2011 Monitoring Report: Muddy Creek Wetland Mitigation Bank, Monroe, Oregon.

I. Project Overview:

(1) ACOE permit # 2005-714
(2) Cascade Geodata 5/7 through 5/31, 2011.
(3) Muddy Creek Wetland Mitigation Bank is 108 acres that will generate 60.33 mitigation credits when fully restored. 101 acres are projected to become wet prairie and palustrine emergent habitats. 7 acres are riparian forest-shrub habitat.
(4) The bank in located west of hwy 99 between McFarland and Dawson Roads, 3 miles north of Monroe, in Benton County. Legal description for Bank location is T14 R5W Section 9, tax lot 300.
(5) Bank was authorized by DSL to sell credits August 17, 2007. The 4th credit release of 11.34 credits was granted on April 29, 2011 for a credit release applied for in 2010. There was no credit release requested in 2011.
(6) This is year 4 monitoring report.
(7) Vegetation monitoring is reported by habitat for phases 1 and 2 through a series of data tables (Section III). Summaries of results are reported for each phase by habitat. Vegetation compliance with Bank instrument performance standards are reported in Section II, Tables II b & II c.
Hydrologic monitoring and compliance with performance standard is reported in Section II, Table II a.
(8) This is the fourth monitoring report submission. There are no additional, or corrective activities to report.
(9) There have been no corrective or remedial actions associated with the Bank.

II. Monitoring Protocol and Compliance with Bank Instrument Performance Standards:

Bank Hydrologic Monitoring:
Hydrology monitoring data is collected to validate compliance with 1987 manual soil saturation standard. 26 monitoring wells were established throughout the Bank. 20 of the 26 wells are located in areas originally delineated as uplands, and later referred to as creation ground in the 2006 wetland delineation. Saturation/soil water depth was measured 10 times on 3-4 day time intervals from March 18 through April 13, 2011.

Vegetation Monitoring:
For wetgrass prairie and emergent wetlands, transects established approximately 250' apart along the baseline. A total of 12 transect lines were established in these two habitats. The location of the first sample plot along the transect line was randomly placed, and then the remaining sample positions follow at roughly 115 foot intervals.

For planted forested wetlands, six 150x50 feet rectangular plots describe tree and shrub information. Within each plot herbaceous vegetation was recorded from a randomly located 1m2 quadrat.

For enhanced forested wetlands, four randomly located 50-feet circular plots record tree and shrub information. Within each plot herbaceous vegetation was recorded from a randomly located 1m2 quadrat.

Detailed vegetation monitoring information is provided in Section III, Tables a-e.

Hydrology Compliance with Bank Instrument Performance Standards:
Well log data summary, at the bottom of Table II-a, shows all Phase 1 wells meeting hydrologic saturation standards.

Well log data shows Phase 2 monitoring wells meeting hydrologic/saturation standards.

During the IRT annual review there was some concern that the creation ground in the northeast corner of Phase 2 (the area of well #17, which had not met compliance in previous years monitoring) was not as "wet" in appearance as other Phase 2 creation ground. To substantiate hydrologic compliance 4 additional wells were established for future monitoring.

The 6 wells where no data was recorded are located on creation ground in the south block of phase 2 where no restoration efforts, (other than herbicide spraying) have occurred.

Vegetation Compliance with Bank Instrument Performance Standards:
Phase 1 enhanced wetland and emergent wetland habitats are meeting all bank instrument performance standards (detailed results are shown in Table II b). Wetgrass prairie is meeting all standards except the 5 native species with 5% cover. 3 species (listed at the bottom of Table II b) exceed 5% cover and 1 exceeds 4% so the habitat is not far off from meeting the standard. Additional seeding with a mix of Lupinus bicolor, Bechmannia syzgachne, and Hordeum brachyantherum was no-till seed drilled into the wetgrass prairie habitat in the fall of 2011. The planted forest habitat is meeting all standards except it is not maintaining the 200 stems per acre density. This is largely the result of herbivory, discussed in the Management Activities. To meet the standard continued planting and management to discourage herbivory will continue.

Phase 2 emergent wetland habitat is meeting all final bank instrument standards. Wetgrass prairie is meeting all years 1 & 2 instrument standards except the 25% cover of tufted hair grass. Failure to meet the tufted hair grass cover standard was the same for wetgrass prairie habitat in phase 1 in the first year monitoring report after planting. My expectation is that tufted hair grass cover will increase in the coming years. If not, supplemental seeding will occur.

III. ***Summary Vegetation Monitoring data:***

a. Vegetation monitoring data table for emergent wetland- phase I
b. Vegetation monitoring data table for wetgrass prairie- phase I
c. Vegetation monitoring data table for planted forest-phase I
d. Vegetation monitoring data table for enhanced forest-phase I
e. Vegetation monitoring data table for emergent wetland-phase II
f. Vegetation monitoring data table for wetgrass prairie-phase II

IV. ***Maps and plans: included with document***

Figure IV a. Map of excavated pools constructed on the north block of Phase 2 during the summer of 2011.

V. ***Conclusions:***

Credit Sales:

Two credit sales were transacted in 2011, totaling 0.31 credits. Specifics of credit sales are detailed in Table V. a.

Management activities: Phase I

Enhanced forested wetland habitat: Selective spot spraying for invasive species (nightshade and reed canary grass) as well as, other non-native vegetation. Supplemental slough sedge plugs planted in areas where prior planting establishment is poor. English hawthorn stump sprouts continue to emerge and are either sprayed or dug out if possible.

Planted forested wetland habitat: Grow tubes were placed on tree and shrub species to reduce vole and mice girdling. This habitat continues experience significant mortality from herbivores, primarily grazing by elk and girdling by voles and mice. Selective spraying for non-native grasses and herbaceous species continues. Habitat is mowed several times during growing season to discourage vole and mice activity.

Emergent wetland habitat: Continued selective spraying for non-native grasses and forbs, reed canary grass, pennyroyal and thistles are the targeted invasives. Selective spraying for this habitat is concentrated in the fall months when ground is dry.

Wetgrass prairie habitat:

Rattail fescue is on the increase on the drier margins of this habitat. We are continuing to spray Diuron herbicide to control its spread. Spot spraying of invasives (primarily thistle) and non-native vegetation continues.

Management activities: Phase II

Emergent wetland habitat:

Selective spraying for invasives (some reed canary grass and pennyroyal) continues. There is a well-established native grass base in this habitat, which keeps most non-native vegetation out. On the negative side, this dense grass base keeps native herbaceous seed from establishing as well.

Wetgrass Prairie:

Completion of grading for the excavated pools on the north block (location is shown on Figure IV a). This ground was seeded to a mix of water foxtail, American slough grass, tufted hair grass, Downingia, and popcorn flower at the rate of 4 lbs per acre. Spot spraying of the habitat for the ground planted in 2010 performed in the spring and summer. Wetgrass prairie habitat in

the south block of Phase 2 was broadcast sprayed with glyphosate herbicide in the spring and fall of 2011 for weed maintenance.

TABLE II a.

Muddy Creek Mitigation Bank Hydrology Wells Monitoring Data

0.0 = water at/or above ground level

	phs-1	phs-1	phs-1	phs-1	phs-1	phs-1	phs-1	phs-1	phs-1	phs-1	phs-1	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2
well #	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**26**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
2008																										
1/23/2008	9.0	23.5	10.0	0.0	16.5	7.0	0.0	0.0	0.0	5.5	21.0	14.5	17.0	12.5	dry	16.0	4.0	22.5	13.0	15.0	18.0	22.5	19.5	2.0	dry	dry
3/5/2008	14.0	28.0	12.5	0.0	19.0	12.5	0.0	5.0	0.0	14.0	22.5	10.5	19.0	18.0	20.0	16.5	5.5	dry	dry	dry	19.0	dry	dry	1.5	dry	dry
3/25/2008	11.5	20.5	9.0	0.0	13.5	9.0	0.0	0.0	0.0	10.0	24.0	9.5	13.5	14.0	21.5	12.5	4.5	20.0	12.5	14.0	dry	dry	dry	0.0	dry	dry
3/27/2008	7.0	15.5	0.0	0.0	14.5	4.0	0.0	0.0	0.0	7.5	6.5	6.0	9.0	7.5	14.0	9.0	1.5	14.5	8.5	9.5	17.0	16.5	12.5	0.0	17.5	dry
4/1/2008	9.5	20.0	6.5	0.0	18.0	9.0	0.0	3.0	0.0	9.0	10.0	9.0	12.0	11.5	dry	11.5	3.0	19.5	11.5	13.0	dry	21.5	15.5	3.0	dry	dry
4/3/2008	13.5	23.5	10.5	0.0	16.0	9.0	0.0	3.5	0.0	10.0	13.0	10.0	14.0	13.5	dry	15.5	6.5	dry	15.5	dry	dry	dry	dry	4.0	dry	dry
4/7/2008	10.0	27.5	10.0	0.0	17.5	13.0	0.0	5.0	0.0	12.0	17.5	8.5	18.0	16.0	dry	15.5	5.5	dry	dry	dry	dry	dry	dry	4.0	dry	dry
4/9/2008.	11.5	27.5	6.0	0.0	16.5	13.0	0.0	4.0	0.0	12.0	17.0	8.0	18.5	17.0	dry	14.5	3.5	dry	dry	dry	dry	dry	dry	3.0	dry	dry
4/24/2008	11.5	26.5	8.0	0.0	21.5	10.5	0.0	6.5	0.0	13.0	20.0	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr	nr
meets criteria	yes	no	yes	yes	no	no	yes	yes	yes	yes	no															
2009																										
3/9/2009	7.0	8.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	2.0	13.5	17.0	14.0	dry	14.0	0.0	dry	17.5	15.0	dry	17.0	dry	2.0	dry	dry
3/13/2009	7.5	8.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	2.5	13.5	17.0	16.5	dry	14.0	0.0	dry	17.0	17.5	dry	19.5	dry	2.0	dry	dry
3/16/2009	8.0	9.5	3.5	0.0	1.0	2.5	0.0	0.0	0.0	5.0	2.5	14.5	18.5	18.5	dry	16.5	0.0	dry	18.5	17.0	dry	23.0	dry	2.0	dry	dry
3/20/2009	8.0	9.0	3.5	0.0	1.5	3.0	0.0	0.0	0.0	6.5	3.0	17.5	16.0	19.5	dry	16.0	0.0	22.5	18.5	18.5	dry	23.0	15.8	2.5	dry	dry
3/23/2009	7.0	10.0	4.5	0.0	2.5	4.0	0.0	0.0	0.0	7.0	4.0	17.5	16.5	19.0	dry	15.5	0.0	20.0	16.0	20.0	dry	dry	18.7	3.0	dry	dry
3/27/2009	6.5	7.5	2.0	0.0	3.5	2.5	0.0	0.0	0.0	8.5	1.5	11.5	16.5	20.5	dry	15.5	0.0	21.5	19.0	20.5	dry	dry	20.5	3.5	dry	dry
3/30/2009	6.5	7.5	3.0	0.0	1.0	2.0	0.0	0.0	0.0	9.0	1.5	10.0	17.5	22.5	dry	14.0	0.0	dry	dry	dry	dry	dry	22.0	4.0	dry	dry
4/3/2009	5.5	8.0	3.5	0.0	1.5	2.0	0.0	0.0	0.0	6.5	2.0	11.0	19.0	dry	dry	14.0	0.0	dry	dry	dry	dry	dry	22.5	3.5	dry	dry
4/9/2009	6.0	8.5	3.5	0.0	2.0	2.5	0.0	0.0	0.0	6.5	2.0	11.5	21.0	dry	dry	15.0	0.0	dry	dry	dry	dry	dry	21.5	3.5	dry	dry
meets criteria	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	no	no	no	yes	no	no	no	no	no	no	yes	no	no
2010																										
3/15/2010	7.0	9.5	0.0	0.0	2.0	4.5	0.0	0.0	0.0	4.0	6.5	1.0	8.0	6.0	8.0	6.0	0.0	12.5	8.5	12.0	16.0	20.0	15.0	0.5	21.0	20.0
3/16/2010	7.5	9.0	0.0	0.0	2.0	5.5	0.0	0.0	0.0	4.5	7.5	1.0	9.0	6.0	8.0	7.5	0.0	14.5	8.5	13.0	16.0	20.0	16.0	0.0	20.0	20.0
3/17/2010	8.0	11.0	0.0	0.0	3.0	6.5	0.0	0.0	0.0	5.0	7.0	1.0	10.0	6.0	9.0	9.0	0.0	15.0	9.5	14.0	18.0	20.0	18.0	0.0	20.0	20.0
3/18/2010	8.0	11.0	0.0	0.0	6.0	6.0	3.0	4.0	0.0	5.0	8.0	3.0	12.0	6.0	9.0	10.0	0.0	15.0	10.0	17.0	22.0	18.0	21.0	2.0	21.0	22.0
3/19/2010	8.0	12.5	0.0	0.0	6.0	6.0	6.0	7.0	0.0	5.0	8.5	3.0	13.0	6.0	10.0	10.0	0.0	15.0	10.0	16.0	22.0	20.0	21.0	0.0	21.0	22.0
4/1/2010	5.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	4.0	0.0	6.0	0.0	6.0	6.0	0.0	6.0	5.0	5.0	10.0	12.0	7.0	0.0	16.0	18.0
4/9/2010	5.5	6.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	1.0	7.0	0.0	6.0	0.0	5.0	5.0	0.0	10.0	6.0	6.0	13.0	16.0	10.0	0.0	21.0	20.0
4/16/2010	5.0	10.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	5.0	11.0	1.0	8.0	4.0	7.5	9.0	0.0	15.0	9.0	13.0	18.0	18.0	16.0	0.0	19.0	18.0
4/28/2010	1.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	1.0	0.0	2.0	1.5	0.0	8.0	3.5	12.0	11.0	11.0	14.0	0.0	13.0	19.0
meets criteria	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	no	no	no	no	yes	no	no

	phs-1	phs-1	phs-1	phs-1	phs-1	phs-1	phs-1	phs-1	phs-1	phs-1	phs-1	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2	phs-2
well #	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**26**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
2011																										
3/18/2011	4.5	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	2.5	0.0	6.0	2.0	6.5	0.0	0.0	8.5	4.5	nr	nr	nr	nr	0.0	nr	nr
3/21/2011	4.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	3.0	0.0	6.0	2.0	6.5	0.0	0.0	9.0	4.5	nr	nr	nr	nr	0.0	nr	nr
3/22/2011	4.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.5	3.0	0.0	6.5	2.0	7.0	0.0	0.0	9.0	5.5	nr	nr	nr	nr	0.0	nr	nr
3/23/2011	4.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	3.0	0.0	7.0	2.0	8.5	0.0	0.0	10.5	7.0	nr	nr	nr	nr	0.0	nr	nr
3/27/2011	5.0	5.5	0.0	0.0	2.0	1.5	2.0	0.0	0.0	4.0	4.5	0.0	4.0	3.0	5.5	2.0	0.0	8.5	6.0	nr	nr	nr	nr	0.0	nr	nr
3/28/2011	5.5	6.0	0.0	0.0	2.5	1.5	2.0	0.0	0.0	5.0	5.0	0.0	3.5	3.5	5.5	2.0	0.0	8.0	6.0	nr	nr	nr	nr	0.0	nr	nr
3/31/2011	5.5	6.5	0.0	0.0	2.5	1.0	2.0	0.0	0.0	4.5	6.5	0.0	3.5	4.0	4.0	2.5	0.0	8.0	7.0	nr	nr	nr	nr	0.0	nr	nr
4/6/2011	3.0	7.5	0.0	0.0	0.0	3.0	3.5	0.0	0.0	6.0	3.5	0.0	5.5	2.5	3.5	1.0	0.0	7.5	8.0	nr	nr	nr	nr	0.0	nr	nr
4/7/2011	3.5	8.0	0.0	0.0	0.0	3.0	3.5	0.0	0.0	7.0	4.0	0.0	5.5	2.5	4.0	1.0	0.0	7.0	7.5	nr	nr	nr	nr	0.0	nr	nr
4/13/2011	4.0	4.5	0.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	1.5	0.0	1.5	4.0	5.0	1.0	0.0	7.5	8.0	nr	nr	nr	nr	0.0	nr	nr
meets criteria	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes					yes		

TABLE II b

ırds Assessment:		
ɟuired to meet final bank instrument standards.		
meet years 1&2 standards	Habitat Score	Met Standard?
:andards--years 1&2 standards		
ıt cover is comprised of native species.	56%	yes
5% relative plant cover.	7.33%	no
! grass, 1 herb.) with **5%** relative plant cover each.*	2 grass, 1 herb spp. > 5%	yes--yes
e plant cover comprised of non-native invasive species**.	1.53%	yes
n moisture index is between **2 and 3.**	2.73%	yes
plant cover by trees or shrubs.	0%	yes
rairie cohort species	not applicable	
Standards		
ve plant cover is comprised of native species.	91%	yes
:r of native grass or grass-like species.	85%	yes
rbaceous species.	12 native herb spp.	yes
ınt cover is comprised of non-native invasive species*	0.43%	yes
is less than **3.0.**	1.67	yes
ir grass (Deschampsia elegans), Epilobeum ciliatum > 5%		
f invasive species		

TABLE II C

Phase 1 Vegetation Standards Assessment:		
All habitats required to meet bank instrument final standards	Habitat Score	Met Standard?
Wetgrass prairie Habitat Standards		
At least **60%** relative plant cover is comprised of native species.	86%	yes
Tufted hair grass at least **25%** relative plant cover.	31.66%	yes
At least **5** native species with **5%** relative plant cover each*.	3 species > 5%, 1>4%	no
No more than **15%** relative plant cover comprised of non-native invasive species**.	1.20%	yes
Wetgrass prairie vegetation moisture index is between **2 and 3.**	2.17%	yes
No more than **5%** relative plant cover by trees or shrubs.	0%	yes
At least **10** wet prairie cohort species	20 cohort species	yes
Emergent Wetland Habitat Standards		
A minimum of **55%** relative plant cover is comprised of native species.	82.29	yes
At least **25%** relative cover of native grass or grass-like species.	48.67	yes
A minimum of **5** native herbaceous species.	23 nat. herb. Species	yes
Less than **15%** relative plant cover is comprised of non-native invasive species**	3.24%	yes
Vegetation moisture index is less than **3.0.**	2.23	yes
Planted Wetland Forest Habitat Standards		
A minimum of **2** native tree species maintained to a density of **200** stems per acre.	8 spp. Nat. trees-136 s/a	yes--no
A minimum of **55%** relative plant cover is comprised of native species.	76.33%	yes
A minimum of **3** native shrub species maintained to a density of **240** stems per acre.	8 spp. nat.shrubs-265 s/a	yes--yes
Less than **15%** relative plant cover is comprised of non-native invasive species.**	3.16%	yes
Vegetation moisture index is less than **3.0**	2.77	yes
Enhanced Wetland Forest Habitat Standards		
A minimum of **2** native shrub species maintained to density of **240** stems per acre.	3 species--385 s/a	yes--yes
A minimum of **20%** relative plant cover slough sedge (*Carex obnupta*).	28.75%	yes
Less than **30%** relative plant cover of non-native invasive species**.	15.25	yes
Minimum of **55%** relative plant cover is comprised of native species.	98%	yes
*Alopecurus geniculatus, Deschampsia caespitosa, D. elegans > 5%		
** references MBRT list of invasive species		

TABLE III a.

2011 Monitoring plot data: **Emergent wetland habitat--Phase I**

Phase 1 emergent wetland vegetation, planted in fall of 2007

		moisture	Plot #																													
Trees/shrubs	Origin	index	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
Fraxinus latifolia	native	2							1																							
Herbaceous plants																																
Alisma plantago-aquatica	native	1	50	35	25	5	65	40					20	75	20	85				1					1			5		16	3	1
Alisma gramineum	native	1			1			3						1														1			1	
Bidens cernua	native	2																									3				1	1
Boisduvalia densiflora	native	2.5					15	5																								
Boisduvalia stricta	native	2									2	1				1																
Castilleja tenuis	native	4															1															
Cerastrium glomeratum	non-native	4									1						1															
Cirsium arvense	invasive	4																	1													
Daucus carota	invasive	4															2		5													
Downingia elegens	native	1			3		1	3															1									
Epilobium ciliatum	native	2.5	2	5					1		1	1				1							1									
Geranium molle	non-native	3.5		1																												
Gnaphalium uliginosum	native	2						1				5			5						1	10		25	15	5	30		3			55
Hypochaeris radicata	non-native	4																20	2													
Lotus pinnatus	native	2	3					5	3		5							50	25								3	1				1
Lupinus bicolor	native	3.5																	1													
Lythrum portula	invasive	1	3				1						15		5	1					30			3		18	1	2			10	
Matricaria discoidea	non-native	4									1								2													
Medicago lupa-lina	non-native	3										10																				
Mentha pulegium	invasive	1									3																					
Myosotis laxa	native	2						1	1			3															3					
Navarettia intertexta	native	2									1								20		1			5								
Parentucellia viscosa	non-native	3		1					4								1		30				2	5								
Plagiobothrys figuratus	native	2																					1									
Plagiobothrys scouleri	native	2									1																					
Polygonum amphibium	native	1		10	15		10				15		20			1									1	5	20	10			30	
Polygonum persicaria	native	2			1							5												15	1	5	5					
Potamogeton epihydrus	native	1												3		5																
Ranunculus uncinatus	native	2																					1									
Rorippa curvisiliqua	native	1									5											1	2		10		5				1	
Rumex crispus	non-native	2.5			1		3				3																					

Sparganium emersum	native	1																			55										
Sonchus asper	non-native	3.5					5													1											
Trifolium repens	non-native	3														1															
Typha latifolia	native	1																												1	
Veronica peregrina	native	1																		1											
Grasses-Grass-like																															
Agrostis capillaris	non-native	3							1											1		1									
Alopecurus aequalis	native	1	1					5							15					30	10		20	15		10	30	10		5	15
Alopecurus geniculatus	native	1	1							90	20	10										30									
Beckmannia syzigachne	native	1						1															15								
Briza minor	non-native	3							1									2													
Bromus carinatus	native	nol															1														
Carex obnupta	native	1																	1												
Deschampsia caespitosa	native	2							70									1				10									
Deschampsia elongata	native	2.5							5							70	19	10		25		28	5								
Echinochloa crus-galli	non-native	2													40	1				5			2	16	3		33		25	27	
Eleocharis acicularis	native	1					1																							1	5
Eleocharis palustris	native	1	35	45	25	95		20		10	40	65	20			5			98					40	60		18	80	55	20	
Glyceria occidentalis	native	1	1		15																										
Hordeum brachyantherum	native	2.5							5									1				25									
Juncus bufonius	natve	2																			20										
Lolium multiflorum	invasive	4																													
Panicum capillare	native	3.5																						1							
Poa annua	non-native	3																													
Vulpia myrunos	non-native	3															10	1													
PERFORMANCE SUMMARY																															
% relative cover native species			98	95	85	100	91	84	86	96	95	91	60	79	45	98	70	70	58	100	58	96	96	85	84	75	79	65	93	71	63	78
MBI standard: minimum of 55% native cover			yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
% relative cover, native grass or grass-like species			38	45	40	95	1	26	80	100	60	75	20	0	15	5	99	20	13	98	55	30	94	40	56	60	10	48	90	55	26	20
MBI standard: at least 25% cover			yes	yes	yes	yes	no	yes	yes	yes	yes	yes	no	no	no	no	yes	no	no	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	no
% cover IRT-listed invasive species			3	0	0	0	1	0	0	0	3	0	15	0	5	1	3	0	6	0	30	2	0	3	0	18	1	2	0	0	10	0
MBI standard: 15% or less, invasive plant cover			yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	no	yes	yes	yes	yes	yes	yes
Moisture index			1.38	2.00	1.31	1.00	1.68	1.45	2.35	1.00	1.92	1.93	1.00	1.00	1.40	1.43	3.25	2.87	3.36	1.00	2.00	1.40	2.04	1.83	1.61	1.50	1.55	1.25	1.33	1.33	1.18	1.50
MBI standard: less than 3.0			yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
% cover bare ground and/or water			2	7	14	1	0	16	8	4	5	5	25	21	15	1	0	0	0	0	5	4	1	5	0	4	20	0	7	4	0	22

							row
31	32	33	34	35	36	37	average
							0.05
35			2	35	67		15.83
							0.19
							0.13
							0.54
							0.11
							0.03
	1						0.08
							0.03
							0.19
							0.22
	1	30				2	1.22
							0.03
	2						4.24
							0.59
							2.59
							0.03
21	2	10	2	5	2		3.46
							0.08
							0.27
						5	0.22
		1					0.24
							0.73
						1	1.18
							0.03
							0.03
20		2					4.56
20							1.4
							0.22
							0.03
		1					0.67
							0.19

							1.48
							0.16
							0.03
							0.03
							0.03
	30					10	1.17
3							4.83
	58	52	95	22			10.21
					1		0.46
							0.08
	3						0.11
							0.03
						75	4.48
							4.64
				3			4.19
							0.19
			1	35	30		21.54
							0.43
	1					2	0.92
1		3				2	0.7
						2	0.05
	1						0.05
	1						0.03
							0.29
75	66	89	98	92	98	83	82.29
yes	yes	yes	yes	yes	yes	yes	yes
4	63	55	96	57	31	81	48.67
no	yes	yes	yes	yes	yes	yes	yes
10	2	0	2	1	1	1	3.24
yes	yes	yes	yes	no	no	no	yes
1.33	2.55	1.50	1.00	1.20	2.2	2.25	2.23
yes	yes	yes	yes	yes	yes	yes	yes
0	0	0	0	0	0	0	5.29

TABLE III b.

2011 Monitoring plot data: **Wetgrass prairie --Phase I**																		
Phase 1 wetgrass prairie, planted in fall of 2009 inventoried: 5/23/2011--2nd full season of growth																		Row
Herbaceous plants	Origin	index	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Average
Alisima gramineum	native	1				1		2										0.20
Bidens cernua	native	2	5															0.33
Castilleja tenuis	non-native	4.5									2							0.13
Cerastium glomeratum	non-native	5	2				3				2		1					0.53
Daucus carota	invasive	4		2	1													0.20
Downingia elegens	native	1			1													0.06
Geranium molle	non-native	4					1				1							0.13
Gnaphalium uliginosum	native	2.5	20						2									1.46
Lactuca serriola	non-native	4									2						1	0.20
Lotus pinnatus	native	2					1					20	40					4.06
Lupinus bicolor	native	3.5									9							0.60
Lythrum portula	invasive	1	10							2	1							0.86
Matricaria discoidea	non-native	4	15															1.00
Mentha puligeum	invasive	2						3										0.20
Myosotis laxa	native	1											1			1		0.13
Navarettia intertexta	non-native	2	2															0.13
Parentucellia viscosa	non-native	3		1			3				20					2		1.73
Plagiobothrys figuratus	native	2	5				2		3			1	2				1	0.93
Plagiobothrys scouleri	native	2	1															0.06
Rorippa curvisiliqua	native	1	3												2			0.33
Rumex crispus	non-native	2									1				1			0.13
Sonchus asper	non-native	3.5		1									1					0.13
Trifolium repens	non-native	3.5		3										3	2			0.53
Veronica peregrina	native	1					2									1		0.20
Grasses-Grass-like																		
Agrostis stolonifera	non-native	3					2									3	4	0.60
Alopecurus geniculatus	native	1	5	10	70	95		15		95	5			75	5		35	27.33
Bechmannia syzignache	native	1						3										0.20
Carex unilateralis	native	2						2										0.13
Deschampsia caespitosa	native	2		55			50		65		35	45	30		65	70	35	31.66
Deschampsia elongata	native	2.5		10	25		30		5		30	25	15	10	15	20	4	12.60
Eleocharis palustris	native	1				2		45										3.13
Hordeum brachyantherum	native	2.5							5		1	1		2	2	3	15	1.93
Juncus bufonius	native	2	25							3			3	3			1	2.33

Juncus nevadensis	native	2															3	0.20
Poa annua	non-native	3		10								5						1.00
PERFORMANCE SUMMARY																		
% relative cover native species			64	75	96	98	85	67	70	98	80	92	91	90	96	95	95	**86.13**
MBI standard: at least 50% cover- years 1&2			yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
tufted hair grass relative plant cover			0	55	25	0	50	0	65	0	35	45	30	0	65	70	35	**31.66**
MBI standard: at least 25% cover			no	yes	yes	no	yes	no	yes	no	yes	yes	yes	no	yes	yes	yes	yes
% cover native grass or grass-like species			30	75	95	97	80	65	65	100	71	71	48	90	94	93	94	**77.86**
MBI standard: 25% cover or greater			yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
% cover non-native species			19	15	0	0	9	0	0	0	28	5	1	3	3	5	5	**6.20**
% cover IRT-listed invasive species			10	2	1	0	0	3	0	2	0	0	0	0	0	0	0	**1.20**
MBI standard: 15% or less, invasive plant cover			yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
% cover bare ground and/or water			7	8	3	2	6	30	30	0	1	3	2	5	1	0	0	**6.53**
Moisture index			2.22	2.81	2.37	1.00	2.72	1.33	2.30	1.33	3.00	2.33	2.50	2.30	2.07	2.14	2.11	**2.17**
MBI standard: between 2.0 and 3.0			yes	yes	yes	no	yes	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes
% cover by trees and shrubs			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0.00**
MBI standard: less than 5% cover			yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

TABLE III C.

ed forest habitat.

(MP) are 125 by 75 feet.

			MP-1	MP-2	MP-3	MP-4	MP-5	MP-6
Status	Origin	Index						
FAC	native	3	5	6	3	4	5	3
FACW	native	2	8	5	3	11	13	7
FACU-	native	4.5	3	4	3			3
FAC	native	3	6	4	5	5	2	
FACU	native	4	5	4	4	3	3	3
FAC+	native	2.5	6	6	3	4	4	3
NOL	native	3	5	5		2	2	8
FAC	native	3	2	1		2		
			40	35	20	31	29	27
FACW	native	2	5	18		3	3	23
FACU	native	4	7	22	10	2		4
FACW-	native	2.5	4	5	5		1	
FAC	native	3	17	10	4	24	23	28
FACU	native	4				1		
FAC	native	3	1					
FACW	native	2	13	1	8	15	10	
FACU	native	4	7	26	20	3	3	1
			54	82	47	56	40	56
			94	117	67	87	69	83
Status	Origin	Index						
FAC	non-native	3		1	1		1	
FACU	non-native	5			1		1	1
FACW	native	2	1				1	
NOL	non-native	4	1				1	5
OBL	invasive	1	1		1	1		
OBL	native	1	1		1			
FACW	non-native	2.5	5	1				1
FAC-	non-native	3		1				1

Grasses- % Cover											
Agrostis stolonifera	FAC	non-native	3		10	15	10	5	5	10	
Alopecurus geniculatus	OBL	native	1			10				1	
Alopecurus pratensis	FACW	non-native	2				1				
Deschampsia caespitosa	FACW	native	2		20	30	55		45	35	
Deschampsia elongata	FACW-	native	2				5	85	1		
Hordeum brachyantherum	FACW	native	2		45	25	25	5	35	35	
Lolium multiflorum	FAC	invasive	3		5	7	1		2	3	
Poa annua	FAC	non-native	3		3	10		4	9	8	
PERFORMANCE SUMMARY											***Habitat Averages***
% cover native:					66%	65%	86%	90%	81%	71%	**76.33%**
meets MOA performance standard-- min. 55% cover natives					yes	yes	yes	yes	yes	yes	yes
% cover non-native herbaceous					29%	28%	13%	9%	17%	26%	**16.33%**
% cover IRT listed invasive species					5%	7%	1%	1%	2%	3%	**3.16%**
meets MOA performance standard-- less than 15% cover					yes	yes	yes	yes	yes	yes	yes
# native trees--stems per acre -- Trees					8--180	8--157	6--90	7--139	6--130	6--121	**7.1--136**
meets MOA performance standard: 2 species--80 stems/acre					yes--yes	yes--yes	yes--yes	yes--yes	yes--yes	yes--yes	yes--yes
stems per acre-- Shrubs					7--243	6--369	5--211	6--336	5--180	4--252	**5.5--265**
meets MOA performance standard:3 species-- 240 stems/acre					yes--yes	yes--yes	yes--no	yes--yes	yes--no	yes--yes	yes--yes
moisture index					1.97	2.82	2.78	2.81	3.40	2.87	**2.77**
meets MOA performance standard: less than 3.0					yes	yes	yes	yes	no	yes	yes

TABLE III d.

2011 monitoring data: **Enhanced Forest wetland habitat**.							
Data recorded in 10m circurlar plots. 27 is the m		moisture					
Tree-Shrub % cover--stem count	Origin	index	ef-1	ef-2	ef-3	ef-4	Row Average
Amelanchier alnifolia	native	4			1--2	15--2	4.00%--1
Cornus sericea	native	2	1--1	2--2	10--6	2--2	3.75%--2.75
Fraxinus latifolia	native	2	90--7	85--11	95--9	70--6	85%--8.75
Pyrus fusca	native	2		35--7			9%--1.75
Rosa pisiocarpa	native	3	1--1	7--3	1--3	30--20	9.75%--6.75
Salix scouleri	native	3	4--7		1--1		1.25%--2
Herbaceous Species-% cover							
Bidens cernua	native	1.5	5	25	2	5	9.25%
Carex obnupta	native	1	30	25	50	10	28.75%
Rumex salicifolius	native	2	1	1		1	0.75%
Solanum dulcamara	invasive	3		1	1	3	1.25%
Grasses % Cover							
Glyceria elata	native	1	3		0	5	2.00%
Phalaris arundinacea	invasive	1	3	15	18	20	14.00%
% cover native species:			100%	100%	100%	100%	98%
meets MBI performance standard: > 55% cover			yes	yes	yes	yes	yes
% cover Carex obnupta:			30%	25%	50%	10%	28.75%
meets MBI performance standard: 20% or > cover			yes	yes	yes	no	yes
IRT listed invasive species:			3%	16%	19%	23%	15.25%
meets MBI performance standard: < 30% cover			yes	yes	yes	yes	yes
minimum of 2 native tree/shrub species			3	3	4	3	3.25
meets MBI performance standard			yes	yes	yes	yes	yes
stems per acre shrubs:			243	324	324	648	384.75
meets MBI performance standard: 240 stems per acre			yes	yes	yes	yes	yes

TABLE III e.

2011 Monitoring plot data: **Emergent wetland habitat--Phase II**

Phase 2 emergent wetland vegetation, planted in fall of 2008, year 3 inventory sampled on 5/31/2011

Herbaceous plants	Origin	index	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	average
Alisima plantago-aquatica	native	1																		1		3				0.17
Downingia elegens	native	1	2				25	1																		1.21
Epilobium ciliatum	native	2.5						1																		0.04
Epilobium glandulosum	native	2.5												1	2				2							0.22
Gnaphalium uliginosum	native	2					1																			0.04
Lotus pinnatus	native	2					1																			0.04
Medicago lupa-lina	non-native	3						2															10			0.52
Plagiobothrys figuratus	native	2					1	1	1									1								0.17
Ranunculus uncinatus	native	2																1								0.04
Rorippa curvisiliqua	native	1					1	1				5		1							1			1		0.43
Rumex crispus	non-native	2.5							1							5					1					0.3
Rumex salicifolius	native	2																		1						0.04
Scirpus validus	native	1																		1						0.04
Trifolium repens	non-native	3															5						20			1.08
Veronica americana	native	1						1										1								0.09
Grasses-Grass-like																										
Agrostis stolonifera	non-native	3													2											0.09
Alopecurus geniculatus	native	1	85	70	75	60	55	75	3			60	5	10	20	40	1		2	1	50	5	1	1	10	27.34
Beckmannia syzigachne	native	1	2			4						10		1			1	15	1	2		50		1	2	3.87
Carex spp	native	2						1									1									0.09
Deschampsia caespitosa	native	2		25		30	5	15	75	95	50	10	80	3	10	40	40	75	90		40		45	90	55	37.95
Deschampsia elongata	native	2.5													5		50							3		2.52
Eleocharis acicularis	native	1					3												1							0.17
Eleocharis palustris	native	1	10																	50		2				2.69
Glyceria occidentalis	native	1			10	1							1		25				1			5			15	2.52
Hordeum brachyantherum	native	2.5		5		5	5		10	5	45		10	85	35	5		3	5		2		15	2	15	11.39
Juncus nevadensis	native	2						2																		0.09
Lolium multiflorum	invasive	4																					10			0.43
PERFORMANCE SUMMARY																										
% cover native species			99	100	85	100	97	98	89	100	95	100	96	99	97	85	93	96	100	56	93	65	61	98	97	91%
MBI standard: 55% relative native plant cover			yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	
% cover grass or grass-like species			97	100	85	100	68	93	88	100	95	95	96	98	95	85	93	93	100	53	92	62	61	97	97	85%
MBI standard: 25% cover or greater			yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	

Number of native herbaceous species yrs 3-5	1	0	0	0	5	5	1	0	0	1	0	1	1	0	0	3	0	3	1	1	0	1	0	0.61
MBI standard: at least 5	no	no	no	no	yes	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	
% cover non-native species	0	0	0	0	0	2	1	0	0	0	0	0	2	5	5	0	0	0	1	0	30	0	0	2.00%
% cover IRT-listed invasive species	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0.43%
MBI standard: 15% or less, invasive plant cover	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	
% cover bare ground and/or water	1	0	15	0	3	0	10	0	5	0	4	0	1	10	2	4	0	45	6	35	0	2	5	6.39%
Moisture index	1.00	1.83	1.00	1.50	1.61	1.75	2.00	2.25	2.25	1.20	1.62	1.50	2.07	2.00	1.91	1.75	1.41	1.16	1.90	1.00	2.58	1.66	1.50	1.67
meets MBI standard: less than 3.0	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

TABLE III f.

2011 Monitoring plot data: **Wetgrass prairie --Phase 2**																		
Phase 2 wetgrass prairie, planted in fall of 2010. Inventoried: 5/23/2011--1st season growth/ inventory; data collected on north blc																		Row
Herbaceous plants	Origin	index	4	5	11	12	13	14	15	21	22	23	24	25	34	35	36	Average
Bidens cernua	native	2													2			0.13
Cerastium glomeratum	non-native	5	1				1	1	3			1						0.47
Downingia elegens	native	1													1			0.06
Epilobium ciliatum	native	2.5	2	2	30		1	1		10	35	15	60	10	1	1	2	11.33
Epilobeum glandulosum	native	2.5		1	1		2	3				5		2	1	1		1.06
Geranium molle	non-native	4			2	3					2		3	2		2		0.93
Gnaphalium uliginosum	native	2.5	2	3	2		10	35		5				3	3		3	4.40
Lactuca serriola	non-native	4						1		1								0.13
Lupinus bicolor	native	3.5	25	2			15					5	10			5		4.13
Medicago lupa-lina	non-native	3			1					1		2	1	1	1			0.47
Myosotis laxa	native	1	3	1														0.27
Naverettia intertexta	non-native	2	1															0.06
Nemophila pedunculata	native	3			1		1	1		1	15		3	3	1		3	1.93
Plagiobothrys figuratus	native	2	5	5	10	10	3		5		2	3		3	3	1		3.27
Plagiobothrys scouleri	native	2		1		2	1			2				1				0.47
Rorippa curvisiliqua	native	1	1													1	1	0.06
Sonchus asper	non-native	3.5											1	1	2	3	5	0.80
Trifolium repens	non-native	3.5	1	1									2		1			0.33
Veronica peregrina	native	1	2	1		1					1					1		0.40
Vicia villosa	non-native	4				1					1							0.13
Grasses-Grass-like																		
Alopecurus geniculatus	native	1	5	1	2	1	5	2										1.07
Deschampsia elongata	native	2.5		5	20	15	10	25			3	20	2	15	10	15	10	9.33
Deschampsia cespitosa	native	2.5	20	55	2	3	10	5		5			2	3		2	3	7.33
Glyceria occidentalis	native	1							65									4.33
Hordeum brachyantherum	native	2.5		2		5		1					1	1	1			0.73
Hordeum (commercial)	non-native	5									1				25	20	25	4.66
Juncus bufonius	native	2	3	5	2	5	3	3		3		5		20	2	15	5	4.40
Lolium multiflorum	invasive	4	1	1						3					3		15	1.53
Poa annua	non-native	3	20	15	10	5	15	2		15	5	20		20				7.80
PERFORMANCE SUMMARY																		
% relative cover native species			68	84	70	42	61	76	70	26	56	53	78	61	25	42	27	**55.90**
MBI standard: at least 50% cover- years 1&2			yes	yes	yes	no	yes	yes	yes	no	yes	yes	yes	yes	no	no	no	yes

tufted hair grass relative plant cover	20	55	2	3	10	5	0	5	0	0	2	3	0	2	3	**7.33**
MBI standard: at least 25% cover	no	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	no
% cover native grass or grass-like species	28	78	26	29	28	36	65	8	3	25	5	39	13	32	18	**28.86**
MBI standard: 25% cover or greater	yes	yes	yes	yes	yes	yes	yes	no	no	yes	no	yes	no	yes	no	yes
% cover non-native species	22	15	13	9	16	4	3	17	9	23	7	24	29	25	30	na
% cover IRT-listed invasive species	1	1	0	0	0	0	0	3	0	0	0	0	3	0	15	**1.53**
MBI standard: 15% or less, invasive plant cover	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes
% cover bare ground and/or water	11	0	17	49	23	20	27	54	35	24	15	15	43	33	28	na
Moisture index	2.43	2.37	2.54	2.41	2.61	3.00	2.66	2.85	3.00	2.88	3.05	2.67	2.73	2.91	2.85	**2.73**
MBI standard: between 2.0 and 3.0	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	yes	yes	yes	yes
% cover by trees and shrubs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0.00**
MBI standard: less than 5% cover	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Figure IVa.


0 40 80 160 240 320
Feet
Legend
Culverts
Constructed Berm
Cut and Fill Berm
Existing Roads
Muddy Creek Taxlot
268.5
268.8
269.4
269.4
269.6
270
269.9
269.2
269.0
269.7
269.9
270
270
269.2

Table V.a

CREDIT SALES							
CUSTOMER	PHONE	FAX	CONSULTANT	DATE	DSL PERMIT #	CORP. PERMIT #	# OF CREDITS
2011							
Department of State Lands	503-986-5200	503-378-4844	Bill Ryan	1/4/2011	WD 2010-0384	NWP-2008-682	0.21 credits (9,147.60 sq.ft.)
775 Summer Street NE, Suite 100			Assistant Director				
Salem, OR 97301-1279			Wetlands and Waterways Conservation Division				
			Oregon Department of State Lands				
Enforcement File No. 7115-ENF				4/1/2011	FP-15110	NWP-98-372	0.10 credits
Avalon Village Mitigation Site							
Lane County							