

**SR 14 Marble Rd Vic. To Belle Center Rd Vic. Safety
Improvements (Cleveland Oak) Mitigation Site**

USACE NWP (23) NWS-2011-544

Southwest Region

2015 MONITORING REPORT

Wetlands Program

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General Site Information		
USACE NWP 23 Number	NWS-2011-544	
Mitigation Location	About 8 miles west of Skamania, WA	
LLID Number	1221983455812	
Construction Date	2013–2014	
Monitoring Period	2015–2024	
Year of Monitoring	1 of 10	
Type of Project Impact	Wetland	Oak Woodland
Area of Project Impact¹	0.16 acre	2.25 acres
Type of Mitigation	Oak Woodland/Savannah Establishment	
Planned Area of Mitigation^{1,2}	12 acres	

¹ The project impact and mitigation areas were referenced from the mitigation plan (WSDOT 2012).

² Additional mitigation for impacts associated with this project is provided at the SR 14 Homestead Lake Mitigation Site, the SR 14 Marble Road NSA Mitigation Site (on-site restoration), and the Wind Mountain Oak Preservation Site. See the mitigation plan for details (WSDOT 2012).

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Summary of Monitoring Results and Management Activities (2015)

Performance Standards	2015 Results ¹	Management Activities
Minimum 90% survival in all woody species planting areas; Uniform germination and active growth in seeded herbaceous areas	89% survival (CI _{80%} = 87-91%)	Planting performed on 6 dates in 2015 (500 serviceberry, 500 Indian plum, 5,000 snowberry)
Maximum 15% cover of blackberries and Class B noxious weeds	Less than 1% cover	Weed control performed on 8 dates in 2015
Japanese knotweed, purple loosestrife, and Class A noxious weeds will be eradicated if present	None observed	
Maximum 25% cover of reed canarygrass	Less than 1% cover	
Maximum 5% cover of non-native grasses and forbs in herbaceous portions of the oak savannah areas	Greater than 5% cover	

Report Introduction

This report summarizes first-year (Year-1) monitoring activities at the State Route (SR) 14 Cleveland Oak Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site development. Monitoring activities in 2015 included vegetation surveys and photo-documentation and was conducted on August 17 to 18.

¹ Estimated values are presented with their corresponding statistical confidence interval. For example, 89% survival (CI_{80%} = 87-91%) means we are 80% confident that the true survival value is between 87% and 91%.

What is the SR 14 Cleveland Oak Mitigation Site?

This 12-acre mitigation site (Figure 1) consists of Oregon white oak woodland establishment on a former hayfield west of Skamania, WA. This site was created as partial compensation for the loss of 2.25 acre of Oregon white oak woodlands due to safety improvements on SR 14 from the Marble Road vicinity to the Belle Center Road vicinity.

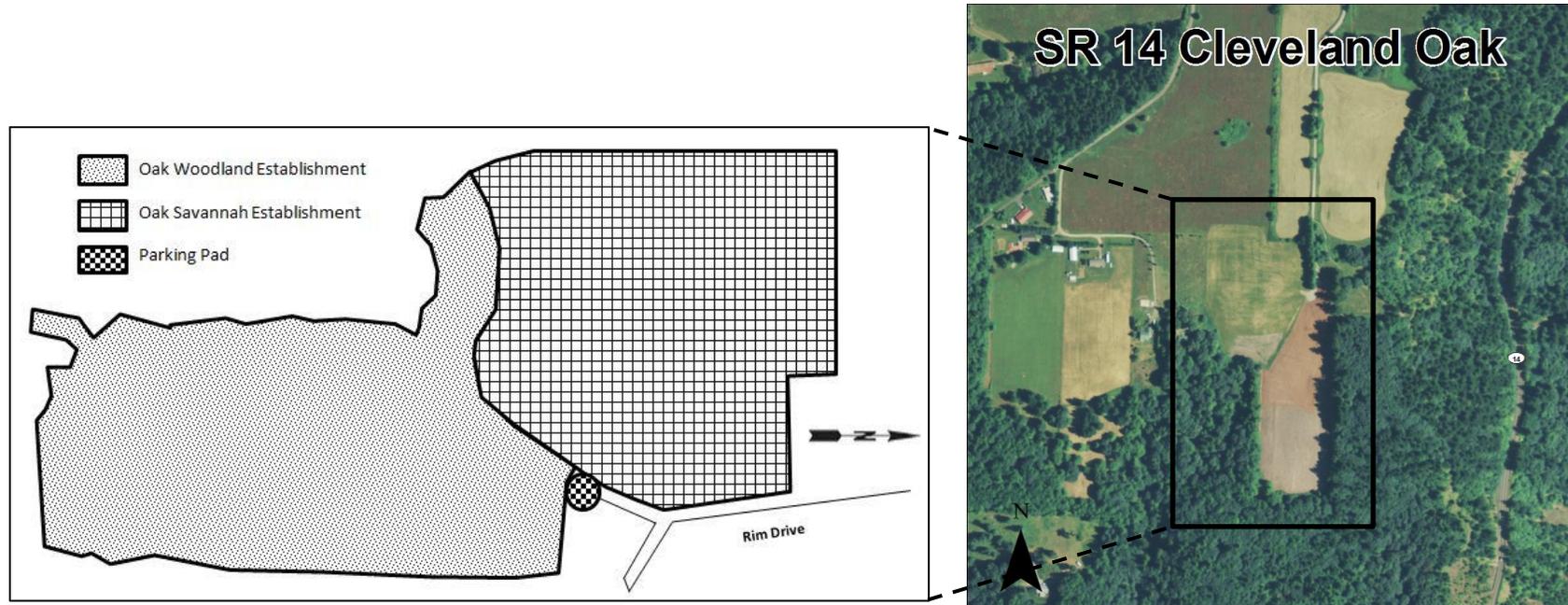


Figure 1 Site Sketch

The SR 14 Cleveland Oak Mitigation Site contains 6.4 acres of oak woodland establishment, designed to eventually have a closed tree canopy and dense woody understory, and 5.7 acres of oak savannah establishment, designed with clumps of oak plantings interspersed with an understory of native grasses and forbs. Appendix 2 includes site directions.

What are the performance standards for this site?

Performance Standard 1

At monitoring year 1, there will be a minimum survival rate of 90% in all woody species planting areas, including Oregon White Oak trees planted within Oak Savannah areas at the Cleveland mitigation site. Seeded herbaceous areas will exhibit uniform germination and active growth during the growing season.

Performance Standard 2

The aerial extent of Blackberry Species and Class B noxious weeds will not exceed 15% in the combined scrub shrub, buffer, and riparian planting areas, exclusive to each mitigation site (ie- invasive species totals at both sites shall not be added together to create a single % cover for reporting purposes).

Performance Standard 3

If/when detected, Class A Noxious Weeds, Japanese Knotweed, and Purple Loosestrife shall be treated so that the species do not exist on the site. These species shall not be included in the 15% cover allowed for invasive species.

Performance Standard 4

At monitoring years 1, 3, 5, and 7, the aerial extent of Reed Canarygrass at each mitigation site shall not exceed 25% total cover in the wetland creation or buffer enhancement areas.

Performance Standard 5

At monitoring year 1, WSDOT will aggressively manage non-native grasses and forbs emerging in the herbaceous oak savannah areas of the Cleveland mitigation site. The aerial extent of non-native grasses and forbs should not exceed 5% total cover in herbaceous portions of the oak savannah areas.

Appendix 1 shows the planting plan (from WSDOT 2012).

How were the performance standards evaluated?

The table to the right documents the sampling methodology utilized for the performance standards. For additional details on the methods see the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).

Placement of Baseline: Through the center of the site, oriented north-south with a short segment offset at the north end.

	PS 1	PS 1	PS 2, 3, 4	PS 5
Attribute	Survival	Survival	Cover/Presence	Cover
Target pop.	Native Woody	Native Woody	Noxious Weeds	Herbs
Zone	Oak Woodland	Oak Savannah	Entire Site	Oak Savannah
Sample method	UBT	UBT	Visual Estimate	Point Line
SU length				20 m
SU width	1 m	1 m		
Points per SU				20
Total # of SU	20	10		23

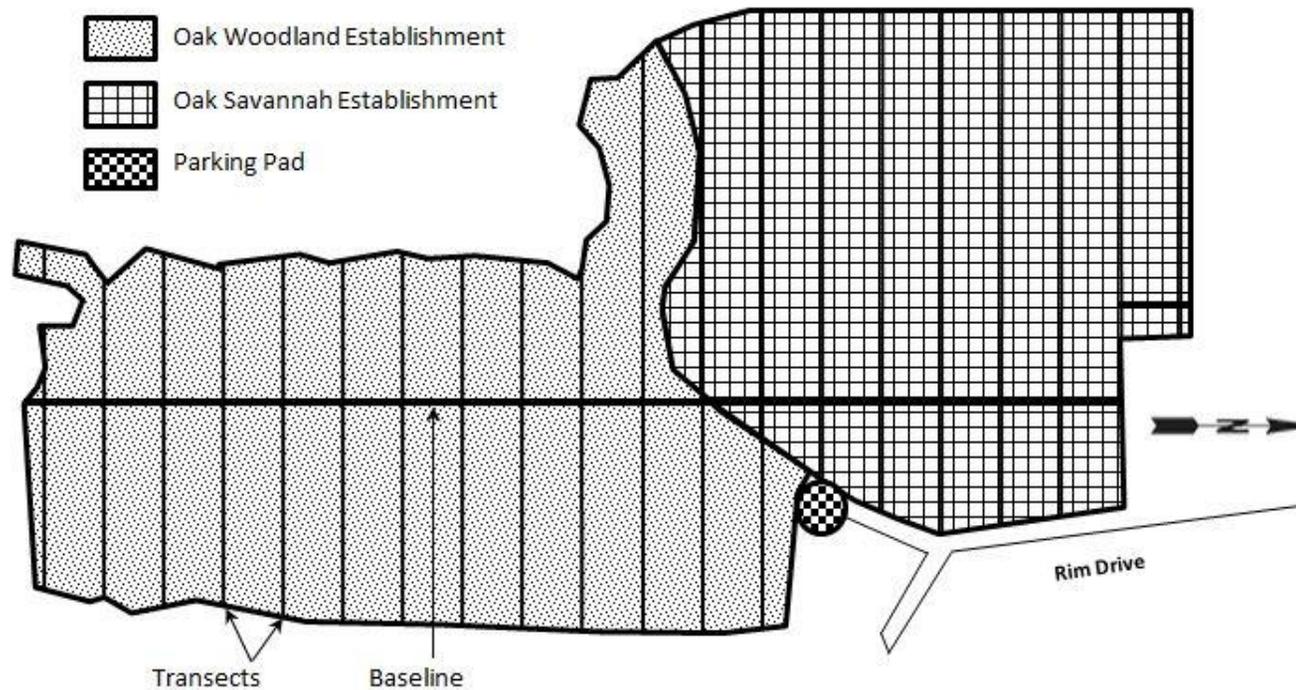


Figure 2 Site Sampling Design (2015)

How is the site developing?

This mitigation site is developing mostly as planned, with the exception of the herbaceous portion of the oak savannah area, which is exceeding the first-year threshold for cover of non-native species. The woody plantings are developing well across the site, with survival in the oak woodland meeting the intended threshold of 90 percent (Performance Standard 1). Survival in the oak savannah is somewhat lower at 70 percent. There are many fewer total plantings in this area, however, and they are all Oregon white oak (*Quercus garryana*) trees (and large stock at that), which are more difficult to get established than many other native woody species, so this is not totally unexpected, particularly in a summer as dry as that of 2015. The sheet mulching and other weed control measures appear to have been effective in limiting noxious weed growth so far, as noxious weeds are not a significant problem at this time.

Results for Performance Standard 1

(Minimum 90% survival in all woody species planting areas; Uniform germination and active growth in seeded herbaceous areas):

The survival rate of woody plantings across the entire site is estimated at 89% (CI_{80%} = 87-91%). In the Oak Woodland area alone (Photo 1), survival is estimated at 90% (CI_{80%} = 88-92%). The most abundant species in this area is snowberry (*Symphoricarpos albus*), followed by dull oregongrape (*Mahonia nervosa*), western serviceberry (*Amelanchier alnifolia*), Oregon white oak (*Quercus garryana*), and Indian plum (*Oemleria cerasiformis*). The survival rate of woody plantings in the Oak Savannah area alone (Photo 2) is estimated at 70% (CI_{80%} = 63-76%). The only woody species planted in this area is Oregon white oak (*Quercus garryana*).



Photo 1
Woody survival in the oak woodland (August 2015)

The germination of seeded herbaceous species in the Oak Savannah area was impossible to assess since the monitoring group did not have a list of seeded species at the time of monitoring, and because monitoring occurred late in the summer when some of the grasses were not identifiable. Success of herbaceous seeding will be assessed in terms of native/non-native cover in future years (see results for Performance Standard 5 below for more details).

Results for Performance Standard 2

(Maximum 15% cover of blackberries and Class B noxious weeds):

No Class B noxious weeds were observed on-site. Non-native blackberries were present in the form of scattered new starts on-site and established off-site patches creeping onto the site. The cover of these species was visually estimated at less than one percent across the entire site.

Results for Performance Standard 3

(Japanese knotweed, purple loosestrife, and Class A noxious weeds will be eradicated if present):

No Japanese knotweed (*Reynoutria japonica*), purple loosestrife (*Lythrum salicaria*), or Class A noxious weeds were observed on or adjacent to the site during monitoring.

Results for Performance Standard 4

(Maximum 25% cover of reed canarygrass):

Reed canarygrass (*Phalaris arundinacea*) was present on-site in small, scattered patches. Cover of this species was visually estimated at less than one percent across the entire site.



Photo 2
Woody survival in the oak savannah (August 2015)

Results for Performance Standard 5

(Maximum 5% cover of non-native grasses and forbs in herbaceous portions of the oak savannah areas):

The results for total cover of non-native grasses and forbs in the herbaceous portions of the oak savannah (Photo 3) were inconclusive due to the timing of the monitoring visit. The site was visited late in the summer of a very dry year and many of the grasses no longer had useful flowering parts for identification. Despite the inconclusive results, in terms of a specific cover estimate for non-native species, it was clear from the incomplete sampling results and visual observations that the cover of non-native species is greater than five percent. In order to obtain more definitive results, monitoring for this site will be scheduled for earlier in the summer in the coming years when better and more abundant specimens are available for identification.



Photo 3
Herbaceous cover in the oak savannah
(August 2015)

Non-native herbaceous species that were present in this area include narrowleaf plantain (*Plantago lanceolata*), oxeye daisy (*Leucanthemum vulgare*), common velvetgrass (*Holcus lanatus*), butter and eggs (*Linaria vulgaris*), sweet vernalgrass (*Anthoxanthum odoratum*), common sheep sorrel (*Rumex acetosella*), red clover (*Trifolium pratense*), and hairy cat's ear (*Hypochaeris radicata*). Native herbaceous species that were present in this area include blue wildrye (*Elymus glaucus*), nodding Trisetum (*Trisetum cernuum*), slender wheatgrass (*Elymus trachycaulus*), California brome (*Bromus carinatus*), and a lupine (*Lupinus* sp.).

What is planned for this site?

Continued spot spraying will occur in the oak woodland and oak savannah bark mulch areas throughout the growing season followed by replanting in the 2016-2017 dormant season.

Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on August 18, 2015 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



Photo Point 3c

Driving Directions:

Contact WSDOT South Central Region environmental staff to obtain a gate key. From I-5, take SR 14 east for 24 miles. Turn left on Belle Center Rd. Drive 1.4 miles then turn right onto Mt. Pleasant Rd. Drive 0.4 mile then turn right onto Strunk Rd. Drive 0.6 mile to the end of Strunk Rd. Turn right and go through the locked gate. Travel about 0.25 mile down the gravel road and the mitigation site will be on the right.

Literature Cited

1. [USACE] US Army Corps of Engineers. 2012. Department of the Army Nationwide Permit (23) Number NWS-2011-544.
2. [WSDOT] Washington State Department of Transportation. 2012. Final Natural Resource Mitigation Plan SR 14 Marble Rd Vic. To Belle Center Rd Vic. Safety Improvements MP 22.60 to 23.70. Vancouver (WA): Washington State Department of Transportation, Southwest Region.
3. [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>