2019 WETLAND MONITORING REPORT

I-90 Snoqualmie Pass East (Stampede Pass)
Advance Mitigation Site

USACE IP NWS-2007-2080

South Central Region

Wetlands Program
Issued March 2020
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## Site Summary

I-90 Snoqualmie Pass East (Stampede Pass) Advance Mitigation Site
USACE IP NWS-2007-2080

<table>
<thead>
<tr>
<th>General Site Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>USACE IP Number</strong></td>
</tr>
<tr>
<td><strong>Ecology WQC</strong></td>
</tr>
<tr>
<td><strong>Mitigation Location</strong></td>
</tr>
<tr>
<td><strong>LLID Number</strong></td>
</tr>
<tr>
<td><strong>Construction Date</strong></td>
</tr>
<tr>
<td><strong>Monitoring Period</strong></td>
</tr>
<tr>
<td><strong>Year of Monitoring</strong></td>
</tr>
<tr>
<td><strong>Type of Advance Mitigation</strong></td>
</tr>
<tr>
<td><strong>Planned Area of Advance Mitigation</strong></td>
</tr>
</tbody>
</table>

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1 Advance mitigation numbers sourced from I-90 Snoqualmie Pass East Stampede Pass Stockpile Site Advance Mitigation Plan (WSDOT 2016).
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1. Introduction

1.1. Summary

This report summarizes third-year (Year-3) monitoring activities at the 090 Stampede Pass Advance Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site development. Monitoring activities in 2019 included vegetation surveys and photo-documentation on August 28 and assessments of wetland hydrology on May 2 and 16.

1.2. Monitoring Results and Management Activities

<table>
<thead>
<tr>
<th>Performance Standards</th>
<th>2019 Results²</th>
<th>Management Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland Hydrology</td>
<td>See results section</td>
<td></td>
</tr>
<tr>
<td>Density of four facultative or wetter woody plants/100ft² the scrub-shrub/forested wetland</td>
<td>13.1 plants/100ft² (CI80%= 11.0-15.1)</td>
<td></td>
</tr>
<tr>
<td>Density of five facultative or wetter herbaceous plants/100ft² in the emergent wetland</td>
<td>15-20% cover (visual estimate); Density standard not evaluated</td>
<td></td>
</tr>
<tr>
<td>Less than 20% cover non-native invasive species in the wetland</td>
<td>2% cover (visual estimate)</td>
<td>Regular weed control was conducted in 2019</td>
</tr>
<tr>
<td>Density of three native woody plants/100ft² in the buffer</td>
<td>9.4 plants/100ft² (CI80%= 6.4-12.5)</td>
<td></td>
</tr>
<tr>
<td>Density of five native herbaceous plants/100ft² in the buffer</td>
<td>See results section</td>
<td></td>
</tr>
<tr>
<td>Less than 20% cover non-native invasive species in the buffer</td>
<td>Less than 1% cover (qualitative)</td>
<td>Regular weed control was conducted in 2019</td>
</tr>
</tbody>
</table>

² Estimated values are presented with their corresponding statistical confidence interval. For example, 13.1 plants/100ft² (CI80% = 11.0-15.1) means we are 80% confident that the true density value is between 11.0 and 15.1 plants/100ft².
2. Site Description

2.1. Location

This 1.92-acre advance mitigation site is a re-established complex of depressional palustrine wetlands in a reclaimed portion of the Stampede Pass Stockpile site located north of Interstate (I) 90 east of Snoqualmie Pass in Kittitas County (Figure 1).

Driving Directions:
From I-90 heading east, take exit 62. Turn left on Kachess Lake Road and continue straight to the Stampede Pass stockpile site.

2.2. Purpose and Description

This site was established as advance mitigation to replace the area, functions, and values of wetland or other aquatic resources lost or affect by future WSDOT projects along I-90. The site provides wildlife habitat and reduces disturbance to wildlife by establishing a buffer between the stockpile and the surrounding forest. This site also provides suitable amphibian breeding sites and improves water quality by providing better site drainage and stormwater treatment.
2.3. Study Area

The 090 Stampede Pass Advance Mitigation Site contains 0.31 acre of emergent wetland, 1.35 acres of scrub-shrub/forested wetland, and 0.52 acre of upland forest in the Swamp Creek Connectivity Emphasis area within the Okanagan-Wenatchee National Forest (Figure 1).

![Figure 1. Site Sketch]
3. Performance Standards and Methods

3.1. Performance Standards

Year 3

**Performance Standard 1**
Conduct field reviews of wetland hydrology including visual inspections, photographs, and/or documentation of primary hydrologic indicators (using current delineation methods) during years with formal monitoring. Soils will be saturated to the surface, or standing water will be present in a monitoring well at 12 inches below the surface or less, for a consecutive number of days greater than or equal to 10 percent of the growing season in years when precipitation meets or exceeds the 30-year average.

**Performance Standard 2**
Native, facultative or wetter, woody species will maintain a minimum average density of four plants per 100 square feet in scrub-shrub/forested wetland re-establishment areas identified as. Include native colonizing vegetation in these density calculations.

**Performance Standard 3**
Native facultative or wetter, herbaceous species will maintain an average density of five plants per 100 square feet in emergent wetland re-establishment areas. Include native colonizing vegetation in these density calculations.

**Performance Standard 4**
Non-native invasive species will be controlled throughout all years allowing native planted and naturally recruited plants to establish and survive. There will be no more than 20 percent cover by non-native invasive species throughout the wetland re-establishment areas.

**Performance Standard 5**
Native woody species will maintain a minimum density of three plants per 100 square feet within upland areas. Include native colonizing vegetation in these coverage calculations.

**Performance Standard 6**
Native herbaceous species will maintain an average density of five plants per 100 square feet within upland areas.

**Performance Standard 7**
Non-native invasive species will be controlled throughout all years allowing native planted and naturally recruited plants to establish and survive. There will be no more than 20 percent cover by non-native invasive species throughout planted upland areas.

Appendix A shows the as-built planting plan (WSDOT 2017).
3.2. Methods

WSDOT staff collected hydrology data using methods described in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (USACE 2010) (Performance Standard 1). Shallow groundwater monitoring wells were installed to evaluate groundwater during the growing season (USACE 2005).

The table below documents sample methods used for the remaining performance standards (PS) required by the mitigation plan. Additional details on our methods are located here: WSDOT Wetland Mitigation Site Monitoring Methods Paper (WSDOT 2008).

### Placement of Baseline

A 151-meter-long baseline was placed at a bearing of 172 degrees through the middle of the site.

![Sample Design](image)

**Figure 2. Sample Design**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>PS 2</th>
<th>PS 3</th>
<th>PS 4</th>
<th>PS 5</th>
<th>PS 6</th>
<th>PS 7</th>
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<tr>
<td>Target population</td>
<td>Density</td>
<td>Density</td>
<td>Cover</td>
<td>Density</td>
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<td>Cover</td>
</tr>
<tr>
<td></td>
<td>FAC or wetter woody species</td>
<td>FAC or wetter herbaceous species</td>
<td>Invasive species</td>
<td>Native woody species</td>
<td>Native herbaceous species</td>
<td>Invasive species</td>
</tr>
<tr>
<td>Zone</td>
<td>PSS/PFO</td>
<td>PEM</td>
<td>Wetland</td>
<td>Buffer</td>
<td>Buffer</td>
<td>Buffer</td>
</tr>
<tr>
<td>Sample method</td>
<td>UBT</td>
<td>Cover estimated visually</td>
<td>Visual estimate</td>
<td>UBT</td>
<td>Visual estimate</td>
<td>Visual estimate</td>
</tr>
<tr>
<td>SU length</td>
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<td>Variable</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>SU width</td>
<td>Variable</td>
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<td></td>
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<td>n/a</td>
<td>2 m</td>
<td>n/a</td>
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<tr>
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<td>15</td>
<td>n/a</td>
<td>15</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>
4. Discussion

4.1. Site Development

The site is generally progressing well. The cover of noxious weeds is very low across the site and the woody plant communities are developing rapidly. The current density targets were easily exceeded in both the buffer and forested/scrub-shrub wetland areas in 2019. The cover of native woody species on-site is currently dominated by Sitka alder (*Alnus viridis*) and Sitka willow (*Salix sitchensis*), but the total of 19 native woody species recorded in our sample demonstrates the diversity that is developing in these communities.

The emergent wetland components of the site are developing differently than planned. There is very little area on-site that could be called a distinct emergent wetland community. Instead there are areas of emergent wetland plants that have developed both in some of the areas shown on the as-built planting plan as emergent wetland and in some of the areas shown as scrub-shrub wetland, but there are generally also woody species growing in all of these same areas. So basically, the entire wetland area of the site appears to be developing as forested/scrub-shrub wetland with what will be an emergent understory in some areas and a few small, mostly unvegetated ponds.

Wildlife observations in 2019 included band-tailed pigeons, chipmunks, deer scat, and garter snakes.
4.2. Results

**Performance Standard 1**
(Wetland Hydrology)

Inundation or saturation to the soil surface was observed in about 40 percent of the intended wetland areas during early growing season site visits on May 2 and 16, 2019 (Photo 1) (Appendix C, Table 1). Two shallow groundwater monitoring wells were installed, along with automated data loggers, on June 3 and data was recorded until mid-October. Water levels were within 12 inches of the soil surface for one week in June and one week in October at one of the two well locations, and were not within 12 inches of the soil surface during this period at the other well location. Based on visual observations from May, coupled with the well data from early June, this standard was likely met for the 2019 growing season for at least the majority of the intended wetland area. Now that the wells are installed, we will have better early growing season groundwater data for the next monitoring report.

**Performance Standard 2**
(Density of four facultative or wetter woody plants/100ft² the scrub-shrub/forested wetland)

The density of native, facultative or wetter, woody species in the scrub-shrub and forested wetland areas is estimated at 13.1 plants/100ft² (CI₈₀%= 11.0-15.1) (Photo 2). This exceeds the performance standard target. Dominant species include Sitka alder (*Alnus viridis*), Sitka willow (*Salix sitchensis*), and black cottonwood (*Populus balsamifera*).
Performance Standard 3
(Density of five facultative or wetter herbaceous plants/100ft² in the emergent wetland)

Although there are virtually no distinct emergent wetland areas on-site, the cover of native FAC or wetter herbaceous species in the areas that appeared to have been planted with emergent species was visually estimated at about 15-20% (Photo 3).

Performance Standard 4
(Less than 20% cover non-native invasive species in the wetland)

The cover of invasive species in the wetland was visually estimated at two percent. Invasive species observed in the wetland areas include reed canarygrass (Phalaris arundinacea), common tansy (Tanacetum vulgare), old-man-in-the-spring (Senecio vulgaris), and oxeye daisy (Leucanthemum vulgare).

Performance Standard 5
(Density of three native woody plants/100ft² in the buffer)

The density of native woody species in the buffer is estimated at 9.4 plants/100ft² (CI₈₀% = 6.4-12.5) (Photo 4). Dominant species include Sitka alder, Douglas-fir (Pseudotsuga menziesii), black cottonwood, and red elderberry (Sambucus racemosa).
Performance Standard 6
(Density of five native herbaceous plants/100ft² in the buffer)

The only herbaceous species planted in the buffer was western swordfern (*Polystichum munitum*) and very few of these plantings survived. There are some native volunteer herbaceous species in these areas, but they are mostly annuals, for which density is not a particularly practical or meaningful metric to apply. Based on visual estimates, however, with these volunteer species included, the density of native herbaceous plants in the buffer probably meets the performance standard target of five plants/100ft². Some of the native herbaceous volunteer species observed in the buffer areas include Canadian horseweed (*Erigeron canadensis*), western Canada goldenrod (*Solidago lepida*), and tall annual willowherb (*Epilobium brachycarpum*).

Performance Standard 7
(Less than 20% cover non-native invasive species in the buffer)

The cover of invasive species in the upland buffer was visually estimated at less than one percent and consisted primarily of oxeye daisy (*Leucanthemum vulgare*).
5. References


Appendix A. As-built Planting Plan with Photo Point and Well Locations

(from WSDOT 2017)
Appendix B.  Photo Points

The photographs below were taken from permanent photo-points on August 28, 2019 and document current site development.

Photo Point 1a

Photo Point 1b

Photo Point 1c
# Appendix C. Data Tables and Figures

## Table 1. Hydrology Observations

<table>
<thead>
<tr>
<th>Date</th>
<th>Surface Observations</th>
<th>Well ID #</th>
<th>Water Level (inches below soil surface unless otherwise noted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2, 2019</td>
<td>Emergent areas are inundated up to a maximum depth of two feet. About 40% of the PSS/PFO areas are saturated to the surface or inundated, mostly in the southern half of the site.</td>
<td>N/A</td>
<td>No wells had been installed yet.</td>
</tr>
<tr>
<td>May 16, 2019</td>
<td>Standing water and saturation present. Some bare ground areas have evidence of recent ponding, including some dead plants due to apparent prolonged ponding.</td>
<td>N/A</td>
<td>No wells had been installed yet.</td>
</tr>
<tr>
<td>June 3, 2019</td>
<td>Two shallow groundwater monitoring wells were installed; no well data was recorded on this visit.</td>
<td>1</td>
<td>Well data from June to October 2019 did not rise to at least 12 inches below the ground surface during this time.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>See Figure 3 for well data from June to October 2019.</td>
</tr>
</tbody>
</table>
Figure 3. 2019 Water Levels for Well 2.