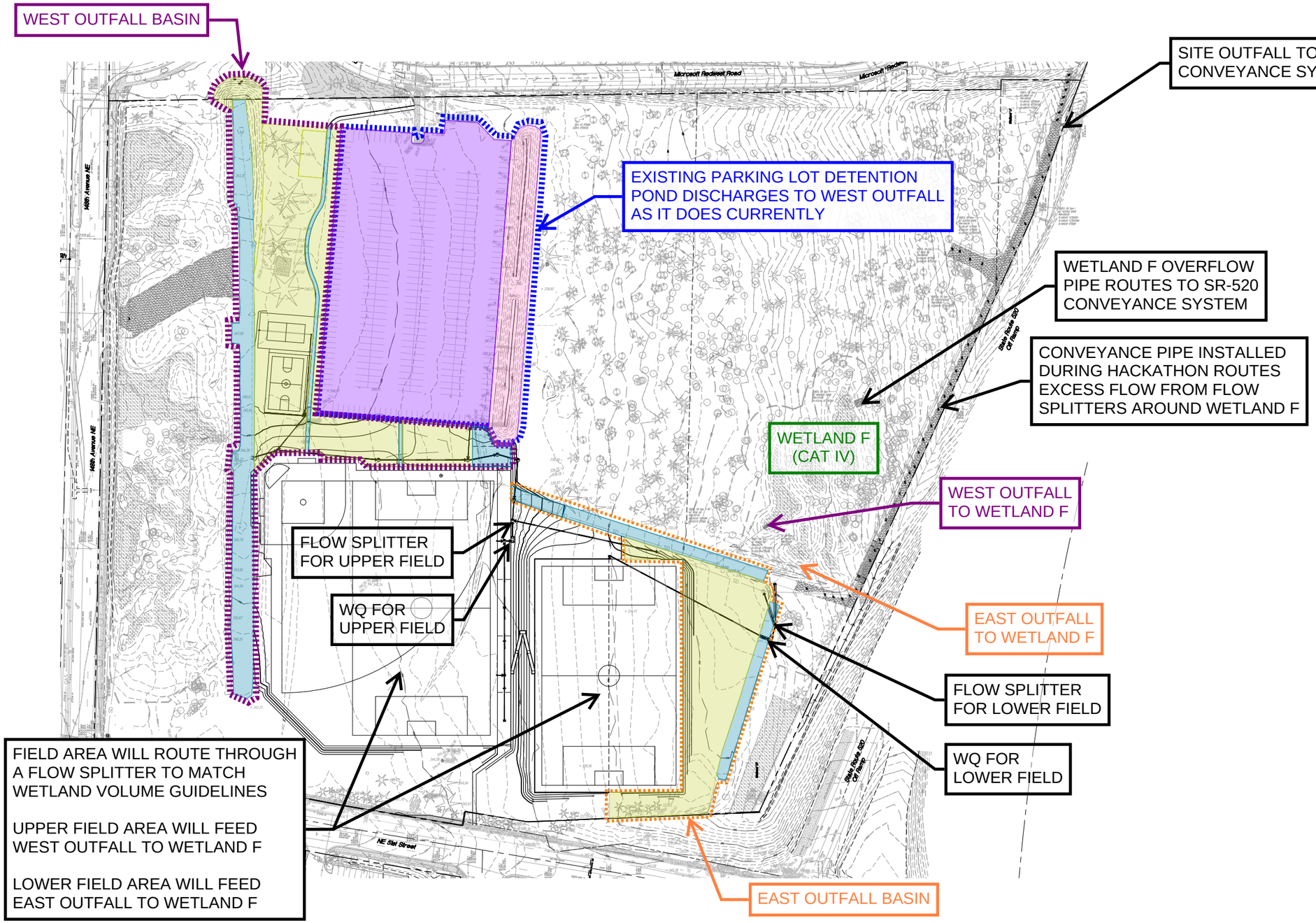
EXISTING WETLAND F BASINS

FIGURE 1



FLOW SPLITTER DESIGN AND WETLAND VOLUME CALCULATIONS TO BE SUBMITTED WITH CCR

PARKING LOT DETENTION POND FLOWING TO WEST OUTFALL

Description	Quantity
Ex Parking Lot to Remain	2.28 Acres
Ex Parking Lot Det Pond to Remain	0.26 Acres

WEST OUTFALL BASIN

Description	Quantity
Impervious Area	0.61 Acres
Pervious Area	1.44 Acres

EAST OUTFALL BASIN

Description	Quantity
Impervious Area	0.24 Acres
Pervious Area	0.77 Acres

Scale: 1"=150'
0' 75' 150'

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PROPOSED WETLAND F BASINS

FIGURE 2