

**SR 532 North Leque Island Slope Protection  
MP 2.96 to MP 3.27 Mitigation Site**

**USACE NWP (13) NWS-2010-968**

**Northwest Region**

**2015 MONITORING REPORT**

**Wetlands Program**

*Issued March 2016*



**Washington State  
Department of Transportation**

Environmental Services Office

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# SR 532 North Leque Island Slope Protection MP 2.96 to MP 3.27 Mitigation Site

## USACE NWP (13) NWS-2010-968



| General Site Information                  |   |                    |
|---|---|--------------------|
| <b>USACE NWP 13 Number</b>                | NWS-2010-968  |                    |
| <b>Mitigation Location</b>                | West of General Mark Clark Bridge adjacent to the Stillaguamish River West Pass |                    |
| <b>LLID Number</b>                        | 1223887482399   |                    |
| <b>Construction Date</b>                  | 2010  |                    |
| <b>Monitoring Period</b>                  | 2011-2015   |                    |
| <b>Year of Monitoring</b>                 | 5 of 5  |                    |
| <b>Area of Project Impact</b>             | Wetland   | Stream             |
| <b>Area of Project Impact<sup>1</sup></b> | 0.38 acre   | 0.20 acre          |
| <b>Type of Mitigation<sup>2</sup></b>     | Wetland Re-establishment  | Stream Restoration |
| <b>Area of Mitigation</b>                 | 0.40 acre   | 0.22 acre          |

<sup>1</sup> Wetland impact areas come from the USACE permit NWS-2010-968.

<sup>2</sup> Removal of the levee segments will occur when it can be demonstrated to the Corps that this activity would not result in an adverse effect on the Camano Island sole source aquifer. Currently, 0.28 acres of wetland re-establishment has occurred. The stream restoration has not occurred to date.

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## Summary of Monitoring Results and Management Activities (2015)

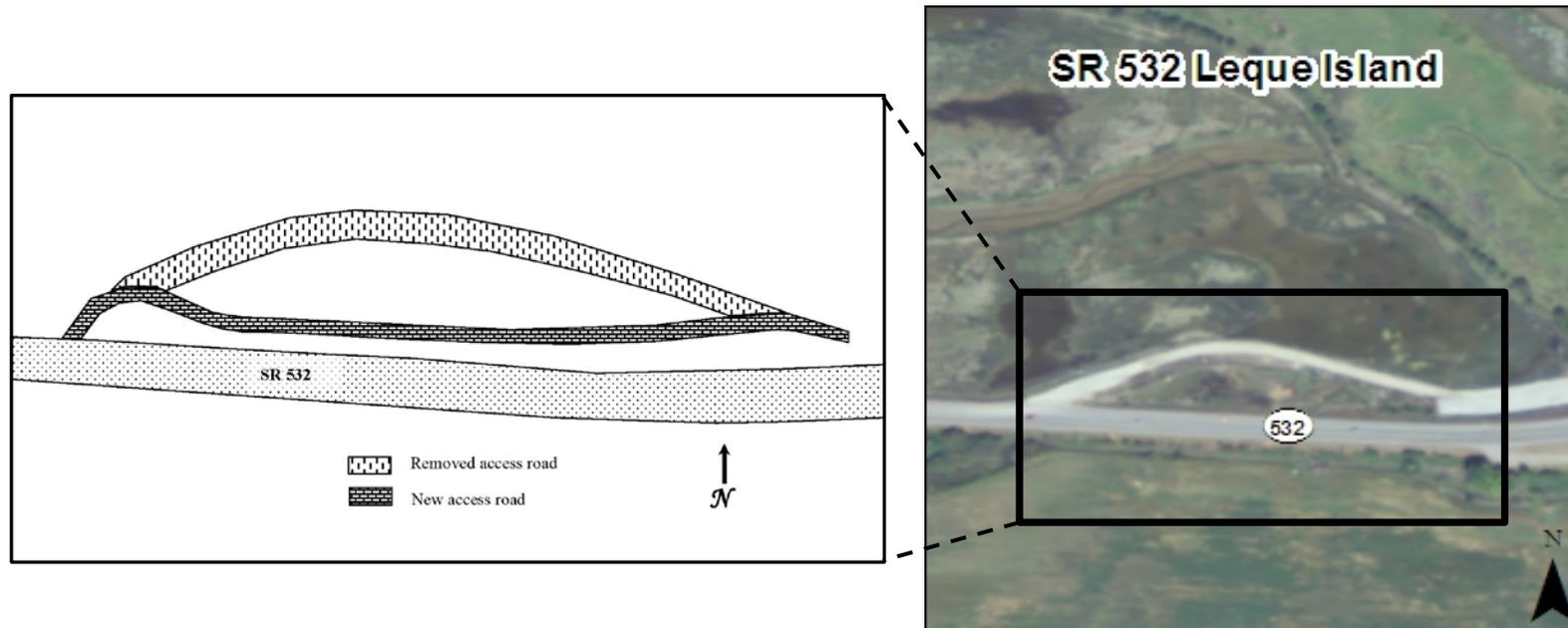
| Performance Standards   | 2015 Results             | Management Activities |
|---|--------------------------|-----------------------|
| Conductivity at high tide shall be between 0.5 and 30 parts per thousand  | Present                  |                       |
| The site will be delineated and show that 0.38 acre of estuarine wetland is present and 0.20 acre of tidally-influenced stream is present   | See report in Appendix 3 |                       |
| Native colonizing salt marsh species will achieve at least 45 percent cover in the estuarine emergent wetland community   | Qualitative: 85%         |                       |
| Observed use of the wetland and stream mitigation areas by salmonid or other pelagic or benthic fish species, migratory waterfowl, macroinvertebrates, and/or mammals               | Present                  |                       |
| Washington State-listed or Snohomish County-listed Class A weeds designated for control by the County Weed Board shall be eradicated  | None present             |                       |
| Washington State-listed and Snohomish County Class B, Class B Undesignated, and Class C and noxious weeds will not collectively exceed 20 percent cover, in the levee removal areas | Levee was not removed    |                       |

## Report Introduction

This report summarizes final-year (Year-5) monitoring activities at the State Route (SR) 532 Leque Island Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site success. Monitoring activities included vegetation surveys and photo-documentation on September 2, 2015 and a wetland delineation on April 14, 2015.

### What is the SR 532 Leque Island Mitigation Site?

This re-established wetland (Figure 1) is located west of the Mark Clark Bridge along the West Pass of the Stillaguamish River. It is part of the 39 acre Skagit Wildlife Area Refuge owned by the Washington State Department of Fish and Wildlife. This site intended to provide 0.62 acre of mitigation that includes 0.40 acre of wetland re-establishment and 0.22 acre of stream restoration, which included 0.08 acre of stream restoration in lieu of buffer mitigation. Currently, 0.28 acres of wetland re-establishment has occurred. The stream restoration has not occurred to date. The mitigation includes removal of an access road, installation of large woody debris (LWD), and removal of segments of a levee along the perimeter of North Leque Island. The levee removal has been put on hold pending further analysis regarding the Camano Island sole source aquifer.



**Figure 1 Site Sketch**

The SR 532 Leque Island Mitigation Site currently consists of the removed access road which will rely on natural recruitment from the large adjacent seed source of native estuarine emergent vegetation to fill in the excavated area over time. Appendix 2 includes site directions.

## **What are the performance standards for this site?**

### **Year 5**

#### Performance Standard 1

Conductivity measured at high or slack tide with a refractometer at the three levee removal sites and at the access road removal site indicates a mixohaline environment (salinity readings between 0.5 and 30 parts per thousand).

#### Performance Standard 2

The Levee and access road removal areas will successfully delineate as estuarine wetlands using the current method for estuarine wetlands. These areas will incorporate at least 0.38 acre of re-established/rehabilitated estuarine wetland and 0.20 acre of restored tidally –influenced stream.

#### Performance Standard 3

Native colonizing salt marsh species will achieve at least 45 percent cover in the estuarine emergent wetland community.

#### Performance Standard 4

Any observed use of the wetland and stream mitigation areas by salmonid or other pelagic or benthic fish species, migratory waterfowl, macroinvertebrates, and/or mammals will be documented during annual monitoring visits.

#### Performance Standard 5

Washington State-listed or Snohomish County-listed Class A weeds designated for control by the County Weed Board shall be eradicated. All occurrences shall be immediately reported to the Northwest Region Landscape Architect and contingency measured initiated within 30 days of reporting.

#### Performance Standard 6

Washington State-listed and Snohomish County Class B, Class B Undesignated, and Class C and noxious weeds will not collectively exceed 20 percent cover, in the levee removal areas.

Appendix 1 shows the As Built (WSDOT 2010).

## How were the performance standards evaluated?

The salinity of the site was measured in two separate locations, one on each side of the bridge, north and south. A refractometer was used at 9:00 am, just after a high tide of 7.55 feet peaked at 8:00am (Performance standard 1).

WSDOT staff performed a wetland delineation using methods described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987), *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Version 2.0) (USACE 2010) and a Global Positioning System (Trimble Mapping Grade) (Performance Standard 2). See Appendix 3 for the delineation report.

The sampling method used for the remaining performance standards (PS) was qualitative. For additional details on the methods see the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).

## Is this site a success?

The site has developed more rapidly than anticipated and has been meeting the Year 5 final year standards for the estuarine wetland for three consecutive years. On May 7, 2013, a request to discontinue quantitative sampling for the estuarine wetland emergent cover was sent to USACE, this request was accepted on June 24, 2013. The final year standards are still currently being met.

This site is successful despite the fact that the levee was not removed according to plan. The existing access road was removed and the area was left to natural recruitment by native plants from the adjacent landscape. This method has been successful during the course of the monitoring period. The area is covered in a variety of native estuarine plants including seaside arrow-grass (*Triglochin maritima*), inland saltgrass (*Distichlis spicata*), Lyngbye's sedge (*Carex lyngbyei*), pickleweed (*Salicornia depressa*), seacoast bulrush (*Schoenoplectus maritimus*), and silverweed cinquefoil (*Potentilla anserina*).

The site was intended to provide increased wildlife habitat and connectivity to the larger estuarine wetland with the removal of the levee sections. Despite the fact that the levee was not removed, there were still many species of birds observed on or adjacent to the mitigation site over the monitoring period.

Results for Performance Standard 1  
(Conductivity):

Conductivity was measured just after high tide (Photo 1). Two measurements were taken in different locations. Point 1 was taken in the middle of the restored road and the result was 20 ppt. Point 2 was taken on the west side of the site and the result was 19 ppt. This indicates a mixohaline environment.

Results for Performance Standard 2  
(Wetland Delineation):

The wetland was delineated in April, 2015. The results are discussed in the report located in Appendix 3.

Results for Performance Standard 3  
(Salt marsh species will achieve at least 45 percent cover):

Herbaceous cover is qualitatively estimated at 85 percent (Photo 2). The existing species in the area have recolonized the old road bed and appear to be thriving. Dominant species include inland saltgrass (*Distichlis spicata*) and Lyngbye's sedge (*Carex lyngbyei*).

Results for Performance Standard 4  
(Wildlife use of mitigation site):

No wildlife observed on site at the time of this visit, most likely due to our presence and the fact that the tide was high. However, killdeer, gulls, and belted kingfisher were observed off site.



**Photo 1**  
**Site just after high tide(Sept 2015)**



**Photo 2**  
**Emergent cover in the wetland (Sept 2015)**

Results for Performance Standard 5 and 6

(Class A listed species shall not be present and Class B and C species shall not have more than 20 percent cover):

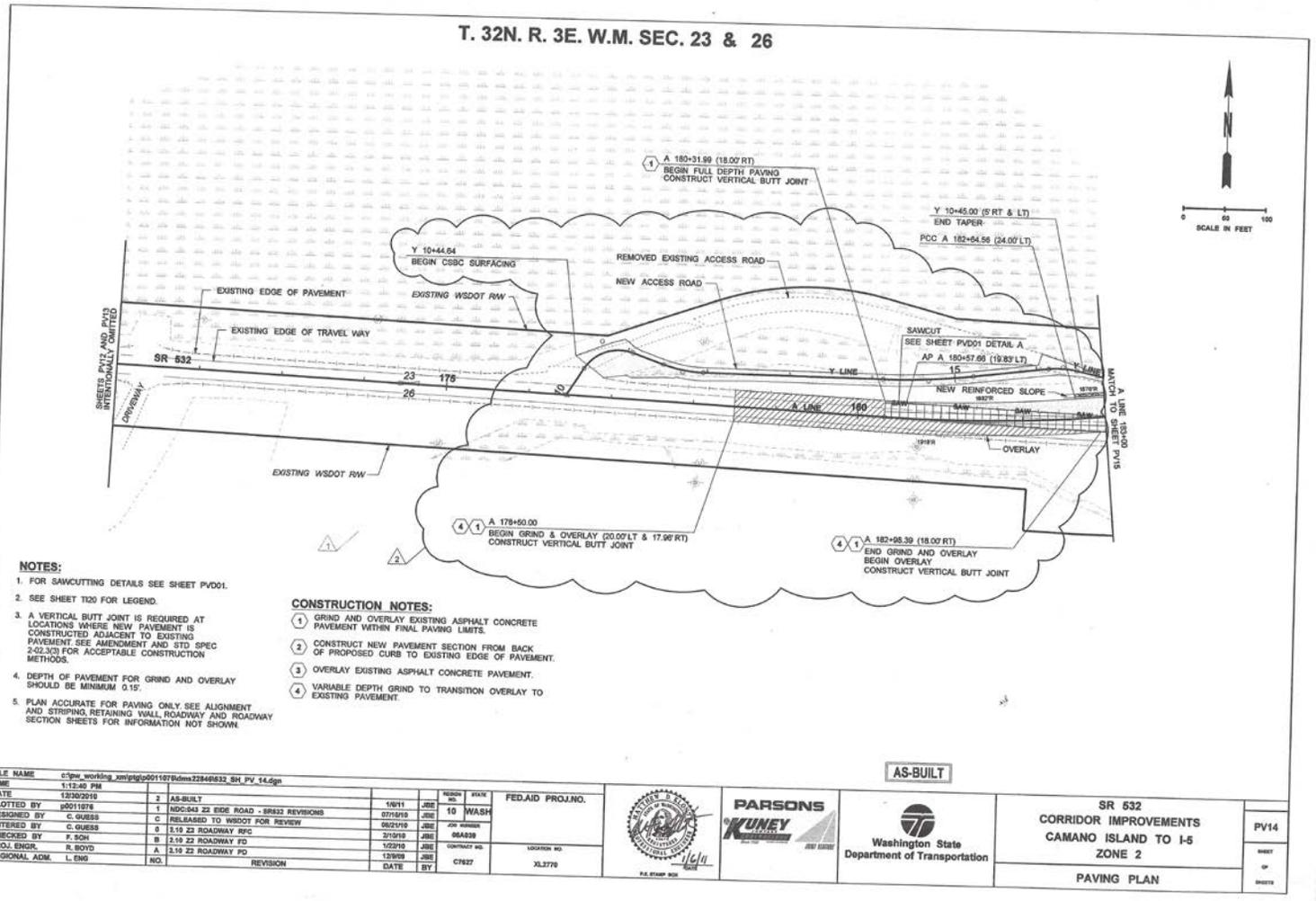
No noxious weeds observed on site. However, narrowleaf cattail (*Typha angustifolia*) and climbing nightshade (*Solanum dulcamara*) were observed nearby.

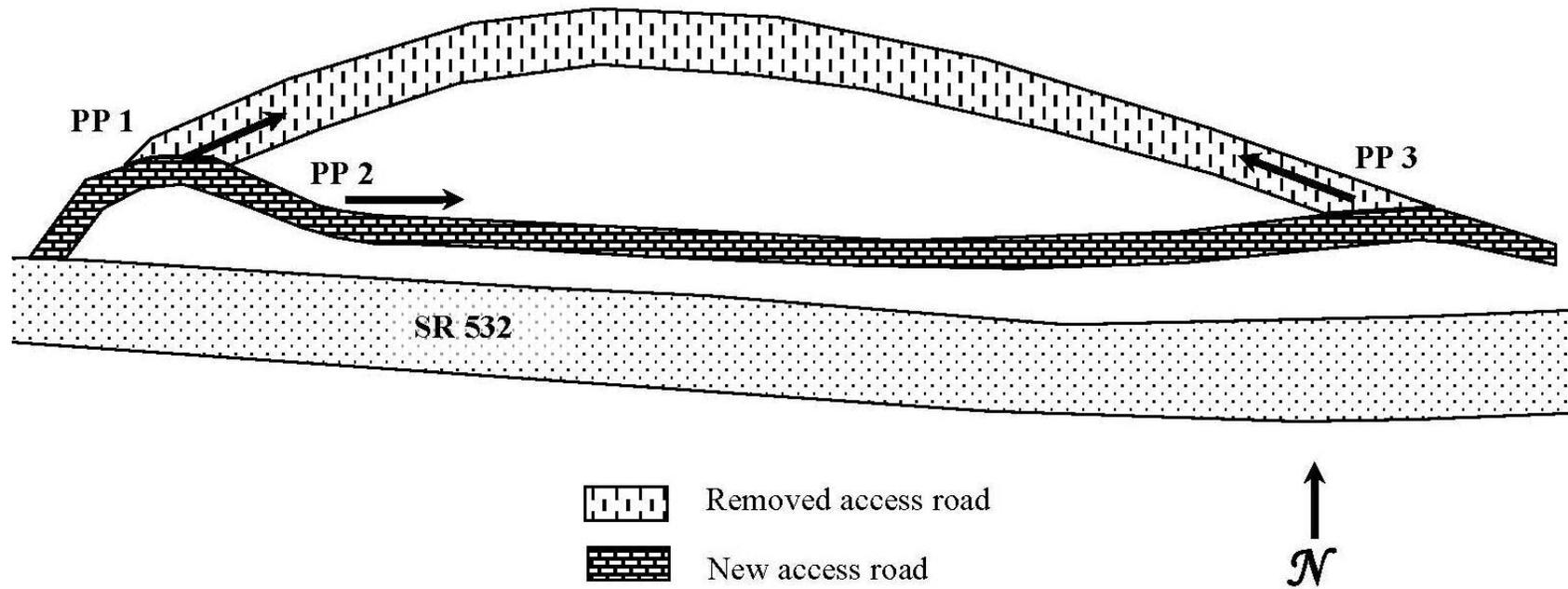
**What is planned for this site?**

The region will perform invasive management as needed.

# Appendix 1 – As-Built and Photo Point Map

(from WSDOT 2010)





## Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on September 2, 2015 and document current site development.



**Photo Point 1**



**Photo Point 2**



**Photo Point 3**

### **Driving Directions:**

From I-5 take Exit 212 toward Camano Island/Stanwood. Travel west on SR 532 for approximately seven miles. After passing over the Gary Clark Bridge take a right onto the access road.

# Appendix 3 – Wetland Delineation Report

# **WETLAND DELINEATION REPORT**

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## **SR 532 Leque Island Mitigation Site**

**SR 532 North Leque Island Slope Protection  
MP 2.96 to MP 3.27  
USACE (NWP 3 & 13) NWS-2010-968**

**Snohomish County, Washington**

**Prepared by:  
Tatiana Dreisbach  
WSDOT Environmental Services Office  
Olympia, Washington**

**February 2016**



**Washington State  
Department of Transportation**

# Introduction

This report was prepared by the Washington State Department of Transportation (WSDOT) to describe the wetland boundary delineation for the SR 532 Leque Island Mitigation Site. Field work was conducted by WSDOT wetland biologists Tatiana Dreisbach and Sean Patrick, on April 14, 2015. The delineation identifies 0.81 acre of estuarine wetland within the mitigation site boundaries. The mitigation site contains estuarine emergent wetland, with 0.28 acre occurring in wetland re-establishment areas where road removal occurred and 0.34 acre of additional estuarine emergent wetland within the mitigation site boundary. The site also includes 0.19 acre of estuarine open water wetland.

| General Information for the SR 532 Leque Island Mitigation Site                    |  |                  |
|--|--|------------------|
| <b>Location:</b>   | S23, T32N, R3E. Snohomish County. (Vicinity map, Figure 1)                           |                  |
|  | <b>USACE NWP 3 &amp; 13 Number</b>   | NWS-2010-968     |
|  | <b>Long./Lat. ID Number</b>  | 1223887482399    |
|  | <b>Land Resource Region (LRR)</b>  | A                |
|  | <b>Major Land Resource Area (MLRA)</b>   | 2                |
|  | <b>Construction Date</b>   | 2010             |
|  | <b>Monitoring Period</b>   | 2011 - 2015      |
|  | <b>Year of Monitoring</b>  | 5 of 5 (in 2015) |
| <b>Area of Project Impact<sup>1</sup></b>  | 0.38 acre  |                  |
| <b>Total Delineated Wetland Area</b>   | 0.62 acre of estuarine emergent wetland<br>0.19 acre of estuarine open water wetland |                  |

<sup>1</sup> Project impact numbers from USACE Nationwide Permit NWS-2010-968 attached drawings dated August 2010 with 0.38 acre impacts (USACE 2010).

# Location

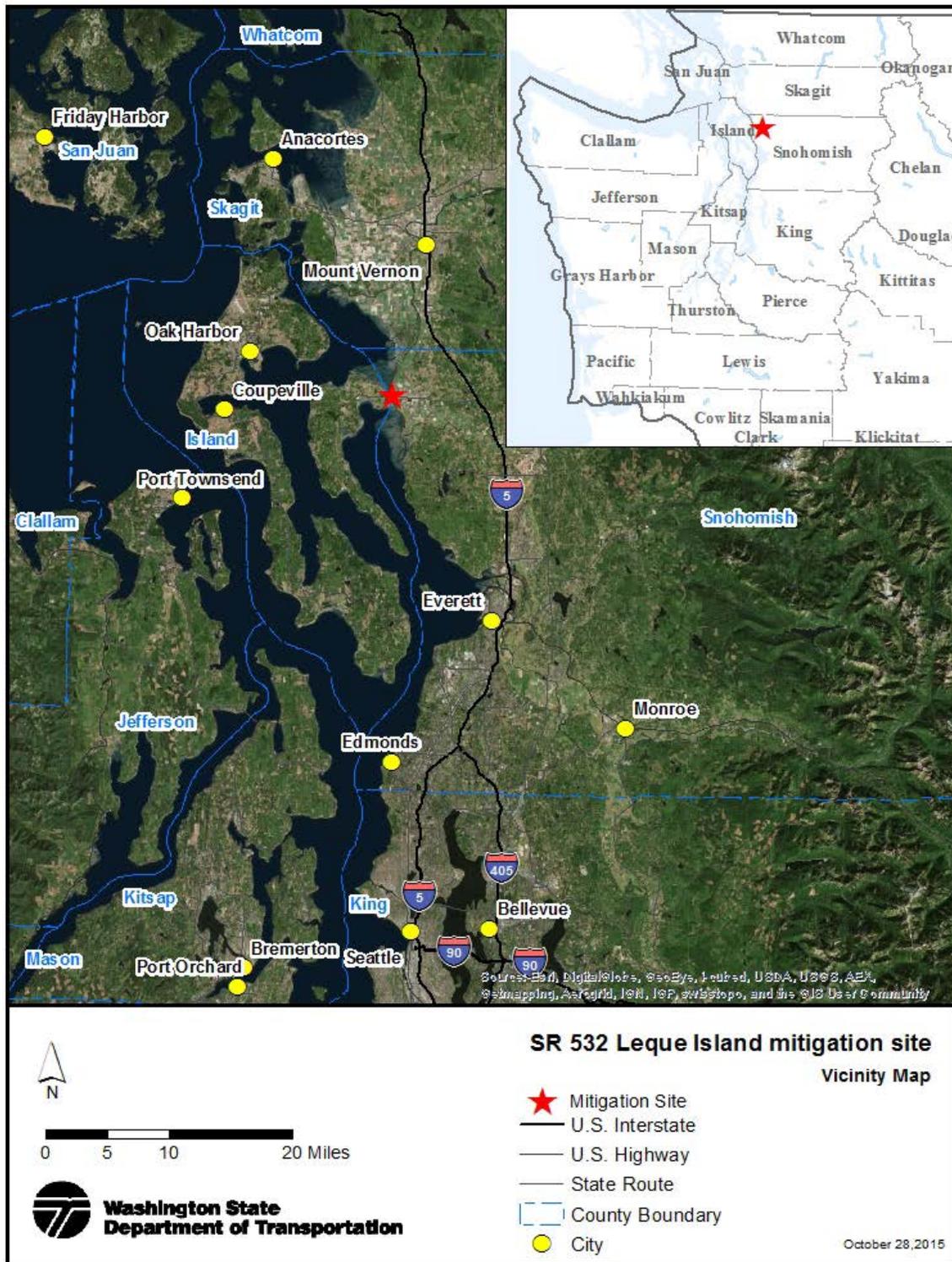


Figure 1. Vicinity Map

# Methods

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Wetland boundaries within the SR 532 Leque Island Mitigation Site were delineated using routine methods described in the:

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

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

A Global Positioning System (GPS) Trimble GeoXT mapping grade unit was used to record the wetland boundaries and sampling point locations (Figure 2). Wetland boundary points were recorded at regular intervals and at any change in direction along the boundary.

## Wetland Delineation and Study Area

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### Study Area

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

### Wetlands

The SR 532 Leque Island Mitigation Site is a tidally-influenced, estuarine emergent, wetland contiguous with a much larger estuarine wetland associated with the mouth of the West Pass Stillaguamish River.

The delineation determined 0.62 acre of estuarine emergent wetland and an additional 0.19 acre of estuarine open water wetland were present within the SR 532 Leque Island Mitigation Site. Delineation data was collected at one sampling point and recorded on a wetland determination data form (Appendix A). A single wetland data point was collected. Typical paired wetland and upland sample points were not collected because the wetland mitigation area is contiguous with adjacent wetlands and is not directly adjacent to upland areas. Data recorded on the wetland determination data form characterizes typical wetland conditions observed on site. Vegetation, soils, and hydrology were examined in several additional sampling locations to determine that the entire site is wetland.

### Precipitation

The Regional Delineation Supplement Version 2.0 (USACE 2010) recommends using methods described in Chapter 19 in *Engineering Field Handbook* (NRCS 1997) to determine if precipitation occurring in the three full months prior to the site visit was normal, drier than normal, or wetter than normal. Actual rainfall is compared to the normal range of the 30-year average. When considering the three prior months as a whole, wetter than normal precipitation conditions were present prior to field work. The first prior month was within the normal range and the second and third months were each wetter than normal (Appendix B-1).

Moderate precipitation was recorded in the ten days preceding field work (Appendix B-2).

### Growing Season

The following evidence of the growing season was observed at the time of the delineation: New vegetative growth was present on herbaceous plants including dominant seacoast bulrush (*Schoenoplectus maritimus*) and Lyngbye's sedge (*Carex lyngbyei*).

# 532 Leque Island, GPS Data: 4/14/2015

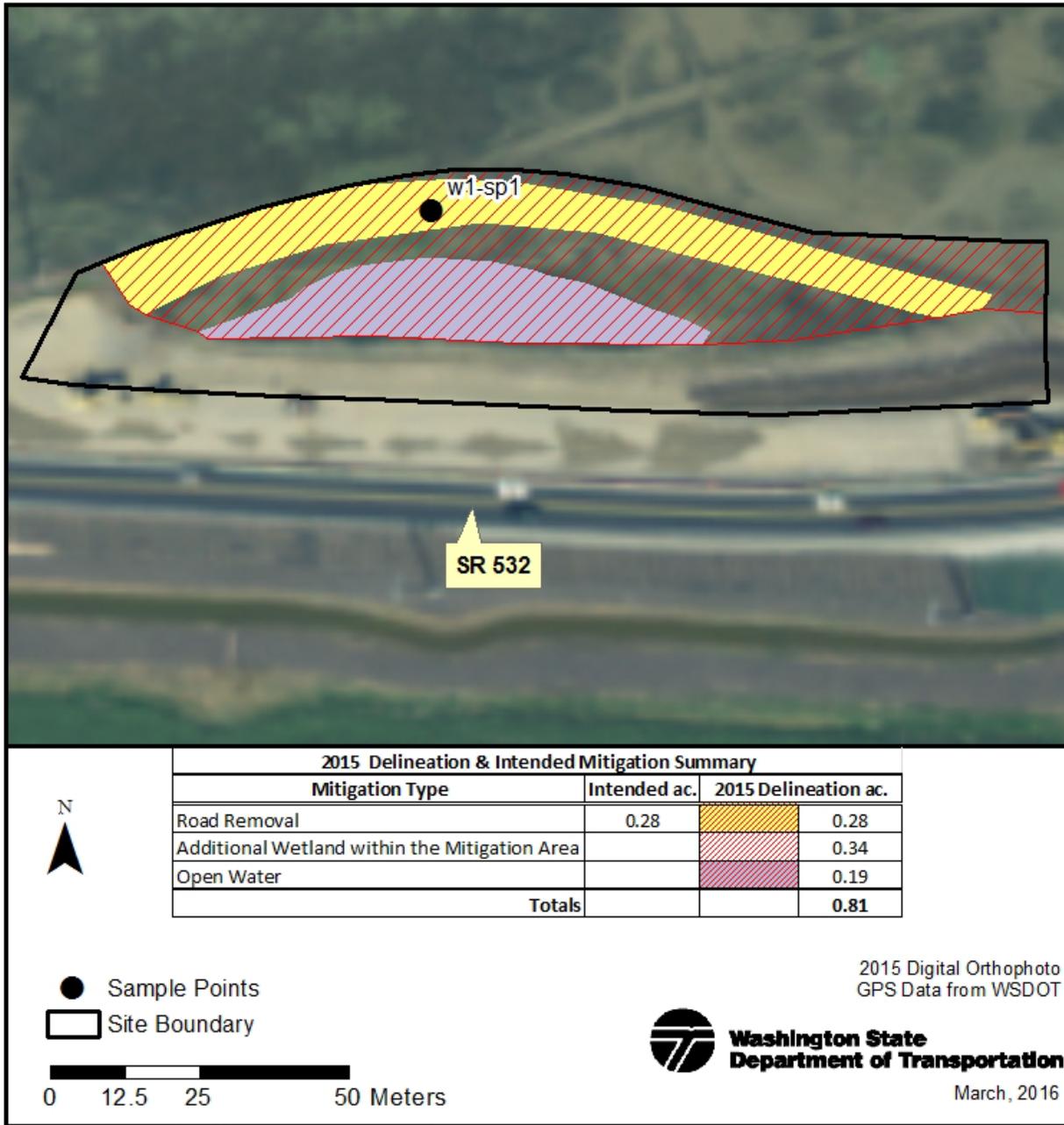


Figure 2. Study area/site boundary in black, wetland boundary in red, and sampling point locations in black.

| SR 532 Leque Island Mitigation Site – Wetland Delineation Summary                 |  |   |
|---|--|---|
| <b>Total Delineated Wetland Area</b>  | 0.62 acre of estuarine emergent wetland<br>0.19 acre of estuarine open water wetland   |   |
|  | <b>Wetland Determination Data Forms</b>  | Appendix A; Sampling Point W1-SP1                       |
|   | <b>Upland Determination Data Forms</b>   | none- mitigation wetland surrounded by off-site wetland |
|   | <b>Delineators</b>   | Tatiana Dreisbach,<br>Sean Patrick                      |
|   | <b>Delineation Date</b>  | April 14, 2015  |
| <b>Vegetation</b>   | Trees – none<br>Shrubs – none<br>Herbs –seacoast bulrush ( <i>Schoenoplectus maritimus</i> ), Lyngbye's sedge ( <i>Carex lyngbyei</i> ), seaside arrow-grass ( <i>Triglochin maritima</i> ), pickleweed ( <i>Salicornia depressa</i> ), spike bentgrass ( <i>Agrostis exarata</i> ), silverweed ( <i>Potentilla anserina</i> ) |   |
| <b>Soils</b>  | Soils examined to a depth of 20 inches exhibited hydric characteristics. Matrix colors of N 5/0 were observed with prominent redoximorphic concentrations. Indicator Loamy Gleyed Matrix (F2) and Depleted Matrix (F3) met.  |   |
| <b>Hydrology</b>  | Tidal water is the primary source of hydrology. Precipitation also contributes to the hydrologic regime of this wetland. Soils were saturated to the surface throughout much of the wetland mitigation site. Sediment deposits on soil and vegetative portions of plants were also observed.                                   |   |
| <b>Rationale for Delineation</b>  | Positive indicators of all three wetland criteria are present. The delineation boundary (Figure 2) identifies the wetland within the mitigation site. The wetland on the mitigation site is contiguous with a much larger estuarine wetland.   |   |

## Limitations

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

# References

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1. Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Vicksburg (MS): US Army Engineer Waterways Experiment Station. Technical Report Y-87-1. Available from: <http://el.erd.c.usace.army.mil/elpubs/pdf/wlman87.pdf>
2. Lichvar RW, Kartesz JT. 2013. North American Digital Flora: National Wetland Plant List (US), version 3.1 [Internet]. Hanover (NH): US Army Corps of Engineers, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory and Chapel Hill (NC): BONAP. [cited 2015 Oct 28]. Available from: [http://wetland\\_plants.usace.army.mil](http://wetland_plants.usace.army.mil)
3. [NRCS] Natural Resource Conservation Service. 1997. Hydrology Tools for wetland determination. Chapter 19 in Engineering Field Handbook. Fort Worth (TX): US. Department of Agriculture, NRCS. <http://www.wsdot.wa.gov/NR/rdonlyres/0685A8C8-0512-4568-BE7F-6FF6D75C15ED/0/WetDelinCh19.pdf>
4. [NRCS] Natural Resources Conservation Service [Internet]. 2015. Field Office Technical Guide. US Department of Agriculture. Climate Data for Snohomish County, Station Everett, Washington 452675. [cited 2015 Nov 17]. Available at: <http://agacis.rcc-acis.org/53061/wets>
5. [NRCS] Natural Resource Conservation Service [Internet]. 2015. Web Soil Survey for Snohomish County, Washington. US Department of Agriculture. [cited 2015 Oct 28]. Available at: <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>
6. [USACE] US Army Corps of Engineers. 2010. Department of the Army Nationwide 3 & 13 Permit Number NWS-2010-968 and attached drawings Sheet 4 of 4.
7. [USACE] US Army Corps of Engineers. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0), ed. Wakeley JS, Lichvar RW, Noble CV, editors. Vicksburg (MS): US Army Engineer Research and Development Center. ERDC/EL TR-10-3. Available at: [http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg\\_supp/west\\_mt\\_finals\\_upp.pdf](http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg_supp/west_mt_finals_upp.pdf)
8. [WSDOT] Washington State Department of Transportation. 2005. Draft Wetland and Stream Mitigation Report SR 532 Leque Island Slope Protection MP 2.96 to MP 3.27. Seattle (WA): Washington State Department of Transportation, Northwest Region.
9. [WSDOT] Washington State Department of Transportation. 2015. Wetland Delineation and Assessment [Internet]. Olympia (WA): Environmental Services Office. [cited 2015 Oct 28]. Available at: <http://www.wsdot.wa.gov/Environment/Wetlands/Delineation.htm>

# **Appendix A —Wetland Determination Data Forms**

Wetland Delineation Data Form for:

W1-SP1

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

**WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region**

Project/Site: SR 532 Leque Island City/County: n/a / Snohomish Sampling Date: 14-Apr-15  
 Applicant/Owner: WSDOT State: WA Sampling Point: W1-SP1  
 Investigator(s): Tatiana Dreisbach, Sean Patrick Section, Township, Range: S 23 T 32N R 3E  
 Landform (hillslope, terrace, etc.): tide flat Local relief (concave, convex, none): none Slope: 2.0 % / 1.1 °  
 Subregion (LRR): LRR A Lat.: 45.24 Long.: -122.388 Datum: NAD83HARN  
 Soil Map Unit Name: Puget silty clay loam NWI classification: EEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation , Soil , or Hydrology  significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation , Soil , or Hydrology  naturally problematic? (If needed, explain any answers in Remarks.)

**Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.**

|   |   |
|---|---|
| Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/><br>Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/><br>Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/> | Is the Sampled Area within a Wetland? Yes <input checked="" type="radio"/> No <input type="radio"/> |
|---|---|

**Remarks:**  
 Narrowleaf cattail (*Typha angustifolia*) and last year's Canadian horseweed (*Conyza Canadensis*) near plot.

**VEGETATION - Use scientific names of plants.**

|  | Absolute % Cover | Rel.Strat. Cover                                 | Indicator Status |   |
|--|------------------|--|------------------|---|
| <b>Tree Stratum</b> (Plot size: <u>10 x 10 feet</u> )          |                  |  |                  |   |
| 1. _____   | _____            | <input type="checkbox"/> 0.0%                    | _____            | <b>Dominance Test worksheet:</b><br>Number of Dominant Species That are OBL, FACW, or FAC: <u>2</u> (A)<br><br>Total Number of Dominant Species Across All Strata: <u>2</u> (B)<br><br>Percent of dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)  |
| 2. _____   | _____            | <input type="checkbox"/> 0.0%                    | _____            |   |
| 3. _____   | _____            | <input type="checkbox"/> 0.0%                    | _____            |   |
| 4. _____   | _____            | <input type="checkbox"/> 0.0%                    | _____            |   |
| <b>= Total Cover</b>   |                  |  |                  |   |
| <b>Sapling/Shrub Stratum</b> (Plot size: <u>10 x 10 feet</u> ) |                  |  |                  |   |
| 1. _____   | _____            | <input type="checkbox"/> 0.0%                    | _____            | <b>Prevalence Index worksheet:</b><br>Total % Cover of: Multiply by:<br>OBL species <u>90</u> x 1 = <u>90</u><br>FACW species <u>5</u> x 2 = <u>10</u><br>FAC species <u>0</u> x 3 = <u>0</u><br>FACU species <u>0</u> x 4 = <u>0</u><br>UPL species <u>0</u> x 5 = <u>0</u><br>Column Totals: <u>95</u> (A) <u>100</u> (B)<br><br>Prevalence Index = B/A = <u>1.053</u>  |
| 2. _____   | _____            | <input type="checkbox"/> 0.0%                    | _____            |   |
| 3. _____   | _____            | <input type="checkbox"/> 0.0%                    | _____            |   |
| 4. _____   | _____            | <input type="checkbox"/> 0.0%                    | _____            |   |
| 5. _____   | _____            | <input type="checkbox"/> 0.0%                    | _____            |   |
| <b>= Total Cover</b>   |                  |  |                  |   |
| <b>Herb Stratum</b> (Plot size: <u>10 x 10 feet</u> )          |                  |  |                  |   |
| 1. <u>Schoenoplectus maritimus</u>                             | <u>40</u>        | <input checked="" type="checkbox"/> <u>42.1%</u> | <u>OBL</u>       | <b>Hydrophytic Vegetation Indicators:</b><br><input type="checkbox"/> 1 - Rapid Test for Hydrologic Vegetation<br><input checked="" type="checkbox"/> 2 - Dominance Test is > 50%<br><input checked="" type="checkbox"/> 3 - Prevalence Index is ≤ 3.0 <sup>1</sup><br><input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup><br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. |
| 2. <u>Carex lyngbyei</u>                                       | <u>30</u>        | <input checked="" type="checkbox"/> <u>31.6%</u> | <u>OBL</u>       |   |
| 3. <u>Triglochin maritima</u>                                  | <u>10</u>        | <input type="checkbox"/> <u>10.5%</u>            | <u>OBL</u>       |   |
| 4. <u>Salicornia depressa</u>                                  | <u>5</u>         | <input type="checkbox"/> <u>5.3%</u>             | <u>OBL</u>       |   |
| 5. <u>Agrostis exarata</u>                                     | <u>5</u>         | <input type="checkbox"/> <u>5.3%</u>             | <u>FACW</u>      |   |
| 6. <u>Argentina anserina</u>                                   | <u>5</u>         | <input type="checkbox"/> <u>5.3%</u>             | <u>OBL</u>       |   |
| 7. _____   | <u>0</u>         | <input type="checkbox"/> <u>0.0%</u>             | _____            |   |
| 8. _____   | <u>0</u>         | <input type="checkbox"/> <u>0.0%</u>             | _____            |   |
| 9. _____   | <u>0</u>         | <input type="checkbox"/> <u>0.0%</u>             | _____            |   |
| 10. _____  | <u>0</u>         | <input type="checkbox"/> <u>0.0%</u>             | _____            |   |
| 11. _____  | <u>0</u>         | <input type="checkbox"/> <u>0.0%</u>             | _____            |   |
| <b>= Total Cover</b>   |                  |  |                  |   |
| <b>Woody Vine Stratum</b> (Plot size: <u>10 x 10 feet</u> )    |                  |  |                  |   |
| 1. _____   | _____            | <input type="checkbox"/> 0.0%                    | _____            |   |
| 2. _____   | _____            | <input type="checkbox"/> 0.0%                    | _____            |   |
| <b>= Total Cover</b>   |                  |  |                  |   |
| <b>% Bare Ground in Herb Stratum:</b> <u>5</u>                 |                  |  |                  |   |

**Remarks:**

<sup>1</sup>Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

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

| Depth (inches) | Matrix        |     | Redox Features |       |                   |                  | Texture | Remarks |                 |                              |
|----------------|---------------|-----|----------------|-------|-------------------|------------------|---------|---------|-----------------|------------------------------|
|                | Color (moist) | %   | Color (moist)  | %     | Type <sup>1</sup> | Loc <sup>2</sup> |         |         |                 |                              |
| 0-20           | N             | 5/0 | 80             | 7.5YR | 4/6               | 15               | C       | M/PL    | Sandy Clay Loam | concentrations are prominent |
|                |               |     |                | 2.5Y  | 5/4               | 5                | C       | M       |                 | concentrations are prominent |
|                |               |     |                |       |                   |                  |         |         |                 |                              |
|                |               |     |                |       |                   |                  |         |         |                 |                              |
|                |               |     |                |       |                   |                  |         |         |                 |                              |
|                |               |     |                |       |                   |                  |         |         |                 |                              |
|                |               |     |                |       |                   |                  |         |         |                 |                              |

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

|  |  |   |
|--|--|---|
| <b>Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)</b> |  | <b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b> |
| <input type="checkbox"/> Histosol (A1)   | <input type="checkbox"/> Sandy Redox (S5)                            | <input type="checkbox"/> 2 cm Muck (A10)                    |
| <input type="checkbox"/> Histic Epipedon (A2)                                    | <input type="checkbox"/> Stripped Matrix (S6)                        | <input type="checkbox"/> Red Parent Material (TF2)          |
| <input type="checkbox"/> Black Histic (A3)                                       | <input type="checkbox"/> Loamy Mucky Mineral (F1) (except in MLRA 1) | <input type="checkbox"/> Other (Explain in Remarks)         |
| <input type="checkbox"/> Hydrogen Sulfide (A4)                                   | <input checked="" type="checkbox"/> Loamy Gleyed Matrix (F2)         |   |
| <input type="checkbox"/> Depleted Below Dark Surface (A11)                       | <input checked="" type="checkbox"/> Depleted Matrix (F3)             |   |
| <input type="checkbox"/> Thick Dark Surface (A12)                                | <input type="checkbox"/> Redox Dark Surface (F6)                     |   |
| <input type="checkbox"/> Sandy Muck Mineral (S1)                                 | <input type="checkbox"/> Depleted Dark Surface (F7)                  |   |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)                                | <input type="checkbox"/> Redox depressions (F8)                      |   |

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

**Restrictive Layer (if present):**  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

**Hydric Soil Present?** Yes  No

Remarks:

**Hydrology**

**Wetland Hydrology Indicators:**

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

**Field Observations:**

Surface Water Present? Yes  No  Depth (inches):

Water Table Present? Yes  No  Depth (inches):

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

**Wetland Hydrology Present?** Yes  No

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

Remarks:  
 Tide flat with shallow inundation in micro depressions. Saturation comes from tidal water as surface flows.

# Appendix B — Precipitation Data

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## Appendix B-1. Comparison of Observed and Normal Precipitation (NRCS 1997)

Monthly precipitation data for Everett, Washington.

|                             |       | Long-term rainfall records <sup>a</sup> |         |                        |                        |   |                 |                    |                                 |
|-----------------------------|-------|---|---------|------------------------|------------------------|---|-----------------|--------------------|---------------------------------|
|                             | Month | 3 yrs. in 10 less than                  | Average | 3 yrs. in 10 more than | Rain fall <sup>a</sup> | Condition dry, wet, normal <sup>b</sup> | Condition Value | Month weight value | Product of previous two columns |
| 1 <sup>st</sup> prior month | Mar   | 2.89                                    | 3.86    | 4.51                   | 3.37                   | N                                       | 2               | 3                  | 6                               |
| 2 <sup>nd</sup> prior month | Feb   | 2.34                                    | 3.41    | 4.07                   | 5.40                   | W                                       | 3               | 2                  | 6                               |
| 3 <sup>rd</sup> prior month | Jan   | 3.00                                    | 4.37    | 5.21                   | 7.15                   | W                                       | 3               | 1                  | 3                               |
|                             |       |   |         |                        |                        |   |                 | <b>Sum</b>         | <b>15</b>                       |

<sup>a</sup>NRCS 2015

<sup>b</sup> Conditions are considered normal if they fall within the low and high range around the average.

Note: If sum is

- 6 - 9 then prior period has been drier than normal
- 10 - 14 then period has been normal
- 15 - 18 then period has been wetter than normal

Condition value:

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

Conclusions: Wetter than normal precipitation conditions were present prior to the field visit.

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

| Date (2015) | Daily Precipitation (inches) <sup>a</sup> |
|-------------|---|
| April 13    | 0.01                                      |
| April 12    | 0.26                                      |
| April 11    | 0.15                                      |
| April 10    | 0.00                                      |
| April 9     | 0.00                                      |
| April 8     | 0.00                                      |
| April 7     | 0.02                                      |
| April 6     | 0.23                                      |
| April 5     | M <sup>b</sup>                            |
| April 4     | M   |

<sup>a</sup> NRCS 2015

<sup>b</sup> "M" indicates data is missing for this day

## Literature Cited

1. [USACE] US Army Corps of Engineers. 2010. Department of the Army Individual Permit Number NWS-2010-968.
2. [USACE] US Army Corps of Engineers. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0), Wakeley JS, Lichvar RW, Noble CV, editors. Vicksburg (MS): US Army Engineer Research and Development Center. ERDC/EL TR-10-3.
3. [WSDOT] Washington State Department of Transportation. 2008. WSDOT Wetland Mitigation Site Monitoring Methods. <http://www.wsdot.wa.gov/NR/rdonlyres/C211AB59-D5A2-4AA2-8A76-3D9A77E01203/0/MethodsWhitePaper052004.pdf>
4. [WSDOT] Washington State Department of Transportation. 2010. Draft Wetland and Stream Mitigation Report SR 532 North Leque Island Slope Protection MP2.96 to MP 3.27. Seattle (WA): Washington State Department of Transportation, Northwest Region.
5. [WSDOT] Washington State Department of Transportation. 2010. SR 532 Corridor Improvements Camano Island to I-5 Zone 2 As-built Plan.