

Washington State Department of Transportation North Fork Newaukum Mitigation Bank

Southwest Region

2014 MONITORING REPORT

Wetlands Program

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Washington State Department of Transportation North Fork Newaukum Mitigation Bank



General Site Information	
Mitigation Location	Surrounding the confluence of the North and Middle Forks of the Newaukum River, Lewis County
LLID Number	1228381466060
Monitoring Period	2003-2033
Year of Monitoring	11 of 30
Credits Released	68.1
Credits Used	24.809
Credits Available	43.291
Total Potential Credits	78.39 over 10 years

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Summary of Monitoring Results and Management Activities (2014)

Performance Standards	2014 Results ¹	Management Activities
5C. 250 living native trees ² per acre in the <i>West Unit</i> . 4 planted tree species will each achieve at least 10 percent survival (Year- 10)	315 plants/acre (CI _{80%} = 288-341)	
5G. 250 living native trees per acre in the <i>East Unit</i> . 2 planted tree species will each achieve at least 10 percent survival (Year- 10)	426 plants/acre (CI _{80%} = 363-489)	
5.L <i>Revised</i> Native woody species in the Estate Buffer (planted and volunteer) will achieve an average density of at least 5 plants per 100 square feet in the Estate Buffer Planting Area (Year-1)	The density of native woody species in the estate buffer is estimated at 9.7 plants/100ft ² (CI _{80%} = 8.6-10.8). The cover of native woody species in the estate buffer is estimated at 35% cover (CI _{80%} = 30-40%).	
5J. 2000 native trees and shrubs per acre in Shoreline Enhancement Planting Area (Year-1)	2,173 plants/acre (CI _{80%} = 1,774-2,571).	Weed control occurred on nine separate occasion in 2014
5.O Native tree species (planted and volunteer) will achieve an average density of at least 1.1 plants per 100 square feet in the Wetland Enhancement Type IV Planting Area (Year-1)	1.16 stems/ 100ft ² The cover of native woody species in the Type IV wetland enhancement is estimated at 15% cover	

¹ Estimated values are presented with their corresponding statistical confidence interval. For example, 315 plants/acre (CI_{80%} = 288-341 cover) means we are 80% confident that the true plants/acre value is between 288 and 341.

²“Trees” in Performance Standards 5C and 5G refers to any native woody vegetation capable of growing into a tree as defined by Cowardin et al. (1979). This includes natural recruitment.

Report Introduction

This report summarizes Year-11 monitoring activities at the North Fork Newaukum Mitigation Bank. 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. Vegetation monitoring occurred on July 21-23, 2014 and then again on September 17-18, 2014.

What is the North Fork Newaukum Mitigation Bank Site?

The North Fork Newaukum Mitigation Bank (NFN Bank) (Figure 1) provides advance mitigation for unavoidable impacts to wetlands from proposed highway projects within Water Resource Inventory Area (WRIA) 23. The site is part of a degraded historic floodplain surrounding the confluence of the Middle and North Forks of the Newaukum River. It consists of former agricultural fields dominated by forbs, grasses, many young establishing tree saplings, and a mature forest in the non-credit generating preserve area. The goals of the NFN Bank focus on re-establishing important wetland and riparian functions. These goals include restoration of historic hydrologic regimes and connectivity between wetland areas, augmenting wetland and riparian function through reforestation, and installing large woody debris to enhance wildlife habitat. Some wetlands in the West Unit were expanded by removing fill to extend hydrologic regimes and expand wetland area. Other wetlands had hydroperiods extended through excavation (Topographic Enhancement Areas A, B, and C). Wetlands in the East Unit were enhanced by creating depressions with explosives (Topographic Enhancement Area D), and disabling the drain tile systems to extend periods of inundation and provide habitat diversity. Shoreline enhancement areas were planted with native shrubs to stabilize eroding banks and provide increased shading.

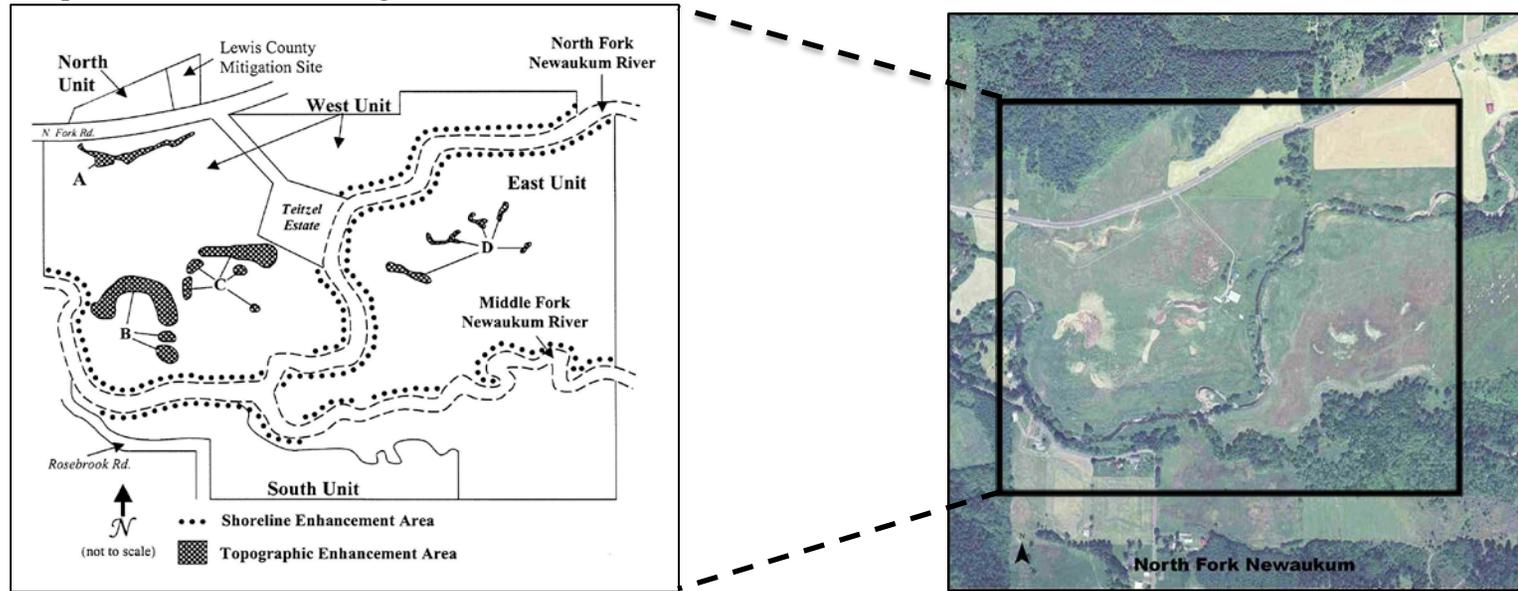


Figure 1 Site Sketch

The NFN Bank contains four large planting units with topographic and shoreline enhancement areas.

What are the performance standards for this site?

Year 10

Performance Standard 5C

At Year 10 there will be a minimum density of 250 living native trees* per acre in the areas identified on the Planting Plan as Oregon Ash Forest, Mixed Hardwood Forest, and Mixed Conifer Forest in the *West* Unit, excluding Emergent Areas (Figure 10). At least four planted tree species will each achieve at least 10 percent survival in said area.

Performance Standard 5G

At Years 10 there will be a minimum density of 250 living native trees* per acre in the areas identified on the Planting Plan as Oregon Ash Forest and Mixed Hardwood Forest in the *East* Unit (Figure 10), excluding Topographic Enhancement Areas (Figure 9). At least two planted tree species will each achieve at least 10 percent survival threshold values in said area.

Year 1

Revision to Performance Standard 5L

Native woody species in the Estate Buffer (planted and volunteer) will achieve an average density of at least five plants per 100 square feet in the Estate Buffer. Aerial cover of native woody plants within the Estate Buffer will also be measured and results reported.

Performance Standard 5J

At Year 1, the areas identified on the Planting Plan as Shoreline Enhancement Planting Area, excluding areas not appropriate for planting (cut banks, rip-rap, high existing native cover, etc.), will have a minimum density of 2,000 native trees and shrubs per acre (Figure 10).

Revision to Performance Standard 5O

Native tree species (planted and volunteer) will achieve an average density of at least 1.1 plants per 100 square feet in the Wetland Enhancement Type IV area. Aerial cover of native woody plants within this area will also be measured and results reported.

Appendix 1 shows the as-built planting plan (WSDOT 2005).

How were the performance standards evaluated?

Unequal-area belt transects were used to estimate the density of living trees per acre in the Estate Buffer, Shoreline Enhancement, and the West and East Units (Revised Performance Standards 5L and 5O and Performance Standards 5C and 5G). A baseline was placed perpendicular to the primary environmental gradient in each of the two units (Figure 2). Four-meter wide unequal-area belt transects were then randomly placed along the baselines for the West and East Units, two-meter wide transects for the Shoreline Enhancement (Figure 3), and one-meter wide transects for the Estate Buffer. Living stems were counted in each belt transect. Table 1 includes additional sample design information.

Table 1. 2014 Sample Design Information

Unit	Baseline Length	Spacing Between Belt Transects	Number of Transects
West	1239 m	80 meter intervals	15
East	539 m	48 meter intervals	11
Estate Buffer	327 m	15 meter intervals	21
Shoreline Enhancement	2089 m	83 meter intervals	25

A total count was conducted in the Type IV wetland enhancement.

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

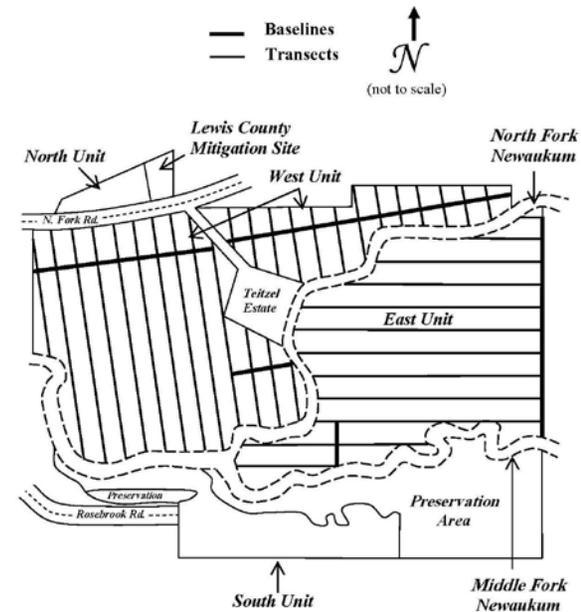


Figure 2 Site Sampling Design (2014)



Figure 3 Shoreline Sampling Design (2014)

How is the site developing?

In general the site is doing quite well. The density of native trees in both the East and West Units has readily met the final-year Year-10 performance standard. The adaptive management plan appears to be on track with both shoreline and wetland enhancement areas meeting their first year performance standards.

The North Unit was qualitatively monitored this year and no significant die-off or recruitment of volunteer species was observed. The density of native trees is estimated at 450 trees/acre and should easily meet the final-year, Year-10, performance standard in 2015.

Results for Performance Standard 5C

(A minimum density of 250 living native trees per acre in the West Unit. At least four planted tree species will each achieve at least 10% survival):

The density of living native trees in the west unit is qualitatively estimated at 315 plants/acre ($CI_{80\%} = 288-341$). The following species have achieved at least 10 percent survival: bigleaf maple (*Acer macrophyllum*), Douglas-fir (*Pseudotsuga menziesii*), Oregon ash (*Fraxinus latifolia*), western red cedar (*Thuja plicata*), quaking aspen (*Populus tremuloides*), black cottonwood (*Populus balsamifera*), and western hemlock (*Tsuga heterophylla*) (Photo 1). Appendix 2 shows relative abundance of all woody species.



Photo 1
Woody Density in the West Unit (July 2014)

Results for Performance Standard 5G

(A minimum density of 250 living native trees per acre, in the East Unit. At least two planted tree species will each achieve at least 10% survival threshold):

The density of living native trees in the east unit is estimated at 426 plants/acre ($CI_{80\%} = 363-489$). The following species have achieved at least 10% survival: Oregon ash (*Fraxinus latifolia*) and Oregon white oak (*Quercus garryana*). Appendix 2 shows relative abundance of all woody species.

Results for Revised Performance Standard 5L

(Native woody species in (planted and volunteer) will achieve an average density of at least 5 plants/100ft²):

The density of native woody species in the estate buffer is estimated at 9.7 plants/100ft² (CI_{80%} = 8.6-10.8). The majority of this density is comprised of roses (*Rosa spp.*). The cover of native woody species in the estate buffer is estimated at 35 percent cover (CI_{80%} = 30-40%).

Results for Performance Standard 5J

(A minimum density of 2,000 native trees and shrubs per acre):

The density of native trees and shrubs in the Shoreline Enhancement Planting Area is estimated at 2,173 plants/acre (CI_{80%} = 1,774-2,571). This is comprised of nearly similar numbers of snowberry (*Symphoricarpos albus*), Pacific ninebark (*Physocarpus capitatus*), Sitka willow (*Salix sitchensis*), and Nootka rose (*Rosa nutkana*) (Photo 2).

Results for Revised Performance Standard 5O

(Native tree species (planted and volunteer) will achieve an average density of at least 1.1 plants/100ft²):

The density of native tree species within the Wetland Enhancement Type IV area is estimated at 1.16 stems/ 100ft². This consists primarily of western red cedar (*Thuja plicata*) and Oregon ash (*Fraxinus latifolia*) (Photo3). The cover of native woody species in the Type IV wetland enhancement is estimated at 15 percent cover.



Photo 2
Shoreline plantings (July 2014)



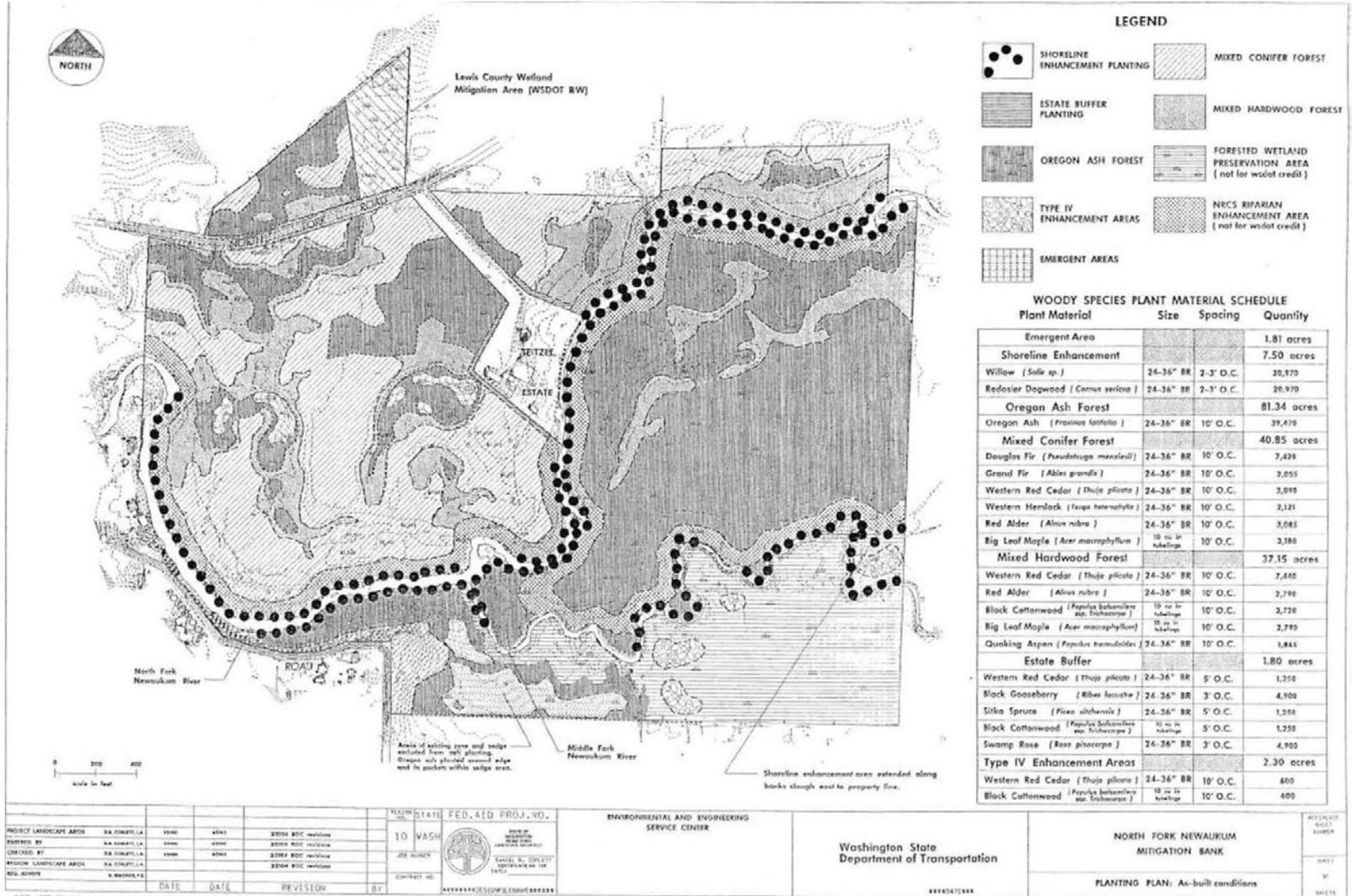
Photo 3
Type IV wetland enhancement plantings (July 2014)

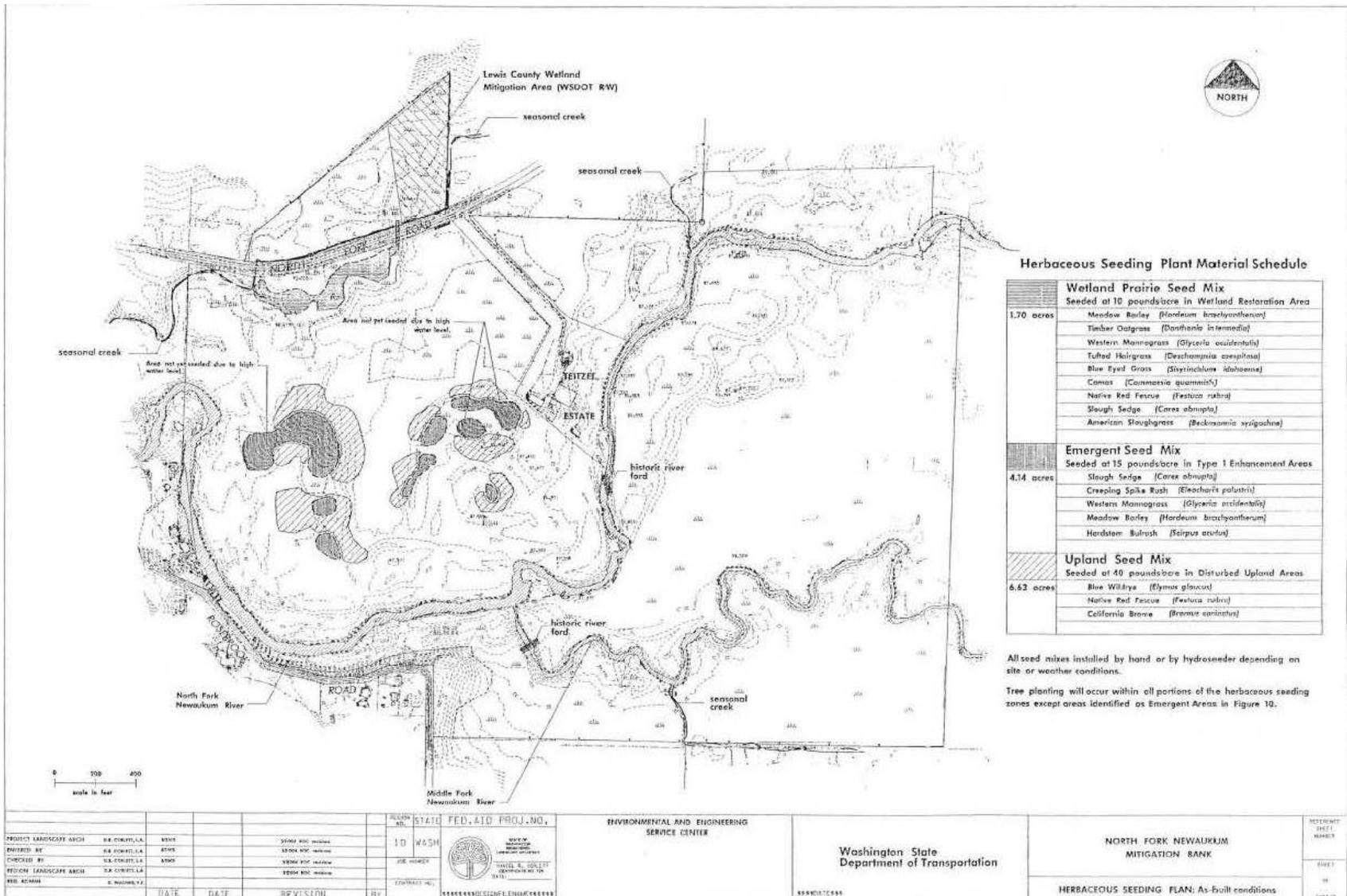
What is planned for this site?

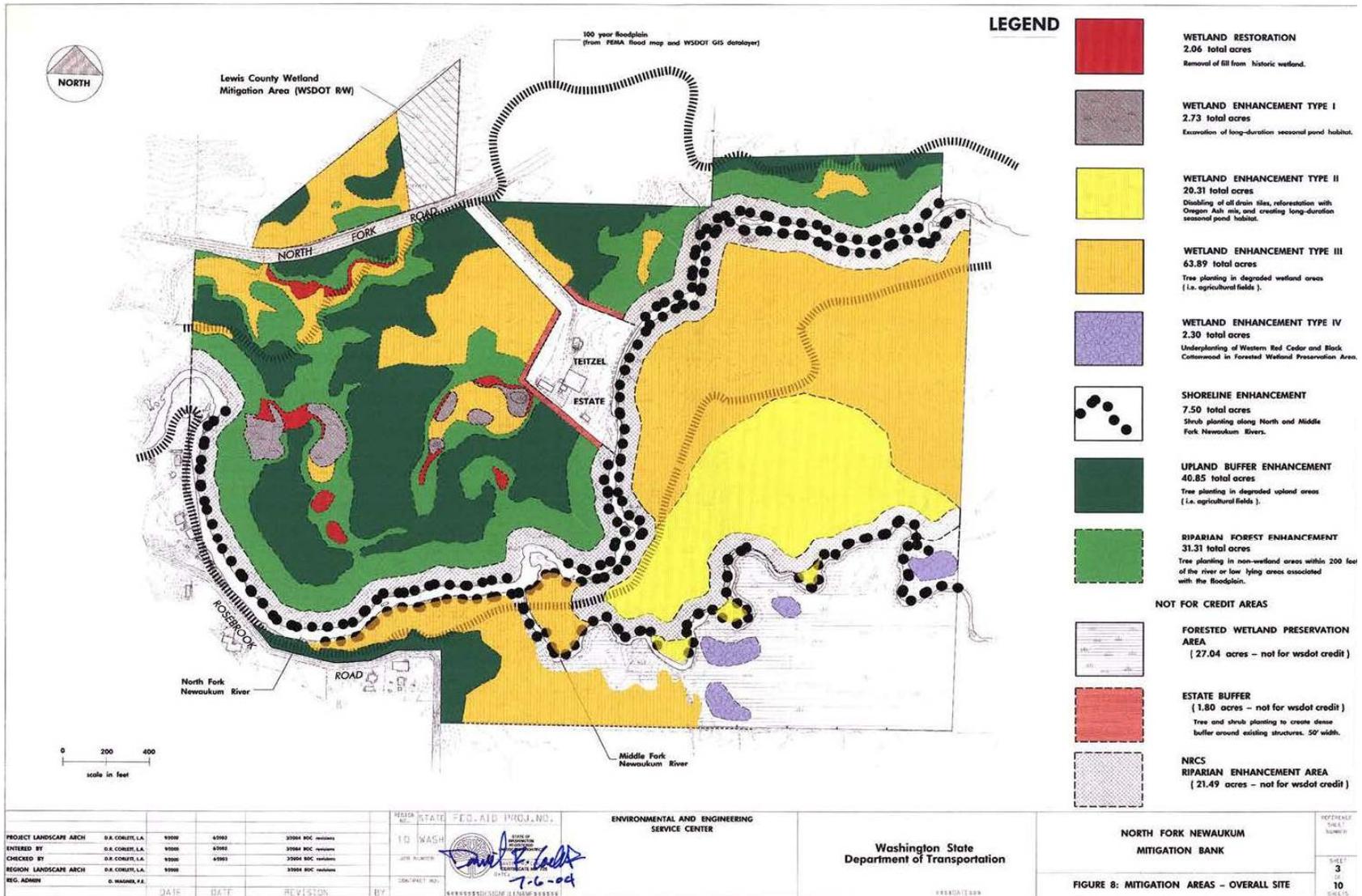
The areas planted as part of the 2013 Adaptive Management Plan will be managed to control weeds and promote establishment of woody vegetation in these areas.

Appendix 1 – Planting Plan

(from WSDOT 2005)







Driving Directions:

From I-5 exit 72 (Rush Road). Turn left off of the ramp. Turn left at the stop sign onto Rush Road and follow Rush Road all the way to the end at a T intersection. Turn right onto Bishop and follow it until the end. Turn right onto Jackson Highway. Turn left onto North Fork Road. After you cross the small bridge, past Pfeiffer Rd., turn right onto the paved driveway and park in front of the gate. A key should be obtained from region personnel.

Appendix 2 – Data Tables

Table 1. Woody Species Relative Abundance in the West Unit

Species	Relative Abundance
bigleaf maple (<i>Acer macrophyllum</i>),	9%
Douglas-fir (<i>Pseudotsuga menziesii</i>),	24%
Oregon ash (<i>Fraxinus latifolia</i>)	35%
Pacific crabapple (<i>Malus fusca</i>)	1%
Sitka spruce (<i>Picea sitchensis</i>)	11%
western red cedar (<i>Thuja plicata</i>)	6%
Cascara buckthorn (<i>Frangula purshiana</i>)	3%
quaking aspen (<i>Populus tremuloides</i>)	2%
black cottonwood (<i>Populus balsamifera</i>)	4%
western hemlock (<i>Tsuga heterophylla</i>)	0%
grand fir (<i>Abies grandis</i>)	4%
Oregon white oak (<i>Quercus garryana</i>)	1%
black hawthorn (<i>Crataegus douglasii</i>)	0%
red alder (<i>Alnus rubra</i>)	0%

Table 2. Woody Species Relative Abundance in the East Unit

Species	Relative Abundance
Oregon ash (<i>Fraxinus latifolia</i>)	89%
Pacific crabapple (<i>Malus fusca</i>)	1%
black hawthorn (<i>Crataegus douglasii</i>)	0%
Oregon white oak (<i>Quercus garryana</i>)	8%
Cascara buckthorn (<i>Frangula purshiana</i>)	0%
black cottonwood (<i>Populus balsamifera</i>)	0%
quaking aspen (<i>Populus tremuloides</i>)	0%
Sitka spruce (<i>Picea sitchensis</i>)	0%

Literature Cited

1. Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of The United States. United States Department of the Interior, Fish and Wildlife Service, Office of Biological Services, Washington, D.C.
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3. [WSDOT] Washington State Department of Transportation. 2005. North Fork Newaukum Mitigation Bank Instrument. Washington State Department of Transportation, Environmental Affairs Office and Southwest Region. Olympia, WA
4. [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>