

SR 142 Bowman Creek Fish Passage Barrier Removal Mitigation Site

USACE NWP (27) 200600090

Southwest Region

2010 MONITORING REPORT

Wetland Assessment and Monitoring Program

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Author:

Tom Mohagen

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

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SR 142 Bowman Creek Fish Barrier Removal Mitigation Site

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General Site Information	
USACE NWP 27 Number	200600090
Mitigation Location	SR 142 at Bowman Creek, approximately MP 20.2, Klickitat County
LLID Number	1210421458485
Construction Date	2007
Monitoring Period	2008-2012
Year of Monitoring	3 of 5
Area of Project Impact	0.03 acre
Type of Mitigation	Wetland Establishment
Area of Mitigation	0.05 acres

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Summary of Monitoring Results and Management Activities (2010)

Performance Criteria	2010 Results	Management Activities
Performance Standard		
50% aerial cover of native facultative and wetter species within the emergent zone	60% cover	Targeted replanting Fall 2011
30% aerial cover of native facultative and wetter woody shrub species within the scrub-shrub zone.		Targeted replanting Fall 2011
A cumulative total of 1/6 th of the planted bank areas will be established with native woody vegetation.	60% cover	Targeted replanting Fall 2011
Reed canarygrass and other invasive species will be controlled in all planting zones of the wetland mitigation site.	25% cover	Continued vegetation management focusing on RCG treatment, Summer 2011
Hydrology will be sufficient to support facultative or wetter vegetative species in the wetland mitigation.	Not present	
Performance Criteria HPA # 103917-2		
80% survival of native woody species in disturbed areas	60% cover	Targeted replanting Fall 2011

Report Introduction

This report summarizes third-year (Year-3) monitoring activities at the State Route (SR) 142 Bowman Creek Fish Barrier Removal Mitigation Site. Included are a site description, the performance criteria, an explanation of monitoring methods, and an evaluation of site performance. Monitoring activities in 2010 included vegetation surveys and photo-documentation. The vegetation monitoring was completed on September 13, 2010.

What is the SR 142 Bowman Creek Mitigation Site?

This 0.05-acre mitigation site (Figure 1) is a new wetland established (formerly called created) on two floodplain benches at the crossing of SR 142 over Bowman Creek. Unavoidable impacts to wetlands occurred when replacing a 4 sided box culvert with a bridge. The replacement of the culvert removed a fish passage barrier on Bowman Creek and permanently impacted 0.03 acre of small riverine wetland. In addition to the 0.05 acre of wetland establishment on the mitigation site, 0.14 acre of upland and riparian buffer will be created adjacent to the intended riverine wetland.

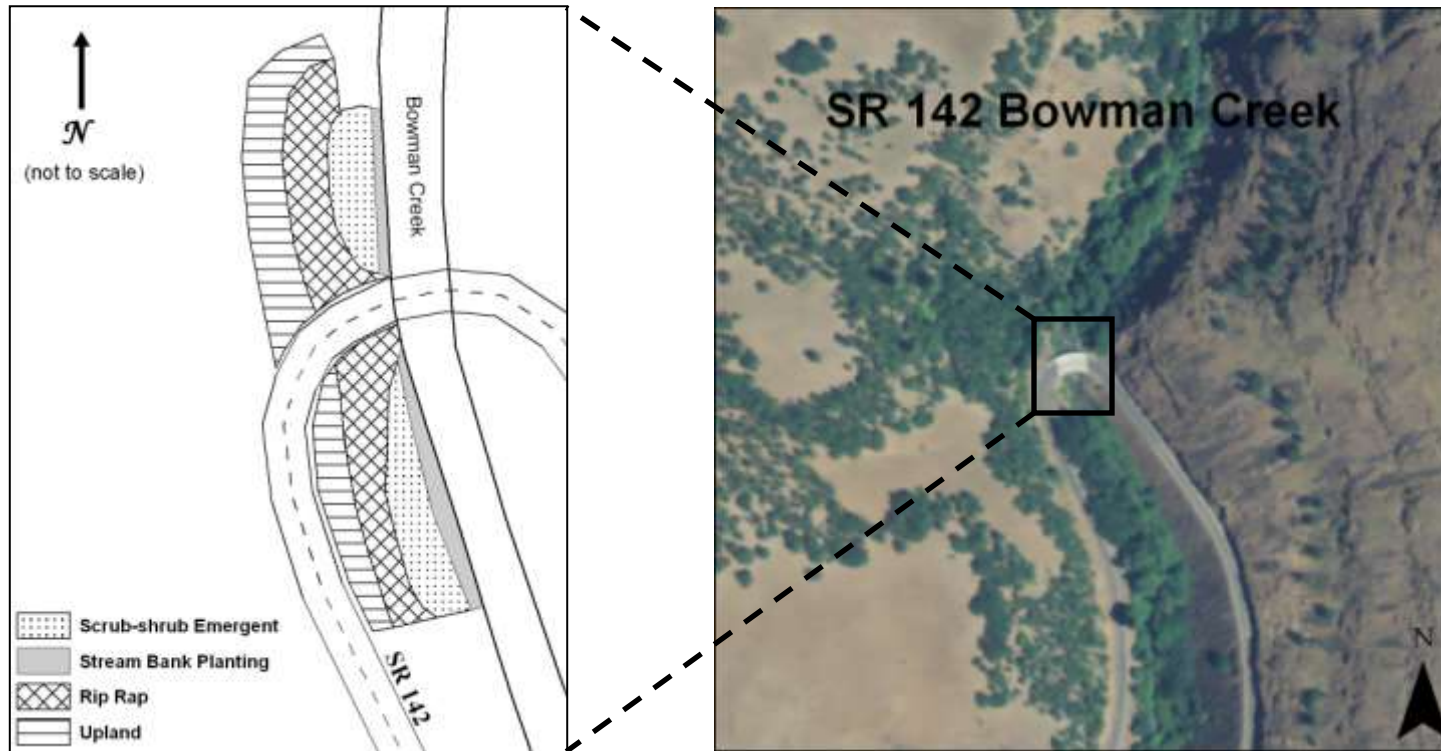


Figure 1 Site Sketch

The SR 142 Bowman Creek Mitigation Site consists of two floodplain planting benches along one side of Bowman Creek, one on each side of the bridge.

What are the performance standards for this site?

Performance Standard 1

At monitoring year 3 there will be a minimum of 50% aerial cover of native facultative and wetter species within the emergent zone.

Performance Standard 2

At monitoring year 3, there will be a minimum of 30% aerial cover of native facultative and wetter woody shrub species within the scrub-shrub zone.

Performance Standard 3

At monitoring year 3, a cumulative total of 1/6th of the planted bank areas will be established with native woody vegetation.

Performance Standard 4

At monitoring years 1 and 3, 5, reed canarygrass and other invasive species will be controlled in all planting zones of the wetland mitigation site to the extent necessary to ensure compliance with performance objectives 1-3.

Performance Standard 5

At monitoring years 3-5, hydrology will be sufficient to support facultative or wetter vegetative species in the wetland mitigation area based on the identification of primary and secondary hydrology indicators.

Permit Requirement 1

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 1 provides the complete text of the performance measures for this project, and Appendix 2 shows the planting plan (Corlett 2006).

How were the performance standards evaluated?

Due to the size of the site and the amount of cover, the standards were addressed qualitatively. Standards that separate zones were difficult to address so native facultative or wetter cover estimates were combined for the emergent and scrub/shrub planting areas.

How is the site developing?

In general, the west benches have developed to a greater extent and display higher aerial native woody coverage and survival. The northeast bench has been the slowest to develop with a native woody aerial coverage of 20 percent. As the site has developed the distinction between an emergent and a scrub/shrub zone has decreased to a point of no distinguishable separation, which has resulted in the inability to address Performance Standards 1 and 2 separately. Invasive aerial cover is qualitatively assessed at 25 percent. *Phalaris arundinacea* (reed canarygrass) is the dominant invasive with *Solanum dulcamara* (climbing nightshade) and burning bush (*Bassia scoparia*) present in small numbers. On the whole the site has shown substantial progress since 2008 (Photo 1).

A shift in channel alignment post-construction scoured away a large portion of the downstream wetland bench and incised the low-flow channel of Bowman Creek. Both of these natural hydraulic actions have left the site not only smaller, but perched above suitable wetland hydrology. While not providing significant wetland values at this time, the floodplain benches do provide lateral storage for high-flow events of Bowman Creek and new side channels cut into the constructed floodplain areas provide stream complexity and habitat.



Photo 1 Woody cover comparison (southwest floodplain bench) 2008 to 2010.

Results for Performance Standards 1 and 2

(50% aerial cover of FAC and wetter species within the emergent zone and 30% aerial cover of FAC and wetter woody shrub species within the scrub-shrub zone):

Cover was assessed across the site rather than by zone. The result of this qualitative estimate is 60 percent overall. Cover varied by location onsite. The northeast side had twenty percent cover, northwest had sixty percent, southwest had eighty-five percent (Photo 2), and the southeast side had sixty percent cover. Sitka alder (*Alnus viridis ssp. Sinuate*), bigleaf maple (*Acer macrophyllum*), and willows (*Salix spp.*) are some of the species present.

Results for Performance Standard 3

(1/6th of the planted bench will have established woody vegetation):

The cumulative area of the planted bank that is established with native woody vegetation is qualitatively estimated at slightly less than two-thirds of the total area. A number of volunteer Sitka alder provide a share of the established woody vegetation.



Photo 2
Woody cover southwest floodplain bench
(September 2010)

Results for Performance Standard 4

(Reed canarygrass and other invasive species will be controlled in all planting zones):

Invasive species cover across the site is estimated at twenty-five percent. This cover is made up predominantly of reed canarygrass (*Phalaris arundinacea*). Other species present include climbing nightshade (*Solanum dulcamara*) and burning bush (*Bassia scoparia*) (Photo 3). Invasive control was not conducted during the 2010 growing season.

Results for Performance Standard 5

(Wetland hydrology):

No wetland hydrology indicators were observed during vegetation monitoring. However, several facultative and wetter species including Sitka alder (*Alnus viridis ssp. Sinuate*) sandbar willow (*Salix exigua*), and redosier dogwood (*Cornus sericea*) have established along the bank and in the wetland zones. This parameter will not be met due to channel downcutting in the adjacent stream, reducing overbank flooding.

Results for Permit Requirement

(80% survival of native woody species in disturbed areas):

The survival of native woody vegetation is qualitatively estimated at 60 percent. Native woody plant establishment has been less successful on the northeast bench (Photo 4).



Photo 3
Reed canarygrass cover northwest floodplain bench (September 2010)



Photo 4
Woody establishment northeast floodplain bench (September 2010)

What is planned for this site?

Targeted replanting will occur during the Fall of 2011. Continued vegetation management activities focusing on Reed canarygrass control and other invasive species will continue throughout the summer months.

Appendix 1 – Goals and Performance Standards

The following excerpt is from the *Draft Wetland Mitigation Plan State Route 142 Bowman Creek Fish Passage Barrier Removal (WSDOT 2006)*. The performance criteria addressed this year are identified in **bold** font.

GOALS AND OBJECTIVES

Goals

The goal of the proposed compensatory mitigation is to replace and enhance wetland types, acreage, and functions which will be lost due to wetland impacts associated with the proposed project, as well as target wetland and watershed functions identified as limiting factors in the Bowman Creek biological assessment. The proposed mitigation intends to create a palustrine, emergent (PEM)/palustrine, scrub-shrub (PSS) riverine wetland complex that provides natural floodplain functions for the adjacent Bowman Creek. The created wetland is anticipated to provide the following functions:

- Provide flood flow attenuation
- Provide opportunities for sediment removal
- Provide erosion control and shoreline stabilization
- Provide general habitat suitability
- Provide general fish habitat

Functions and Values

The following is an itemized list of functions and values that will be provided by the proposed mitigation site:

Flood Flow Alteration

The wetland mitigation site and associated floodplain benches provide the widest floodplain area for some distance up and downstream of the project area. This function may decrease erosive forces in more unstable sections of the stream channel downstream.

Sediment Removal

The floodplain benches and wetland mitigation site will be graded and planted to provide the ability to naturally trap suspended sediments from seasonal floodwater entering the site.

Erosion Control and Shoreline Stabilization

Establishment of herbaceous and woody vegetation within the mitigation area and associated streambanks will minimize erosion and stabilize the low flow and high water stream edges. Dense vegetation can also reduce the water velocity near the bank, further reducing erosion and promoting long term stability.

General Wildlife Suitability

As part of a much larger riparian corridor, the floodplain benches and wetland mitigation site will maintain and enhance the corridor's function as a natural wildlife conduit. The wetland areas may also provided areas for feeding, access water, cover, and nesting.

General Fish Habitat

This project is being implemented to eliminate an existing fish barrier and improve overall fish passage. The wetland mitigation area will promote and provide bank stability and complexity, shade, cover, and food chain support to aquatic species in Bowman Creek. The constructed side channel will increase aquatic habitat complexity and may provide refugia functions in high flow events.

Objectives, Performance Measures, and Success Standards

The following list describes the thresholds that will determine site success and guide management. This list is preliminary and may be adjusted with additional information.

Performance Objective 1: Create native emergent wetland areas on constructed floodplain areas of the wetland mitigation site.

Success Standard 1a: At monitoring year 1, there will be a minimum of 30% aerial cover of native facultative and wetter species within the emergent zone.

***Success Standard 1b:* At monitoring year 3, there will be a minimum of 50% aerial cover of native facultative and wetter species within the emergent zone.**

Success Standard 1c: At monitoring year 5, there will be a minimum of 60% aerial cover of native facultative and wetter species within the emergent zone.

Performance Objective 2: *Native wetland shrubs will dominate the scrub-shrub zone of the wetland mitigation site.*

Success Standard 2a: At monitoring year 1, all dead woody plantings within the scrub-shrub zone will be replanted.

***Success Standard 2b:* At monitoring year 3, there will be a minimum of 30% aerial cover of native facultative and wetter woody shrub species within the scrub-shrub zone.**

Success Standard 2c: At monitoring year 5, there will be a minimum of 50% aerial cover of native facultative and wetter woody shrub species within the scrub-shrub zone.

Performance Objective 3: Woody plant species will be present and established for a minimum of 1/4 of the length of the stream bank within the wetland mitigation area adjacent to the low flow channel of Bowman Creek by the end of the monitoring period.

Success Standard 3a: At monitoring year 1, all dead woody plantings within along the planted portions of the streambank will be replanted.

***Success Standard 3b:* At monitoring year 3, a cumulative total of 1/6th of the planted bank areas will be established with native woody vegetation.**

Success Standard 3c: At monitoring year 5, a minimum cumulative total of 1/4th of the planted streambank will be established with native woody vegetation.

Performance Objective 4: Limit growth and spread of Reed canarygrass and other nuisance species throughout the wetland mitigation site to ensure the success of performance objectives 1 through 3.

Success Standard 4: At monitoring years 1 and 3, 5, reed canarygrass and other invasive species will be controlled in all planting zones of the wetland mitigation sit to the extent necessary to ensure compliance with performance objectives 1-3.

Performance Objective 5: The wetland mitigation site will provide sufficient ground or surface water inundation to support wetland processes and meet USACE criteria for hydrology in normal rainfall years.

Success Standard 5: At monitoring years 3-5, hydrology will be sufficient to support facultative or wetter vegetative species in the wetland mitigation area based on the identification of primary and secondary hydrology indicators.

Monitoring Plan

The monitoring objective for the Bowman Creek wetland mitigation site is to determine whether the site is meeting the objectives and performance standards as outlined above and to help guide management actions that are tied to long-term development of the site.

A monitoring plan will be developed that addresses the success standards listed in this plan. The site will be monitored in years 1, 3, and 5 by the WSDOT Wetland Mitigation Monitoring Program to evaluate compliance with performance standards. In formal monitoring years 1, 3, and 5, reports of the formal monitoring will be prepared and submitted both to the Corps of Engineers and Ecology. Additional monitoring will occur in intervening non-report years in order to inform and guide site development activities, informal monitoring. Successful mitigation will be measured by attainment of the performance standards described in the mitigation plan.

The Wetland Mitigation Monitoring Program uses objective-based monitoring to document the condition of WSDOT's wetland mitigation sites. Monitoring protocols are selected based on objectives specified in the mitigation plan, and evaluation of current

site conditions. Quantitative data collection techniques presently in use are based on standard ecological and biostatistical methods described in Bonham (1989), Elzinga et al. (1998), Krebs (1999), Zar (1999), and other sources. The Wetland Program’s current monitoring methods include the key concepts of objective-based monitoring, adaptive management, and statistical rigor. Quantitative monitoring methods employed involve sample size analyses and may include the point-line, point-frame, quadrat, and line-intercept methods as defined by the works cited above.

Formal and informal monitoring of the mitigation site will occur over the 5-year monitoring period. Table 5 lists the monitoring schedule for the mitigation site. Successful mitigation will be measured by attainment of the performance standards described in this mitigation plan document. Monitoring will cease as soon as all success standards have been attained.

Table 5. Monitoring Schedule.

<i>Monitoring Year</i>	<i>Type of Monitoring</i>	
	<i>Formal</i>	<i>Informal</i>
1	Yes	quarterly site visits
2	No	quarterly site visits
3	Yes	quarterly site visits
4	No	quarterly site visits
5	Yes	quarterly site visits

PERMIT REQUIREMENTS

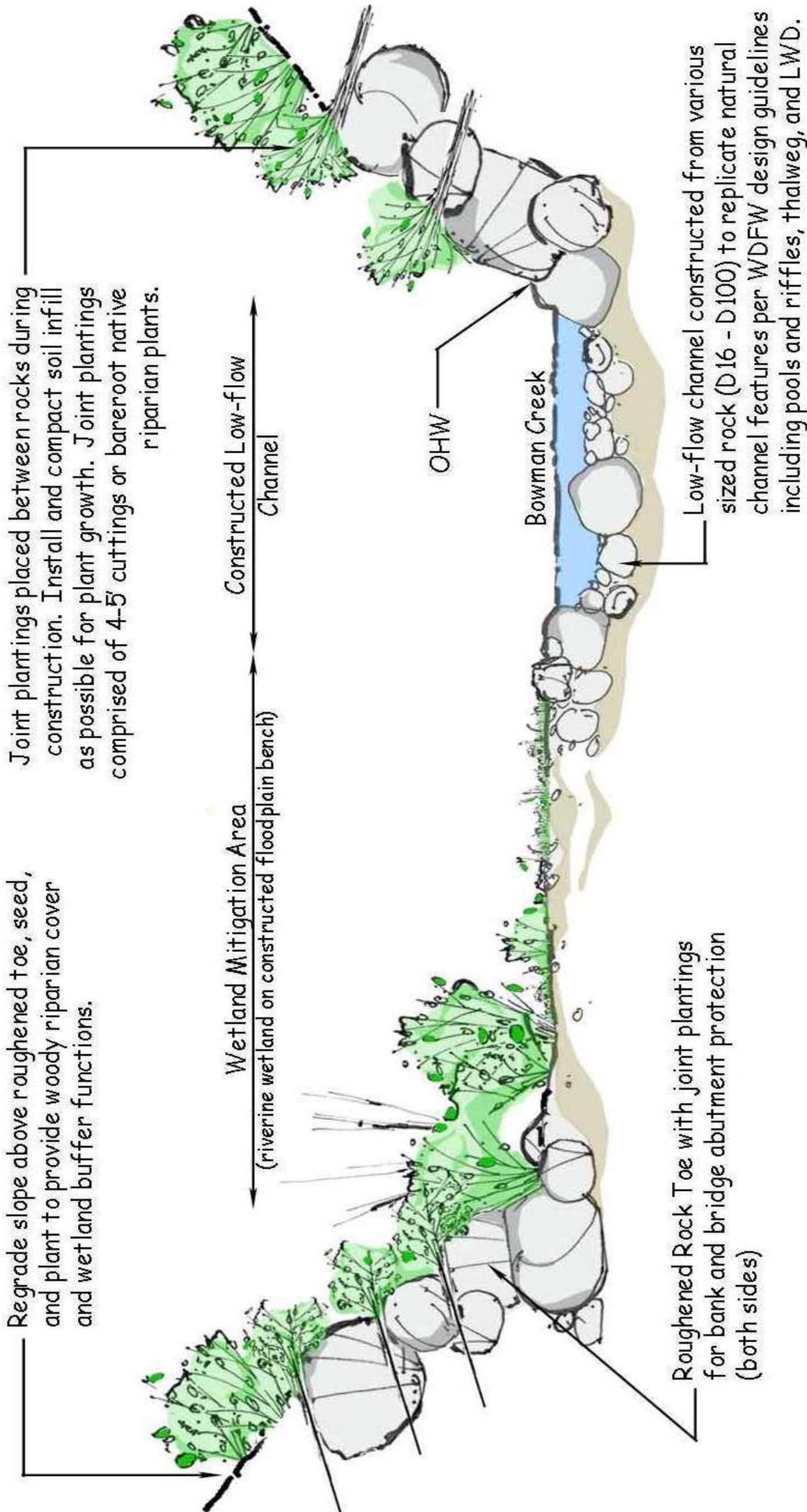
The following excerpt is from the Washington State Department of Fish and Wildlife HPA Permit Number 103917-2. Requirements addressed this year are identified in **bold** font.

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 on 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 – Stream Channel Concept

(from Corlett 2006)



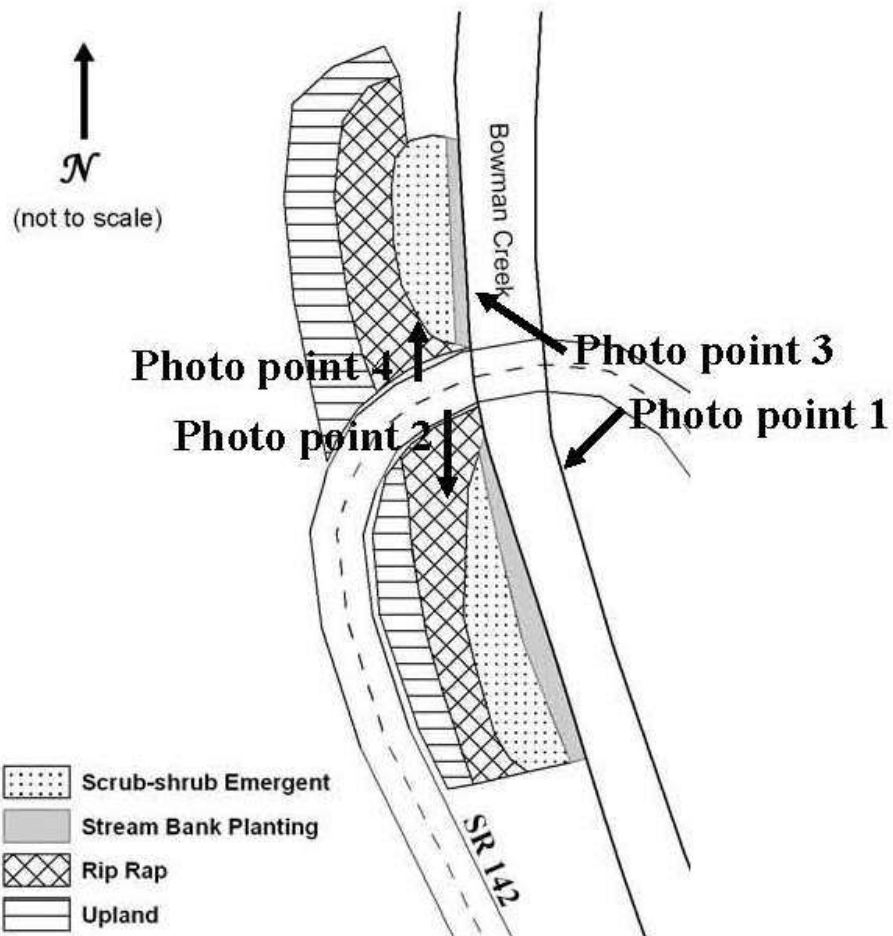
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SR-142/ Bowman Creek Fish Barrier Removal Project Proposed Channel Treatment and Wetland Mitigation Concept

idealized section looking upstream, BC Station 12+60



Appendix 3 – Photo Points



The photographs below were taken from permanent photo-points on September 13th, 2010 and document current site development.



Photo Point 1 (southeast bench)



Photo Point 2 (southwest bench)



Photo Point 3 (northeast bench)



Photo Point 4 (northwest bench)

Literature Cited

1. Corlett, D. and Kohl, T. 2006. Draft Wetland Mitigation Plan State Route 142, Bowman Creek Fish Passage Barrier Removal. Washington State Department of Transportation, Southwest Region, Seattle, WA.
2. United States Army Corps of Engineers. 2006. Department of the Army Permit Number 200600090.
3. Washington State Department of Fish and Wildlife. 2006. Hydraulic Project Approval Number 103917-2.
4. 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>