

Mud Slough Wetland Mitigation Bank – Phase 3

2010

Monitoring Report

Submitted by:

Mark Knaupp and Ridgeline Resource Planning

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1.0 REGULATORY BACKGROUND

The purpose of this report is to summarize the progress of Phase 3 of the Mud Slough Wetland Mitigation Bank (Bank). The Bank is located in Polk County, Township 7S, Range 4W, Section 20, Tax Lot 300. Phase 3 of the Bank is only a portion (81.5 acres) of the 413 acre tax lot. The address is 1875 N. Greenwood Road, Rickreall, Oregon. The MOA for Phase 3 was approved in July 2008. In December 2008, the first 30% (12.45 credits) were released for sale. The next 20% (8.3 credits) were released in 2009. The ACOE released the credits in September and DSL followed in December 2009.

The primary goal(s) of Phase 3 are to enhance 80 acres of cropped wetlands to emergent and wet prairie and restore 1.5 acres of upland to wet prairie habitat. Phase 3 totals 81.5 acres.

Bank credits:	<u>Acres</u>	<u>Mitigation Type</u>	<u>Credit Ratio</u>	<u>Credits Earned</u>
	80.0	Enhancement of cropped wetland	2:1	40.0
	<u>1.5</u>	Restoration	1:1	<u>1.5</u>
	81.5	Total Site		41.5

2.0 WORK SUMMARY

2.1 Site Grading

The initial herbicide application occurred in November 2008, with additional applications in March and July 2008. The grading followed the third herbicide application in July 2008. The grading included removing the surface drain system and the construction of four low berms. The berms have a maximum height of two feet, with 10 foot wide tops with 10:1 side slopes. The average pond created by the berms is 0.7 acres. Overflows are around the upper end of the dikes to avoid erosion potential. All excavation work was done with irregular boundaries and shape mimicking natural features. Two larger areas (approximately 5 and 6 acres) of shallow water/emergent zones were created in the naturally existing lower portions of the site. The only additional grading that has occurred was in August 2009, the northern most berm on the east side of the railroad was extended slightly to help prevent water from going around the edge of the berm. This was done to create more water storage as was designed.

2.2 Seeding and Planting

Grass and forb species were seeded in early October 2008 with the tree and shrubs following in February 2009. Willow (*Salix ssp.*) and Douglas spirea (*Spiraea douglasii*) cuttings were planted with the remainder of the tree and shrub species planted as bare root stock. Seed was applied by both drilling and broadcast in a zone planting for individual species to optimize the different hydrological zones (i.e. emergent, wet prairie). Phase 3 was seeded with a wide variety of species, in particular forbes, to increase the diversity of the plant species on site, and thereby the wildlife that frequents it. The forested and

shrub/shrub areas were planted with a mixture of less aggressive wetland herbaceous species to provide slightly less competition for the trees and shrubs. The shrub areas are scattered throughout Phase 3 in small plantings, mimicking naturally occurring shrub areas. The sample plot monitoring data includes a list of the planted species.

2.3 Weed control and Maintenance

Mowing was conducted in September 2009 to facilitate spot treatment of non-natives. Extensive spot treatment of individual plants and seed heads was conducted from the fall 2009 thru the spring of 2010. Targeted species included annual ryegrass (*Lolium multiflorum*), tall fescue (*Festuca arundinacea*), meadow foxtail (*Alopecurus pratensis*), velvet grass (*Holcus lanatus*) tansy ragwort (*Tanacetum vulgare*), Himalayan blackberry (*Rubus discolor*) and pennyroyal (*Mentha pulegium*).

As previously mentioned, in August 2009, the northern most berm on the east side of the railroad was extended slightly to help prevent water from going around the edge of the berm. A second maintenance activity that was conducted includes removing a section of tile that is seeping water from the western most pond, on the west side of the railroad. Both of these procedures produced the desired results.

2.4 Planned Future Work

The vegetation is doing exceptionally well. With the exception of normal spot treatment on non-native vegetation, no further work is anticipated.

3.0 AS-BUILT PLANS

The as-built plans were submitted to DSL and the ACOE in December 2008.

4.0 HYDROLOGY PERFORMANCE STANDARDS, METHODOLOGY, AND RESULTS

4.1 PERFORMANCE STANDARDS

The hydrology objective is to create areas that will hold precipitation to create seasonal saturation and inundation and meet the criteria defined in the 1987 Corps of Engineers Wetlands Delineations Manual (1987 Wetland Delineation Manual).

4.2 METHODOLOGY:

A one time hydrology delineation designed to meet the requirements of the 1987 Wetland Delineation Manual will be performed. This delineation will include paired plots concentrating along the wetland boundary, any areas dominated by upland vegetation, and any high areas to indicate the exact location of the wetland boundary. The paired plots will be evaluated using soil probes or pits. 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

Delineation: The one time hydrology delineation was conducted in March 2010 and concentrated on the 1.5 acres of upland that existed prior to the construction of Phase 3. Five monitoring tubes were installed and monitored on March 12 and 15, 2010. The location of the monitoring tubes is included on the Monitoring Point Location Map - Attachment 1. The results of this monitoring indicate that each of the monitoring locations was saturated to within at least 8” of the surface during the monitoring. Water in the monitoring tubes ranged from at the surface to 8” below the surface.

Precipitation data for this period was obtained from the preliminary local climatology data from the National Climatic Data Center for Salem Oregon data. The historic averages were obtained from the NRCS WETS table for Dallas Oregon. During the two weeks prior to the beginning of the monitoring (February 26 - March 11), the precipitation was 1.76” with an additional 0.28” on rain on March 12. There was no further rain during the monitoring period. The percent of normal rainfall since the beginning of the rain year, October 1, 2009 to March 15, 2010 was 78.1% of normal (observed 28.13”, average 36.01”).

Table 1 - Rainfall Summary for October 1, 2009 through March 15, 2010

Month	Observed Precipitation (inches)	Average Precipitation (inches)	% of Normal
October	2.61	3.25	80.3%
November	8.02	7.64	105.0%
December	6.14	8.63	71.1%
January	5.85	7.59	77.1%
February	4.07	6.26	65.0%
March 15*	1.44	2.64	54.5%
Total	28.13	36.01	78.1%

*prorated

Table 2 - Monitoring Tube Results

Tube #	March 12	March 13
1	1	6
2	1	8
3	1	4
4	0	2
5	1	4

Data is depth in inches below the surface, “0” = water at the surface

5.0 VEGETATION PERFORMANCE STANDARDS, METHODOLOGY AND RESULTS

5.1. Performance Standards

A. Emergent Herbaceous

1. A minimum of 55% of the relative plant cover is comprised of native species. These densities will be a combination of planted individuals and natural recruitment.
2. No more than 15% of the relative plant cover is comprised of non-native invasive species as defined below.
3. The wetland's moisture index is less than 3.0.
4. By year 5, there will be a minimum of 4 obligate species represented in the monitoring plots.

*Non-native invasive species to be included: reed canary grass (*Phalaris arundinacea*), purple loosestrife (*Lythrum salicaria*), Himalayan blackberry (*Rubus discolor*), Japanese knotweed (*Polygonum cuspidatum*), Eurasian water milfoil (*Myriophyllum spicatum*), climbing nightshade (*Solanum dulcamara*), yellow-flag iris (*Iris pseudacorus*), Queen Anne's lace (*Daucus carota*), Canadian thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), orchard grass (*Dactylis glomerata*) annual ryegrass (*Lolium multiflorum*), penny royal (*Mentha pelugium*), and spatulaleaf loosestrife (*Lythrum portula*).

B. Wetgrass Prairie

1. At least 10 wetgrass prairie species are present
2. Tufted hairgrass (*Deschampsia cespitosa*) is represented by 5% or greater relative plant cover in year 1 and 25% by year 5.
3. At least 50% of the relative plant cover is comprised of native species. These densities will be a combination of planted individuals and natural recruitment.
4. No more than 15% of the relative plant cover is comprised of non-native invasive species as defined above.
5. The prairie's moisture index should be between 2.0 and 3.0.
6. No more than 5% relative plant cover is composed of shrubs or trees.

C. Overstory and Scrub-Shrub

1. Relative plant cover, of all layers, is comprised of a minimum of 55% native species.
2. The moisture index is equal or less than 3.0.
3. There will be a minimum of 150 trees per acre and 300-400 shrubs per acre in all years 1-5.
4. No more than 5% of the relative live stem count should be comprised of non-native species.
5. These densities will be a combination of planted individuals and natural recruitment.
6. No more than 15% of the relative plant cover, of all layers, is comprised of non-native invasive species.

5.2 Methodology

Transect and sample plot locations are laid out in a stratified arrangement with approximately 300' between each transect and sample plot. Due to the low percentage of overstory and shrub areas, two additional plots (#42, #43) within the overstory/shrub areas were added to provide better coverage. The transects run east to west on the west side of the railroad, and north to side on the east side of the railroad. The sample plots are permanently identified in the field and are plotted on a site map. One plot (#41), outside of the mapped transects was included to monitor the small 1.5 acre upland, which did not fall within plots transects (See Attachment 1 - Monitoring Point Location Map).

Each sample point is the center of a circular plot, ten feet diameter for the herbaceous layer and 30 feet for the scrub/shrub and overstory layers. The center point for the herbaceous, shrub and overstory radius are the same. Each sample plot was evaluated for species, indicator status, native/non-native and invasive status, and the percent cover of each species present.

5.3 VEGETATION MONITORING RESULTS

Vegetation monitoring was conducted June 6, 2010 by Mark Knaupp. Attachment 2 includes spread sheets with the results of the sampling. Forty-four monitoring plots were examined. The spread sheets include the botanical names, common names, indicator status, origin (native or non-native), moisture index, and if it was planted or a volunteer species. The Plant Species list includes all species found within Phase 3 within the plots or found while walking between sample plots.

Table 3 includes a species summary of just the species found within the monitoring plots.

Table 3 - Phase 3 2009 vs 2010 Monitoring Plot Species Summary

	2009		2010	
Number of Species Identified	68		51	
Number and % of Native Species	37	54%	38	75%

As is seen in the above table, Phase 3 has changed significantly from the June 2009 monitoring. In both 2009 and 2010, there were nearly the same number of species identified within the plots, but in 2009 54% were native, whereas in 2010, 75% of the species were native. It should also be noted that of these 75% native species, they accounted for over 98% of the vegetation cover. Some of the more aggressive non-native species continue to be heavily targeted with spot spray but other less aggressive annual non-native forbes were not targeted since spraying for those species would increase the exposure of the native annuals and perennial forbes to the herbicide.

5.3.1 Emergent Vegetation

Plots 1, 2, 3, 4, 24, 25, 32, and 33 were originally classified as emergent plots. This initial classification was based on the mapping and planned vegetation and hydrologic regimes. As the site ages it has become apparent that the hydrology regime planned for plot #25 is not as wet as planned and this monitoring point should be included as a wet prairie sampling plot. This change has been made in the sampling data for 2010.

Nineteen native species were identified in the emergent plots. A huge change occurred from the 2009 monitoring with the presence of standing water in 2010. In 2009, there was no standing water, whereas in 2010 there was an average of 53% water in the seven emergent plots. This change in the hydrology (and weather) also

caused changes in the vegetation. The most abundant species in 2009 was showy downingia (*Downingia elegans*) at 52%, whereas in 2010 it was 0.25%. The sponsor feels that downingia, which is an annual, is tied to the light and water sequence in the growing year. A combination of heavy biomass and water did not allow for the correct sequencing required and the seeds did not germinate. The seeds are still present, and it is assumed they will germinate in subsequent years. The most abundant species in 2010 was American sloughgrass (*Beckmania syzigachne*) at 11.5%. Tufted and slender hairgrass (*Deschampsia cespitosa* and *elongata*) tied with each at 6.35%.

The performance criteria for **emergent wetland** was met for all 4 of the requirements.

Required: A minimum of 55% of the relative plant cover is comprised of native species. These densities will be a combination of planted individuals and natural recruitment. *Met, the emergent plots are comprised of 100% native species. There is however, water covering 53% of the plots.*

Required: No more than 15% of the relative plant cover is comprised of non-native invasive species. *Met with 0% of non-native invasive species. There are no non-native invasive species present.*

Required: The wetland's moisture index is less than 3. *Met with an average moisture index of 1.38*

Required: By year 5, there will be a minimum of 4 obligate species represented in the monitoring plots. *Met, there are seven obligate species in the monitoring plots, with four of those in greater than trace amounts.*

5.3.2 Wetland Prairie

Native herbaceous cover averaged 98.4% throughout the wetland prairie with 26 native species identified in the 32 prairie plots. Eleven native forbes were present at greater than trace amounts. The three most common species are tufted hairgrass (*Deschampsia cespitosa*) at 25.5%, Meadow barley (*Hordeum brachyantherum*) at 25.4% and slender hairgrass (*Deschampsia elongata*) at 19.9%.

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

Required: At least 10 wetgrass prairie species are present *Met. Nineteen wet grass prairie/vernal pool species have been identified within the prairie plots.*

Required: Tufted hairgrass (*Deschampsia cespitosa*) is represented by 5% or greater relative plant cover in year 1 and 25% by year 5. *Met. Tufted hairgrass is*

present in all 31 of the wet prairie plots, with an average cover of 25.5%. This is a huge increase from the 2009 monitoring results.

Required: At least 50% of the relative plant cover is comprised of native species.

Met. Native species accounted for 98.4% of the vegetative cover.

Required: No more than 15% of the relative plant cover is comprised of non-native invasive species. *Met with 0% of non-native invasive species.*

Required: The wetland prairie moisture index is between 2.0 and 3.0. *Met. The average moisture index is 2.07.*

Required: No more than 5% relative plant cover is comprised of shrubs or trees.

Met. No trees or shrubs occurred in the wet prairie.

5.3.3 Shrub and Forest

Both the planted and volunteer Oregon ash (*Fraxinus latifolia*) continues to do well. Douglas spirea (*Spiraea douglasii*) has increased in abundance whereas, sitka willow (*salix sitchensis*) has declined. The overall numbers of both trees and shrubs is well within the performance standard levels.

The performance criteria for **shrub forest wetland** was met for all 5 of 5 of the requirements.

Required: Relative plant cover, of all layers, is comprised of a minimum of 55% native species. *Met, with 90% of the herbaceous and 100% of the tree and shrub cover being native.*

Required: There will be a minimum of 150 trees per acre and 300-400 shrubs per acre in all years 1-5. *Met with mean trees per acres of 4778 (includes the seedlings) or 154 without seedlings. The average shrubs per acre is 971.*

Required: No more than 5% of the relative live stem count should be comprised of non-native species. *Met, with 0% of the live stem count comprised of non-native species.*

Required: No more than 15% of the relative plant cover, of all layers, is comprised of non-native invasive species. *Met, with 0% of non-native invasive species.*

Required: The wetland's moisture index is less than 3. *Met, with an average moisture index of 1.43.*

6.0 SPECIES AREA CURVE

No species area curve analysis was conducted as in 2009, the analysis indicated a sufficient number of plots had been monitored. The same plots were monitored in 2010.

7.0 PHOTO POINT MONITORING

Photos from each of the established six photo points are included as Attachment 3.

8.0 CREDIT SALES SUMMARY

Date	Name	DSL Permit #	ACOE Permit #	Credits Purchased
11/20/09	Advantage Precast, Inc	ENF6899	NA	1.567
12/1/09	State of Oregon	34119-FP	2004-803	0.40
12/14/09	Central School District	42503-RF	2009-00253	1.70
12/14/09	GreenTree, LLC	39251	2007-842	0.44
12/23/09	ODOT	10008-RF	1996-00016	1.46
12/23/09	Pfeiffer Roofing, Inc.	ENF-6902	NA	0.19
2/3/10	Windigo Properties, LLC	42654	2009-302	0.89
4/5/10	State of Oregon	43698-RF	2009-337	0.27
Total Phase 3 Credit Sales in Nov. 2009 thru April 2010				6.917

There are 41.5 credits available for Phase 3. To date 50% (20.75) have been released. Of these 20.75 credits, 6.917 have been sold leaving 13.833 credits released and unsold.

9.0 CREDIT RELEASE REQUEST

Phase 3 has 41.5 credits, 50% (20.75 credits) have been released for sale. With this submission of the 2010 monitoring report, we are requesting the release of the next 30% credit release for an additional 12.45 credits. This will total an 80% credit release for Phase 3.

10.0 BOND REASSIGNMENT REQUEST

A \$51,853 bond was posted for Phase 3. According to the bond release schedule, 70% (releases 1, 2 and 4) of the bond (\$36,297) is now eligible for release. We are requesting that this bond and any interest that it has accumulated, be reassigned to Phase 4 of the Mud Slough Wetland Mitigation Bank, instead of it being released at this time.

11.0 ENDOWMENT AND LONG TERM STEWARD

The sponsor has signed a conservation easement on Phase 3 with The Wetland Conservancy, which also holds the conservation easement for Phases 1 and 2 of the Bank. An additional \$81,000 was added to the long term endowment for Phase 3.

Phase 3 Mud Slough Wetland Mitigation Bank

Plant Species List

June, 2010

Includes species identified in monitored plots, planted, or found while walking between sample plots

Common Name	Botanical Name	Status	Origin	Wet Prairie Vernal pool	Moisture Index	Planted
Overstory and Scrub/shrub Species		Species				
<i>Crataegus douglasii</i>	Black hawthorne	FAC	native		3	
<i>Fraxinus latifolia</i>	Oregon ash	FACW	native		2	X
<i>Pyrus fusca</i>	Pacific crabapple	NOL	native		3	X
<i>Rosa nutkana</i>	Nootka rose	FAC	native	Yes	3	X
<i>Salix lasiandra</i>	Pacific willow	FACW	native		2	X
<i>Salix sitchensis</i>	Sitka willow	FACW	native		2	X
<i>Spiraea douglasii</i>	Douglas spirea	FACW	native		2	X
Herbaceous Species						
<i>Alisma plantago</i>	Water plantain	OBL	native		1	
<i>Anthemis cotual</i>	Mayweed chamomile	FACU	introduced		4	
<i>Asclepias speciosa</i>	Showy milkweed	FAC	native		3	X
<i>Aster hallii</i>	Hall's aster	FAC	native	Yes	3	X
<i>Bidens cernua</i>	Nodding beggars-tick	FACW	native		2	X
<i>Bidens frondosa</i>	Leafy beggars-tick	FACW	native		2	X
<i>Boisduvalia densiflora</i>	Dense spike-primrose	FACW	native	Yes	4	X
<i>Briza minor</i>	Little quaking-grass	FAC	introduced		3	
<i>Camassia quamash</i>	Common camas	FACW	native	Yes	2	X
<i>Capsella bursa-pastoris</i>	Shepherd's purse	FACU	introduced			
<i>Carex densa</i>	Dense sedge	OBL	native	Yes	1	X
<i>Carex feta</i>	Green-sheath sedge	FACW	native	Yes	2	X
<i>Carex ssp</i>	Sedge ssp.		native			
<i>Carex unilateralis</i>	One-sided sedge	FACW	native	Yes	2	X
<i>Centaurium umbellatum</i>	Common centuary	FAC	introduced		3	
<i>Cerastium vulgatum</i>	Mouse-ear chickweed	FACU	introduced		4	
<i>Chamaemelum mixtum</i>	Dog fennel	NOL	introduced			
<i>Chamomilla suaveoleus</i>	Pineapple weed	FACU	native		4	
<i>Cirsium arvense</i>	Canada thistle	FACU	introduced		4	
<i>Cirsium vulgare</i>	Bull thistle	FACU	introduced		4	
<i>Convolvulu arvensis</i>	Bindweed	NOL	introduced			
<i>Crepis setosa</i>	Bristly Hawksbeard	NOL	native			
<i>Daucus carota</i>	Queen Anne's Lace	NOL	introduced			
<i>Downingia elegans</i>	Showy downingia	OBL	native	Yes	1	X
<i>Eleocharis ovata</i>	Ovoid spikerush	OBL	native	Yes	1	X
<i>Epilobium ciliatum</i>	Hairy willow-herb	FACW	native	Yes	2	
<i>Epilobium paniculatum</i>	Autumn willow-herb	NOL	native	Yes		
<i>Eriophyllum lanatum</i>	Wolly sunflower	NOL	native	Yes		X
<i>Eryngium petiolatum</i>	Rush leaf coyote thistle	OBL	native	Yes	1	X
<i>Galium aparine</i>	Catchweed	FACU	introduced		4	
<i>Galium parisiense</i>	Wall bedstraw	UPL	introduced			
<i>Ghaphalium palustre</i>	Lowland cudweed	FAC	native	Yes	3	
<i>Grindelia integrifolia</i>	Willamette Valley gumweed	FACW	native	Yes	2	X
<i>Hypochaeris radicata</i>	Cat's ear dandelion	FACU	introduced		4	
<i>Juncus bufonius</i>	Toad rush	FACW	native	Yes	2	
<i>Juncus ensifolius</i>	Dagger leaf rush	FACW	native		2	
<i>Juncus nevadensis</i>	Sierra rush	FACW	native	Yes	2	X
<i>Juncus tenuis</i>	Slender rush	FACW	native	Yes	2	X
<i>Kickxia elatine</i>	Sharppoint fluvelin	UPL	introduced			
<i>Lactuca serriola</i>	Prickly lettuce	FACU	introduced		4	
<i>Lathyrus sphaericus</i>	Grass pea-vine	NOL	introduced			
<i>Lamium amplexicaule</i>	Henbit	NOL	introduced			
<i>Lomatium nudicaule</i>	Barestem desert-parsley	NOL	native	Yes		X
<i>Lotus purshianus</i>	Spanish clover	NOL	native	Yes		X
<i>Lupinus micranthus</i>	Minature lupine	NOL	native			

<i>Lupinus polyphyllus</i>	Bigleaf lupine	FAC	native	Yes	3	X
<i>Medicago lupulina</i>	Black medic	FAC	introduced		3	
<i>Mentha pulegium</i>	Pennyroyal	OBL	introduced		1	
<i>Mimulus guttatus</i>	Common monkey flower	OBL	native	Yes	1	
<i>Myosotis discolor</i>	Yellow & blue forget-me-not	FACW	introduced		2	
<i>Navarretia intertexta</i>	Needle-leaved navarretia	FACW	native	Yes	2	
<i>Navarretia squarrosa</i>	Skunkweed	NOL	native	Yes		
<i>Pepelis portula</i>	Water-purslane	NOL	introduced			
<i>Phacelia</i> ssp.	Phacelia ssp.					
<i>Plagiobothrys figuratus</i>	Fragrant popcorn flower	FACW	native	Yes	2	X
<i>Plagiobothrys scouleri</i>	Scouler's popcorn flower	FACW	native	Yes	2	X
<i>Plantago lanceolata</i>	Buckhorn plantain	FAC	introduced		3	
<i>Plantago major</i>	Common plantain	FACU	introduced		4	
<i>Polygonum aviculare</i>	Prostrate knotweed	FACW	introduced		2	
<i>Potentilla gracilis</i>	Northwest cirquefoil	FAC	native	Yes	3	X
<i>Prunella vulgaris</i>	Self-heal	FACU	native	Yes	4	X
<i>Ranunculus orthorhynchus</i>	Straight beaked buttercup	FACW	native	Yes	2	
<i>Ranunculus sceleratus</i>	Cellery leaf buttercup	OBL	native		1	
<i>Rorippa curvisiliqua</i>	Western yellowcress	OBL	native	Yes	1	
<i>Rumex crispis</i>	Curly dock	FAC	introduced		3	
<i>Scirpus americanus</i>	Bulrush	OBL	native		1	X
<i>Senecio jacobea</i>	Tansy ragwort	FACU	introduced		4	
<i>Senecio vulgaris</i>	Common groundsel	FACU	introduced			
<i>Sidelpcea nelsoniana</i>	Nelson's checker-mallow	FAC	native		3	X
<i>Sonchus asper</i>	Prickly sow-thistle	FAC	introduced		3	
<i>Spergularia</i> ssp.	Sand spurry					
<i>Taraxicum officinale</i>	Dandelion	FACU	introduced		4	
<i>Typha latifolia</i>	Cat-tail	OBL	native		1	
<i>Ventenata dubia</i>	Ventenata	NOL	introduced			
<i>Veronica peregrina</i>	Purslane speedwell	OBL	native	Yes	1	
<i>Veronica scutella</i>	Marsh speedwell	OBL	native		1	
<i>Vicia hirsuta</i>	Hairy vetch	NOL	introduced			
<i>Vicia tetrasperma</i>	Slender vetch	NOL	introduced			
Grass Species						
<i>Agrostis exarata</i>	Spike bentgrass	FACW	native	Yes	2	X
<i>Alopecurus aequalis</i>	Short-awned foxtail	OBL	native		1	
<i>Alopecurus geniculatus</i>	Water foxtail	OBL	native		1	X
<i>Alopecurus pratensis</i>	Meadow foxtail	FACW	introduced		2	
<i>Beckmania syzigachne</i>	American sloughgrass	OBL	native	Yes	1	X
<i>Bromus carinatus</i>	California brome	NOL	native			
<i>Bromus mollis</i>	Soft brome	UPL	introduced			
<i>Bromus rigidus</i>	Ripgut brome	NOL	introduced			
<i>Danthonia californica</i>	California oatgrass	NOL	native	Yes		X
<i>Deschampsia cespitosa</i>	Tufted hairgrass	FACW	native	Yes	2	X
<i>Deschampsia elongata</i>	Slender hairgrass	FACW	native	Yes	2	X
<i>Festuca arundinacea</i>	Tall fescue	FAC	introduced		3	
<i>Festuca bromoides</i>	Barren fescue	NOL	introduced			
<i>Festuca myuros</i>	Rat-tail fescue	NOL	introduced			
<i>Glyceria borealis</i>	Northern mannagrass	OBL	native		1	
<i>Glyceria occidentalis</i>	Western mannagrass	OBL	native		1	X
<i>Holcus lanatus</i>	Velvet grass	FAC	introduced		3	
<i>Hordeum brachyantherum</i>	Meadow barley	FACW	native	Yes	2	X
<i>Lolium multiflorum</i>	Annual ryegrass	NOL	introduced			
<i>Lolius perenne</i>	Perennial ryegrass	FACU	introduced		4	
<i>Panicum capillare</i>	Common witchgrass	FACU	native	Yes	4	
<i>Poa annua</i>	Annual bluegrass	FAC	introduced		3	
<i>Poa pratensis</i>	Kentucky bluegrass	FAC	introduced		3	
<i>Poa trivialis</i>	Rough bluegrass	FACW	introduced		2	

**Phase 3 Mud Slough Wetland Mitigation Bank
Emergent Marsh (PEMC) Plot Data - June 6, 2010**

Species Observed		Status	Origin	Index	Ave. % Ave. % Cover	Sample Plot Number						
Botanical Name	Common Name					1	2	3	4	24	32	33
Herbaceous Species - percent cover						ea. Species						
<i>Boisduvalia densiflora</i>	Dense spike-primrose	FACW	native	3	0.00					T		
<i>Downingia elegans</i>	Showy downingia	OBL	native	1	0.25	T	T	2				
<i>Eleocharis palustris</i>	Creeping spike rush	OBL	native	1	1.25			10	T			
<i>Epilobium ciliatum</i>	Hairy willow-herb	FACW	native	2	1.25					T	10	
<i>Eryngium petiolatum</i>	Rush leaf coyote thistle	OBL	native	1	0.25							2
<i>Gnaphalium palustre</i>	Cudweed	FAC	native	3	0.00						T	
<i>Hypochaeris radicata</i>	Cat's ear dandelion	FACU	introduced	4	0.00					T		
<i>Juncus bufonius</i>	Toad rush	FACW	native	2	1.88							15
<i>Lotus purshianus</i>	Spanish clover	NOL	native		0.63					T	5	
<i>Medicago lupina</i>	Black medic	FAC	introduced	3	0.00					T		
<i>Peplis portula</i>	Water-purslane	NOL	introduced		0.00		T		T			
<i>Plagiobothrys figuratus</i>	Fragrant popcorn flower	FACW	native	2	4.75		35		3	T	T	T
<i>Plagiobothrys scouleri</i>	Scouler's popcorn flower	FACW	native	2	0.00						T	
<i>Prunella vulgaris</i>	Self-heal	FACU	native	4	2.50						20	
<i>Rorippa curvisiliqua</i>	Western yellowcress	OBL	native	1	0.00		T	T		T	T	T
<i>Sidalcea nelsoniana</i>	Nelson's checker-mallow	FAC	native	3	0.00					T		
Grass Species												
<i>Alopecurus geniculatus</i>	Water foxtail	OBL	native	1	0.00		T			T	T	T
<i>Beckmania syzigachne</i>	American sloughgrass	OBL	native	1	11.50	15	10	T	32	T	15	20
<i>Deschampsia cespitosa</i>	Tufted hairgrass	FACW	native	1	6.25	T	T			T	50	
<i>Deschampsia elongata</i>	Slender hairgrass	FACW	native	2	6.25						45	5
<i>Glyceria borealis</i>	Northern mannagrass	OBL	native	1	0.00				T			
<i>Hordeum brachyantherum</i>	Meadow barley	FACW-	native	2	4.38						35	
<i>Poa trivialis</i>	Rough-stalk bluegrass	FAC	introduced	3	0.00					T		
Total vegetative cover						15	45	12	35	100	100	22
Water						85	55	88	65			78
Relative Percent Native Cover		Mean =	47.00			15	45	12	35	100	100	22
Relative Percent Non-Native Co		Mean =	0.00			0	0	0	0	0	0	0
Moisture Index		Mean =	1.38			1.00	1.77	1.09	1.08	2.40	1.32	1.00
Total # of Native Species: 19												

Phase 3 Mud Slough Wetland Mitigation Bank
Planted Shrub/Forest (PFO) Sample Plot Monitoring Results
June 6, 2010

Species Observed		Status	Origin	Moisture Index	per plot	11	12	42	43
Botanical Name	Common Name								
Planted Overstory Species - stem count within 30' diameter									
<i>Crataegus douglasii</i>	Black hawthorne	FAC	native	3					3
<i>Fraxinus latifolia</i>	Oregon ash	FACW	native	2	1.75			7	
Ash seedlings					75			300	
<i>Pyrus fusca</i>	Pacific crabapple	FAC	native	3	0.75				3
<i>Rosa nutkana</i>	Nootka rose	FAC	native	3	7.5				30
<i>Salix lasiandra</i>	Pacific willow	FACW	native	2	1.5	6			
<i>Salix sitchensis</i>	Sitka willow	FACW	native	2	0.25	1			
<i>Spiraea douglasii</i>	Douglas spirea	FACW	native	2	6.5	11	15		
Total Stems per plot:						18	15	307	33
Average Trees per Plot =				77.5					
Average trees per Plot (w/o) seedlings=				2.5					
Mean Trees/Acre =				4778 or 154 without seedlings					
Average shrubs per plot =				15.75					
Mean Shrubs/Acre =				971					
					Ave.%				
					Cover ea				
					Species				
Herbaceous Species - percent cover									
<i>Downingia elegans</i>	Showy downingia	OBL	native	1	5.0	10			
<i>Eleocharis palustris</i>	Creeping spike rush	OBL	native	1	0.0	T	T		
<i>Epilobium ciliatum</i>	Hairy willow-herb	FACW	native	1	0.0	T			
<i>Grindelia integrifolia</i>	Willamette Valley gumweed	FACW	native	2	0.0	T			
<i>Pepils portula</i>	Water-purslane	NOL	introduced		10.0		20		
<i>Plagiobothrys figuratus</i>	Fragrant popcorn flower	FACW	native	2	0.0	T			
<i>Veronica scutella</i>	Marsh speedwell	OBL	native	1	0.0		T		
Grass Species									
<i>Beckmania syzigachne</i>	American sloughgrass	OBL	native	1	22.5	15	30		
<i>Bromus carinatus</i>	California brome	NOL	native		0.0		T		
<i>Deschampsia cespitosa</i>	Tufted hairgrass	FACW	native	2	0.0		T		
<i>Deschampsia elongata</i>	Slender hairgrass	FACW	native	2	2.5	5			
<i>Hordeum brachyantherum</i>	Meadow barley	FACW	native	2	22.5	35	10		
<i>Poa trivialis</i>	Rough bluegrass	FACW	introduced	2	0.0		T		
Bareground									
WATER							35	40	
Relative % non-native canopy cover:		Mean =		10.00		0.0		20.0	
% of Total Vegetation that is Native =				90.00		65		40	
Relative % non-native invasive canopy cover		Mean =		0		0		0	
Sample plot average moisture index				1.43		1.60		1.25	
Total # of native Species: 18									

**Phase 3 Mud Slough Wetland Mitigation Bank
Wetland Prairie Plot Data
June 6, 2010**

Species Observed		Status	Origin	Wet/Prairie		Ave. % Cover es	Plot #s																																		
Botanical Name	Common Name			Vernal Pool Species	Moisture Index		Species	5	6	7	8	9	10	13	14	15	16	17	18	19	20	21	22	23	25	26	27	28	29	30	31	34	35	36	37	38	39	40	41		
Herbaceous Species																																									
<i>Bidens cernua</i>	Nodding beggars-tick	FACW	native		2	0.00																																			
<i>Boisduvalia densiflora</i>	Dense spike-primrose	FACW	native	Yes	4	0.38		T			T	2				5	5		T																						
<i>Carex ssp.</i>	Sedge ssp.		native			0.00																																			
<i>Cerastium vulgatum</i>	Mouse-ear chickweed	FACU	introduced		4	0.00																																			
<i>Crepis setosa</i>	Bristly Hawksbeard	NOL	native			0.31																																			
<i>Epilobium ciliatum</i>	Hairy willow-herb	FACW	native	Yes	2	0.78	T	T			T		5	10		T	T		T	T																					
<i>Epilobium paniculatum</i>	Autumn willow-herb	NOL	native	Yes		0.31																																			
<i>Eriophyllum lanatum</i>	Woolly sunflower	NOL	native	Yes		0.00																																			
<i>Galium parisiense</i>	Wall bedstraw	UPL	introduced			0.47																																			
<i>Ghaphalium palustre</i>	Lowland cudweed	FAC	native	Yes	3	0.00																																			
<i>Hypochaeris radicata</i>	Cat's ear dandelion	FACU	introduced		4	0.16																																			
<i>Juncus bufonius</i>	Toad rush	FACW	native	Yes	2	4.38	T				T	T	T	T	T																										
<i>Juncus tenuis</i>	Slender rush	FACW	native	Yes	2	0.06																																			
<i>Lactuca serriola</i>	Prickly lettuce	FACU	introduced		4	0.16																																			
<i>Lotus purshianus</i>	Spanish clover	NOL	native	Yes		3.19																																			
<i>Medicago lupina</i>	Black medic	FAC	introduced		3	0.00																																			
<i>Mentha pulegium</i>	Pennyroyal	OBL	introduced		1	0.00																																			
<i>Myosotis discolor</i>	Yellow & blue forget-me-not	FACW	introduced		2	0.00																																			
<i>Pepelis portula</i>	Water-purslane	NOL	introduced			0.31																																			
<i>Plagibothrys figuratus</i>	Fragrant popcorn flower	FACW	native	Yes	2	0.16																																			
<i>Plagibothrys scouleri</i>	Scouler's popcorn flower	FACW	native	Yes	2	0.00																																			
<i>Potentilla gracilis</i>	Northwest cirquefoil	FAC	native	Yes	3	0.16																																			
<i>Prunella vulgaris</i>	Self-heal	FACU	native	Yes	4	7.34																																			
<i>Rorippa curvisiliqua</i>	Western yellowcress	FACW	native	Yes	2	0.00	T																																		
<i>Sidalcea nelsoniana</i>	Nelson's checker-mallow	FAC	native			0.00																																			
<i>Sonchus asper</i>	Prickly sow-thistle	NOL	introduced			0.00																																			
<i>Ventenata dubia</i>	Ventenata	NOL	introduced			0.47																																			
<i>Veronica peregrina</i>	Purslane speedwell	OBL	native	Yes	1	0.16																																			
<i>Veronica scutella</i>	Marsh speedwell	OBI	native			0.00																																			
Grass Species																																									
<i>Agrostis exarata</i>	Spike bentgrass	FACW	native	Yes	2	0.00																																			
<i>Alopecurus geniculatus</i>	Water foxtail	OBL	native		1	0.88	10	3																																	
<i>Alopecurus pratensis</i>	Meadow Foxtail	FACW	introduced		2	0.00																																			
<i>Beckmania syzigachne</i>	American sloughgrass	OBL	native	Yes	1	8.09																																			
<i>Bromus cernatus</i>	California brome	NOL	native			0.00																																			
<i>Deschampsia cespitosa</i>	Tufted hairgrass	FACW	native	Yes	2	25.53	85	90																																	
<i>Deschampsia elongata</i>	Slender hairgrass	FACW	native	Yes	2	19.94																																			
<i>Festuca myuros</i>	Rat-tail fescue	NOL	introduced			0.00																																			
<i>Hordeum brachyantherum</i>	Meadow barley	FACW	native	Yes	2	25.38	5	2																																	
<i>Poa trivialis</i>	Rough bluegrass	FACW	introduced		2	0.00																																			
Bareground Mean =		1.41																																							
Relative % non-native invasive canopy cover: Mean =		0.00					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	0	0	0	0	0	0	
Relative % non-native canopy cover: Mean =		1.6					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	0	0	0	0	0	0	
% of Total Vegetation that is Native =		98.4					100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
Sample plot average moisture index Mean =		2.07					1.90	1.97	2.25	2.10	2.11	2.00	2.00	1.85	1.95	2.05	1.35	1.65	1.85	1.55	1.90	2.00	2.15	3.40	2.10	2.00	3.40	2.27	2.85	2.00	1.67	2.00	2.11	2.00	1.96	1.89	1.80	2.05			
Total # of native Species: 26		# of Wet Prairie or Vernal Pool Species = 20																																							
Total number of Species Sampled: 39		Total Number of Sample Plots: 32																																							

PHOTO POINT #1 Facing East (June 2010)



PHOTO POINT #2 Facing East (June 2010)

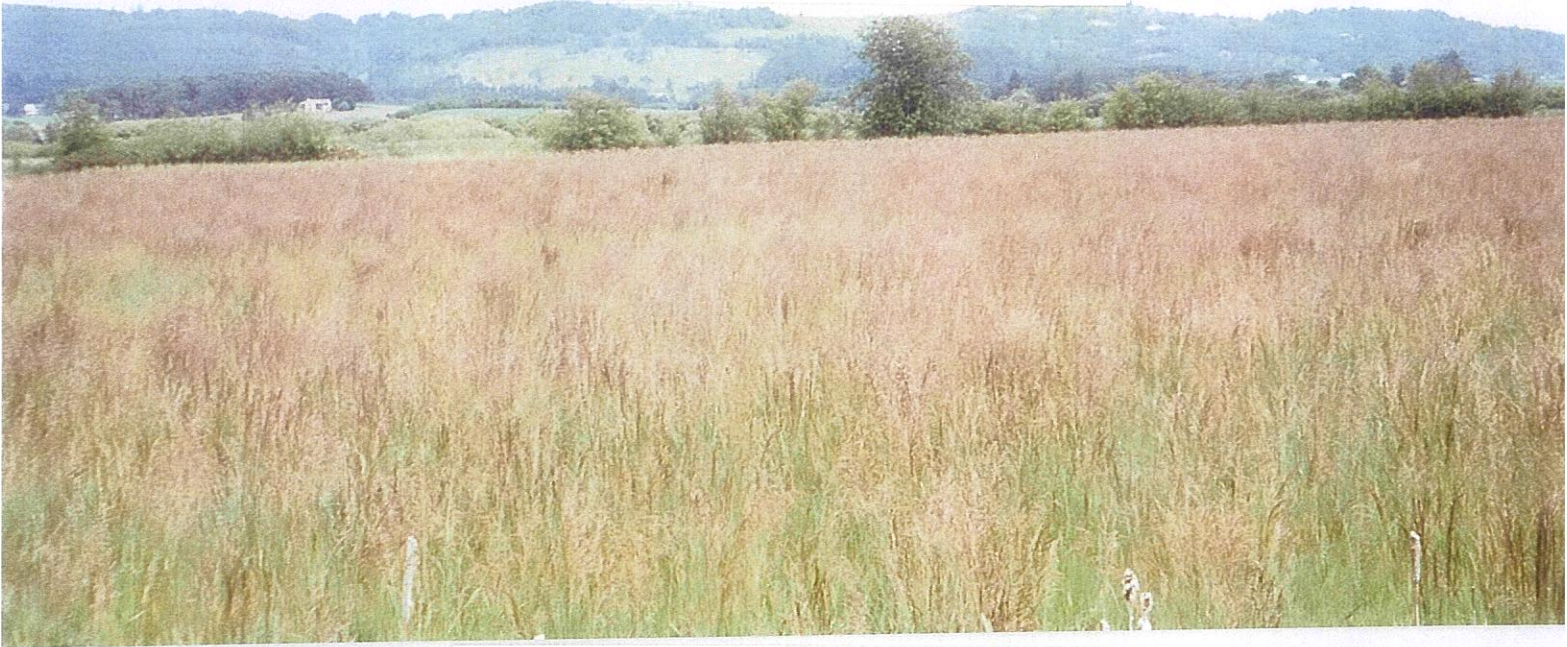


PHOTO POINT #3 Facing East (June 2010)



PHOTO POINT #4 Facing West (June 2010)



PHOTO POINT #5 Facing West (June 2010)



PHOTO POINT #6 Facing South (June 2010)

