SR 410 Nile Valley Landslide Reconstruct Route (Nile Slide) Mitigation Site

USACE NWS-2010-511-DOT

South Central Region

2015 MONITORING REPORT

Wetlands Program

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USACE NWS-2010-511-DOT

General Site Information				
USACE NWS #	NWS-2010-511-DOT			
Mitigation Location	23 miles west of Yakima, WA along SR 410 roughly at MP 108			
LLID Number	1209251468152			
Construction Date	2009-2013			
Monitoring Period	2014 -2020			
Year of Monitoring	2 of 7 (reporting Year 1 monitoring)			
Area of Project Impact[1]	1.93 acre			
Type of Mitigation	Riparian Planting	Riparian Preservation	Floodplain Rehabilitation	Off –channel habitat
Planned Area of Mitigation	7.02 acre	35.11 acre	4.36 acre	0.25 acre

[1]Impacts sourced from WSDOT (2011) and mitigation acreage sourced from WSDOT (2015).additional out-of kind mitigation included rock barbs, large woody debris structures, and a flood fence

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Summary of Monitoring Results and Management Activities (2015)

Performance Standards	2015 Results[1]	Management Activities
Document whether flows are high enough to enter the breeches.	Present	Photo documentation of flow-through on 12/9/2015.
Native species, planted and/or volunteer, will exhibit an average density of at least four plants per 100 square feet.	5 plants/100ft² ($CI_{80\%}$ = 4.4-5.7)	
Removal of Class-A weeds control of Class-B weeds	No Class A weeds observed. Class B weeds controlled	Continued weed control.

Report Introduction

This report summarizesYear-1 monitoring activities at the State Route (SR) 410 Nile Slide Mitigation Site. This report is being issued in 2015 because performance standard and mitigation acreage revisions were in-flux during Year-1 (2014). Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site development. Monitoring activities included vegetation surveys, photo-documentation, and assessments of floodplain hydrology. Vegetation monitoring occurred on September 21-22, 2015.

[1] Estimated values are presented with their corresponding statistical confidence interval. For example, 5 plants/100ft² ($CI_{80\%}$ = 4.4-5.7) means we are 80% confident that the true density value is between 4.4 and 5.7 plants per 100 ft^2.

What is the SR 410 Nile Slide Mitigation Site?

This 51.9-acre mitigation site (Figure 1) is an out-of-kind mitigation effort created within the floodplain of the Nile River 28 miles east of Yakima, Washington. This site was created to compensate for the loss of 1.93 acres of wetlands due to the realignment of SR 410 following the catastrophic 2009 landslide. The riparian enhancement and floodplain rehabilitation areas are designed to improve river and floodplain interaction. The riparian plantings will eventually provide shade, decrease water temperatures and become available for large woody debris recruitment.

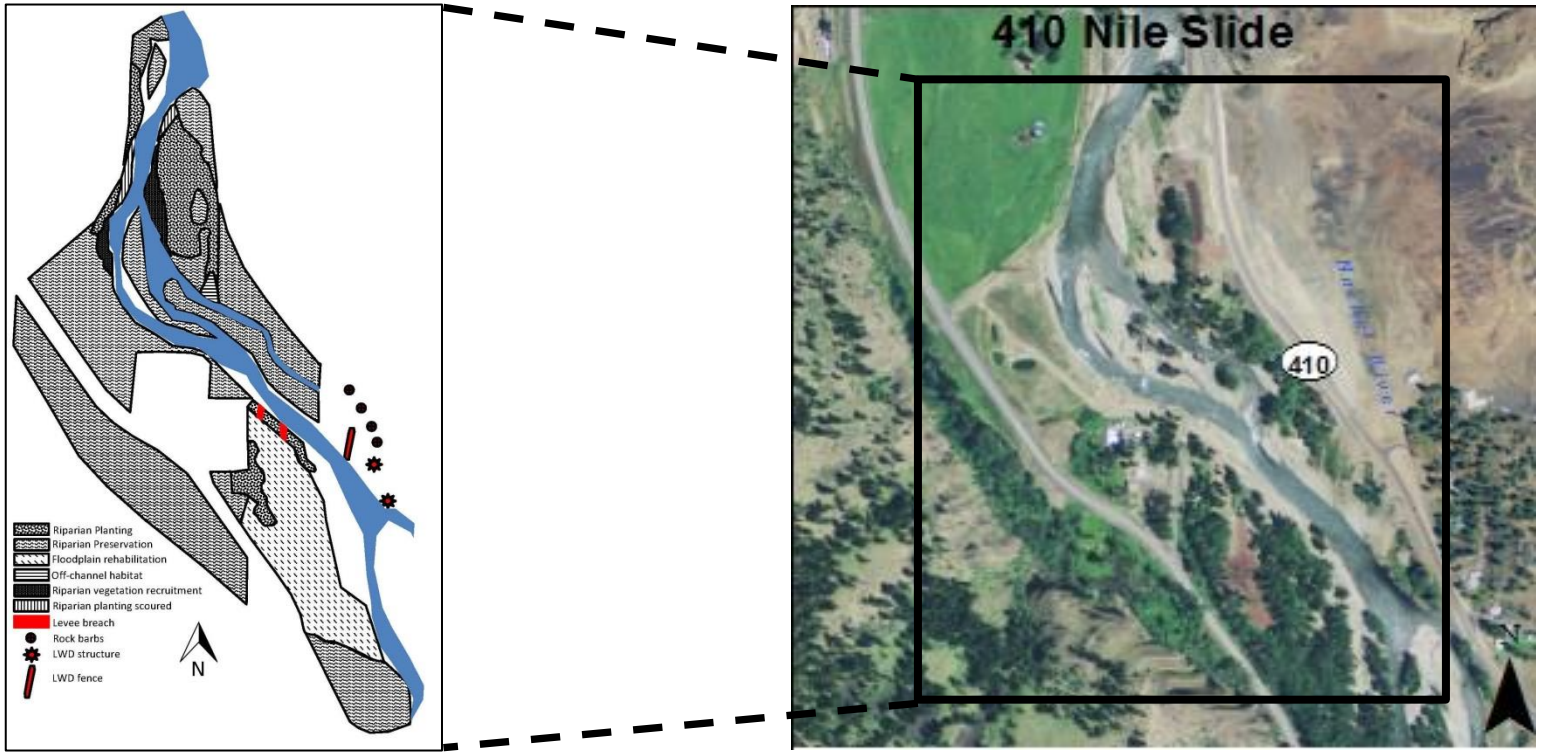


Figure 1 Site Sketch

The SR 410 Nile Slide Mitigation Site contains a created backwater channel that will provide off-channel habitat for fish and refugia during flood events. In addition, rock barbs, large woody debris structures, and a flood fence were constructed to recruit additional woody material and provides extensive floodplain preservation. Appendix 2 includes site directions.

What are the performance standards for this site?

Year-1

Performance Standard 1
Document whether flows were high enough to enter the levee breeches. If so, document the area inundated behind the levee.

Performance Standard 2
Across the site, native species (see Note), planted and/or volunteer, will exhibit an average density of at least four plants per 100 square feet. If dead plantings are replaced to meet this density threshold, the performance measure will be met.

Performance Standard 3
County-listed Class-A weeds will be removed from the site, when observed. The spread of county-listed Class B weeds, or other non-native species that significantly reduce the survivability of native vegetation, will be controlled.

Appendix 1 shows the planting plan as-built (WSDOT 2015).

How were the performance standards evaluated?

The table and figure below document the sampling methodology utilized for all of the 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). **Placement of Baseline:** The baseline runs through each section of the planted riparian areas (Figure 2).

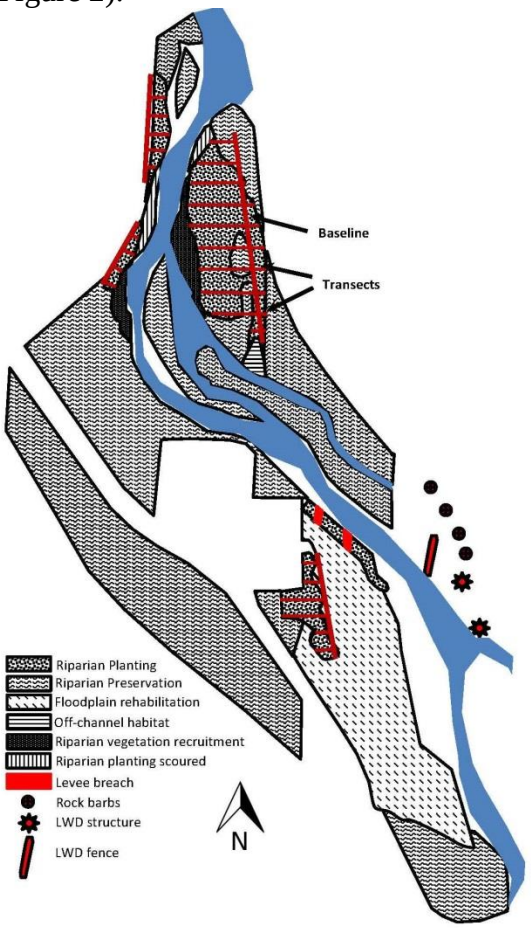


Figure 2 Site Sampling Design (2015)

	PS 1	PS 2	PS 3
Attribute	Hydrology	Density	Presence/Absence
Target pop.	N/A	Native Woody	Noxious Weeds
Zone	Levee breech	Riparian	Riparian
Sample method	Photo	UBT	Qualitative
Sample unit length	N/A	Variable	N/A
Sample unit width	N/A	1 m	N/A
Points per Sample unit	N/A	N/A	N/A
Total # of Sample units	N/A	75	N/A

How is the site developing?

Now that the Naches River is closer to reaching meander equilibrium in this area, the site is beginning to establish and provide many of the intended functions across the site. Volunteer black cottonwood (*Populus balsamifera*) and sandbar willow (*Salix exigua*) have helped to increase the overall density across the site (Photo 2). The deep bore cottonwood stakes that were planted along the top of the levee have not fared well with density observed at 1 plant/100ft^2(Photo 1). However, volunteer black cottonwood (*Populus balsamifera*) and sandbar willow (*Salix exigua*) are colonizing the levee from the top of the slope down to the water's edge. This area was sampled and the density, all of which are volunteers, is estimated at 22.3 plants/100ft² ($CI_{80\%}$ = 15.6-29). These volunteer plants are not included in the density estimate for the rest of the site as it was believed they will be washed away during the high waters of winter and early spring. Should it be determined that the volunteers are viable they will be counted towards the overall density of native woody species in the years to come.

Connectivity to the floodplain has been reestablished by the breeches created in the levee (Photo 3). Invasive cover across the site is low. The backwater channel is developing wetland characteristics. Completion of the rock barbs, large woody debris structures, and flood fence was confirmed.

Photo 1

Black cottonwood stakes on the levee (September 2015)

Photo 2

Volunteer black cottonwoods (September 2015)

Results for Performance Standard 1
(Document whether flows are high enough to enter the breeches):

On December 9, 2015 the Naches River reached flows high enough to enter the breeches in the levee and access the reestablished floodplain (Photo 3) (Appendix 3).

Results for Performance Standard 2
(Across the site, native species, planted and/or volunteer, will exhibit an average density of at least 4 plants/100ft^2):

The density of native woody species across the site is estimated at 5 plants/100ft^2 ($CI_{80\%}$ = 4.4-5.7) (Photo 4). This does not include the levee. The dominant species include black cottonwood (*Populus balsamifera*), snowberry (*Symphoricarpos albus*), and sandbar willow (*Salix exigua*). An additional fifteen species were observed during sampling.

Results for Performance Standard 3
(Removal of Class-A weeds control of Class-B weeds):

No Class A weeds were observed. Class B weeds Kochia (*Bassia scoparia*) and diffuse knapweed (*Centaurea diffusa*) were observed on site. Control of noxious species has been on-going and will continue in 2016.

What is planned for this site?

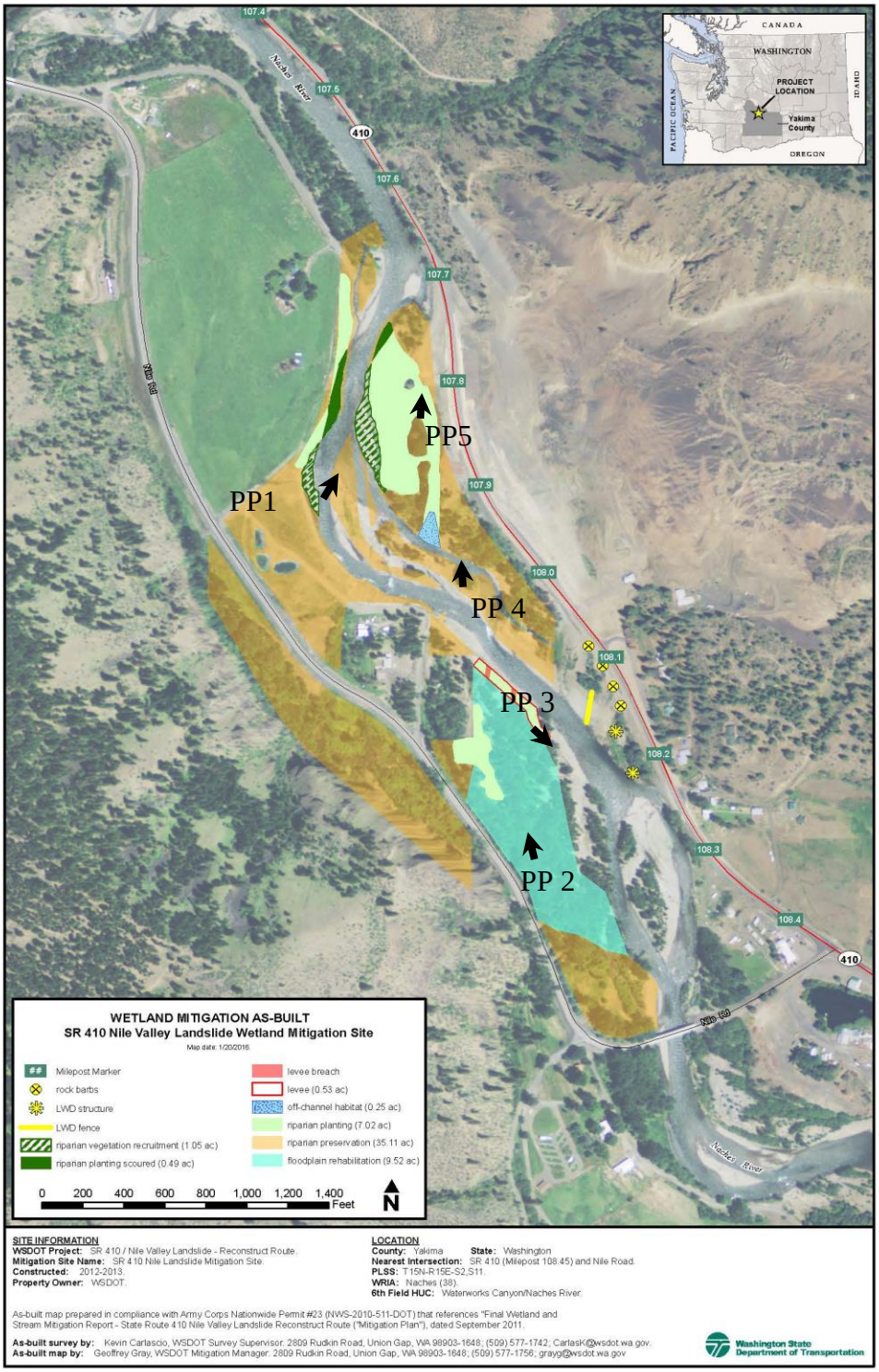
Weed control as needed.

Photo 3
Levee breech allowing flow to reconnect to the floodplain (December 2015)

Photo 4
Density of woody riparian plantings (September 2015)

Appendix 1 – As-built with Photo Point Locations

(from WSDOT 2015)



Appendix 2 – Photo Points

The photographs below were taken from permanent photo points on September 22, 2015 and document current site development.

Photo Point 1

Photo Point 2

Photo Point 3

Photo Point 4

Photo Point 5

Driving Direction

From I-5 S take Exit 68 to US 12 East. From US 12 turn left onto 410 westbound. Drive for 8.6 miles and find the parking pad on the east side of the roa

Appendix 3 – Levee Breach Flooding (2015)

Literature Cited

1. [USACE] US Army Corps of Engineers. 2011. Department of the Army Individual Permit Number NWS-2010-511-DOT.

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

3. [WSDOT] Washington State Department of Transportation. 2011. Final Wetland and Stream Mitigation Report State Route 410 Nile Valley Landslide Reconstuct Route. Yakima (WA): Washington State Department of Transportation, Southcentral Region.

4. [WSDOT] Washington State Department of Transportation. 2015. SR 410 Nile Slide Mitigation Site As-built Planting Plan.

5. [WSDOT] Washington State Department of Transportation. 2016. SR 410 Nile Slide Mitigation Site Permit Modification Request (NWS-2010-511-DOT).