Mitigation Monitoring Report Cover Sheet

Oregon Department of State Lands

Block 1: Report Information

DSL Permit Number: 36700-RF COE Permit Number: *Nationwide Permit 27* -#200500622
Permittee: Alton Sullivan
County: Linn Report Date: 12/15/2014 Monitoring Year 8
Date Removal-Fill Activity Completed: July 07
Date mitigation was completed Grading: 7/06 Planting: 9/06, 10/06, 2/07-4/07, 10/07, and 2/08.
Report submitted by: Oregon Wetlands LLC – One Horse Wetland Mitigation Bank

Block 2: Monitoring Report Purpose

This monitoring report is for monitoring a project that includes: (check all that apply):

X Compensatory **freshwater** wetland mitigation for permanent wetland impacts.
NA Compensatory **estuarine** wetland mitigation for permanent wetland impacts.
Only non-wetland compensatory mitigation.
Only mitigation for temporary impacts that has a monitoring requirement.
Voluntary wetland enhancement, creation or restoration (General authorization or individual permit) not funded with money from our wetland mitigation revolving fund.
Voluntary wetland enhancement, creation or restoration (General authorization or individual permit) funded with money from **our wetland mitigation revolving fund.**
X **Mitigation Bank** Report
Other: _____

Block 3: Results

	Success Criteria	Met (Y/N)	Comments/Reasons for Failure*
1.	Emergent Vegetation	3 of 3 requirements	
2.	Wetland Prairie	6 of 6 requirements	
3.	Created Tree/Shrub	6 of 6 requirements	
4.	Hydrology – Water Monitoring Tubes	1 of 1 requirement	Met 2009
5.	Hydrology - Delineation	1 of 1 requirement	Met 2009

Remedial work recommended Yes
No X

Deed Restriction or other protection instrument attached (noted: if a filed deed restriction was a required as a permit condition, please attach a copy: *previously submitted* Yes
No

Final Monitoring Report? Yes No X
Requesting release or partial release of bond/credits Yes No X
*see report for detailed information

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LIST OF ATTACHMENTS

1.0 REGULATORY BACKGROUND

The purpose of this report is to summarize the progress of the One Horse Wetland Mitigation Bank (Bank). The Bank is located on the south side of Payne Rd. in T12S, R2W, Sec. 1 & 36 Lots 201, 2201 and 3900. The letter of approval for the Bank was signed on December 5, 2006 and is permitted as DSL permit # 36700 and COE permit #200500622. The Bank consists of 130.48 acres.

Development of the Bank was through a combination of enhancement of cropped wetland (118.47 acres), and creation of wetlands (11.81acres). A portion (0.20 acres) of the 130.48 total acres is being used as parking and is not included in credit generation of bank credits:

Type of Credit	Acres	Ratio	Credits
Cropped Wetland Enhancement	118.47	2:1	59.235
Creation	11.81	1.5:1	7.87
New Parking	0.20		
Total	**130.48 acres**		**66.91 credits**

2.0 WORK SUMMARY

Beginning in early March, efforts concentrated on covering all older prairie areas to spot treat unwanted species before native grasses got tall and inhibited detection. All prairie areas were covered with ATV at least once targeting velvet grass, bent grass, rough-stalk bluegrass, annual blue grass, and any other non-natives encountered. Forbs dominated prairie areas were walked multiples times with backpacks targeting Prickly lettuce, Thistle spp., and any other non-native species encountered, which was much less times consuming this year as natives forbs continue to expand. A 60ft band along the East and West boundaries were broadleaf herbicide treated when conditions were favorable to prevent encroachment from surrounding properties. All tree and shrub plantings were covered with ATV in late spring to spot treat any invading species, Canadian thistles, prickly lettuce, and sow thistles were the primary targets. Since decreasing mowing in the PFO/PSS areas, non-natives have become much less of an issue, and some areas are beginning to get enough canopy cover to eliminate herbaceous species.

The existing forested area was periodically spot treated throughout the season, with Nipple wart and Curly dock being the main targets. The emergent areas were covered in early fall to spot treat any pennyroyal present, and monitor for any other non-natives. Also in early fall, the few Himalayan blackberries that had been encountered within the site throughout the season were treated, which provides the most effective long term control. All borders were spot treated for non-natives to prevent these species from entering the site.

Slightly more mowing was completed this year to test responses from both vegetation and wildlife. Approximately half of the forbs dominated prairie was mowed for the first time, selected based on amount of grass competition and was subsequently sprayed in late fall with grass specific herbicide.

These areas were mowed in conjunction with meandering trails throughout the site, to distribute the seed and provide access through tall vegetation. As a side by side comparison, one of the forbs dominated areas was split into quadrants with the following treatments: Mowing with fall grass specific herbicide treatment, unmowed with fall grass specific herbicide treatment , mowing with no herbicide treatment, and unmowed with no herbicide treatment. The water edges of all emergent areas were mowed to provide better conditions during shorebird migrations. All berms were also mowed this year, as they had been avoided for the last several years.

A diverse mix of sedges and rushes totaling 9 species was hand collected from One-Horse Slough throughout the late summer and fall. Also through cleaning out the seed drill after planting several other projects, ~40 species of forbs seed were also collected. All this seed was blended with remaining seed leftover from last year's plantings which was purchased from Heritage Seedlings, and broadcast in the forbs dominated prairies everywhere there was sufficient bare ground for establishment.

Table 1. Summary of Restoration Activities at One Horse Slough Mitigation Bank December 2013 – November 2014

Activity	Location
Site preparation	Ongoing on borders
Existing forested vegetation treatment	All Non-native vegetation treated (on-going)
Spot weed control	100% of mitigation bank area (on-going)
Broadcast weed control	60ft swath along sections of the borders in spring 2013(broadleaf) ~15 acres of previously planted forbs(grass specific)
Mowing	Maintenance trails, ½ forbs, water edges, and berms
Prairie seeding (Fall)	A diverse mix of forbs, rushes and sedges was planted in bare areas throughout the prairie.

3.0 AS-BUILT PLANS

The as-built plans were submitted within 60 days of grading as specified in the final instrument.

4.0 HYDROLOGY PERFORMANCE STANDARDS, METHODOLOGY, AND RESULTS

4.1 Performance Standards

Wetland hydrology sufficient to meet the criteria defined in the 1987 Corps of Engineers Wetland Delineation Manual (1987 Wetland Delineation Manual), will be present in at least three out of five years if the weather records are close to normal and no irrigation is supplied. Water depth and depth of saturation will be evaluated throughout the site using a combination of monitoring wells a d a one time hydrology and vegetation delineation designed to meet the requirements of the 1987 Wetland

Delineation Manual. The soil parameter is expected to be disturbed by the proposed grading, therefore lock of hydric soils indicators will not be interpreted as disqualifying a plot as wetland.

4.2 Methodology

Water Monitoring Tubes: At least six (number of tubes will be driven by the site conditions, following bank grading) groundwater monitoring tubes will be constructed and monitored to show the duration of saturation. Tube monitoring data shall be collected three times between approximately March 1 and May 30 to demonstrate sufficient duration of wetness to meet the 1987 Wetland Delineation Manual. The monitoring report will also include precipitation date for the monitoring period from the nearest recording station. The locations of the monitoring tubes will be representative of the hydrological variation on site to prove duration of saturation needed to meet the 87 Manual criteria. These will be included on the as-built drawings.

Delineation: Paired plots concentrating along the wetland boundary, for any plots dominated by upland vegetation, and in any high areas will be utilized to indicate the exact location of the wetland boundary. The paired plots will be evaluated using soil probes or pits. This will be done to document that wetland hydrology has been achieved throughout the site. In addition to plot data, these areas will be visually documented with photographs to show a dominance of wetland species. The wetland boundary will then be displayed on a site map to confirm acreage achieving the performance measure.

4.3 Results

This provision has been met for at least three years and is no longer being monitored.

5.0 VEGETATION PERFORMANCE STANDARDS AND METHODOLOGY

5.1 Performance Measures

Emergent Herbaceous

1. A minimum of 55% of the relative plant cover (including bare soil) is comprised of native species.
2. No more that 15% of the relative plant cover is comprised of non-native invasive species as define below.
3. The wetland's moisture index is less than 3.0.

*Non-native invasive species to be included: reed canary grass (*Phalaris arundinacea*), purple loosestrife (*Lythrum salicaria*), Himalayan blackberry (*Rubus discolor*), and Japanese knotweed (*Polygonum cuspidatum*), Eurasion water milfoil (*Myriophyllum spicatum*), climbing nightshade (*solanium dulcamara*) (and yellow-flag iris (*Iris pseudacorus*), Anne•s lace (*Daucus carota*), Canadian thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), orchard grass (*Dactylis glomerata*) and annual ryegrass (*Lolium multiflorum*) or others as determined by the MBRT.

Wetland Prairie

The above performance standards along with the following:

1. At least 10 wetgrass prairie species are present as listed in "Species Composition for Willamette Valley Vegetation Types" by Kathy Pendergrass, August 2003, *supplied by John Marshall (USFWS) author of Draft Guidance on Vegetation Performance Standard and Monitoring Protocols for Reference Sites and Mitigation Sites"* to enhance Appendix II of this document.
2. Tufted hairgrass (*Deschampsia cespitosa*) is represented by 25% or greater relative plant cover.

3. At least 50% of the relative plant cover (including bare soil) is comprised of native species.
4. No more that 15% of the relative plant cover is comprised of non-native invasive species as define above.
5. The prairie's moisture index is between 2.0 and 3.0.
6. No more than 5% relative plant cover by shrubs or trees.

Shrub and Forest - Restoration
By the end of the second growing season, the newly planted shrub and forest component of the wetland will meet or exceed 75% of the species richness of the reference site (excluding non-native invasive species). The plant density in forested and shrub/scrub wetlands will be at least 80% of the reference site, of species that are rated FAC or wetter, excluding FAC- species. This must be achieved by the end of the second growing season following planting and maintained through the end of the monitoring period until trees and shrubs are established and free to grow. There will be no more than 15% aerial coverage of non-native invasive species*. These densities will be a combination of planted individuals and natural recruitment.

In addition, the herbaceous layer in the forest and shrub areas will meet or exceed the performance measures for emergent herbaceous wetlands as stated above.

5.2 Methodology

A stratified, systematic plot method was used to conduct vegetation sampling in all areas. Vegetation data was collected at each of 71 original sample points that had been pre-determined and plotted along 6 transects. One additional plot (#72) was added to the upper PSS area in 2007 for a better representation of this area. Four additional emergent plots (#73 - #76) were added in between existing plots to get a better sample of this habitat type, and flatten out the species area curve. These points were randomly selected from the monitoring map in ArcGIS, then uploaded to a handheld GPS, and marked in the field. The monitoring point location map is included as Attachment 2. Each original transect crosses the entire wetland (north to south) and they are located approximately 400 feet apart (north-south). Sampling plots were then located at 200 foot intervals along each transect. Herbaceous data was collected using 1-meter quadrants, and tree and shrub data was collected in 30’diameter plots.

5.3 Vegetation Monitoring Results

Vegetation monitoring was conducted on June 2, 2014 by Ray Fiori for the wet prairie and PFO/PSS plots. Due to the hydrology and late draw down of emergent areas, the emergent sampling was completed on September 8, 2014 by Ray Fiori. Attachment 1 includes spread sheets with the results of the monitoring. The spread sheets include a complete listing of all plant species identified in the monitoring plots. Several species that are still present on site but didn’t make the monitoring plots this year were left on the list. Seventy-six monitoring plots were examined. The data spread sheets include the botanical names, common names, indicator status, origin (native or non-native) and prevelance index.

In 2014, 60 plant species were identified in the monitoring plots. Of the species present, 59 were native and 22 are on the prairie cohort list. The low occurrence and cover of invasive and non-native species on site is a reflection of the continued effectiveness of site preparation, monitoring, establishment, care and spot treatment that the Bank sponsors continue. The increase in diversity is a direct result of allocating substantial resources to far exceed performance measures by continuing to incorporate new species to create diverse habitats as well as eliminating non-natives to encourage natural recruitment.

5.3.1 Emergent Vegetation

Herbaceous native canopy cover averaged 98.93% throughout the emergent marsh area. Open water and bare ground comprised 2.23% and 1.07% respectively. As in the previous 4 years, emergent monitoring occurred 2 months later than 2008, allowing significant draw down to occur and the vegetation to respond. The recorded vegetation cover was 100% native species.

All three of the performance criteria for **emergent herbaceous** vegetation were met.

Required: At least 55% of the mean plant cover (including bare soil) will be comprised of native species – **Met**; the emergent vegetation plots have a relative percent native cover of 98.93%.

Required: No more that 15% of the mean plant cover will be comprised of non-native invasive species. –***Met;*** *no non-native or invasive species.*

Required: The wetlands moisture index is less than 3 –***Met;*** *with an average weighted moisture index of 1.00.*

5.3.2 Wetland Prairie

Herbaceous native canopy cover averaged 93.51% throughout the wetland prairie areas. Non-native canopy cover (including bareground) averaged 6.49% of which 5.95% was bareground. The only non-native was Centaury, which accounted for 0.54 % cover. Of the vegetation itself in the wet prairie, 99.46% was native, while 0.54% is non-native species. Forbs/sedge/rush cover remained about the same at 33.11% this year, while grass cover was also similar at 60.95% cover, and bareground was 5.95%.

The performance criteria for **wetland prairie** were met for 6 of the 6 requirements.

Required: At least 10 wetgrass prairie species are present as listed in "Species Composition for Willamette Valley Vegetation Types" by Kathy Pendergrass. – In conversations in spring 2008 with John Marshall (USFWS), it was agreed upon to include the vernal pool species from this same source in the 10 required species, as this was the original intent. ***Met****; 18 wetgrass prairie and vernal pool species were identified within the prairie plots, with 22 species found throughout all the monitoring plots.*

Required: Tufted hairgrass (Deschampsia cespitosa) is represented by 25% or greater mean cover. - **Met**; Tufted hairgrass represented 31.35%. **As discussed during the annual site visits, this provision needs removed, as its been the biggest factor in reducing diversity. As seen with all Oregon Wetlands LLC banks, the reduction in cover of tufted hairgrass is directly correlated to an increase in diversity (i.e. forbs/sedge/rush cover).**

Required: At least 55% of the relative plant cover (including bare soil) will be comprised of native species- ***Met;*** *the overall relative native plant cover was 93.51%.*

Required: No more that 15% of the mean plant cover will be comprised of non-native invasive species –***Met;*** *with no non-native invasive species. Non native plant cover was 0.54%.*

Required: The wetland prairie moisture index is between 2.0 and 3.0 – ***Met****; the prevelance index is 2.30.*

Required: The prairie has no more than 5% relative plant cover comprised of shrubs or trees. ***Met****; this has not been an issue. Very few trees have been observed in the prairie. With increased disturbance to introduce forbs, shrubs and trees will likely try to colonize these areas when there is little cover to compete with. They will be monitored, and mowed if necessary to keep them in check.*

5.3.3 Forest and Scrub/Shrub Creation

Four plots were picked at random in the reference site which is directly adjacent to the bank, and represent both the open and closed canopy sections of this relatively undisturbed forested wetland. Many areas had extensive Himalayan blackberry thickets and were avoided as reference plots. These plots are representative of other forested wetlands in the area, although the shrub density seems to be higher than other sites. Every tree stem over 18” and every shrub stem over 1” diameter

was counted to compute the stem density. Although this would be too time consuming on a large scale, with a relatively small site this seemed the best way to quantify stem density and compare it to the restored areas. An analysis of the original reference site data was conducted with the results included in Table 2.

Monitoring plots were surveyed in a similar way as the reference site. Based on comments from the 2009 monitoring report, plant counts were used to quantify shrub species, rather than stem counts. Tree species over 18" tall (2 to3 yrs old) were counted as in the reference site. A 30ft diameter sampling plot was used from the original monitoring date, as all but one plot contained both tree and shrub species. This same sampling protocol has been followed in subsequent years to be consistent, and the 30ft diameter plot has been utilized in all the emergent and wet prairie sample plots to quantify encroachment of woody vegetation into these habitats. Many new trees and shrubs are taking hold through natural recruitment from adjacent areas as well as from planted individuals in these areas and will take several years to fully establish. This year's data is included in table 3.

Required: Year 2 performance measure. Meet or exceed 75% of the species richness of the reference site excluding non native invasive species. ***Met****; 13 woody species were identified with only seven species in the reference site.*

Required: Year 2 performance measure. Plant density will be at least 80% of the reference site with FAC or wetter species. ***Met****; with an average of 779 stems/plants per acre of FAC or wetter species. An analysis of the original reference site data was conducted with the results included in Table 2.*

Table 2 - Reference Site Analysis Summary

Reference Site Species	**Native/Non**	**Indictor Status**	**Reference Site Stem/Acre**
Oregon Ash	Native	FAC	200
Pacific crabapple	Native	FACW	30
Nootka rose	Native	FAC	222
Sweetbriar rose	**Non**	FACW	87
Service berry	Native	**FACU**	65
Snowberry	Native	**FACU**	65
English hawthorne	**Non**	FAC	65
Total stems per acre of FAC or wetter and native			452

*** Items in bold** do not meet bank performance standards

The analysis showed that of the seven species in the reference site only three species (Oregon ash, pacific crabapple and nootka rose) were both FAC or wetter and native species. The other four species were either non-native or FACU species. The original stem density calculations for the reference site included all of the species, even those that do not count toward the Bank's performance standard (FAC or wetter and native). It was determined that of the suitable species on the reference site, the stem density is 452 stems per acre. Using this analysis information, the reference site usable stem densities would be 80% of 452 stems/per acre which is 362 stems per acre.

A similar analysis was done of the 13 species that were found in the created shrub/forest wetlands within the Bank. All of the Bank species are native and of the 13 species, 7 are FAC or wetter. The results are included on Table 3.

Table 3 – One Horse Shrub/Forest Analysis Summary

Bank Species	Native/Non	Indictor Status	Stem/Acre
Douglas hawthorne	native	FAC	84
Oregon ash	native	FACW	370
Ponderosa pine	native	**FACU**	6
Black cotton wood	native	FAC	22
Service berry	native	**FACU**	6
Red osier dogwood	native	FACW	6
Pacific ninebark	native	FACW	6
Red flowering current	native	**FACU**	11
Nootka rose	native	FAC	95
Clustered rose	native	FAC	112
Pacific willow	native	FACW	34
Douglas spirea	native	FAC	50
Snowberry	native	**FACU**	101
Total stems per acre of FAC or wetter and native			**779**

*__Items in bold__ do not meet bank performance standards

Required: Year 2 performance measure. There will be no more than 15% aerial coverage of non-native invasive species*. ***Met;*** *with 0% non-native invasive species found within in the plots.*

The herbaceous layer in the shrub and forest area will meet or exceed the following year 2 emergent habitat performance measures.

Required: At least 55% of the mean plant cover (including bare soil) will be

comprised of native species – ***Met****; Native plant cover was 92.27%, while non-native cover (including bareground) was 7.27%*

Required: No more that 15% of the mean plant cover will be comprised of non-native invasive species – ***Met;*** *with 0 % of non-native invasive species found in the plots.*

Required: The wetlands moisture index is less than 3 –***Met;*** *mean prevelance index of the herbaceous layer is 2.25.*

6.0 PHOTO POINT MONITORING

Photos from the photo points are included as Attachment 3. Photos were taken on June 2, 2014.

7.0 CREDIT SALES SUMMARY

An initial 17.8 credits (30% of enhancement credits) were released in December 2006. Following the 2007 MBRT site visit Release #2 was approved pending submission of the monitoring report. The 2008 Monitoring Report was submitted and release #2 and a partial release #3 were issued by DSL on 09/09/08 and by the Corps on 08/14/08 for 19.11 credits. The remainder of release #3 and a partial release of #4 was issued by DSL on 1/26/2010 for 15.99 credits and by the Corps on 1/25/2010 for 7.72 credits. A combination of releases by both agencies yielded a total credit release of 52.9 credits on 1/26/10. On 7/7/11 7.31 credits were released by both agencies, resulting in 90% of the total credits available being released, for a total of 60.21 credits released Table 4 is a summary of the credit sales to date. No credits were sold in 2014.

Release 1 (Fall/Winter 2006): Up to 30 percent (of the enhancement areas until a hydrology delineation occurs on the creation areas), upon submission of the grading as-built, Restrictive Covenant, submission of financial assurance and the MBRT conducts a field inspection**.**
Completed

Release 2 (Spring/Summer 2007): Up to 20 percent (of the enhancement areas until a hydrology delineation occurs on the creation areas) upon demonstration of all performance measures being achieved and delineation of acreage meeting the 1987 Wetland Delineation Manual hydrology (if weather conditions are close to normal).
Completed

Release 3 (Spring/Summer 2008): Up to 20 percent upon demonstration of all performance measures being. **Completed**

Release 4 (Spring/Summer 2009): Up to 20 percent upon demonstration of all

performance measures being. **Completed**

Release 5 (end of the 5th year monitoring or 5 years after replanting for those areas replanted): All remaining credits (10%) upon demonstration of all performance standards being achieved. In addition, the long term management plan and funding must be reviewed and approved by the MBRT.

Table 4: One Horse Credit Sales Summary

DATE	NAME	LOCATION	DSL	CORP	ADDED	SOLD	BALANCE
12/5/06	**INITIAL 30% RELEASE**		**Permit Number**		**17.8**		**17.8**
12/28/06	City of Lebanon	T12S; R2W; Sec 16; DA; Lot 300	37235-RF	2006-00825		0.71	**17.09**
12/28/06	Pace American	T12S; R2W; Sec 16; DA; Lot 301	37233-RF	2006-00737		5.02	**12.07**
12/28/06	David Hunter	T12S; R2W; Sec 16; DA; Lot 302	36777-RF	2006-00462		1.38	**10.69**
12/28/06	RC Ventures	T12S; R2W; Sec 16; DA; Lot 303	36799-RF	2006-00462		2.08	**8.61**
12/28/06	Lane Manufacturing	T12S; R2W; Sec 16; DA; Lot 304	37302-RF	2006-00786		1.1	**7.51**
3/19/07	RC Ventures	T12S; R2W; Sec 16; DA; Lot 305	36799-RF	2006-00462		0.046	**7.464**
3/20/07	Lepman Properties	Sweet Home	37745-RF	NA		0.2	**7.264**
4/3/07	Linn County Parks Dept	Calkins Park Boating Facility	37424-RF	2006-00851		0.154	**7.11**
7/11/07	Western Warehousing, LLC	Lebanon	38585-RF	NA		0.56	**6.55**
5/12/08	Ralph Nauman	Thornton Lake Drive, Albany	37957-RF	2007-148		0.15	**6.4**
7/21/08	LCD Partners LLC	Lebanon; 2900 S. Main Road	39960-RF	2008-125		0.31	**6.09**
7/25/08	Pacific Cast Technologies	2008 expansion –Pacific Cast T	40084	2008-154		0.28	**5.81**
8/5/08	Benton Co. Public Works	53rd Street	34015-NP	NA		.06	**5.75**
8/12/08	Gilbert LLC	T12S, R2W, Sec 16; TL 808 &900	40946-RF	2008-388		1.92	**3.83**

8/25/08	City of Lebanon	Lebanon Railroad Reload Facility	41028	2008-439		0.86	**2.97**
9/9/08	**RELEASE #2 & part of #3**				**19.11**		**22.08**
10/29/08	City of Lebanon	NW Industrial Improvements	6392-ENF	NA		0.27	**21.81**
10/20/09	First Creek, Lebanon	T12S, R1W, Sect. 4&5	43062-RF	2009-457		1.22	**20.59**
1/26/10	**RELEASE #3 & part of #4**				**15.99**		**36.58**
			Permit Number				
7/1/11	City of Lebanon	Stoltz Hill Rd. Lebanon, OR	44572-RF	2011-181-1		0.68	**35.9**
7/11/11	**RELEASE #4 (90%)**				**7.31**		**43.21**
10/15/11	Lowe's	Oak St. & 9th, Albany, OR	45917-RF	2005-00045-2		2.59	**40.62**
1/9/12	Albany-Lebanon Investments LLC	T12S R02W Sections 3 & 4, Tax Lots 1900 & 2000	39843-RF	NWP-2007-00571		3.32	**37.3**
6/18/12	Evergreen Hospice	T11SR03Wsect20 tax lot AC00200	16749-FP	NA		0.63	**36.67**
7/18/12	Linn Co. Rd Department	T10S, R2W, SEC 27	50629-GP	NWP-2012-2007-971/2		.033	**36.637**
9/10/12	Western Warehousing LLC	T12S, R02W, SECT 3&10, Tax lot 100	38585-RF	NA		1.5	**35.137**
12/28/12	CPF Inc	T13S, R01E, SECT 33&34, Tax lots 600, 601, & 5700	37003-RF	2006-00525		1.1	**34.037**
Total Sold						*26.173*	

One Horse Slough Wetland Mitigation Bank															
Wetland Prairie Plot Data															
June 2, 2014															
Species Observed				Wet/Prairie		Ave. %									
				Vernal	Moisture	Cover	Plot #s								
Botanical Name	Common Name	Status	Origin	Pool	Index	ea. Species	1	4	12	13	14	15	16	19	23
				Species											
Oversory Species. - stem count within 30' Diameter (over 18" tall)															
Fraxinus latifolia	Oregon ash	FACW	native		2										
Herbaceous Species - percent cover															
Achillea millefolium	Yarrow	FACU	native		4	0.68									
Alisma gramineum	Narrow leaf water plantain	OBL	native		1	0.00									
Camassia quamash	Camas	FACW	native	Yes	2	0.00									
Carex stipata	Saw-beaked sedge	FACW	native		2	0.41							15		
Carex unilateralis	One-sided sedge	FACW	native	Yes	2	0.27			10						
Centuarium umbellatum	Common centuray	FAC	non		3	0.54									
Eleocharis ovata	Ovoid spike rush	OBL	native	Yes	1	0.00									
Eleocharis palustris	Creeping spike rush	OBL	native		1	0.00									
Epilobium ciliatum	Fringed willoweed	FACW	native	Yes	2	2.16			10			15			
Epilobium densiflorum	Dense spike-primrose	FACW	native	Yes	2	0.81									
Eriophyllum lanatum	Oregon sunshine	NOL	native	Yes	5	3.24									
Geum macrophyllum	Large leaf avens	FACW	native		2	0.68									
Gnaphalium palustre	Cudweed	FAC	native	Yes	3	0.00									
Juncus bolanderi	Bolanders rush	OBL	native	Yes	1	0.00									
Juncus bufonius	Toad rush	FACW	native	Yes	2	0.14									
Juncus effusus	Soft rush	FACW	native		2	0.14				5					
Juncus tenuis	Slender rush	FACW	native	Yes	2	1.89			10			10			
Lactuca serriola	Prickly lettuce	FACU	non		4	0.00									
Lythrum portula	Spatulaleaf loosestrife	OBL	non		1	0.00									
Mimulus guttatus	Common monkey-flower	OBL	native	Yes	1	0.95									
Navarretia intertexta	Naverretia	FACW	native	Yes	2	0.00									
Plagiobothrys figuratus	Fragrant popcorn flower	FACW	native	Yes	2	0.41									
Plagiobothrys scouleri	Scouler's popcorn flower	FACW	native	Yes	2	0.81				5					
Prunella vulgaris	Common selfheal	FACU	native	Yes	4	8.92									
Rorippa curvisiliqua	Western yellowcress	OBL	native	Yes	1	0.14									
Sidalcea campestris	Meadow checkermallow	FACU	native		4	0.68									
Sidalcea cusickii	Cusick's checkermallow	FACW	native	Yes	2	10.14			60	10					
Veronica peregrina var. xalap	Hairy purlane speedewell	OBL	native	Yes	1	0.14									
						33.11									
Grass Species															
Agrostis exarata	Spike bentgrass	FACW	native	Yes	2	10.41	20				10	35	30	25	20
Alopecurus aequalis	Short-awned foxtail	OBL	native		1	0.00									
Alopecurus geniculatus	Water foxtail	OBL	native		1	0.00									
Beckmania syzigachne	American Sloughgrass	OBL	native	Yes	1	0.14									
Deschampsia cespitosa	Tufted hairgrass	FACW	native	Yes	2	31.35	20	40		35	70	20	45	35	60
Deschampsia danthonioides	Annual hairgrass	FACW-	native	Yes	2	0.00									
Deschampsia elongata	Slender hairgrass	FACW	native	Yes	2	0.00									
Glyceria occidentalis	Western mannagrass	OBL	native		1	0.00									
Hordeum brachyantherm	Meadow barley	FACW	native	Yes	2	18.78	40	40	10	25		10	10	40	
Leersia oryzoides	Rice cut-grass	OBL	native		1	0.00									
Lolium multiflorum	Annual rye grass	FACU	non		4	0.00									
Panicum capillare	Common witchgrass	FAC	native	Yes	3	0.27									
Poa trivialis	Rough-stalk bluegrass	FAC	non		3	0.00									
Vulpia myuros	Rattail fescue	FAC	non		3	0.00									
						60.95									
Bareground due to : (organic litter)			**Mean =**	**5.95**			20	20		20	20	10			20
Relative % Native canopy cover			**Mean =**	**93.51**			80	80	100	80	80	90	100	100	80
Relative % non-native invasive canopy cover :			**Mean =**	**0.00**			0	0	0	0	0	0	0	0	0
Relative % non-native canopy cover, includes bareland:			**Mean =**	**6.49**			20	20	0	20	20	10	0	0	20
% of Total Vegetation that is Native =		**99.46**		Percent of Total Vegetation that is Non-native =						**0.54**					
Prevelance Index			**Mean =**	**2.30**			2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

Attachment 1: Sample Plot Monitoring Data

Plot #s																											
24	26	27	28	29	33	34	35	36	37	41	42	43	45	47	50	51	52	53	56	58	59	60	61	62	63	64	65
			2																								
	10																				5				10		
																5							5		5		5
		5		5		5		10	10							5	5							10			
						5		5												10	5			5			
	20			35	20	15		10	10											5	5						
																										25	
										5																	
					10																10		15	10			5
								5	20														5				5
								10	5																		
								5												15	5						
	15				40	45		25	25											15	50		30	20	40		25
										5																	
																										25	
	45			30	25	25	10	10	25									30		15	10		10	15	5	25	25
																	5										
		5		5			10	5		35	15	40	30			15	20	30	35								
																	5										
70	10	50	60				40	10		40	85	60	50	50	95	10	40					85	10	10	10	15	35
10		40	40	20	5	5	30	5	5	5				50	5	55	25	30	65	15	10	15	15	30	30	10	
10																											
10				5			10			10			20			10		10		25			10				
90	100	100	100	95	100	100	90	100	100	90	100	100	80	100	100	85	100	90	100	75	100	100	85	100	95	100	95
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	5	0	0	10	0	0	10	0	0	20	0	0	15	0	10	0	25	0	0	15	0	5	0	5
2.11	3.10	2.00	2.00	3.11	3.40	3.35	2.00	2.75	2.60	1.94	2.00	2.00	2.00	2.00	2.00	2.06	1.90	2.00	2.00	2.60	3.25	2.00	2.67	2.40	3.05	2.50	2.50

Attachment 1: Sample Plot Monitoring Data

Species Observed					Ave. %	Sample Plot Number										
				Moisture	Cover											
Botanical Name	**Common Name**	**Status**	**Origin**	**Index**	**ea. Species**	**2**	**3**	**8**	**9**	**10**	**11**	**17**	**18**	**20**	**21**	**22**
Herbaceous Species - percent cover																
Alisma gramineum	Narrow leaf water plantain	OBL	native	1	0.00											
Alisma triviale	Northern Water plantain	OBL	native	1	4.29		20	20			10	10				
Downingia elegans	Common downingia	OBL	native	1	0.00											
Eleocharis acicularis	Needle spike-rush	OBL	native	1	0.54											
Eleocharis ovata	Ovoid spike rush	OBL	native	1	1.43											20
Eleocharis palustris	Creeping spike rush	OBL	native	1	34.29	90				60		30	60			25
Gratiola ebracteata	Bractless hedgehyssop	OBL	native	1	0.00											
Gnaphalium palustre	Cudweed	FAC	native	3	0.00											
Juncus bolanderi	Bolanders rush	OBL	native	1	0.00											
Juncus bufonius	Toad rush	FACW	native	2	0.00											
Ludwigia palustris	Marsh seedbox	OBL	native	1	6.25			40				20		30	45	
Lythrum portula	Spatulaleaf loosestrife	OBL	non	1	0.00											
Najas guadalupensis	Common water-nymph	OBL	native	1	8.21		60		60		40					
Plagiobothrys figuratus	Fragrant popcorn flower	FACW	native	2	0.00											
Plagiobothrys scouleri	Scouler's popcorn flower	FACW	native	2	0.00											
Persicaria hydropiperoides	Waterpepper	OBL	native	1	1.07										30	
Potamogeton natans	Floating-leaved pondweed	OBL	native	1	0.00											
Rorippa curvisiliqua	Western yellowcress	OBL	native	1	0.18											
Sagittaria latifolia	Wapato	OBL	native	1	0.89											
Sparganium emersum	Simple-stem bur-reed	OBL	native	1	17.68			40	25	30	50		10	55		
Typha latifolia	Common cattail	OBL	native	1	8.75	10						10	30	15	25	
Grass Species																
Agrostis exarata	Spike bentgrass	FACW	native	2	0.00											
Alopecurus geniculatus	Water foxtail	OBL	native	1	0.00											
Beckmania syzigachne	American Sloughgrass	OBL	native	1	5.36							20				25
Deschampsia cespitosa	Tufted hairgrass	FACW	native	1	0.89											10
Glyceria borealis	Floating mannagrass	OBL	native	1	0.00											
Hordeum brachyantherm	Meadow barley	FACW-	native	2	0.00											
Leersia oryzoides	Rice cut-grass	OBL	native	1	6.79							10				20
Panicum capillare	Common witchgrass	FAC	native	3	0.00											
Bareground (due to recent inundation) Mean =		**1.07**														
Open Water Mean =		**2.32**					20		15	10						
Relative Percent Native Cover			**Mean =**	**98.93**		100	100	100	100	100	100	100	100	100	100	100
Relative Percent Non-Native Cover (includes bareland)			**Mean =**	**1.07**		0	0	0	0	0	0	0	0	0	0	0
Relative % non-native invasive canopy cover :			**Mean =**	**0.00**												
Percent of Total Vegetation Cover That is Native =			**Mean =**	**100.00**	Percent of Total Vegetation Cover That is Non-Native =								0.00			
Prevelance Index			**Mean =**	**1.00**		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Attachment 1: Sample Plot Monitoring Data

Sample Plot Number																
25	**30**	**31**	**32**	**38**	**39**	**40**	**44**	**48**	**49**	**54**	**55**	**57**	**73**	**74**	**75**	**76**
										20			30	10		
											15					
											20					
100	30	50	25				100	100	70		30	10	50	60	40	30
									10					30		
					60					10						
		5														
	25															
	25				20	100			20	40	20					60
		10		100							15		20		10	
		35	60									10				
			15													
	20											80			50	10
										30						
					20											
100	100	100	100	100	100	100	100	100	100	70	100	100	100	100	100	100
0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

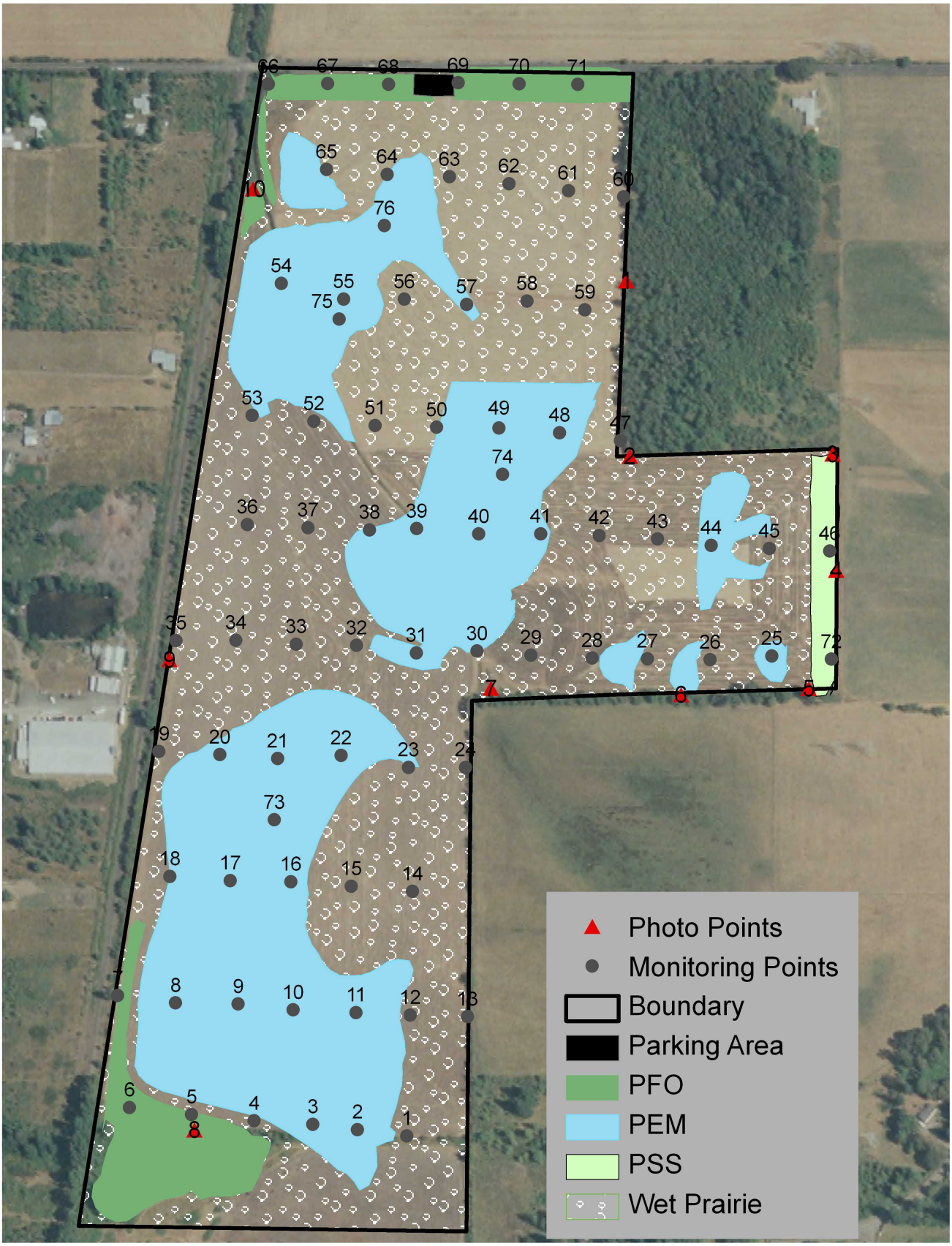
One Horse Slough Wetland Mitigation Bank

Planted Shrub/Forest (PFO) Sample Plot Monitoring Results - June 02, 2014

Species Observed					Ave.%	Plot #										
				Moisture	Cover	5	6	7	46	66	67	68	69	70	71	72
Botanical Name	Common Name	Status	Origin	Index	ea. Species											
Overstory Species. - stem count within 30' diameter																
Crataegus douglasii	Douglas hawthorne	FAC	native	3		1		4	3	4		1				2
Fraxinus latifolia	Oregon ash	FACW	native	2		20	7	4	1	4	6	5	4	7	8	
Malus fusca	Flowering crabapple	FACW	native	2												
Pinus ponderosa	Ponderosa pine	FACU	native	4				1								
Populus balemifera	Black cotton wood	FAC	native	3						2	2					
Total # of Plots: 11																
Total Stems per plot						21	7	9	4	10	8	6	4	7	8	2
Average Stems per Plot =	7.8	Avg Stems per Plot (fac or wetter) =			7.7	21	7	8	4	10	8	6	4	7	8	2
Mean Trees/Acre =	482															
Mean Trees/Acre(fac or wetter) =	476															
Shrub Species. - stem count within 30' diameter																
Amelanchier alnifolia	Service berry	FACU	native	4					1							
Cornus sericea	Red osier dogwood	FACW	native	2									1			
Oemlaria cerasiformis	Indian plum	FACU	native	4												
Physocarpus capitatus	Pacific ninebark	FACW	native	2												1
Ribies sanquineum	Red flowering current	FACU	native	4					2							
Rosa nutkana	Nootka rose	FAC	native	3					7	2		1			1	6
Rosa pisocarpa	Clustered rose	FAC	native	3			3		7	2	3	1		1		3
Salix lasiandra	Pacific willow	FACW	native	2		1	3						2			
Spiraea douglasii	Douglas spirea	FAC	native	3					2			1				6
Symphoricarpos albus	Snowberry	FACU	native	4		2	1	1	8		1	2				3
Total # of Plots: (11)																
Total Stems per plot						3	7	1	27	4	4	5	3	1	1	19
Average Stems per Plot =	6.8	Avg Stems per Plot (fac or wetter) =			4.9	1	6	0	16	4	3	3	3	1	1	16
Mean Shrubs/Acre =	420															
Mean Shrubs/Acre(fac or wetter) =	303															
Herbaceous Species - percent cover																
Achillea millefolium	Yarrow	FACU	native	4	0.91											10
Carex densa	Dense sedge	OBL	native	1	5.91	65										
Carex feta	Green-sheath sedge	FACW	native	2	1.36				15							
Carex unilateralis	One-sided sedge	FACW	native	2	3.64				30						10	
Centuarium umbellatum	Common centuray	FAC	non	3	0.45											5
Epilobium ciliatum	Fringed willoweed	FACW	native	2	12.73		15				30	60		25	10	
Eriophyllum lanatum	Oregon sunshine	NOL	native	5	6.36				10		30					30
Galium trifidum var. pacificum	Small bedstraw	FACW	native	2	0.00											
Gilia capitata	Bluefield gilia	NOL	native	5	0.00											
Gnaphalium palustre	Cudweed	FAC	native	3	0.91										10	
Juncus bufonius	Toad rush	FACW	native	2	0.00											
Juncus tenuis	Slender rush	FACW	native	2	4.55	10	5							25	10	
Lupinus rivularis	Stream-side lupine	FAC	native	3	0.91											10
Lythrum portula	Spatulaleaf loosestrife	OBL	non	1	0.00											
Navarretia intertexta	Naverretia	FACW	native	2	0.00											
Rorippa curvisiliqua	Western yellowcress	OBL	native	1	0.91								5		5	
Sidalcea cusickii	Cusick's checkermallow	FACW	native	2	2.73			30								
Sisyrinchium angustifolium	Blue-eyed grass	FACW	native	2	0.00											
Vicia americana	American vetch	FAC	native	3	0.91						10					
Grass Species																
Agrostis exarata	Spike bentgrass	FACW	native	2	9.09				15				60	10	15	
Alopecurus geniculatus	Water foxtail	OBL	native	1	0.00											
Beckmania syzigachne	American Sloughgrass	OBL	native	1	0.00											
Deschampsia cespitosa	Tufted hairgrass	FACW	native	2	15.00	15	20	40		35			25	20	10	
Deschampsia elongata	Slender hairgrass	FACW	native	2	3.64					5		20	10	5		
Elymus glaucus	Blue wildrye	FACU	native	4	2.73				5							25
Hordeum brachyantherm	Meadow barley	FACW	native	2	20.45	10	60	15	25	60	20			5	10	20
Panicum capillare	Common witchgrass	FAC	native	3	0.00											
Poa annua	Annual bluegrass	FAC	non	3	0.00											
Poa trivialis	Rough-stalk bluegrass	FAC	non	3	0.00											
Bareground due to Oraganic Litter:			**Mean =**	**6.82**				15			10	20		10	20	
Relative % native cover (herbaceous only)			**Mean =**	**92.27**		100	100	85	100	100	80	80	100	90	80	100
Relative % non-native invasive (herbaceous layer only):			**Mean =**	**0**		0	0	0	0	0	0	0	0	0	0	0
Relative % non-native (includes bareground,herbaceous layer only):			**Mean =**	**7.27**		0	0	15	0	0	10	20	0	10	20	5
Percent of Total Vegetation Cover That is Native =			**Mean =**	**99.55**	Percent of Total Vegetation Cover That is Non-Native =								**0.45**			
Prevelance Index (herbacous only)			**Mean =**	**2.25**		1.35	2.00	2.00	2.47	2.00	3.13	2.00	1.95	2.00	2.06	3.75
Total Sample points = 11																

Attachment 2: Monitoring Point Location Map

One Horse Slough Mitigation Bank
Photo and Vegetation Monitoring Points



N

0 400 800 1,600 Feet

1 inch equals 466 feet

One-Horse Slough Mitigation Bank 2014 Photo Monitoring

Photo Point 1 North

Photo Point 1 East

Photo Point 1 South

Photo Point 1 West

Photo Point 2 North

Photo Point 2 East

Photo Point 2 South

Photo Point 2 West

Photo Point 3 North

Photo Point 3 Southwest

Photo Point 3 South

Photo Point 3 West

Photos Taken June 2, 2014

Attachment 3: Monitoring Photos

Photo Point 4 North

Photo Point 4 South

Photo Point 4 West

Photo Point 5 North

Photo Point 5 East

Photo Point 5 South

Photo Point 5 West

Photo Point 6 North

Photo Point 6 East

Photo Point 6 West

Photos Taken June 2, 2014

Attachment 3: Monitoring Photos

Photo Point 7 North

Photo Point 7 East

Photo Point 7 Southwest

Photo Point 7 West

Photo Point 8 North

Photo Point 8 East

Photo Point 8 South

Photo Point 8 West

Photo Point 9 North

Photo Point 9 East

Photo Point 9 South

Photos Taken June 2, 2014

Attachment 3: Monitoring Photos

Photo Point10 North

Photo Point 10 East

Photo Point 10 South

Photo Point 10 SE

Photos Taken June 2, 2014