SR 539 Widening Project: Horton Road to Tenmile Road (MP 1.64 to MP 6.26) (Strand Road) Mitigation Site

WIN #A53902D

USACE 200500927

Northwest Region

2010 MONITORING REPORT

Wetland Assessment and Monitoring Program

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USACE 200500927

General Site Information		
USACE Number	200500927	
Mitigation Location	East of Bellingham on SR 9 in Whatcom Co.	
LLID Number	1222015487586	
Construction Date	2008	
Monitoring Period	2010-2019	
Year of Monitoring	Year 1 of 10	
Type of Project Impact	Wetland	Buffer
Area of Project Impact	5.97 acres	5.97 acres
Type of Mitigation[1]	Wetland Enhancement	Wetland Buffer Enhancement
Area of Mitigation	6.26 acres	4.37 acres

[1] Additional mitigation for this project is provided at the Larson Road and Potter Road mitigation sites. See Appendix 2 for more information.

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Summary of Monitoring Results and Management Activities (2010)

Performance Standards	2010 Results[2]	Management Activities
Wetland Hydrology	Not formerly assessed in 2010 / Indicators identified in summer vegetation monitoring.	
100% survival of planted woody species in the wetland and the buffer	96% survival ($CI_{80\%}$ = 95-96%)	
Not more than 30% cover by non-native invasive species across the site	5% cover	Manual weed control and herbicide application occurred in July, August, September, and October of 2010.

Report Introduction

This report summarizes Year 1 monitoring activities at the State Route (SR) 539 Strand Road Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site development. Monitoring activities included vegetation surveys and photo-documentation on July 21st, 2010.

[2] Estimated values are presented with their corresponding statistical confidence interval. For example, 96% ($CI_{80\%}$ = 95-96% cover) means we are 80% confident that the true aerial cover value is between 95% and 96%.

What is the SR 539 Strand Road Mitigation Site?

This 10.54 acre mitigation site (Figure 1) provides 6.26 acres of wetland enhancement and 4.37 acres of wetland buffer enhancement. This site was created to partially compensate for the loss of 5.97 acres of wetlands due to road improvements along SR 539. The enhanced wetland area is anticipated to provide flood flow alteration, sediment removal, nutrient and toxicant removal, general wildlife habitat, and native plant species richness.

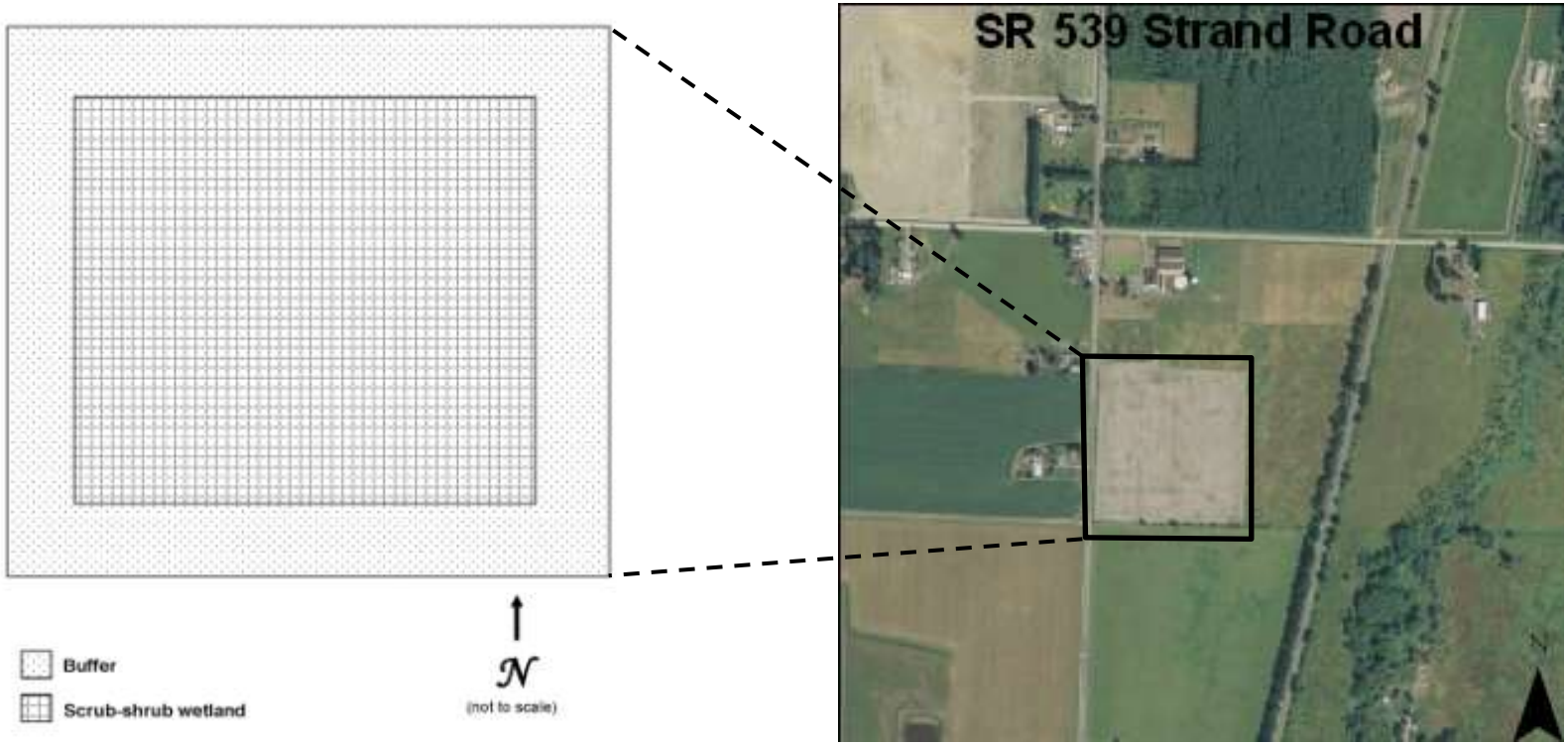


Figure 1 Site Sketch

The SR 539 Strand Road Mitigation Site consists primarily of dense scrub-shrub with an underlying herbaceous layer of vegetation surrounded by an 80-foot enhanced buffer.

What are the performance standards for this site?

Performance Standard 1
The 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% of the growing season when rainfall meets or exceeds the 30-year average.

Performance Standard 2
The vegetation will achieve 100 percent survival of planted woody species (trees and shrubs) at the end of the of the first year plant establishment period. If all dead woody plantings are replaced, the performance measure will be met.

Performance Standard 3
No more than 30 percent cover by non-native invasive species as listed in Table 24 across the entire mitigation site. The presence of Japanese knotweed or purple loosestrife will initiate the invasive species contingency measures.

Appendix 1 provides the complete text of the performance standards for this project, and Appendix 3 shows the planting plan (Grant 2007).

How were the performance standards evaluated?

An assessment of hydrology indicators was completed using methods described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (USACE 2010) (Performance Standard 1).

To evaluate standards for vegetative survival, a 200 meter baseline was established parallel to the northern border of the site (Figure 2). Ten sampling transects were placed perpendicular to the baseline using the restricted random method. The unequal belt transect method was used to determine woody survival (Performance Standard 2). Ten one meter wide belt transects were placed on each transect.

The cover of non-native invasive species across the site was qualitatively estimated (Performance Standard 3).

For additional details on the methods, view the WSDOT Wetland Mitigation Site Monitoring Methods Paper (WSDOT 2008).

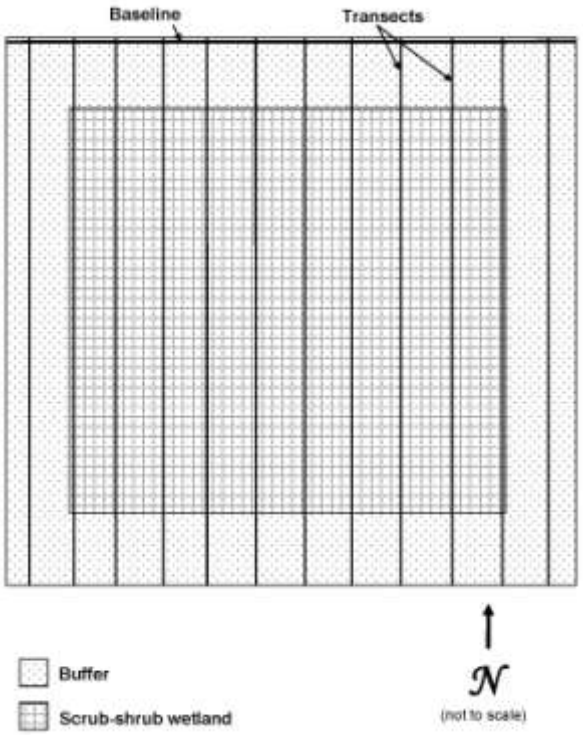


Figure 2 Site Sampling Design (2010)

How is the site developing?

This site is quickly developing into a dense and diverse scrub-shrub wetland. Plant establishment has been successful and non-native invasive species cover has been managed to remain at a low level.

The enhanced wetland is intended to provide flood flow alteration, sediment removal and nutrient and toxicant removal. The structures needed to facilitate these functions are present on site such as slight depressions in topography to store water and the early development of an herbaceous understory. During monitoring in July, WSDOT staff confirmed the presence of the twelve different woody species listed on the planting plan. This plant diversity provides general habitat suitability. Several species of birds were observed on site as well as rabbits and signs of herbivory.

The Sitka spruce (*Picea sitchensis*) and western red cedar (*Thuja plicata*) planted on site are stressed. The pathogen *Phytophthora* was found to be present on site by the WSU Plant Pathology Lab. The pathogen may or may not have contributed to poor plant health. Additional factors are wind and hydrology. The conifers have continued to increase in vigor over time.

Overall, the site is developing well and will likely achieve density standards in Year-3.

Results for Performance Standard 1
(Wetland Hydrology):

The wetland monitoring staff did not receive information regarding this site in time for hydrology monitoring. However, during vegetation monitoring in the summer, hydrology indicators were observed including soil cracks, water marks, and erosion of mulch from run-off (Photo 1). The high survival rate of facultative and wetter species also suggests the presence of wetland hydrology.

Results for Performance Standard 2
(100% survival of woody plantings across the site):

Survival of woody species across the site is 96% ($CI_{80\%}$ = 95-96%). Most species displayed vigorous growth (Photo 2). Dominant species include willows (*Salix* spp.), redosier dogwood (*Cornus sericea*), roses (*Rosa* spp.), and twinberry honeysuckle (*Lonicera involucrata*).

Photo 1
Soil cracks in the scrub-shrub wetland (July 2010)

Photo 2
Woody cover in the wetland (July 2010)

Results for Performance Standard 3
(No more than 30% cover by non-native invasive species):

Due to the low cover of non-native invasive species throughout the site, this standard was addressed qualitatively. Cover is estimated at five percent. Species observed include reed canarygrass (*Phalaris arundinacea*) and Himalayan blackberry (*Rubus armeniacus*). The planting area is surrounded on three sides by fields of reed canarygrass, so it will be difficult to keep this species from encroaching. Maintenance of this site includes mowing a ten foot perimeter around the plantings to discourage this encroachment until the installed plants have time to become established.

What is planned for this site?

Ongoing weed control is planned through the 2011 growing season.

Appendix 1 – Goals and Performance Standards

The following excerpt is from the *Final Wetland and Stream Mitigation Report SR 539Widening Project: Horton Road to Tenmile Road (MP 1.64 to MP 6.26) (WSDOT 2007).* The performance criteria addressed this year are identified in **bold** font.

GOALS AND OBJECTIVES

Goal

The goal of the proposed compensatory mitigation is to replace wetland acreage and functions lost due to wetland impacts associated with the proposed project.

Potter Road and Strand Road Mitigation Sites

The proposed mitigation on the Potter Road Mitigation Site intends to create 10.40 acres of wetland that will contain forested and scrub-shrub vegetation communities, and enhance 6.53 acres of scrub-shrub and forested vegetation communities. At the Strand Road Mitigation Site, 6.26 acres of existing wetland will be enhanced to a scrub-shrub wetland vegetation community.

Functions and Values

Strand Road Mitigation Site

The enhanced wetland area is anticipated to provide flood flow alteration, sediment removal, nutrient and toxicant removal, general wildlife habitat, and native plant richness.

Dense woody vegetation consisting of shrubs and trees installed on the site will function to slow high flood flows during winter flood events. Underlying herbaceous vegetation will also function to slow flows and facilitate sediment, nutrient, and toxicant removal from surface water entering the site from adjacent properties and existing roads. High diversity of plant species (i.e., high native plant richness) will provide general suitability for habitat.

Objectives, Interim Performance Measures, and Success Standards

The following list describes the thresholds that will determine site success and guide management for the Larson Road, Potter Road, and Strand Road Mitigation Sites.

Objective 1 – Hydrology

The mitigation sites will possess ground and/or surface water inundation or saturation sufficient to support the wetland sites.

Performance Measures

- ***Years 1-9*—The 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% of the growing season when rainfall meets or exceeds the 30-year average.**

- *Year 5*—The wetland areas will be delineated using current methods. The Potter Road Mitigation Site will contain 10.40 acres of created wetland.

Success Standards

- *Year 10*—The wetland areas will be delineated using current methods. The Potter Road Mitigation Site will contain 10.40 acres of created wetland.

Objective 2 – Wetland Vegetation

The Strand Road Mitigation Site will include areas of scrub-shrub wetland communities and the Potter Road Mitigation Site will include areas of forested wetland and scrub-shrub wetland communities.

Performance Measures

- ***Year 1*—The vegetation will achieve 100 percent survival of planted woody species (trees and shrubs) at the end of the of the first year plant establishment period. If all dead woody plantings are replaced, the performance measure will be met.**

- *Year 3*—The native woody species will maintain a minimum average density of four plants per 100 square feet in scrub-shrub and forested wetland communities. Native colonizing vegetation will be included in this coverage calculation.

- *Year 5*—Native facultative or wetter woody species will achieve a minimum of 35 percent coverage in the forested and scrub-shrub wetland communities. Native colonizing vegetation will be included in these coverage calculations.

- *Year 7*—Native facultative or wetter woody species will achieve a minimum of 50 percent coverage in the forested and scrub-shrub wetland communities. Native colonizing vegetation will be included in these coverage calculations.

- ***Years 1-9*— No more than 30 percent cover by non-native invasive species as listed in Table 24 across the entire mitigation site. The presence of Japanese knotweed or purple loosestrife will initiate the invasive species contingency measures.**

Success Standards

- *Year 10*—Native facultative or wetter woody species will achieve a minimum of 60 percent coverage in the forested and scrub-shrub wetland communities. Native colonizing vegetation will be included in these coverage calculations.

- *Year 10*— No more than 30 percent cover by non-native invasive species as listed in Table 24 across the entire mitigation site.

Objective 3 – Buffer Vegetation

The Potter Road and Strand Road Mitigation Sites will include a total of approximately 13.61 acres of enhanced buffer vegetation.

Performance Measures

- ***Year 1*—The vegetation will achieve 100 percent survival of planted woody species at the end of the of the first year plant establishment period. If all dead woody plantings are replaced, the performance measure will be met.**

- *Year 3*—The native woody species will maintain a minimum average density of four plants per 100 square feet in buffer communities.

- *Year 5*—Native woody species will achieve a minimum of 30 percent coverage in the buffer community. Native colonizing vegetation will be included in this coverage calculation.

- *Year 7*—Native woody species will achieve a minimum of 40 percent coverage in the buffer community. Native colonizing vegetation will be included in this coverage calculation.

- ***Years 1-9*—No more than 30 percent cover by non-native invasive species as listed in Table 24 in the buffer communities across the entire mitigation site. The presence of Japanese knotweed or purple loosestrife will initiate the invasive species contingency measures.**

Success Standards

- *Year 10*—Native woody species will achieve a minimum of 50 percent coverage in the buffer community. Native colonizing vegetation will be included in this coverage calculation.

- *Year 10*—No more than 30 percent cover by non-native invasive species as listed in Table 24 in the buffer communities across the entire mitigation site.

Table 1. Non-native invasive species

Scientific Name	Common Name
Buddleia alternifolia	fountain butterfly bush
Cirsium arvense	Canada thistle
Cytisus scoparius	Scot's broom
Geranium robertianum	herb Robert
Hedera helix	English ivy
Ilex aquifolium	English holly
Iris pseudoacorus	yellow flag iris
Lythrum salicaria	purple loosestrife
Phalaris arundinacea	reed canarygrass
Polygonum cuspidatum (and related species and hybrids)	Japanese knotweed
Prunus laurocerasus	English laurel
Rubus laciniatus	evergreen blackberry
Rubus armeniacus (discolor)	Himalaya or Armenian blackberry

Monitoring Plan

The mitigation site will be monitored for a minimum of ten years or longer as needed to meet the performance standards. Formal monitoring procedures will be performed in years one, three, five, seven, and ten after initial acceptance of the mitigation construction. The site should be evaluated informally the summer following plant installation to evaluate survival rates and document the presence of non-native invasive species. Informal (qualitative) monitoring will occur in years two, four, six, eight, and nine. Monitoring reports will be submitted to the Corps of Engineers, Ecology, Whatcom County, and other resource agencies

for review and comment. Monitoring reports will be completed by April following the previous monitoring activities occurring in years one, three, five, seven, and ten. Mitigation success will be measured by the attainment of performance standards.

Appendix 2 – Data Tables

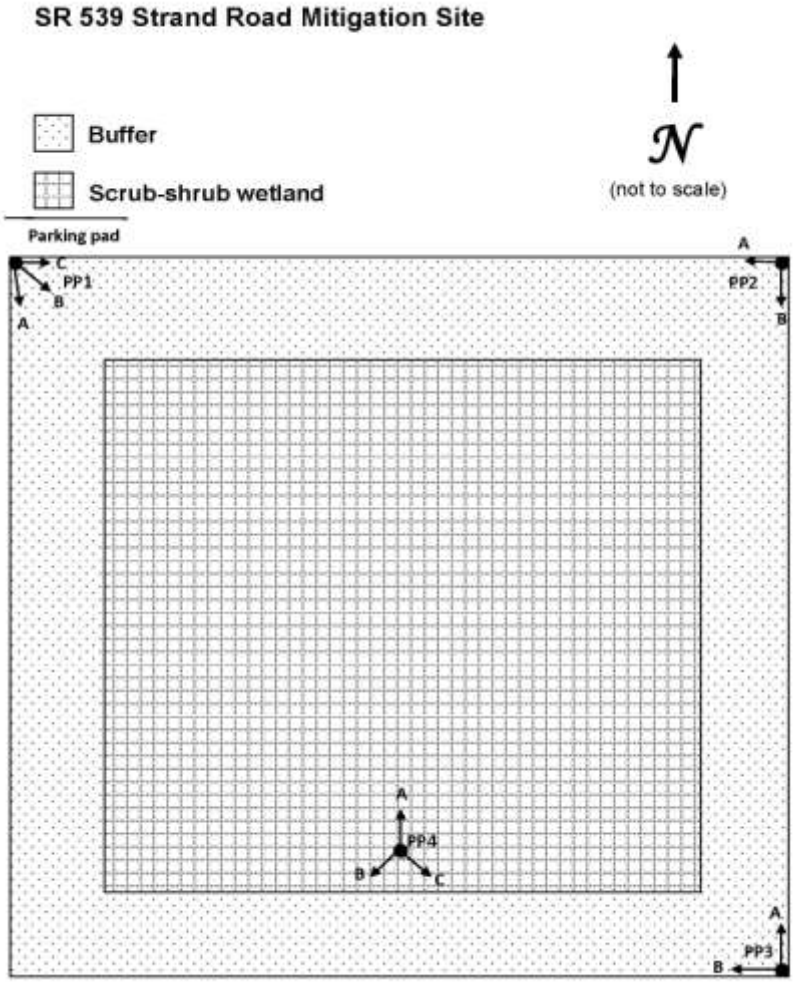
Table 1.

Mitigation Type	Potter Road Mitigation Site (ac)	Strand Road Mitigation Site (ac)	Wiser Lake Mitigation Site (ac)	Larson Road Mitigation Site (ac)	Totals (ac)
SR 539 Horton Road to Tenmile Road USACE #200500927					
Creation	**7.66**	**0.00**	**0.00**	**0.37**	**8.03**
Enhancement	**3.57**	**6.26**	**0.00**	**1.12**	**10.95**
Buffer Enhancement	**4.47**	**4.37**	**0.00**	**0.10**	**8.94**
SR 539 Tenmile Road to Badger Rd (SR 546) USACE #NWS-2007-470-SOD					
Creation	**1.74**	**0.00**	**0.00**	**0.00**	**1.74**
Enhancement	**1.49**	**0.00**	**2.53**	**0.00**	**4.02**
Buffer Enhancement	**4.77**	**0.00**	**2.09**	**0.00**	**6.86**
SR 542 CED East Church Mountain Rd USACE #NWS-2009-786					
Creation	**0.13**	**0.00**	**0.00**	**0.00**	**0.13**
Enhancement	**0.26**	**0.00**	**0.00**	**0.00**	**0.26**
Buffer Enhancement	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Future Mitigation					
Creation	**0.86**	**0.00**	**0.00**	**0.00**	**0.86**
Enhancement	**1.19**	**0.00**	**0.00**	**0.00**	**1.19**

Appendix 3 – Planting Plan

(from Grant 2007)

Appendix 4 – Photo Points



The photographs below were taken from permanent photo-points on July 21, 2010 and document current site development.

Photo Point 1a

Photo Point 1b

Photo Point 1c

Photo Point 2a

Photo Point 2b

Photo Point 3a

Photo Point 3b

Photo Point 4a

Photo Point 4b

Photo Point 4c

Literature Cited

1. Grant, L. 2007. Final Wetland and Stream Mitigation Report SR 539 Widening Project: Horton to Tenmile Road (MP 1.64 to MP 6.26) Planting Plan. WSDOT. Northwest Region, Seattle, WA.

2. [USACE] United States Army Corps of Engineers. 2005. Department of the Army Permit Number 200500927.

3. United States 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. Vicksburg (MS): US Army Engineer Research and Development Center. ERDC/EL TR-10-3. Available at: http://www.usace.army.mil/CECW/Documents/cecwo/reg/west_mt_finalsupp.pdf

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5. Washington State Department of Transportation (WSDOT) WSDOT Wetland Mitigation Site Monitoring Methods (12 June 2008). http://www.wsdot.wa.gov/NR/rdonlyres/C211AB59-D5A2-4AA2-8A76-3D9A77E01203/0/MethodsWhitePaper052004.pdf