

**SR 9 212th St. SE to 176th St. SE; Widening – Stage 3
Charles E. Plummer Mitigation Site
WIN A00900F**

USACE NWS-2010-1228

Northwest Region

2015 MONITORING REPORT

Wetlands Program

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General Site Information			
USACE IP Number	NWS-2010-1228		
Mitigation Location	Three quarters of a mile north of the intersection of SR 9 and SR 522 just west of SR 9		
LLID Number	1221442477934		
Construction Date	2012-2013		
Monitoring Period	2013-2022		
Year of Monitoring	3 of 10		
Area of Project Impact¹	0.37 acre		
Type of Mitigation	Wetland establishment	Wetland enhancement	Wetland preservation
Planned Area of Mitigation²	2.5 acres	0.29 acre	3.33 acres

¹ The area of project impact was referenced from the JARPA drawings associated with the USACE permit (USACE 2010).

² The area of mitigation was referenced from the mitigation plan (WSDOT 2011).

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Summary of Monitoring Results and Management Activities (2015)

Performance Standards	2015 Results Non-violation Areas ³	2015 Results FRPC Violation Areas ³	Management Activities
Wetland hydrology	Present in all intended areas		
The native woody species (planted and volunteer) will maintain at least an average density of four plants per 100 square feet in woody wetland communities.	10.9 plants/100ft ² (CI _{80%} = 9.4-12.4)	8.6 plants/100ft ² (CI _{80%} = 7.2-10)	101 willows planted along creek banks on two dates in early 2015.
Native facultative or wetter woody species (planted and volunteer) will achieve at least 20 percent cover in woody wetland communities.	89% cover (CI _{80%} = 86-92%)	79% cover (CI _{80%} = 65-92%)	
Native facultative or wetter herbaceous vegetation (planted and volunteer) will achieve at least 25 percent cover in the emergent wetland communities.	83% cover (CI _{80%} = 80-87%)		
Native woody species (planted and volunteer) will maintain at least an average density of four plants per 100 square feet in buffer communities. If all dead planted species are replaced, the performance measure will be met.	13.2 plants/100ft ² (CI _{80%} = 10.3-16.2)	12.1 plants/100ft ² (CI _{80%} = 10.5-13.8)	
Washington State-listed or Snohomish County-listed Class A weeds must be eradicated.	None observed		Weed control took place on 14 dates in 2014 and 10 dates in 2015.
If Washington State Class B weeds designated for control or Snohomish County Class B, Class B Undesignated, and Class C noxious designated for control are found on the site during the monitoring period, the Northwest Region Landscape Architect will initiate immediate removal and control.	Purple loosestrife and Ornamental jewelweed were observed on-site. Site managers were notified immediately and control of these species was conducted several times over the summer.		
Reed canarygrass, non-native blackberries, Scotch broom, thistles, and species listed in Table 32 will not exceed 25 percent cover, collectively, in the wetland and buffer areas.	Less than 5% (visual estimate) in violation and non-violation wetland and buffer areas		

³ Estimated values are presented with their corresponding statistical confidence interval. For example, 10.9 plants/100ft² (CI_{80%} = 9.4-12.4) means we are 80% confident that the true density value is between 9.4 and 12.4 plants per 100 square feet.

Report Introduction

This report summarizes third-year (Year-3) monitoring activities at the State Route (SR) 9 Charles E. Plummer Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site development. Monitoring activities in 2015 included vegetation surveys, photo-documentation, and assessments of wetland hydrology. Hydrology monitoring occurred on March 19, April 2, and April 16. Vegetation monitoring was conducted on August 10 to 12.

What is the SR 9 Charles E Plummer Mitigation Site?

This 15-acre mitigation site (Figure 1) is a combination of new and restored wetlands created east of SR 9 across the highway from the Brightwater Treatment Facility. This site was created to compensate for the loss of 0.36 acre of wetlands due to road improvements along SR 9 between MP 1.62 and MP 4.22. The enhanced and established wetlands and stream buffers are designed to provide mitigation for lost wetland functions including sediment and nutrient/toxicant removal, flood attenuation and capacity, general habitat suitability, and riparian habitat and organic input along fish bearing streams that result from project construction. The established and enhanced wetlands are intended to provide or exceed the same type and level of wetland functions as those impacted by the project.

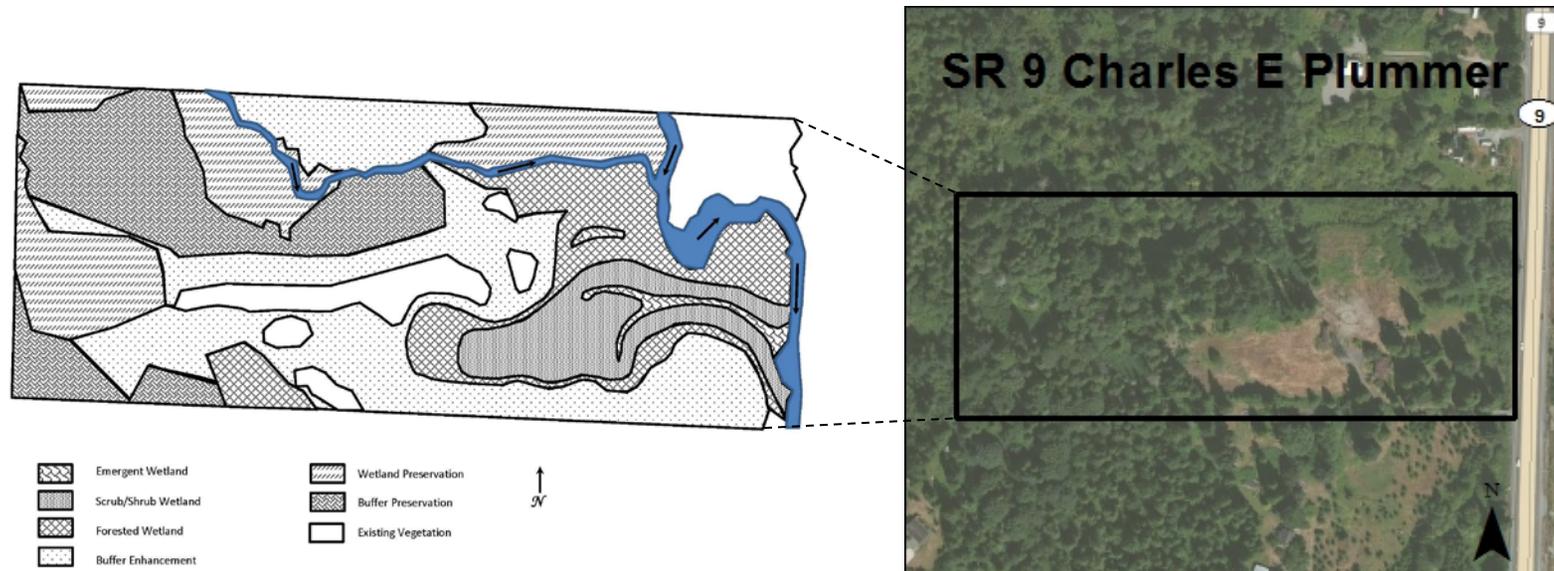


Figure 1 Site Sketch

The SR 9 Charles E Plummer Mitigation Site contains 2.5 acres of established riverine wetland, 0.29 acre of enhanced wetlands and 3.33 acres of existing Category I wetlands adjacent to Little Bear Creek. Appendix 2 includes site directions.

What are the performance standards for this site?

Year 3

Performance Standard 1

In normal years, the wetland area will be inundated or soils will be saturated to within 12 inches of the soil surface for a consecutive number of days greater than or equal to 10% of the growing season in years when rainfall meets or exceeds the 30-year average.

Performance Standard 2

The native woody species (planted and volunteer) will maintain at least an average density of four plants per 100 square feet in woody wetland communities.

Performance Standard 3

Native facultative or wetter woody species (planted and volunteer) will achieve at least 20 percent cover in woody wetland communities.

Performance Standard 4

Native facultative or wetter herbaceous vegetation (planted and volunteer) will achieve at least 25 percent cover in the emergent wetland communities.

Performance Standard 5

Native woody species (planted and volunteer) will maintain at least an average density of four plants per 100 square feet in buffer communities. If all dead planted species are replaced, the performance measure will be met.

Performance Standard 6

Washington State-listed or Snohomish County-listed Class A weeds must be eradicated. All occurrences shall be immediately reported to the Northwest Region Landscape Architect and an eradication program will be initiated within 30 days of the report.

Performance Standard 7

If Washington State Class B weeds designated for control or Snohomish County Class B, Class B Undesignated, and Class C noxious designated for control are found on the site during the monitoring period, the Northwest Region Landscape Architect will initiate immediate removal and control. This list includes, but is not limited to: purple loosestrife (*Lythrum salicaria*), yellow-flag

iris (*Iris pseudacorus*), non-native knotweeds (*Polygonum cuspidatum*, *P. polystachyum*, *P. sachalinense*, and *P. bohemicum*), and similar related species and hybrids.

Performance Standard 8

Reed canarygrass (*Phalaris arundinacea*), non-native blackberries (*Rubus armeniacus* and *R. laciniatus*), Scotch broom (*Cytisus scoparius*), thistles (*Cirsium arvense*, *C. vulgare*, *Carduus nutans*, and *Onopordum acanthium*), and species listed in Table 32 will not exceed 25 percent cover, collectively, in the wetland and buffer areas. Reed canarygrass will be managed and controlled to reduce competition with and enhance the survival of tree and shrub plantings in the wetland and buffer areas. Due to high levels of reed canarygrass in the watershed, there is no specific threshold for control, and no maximum allowable amount. Reed canarygrass will be managed so that the woody species performance standards are attained.

Table 32. Non-native invasive species.

Scientific Name	Common Name
<i>Buddleia alternifolia</i>	Fountain butterfly bush
<i>Geranium robertianum</i>	Herb Robert
<i>Hedera helix</i>	English ivy
<i>Ilex aquifolium</i>	English holly
<i>Myriophyllum spicatum</i>	Eurasian water milfoil
<i>Prunus laurocerasus</i>	English laurel

Year 10

Performance Standard 9

Native facultative or wetter woody species (planted and volunteer) will achieve at least 70 percent cover in the woody wetland communities.

Performance Standard 10

Native facultative or wetter herbaceous vegetation (planted and volunteer) will achieve at least 75 percent cover in the emergent wetland communities.

Appendix 1 shows the planting plan (WSDOT 2011).

How were the performance standards evaluated?

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).

The table below documents the sampling methodology utilized for the remaining performance standards (PS) as required by the mitigation plan or permits. For additional details on the methods see the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).

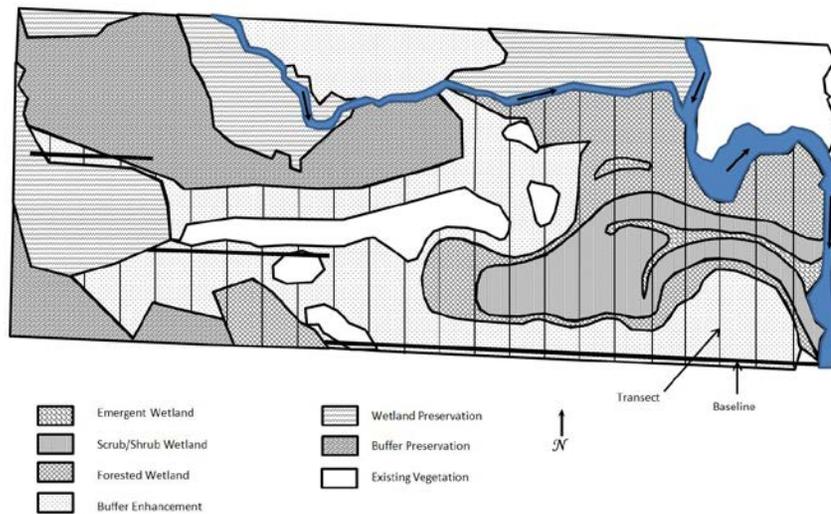


Figure 2 Site Sampling Design (2015)

Placement of Baseline: East to west in three segments equaling a total length of 316 meters (main segment along southern border of site; second and third segments shifted to the north for convenience).

	PS 2	PS 3 and 9	PS 4 and 10	PS 5	PS 6, 7, and 8
Attribute	Density	Cover	Cover	Density	Presence/Absence & Cover
Target pop.					Noxious Weeds/ Invasive species
Zone	PSS/PFO	PSS/PFO	Emergent	Buffer	Entire site
Sample method	UBT	Line Intercept	Point Line	UBT	Visual Estimates
SU length		10 m	5		
SU width	1 m			1 m	
Points per SU			25		
Total # of SU	24	23	10	32	

How is the site developing?

Overall, this site is developing wonderfully and is well on its way to becoming a very successful mitigation site. It is meeting or exceeding all of its current performance standards. In addition, it is meeting final-year performance standards for native facultative or wetter woody cover in the forested and scrub-shrub wetland areas and native facultative or wetter herbaceous cover in the emergent wetland areas.

At some point in late 2014 or early 2015, beaver dammed Little Bear Creek near the northeast corner of the site causing water to back up and flow through part of the wetland establishment area (Photo 1). Overall, this appears to be a net benefit to the site, as it provides an additional source of relatively consistent hydrology to the wetland establishment areas and reduces flow velocity and overall energy in the main creek channel (which takes a sharp turn that was armored by the previous owners of the property), potentially helping to avoid more energetic breaches of the creek banks like those that occurred in late 2012/early 2013. The additional water flowing through the establishment area of the site has had some impact on a small area of intended buffer just west of the northern-most part of the wetland establishment area (Photo 2). This area, which was already fairly wet for a buffer area, is now definitely too wet for the buffer species planted here and they are, consequently, struggling. This area is filling in with a mix of native and non-native herbaceous species. The monitoring team will keep an eye on this area to see how it is developing and determine whether additional planting or weed control may be necessary.



Photo 1
Beaver dam on Little Bear Creek (March 2015)



Photo 2
Wet buffer area affected by beaver dams (August 2015)

Results for Performance Standard 1
(Wetland hydrology):

Inundation (Photo 3) or a water table within the upper 12 inches of the soil surface was present in all intended wetland areas during all three hydrology visits in 2015, spanning 28 days within the growing season (March 19, April 2, and April 16). See Appendix 3, Table 1 for detailed results of the hydrology visits.

Results for Performance Standard 2
(Native woody density of at least four plants per 100 square feet in the PSS/PFO):

Non-violation Areas:

The density of native woody species in the non-violation forested and scrub-shrub wetland areas (Photo 4) is estimated at 10.9 plants/100ft² (CI_{80%} = 9.4-12.4).

FRPC Violation Areas:

The density of native woody species in the FRPC violation forested and scrub-shrub wetland areas (Photo 4) is estimated at 8.6 plants/100ft² (CI_{80%} = 7.2-10).



Photo 3
Inundation in the forested and scrub-shrub wetland (April 2015)



Photo 4
Density and cover in the PSS/PFO (August 2015)

Results for Performance Standards 3 and 9

(At least 20 percent cover [70% in year 10] of native facultative or wetter woody species in the PSS/PFO):

Non-violation Areas:

The cover of native facultative or wetter woody species in the non-violation forested and scrub-shrub wetland areas (Photo 4) is estimated at 89% (CI_{80%} = 86-92%).

FRPC Violation Areas:

The cover of native facultative or wetter woody species in the FRPC violation forested and scrub-shrub wetland areas (Photo 4) is estimated at 79% (CI_{80%} = 65-92%).

The dominant species in both the violation and non-violation forested and scrub-shrub wetland areas are Sitka willow (*Salix sitchensis*), redosier dogwood (*Cornus alba*), and Pacific willow (*Salix lasiandra*).

Results for Performance Standards 4 and 10

(At least 25 percent cover [75% in year 10] of native facultative or wetter herbaceous vegetation in the emergent wetland communities):

The cover of native facultative or wetter herbaceous vegetation in the emergent wetland (Photo 5) is estimated at 83% (CI_{80%} = 80-87%). The dominant species in these areas are small-fruited bulrush (*Scirpus microcarpus*), soft rush (*Juncus effusus*), spike bentgrass (*Agrostis exarata*), and Northwest Territory sedge (*Carex utriculata*).



Photo 5
Herbaceous cover in the emergent wetland
(August 2015)

Results for Performance Standard 5

(Native woody density of at least four plants per 100 square feet in the buffer):

Non-violation Areas:

The density of native woody species in the non-violation buffer areas (Photo 6) is estimated at 13.2 plants/100ft² (CI_{80%} = 10.3-16.2).

FRPC Violation Areas:

The density of native woody species in the FRPC violation buffer areas (Photo 6) is estimated at 12.1 plants/100ft² (CI_{80%} = 10.5-13.8).

The most abundant species in both the violation and non-violation buffer areas are thimbleberry (*Rubus parviflorus*), salal (*Gaultheria shallon*), and salmonberry (*Rubus spectabilis*).



Photo 6
Woody density in the buffer (August 2015)

Results for Performance Standard 6

(Class A noxious weeds must be eradicated):

No Class A noxious weeds were observed anywhere on-site.

Results for Performance Standard 7

(The presence of Washington State Class B weeds designated for control or Snohomish County Class B, Class B Undesignated, and Class C noxious designated for control will initiate immediate removal and control):

Two Snohomish County Class B noxious weeds were observed on-site during monitoring: purple loosestrife (*Lythrum salicaria*) and ornamental jewelweed (*Impatiens glandulifera*). Several small patches of purple loosestrife were present in both the violation and non-violation wetland establishment areas. Ornamental jewelweed was observed in the preserve wetland area in the northeast

corner of the site. The site manager was notified immediately. Control of these species on-site had already taken place earlier in the summer, but further control measures were implemented in a timely manner and focused on the areas identified by the monitoring team.

Results for Performance Standard 8

(Reed canarygrass, non-native blackberries, Scotch broom, thistles, and species listed in Table 32 will not exceed 25 percent cover, collectively, in the wetland and buffer areas)

The cover of applicable invasive species in both the violation and the non-violation wetland and buffer areas was visually estimated at less than 5%. The species observed on-site include reed canarygrass (*Phalaris arundinacea*), Himalayan blackberry (*Rubus armeniacus*), Robert geranium (*Geranium robertianum*), English holly (*Ilex aquifolium*), and English ivy (*Hedera helix*).

Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on August 12, 2015 and document current site development. Photo points 2 and 3 were mistakenly omitted during monitoring in 2015. These photo points will be included in the next monitoring report.



Photo Point 1a



Photo Point 1b



Photo Point 1c

Driving Directions:

The site is located in Snohomish County, directly across SR 9 (west side) from the north end of the Brightwater Treatment Plant approximately MP 0.75.

Appendix 3 – Data Tables

Table 1. Hydrology Observations.

Date	Surface Observations	Well ID #	Water Level (inches below soil surface unless otherwise noted)
March 19, 2015	New beaver dam has inundated much of the eastern portion of site.	1	3"
		2	8.5"
		3	0.5" inundation
		4	3.5"
		5	5.5"
April 2, 2015	Sheet flow across the east side of the site due to 2 beaver dams on the creek. Much of the wetland area otherwise was either saturated or inundated in small pockets	1	6.5"
		2	3"
		3	Saturated to the soil surface
		4	3"
		5	5"
April 16, 2015		1	11"
		2	3"
		3	Saturated to the soil surface
		4	Saturated to the soil surface
		5	6"

Table 2. Comparison of Observed and Normal Precipitation (NRCS 1997)

Monthly precipitation data for Monroe, Washington.

	Long-term rainfall records ^a			Rain fall ^a	Condition dry, wet, normal ^b	Condition Value	Month weight value	Product of previous two columns	
	Month	3 yrs. in 10 less than	Average						3 yrs. in 10 more than
1 st prior month	Jan	4.24	6.05	7.18	4.41	N	2	3	6
2 nd prior month	Feb	3.26	4.50	5.31	6.13	W	3	2	6
3 rd prior month	Mar	3.93	5.09	5.90	4.05	N	2	1	2
Sum								14	

^aNRCS 2015

^b Conditions are considered normal if they fall within the low and high range around the average.

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

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

Conclusions: Normal precipitation conditions were present leading up to the hydrology field visits.

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