

**Year Three Monitoring Report for the Muddy Creek Mitigation Bank
Fall 2010**



ACOE Permit # 2005-714

**Prepared for:
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1.0 Introduction

Muddy Creek Wetland Mitigation Bank (The Bank) (ACOE permit # 2005-714) 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. The Bank was authorized by DSL to sell credits August 17, 2007. Cascade Geodata & Western Stewardship Services 5/7-9, 27-29, 6/28-29, 2010. The bank is 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. (see figure 1). This report summarizes the results of Year Three monitoring that occurred at the site in 2010 and also reviews maintenance activities that have occurred.

2.0 Implementation of the Plan

Management activities: Phase I

Enhanced forested wetland habitat: Selective spraying for non-native vegetation, focusing on nightshade and reed canary grass, occurred over the course of the spring as pooled water receded. Sprouting English hawthorn stumps cut in 2009 were either sprayed, or chopped away.

Planted forested wetland habitat: Selective spraying for non-native grasses and pennyroyal throughout the spring. Ground that was not planted in rootstock was mowed in late May to reduce future moisture competition. Occasional maintenance, (primarily hand pulling vegetation threatening to overtop rootstock), occurred throughout the summer.

Emergent wetland habitat: Selective spraying for non-native grasses and forbs throughout winter and spring of 2010. Pennyroyal and thistles are the targeted invasives. Selective spraying resumed in the fall focusing on pennyroyal, Queen Anne's lace, and the occasional reed canary grass. Much of the habitat was mowed in August.

Wetgrass prairie habitat:

On the IRT annual review rattail fescue was noticed at one site. On the recommendation of the Benton County agronomist we broadcast sprayed a weak solution of Diuron herbicide that apparently is effective in controlling rattail fescue without harming perennial grasses. We will continue to monitor that area and may re-spray with Diuron in the spring of 2011 if needed.

Previous monitoring showed low, but frequent, amounts of Lythrum and Lolium but those two invasives were not much of a problem this year. As this habitat continues to mature, the presence of Lythrum is considerably less.

In the fall of 2010 we did supplemental planting with largely a native herbaceous mix. At a rate of ¼ lb per acre we planted blue-eyed grass (*Sisyrinchium angustifolium*), Canada goldenrod (*Solidago canadensis*), western yarrow (*Achillea millifolium*), and big leaf lupine (*Lupinus latifolius*). California oat grass (*Danthonia californica*) was also planted at a ½ lb per acre.

Management activities: Phase II

Emergent wetland habitat:

Selective spraying for invasives occurred throughout the spring of 2010. Annual ryegrass concerns noted in the 2009 monitoring report have diminished considerably. Weed wiping with glyphosate appears to be an effective control method. This ground was mowed in August

In June and July 2010 approximately 800 cubic yards of fill excavated out of phase 2 creation ground was used to fill the drainage ditch that borders the eastern edge of the bank.

Wetgrass Prairie:

Completion of grading for 21 of the 32 acres (66%) of creation ground designated as wetgrass prairie habitat. The 21 acres were planted to a wetland prairie mix of tufted hair grass, slender hair grass, American slough grass, meadow barley, and spike bentgrass. Planting rate for this grass mix was 4 lbs to the acre. To discourage waterfowl predation, bamboo stakes with plastic flagging were placed in a 15 x 15 grid on the newly planted ground.

The remaining 11 acres of creation ground was broadcast sprayed with glyphosate herbicide for weed maintenance.

3.0 Monitoring requirements and 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 in the 2006 wetland delineation. Saturation/soil water depth was measured daily for the week of March 15-19 then once a week until April 28, 2010.

Hydrology Performance:

Well log data summary (in section III) shows all phase 1 wells meeting hydrologic saturation standards.

Well log data shows phase 2 enhancement ground is meeting hydrologic/saturation standards.

Vegetation Monitoring:

For **wetgrass prairie** and **emergent wetlands**, transects established approximately 250' apart along the baseline (see Attachment A). 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 150 x 50 feet rectangular plots describe tree and shrub information. Within each plot herbaceous vegetation was recorded from a randomly located 1m quadrat.

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

Vegetation Performance:

All habitats are meeting performance standards. Detailed performance information is provided in Appendix C.

Vegetation monitoring data tables (see Appendix C) for all phase1 habitats (emergent wetland, wetgrass prairie, planted forest and enhanced forest) show the Bank meeting all MBI performance standards. Phase 2 emergent wetland habitat is meeting all vegetation performance standards.

Wetland Delineation

Wetlands in Phase 1 of the Muddy Creek Mitigation Bank have been re-delineated as part of this year's monitoring requirements. The "Delineation Lite" method from the Removal-Fill Guidelines; Compensatory Mitigation for Wetlands and Tidal Waters (DSL, February 2010) was utilized to characterize wetlands in the project area. Wetlands on-site were delineated in 2006 by Turnstone to document pre-construction conditions on-site. An addendum to the report was created in 2009 that more accurately depicted some small areas of upland within the study area.

15 Sample Points were placed in areas where wetland creation has occurred (see Appendix D). The standard 1987 Manual/Supplement data forms were used for each plot and are included in the appendix. Five upland areas that did not exhibit wetland characteristics during the original delineation have been graded to function as wetland. Paired plots were not used because the entire area is now wetland. Hydrology monitoring occurred on March 17th and 26th and April 1st, 9th and 16th of 2010. Vegetation and soil data was recorded on May 24th through 26th and July 6th through 8th. These different visits were necessary to let hydrology subside enough to collect data and so that most plants were readily identifiable. Observations of soils, vegetation and hydrology were made using the "Routine Onsite" method of the Manual and the Interim Regional Supplement for Western Mountains, Valleys, and Coasts (U.S. Army Corps of Engineers, 2008). Data forms are included in Appendix E.

Delineation Results and Conclusions

This delineation concurs with the previous delineation and addendum with the addition of 9.17 acres of wetland due to wetland creation. Hydrophytic vegetation dominates Phase 1 of the Muddy Creek Mitigation Bank. Wetland hydrology is present within the areas that were previously upland. Hydric soils have yet to develop in the wetland creation areas but according to Chapter 5 of the Regional Supplement (USACE, 2007), problematic soils in recently developed wetlands may be considered hydric if the vegetation and hydrology parameters are met.

Table 1. Wetland Dimensions

Berm Number	2010 Delineation Area
1	1.76 acres
2	2.78 acres
3	3.74 acres
4	0.74 acres
6	0.15 acres
Total	9.17 acres

Precipitation Data and Analysis

Table 2. Precipitation (inches) on the days of field investigation and 2 weeks prior

Date							March 1
Precip							0.00
Date	March 2	March 3	March 4	March 5	March 6	March 7	March 8
Precip	0.03	0.06	0.00	0.00	0.00	0.00	0.02
Date	March 9	March 10	March 11	March 12	March 13	March 14	March 15
Precip	0.06	0.00	0.35	0.42	0.07	0.00	0.00
Date	March 16	March 17	March 18	March 19	March 20	March 21	March 22
Precip	0.00	0.01	0.00	0.00	0.00	0.00	0.05
Date	March 23	March 24	March 25	March 26	March 27	March 28	March 29
Precip	0.00	0.00	0.71	0.79	0.01	0.51	0.90
Date	March 30	March 31	April 1	April 2	April 3	April 4	April 5
Precip	0.48	0.12	0.01	0.45	0.10	0.03	0.33
Date	April 6	April 7	April 8	April 9	April 10	April 11	April 12
Precip	0.00	0.00	0.71	0.79	0.01	0.15	0.19
Date	April 13	April 14	April 15	April 16			
Precip	0.04	0.00	0.05	0.00			
Date							
Precip							
Actual precipitation: 7.45 inches				Average precipitation: 5.91 inches			

Source: Weather Underground, Corvallis Airport Weather Station, 2010

Table 3. Percent of normal rainfall for the water year to date of field investigation (October 1, 2009-April 16, 2010)

Precipitation	25.09 inches
Average Precipitation	36.05 inches
Percent of Normal	69%

Source: WETS Tables and Weather Underground

Table 4. Monthly percent of normal precipitation for 3 months prior to field investigation

Month	Actual Precipitation (In.)	Average Precipitation (In)	Percent of Normal
January 2010	3.69	8.99	41
February 2010	3.41	3.86	88
March 2010	4.59	4.52	101
Total	11.69	17.37	67

Source: WETS Tables and Oregon Climate Service

4.0 Summary and Recommendations

Credit Sales:

There were no credit sales to report in 2010.

Vegetation Performance

Vegetation performance standards have been met for Year Three. There are no additional, or corrective activities to report. There have been no corrective or remedial actions associated with the Bank.

Wetland Delineation

Phase 1 of the mitigation bank meets wetland criteria.

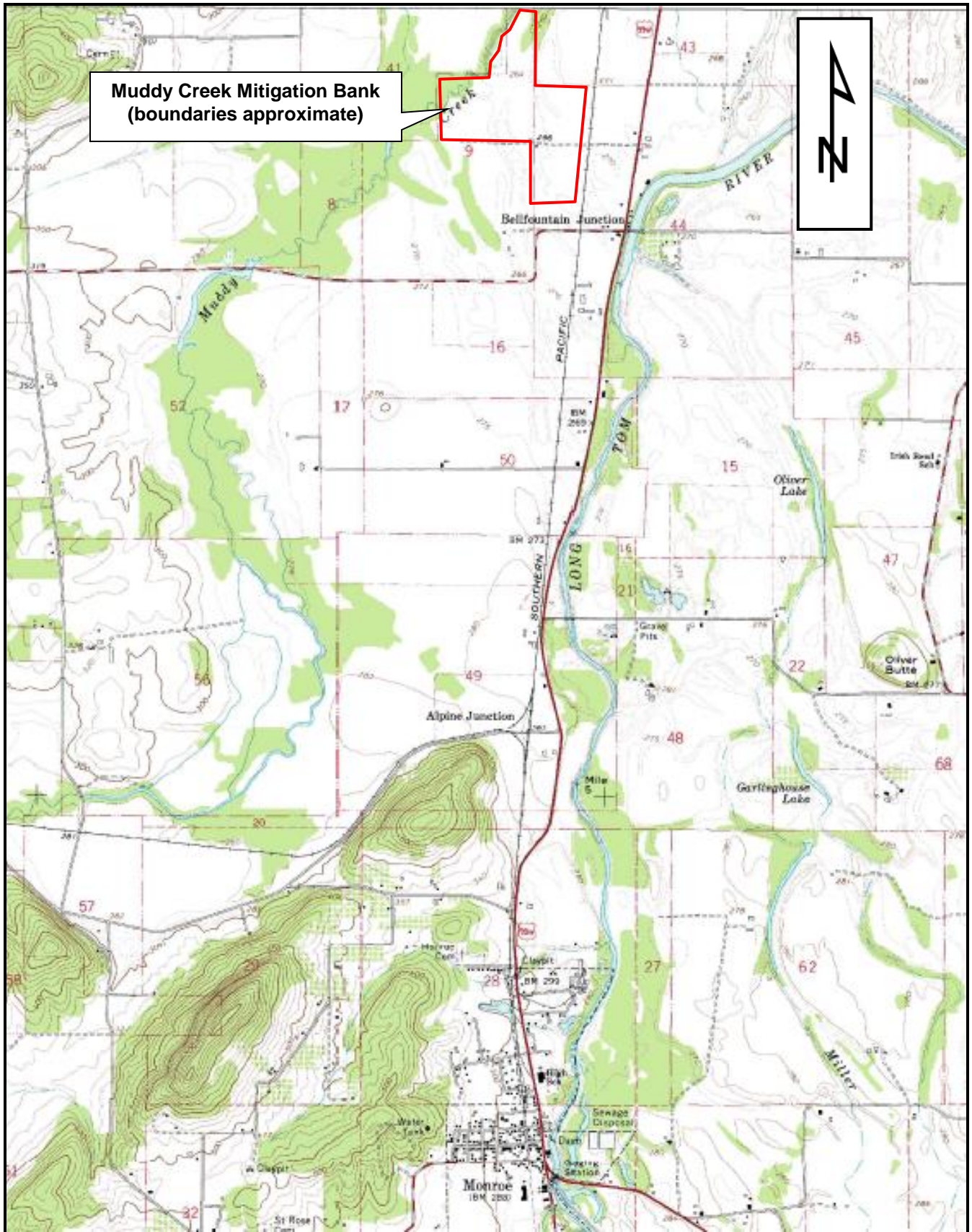


Figure 1. Site Location (not to scale)

Appendix A:
Monitoring Diagram

Appendix B:

Hydrology Data

Appendix C: Vegetation Data

Appendix D:
Wetland Delineation Map

Appendix E:
Wetland Delineation Data Forms