Mud Slough Wetland Mitigation Bank – Phases 3 & 4

2012 Monitoring Report

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LIST OF ATTACHMENTS

1.0 REGULATORY BACKGROUND

The purpose of this report is to summarize the progress of Phases 3 and 4 of the Mud Slough Wetland Mitigation Bank (Bank) located it 1875 N. Greenwood Road, Rickreall, Polk County, Oregon. Phase 3 of the Bank is located in Township 7S, Range 4W, Section 20, Tax Lot 300. Phase 3 occupies 81.5 acres of the 413 acre tax lot. The MOA for Phase 3 was approved in July 2008. In December 2008, the first 30% (12.45 credits) of Phase 3 were released for sale. The second release of 20% (8.3 credits) was released in 2009. The ACOE released the credits in September and DSL followed in December 2009. The third release of 30% (12.45 credits) was released in November 2010. The final 20% (8.3 credits) were released in December 2011. All Phase 3 credits have been released for sale.

The primary goals 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:	Acres	Mitigation Type	Credit Ratio	Credits Earned
	80.0	Enhancement of cropped wetland	2:1	40.0
	1.5	Restoration	1:1	1.5
	81.5	Total Site		41.5

The MOA for Phase 4 was approved in June 2011. Phase 4 of the Bank includes 47.2 acres in Township 7S, Range 4W, Section 17, portions of Tax Lots 400 and 500. The primary goals for Phase 4 are to create 1.77 acres, enhance 1.24 acres and restore 40.1 acres of wet prairie and emergent wetland habitat. The Bank also includes a 4.09 acre upland knoll to provide varied wildlife habitat within the Bank. No credits have been released (see Section 10.0).

2.0 WORK SUMMARY

2.1 Phase 3

Phase 3 began with herbicide applications late 2007 with initial grading following in the summer of 2008. Grading included removing the surface drain system and construction of four low berms (2 foot max height, 10 foot wide tops, 10:1 side slopes). The average pond area created by the berms is 0.7 acres. Overflows are around the upper end of the dikes to avoid erosion. All excavation work was done with irregular boundaries and shape mimicking natural features. Two areas, approximately five and six acres each of shallow water/emergent zones, were created in the naturally existing lower portions of the site.

Limited additional grading occurred in August 2009. At this time 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. At the same time, a section of tile was removed that allowed water to seep from the western most pond, on the west side of the railroad. Both of these procedures produced the desired results. In the past year no additional maintenance activities have occurred.

Grass and forb species were seeded in early October 2008 with the trees and shrubs following in February 2009. 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 forbs, to increase the diversity of the plant species on site. 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.

Phase 3 has undergone a similar tufted hairgrass die off as occurred four years ago in a previous phase of the Bank, when hairgrass fell over and smothered itself out. This occurrence is on a smaller scale in Phase 3 and unlike the previous occurrence where there was a problem with non-native annuals establishment, this time the growth appears to be native grasses. This appears to be part of a natural hairgrass cycle.

Spot treatment of individual plants and seed heads has continued over the past year. The primary species targeted have been velvet grass (*Holcus lanatus*) and pennyroyal (*Mentha pulegium*), and reed canary grass (*Phalaris arundinacea).*

2.2 Phase 4

Herbicide applications occurred in October 2009 and in January, May and July 2010. Between August and November 2010, the drainage system was made inoperable and the drainage ditch in the southeast corner filled. The drain system was made inoperable by disconnecting all of the laterals of the system. This was accomplished by removing 15 to 20 feet of pipe at the lower end of the system where they enter the main lines. Some minimal grading was done during this time to fill shallow ditches allowing for inundation of low areas.

Primary seeding of the site was conducted in October 2010. Some additional seeding of fragrant and scouler's popcorn flower *(Plagiobothrys figuratus and Plagiobothrys scouleri)* was done in early February 2011. The trees and shrubs were planted on the upland knoll in February 2011. A total of 46 native species were planted.

Vegetation establishment in Phase 4 is unique from the previous phases of the Bank. The entire emergent and wet prairie was seeded with mix predominantly comprised of forbs, sedges and rushes, with slough grass being the only grass species widely planted. The site was seeded with a mulch-seed mixture planted in a zone planting for individual species. The seed blend then sorted itself out into different zones by moisture tolerance and topography. Individual species seeding was also done for the more dominate species.

This planting method is an effort to increase the forbs present in the prairie. There are some concerns that this method may slow the bank establishment and increase air born invasive species. Air born invasive species, such as sow thistle (*Sonchus asper*) and

prickly lettuce (*Lactuca serriola*) will have open ground to gain an initial foothold, without the wetland grass coverage. To date these have been kept to a minimum, but will continued to be monitored by the sponsor.

Small additional seeding was done in October 2011, including spike bentgrass (*Agrostis exarata*), meadow barley (*Hordeum brachyantherum*), slender hairgrass (*Deschampsia elongata*), northwest cinquefoil (*Potentilla gracilis*), and wooly sunflower (*Eriophyllum lanatum*).

Manual removal of weeds along with spot spraying of weeds continues on Phase 4. The targeted species includes prickly lettuce, sow thistle, tansy ragwort *(Senecio jacobea),* St.John's-wort (*Hypericum perforatum*), Himalayan blackberry (*Rubus discolor*), tall fescue *(Festuca arundinacea)*, meadow foxtail (*Alopecurus pratensis*), parentucellia (*Parentucellia viscosa*), wild carrot (Daucus ssp.), false dandelion (*Nothocalais ssp.*) and velvet grass. No additional maintenance activities have been necessary.

Normal Spot spraying and hand plant removal will continue. Due to the success of the site, no additional plantings are planned.

3.0 AS-BUILT PLANS

Phase 3 as-built plans were submitted to DSL and the ACOE in December 2008. No as-built plans were required or submitted for Phase 4 due to the lack of substantial grading changes made in Phase 4.

4.0 PHASE 3 HYDROLOGY PERFORMANCE STANDARDS, METHODOLOGY, AND RESULTS

The Phase 3 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).

The hydrology delineation was conducted in March 2010 and reported on in the 2010 Monitoring Report. Due to some timing concerns with the 2010 monitoring, further monitoring was conducted in March and April 2011 on the 1.5 acres of upland, that existed prior to the construction of Phase 3. This was reported on in the 2011 Monitoring Report. The results of this final monitoring indicate that each of the monitoring locations had standing water a maximum of 12" below the surface during the entire two months of monitoring, even though the average rain year was slightly below normal.

5.0 PHASE 4 HYDROLOGY PERFORMANCE STANDARDS, METHODOLOGY, AND RESULTS

5.1 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) and regional supplements.

5.2 Methodology

Hydrology monitoring will be performed in the restoration and creation portion of the Bank. Sufficient data shall be collected to demonstrate that the area possesses wetland hydrology for a minimum of two weeks during the spring growing season of one year with below normal or normal precipitation. Visual observations will be recorded of the water table depth and depth to saturated soils. If standing water is found at 12" or less in the monitoring tubes, no soil saturation levels will be required. Hydrology data shall be collected a minimum of every few days over a two week period during the months of February 1 through April 31, depending on the determined growing season for that year. This hydrology monitoring is to establish that the hydrology has been restored by taking out the drain tiles so the initial credits can be released. Monitoring points have been plotted to verify that the hydrology has been restored and shown on Figure 10 - Hydrology Monitoring Map. The monitoring points, designed to show duration of saturation, will consist of transects of three monitoring tubes placed within separate elevation contours on the north, east, south and west sides of the upland knoll and three sets of three tubes within the upland area delineated along the west side of the northern portion of Phase 4.

DELINEATION LITE
On any portion of the Bank, that after the hydrology monitoring indicates it is still upland, a "Delineation Lite" will be conducted between years two and year four after planting. This delineation will more finely tune the area of the Bank not meeting the hydrology standards (1987 US Army Corps of Engineers Wetland Delineation Manual and regional supplements).

The Delineation Lite will show duration of saturation using the same hydrology monitoring protocols as described in the Hydrology Monitoring Section. In addition, these same plots would be evaluated for vegetation utilizing paired plots, to indicate if there is a dominance of hydrophytic vegetation present to support the hydrology monitoring data.

5.3 Results

Delineation: The one time hydrology delineation was conducted between February 6 and April 30, 2011. The hydrology monitoring included 12 monitoring tubes in the 4.09 acres of the upland knoll, nine monitoring tubes in the 1.77 acres of creation, and 10 monitoring tubes (every third monitoring point) across Phase 4. The results of the 2011 monitoring indicated the upland knoll area (except for one monitoring location – Tube #4) did not qualify as jurisdictional wetland which is as expected. The hydrology of the remainder of the site all qualified as jurisdictional wetland, with standing water at a maximum of 12" below the surface.

Due to some questions with the upland knoll 2011 results, additional monitoring of this area occurred in March 2012. The results of this monitoring obtained very similar results to the 2011 monitoring. Jamie Davis (USACE) and Dana Field (DSL) reviewed both the monitoring results and the site itself. They determined that there was a slight

variation in the upland knoll perimeter from the original determination but the change in the acreage was negligible, so the original determination acreage was acceptable. (See Attachment 1- Email Concurrence.) Table 1 includes the results of the 2012 upland knoll monitoring. The monitoring point locations are included in Attachment 2.

Table 1 – Phase 4 2012 Upland Knoll Monitoring Tube Results

Tube #	March						April		
	2	6	13	16	19	22	2	7	13
1	8	9	6	8	10	5	12	12	D
2	9	10	6	8	10	5	D	D	D
3	12	12	10	12	12	10	D	D	D
4	0	0	0	0	0	0	0	0	0
5	5	5	3	4	6	2	8	6	6
6	12	12	9	12	12	10	D	D	D
7	7	7	2	4	8	1	12	12	12
8	8	8	2	4	10	3	D	D	D
9	10	10	6	6	10	4	D	D	D
10	12	12	10	8	12	6	D	D	D
11	D	D	12	D	D	12	D	D	D
12	12	12	11	12	D	10	12	12	13
13	12	12	9	10	12	7	12	12	12
14	10	10	2	7	10	2	10	10	11
15	D	D	12	D	D	12	D	D	D
16	D	D	11	12	D	12	D	13	13
17	11	12	5	10	12	7	12	12	12
18	7	8	2	4	8	0	10	9	10

Data is depth in inches below the surface, "0" = water at the surface. SW= standing water

6.0 PHASE 3 VEGETATION PERFORMANCE STANDARDS, METHODOLOGY AND RESULTS

6.1 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 pulegium*), 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.

6.2 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 2 - 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.

6.3 Phase 3 Vegetation Monitoring Results

Vegetation monitoring was conducted June 22, 2011 by Mark Knaupp. Attachment 3 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 2 includes a general species summary of just the species found within the monitoring plots.

Table 2 - Phase 3: 2009, 2010, 2011 and 2012 Monitoring Plot Species Summary

	2009		2010		2011		2012	
Number of Species Identified	68		51		52		61	
Number and % of Native Species	37	54%	38	75%	38	73%	46	75%

As is seen Table 2, both the number and percentage of native plant species in Phase 3 continues in an upward trend.

6.3.1 Emergent Vegetation

Twenty-two native species were identified in the emergent plot which is an increase from 2011 with 16 native species.

The two most abundant species in 2012 were fragrant popcorn flower at 22.86% and creeping spikerush (*Eleocharis palustris*) at 18.29%. This is a change from 2011, when tufted hairgrass (*Deschampsia cespitosa*) at 8.1% was the second most common species. The decrease in the tufted hairgrass was discussed in Section 2.2.

The performance criteria for **emergent wetland** were 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 82.5% native species cover. There is a combination of dead grass and water or bareground due to recent inundation covering 13.3% of the emergent plots.*

Required: No more that 15% of the relative plant cover is comprised of non-native invasive species. ***Met*** *with 1.67% of non-native invasive species. The only non-native invasive species present is water-purslane (Lythrum portula).*

Required: The wetland's moisture index is less than 3.0. ***Met*** *with an average moisture index of 1.61.*

Required: By year five, there will be a minimum of four obligate species represented in the monitoring plots. ***Met,*** *there are 11 obligate species in the monitoring plots, with seven of those in greater than trace amounts.*

6.3.2 Wetland Prairie

Native herbaceous/grass cover averaged 75.5% throughout the wetland prairie with 20 native species identified in the 33 prairie plots. This percentage increases to 95.7% when included the areas of dead tufted hairgrass (see Section 2.1) which had new growth underneath that is too young to identify completely. The two most common herbaceous species are hairy willow-herb (*Epilobium ciliatum*) at 11% and Spanish clover (*Lotus purshianus*) at 14.2%. The two most common grass species are meadow barley at 20% and slender hairgrass at7.2%. The performance criteria for **wetland prairie** were met for 5 of the 6 of the requirements.

Required: At least 10 wetgrass prairie species are present. ***Met.*** *Twenty-one wet grass prairie/vernal pool species have been identified within the prairie plots. This is a 31% increase in the number of wetgrass and vernal pool species since 2011.*

Required: Tufted hairgrass is represented by 5% or greater relative plant cover in year 1 and 25% by year 5. ***Did not Meet.*** *Tufted hairgrass is present 70% of the plots, varying from trace amounts to 10%, with an overall average of 0.55%. This is a significant decrease from the 2011 of 39.3%. This could be due to the cyclic nature of heavy tufted hairgrass vegetation concentrations whereby hairgrass falls over and smothers itself out.*

Required: At least 50% of the relative plant cover is comprised of native species. ***Met.*** *Native species accounted for 75.5 of the vegetative cover.*

Required: No more that 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 2.10.*

Required: No more than 5% relative plant cover is comprised of shrubs or trees. ***Met.*** *No trees or shrubs occurred in the wet prairie.*

6.3.3 Shrub and Forest

Both the planted and volunteer Oregon ash (*Fraxinus latifolia*) has done well. The tree and shrub diversity remains intact and the overall numbers of both trees and shrubs is well within the performance standard levels.

The performance criteria for **shrub forest wetland** were 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 88% 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 at 881 (includes the seedlings) or 111 without seedlings. The average shrubs per acre is 940.*

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 6.0% of non-native invasive species.*

Required: The wetland's moisture index is less than 3.0. ***Met,*** *with an average moisture index of 1.57.*

7.0 PHASE 4 VEGETATION PERFORMANCE STANDARDS, METHODOLOGY AND RESULTS

7.1. Performance Standards

A. HERBACEOUS PERFORMANCE STANDARDS

1. The cover of native species is at least 60%. These densities will be a combination of planted individuals and natural recruitment.
2. The cover of invasive species is no more than 10%.
3. The wetland's prevalence index is less than 3.0.
4. By Year 3 and thereafter, there are at least six different native species or groupings of native species. To qualify, a species must have at least 5% average cover in the habitat class, and occur in at least 10% (three or more based on 31 plots) of the plots sampled. To qualify as a grouping of native species, each member of the grouping must have between 1 and 4% average cover. The grouping, will total 5% average cover and occur in at least 10% (three or more based on 31 plots) of the plots sampled.
5. Bare substrate represents no more than 20% cover.

*Non-native invasive species to be included: any plant species that appears on the current Oregon Department of Agriculture Noxious Weed list, plus known problem species including *Phalaris arundinacea, Mentha pulegium, Holcus lanatus, Anthoxanthum odoratum,* and the last crop plant if it is non-native. Beginning in year two of monitoring, DSL may consider a non-native plant species invasive if it comprises more than 15% cover in 10% or more of the sample plots in any habitat class, and increases in cover or frequency from the previous monitoring period. Plants that meet this definition should be considered invasive for all successive years of monitoring.

B. UPLAND KNOLL PERFORMANCE STANDARDS

1. The cover of native species is at least 60%.
2. The cover of invasive species is no more than 10%.

7.2 Methodology

Transect and sample plot locations were laid out in a stratified arrangement with equal distance between each transect and sample plot (See Attachment 1 - Monitoring Point Location Map). Transects were laid out in a stratified arrangement along one baseline with equal distance between each transect (approximately 400'). Transects run north to south with the sampling plots predetermined and systematically plotted on transects at equal distance from each other; the location of the first was randomly chosen. The starting points of the sample plots were staggered in order to cover a broader area. The sample plots were permanently identified in the field and are plotted on a site map. The upland knoll was monitored with five sample plots.

Each sample point is the center of a circular plot, the radius of which will be five feet for the herbaceous layer and 30 feet radius for the overstory layer within the upland knoll, with center point for the herbaceous and overstory radius being the same. Each sample plot will be evaluated for species, indicator status, native/non-native and invasive status, the percent cover of each species present. If a plot includes bare soil, the reason for the bare soil will be noted and the percent it covers of each plot included. The number of stems for each tree species will be counted

7.3 Phase 4 Vegetation Monitoring Results

Vegetation monitoring was conducted June 21, 2011 by Mark Knaupp. Attachment 3 includes spread sheets with the results of the sampling. Thirty-six 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 4 within the plots or found while walking between sample plots. Phase 4 is continues to have a remarkable diverse native forb population. It is anticipated that with time the diversity will change as both the planted and volunteer species sort themselves out in the restored wetland.

7.3.1 Wet Prairie and Emergent Vegetation

Thirty nine native species were identified within the wet prairie and emergent vegetation plots. The three most abundant herbaceous species are autumn willow-herb (*Epilobium paniculatum*) at 11.45%, Fragrant popcorn flower *at 8.55%*, and toad rush (*Juncus bufonius*) at 7.97%. The most common grass species is American sloughgrass (*Beckmania syzigachne) at 15.68%.*

The performance criteria for herbaceous wetland were met for all five of the requirements met.

Required: The cover of native species is at least 60%. These densities will be a combination of planted individuals and natural recruitment. ***Met,*** *with 94.2% of the total ground cover (including bareland) being native species.*

Required: The cover of invasive species is no more than 10%. ***Met,*** *with no non-native plant cover.*

Required: The wetland's prevalence index is less than 3.0. ***Met,*** *with a moisture index of 1.73.*

Required: By Year 3 and thereafter, there are at least six different native species or groupings of native species. To qualify, a species must have at least 5% average cover in the habitat class, and occur in at least 10% (three or more based on 31 plots) of the plots sampled. To qualify as a grouping of native species, each member of the grouping must have between 1% and 4% average cover. The grouping will total 5% average cover and occur in at least 10% (three or more based on 31 plots) of the plots sampled. ***Met*** *with nine individual species with 5% or more average cover in at least 10% of the plots.*

Required: Bare substrate represents no more than 20% cover. ***Met*** *with 4.52% bareground, all of which was due to recent inundation.*

7.3.2 Upland Knoll

The native herbaceous cover in the upland knoll averaged 100% of the total vegetation present with no non-native species present. There were 15 native species identified in the five upland knoll plots.

The most common native species is farewell spring (*Clarkia amaena*) at 29.6%. There are four other species present ranging from 14% to 18% coverage including Meadow barley, California oatgrass (*Danthonia californica*), wooly sunflower, and western yarrow (*Achillea millefolium*).

Two hundred and thirty-five native trees and shrubs were planted within the upland knoll. Since there are no performance standards for tree and shrub planting or survival, no specific overstory monitoring was conducted.

The performance criteria for **upland knoll** were met for two of the two requirements.

Required: The cover of native species is at least 60%. ***Met*** *with 100% native vegetation.*

Required: The cover of invasive species is no more than 10%. ***Met,*** *with no non-native species.*

8.0 PHOTO POINT MONITORING

Photos from each of the established six photo points for Phase 3 and six points for Phase 4 are included as Attachment 4. Photos were taken on June 22, 2012.

9.0 CREDIT SALES SUMMARY

Table 3 – 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
8/3/10	3510 Lancaster LLC	4145552-RF	2008-586	0.57
8/10/10	City of Salem	4925-ENF 4926-ENF	NA	0.22

		4927-ENF 4928-ENF 4929-ENF		
8/19/10	Troy and Gina Bundy	7014-ENF	NA	0.03
8/12/10	Les Toth dba Kathleen Manor	6994-ENF	NA	0.64
11/22/10	City of Dundee	45474-RF	2010-154	0.64
12/14/10	City of Oregon City	44900	2010-32	0.24
12/28/10	Eyvette & Loran Davidson	6612-ENF	NA	0.07
2/12/11	The Lenity Group	45110	2009-654	1.65
6//6/11	City of Salem	46640-GP	2011-98	0.14
6/23/11	Investors Brokerage, Inc.	46715-RF	2006-348	0.29
	Total Phase 3 Credit Sales in Nov. 2009 thru June 2011			**10.894**
7/5/11	City of Salem	46653-GP	2010-129	0.166
7/14/11	City of Wilsonville	45448-FP	2010- 40	0.40
10/17/11	Eyvette and Loran Davidson	ENF6612	N/A	0.25
10/11- 3/12	Sean Tyler Keys LLC	35920-RF	2010-402	0.34
11/14/11	Brian Sparks	47906 RF	2011-348	0.17
12/16/11	ODOT	48315	2011-487	0.042
3/31/12	ODOT	48392	2011-466	0.05
5/28/12	Pac Trust	49112	2012-48	0.41
6/11/12	MWSH Salem, LLC	48938-RF	2012-37	0.05
Total Phase 3 Credit Sales in July 2011 thru June 25, 2012				**1.878**
Total Phase 3 Credits Sold				**12.772**

There are 41.5 credits available for Phase 3, all of which have been released. Of these 41.5 credits, 12.772 have been sold leaving 28.728 credits released and unsold.

10.0 CREDIT RELEASE REQUEST

All 41.5 credits of Phase 3 have been released.

No credit release for Phase 4 is being requested due to slow sales and the lack of need for credits at this time. However, Phase 4 is eligible for credit releases #1, #2 and #3 totaling 50% release of the total credits, as soon as the restrictive covenant and access easement are recorded and financial assurance is submitted.

11.0 BOND REASSIGNMENT REQUEST

A $51,853 bond was posted for Phase 3. To date, 70% of the bond has been released (releases 1, 2 and 4) totaling $36,297. No further bond release is due at this time.

12.0 ENDOWMENT AND LONG TERM STEWARD

The sponsor has signed a conservation easement on Phase 3 with The Wetland Conservancy. New amended language has been finalized with the IRT and The Wetland Conservancy and has been recorded by the regulatory agencies.
The Wetland Conservancy has agreed to act as the long-term steward for Phase 4. No easement is yet in place, but the amended language for Phase 3 should be usable for Phase 4 as well. A complete draft, long term management plan, including funding information, will be submitted to the IRT for approval, prior to the release of the 25% credit release dedicated to the Long Term Management Plan and Conservation Easement.

Attachment 1

PHASE 4 HYDROLOGY CONCURRENCE – EMAIL

Carla Cudmore

Subject: FW: Hydrology monitoring-upland knoll, Phase 4 (UNCLASSIFIED)
Attachments: Scan0011.pdf; Scan0012.pdf; Scan0013.pdf

From: Mark Knaupp [mailto:wetlandbank@msn.com]
Sent: Friday, July 13, 2012 12:03 PM
To: Cudmore
Subject: FW: Hydrology monitoring-upland knoll, Phase 4 (UNCLASSIFIED)

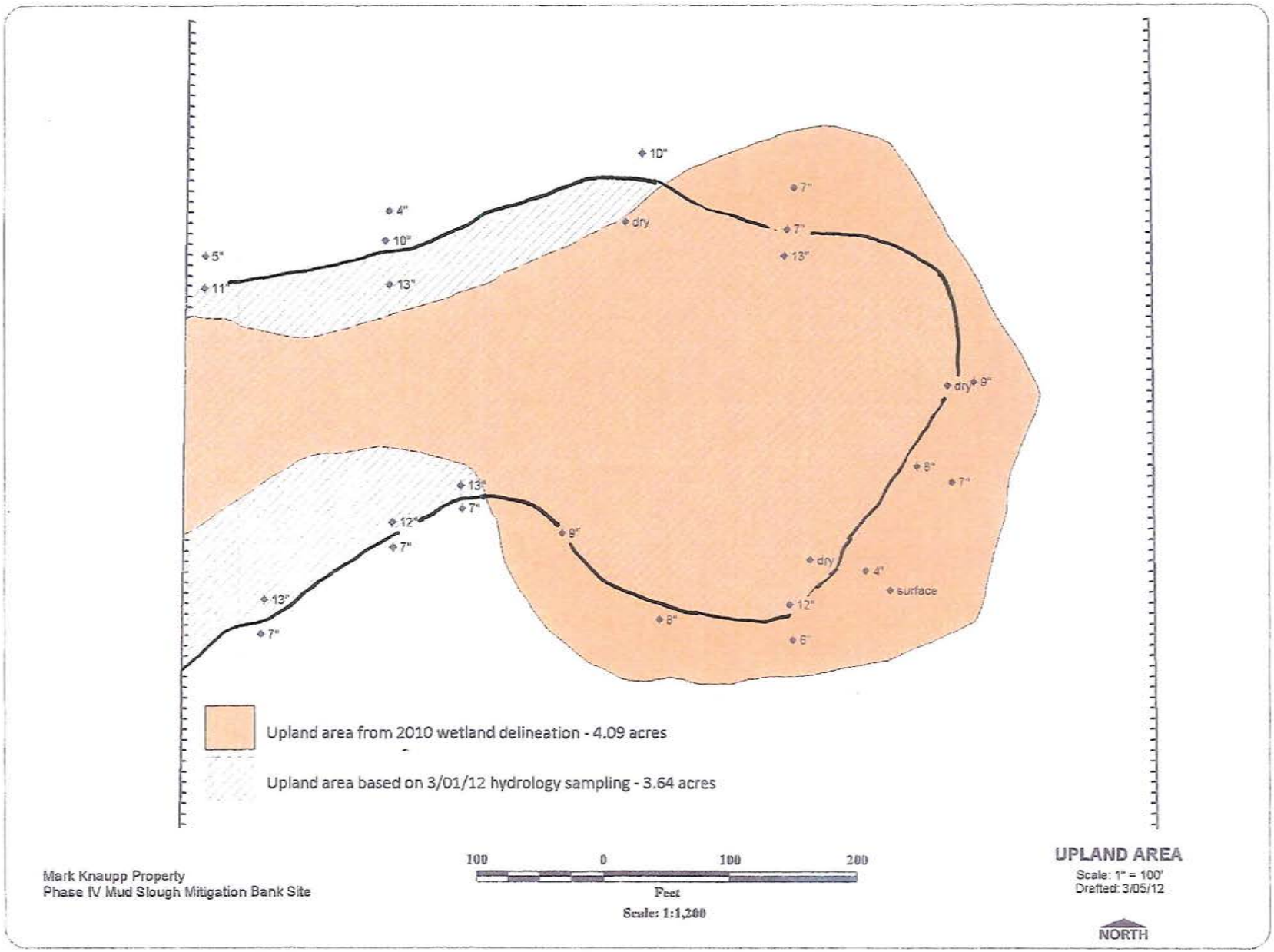
> From: Jaimee.W.Davis@usace.army.mil
> To: dana.field@state.or.us; wetlandbank@msn.com
> Subject: RE: Hydrology monitoring-upland knoll, Phase 4 (UNCLASSIFIED)
> Date: Wed, 11 Jul 2012 23:50:45 +0000
>
> Classification: UNCLASSIFIED
> Caveats: NONE
>
> I also took a look at your data and the precip. records and I agree with your red line, Mark. However I believe you said you did not want to spend the money to get that line surveyed since the difference in area is relatively small. If I misunderstood you, please let me know. If you do not want to survey that line and want to stick with the original delineation, the Corps is fine with that. Just let us know what you want to do.
>
> Thanks,
> -Jaimee
>
> Jaimee W. Davis, CPSS
> Mitigation Program Manager
> U.S. Army Corps of Engineers - Portland District
> PO Box 2946
> Portland, OR 97208-2946
> 503-808-4390 (phone)
> 503-808-4375 (fax)
>
> -----Original Message-----
> From: FIELD Dana [mailto:dana.field@state.or.us]
> Sent: Wednesday, July 11, 2012 3:53 PM
> To: Mark Knaupp
> Cc: Davis, Jaimee NWP
> Subject: RE: Hydrology monitoring-upland knoll, Phase 4
>
> Hi Mark,
>
> I pulled up the precip records; no surprise they show March was really wet but April was close to normal. As you pointed out, there is very little change in acreage between the pre-project delineation and your April line. DSL is OK if we just keep the original delineation acreage of 4.09 ac of uplands in the knoll.
>
> Dana Field
> Mitigation Specialist
> Oregon Dept. of State Lands
> 775 Summer St NE
> Salem OR 97301
> 503-986-5238 voice
> 503-378-4844 FAX
> DSL website: www.oregonstatelands.us <http://www.oregonstatelands.us/>
>

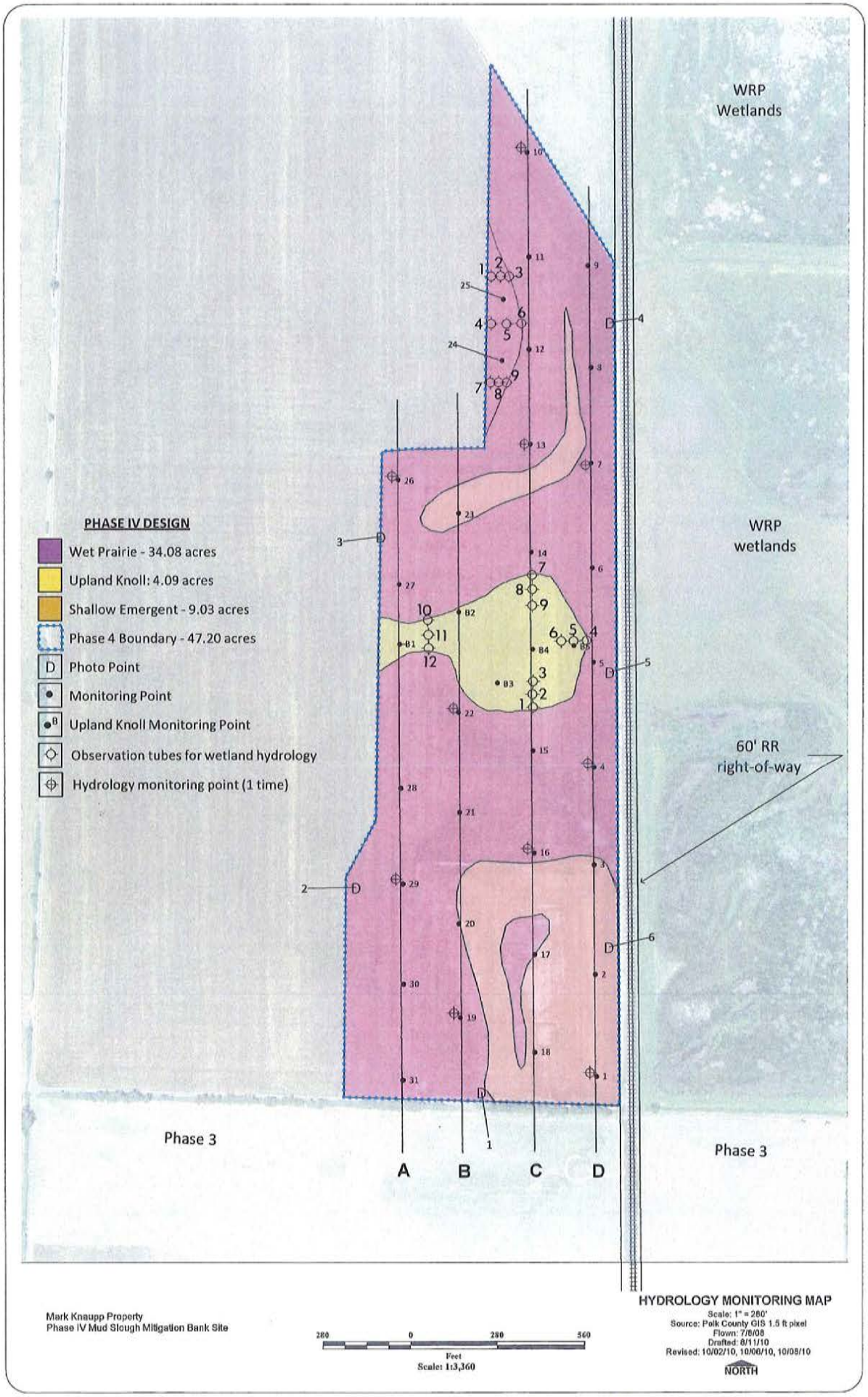
> From: Mark Knaupp [mailto:wetlandbank@msn.com]
> Sent: Thursday, July 05, 2012 1:26 PM
> To: Jamie Davis; Dana Field
> Subject: Hydrology monitoring-upland knoll, Phase 4
>
> Jamie and Dana:
>
> Attached is the data we looked at this morning. Let me know if you're good with the original delineated numbers. That would allow me to avoid more expense, since the line seems to change very little.
>
> Thanks,
> Mark

Attachment 2

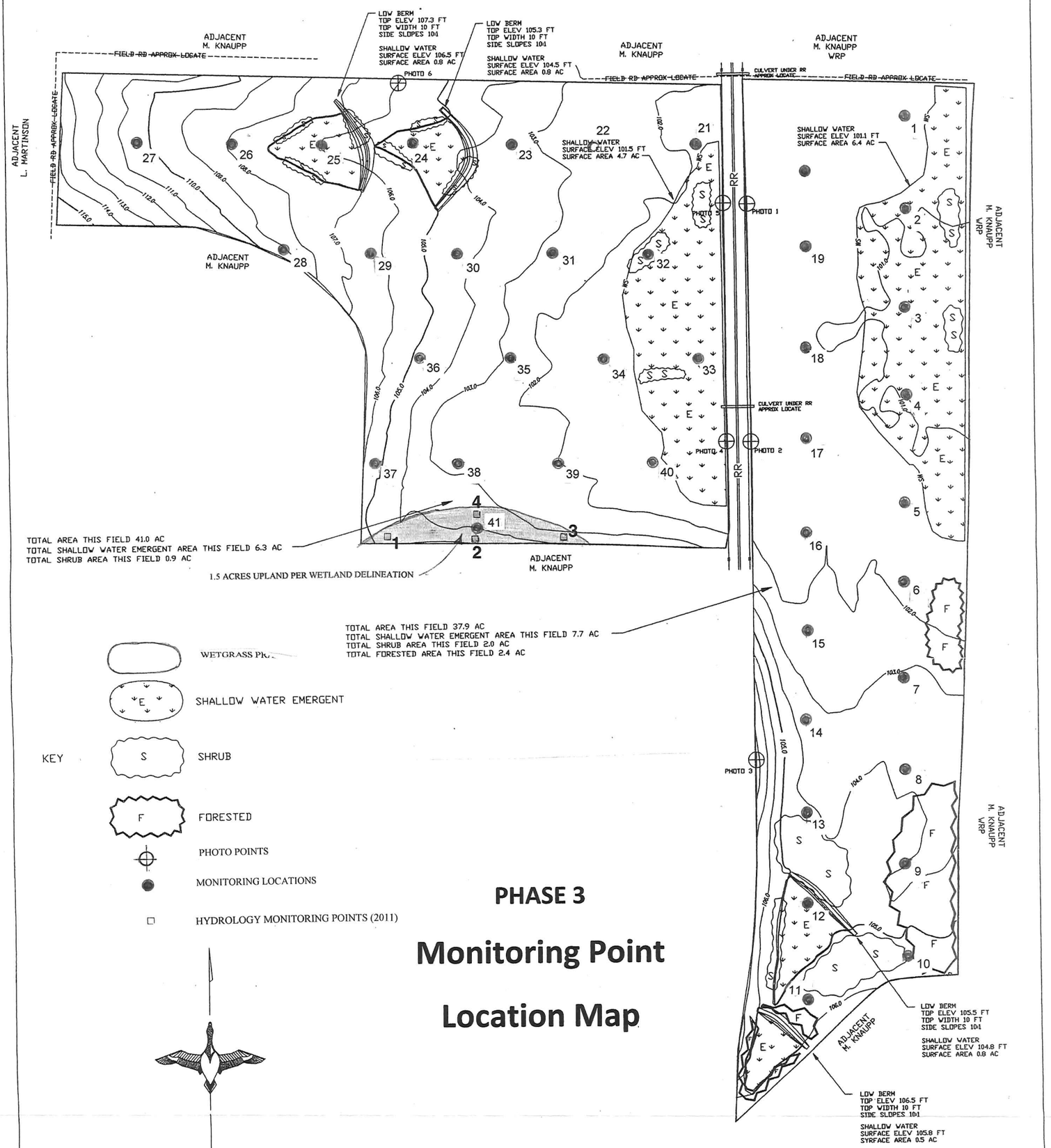
MONITORING POINT LOCATION MAPS

Phase 4 - 2012 Limited Hydrology Monitoring Point Location Map





Phase 4 Monitoring Point Location Map



PHASE 3

Monitoring Point Location Map

	PROJECT NO.		DESIGNED BY: MK
	MUD SLOUGH WETLAND MITIGATION BANK		DRAWN BY: JPS
			SURVEYED BY: MK&JPS
			CHECKED BY:
DATE: SURVEY 12/15/07	SHEET NO.	APPROVED BY:	APPROVED BY:

HORIZONTAL COORDINATES: OREGON STATE PLANE NORTH ZONE NAD83 (2007)
VERTICAL COORDINATES: ASSUMED ELEVATION
(ASSUMED ELEVATION MONUMENT SE CRNR SEC17=100.0 FT, NAVD88 ELEVATION = 174.7 FT)
SURVEY CONTROL BY GPS OBSERVATION NGS NESMITH PID QE2664

Phase 3 Monitoring Point Location Map

Attachment 3

SAMPLE PLOT MONITORING DATA

Phase 3 Mud Slough Wetland Mitigatigation Bank
Plant Species List
June, 2012

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		
Crataegus douglasii	Black hawthorne	FAC	native		3	
Fraxinus latifolia	Oregon ash	FACW	native		2	X
Pyrus fusca	Pacific crabapple	NOL	native		3	X
Rosa nutkana	Nootka rose	FAC	native	Yes	3	X
Salix lasiandra	Pacific willow	FACW	native		2	X
Salix sitchensis	Sitka willow	FACW	native		2	X
Spiraea douglasii	Douglas spirea	FACW	native		2	X
Herbaceous Species						
Alisma plantago	Water plantain	OBL	native		1	
Asclepias speciosa	Showy milkweed	FAC	native		3	X
Aster hallii	Hall's aster	FAC	native	Yes	3	X
Bidens cernua	Nodding beggars-tick	FACW	native		2	X
Bidens frondosa	Leafy beggars-tick	FACW	native		2	X
Boisduvalia densiflora	Dense spike-primrose	FACW	native	Yes	2	X
Briza minor	Little quaking-grass	FAC	introduced		3	
Camassia quamash	Common camas	FACW	native	Yes	2	X
Carex densa	Dense sedge	OBL	native	Yes	1	X
Carex feta	Green-sheath sedge	FACW	native	Yes	2	X
Carex ssp	Sedge ssp.		native			
Carex unilateralis	One-sided sedge	FACW	native	Yes	2	X
Centaurium umbellatum	Common centuary	FAC	introduced		3	
Cerastium vulgatum	Mouse-ear chickweed	FACU	introduced		4	
Cirsium arvense	Canada thistle	FACU	introduced		4	
Cirsium vulgare	Bull thistle	FACU	introduced		4	
Convolvulsu arvensis	Bindweed	NOL	introduced			
Crepis setosa	Bristly Hawksbeard	NOL	native			
Daucus carota	Queen Anne's Lace	NOL	introduced			
Downingia elegans	Showy downingia	OBL	native	Yes	1	X
Eleocharis ovata	Ovoid spikerush	OBL	native	Yes	1	X
Eleocharis palustris	Creeping spike rush	OBL	native		1	
Epilobium ciliatum	Hairy willow-herb	FACW	native	Yes	2	
Epilobium paniculatum	Autumn willow-herb	UPL	native	Yes	5	
Eriophyllum lanatum	Wolly sunflower	NOL	native	Yes		X
Eryngium petiolatum	Rush leaf coyote thistle	OBL	native	Yes	1	X
Galium parisiense	Wall bedstraw	UPL	introduced			
Ghaphalium palustre	Lowland cudweed	FAC	native	Yes	3	
Grindelia integrifolia	Willamette Valley gumweed	FACW	native	Yes	2	X
Heracleum lanatum	Cow parsnip	FAC	native			
Hypochaeris radicata	Cat's ear dandelion	FACU	introduced		4	
Juncus bufonius	Toad rush	FACW	native	Yes	2	
Juncus ensifolius	Dagger leaf rush	FACW	native		2	
Juncus nevadensis	Sierra rush	FACW	native	Yes	2	X
Juncus tenuis	Slender rush	FACW	native	Yes	2	X
Kickxia elatine	Sharppoint fluvelin	UPL	introduced			
Lactuca serriola	Prickly lettuce	FACU	introduced		4	
Lomatium nudicaule	Barestem desert-parsley	NOL	native	Yes		X
Lotus purshianus	Spanish clover	NOL	native	Yes		X
Ludwigia palustris	Water pursalane	OBL	native		1	
Lupinus micranthus	Minature lupine	NOL	native			
Lupinas polyphyllus	Bigleaf lupine	FAC	native	Yes	3	X
Lythrum portula	Water-purslane	NOL	introduced			

Madia sativa	Coast Tarweed	NOL	native			
Medicago lupulina	Black medic	FAC	introduced		3	
Mentha pulegium	Pennyroyal	OBL	introduced		1	
Mimulus guttatus	Common monkey flower	OBL	native	Yes	1	
Navarretia intertexta	Needle-leafed navarretia	FACW	native	Yes	2	
Navarretia squarrosa	Skunkweed	NOL	native	Yes		
Plagiobothrys figuratus	Fragrant popcorn flower	FACW	native	Yes	2	X
Plagiobothrys scouleri	Scouler's popcorn flower	FACW	native	Yes	2	X
Plantago major	Common plantain	FACU	introduced		4	
Potentilla gracilis	Northwest cirquefoil	FAC	native	Yes	3	X
Prunella vulgaris	Self-heal	FACU	native	Yes	4	X
Ranuculus orthorhynchus	Straight beaked buttercup	FACW	native	Yes	2	
Ranuculus sceleratus	Cellery leaf buttercup	OBL	native		1	
Rorippa curvisiliqua	Western yellowcress	OBL	native	Yes	1	
Rumex crispis	Curly dock	FAC	introduced		3	
Scirpus americanus	Bulrush	OBL	native		1	X
Senecio jacobea	Tansy ragwort	FACU	introduced		4	
Sidelcea nelsoniana	Nelson's checker-mallow	FAC	native		3	X
Sonchus asper	Prickly sow-thistle	FAC	introduced		3	
Spergularia ssp.	Sand spurry					
Taraxicum officinale	Dandelion	FACU	introduced		4	
Typa latifolia	Cat-tail	OBL	native		1	
Ventenata dubia	Ventenata	NOL	introduced			
Veronica peregrina	Purslane speedwell	OBL	native	Yes	1	
Veronica scutella	Marsh speedwell	OBl	native		1	
Vicia hirsuta	Hairy vetch	NOL	introduced			
Vicia tetrasperma	Slender vetch	NOL	introduced			
Grass Species						
Agrostis exarata	Spike bentgrass	FACW	native	Yes	2	X
Alopecurus aequalis	Short-awned foxtail	OBL	native		1	
Alopecurus geniculalus	Water foxtail	OBL	native		1	X
Alopecurus pratensis	Meadow foxtail	FACW	introduced		2	
Beckmania syzigachne	American sloughgrass	OBL	native	Yes	1	X
Bromus carinatus	California brome	NOL	native			
Bromus mollis	Soft brome	UPL	introduced			
Bromus rigidus	Ripgut brome	NOL	introduced			
Bromus ssp.	Brome ssp					
Danthonia californica	California oatgrass	NOL	native	Yes		X
Deschampsia cespitosa	Tufted hairgrass	FACW	native	Yes	2	X
Deschampsia elongata	Slender hairgrass	FACW	native	Yes	2	X
Echinochloa crus-gali	Barnyard grass	FACW	introduced		2	
Festuca arundinacea	Tall fescue	FAC	introduced		3	
Festuca bromoides	Barren fescue	NOL	introduced			
Glyceria borealis	Northern mannagrass	OBL	native		1	
Glyceria occidentalis	Western mannagrass	OBL	native		1	X
Holcus lanatus	Velvet grass	FAC	introduced		3	
Hordeum brachyantherum	Meadow barley	FACW	native	Yes	2	X
Loloium multiflorum	Annual ryegrass	NOL	introduced			
Panicum capillare	Common witchgrass	FACU	native	Yes	4	
Poa annua	Annual bluegrass	FAC	introduced		3	
Poa pratensis	Kentucky bluegrass	FAC	introduced		3	
Poa trivialis	Rough bluegrass	FACW	introduced		2	
Vulpia myuros	Rat-tail fescue	FAC	introduced		3	

Phase 3 Mud Slough Wetland Mitigatigation Bank
Emergent Marsh (PEMC) Plot Data - June 22, 2012

Species Observed					Ave. %		Sample Plot Number				
Botanical Name	Common Name	Status	Origin	Index	Ave. % Cover	1	2	3	4	32	33
Herbaceous Species - percent cover					ea. Species						
Bidens cernua	Nodding beggars-tick	FACW	native	2	2.50	T		15	T	T	
Bidens frondosa	Leafy beggars-tick	FACW	native	2	0.83	T	2	T			3
Carex unilateralis	One-sided sedge	FACW	native	2	0.00					T	
Downingia elegans	Showy downingia	OBL	native	1	4.17	5	5	5	10		
Eleocharis ovata	Ovoid spikerush	OBL	native	1	0.83			5			
Eleocharis palustris	Creeping spike rush	OBL	native	1	21.33	3		40	35		50
Epilobium ciliatum	Hairy willow-herb	FACW	native	2	1.67					10	
Eryngium petiolatum	Rush leaf coyote thistle	OBL	native	1	0.00	T					
Ghaphalium palustre	Lowland cudweed	FAC	native	3	2.50			15			
Grindelia integrifolia	Willamette Valley gumweed	FACW	native	2	0.00			T	T		
Hypochaeris radicata	Cat's ear dandelion	FACU	introduced	4	1.67					10	
Juncus bufonius	Toad rush	FACW	native	2	3.33					20	
Juncus nevadensis	Sierra rush	FACW	native	2	0.33	2					
Ludwigia palustris	Water pursalane	OBL	native	1	0.00	T					
Lythrum portula	Water-purslane	NOL	introduced		1.67	T	T	10		T	
Mentha pulegium	Pennyroyal	OBL	introduced	1	0.00		T				
Plagiobothrys figuratus	Fragrant popcorn flower	FACW	native	2	26.67	40	90	T	30	T	
Rorippa curvisiliqua	Western yellowcress	OBL	native	1	0.00			T			
Rumex crispis	Curly dock	FAC	introduced	3	0.00						
Typa latifolia	Cat-tail	OBL	native	1	0.33						2
Grass Species											
Agrostis exarata	Spike bentgrass	FACW	native	2	2.50					15	
Alopecurus aequalis	Short-awned foxtail	OBL	native	1	0.83			5			
Alopecurus geniculatus	Water foxtail	OBL	native	1	0.83	T			5		
Beckmania syzigachne	American sloughgrass	OBL	native	1	13.00	50	3	T	20	T	5
Deschampsia cespitosa	Tufted hairgrass	FACW	native	2	0.83					5	
Echinochloa crus-gali	Barnyard grass	FACW	introduced	2	0.83			5			
Water/bareground due to recent inundation					6.67						40
Dead grass					6.67					40	
Relative Percent Native Cover	Mean =	82.50				100	100	85	100	50	60
Relative Percent Non-Native Cover	Mean =	4.17				0	0	15	0	10	0
Relative % non-native invasive canop	Mean =	1.67				0	0	10	0	0	0
Moisture Index	Mean =	1.61				1.40	1.92	1.56	1.40	2.30	1.05
Total # of Native Species: 21											

*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).

Phase 3 Mud Slough Wetland Mitigatigation Bank

Planted Shrub/Forest (PFO) Sample Plot Monitoring Results

June 22, 2012

Species Observed				Moisture	per plot				
Botanical Name	Common Name	Status	Origin	Index		11	12	42	43
Planted Overstory Species. - stem count within 30' diameter									
Crataegus douglasii	Black hawthorne	FAC	native	3	1				4
Fraxinus latifolia	Oregon ash	FACW	native	2	0.5			2	
Ash seedlings					12.5			50	
Pyrus fusca	Pacific crabapple	FAC	native	3	0.25				1
Rosa nutkana	Nootka rose	FAC	native	3	8.5				34
Salix lasiandra	Pacific willow	FACW	native	2	1.5	6			
Spiraea douglasii	Douglas spirea	FACW	native	2	5.25	8	13		
Total Stems per plot:						14	13	52	39
Average Trees per Plot =	14.3								
Average trees per Plot (w/o) seedlings=	1.8								
Mean Trees/Acre =	881 or 111 without seedlings								
Average shrubs per plot =	15.25								
Mean Shrubs/Acre =	940				Ave.%				
					Cover ea				
Herbaceous Species - percent cover					Species				
Bidens cernua	Nodding beggars-tick	FACW	native	2		T	3		
Boisduvalia densiflora	Dense spike-primrose	FACW	native	2		T			
Carex unilateralis	One-sided sedge	FACW	native	2		T	T		
Downingia elegans	Showy downingia	OBL	native	1	1.5	3	T		
Eleocharis palustris	Creeping spike rush	OBL	native	1	37.5	40	35		
Epilobium ciliatum	Hairy willow-herb	FACW	native	2	0.0	T	T		
Epilobium paniculatum	Autumn willow-herb	NOL	native			T			
Eryngium petiolatum	Rush leaf coyote thistle	OBL	native	1	0.0	T	T		
Lactuca serriola	Prickly lettuce	FAC	introduced	3			5		
Lythrum portula	Water-purslane	NOL	introduced		6.0	2	10		
Mentha pulegium	Pennyroyal	OBL	introduced	1	0.0		T		
Plagiobothrys figuratus	Fragrant popcorn flower	FACW	native	2	12.5	25	T		
Rumex crispis	Curly dock	FAC	introduced	3	1.0		2		
Sonchus asper	Prickly sow thistle	FAC	introduced	3		T	5		
Typa latifolia	Cat-tail	OBL	native	1	0.0		T		
Veronica peregrina	Purslane speedwell	OBL	native	1			10		
Vicia tetrasperma	Slender vetch	NOL	introduced			Y			
Grass Species									
Agrostis exarata	Spike bentgrass	FACW	native	2	0.0		T		
Alopecurus pratensis	Meadow foxtail	FACW	introduced	2		T			
Beckmania syzigachne	American sloughgrass	OBL	native	1	2.5	T	5		
Hordeum brachyantherum	Meadow barley	FACW	native	2	27.5	30	25		
Poa trivialis	Rough bluegrass	FACW	introduced	2	0.0	T			
Bareground									
Water									
Relative % non-native canopy cover:	Mean =	12.00				2	22		
% of Total Vegetation that is Native:	Mean =	88.00				98.00	78.00		
Relative % Non-native Invasive Canopy Ccove	Mean =	6.00				2	10		
Sample plot average moisture index		1.57				1.56	1.58		
Total # of native Species: 19									

Phase 3 Mud Slough Wetland Mitigatigation Bank
Wetland Prairie Plot Data
6/22/2012

Species Observed			Wet/Prairie			Ave. %	Plot #s																																	
				Vernal	Moisture	Cover ea																																				
Botanical Name	Common Name	Status	Origin	Pool Species	Index	Species	5	6	7	8	9	10	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	34	35	36	37	38	39	40	41
Herbaceous Species																	T																							
Alisma plantago	Water plantain	OBL	native		1	0.00																						5	T											
Aster hallii	Hall's aster	FAC	native	Yes	3	0.15												20	T	T												2								
Bidens cernua	Nodding beggars-tick	FACW	native		2	0.67	T									T	5																							
Boisduvalia densiflora	Dense spike-primrose	FACW	native	Yes	2	0.76					20								T	T	T	T	T	T					2		T		T		T		T	T	
Carex ssp	Sedge ssp.		native			0.06	T						T		T	T																	5						
Convolvulsu arvensis	Bindweed	NOL	introduced			0.15																															3		
Downingia elegans	Showy downingia	OBL	native	Yes	1	0.09																																		
Epilobium ciliatum	Hairy willow-herb	FACW	native	Yes	2	11.03	5	T	T	10	5	5	50	40	7	T	15	10	2	T	25	30		30	T				T	40	25	10	15	T		T	20	20	
Epilobium paniculatum	Autumn willow-herb	UPL	native	Yes	5	1.21	5	T	T	T	T	10		T	T	5	T					T			5				T	5	T		15	T	T				
Eriophyllum lanatum	Wooly sunflower	NOL	native	Yes		0.15																																		
Galium parisiense	Wall bedstraw	UPL	introduced		5	0.00						T																2								T			
Ghaphalium palustre	Lowland cudweed	FAC	native	Yes	3	0.06																						T					T	15					
Hypochaeris radicata	Cat's ear dandelion	FACU	introduced		4	0.45																										2				5	10	
Juncus bufonius	Toad rush	FACW	native	Yes	2	3.39	T	5			10		25	5		T	T	20	10	15	5	T													5				
Juncus tenuis	Slender rush	FACW	native	Yes	2	0.15																											T		T				
Lactuca serriola	Prickly lettuce	FACU	introduced		4	0.00			T		T	T	T			T			T	T				20	50	60	70	20	5					5	60	50			10
Lotus purshianus	Spanish clover	NOL	native	Yes		14.24			80	40								T		T	T										2					20	30		
Lythrum portula	Water-purslane	NOL	introduced			1.58						T																											
Madia sativa	Coast tarweed	NOL	native			0.00																								5						5	2	
Plagiobothrys figuratus	Fragrant popcorn flower	FACW	native	Yes	2	4.42	10				10	T		20	50	30	5	5	2	T	2	T				5												30
Potentilla gracilis	Northwest cirquefoil	FAC	native	Yes	3	1.06																						60											
Prunella vulgaris	Self-heal	FACU	native	Yes	4	1.82																								2			T						
Rorippa curvisiliqua	Western yellowcress	FACW	native	Yes	2	0.12							T				T	T			2	T			T														
Sidelcea nelsoniana	Nelson's checker-mallow	FAC	native		3	0.00													T	T	T	T		T		5	T		10	1	T		T					
Sonchus asper	Prickly sow-thistle	FAC	introduced		3	0.48			T			T	T																					5					
Ventenata dubia	Ventenata	NOL	introduced			0.15																																		
Veronica peregrina	Purslane speedwell	OBL	native	Yes	1	0.21	T	T			T						T	3	2	2												T				T			
Vicia tetrasperma	Slender vetch	NOL	introduced			0.00						T																											
Grass Species																																							
Agrostis exarata	Spike bentgrass	FACW	native	Yes	2	5.79	10	15		5		T	T	20	8	10	10	T	10	5	15	10	5	5		T	T		3		10	10	10	5		5	15	5		
Alopecurus geniculalus	Water foxtail	OBL	native		1	0.55	5			T	T				3	5		T	2	T						T	T		3				T						
Alopecurus pratensis	Meadow foxtail	FACW	introduced		2	0.00																				T													
Beckmania syzigachne	American sloughgrass	OBL	native	Yes	1	1.88	2			T	T		T	T			5	2		5	1	5			T			T		2	5	T	15	T			15	5		
Bromus carinatus	California brome	NOL	native			0.00																																		
Bromus ssp	Brome ssp.					0.00		T	T																			T											
Danthonia californica	California oatgrass	NOL	native	Yes		0.00																																		
Deschampsia cespitosa	Tufted hairgrass	FACW	native	Yes	2	0.55	3	T	T		T	T	T	T	T	T	T	10	5	T		T		T	T				T	T			T	T						
Deschampsia elongata	Slender hairgrass	FACW	native	Yes	2	7.18	10	10	T	5	15	T	20	10	7	5						T		30	T	10			25	5	15		15	35	5	5	10		
Glyceria occidentalis	Western mannagrass	OBL	native		1	0.00					T																												
Holcus lanatus	Velvet grass	FAC	introduced		3	0.00						T																											
Hordeum brachyantherum	Meadow barley	FACW	native	Yes	2	20.00			15	30	10	70	5	T	T				15	50	50	30	15	25	20	30	15	50	40	25	5	15	30	25	40	10		40	
Poa trivialis	Rough bluegrass	FACW	introduced		2	0.76			5	T	T	T											T		5		T					5	T	T			10	
Vulpia myuros	Rat-tail fescue	FAC	introduced		3	0.76																			15		T										10	
Dead grass						20.12	50	70		10	30	15		5	25	45	60	30	67	58		5	65							20	54	30					25		
TOTAL %							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
Bareground **Mean =**	**0.00**																																						
Relative % non-native invasive canopy cover: **Mean =**		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	0	0	0	0
Relative % non-native canopy cover: **Mean =**		**4.3**				4.3	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	15	10	0	0	10	1	0	2	0	25	5	0	20	30	20	
% of Total Native Vegetation=	**Mean=**	**75.5**				75.5	50	30	95	90	70	85	100	95	75	55	40	70	33	42	100	95	35	100	85	90	100	100	90	99	80	44	70	75	95	100	80	45	80	
% Vegetation Native/Dead Gras	**Mean=**	**95.7**				95.7	100	100	95	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	85	90	100	100	90	99	100	98	100	75	95	100	80	70	80	
Sample plot average moisture index **Mean =**		**2.10**				2.1	2.16	2.00	2.00	2.00	2.00	2.35	2.00	2.00	1.96	2.18	1.88	1.93	1.88	1.79	1.99	1.95	2.00	2.15	2.44	2.13	2.00	3.56	2.07	2.09	2.00	1.66	2.64	2.42	2.00	2.00	1.81	1.86	2.44	
Total # of native Species: 29		# of Wet Praire or Vernal Pool Species = 21																																						
Total number of Species Sampled: **42** Total Number of Sample Plots: **33**																																							

**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).

Phase 4 Mud Slough Wetland Mitigatigation Bank
Plant Species List
June, 2012

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

		Status	Origin	Wet Prairie	Moisture	Planted
Overstory				Vernal pool	Index	
Crataegus douglasii	Black Hawthorne	FAC	native		3	
Pinus ponderosa	Willamette V. Ponderosa Pine	FACW	native		2	X
Pyrus fusca	Pacific Crab apple	NOL	native			X
Quercus garryana	Oregon White Oak	NOL	native			X
Salix sitchensis	Sitka willow	FACW	native		2	X
Tsuga heterophylla	Westen Red cedar	FACU	native			X
Shrubs						
Amelanchier alnifolia	Serviceberry	FACU	native		4	X
Oemleria cersiformis	Indian Plum	FACU	native		4	X
Symphoricarpos albus	Snowberry	FACU	native		4	X
Herbaceous Species						
Achillea millefolium	Western yarrow	FACU	native			X
Alisma plantago	Water plantain	OBL	native		1	
Allium amplectens	Slimleaf onion	NOL	native	Yes		X
Anthemis cotual	Mayweed chamomile	FACU	introduced		4	
Aster halii	Hall's aster	FAC	native	Yes	3	X
Bidens cernua	Nodding beggars-tick	FACW	native		2	X
Bidens frondosa	Leafy beggars-tick	FACW	native		2	X
Boisduvalia densiflora	Dense spike-primrose	FACW	native	Yes	2	X
Brodiaea hyacinthina	Hyacinth brodiaea	NOL	native	Yes		X
Camassia quamash	Common camas	FACW	native	Yes	2	X
Castilleja tenuis	Hairy Indian paintbrush	NOL	native			
Cerastium vulgatum	Mouse-ear chickweed	FACU	introduced		4	
Carex densa	Dense sedge	OBL	native	Yes	1	X
Carex feta	Green-sheathed sedge	FACW	native	Yes	2	X
Carex unilateralis	One-sided sedge	FACW	native	Yes	2	X
Carex ssp.	Sedge ssp.		native			
Centaurium umbellatum	Common centuary	FAC	introduced		3	
Cirsium arvense	Canada thistle	FACU	introduced		4	
Cirsium vulgare	Bull thistle	FACU	introduced		4	
Clarkia amoena var caurina	Farrwell to spring	NOL	native			X
Conyza bonayiensis	Wavy fleabane	NOL	introduced			
Conyza canadensis	Canadian Horseweed	FACU	native			
Crepis setosa	Bristly Hawksbeard	NOL	native			
Daucus carota	Queen Anne's Lace	NOL	introduced			
Downingia elegans	Showy downingia	OBL	native	Yes	1	X
Eleocharis ovata	Ovoid spikerush	OBL	native	Yes	1	X
Eleocharis palustris	Creeping spike rush	OBL	native		1	
Erynigium petiolatum	Rush leaf coyote thistle	OBL	native	Yes	1	X
Epilobium ciliatum	Hairy willow-herb	FACW	native	Yes	2	
Epilobium paniculatum	Autumn willow-herb	NOL	native	Yes		
Eriophyllum lanatum	Wooly sunflower	NOL	native	Yes		X
Galium parisiense	Wall bedstraw	UPL	introduced			
Ghaphalium palustre	Lowland cudweed	FAC	native	Yes	3	
Grindelia integrifolia	Willamette Valley gumweed	FACW	native	Yes	2	X
Hypericum perforatum	St. John's-wort	NOL	introduced			
Hypochaeris radicata	Cat's ear dandelion	FACU	introduced		4	
Juncus bufonius	Toad rush	FACW	native	Yes	2	
Juncus tenuis	Slender rush	FACW	native	Yes	2	X
Kickxia elatine	Sharppoint fluvelin	UPL	introduced		5	
Lactuca serriola	Prickly lettuce	FACU	introduced		4	

Lathyrus sphaericus	Grass pea-vine	NOL	introduced			
Lamium amplexicaule	Henbit	NOL	introduced			
Lomatium nudicaule	Barestem desert-parsley	NOL	native	Yes		X
Lotus purshianus	Spanish clover	NOL	native	Yes		X
Lupinus micranthus	Minature lupine	NOL	native			
Lupinas polyphyllus	Bigleaf lupine	FAC	native	Yes	3	X
Lythrum hyssopifolia	Hyssop loosesstrife	OBL	introduced		1	
Lythrum portula	Water-purslane	NOL	introduced			
Madia saliva	Coast tarweed	NOL	native			
Medicago lupulina	Black medic	FAC	introduced		3	
Mentha pulegium	Pennyroyal	OBL	introduced		1	
Mimulus guttatus	Common monkey flower	OBL	native	Yes	1	
Navarretia intertexta	Needle-leafed navarretia	FACW	native	Yes	2	
Parentucellia viscosa	Parentucellia	FAC	introduced		2	
Perideridia gairdneri	Gairdner's yampah	FAC	native	Yes	3	X
Plagiobothrys figuratus	Fragrant popcorn flower	FACW	native	Yes	2	X
Plagiobothrys scouleri	Scouler's popcorn flower	FACW	native	Yes	2	X
Plantago major	Common plantain	FACU	introduced		4	
Polygonaceae persicaria	Lady's thumb	FACW	introduced		2	
Potentilla gracilis	Northwest cirquefoil	FAC	native	Yes	3	X
Prunella vulgaris	Self-heal	FACU	native	Yes	4	X
Ranuculus sceleratus	Cellery leaf buttercup	OBL	native		1	
Ranunculus occidentalis	Western buttercup	FAC	native	Yes	3	X
Rorippa curvisiliqua	Western yellowcress	FACW	native	Yes	2	
Rumex crispis	Curly dock	FAC	introduced		3	
Senecio jacobea	Tansy ragwort	FACU	introduced		4	
Senecio vulgaris	Common groundsel	FACU	introduced			
Sidalcea campestris	Meadown checker-mallow	NOL	native			X
Sidelcea nelsoniana	Nelson's checkermallow	FAC	native		3	X
Sonchus asper	Prickly sow-thistle	FAC	introduced		3	
Sisyrinchium auguslifolium	Pointed blue-eyed grass	FACW	native	Yes	2	X
Taraxicum officinale	Dandelion	FACU	introduced		4	
Typa latifolia	Cat-tail	OBL	native		1	
Veronica peregrina	Purslane speedwell	OBL	native	Yes	1	
Vicia hirsuta	Hairy vetch	NOL	introduced			
Vicia tetrasperma	Slender vetch	NOL	introduced			
Wyethia angustifolia	Narrow-leaf mulesears	FACU	native		4	X
Grass Species						
Agrostis exarata	Spike bentgrass	FACW	native	Yes	2	X
Alopecurus aequalis	Short-awned foxtail	OBL	native		1	
Alopecurus geniculalus	Water foxtail	OBL	native		1	
Alopecurus pratensis	Meadow foxtail	FACW	introduced		2	
Beckmania syzigachne	American sloughgrass	OBL	native	Yes	1	X
Bromus carinatus	California brome	NOL	native			
Danthonia californica	California oatgrass	NOL	native	Yes		X
Deschampsia cespitosa	Tufted hairgrass	FACW	native	Yes	2	X
Deschampsia elongata	Slender hairgrass	FACW	native	Yes	2	X
Echinochloa crus-galli	Barnyard grass	FACW	introduced		2	
Festuca arundinacea	Tall fescue	FAC	introduced		3	
Festuca myuros	Rat-tail fescue	NOL	introduced			
Glyceria borealis	Northern mannagrass	OBL	native		1	
Glyceria occidentalis	Western Mannagrass	OBL	native		1	X
Holcus lanatus	Velvet grass	FAC	introduced		3	
Hordeum brachyantherum	Meadow barley	FACW	native	Yes	2	X
Panicum capillare	Common witchgrass	FACU	native	Yes	4	
Poa annua	Annual bluegrass	FAC	introduced		2	
Poa trivialis	Rough bluegrass	FACW	introduced		2	
Vulpia myuros	Rat-tail fescue	FAC	introduced		3	

Phase 4 Mud Slough Wetland Mitigatigation Bank
Upland Knoll Plot Data - June 21, 2012

Species Observed					Ave. %		Sample Plot Number			
Botanical Name	Common Name	Status	Origin	Index	Ave. % Cover	1	2	3	4	5
Herbaceous Species - percent cover					ea. Species					
Achillea millefolium	Western yarrow	FACU	native		14.00	15	10	15	20	10
Clarkia amaena	Farewell to spring	NOL	native		29.60	20	28	20	30	50
Epilobium ciliatum	Hairy willow-herb	FACW	native	2	0.00				T	T
Eriophyllum lanatum	Wooly sunflower	NOL	native		15.60	28	20	15	5	10
Grindelia integrifolia	Willamette Valley gumwe	FACW	native	2	1.00	2		2	T	1
Potentilla gracilis	Northwest cirquefoil	FAC	native	3	3.00	3	7	3	T	2
Prunella vulgaris	Self-heal	FACU	native	4	0.40		T		T	2
Grass Species										
Agrostis exarata	Spike bentgrass	FACW	native	2	0.40	2			T	T
Beckmania syzigachne	American sloughgrass	OBL	native	1	0.00		T			
Bromus carinatus	California brome	NOL	native		0.00	T				T
Danthonia californica	California oatgrass	NOL	native		16.00	15	20	20	20	5
Deschampsia cespitosa	Tufted hairgrass	FACW	native	2	0.00					
Deschampsia elongata	Slender hairgrass	FACW	native	2	2.00				T	10
Hordeum brachyantherum	Meadow barley	FACW	native	2	18.00	15	15	25	25	10
Panicum capillare	Common witchgrass	FACU	native	4	0.00					
Bareground	**Mean =**	**0.00**			0.00					
Relative Percent Native Cover	**Mean =**	**100.00**				100	100	100	100	100
Relative Percent Non-Native Cover	**Mean =**	**0.00**				0	0	0	0	0
% of Total Vegetation that is Native =		**100.0**				0	0	0	0	0
Total # of Native Species: **15**										

Phase 4 Mud Slough Wetland Mitigatigation Bank
Wetland Prairie and Emergent Plot Data
June 21, 2012

Species Observed			Ave. % Cover ea	Plot #s																													
Botanical Name	Common Name	Origin	Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Herbaceous Species																																		
Achillea millefolium	Western yarrow	native	0.00																						T									
Alisma plantago	Water plantain	native	0.00				T																							T				
Allium amplectens	Slimleaf onion	native	0.00																							10								
Aster halii	Hall's aster	native	0.32																															
Bidens cernua	Nodding beggars-tick	native	0.42	5		3	T					5																						
Bidens frondosa	Leafy beggars-tick	native	0.97	20			T														10													
Boisduvalia densiflora	Dense spike-primrose	native	3.42			5			T	5	2							10	17			15	5	40						2			5	
Carex ssp	Sedge ssp.	native	1.65	T		20	3		5	T	3	T						T		5			15										
Centaurium umbellatum	Common centuary	introduced	0.03					T		T																T			T	1				T
Clarkia amoena var caurina	Farrwell to spring	native	1.77					40							T	T	T		T	5					T	10								
Downingia elegans	Showy downingia	native	5.77	5	35	2	10	T	25	2	20	5		T			5			5	50		15								T		
Eleocharis ovata	Ovoid spikerush	native	0.65		5	T					T									10	5		T										
Eleocharis palustris	Creeping spike rush	native	1.13		5		10		T		12	T									5		3										
Epilobium ciliatum	Hairy willow-herb	native	1.13			T		T	5	T	3	10		T		15	2	T	T			T	T	T	T	T	T	T	T	T	T	T	T
Epilobium paniculatum	Autumn willow-herb	native	11.45					5		50			5	5		15	30	10	10	T		50		T	50	20			10	65	5	5	10	10
Eriophyllum lanatum	Wooly sunflower	native	10.06										2		75		T		5			T		T	5	15	68	70	T	5	2			65
Erynigium petiolatum	Rush leaf coyote thistle	native	0.16																T	5			T										
Galium parisiense	Wall bedstraw	introduced	0.00														T																
Ghaphalium palustre	Lowland cudweed	native	1.13				10		10							15		T																
Grindelia integrifolia	Willamette Valley gumwe	native	0.52		T	5	2	T	T		T						2	T	T	5		T	2										
Juncus bufonius	Toad rush	native	7.97				T			10	T	T				T		35	30	10				50	24	25			10	19	2	25	7	
Lactuca serriola	Prickly lettuce	introduced	0.00																						T								
Lotus purshianus	Spanish clover	native	5.16					T					T	25																60	25	50	
Lythrum hyssopifolia	Hyssop loosesstrife	introduced	0.48	5		T														5	5		T										
Lythrum portula	Water-purslane	introduced	0.81	10	5	T	T									5				T	5		T										
Madia saliva	Coast tarweed	native	0.32										T													10							
Medicago lupulina	Black medic	introduced	0.00															T															
Mimulus guttatus	Common monkey flower	native	0.16													5																	
Navarretia intertexta	Needle-leafed navarretia	native	0.00															T														T	
Perideridia gairdneri	Gairdner's yampah	native	0.00														T	T						T	T	T				T			
Plagiobothrys figuratus	Fragrant popcorn flower	native	8.55	35	T	15	60	T	15	3	20	10		5		T	5	35	30		10	T	10	5	T	T			5	2		T		
Plagiobothrys scouleri	Scouler's popcorn flower	native															T																
Polygonum persicaria	Lady's thumb	introduced	0.00				T																											
Potentilla gracilis	Northwest cirquefoil	native	0.45														1	T	3					T	2	5			2	1				
Prunella vulgaris	Self-heal	native	1.06					T					18	T																	10		5	
Ranunculus occidentalis	Western buttercup	native	0.00																						T	T								
Rorippa curvisiliqua	Western yellowcress	native	0.32	5			T	T	5	T		T				T				T		T												
Sonchus asper	Prickly sow-thistle	introduced	0.00														T																	
Sisyrinchium auguslifolium	Pointed blue-eyed grass	native	0.00																T						T	T				T				
Veronica peregrina	Purslane speedwell	native	0.00						T																									
Vicia tetrasperma	Slender vetch	introduced	0.00											T					T															
Grass Species																																		
Agrostis exarata	Spike bentgrass	native	0.13					T					T		T			T		T		T		T	1		2		T		1		T	T
Alopecurus aequalis	Short-awned foxtail	native	0.00	T																														
Beckmania syzigachne	American sloughgrass	native	15.68	5	T	50	5	55	25	20	40			T		30	55	10	5	50	10	25	50	5	5	5		T	20	5	T	8	3	T
Danthonia californica	California oatgrass	native	0.00					T																										T
Deschampsia cespitosa	Tufted hairgrass	native	0.03																			T			1					T		T	T
Deschampsia elongata	Slender hairgrass	native	7.58							5			60	50		T						T		T	10				50	T	15	35	10	T
Hordeum brachyantherum	Meadow barley	native	6.19					T		5			15	15	25	15		T	T			10			2		30	30	3		5	2	10	25
Poa trivialis	Rough bluegrass	introduced	0.00											T																				
Bareground recent inundation			4.52	10	50				10			70																						
Relative % non-native invasive canopy cover:		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:		1.3		15	5	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	10	0	0	0	0	0	0	0	0	1	0	0	0	0
% of Total Vegetation that is Native =		98.7		85.0	95.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	95.0	100.0	100.0	100.0	95.0	90.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.0	100.0	100.0	100.0	100.0
% of Ground Cover that is Native Vegetation=		94.2		75.0	45.0	100.0	100.0	100.0	90.0	100.0	100.0	30.0	100.0	100.0	100.0	95.0	100.0	100.0	100.0	95.0	90.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.0	100.0	100.0	100.0	100.0
Sample plot average moisture index		1.73		1.81	1.00	1.35	1.84	1.00	1.53	1.56	1.26	1.83	2.39	2.00	2.00	1.75	1.16	2.00	1.98	1.17	1.21	1.50	1.20	1.55	1.93	2.22	2.00	2.00	1.80	1.90	2.61	1.89	2.18	2.00
Total # of native Species: 39																																		
Total number of Species Sampled: **49** Total Number of Sample Plots: **31**																																		

*Non-native invasive species to be included: any plant species that appears on the current Oregon Department of Agriculture Noxious Weed list, plus known problem species including Phalaris arundinacea, Mentha pulegium, Holcus lanatus, Anthoxanthum odoratum, and the last crop plant if it is non-native. Beginning in year 2 of monitoring, DSL may consider a non-native species invasive if is comprises more than 15% cover in 10% or more of the sample plots in any habitat class, and increases in cover or frequency from the previous monitoring period. Plants that meet this definition should be considered invasive for all successive years of monitoring.

Attachment 4

MONITORING PHOTOS

PHOTO POINT #1 Facing East (June 2012)

PHOTO POINT #2 Facing East (June 2012)

PHOTO POINT #3 Facing East (June 2012)

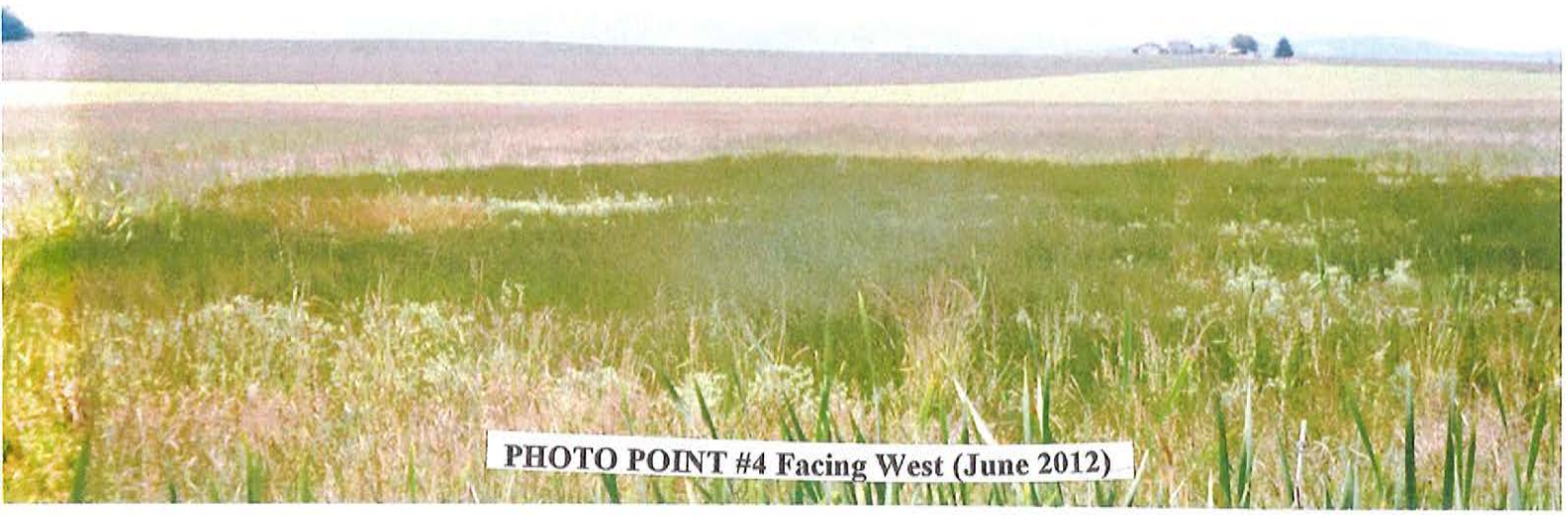


PHOTO POINT #4 Facing West (June 2012)

PHOTO POINT #5 Facing West (June 2012)

PHOTO POINT #6 Facing South (June 2012)

PHOTO POINT #1 Facing North (June, 2012)

PHOTO POINT #2 Facing East (June, 2012)

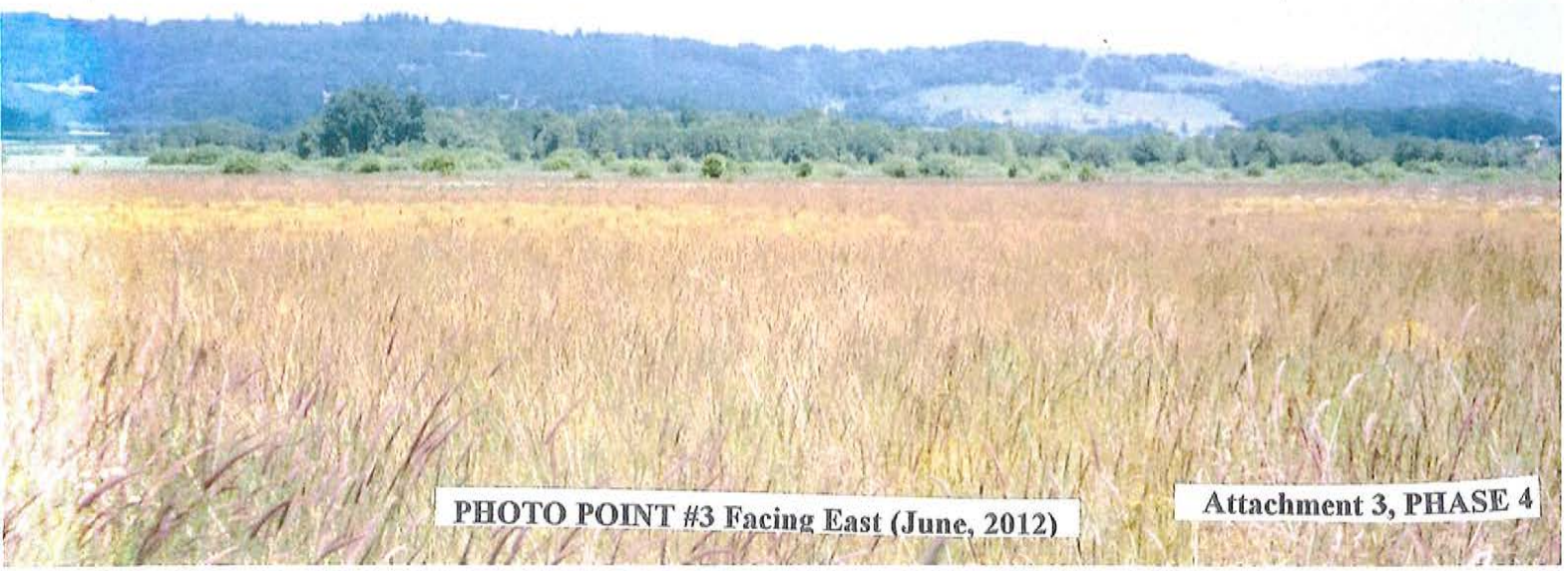


PHOTO POINT #3 Facing East (June, 2012)

Attachment 3, PHASE 4

PHOTO POINT #4 Facing West (June, 2012)

PHOTO POINT #5 Facing West (June, 2012)

PHOTO POINT #6 Facing West (June, 2012)