

SR 167 North Sumner Interchange Wetland Mitigation Site

USACE IP 1998-4-00422

Olympic Region

2010 MONITORING REPORT

Wetland Assessment and Monitoring Program

Issued March 2011



**Washington State
Department of Transportation**

Environmental Services Office

Author:

Doug Littauer

Editor:

Tony Bush

Contributors:

Teri Fisher

Diana Martinez


For additional information about this report or the WSDOT Wetland Assessment and Monitoring Program, please contact:

Tony Bush, Wetland Assessment and Monitoring Program
WSDOT, Environmental Services Office
P. O. Box 47332, Olympia, WA 98504
Phone: 360-570-6640 E-mail: busht@wsdot.wa.gov

Monitoring reports are published on the web at: <http://www.wsdot.wa.gov/Environment/Biology/Wetlands/reports.htm>

SR 167 North Sumner Interchange Mitigation Site

USACE IP 1998-4-00422

	General Site Information			
	USACE NWP 23 Number	1998-4-00422		
	WDFW HPA Number	ST-F4047-02		
	Mitigation Location	West of SR 167 near the 27 th Street exit, east of Soaton Creek, Pierce County		
	LLID Number	1222491472284		
	Construction Date	2005-2006		
	Monitoring Period	2006-2015		
	Year of Monitoring	5 of 10		
	Area of Project Impact	1.42 acres		
	Type of Mitigation	Wetland Establishment	Wetland Enhancement	Riparian Enhancement
	Area of Mitigation	1.85 acres	2.38 acres	2.71 acres

This Page Intentionally Left Blank

Summary of Monitoring Results and Management Activities (2010)

Performance Standards and Permit Requirements	2010 Results ¹	Management Activities
80% cover of emergent vegetation and ≥ 4 native, facultative and wetter species each with $\geq 10\%$ cover represented.	75% cover (qualitative), 2 species with 10% cover	
80% cover of woody species in the scrub-shrub restoration/creation and forested enhancement areas and ≥ 3 different shrub species, each with $\geq 10\%$ cover, and 6 different tree species, each with $\geq 5\%$ cover.	Forested: 99% (CI _{99%} = 97-100% cover) 2 shrub and 5 tree species meet cover criteria Scrub-shrub: 80% (CI _{80%} = 64-96% cover) 2 shrub species, 4 tree species meet criteria	
80% cover of trees and shrubs in the buffer with ≥ 4 different tree species each with $\geq 10\%$ cover.	37% (CI _{80%} = 29-44% cover) No species meet cover criteria	Replanting
Invasive plant species cover shall be $< 25\%$ in the wetland restoration/creation and enhancement forested areas.	Scrub-shrub and Emergent: 57% (CI _{80%} = 50-64% cover) Forested: 43% (CI _{80%} = 30-55% cover) Riparian: 95% (qualitative)	Weed control
The wetland emergent and scrub-shrub creation areas will be periodically saturated to the surface for $\geq 12.5\%$ of the growing season	Present	
At least 6 snags and 15 loafing logs/downed logs will be present in the mitigation area.	Present	
80 percent survival of woody plantings in the riparian enhancement area	10 percent (qualitative)	Replanting, weed control

Report Introduction

This report summarizes fifth-year (Year-5) monitoring activities at the State Route (SR) 167 North Sumner Interchange Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site development. Monitoring activities include vegetation surveys, photo-documentation, and assessments of wetland hydrology. Vegetation monitoring occurred on August 16th, 17th and 18th. Hydrology visits occurred on February 22nd, March 10th, and March 22nd, 2010.

¹ Estimated values are presented with their corresponding statistical confidence interval. For example, 99% (CI_{99%} = 97-100% cover) means we are 99% confident that the true aerial cover value is between 97% and 100%.

What is the SR 167 North Sumner Interchange Mitigation Site?

This 8.6-acre mitigation site (Figure 1) was created to compensate for the loss of 1.42 acres of Category II and III wetlands due to the construction of a new split diamond interchange and road expansions along SR 167. The site consists of wetland establishment (formerly called creation), wetland enhancement, riparian enhancement, and buffer. The site is designed to provide lost wetland functions including wildlife habitat, storm and floodwater storage, and water quality improvement.

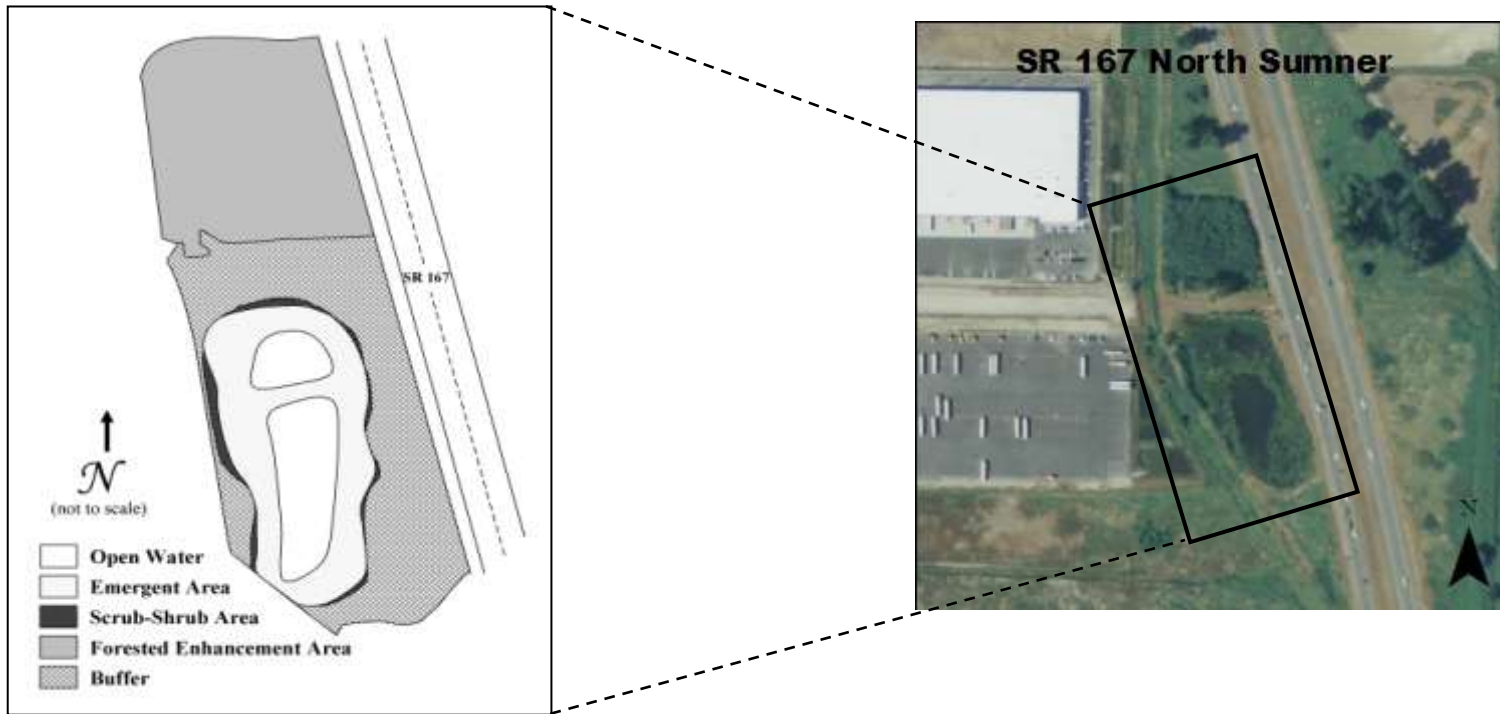


Figure 1 Site Sketch

The SR 167 North Sumner Mitigation Site consists of an established emergent wetland bordered by scrub-shrub wetland and buffer with a connection to Soaton Creek. An emergent wetland north of the established wetland was enhanced with native woody vegetation. A stream buffer was planted west of the wetland on both sides of Soaton Creek (not visible in sketch).

What are the performance criteria for this site?

Performance Standard 1 and Permit Requirement 1

Total cover of emergent vegetation in the emergent wetland area will be at least 80% and will have at least four native, facultative and wetter species each with at least 10% cover represented.

Performance Standard 2 and Permit Requirement 2

80% cover of woody species and at least three different shrub species, each with at least 10% cover, and six different tree species, each with at least 5% cover.

Performance Standard 3 and Permit Requirement 3

80% cover of trees and shrubs in the buffer with at least four different tree species each with at least 10% cover.

Performance Standard 4 and Permit Requirement 4

Invasive plant species cover shall be less than 25% in the wetland restoration/creation and enhancement forested areas. Invasive plant species control in the riparian restoration area will be limited to the area immediately around the installed plants.

Performance Standard 5 and Permit Requirement 5

Water levels in the mitigation areas will be sufficient to support hydrophytic plantings. The wetland emergent and scrub-shrub creation areas will be periodically saturated to the surface for at least 12.5% of the growing season (March 1 to October 31). Surface saturation will be measured by field observation. Groundwater monitoring wells may be installed and maintained until the presence of wetland hydrology is determined.

Performance Standard 6

At least six snags and fifteen loafing logs/downed logs will be present in the mitigation area.

Permit Requirement 6

Maintenance as necessary for three years to ensure 80 percent survival of woody plantings in the riparian enhancement area

Appendix 1 provides the complete text of the performance standards for this project, and Appendix 4 shows the planting plan (WSDOT 2006).

How were the performance standards evaluated?

To evaluate standards for vegetative cover, three baselines were established (Figure 2). Due to the configuration of the different zones, aerial cover data was collected separately for each planted community. To determine the cover of woody vegetation in the forested and scrub-shrub wetlands, two different baselines were utilized. The primary baseline consisted of three sections located around the perimeter of the upland buffer. The line intercept method was used to estimate woody cover in the scrub-shrub wetland (Performance Standard 2 and Permit Requirement 2) and the cover of woody species in the upland buffer (Performance Standard 3 and Permit Requirement 3). An additional baseline was established along the southern margin of the enhanced forested wetland. The line intercept method was used to estimate woody cover in the forested wetland (Performance Standard 2 and Permit Requirement 2) and the point-intercept method was used to determine the cover of invasive species in this zone (Performance Standard 4 and Permit Requirement 4). A baseline was established through the center of the site to estimate the cover of invasive species in the emergent and scrub-shrub wetlands (Performance Standard 4 and Permit Requirement 4). The cover of emergent species was estimated qualitatively (Performance Standard 1 and Permit Requirement 1).

For additional details on the methods, see Appendix 2 of this report or view the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).

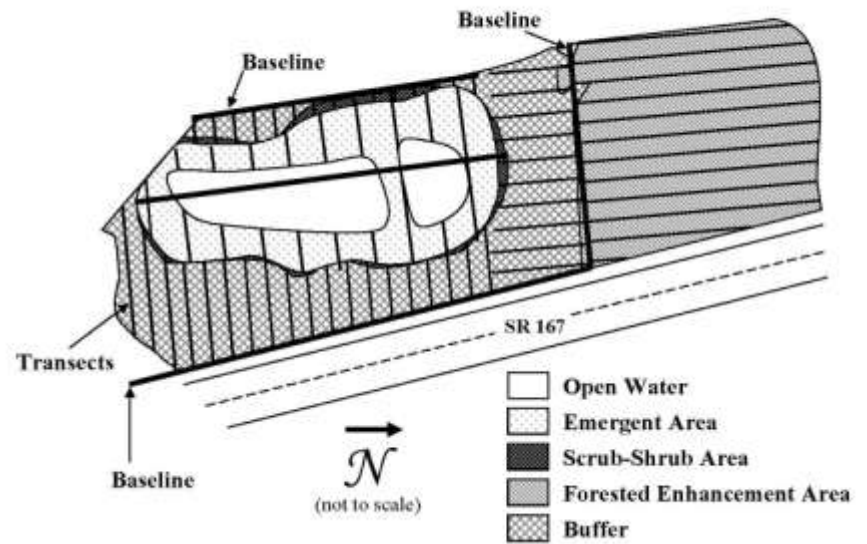


Figure 2 Site Sampling Design (2010)

How is the site developing?

The site continues to develop somewhat differently than originally intended due to higher water levels than expected as discussed in the Year-2 Annual Monitoring Report (WSDOT 2009). However, the vegetation in the wetland zones has established dense, diverse communities that are dominated by native species. Because the established scrub-shrub and the enhanced forested wetlands were sampled separately for woody cover, it is difficult to determine if the individual species cover standards were achieved, however, species diversity appears adequate and multiple layers of woody vegetation are present throughout the majority of both zones. Although reed canarygrass is present in all wetland zones, it does not appear to be a barrier to the establishment of native vegetation. Unfortunately, this is not the case with the riparian. While the woody vegetation in the upland buffer did not achieve the performance standard target, recent replanting and mulch ring applications should encourage the achievement of this standard in future years.

Results for Performance Standard 1 & Permit Requirement 1
(80% cover of emergent vegetation and four native species with at least 10% aerial cover):

Aerial cover of native herbaceous vegetation in the emergent wetland is qualitatively estimated to be 75 percent (Photo 1). This estimate is slightly less than the 80 percent target. Two species, broadleaf cattail (*Typha latifolia*), and soft-stem bulrush (*Schoenoplectus tabernaemontani*), each provide at least 10 percent cover. Broadleaf cattail is very dominant in this community and provides an estimated 55 percent aerial cover. Soft-stem bulrush is estimated to provide 10 percent aerial cover; soft rush (*Juncus effusus*) and woolgrass (*Scirpus cyperinus*) each provide five percent cover.



Photo 1 Herbaceous cover in the emergent wetland (August 2010)

Results for Performance Standard 2 & Permit Requirement 2
(80% cover of woody species and at least three different shrub species, each with at least 10% cover, and six different tree species, each with at least 5% cover):

The aerial cover of native woody vegetation in the scrub-shrub wetland is 80% ($CI_{80\%} = 64-96\%$) (Photo 2), and 97% ($CI_{90\%} = 97-100\%$) in the enhanced forested wetland. Both of these mean values achieve the over-all cover target. In the scrub-shrub wetland, five tree species were estimated to provide greater than five percent cover, and two shrub species provide greater than ten percent cover. In the forested wetland, five trees were estimated to provide greater than five percent cover and two shrubs were estimated to provide greater than ten percent cover. See Tables 1 and 2 in Appendix 3 for detailed cover data.



Photo 2 Woody cover in the scrub-shrub wetland (August 2010)

Results for Performance Standard 3 & Permit Requirement 3
(80% cover of trees and shrubs in the buffer with at least four different tree species each with at least 10% cover):

The aerial cover of native woody vegetation in the upland buffer is 37% (CI_{80%} = 28-45%). Generally, cover in the buffer is most lacking in the area between the upland buffer and scrub-shrub wetland (Photo 3). Native cover is greater in the southern area of the upland buffer. Dominant species present in the buffer include snowberry (*Symphoricarpos albus*), Douglas-fir (*Pseudotsuga menziesii*), and roses (*Rosa* spp.) approximately one to two meters in height. No species in the upland buffer provide greater than ten percent cover.

Results for Performance Standard 4 & Permit Requirement 4
(Invasive plant species cover shall be less than 25% in the wetland restoration/creation, enhanced riparian area, and forested enhancement areas):

Invasive cover in the emergent and scrub-shrub wetland is estimated at 57% (CI_{80%} = 50-64%). The dominant invasive in these communities is reed canarygrass (*Phalaris arundinacea*), which is located primarily in the emergent plant community and is interspersed with the native herbaceous vegetation. Reed canarygrass is qualitatively estimated at 95 percent in the enhanced riparian area. The cover of invasive species in the enhanced forested wetland is 43% (CI_{80%} = 30-55%). Reed canarygrass is also the primary invasive in this zone and is present in clumps throughout the understory. Weed control did occur on this site in 2010 and will continue in 2011.



Photo 3
Woody cover in upland buffer (August 2010)

Results for Performance Standard 5 & Permit Requirement 5
(Wetland hydrology):

Monitoring records from February and March 2010 indicate wetland hydrology is present in all intended areas (See results in Appendix 3, Table 3). Surface saturation or inundation (Photo 4) was observed across the entire wetland establishment area during all hydrology monitoring visits.

Results for Performance Standard 6

(At least six snags and fifteen loafing logs/downed logs will be present):

All nine snags shown on the planting plan were observed in August 2010. Of the seventeen downed logs shown on the planting plan, eleven were observed. The remaining six logs were mapped in areas that were inundated during the August monitoring visit. It is likely that they are waterlogged and still present below the surface of the water.

Results for Permit Requirement 6

(80 percent survival of woody plantings in the riparian enhancement area):

The survival of woody plantings in the riparian area is qualitatively estimated at 10 percent. The high mortality of planted stakes in this zone is due to competition with reed canarygrass (*Phalaris arundinacea*), beaver herbivory, and high winter water levels and velocity.



Photo 4
Inundation in the emergent wetland (March 2010)

What is planned for this site?

Site managers will continue with ongoing weed control and watering as needed. The buffer area around the pond and the riparian area have been recently replanted and mulch rings have been installed around the new buffer plantings. The riparian area has recently been replanted.

Appendix 1 – Goals and Performance Standards

The following excerpt is from the *Environmental Mitigation Plan State Route 167 North Sumner Interchange* (WSDOT 2003). The performance criteria addressed this year are identified in **bold** font.

GOALS AND OBJECTIVES

4.1 *Mitigation Goal and Objectives*

The goal of the mitigation plan is to restore and enhance wetlands in the 32nd Street area and along Soaton Creek to provide increased biological habitat functions, storm and floodwater storage, and water quality improvement. This goal can be achieved through the following nine specific objectives:

1. Avoid construction impacts to wetlands that lie north and south of the mitigation area and to the riparian buffer along Soaton Creek;
2. Improve overall habitat function by creating/restoring 0.75 hectare (1.85 acres) of emergent, scrub-shrub, and forested wetland habitat;
3. Improve habitat functions by enhancing 2.06 hectares (5.09 acres) of degraded wetland and riparian habitat;
4. Improve buffer functions by enhancing a minimum 15-meter (50 foot) wide buffer located between the created/restored wetland and SR 167;
5. Enhance wildlife habitat by increasing structural and species diversity and by maintaining habitat features in the mitigation area;
6. Enhance fish habitat by establishing wetland adjacent to Soaton Creek that will provide off-channel habitat during periods of high flows;
7. Establish native vegetation in the restored wetland area in order to minimize reed canary grass (*Phalaris arundinacea*) on the site; and
8. Ensure sufficient hydrologic conditions to supportive native wetland species by properly grading and planting the restoration and enhancement areas.

4.2 *Performance Standards*

A specific set of performance standards have been established that correspond to the stated mitigation goal and objectives. These measurable standards will be used during the monitoring period to determine if the on-site mitigation goals and objectives have

been achieved. Monitoring the project and comparing monitoring results to performance standards can help make a determination of appropriate site management activities. The performance standards are follows:

- **Total cover of native, facultative or wetter emergent vegetation in the emergent restoration/creation wetland area will be at least 50% in Year 3 and 80% in year 10;**
- **The emergent restoration/creation are will have at least four native, facultative and wetter species each with at least 10% cover represented (by Year 5);**
- Total cover of pioneering and planted trees and shrubs in the scrub-shrub restoration/creation area and forested enhancement area will be 50% in Year 3 and 80% in Year 10;
- **The scrub-shrub restoration/creation and forested enhancement areas will have at least three different shrub species, each with at least 10% cover, and six different tree species, each with at least 5% cover (by Year 5);**
- **Total cover of all pioneering and planted trees and shrubs in the buffer will be at least 50% in Year 3 and 80% in Year 10 with at least three different shrub species each with at least 10% cover and four different tree species each with at least 10% cover (by Year 5);**
- Total cover of all pioneering and planted trees and shrubs in the riparian restoration area will be at least 35% by Year 10, or survival of planted material shall be at least 50% by Year 10;
- Survival of planted stock shall be 95% at the end of Year 1 and at least 80% in year 3.
- **Invasive plant species cover shall be less than 10% after Year 1 and less than 25% in subsequent years in the wetland restoration/creation and enhancement forested areas. Invasive plant species control in the riparian restoration area will be limited to the area immediately around the installed plants;**
- **Water levels in the mitigation areas will be sufficient to support hydrophytic plantings. The wetland emergent and scrub-shrub creation areas will be periodically saturated to the surface for at least 12.5% of the growing season (March 1 to October 31). Surface saturation will be measured by field observation. Groundwater monitoring wells may be installed and maintained until the presence of wetland hydrology is determined; and**
- **At least six snags and fifteen loafing logs/downed logs will be present in the mitigation area in each year of the ten year monitoring period.**

PERMIT REQUIREMENTS

The following excerpt is from the Washington State Department of Ecology Water Quality Certification #1998-4-00422 (2000). The permit requirements in **bold** font are applicable this year (year 5). All requirements for year 5, however, correspond precisely to performance standards in the mitigation plan. Therefore, they have been addressed in this report only as the corresponding

performance standards. In the order listed below, the applicable permit requirements correspond to performance standards` 1, 2, 3, 4, and 5 respectively.

3. The following Performance Standards shall be met at the mitigation site:

- **Total cover of emergent vegetation in the emergent wetland area will be at least 50% in Year 3 and 80% in year 5;**
- **Total cover of pioneering and planted trees and shrubs in the forested wetland will be 50% in Year 3 and 80% in Year 5;**
- **Total cover of all pioneering and planted trees and shrubs in the forested upland buffer will be at least 50% in Year 3 and 80% in Year 5;**
- **Invasive plant species cover shall be less than 10% after Year 1, and less than 25% in Year 5;** and
- **Water levels in the mitigation areas will be sufficient to support hydrophytic plantings.**

The following excerpt is from the Washington State Department of Fish and Wildlife Hydraulic Project Approval Log Number ST-F4047-02 (2003). Requirements addressed this year are identified in **bold** font.

46. Alteration or disturbance of the bank and bank vegetation shall be limited to that necessary to construct the project. Within seven calendar days of project completion, all disturbed areas shall be protected from erosion using vegetation or other means. Within one year of project completion, the banks, including riprap areas, shall be revegetated with native or other approved woody species. **Vegetative cuttings shall be planted at a maximum interval of three feet (on center) and maintained as necessary for three years to ensure 80 percent survival.**

Appendix 2 – Methods

To evaluate standards for vegetative cover, three baselines were established (Figure 2). Due to the configuration of the different zones, aerial cover data was collected separately for each planted community. To determine the cover of woody vegetation in the forested and scrub-shrub wetlands, two different baselines were utilized. The primary baseline consisted of three sections located to the north, east, and west of the upland buffer and was 398 meters long. Twenty-nine sampling transects were positioned along this baseline using the systematic random method. The line intercept method was used to estimate woody cover in the scrub-shrub wetland (Performance Standard 2 and Permit Requirement 2) and the cover of woody species in the upland buffer (Performance Standard 3 and Permit Requirement 3). An additional baseline was established along the southern margin of the enhanced forested wetland. The point intercept method was used to estimate woody cover in the forested wetland (Performance Standard 2 and Permit Requirement 2) and the cover of invasive species in the forested wetland zone (Performance Standard 4 and Permit Requirement 4). Eighteen randomly positioned 20-meter line-segment sample units (20 points each) were placed along sampling transects in the forested wetland. A baseline was established through the center of the site to estimate the cover of invasive species in the emergent and scrub-shrub wetlands (Performance Standard 4 and Permit Requirement 4). Twenty-nine randomly positioned 25-meter line-segment sample units (25 points each) were placed along sampling transects in the emergent and scrub-shrub wetlands. The cover of emergent species was estimated qualitatively (Performance Standard 1 and Permit Requirement 1).

Sample size analysis confirmed sufficient sampling had been completed based on site sampling objectives and the desired level of statistical confidence. The sample size equation shown here (below) was used to perform the analysis on data collected (Performance Standards and Permit requirements 2, 3, and 4). In this equation, the precision level (*B*) equals half the maximum acceptable confidence interval width multiplied by the sample mean.

$$n = \frac{(z)^2 (s)^2}{(B)^2}$$

n = unadjusted sample size
z = standard normal deviate
s = sample standard deviation
B = precision level

WSDOT staff collected hydrology data using methods described in the *Washington State wetlands Identification and Delineation Manual* (Ecology 1997) (Performance Standard 5). Four permanent hydrology pit locations were established in Year-1 of monitoring and recorded on a map. During each monitoring visit, visual observations are made to determine the extent of inundation and surface saturation. Depth and location of standing water is recorded. At each pit location, in the absence of inundation or surface saturation, subsurface observations are made.

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

Appendix 3 – Data Tables

Table 1 Tree and shrub cover in the scrub-shrub wetland

Woody Species in Scrub-shrub Wetland	Absolute Cover	
Sitka willow (<i>Salix sitchensis</i>)	22% cover (CI80% = 10-35%)	Shrub
roses (<i>Rosa</i> spp.)	11% cover (CI80% = 4-19%)	Shrub
Oregon ash (<i>Fraxinus latifolia</i>)	19% cover (CI80% = 11-26%)	Tree
red alder (<i>Alnus rubra</i>)	13% cover (CI80% = 4-22%)	Tree
black cottonwood (<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>)	11% cover (CI80% = 3-19%)	Tree
Douglas-fir (<i>Pseudotsuga menziesii</i>)	5% cover (CI80% = 1-9%)	Tree

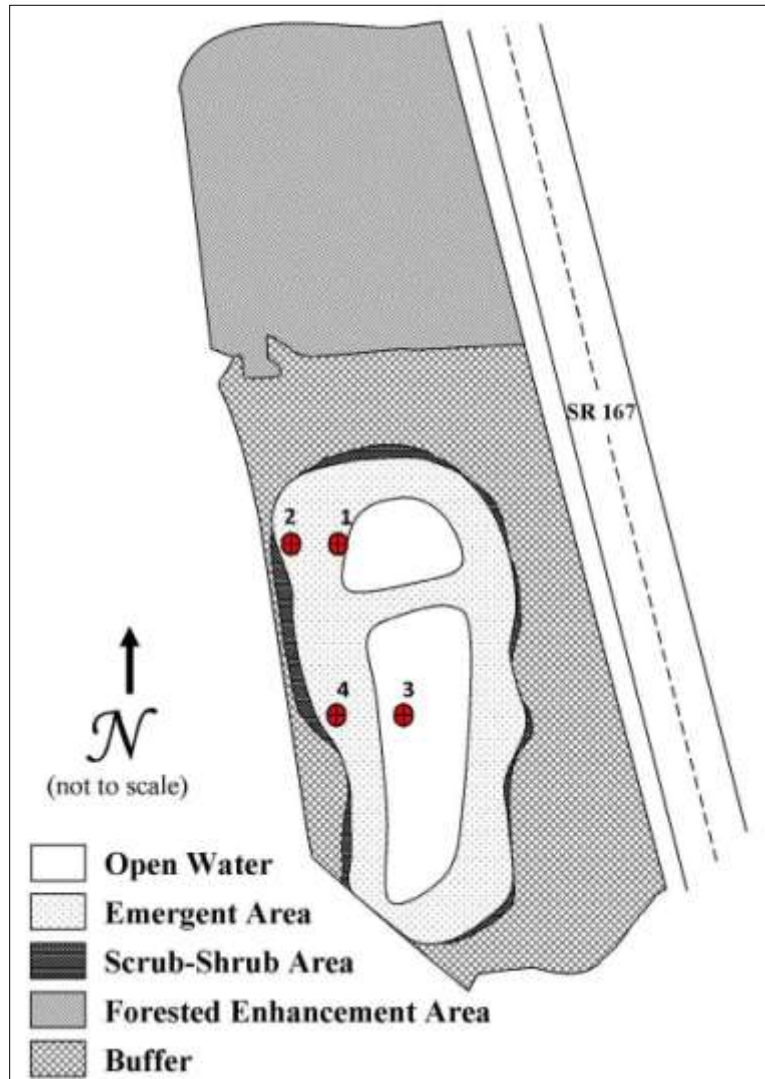
Table 2 Tree and shrub cover in the forested wetland

Woody Species in the Forested Wetland	Absolute Cover	
Pacific willow (<i>Salix lucida</i> ssp. <i>lasiandra</i>)	40% cover (CI80% = 26-54%)	Shrub
Scouler's willow (<i>Salix scouleriana</i>)	11% cover (CI80% = 2-20%)	Shrub
black cottonwood (<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>)	48% cover (CI80% = 39-57%)	Tree
Oregon ash (<i>Fraxinus latifolia</i>)	34% cover (CI80% = 26-43%)	Tree
western red cedar (<i>Thuja plicata</i>)	8% cover (CI80% = 4-13%)	Tree
red alder (<i>Alnus rubra</i>)	8% cover (CI80% = 4-12%)	Tree
Sitka spruce (<i>Picea sitchensis</i>)	7% cover (CI80% = 3-11%)	Tree

Table 3 Hydrology Observations

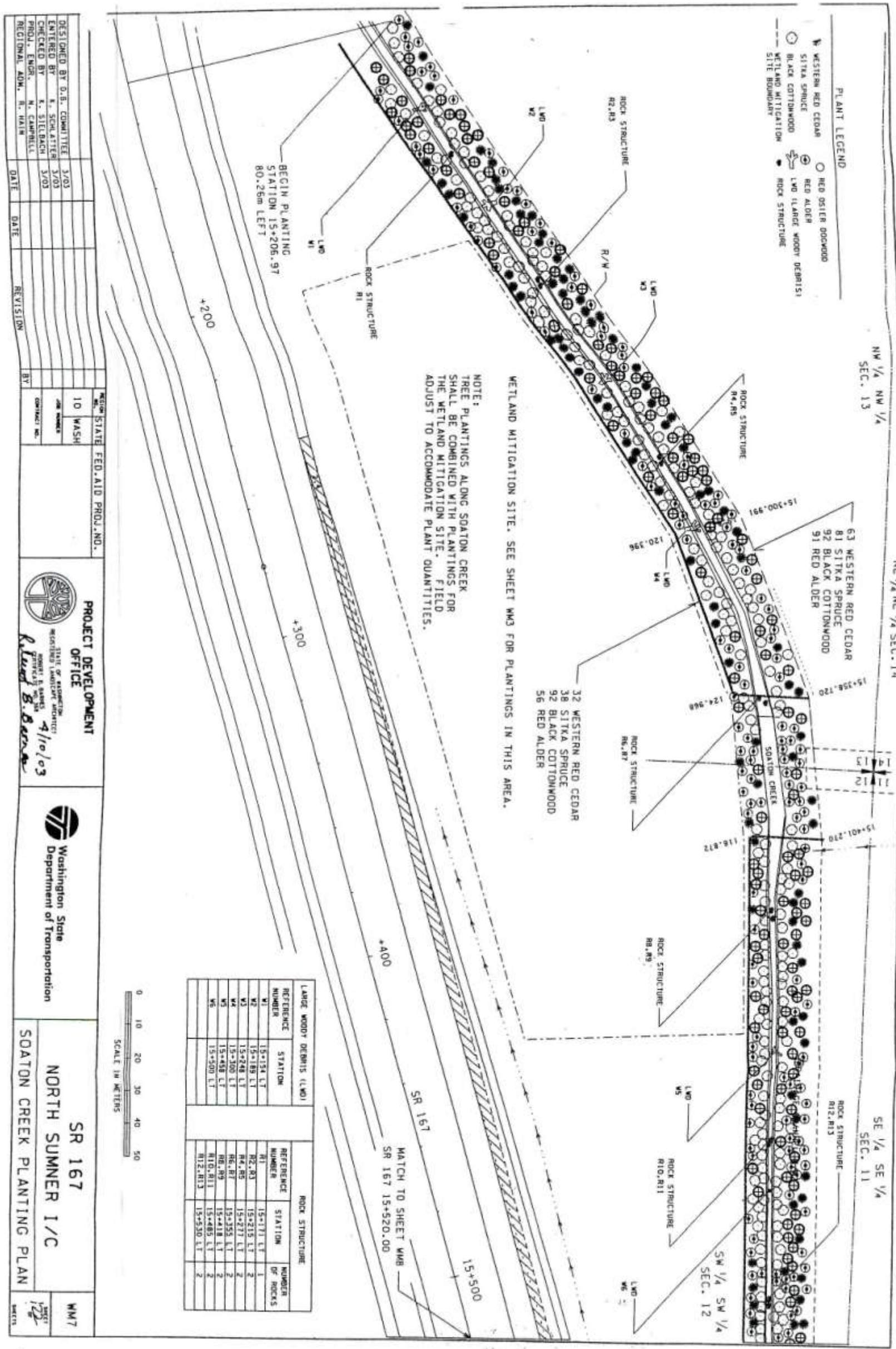
Date	Surface Observations	Subsurface Observations	
2/22/2010	Hydrology observed on surface or within top 12" of the soil in all intended areas. Poned ares inundated up to 24"	Pit 1	Saturated to surface
		Pit 2	Standing water at 12" after 42 minutes
		Pit 3	Standing water at 11" after 37 minutes
		Pit 4	Standing water at 10" immediately
3/10/2010	Large middle area of deep year-round inundation. Areas surrounding the inundation are saturated all the way to the toe of the buffer slope, except on the NW side near pit 3.	Pit 1	Saturated to the surface
		Pit 2	standing water at 11" after 30 min.
		Pit 3	Saturation at 11.5" after 30 min.
		Pit 4	Standing water at 9" immediately
3/22/2010	Hydrology present in all intended areas, inundated throughout emergent zone with saturation around the inundated areas.	Pit 1	Saturated to the surface
		Pit 2	Standing water at 10" immediately
		Pit 3	Standing water at 12" after 28 minutes
		Pit 4	Standing water at 9" immediately

Hydrology Pit Locations



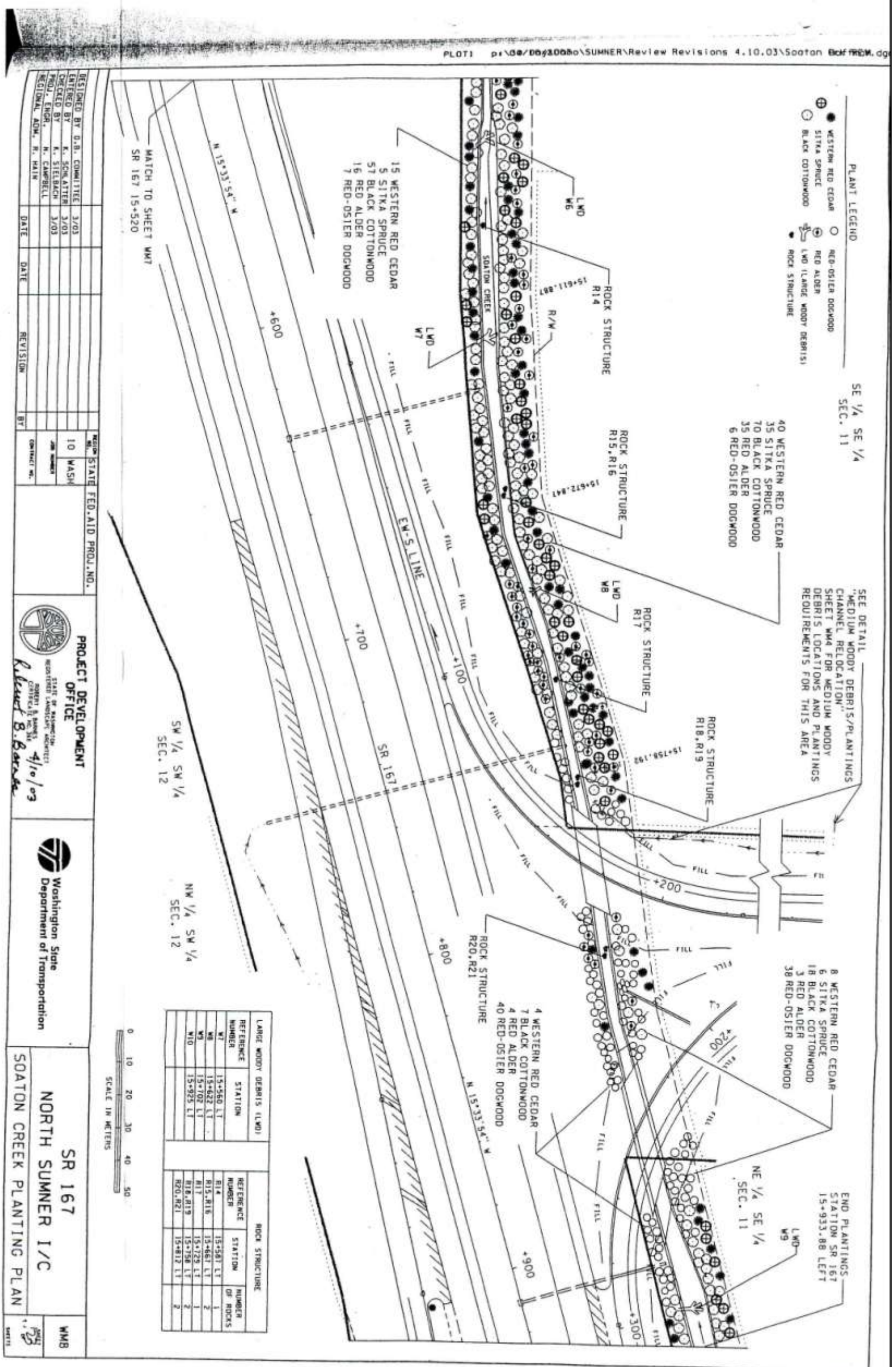
Riparian Enhancement Area Planting Plan (1 of 2)

(from WSDOT 2003)



Riparian Enhancement Area Planting Plan (2 of 2)

(from WSDOT 2003)



Appendix 5 – Photo Points

The photographs below were taken from permanent photo-points on August 17th, 2010 and document current site development.

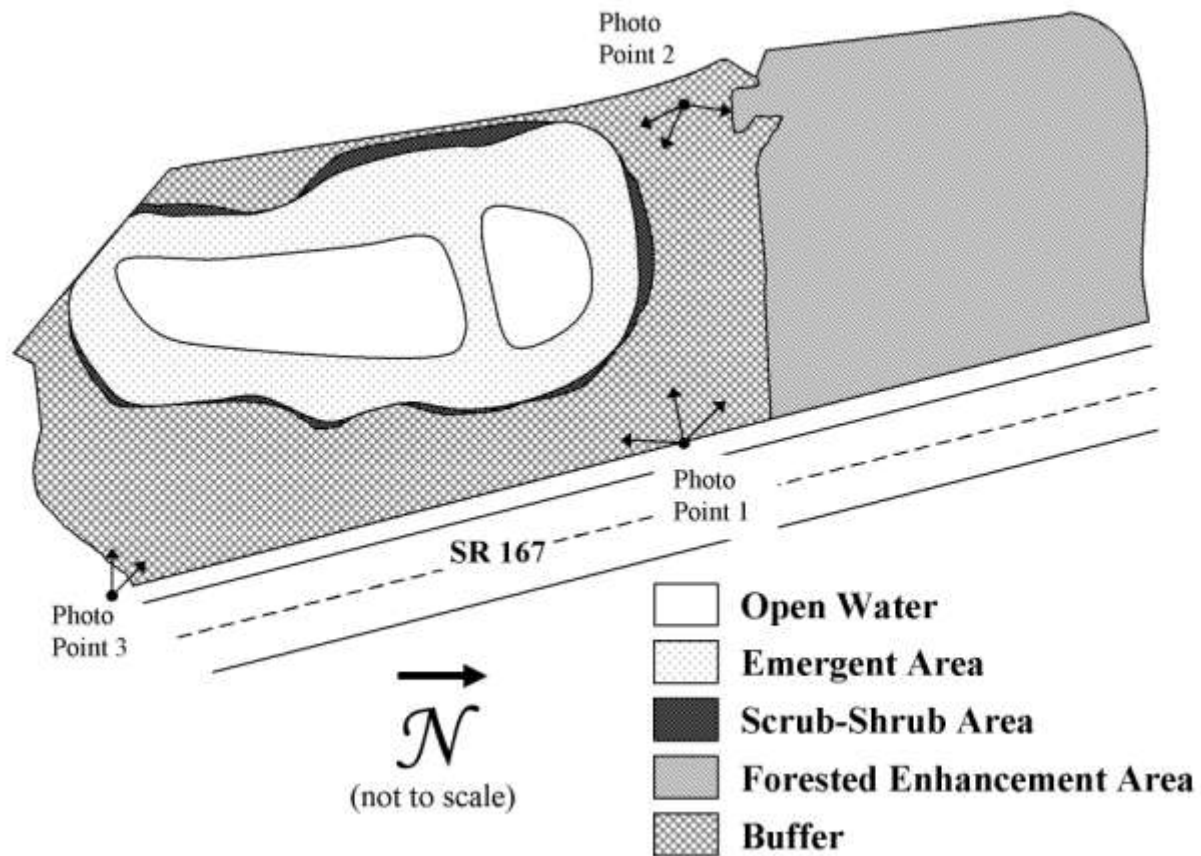




Photo Point 1a



Photo Point 1b



Photo Point 1c



Photo Point 2a



Photo Point 2b



Photo Point 2c



Photo Point 3a



Photo Point 3b

Literature Cited

1. Ecology. See Washington State Department of Ecology.
2. Evans, D. 2003. Environmental Mitigation Plan State Route 167 North Sumner Interchange. Revised by Washington State Department of Transportation Olympic Region EHS, Tumwater, WA.
3. United States Army Corps of Engineers. 2003. Department of the Army Individual Permit No. 1998-4-00422.
4. Washington State Department of Ecology (Ecology). 1997. Washington State Wetlands Identification and Delineation Manual. Publication No.96-94, Olympia, WA.
5. Washington State Department of Ecology (Ecology). 2000. Water Quality Certification #1998-4-00422.
6. Washington State Department of Fish and Wildlife (WDFW). 2003. Hydraulic Project Approval Log Number ST-F4047-02
7. Washington State Department of Transportation (WSDOT). 2003. SR 167 North Sumner Interchange Riparian Area Planting Plan. WSDOT Olympic Region, Tumwater, WA.
8. Washington State Department of Transportation (WSDOT). 2006. SR 167 North Sumner Interchange As-built Planting Plan. WSDOT Olympic Region, Tumwater, WA.
9. 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>
10. Washington State Department of Transportation (WSDOT). 2009. SR 167 North Sumner Interchange Wetland Mitigation Site 2008 Wetland Monitoring Report <http://www.wsdot.wa.gov/NR/rdonlyres/184899E6-831F-4BE4-BDF6-CCA8F9379970/0/2008167NSumner.pdf>