

**SR 502 NE 15th Ave to NE 102nd Ave
(Mill Creek North) Mitigation Site**

USACE NWS 2009-1093

Southwest Region

2014 MONITORING REPORT

Wetlands Program

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SR 502 NE 15th Ave to NE 102nd Ave (Mill Creek North) Mitigation Site

USACE NWS 2009-1093



General Site Information		
USACE NWS Number	2009-1093	
Mitigation Location	Along Mill Creek between 50 th Ave and 57 th Ave on the North side of SR 502	
LLID Number	Pending	
Construction Date	2012-2013	
Monitoring Period	2014-2023	
Year of Monitoring	1 of 10	
Area of Project Impact	11.12 acres	
Type of Mitigation	Wetland Establishment	Wetland Rehabilitation
Planned Area of Mitigation¹	3.38 acres	13.91 acres

¹ Additional mitigation provided for the SR 502 Corridor Widening project at SR 502 Sunset Oaks and I-5 Cedars Creek mitigation sites. See Appendix 3, Table 1 for a breakdown of mitigation sites and mitigation acreage.

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Summary of Monitoring Results and Management Activities (2014)

Performance Standards	2014 Results ²	Management Activities
Wetland hydrology present	Present	
90% woody survival across the site	88% survival (CI _{80%} = 86-90%).	
Blackberry species and Class B Noxious Weeds will not exceed 15%	Invasive cover <5%	
If detected all Class A Noxious Weeds, Japanese knotweed (<i>Reynoutria japonica</i>), and purple loosestrife (<i>Lythrum salicaria</i>) shall be eradicated	Purple loosestrife observed	
Reed canarygrass (<i>Phalaris arundinacea</i>) will not exceed 25% cover	20% cover (CI _{80%} = 17-22%).	5 separate weed management visits in 2014

Report Introduction

This report summarizes Year-1 monitoring activities at the State Route (SR) 502 Mill Creek North 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, photo-documentation, and assessments of wetland hydrology. Hydrology visits occurred on March 6, 19, and April 10, 2014. Vegetation surveys occurred on August 18-20, 2014.

² Estimated values are presented with their corresponding statistical confidence interval. For example, 88% survival (CI_{80%} = 86-90%) means we are 88% confident that the true survival value is between 86% and 90%.

What is the SR 502 Mill Creek North Mitigation Site?

This 64.64-acre mitigation site (Figure 1) is a combination of wetland establishment and wetland rehabilitation. This site was created to partially compensate for the loss of 11.12 acres of wetlands due to road improvements along SR 502. The newly established ponded depressions, channel realignment and surrounding scrub-shrub and forested areas are designed to provide mitigation for lost wetland functions including wildlife habitat, nutrient and sediment removal, and flood flow attenuation.

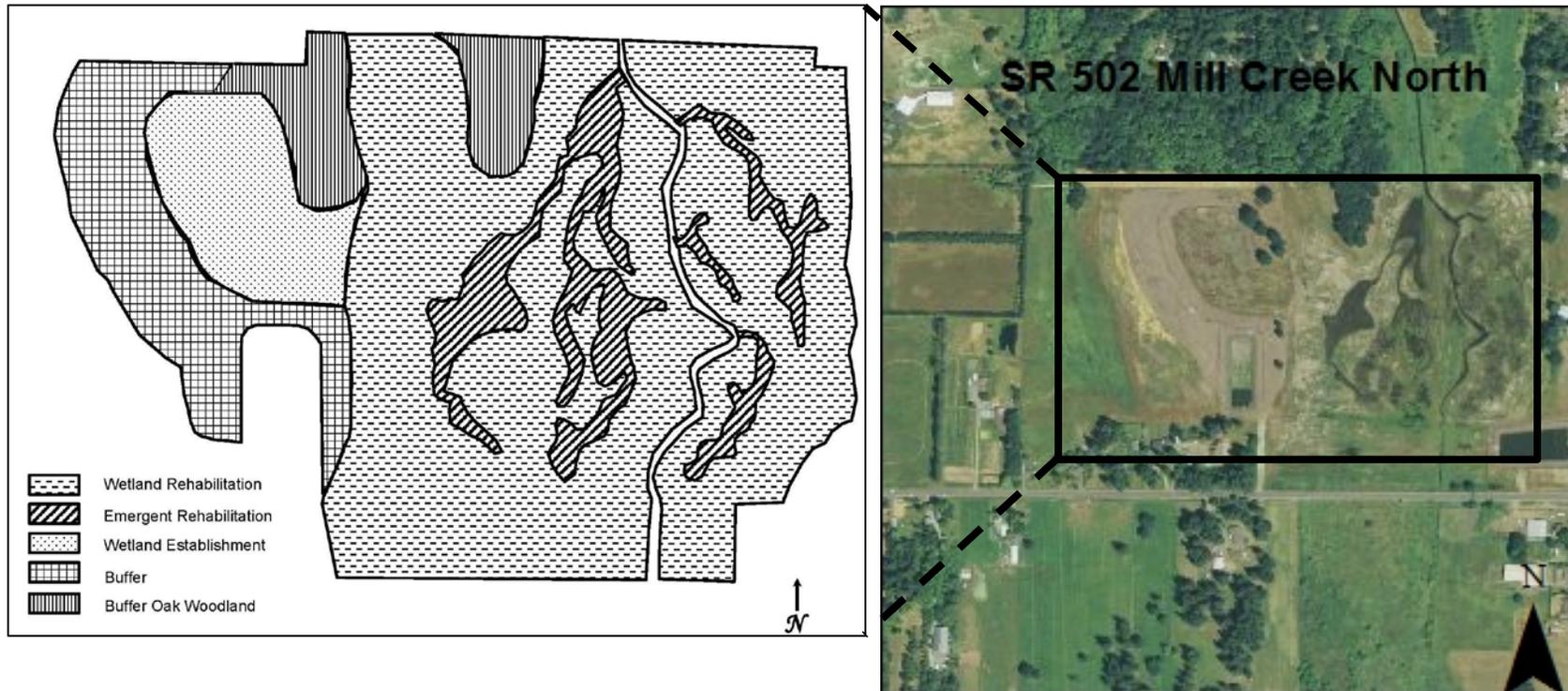


Figure 1 Site Sketch

The SR 502 Mill Creek North Mitigation Site contains two stands of Oregon White Oak with an enhanced understory. Emergent and scrub-shrub areas flank the channel of Mill Creek. Appendix 2 includes site directions.

What are the performance standards for this site?

Year 1

Performance Standard 1

The soils will be saturated to the surface, or standing water will be present 12 inches or less below the surface for at least 10 percent of the growing season (growing season as defined in the Soil Survey of Clark County, WA., USDA, 1972) in years when rainfall meets or exceeds the 30-year precipitation average.

Performance Standard 2

At monitoring year 1, there will be a minimum survival rate of 90 percent in all areas identified on the Revegetation Concept as Wetland Creation, Wetland Enhancement, Wetland Buffer, and Oak Woodland Preservation/Enhancement Areas.

Performance Standard 3

The aerial extent of blackberry species (*Rubus* species) and Class B (WA Dept of Agriculture and Clark County Weed Board) noxious weeds will not exceed 15 percent in the combined wetland and buffer areas.

Performance Standard 4

If/when detected, Class A Noxious Weeds (WA Dept. of Agriculture and Clark County), Japanese Knotweed, and Purple Loosetrife shall be treated so that the species do not exist on the site. These species shall not be included in the 15 percent cover allowed for invasive species.

Performance Standard 5

At monitoring years 1, 3, 5, and 7, the aerial extent of Reed Canarygrass shall not exceed 25 percent total cover in the wetland creation, wetland enhancement, or buffer enhancement areas.

Appendix 1 shows the planting plan (WSDOT 2012).

How were the performance standards evaluated?

To evaluate standards for vegetative cover, a segmented baseline was established parallel to the site boundary with one on either side of Mill Creek (Figure 2). Twenty-seven sampling transects were randomly placed perpendicular to the baseline. The unequal belt transect method was used to estimate woody survival (Performance Standard 2), and the point intercept method was used to estimate reed canarygrass cover (Performance Standard 5). A total of eighty-five twenty-meter sample units with a resolution of forty points were used to estimate reed canarygrass cover. The presence or absence of Class A Noxious Weeds and the cover of blackberries and Class B Noxious Weeds was evaluated qualitatively with visual estimates (Performance Standards 3 and 4).

WSDOT staff collected hydrology 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) (Performance Standard 1).

For additional details on the methods, see the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).

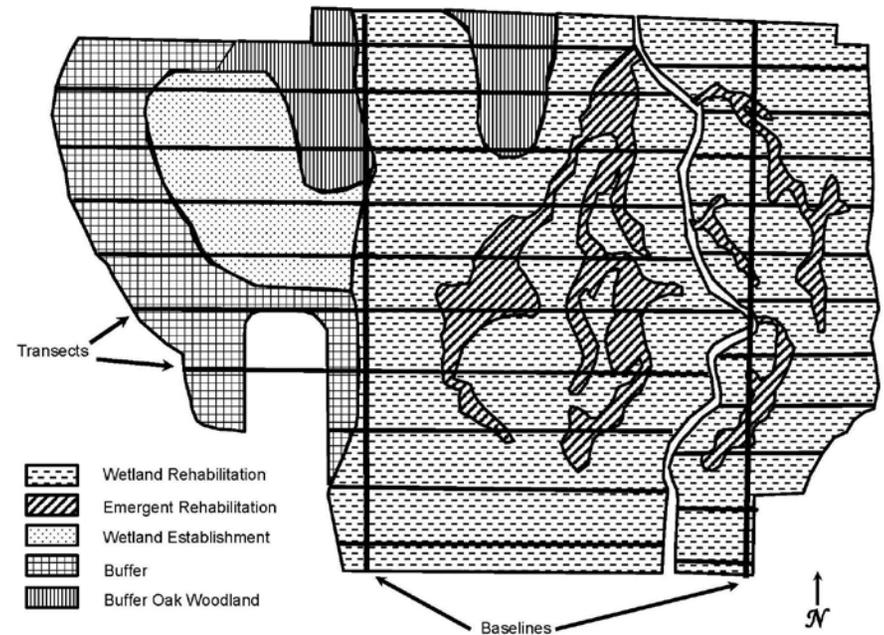


Figure 2 Site Sampling Design (2014)

How is the site developing?

In general the site is developing on a positive trajectory. The survival of native woody plantings is just shy of meeting the performance standard, but within the confidence intervals. The emergent zone has developed rapidly with a diverse mosaic of native herbaceous species. Although there is no performance standard for year one, cover was qualitatively assessed at 75 percent meeting the final-year performance standard. The cover of reed canarygrass is a little high but still below the performance standard threshold, and continued weed management should prevent the threshold from being met or exceeded.

The site was intended to provide wildlife habitat and food chain support, and it appears that both functions are supported. Preservation and planting of a large block of land within the Mill Creek watershed will increase overall habitat for numerous upland and wetland wildlife species. The interspersed wetland and upland habitats have created areas for nesting and foraging, cover, and food chain support. In the first year of monitoring, twenty-one species of birds have already been observed. Deer have been observed browsing vegetation on the site, and rodents and birds have been observed using the habitat structures. Raccoon, garter snakes, and rabbits have also been observed.

Flood attenuation, sediment and toxicant retention, and nutrient removal and transformation were other functions intended for this site. Grading and plant establishment activities have likely enhanced the performance of these functions. The newly established depression wetland is being subjected to longer term seasonal inundation promoting nutrient and sediment removal (Photo 1).

Results for Performance Standard 1
(Wetland hydrology present):

On all three hydrology visits each of the three ground monitoring wells was either saturated to the surface or had water within the top twelve inches of the soil surface. A majority of the site was either inundated or saturated to the surface on each of the three hydrology visits (Photo 1). See Appendix 3 Table 2 for complete results.

Results for Performance Standard 2
(90% survival of planted woody species):

Survival of planted woody species across the site is estimated at 88 percent ($CI_{80\%} = 86-90\%$) (Photos 2 and 3). This fails to meet the performance standard, but is within the confidence interval. There was significant die-off in between the two Oregon white oak preserves and in the southeast corner of the site that experienced an extended period of inundation.



Photo 1
Inundation within the wetland establishment (March 2014)

Results for Performance Standard 3

(15% cover of Class B Noxious weeds and Blackberry species):

Cover of invasive species across the site is estimated at less than five percent. This consists exclusively of Himalayan blackberry (*Rubus armeniacus*). The majority of which was located in the southeast corner of the site, as small individual starts.

Results for Performance Standard 4

(Presence/absence of Class A noxious weeds, Purple loosestrife, and Japanese knotweed):

No Class A noxious weeds or Japanese knotweed were observed on site. However three individual specimens of Purple loosestrife were observed in the reestablished wetland. These individuals were hand pulled and removed from the site upon observation.

Results for Performance Standard 5

(25% cover of reed canarygrass):

Reed canarygrass cover is estimated at 20% ($CI_{80\%} = 17-22\%$). The majority of the reed canarygrass is located within the reestablished wetland. One-hundred and thirty five hours were spent treating reed canarygrass throughout the year, this effort will continue to ensure the establishment of native herbaceous and woody species.



Photo 2
Woody survival in the rehabilitated wetland (August 2014)



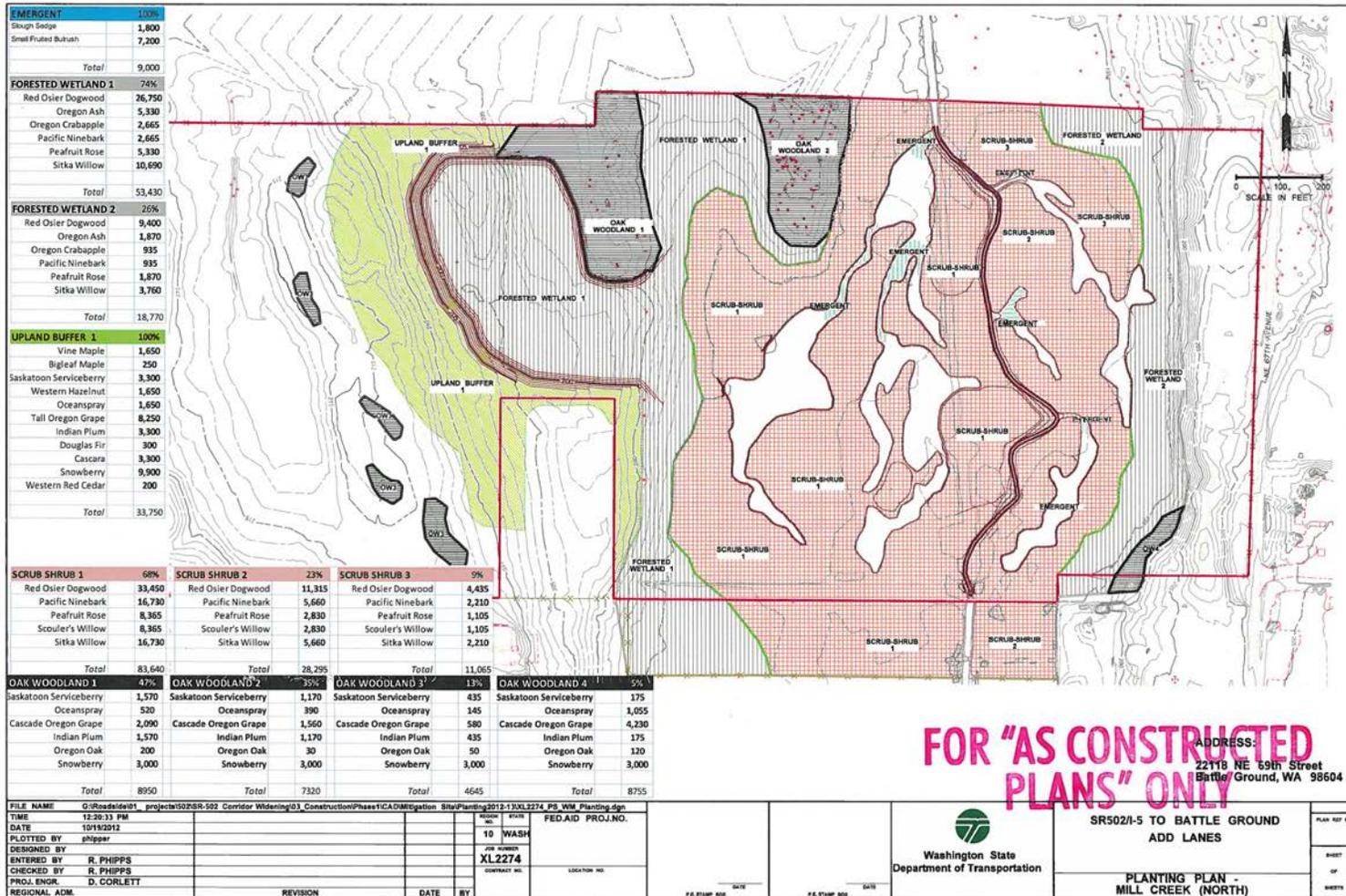
Photo 3
Woody survival in the upland buffer (August 2014)

What is planned for this site?

The region has plans to replant and continue weed control as needed.

Appendix 1 – Planting Plan

(from WSDOT 2012)



Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on August 20, 2014 and document current site development.



Photo Point 1a



Photo Point 1b



Photo Point 1c



Photo Point 1d

The photographs below were taken from permanent photo-points on August 20, 2014 and document current site development.



Photo Point 2a



Photo Point 2b



Photo Point 2c



Photo Point 3a

The photographs below were taken from permanent photo-points on August 20, 2014 and document current site development.



Photo Point 3b



Photo Point 3c



Photo Point 3d



Photo Point 4a

The photographs below were taken from permanent photo-points on August 20, 2014 and document current site development.



Photo Point 4b



Photo Point 5a



Photo Point 5b



Photo Point 6a

The photographs below were taken from permanent photo-points on August 20, 2014 and document current site development.

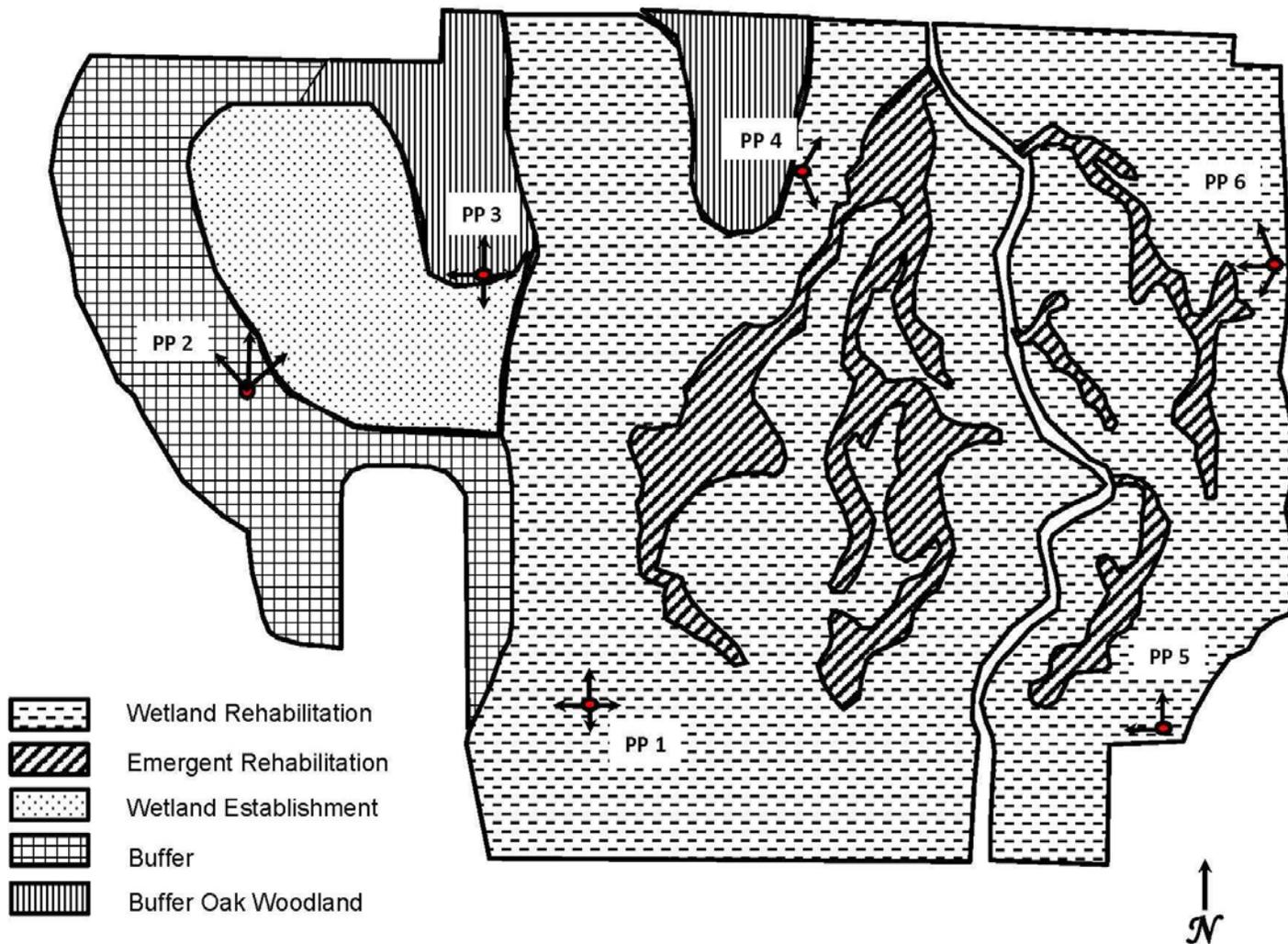


Photo Point 6b



Photo Point 6c

Photo Point Map



Driving Directions:

From I-5 take Exit 11 to Battle Ground. Travel east on SR 502 for about 7 miles. Turn left onto driveway at approximately 5804 NE 219th St.

Appendix 3 – Data Tables

Table 1. Mitigation site acreage³

Mitigation Type	Cedars Creek Mitigation Site (ac)	Mill Creek North Mitigation Site (ac)	Sunset Oaks Mitigation Site (ac)	Mill Creek Complex South (ac) ³	East Fork Lewis Mitigation Bank (credits)	Totals (ac)
Wetland Establishment	0.33	3.88		1.63		5.84
Wetland Enhancement				0.11		0.11
Wetland Reestablishment		13.91	6.54		4.72	25.17
Wetland Preservation				0.5		0.5
Future Mitigation						
Establishment	4.37	0.68				5.05
Reestablishment		12.2	14.39			26.59

Table 2. Hydrology Observations.

Date	Surface Observations	Well ID #	Water Level (inches below soil surface unless otherwise noted)
March 6, 2014	Entire site is inundated.	1	Saturated to the soil surface
		2	Saturated to the soil surface
		3	Saturated to the soil surface
March 19, 2014	Water is lower than first visit, but much of the site still appears saturated with pockets of inundation.	1	Saturated to the soil surface
		2	Saturated to the soil surface
		3	0.5"
April 10, 2014	Entire establishment area inundated or saturated to surface.	2	2.5"
		1	Saturated to the soil surface
		3	Saturated to the soil surface

³ Acreage numbers for Mill Creek Complex South were taken from the Final Critical Areas Mitigation Plan (WSDOT 2012). All other acreage numbers were taken from USACE Permit Number NWS-2009-1093. Additional mitigation for the SR 502 Corridor Widening project will be added in 2015

Literature Cited

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