MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2008

Perry Ranch
Glacier County, Montana

Prepared for:

MONTANA DEPARTMENT OF TRANSPORTATION
2701 Prospect Avenue
Helena, MT 59620-1001

Prepared by:

POST, BUCKLEY, SCHUH, AND JERNIGAN
801 North Last Chance Gulch, Suite 101
Helena, MT 59601-3360

December 2008

PBS&J Project No. 0B4308801.04.05

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Cover Photograph: Northern boundary of the Northern Excavated Area. View is west.

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1.0 INTRODUCTION

The Perry Ranch wetland mitigation site was constructed during early summer 2001 to mitigate for wetland impacts associated with Montana Department of Transportation (MDT) projects NH 1-3(12)225F (Browning-Meriwether) and F BRF 1-3(11)219 (Browning East & West). These two projects resulted in a combined projected wetland loss of approximately 14.7 acres.

This report documents the seventh year of monitoring at the Perry Ranch Wetland Mitigation site. The mitigation site is located approximately 13 miles west of Browning and four miles north of U.S. Highway 2 in Glacier County (**Figure 1**). The entire site occurs within the confines of the Tribally-owned Perry Ranch on the Blackfeet Indian Reservation and is within Watershed #8 (Marias).

The intent of the project was to create, via dike placement and shallow excavation, two wetland impoundments within historic oxbows located in the Cut Bank Creek floodplain (**Appendix D**). The inner oxbow impoundment, located adjacent to Cut Bank Creek, was designed to provide approximately 6.1 wetland acres with a maximum depth of 2.6 feet. The outer oxbow impoundment, located immediately north of the inner oxbow, was designed to provide approximately 21.5 wetland acres with a maximum three-foot depth.

Wetland hydrology at the inner oxbow would be provided via overbank flood flows, alluvial flow, and precipitation; flood flows and precipitation would source the outer oxbow. The site was designed to provide ephemeral surface water. It is anticipated that, over time, vegetation at the inner oxbow will be comprised of scrub/shrub and emergent communities with occasional cottonwoods scattered throughout. The outer oxbow would likely be dominated by emergent communities.

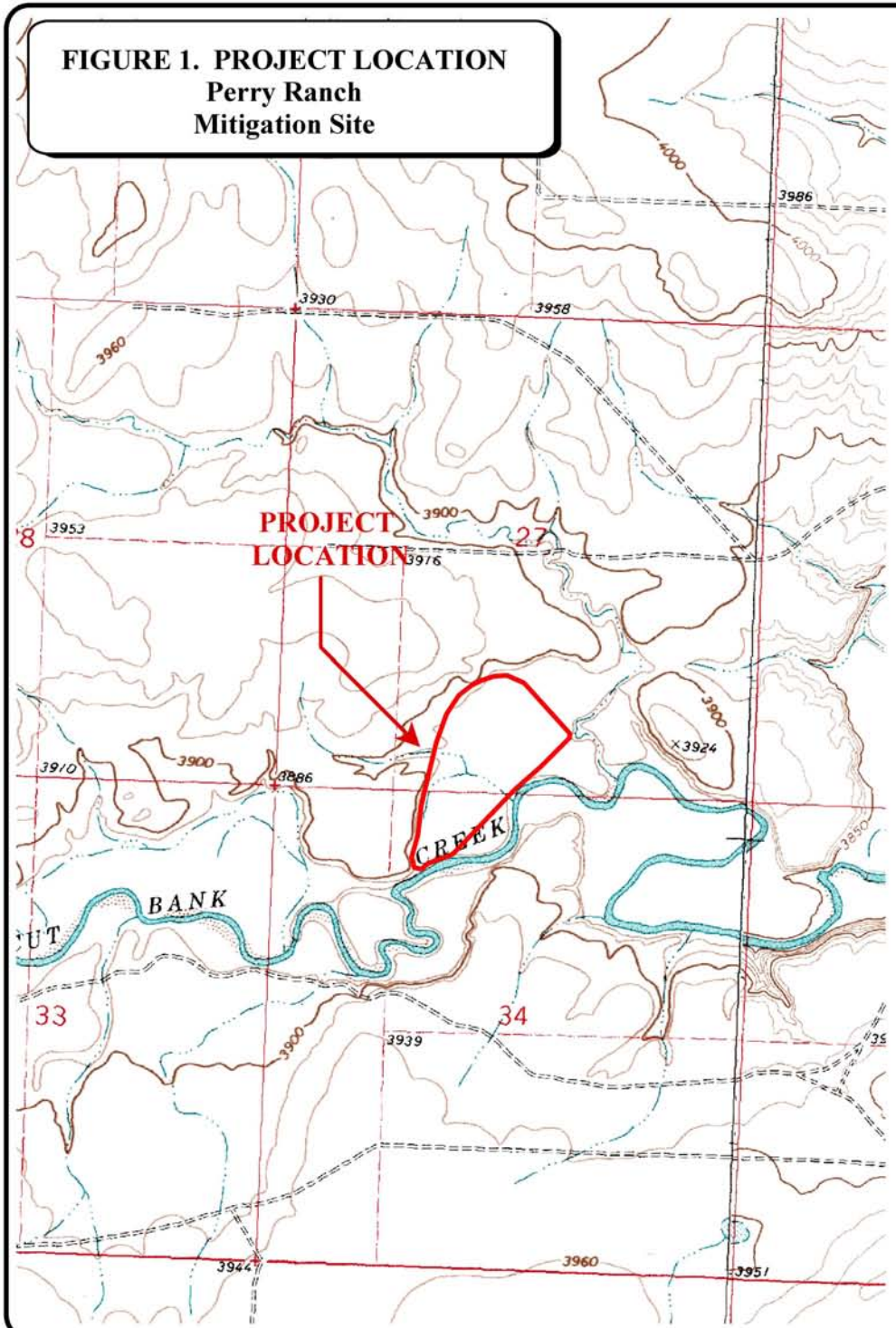
Prior to construction, approximately 2.3 acres of wetland occurred at the inner oxbow and approximately 1.1 acres occurred at the outer oxbow. The mitigation target of 27.6 acres is inclusive of these 3.4 acres of existing wetlands. This site has been monitored twice per year to document wetland and other biological attributes. No performance standards or success criteria were required by the U.S. Army Corps of Engineers (COE), MDT, Blackfeet Tribe, or other agencies. The monitoring area is illustrated in **Figure 2** (**Appendix A**)

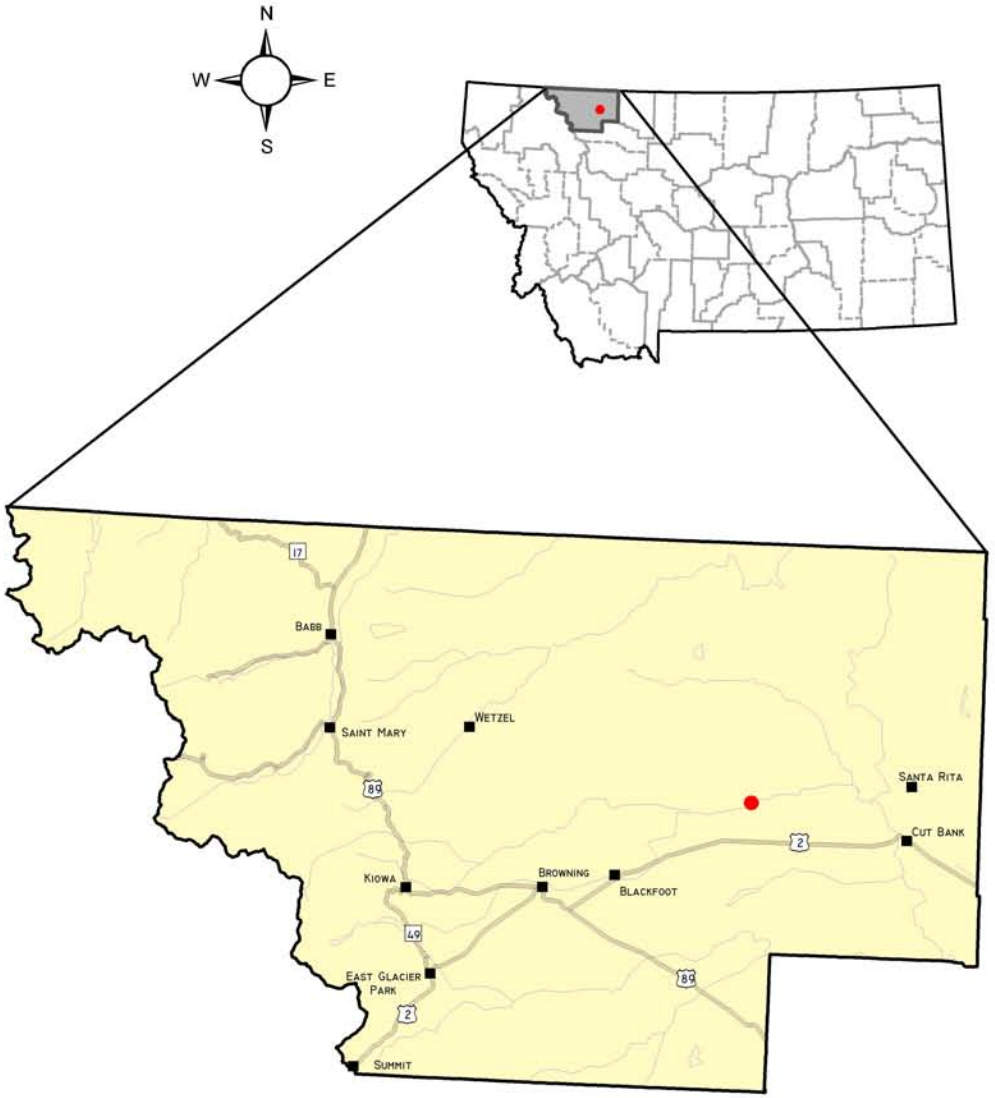
2.0 METHODS

2.1 Monitoring Dates and Activities

The site was visited on May 6th (spring) and July 9th (mid-season) of 2008. The primary purpose of the spring visit was to conduct a survey for birds and general wildlife.

FIGURE 1. PROJECT LOCATION
Perry Ranch
Mitigation Site





800 0 800 1600 FEET

1: 24,000

PROJECT #: 0B4308801
DATE: NOV 2008
LOCATION: GLACIER CO
PROJECT MANAGER: J. BERGLUND
DRAWN BY: B. NOECKER

PBS&J

801 N. Last Chance Gulch
Suite 101
Helena, MT 59601-3360

The mid-season visit was conducted in July to document vegetation, soil, and hydrologic conditions used to map jurisdictional wetlands. All information contained on the Wetland Mitigation Site Monitoring Form (**Appendix B**) was collected at this time. Activities typically conducted and information collected included: wetland delineation; vegetation community mapping; vegetation transect monitoring; soils data collection; hydrology data collection; bird and wildlife use documentation; macroinvertebrate sampling; photopoint sampling; and a non-engineering examination of the site.

2.2 Hydrology

Wetland hydrology at the inner oxbow (2.6-foot maximum depth) was to be provided via overbank flood flows, alluvial flow, and precipitation. Wetland hydrology at the outer oxbow (3-foot maximum depth) was to be provided via flood flows and precipitation. Impoundment areas are indicated on the proposed project plan sheets (**Appendix D**).

Hydrologic indicators were primarily evaluated during the mid-season visit. Wetland hydrology indicators were recorded using procedures outlined in the COE 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Hydrology data were recorded on COE Routine Wetland Delineation Data Forms (**Appendix B**).

All additional hydrologic data were recorded on the Wetland Mitigation Site Monitoring Form (**Appendix B**). The boundary between wetlands and open water aquatic habitats (no rooted vegetation) was mapped on an aerial photograph and an estimate of the average water depth at this boundary was recorded.

There were no groundwater monitoring wells at the site. Groundwater depths were only documented if they were located within 12 inches of the ground surface in soil pits are dug for purposes of delineating wetlands. Groundwater depths within soils pits were recorded onto COE Routine Wetland Delineation Data Forms (**Appendix B**).

2.3 Vegetation

General dominant species-based vegetation community types were delineated on the 2008 aerial photograph. Standardized community mapping was not employed as many of these systems are geared towards climax vegetation. Estimated percent cover of the dominant species in each community type was recorded on the Wetland Mitigation Site Monitoring Form (**Appendix B**). Plants observed were identified using Flora of the Pacific Northwest (Hitchcock and Conquist 1975) and Plants of Montana (Dorn 1984). Nomenclature follows that of Dorn (1984).

A single 10-foot wide belt transect was sampled during the mid-season visit to represent the range of current vegetation conditions (**Figure 2** in **Appendix A**). Percent cover was estimated for each vegetative species encountered within the "belt" within each community type using the following values: + (<1%); 1 (1-5%); 2 (6-10%); 3 (11-20%); 4 (21-50%); and 5 (>50%). Photographs of the transect were taken from both ends. No monitoring of planted species was conducted as no woody species were planted at the site.

2.4 Soils

Soils were evaluated during the mid-season visit in accordance with procedures outlined in the COE 1987 Wetland Delineation Manual. Soil data were recorded for each wetland determination point on the COE Routine Wetland Delineation Data Form (**Appendix B**). The most current NRCS terminology was used to describe hydric soils (USDA 1998). The 1980 Glacier Area soil survey was consulted relative to mapped soil units at the site.

2.5 Wetland Delineation

A wetland delineation was conducted during the mid-season visit in accordance with the 1987 COE Wetland Delineation Manual. In July 2008, consultation with the COE (Steinle pers. comm.) confirmed that, where the 1987 manual was used to establish baseline wetland conditions at MDT wetland mitigation sites, it should continue to be applied at such sites for the duration of the monitoring period. Consequently, application of the new *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (COE 2008) was not required or undertaken at this site in 2008.

Wetland and upland areas within the monitoring area were investigated for the presence of wetland hydrology, hydrophytic vegetation, and hydric soils. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1988). The information was recorded onto COE Routine Wetland Delineation Data Forms (**Appendix B**).

In 2002, the wetland/upland boundaries were delineated using a GPS unit in conjunction with hand-mapping onto the aerial photograph. In 2008, wetland mapping revisions were accomplished using a combination of GPS coordinates and hand-mapping onto the 2008 aerial photograph. Wetland delineation data collected during 2008 were compared to pre-construction estimates in an effort to calculate additional wetland development since project construction.

2.6 Mammals, Reptiles, and Amphibians

Mammal, reptile, and amphibian species observations and other positive indicators of use, such as vocalizations, were recorded onto the Wetland Mitigation Site Monitoring Form during each site visit (**Appendix B**). Indicators of indirect use, such as tracks, scat, burrows, eggshells, skins, and bones were also recorded. Observations were recorded during all visits as the observer traversed the site while conducting other required activities. Direct sampling methods such as snap traps, live traps, and pitfall traps, were not implemented. A comprehensive list of wildlife species observed was compiled.

2.7 Birds

Bird observations were recorded during both site visits. No formal census plots, spot mapping, point counts, or strip transects were conducted. During the spring visit, observations were recorded in compliance with the Bird Survey Protocol (**Appendix E**). During the mid-season visit, bird observations were recorded incidental to other monitoring activities. During all visits,

observations were categorized by species, activity code, and general habitat association on the Bird Survey Field Data Sheet (**Appendix B**). A comprehensive bird list was compiled using these observations. No birdhouses occur on the site.

2.8 Macroinvertebrates

A macroinvertebrate sample was collected during the mid-season visit in years when surface water was present (**Figure 2** in **Appendix A**). The sample was collected and preserved according to the Macroinvertebrate Sampling Protocol (**Appendix D**). Laboratory analysis of the sample and reporting were conducted by Rhithron Associates, Inc. in Missoula, Montana. In 2008, one sample was collected in the Outer Oxbow.

2.9 Functional Assessment

Since 2001, a functional assessment for each delineated wetland was conducted using the 1999 MDT Montana Wetland Assessment Method (Berglund 1999). In 2008 the 2008 MDT Montana Wetland Assessment Method (Berglund and McEldowney 2008) was applied. Field data necessary for this assessment were collected during the mid-season site visit with the remainder of the functional assessment completed in the office. A Functional Assessment Form was completed for the inner oxbow, outer oxbow, and northern excavated area (**Appendix B**).

2.10 Photographs

Photographs were taken showing the current land use surrounding the site, the upland buffer, the monitored area, and the vegetation transect (**Appendix C**). Three photograph points were established and shot each year from 2002 to 2008 (**Figure 2** in **Appendix A**). Panoramic type photographs were taken at these three photograph points (**Appendix C**). In 2007 MDT/Blackfoot Tribe established four permanent photo points for monitoring noxious weed populations. Photographs at three of these weed photo points were taken during the mid-season visit in 2008. Aerial photographs from 2002 through 2008 were also compiled into the report (**Appendix C**).

2.11 GPS Data

During 2002, 2006, 2007, and 2008, a resource grade GPS unit was used to mark the following locations: vegetation transect start and end, photograph points, wetland boundaries, soil pits, noxious weed populations, and reference landmarks. Procedures used for GPS mapping and aerial photography referencing are included in **Appendix E**.

2.12 Maintenance Needs

The dike along the east boundary was examined during the 2008 site visits for obvious signs of breaching, damage, or other problems. This did not constitute an engineering-level structural inspection, but rather a cursory examination. Current or future potential problems were documented.

3.0 RESULTS

3.1 Hydrology

Hydrology at the Perry Ranch Mitigation Site is determined by flow in Cut Bank Creek and by direct precipitation. These water sources interact with groundwater, which ultimately will drive wetland development. Inferences regarding hydrology at the site were made from a gauging station on Cut Bank Creek near Browning and at a weather station in Cut Bank.

It was assumed that precipitation levels measured at the Cut Bank FAA Airport would serve as an indicator of precipitation received at the mitigation site. The total precipitation received at this station from January through July of 2008 was 9.84 inches (WRCC 2008). This represents 124% of the mean precipitation (7.88 inches) recorded between January and July from 1903 to July 2008. This period in 2008 was also significantly wetter than the same period in 2007 (1.17 in), 2006 (2.70 in), 2004 (4.57 in), and 2003 (2.63 in), and was comparable to 2005 (9.21 in) (WRCC 2008).

Flow data in Cut Bank Creek near Browning (USGS 06098500) have been used to indicate hydrology at the Perry Ranch mitigation site. The USGS gauging station was in operation from April 1918 through September 2007. Therefore 2008 flow data were unavailable. Based on the site visits and aerial photograph, it was evident that flows in Cut Bank Creek were very high and peaked sometime after May 8th and prior to July 7th of 2008. The entire site was dry on May 8th except for two small ponds within the inlet channel. The entire site was inundated on July 9th, with water depths up to 12 inches in portions of the site.

In 2007 it was unlikely that the site was inundated between the spring and fall visits, as flow data peaked at about 350 cubic feet per second (cfs) from early May through mid-June in 2007 (USGS 2007). In comparison, 2006 peak flows ranged from 600 to 900 cfs between late May and mid-June, 2005 peak flows ranged from 450 to 700 cfs between late May and early June, and 2004 peak flows ranged from 400 to 550 cfs between early May and early June (USGS 2006).

3.2 Vegetation

Vegetation community types are based on topography, hydrology, and plant composition. Since 2002 a comprehensive plant species list has been maintained for the Perry Ranch Mitigation Site (**Table 1**; **Monitoring Form** in **Appendix B**). At Perry Ranch, shifts in plant composition have been observed annually in several of the vegetation types. During 2008 six vegetation community types were identified and mapped: Type 1 - *Juncus balticus/Carex praegracilis,* Type 2 - *Eleocharis palustris/Polygonum amphibium,* Type 3 - *Upland Floodplain,* Type 4- *Salix*/*Hordeum jubatum*/*Equisetum,* Type 5 – *Hordeum,* and Type 6 – *Upland* (**Figure 3** in **Appendix A**).

Significant vegetation changes occurred in 2008 because the excavated portions of the site were inundated. A dominance of wetland plants eliminated the Type 3A –*Transitional Upland* type. Wetland plant species thrived, particularly *Alopecurus pratensis* and *Eleocharis palustris*. Many

facultative (e.g. *Kochia scoparia*) and upland (e.g. *Cirsium arvense*) plants were either absent or stressed from the inundation.

Table 1: ***2002-2008 Perry Ranch vegetation species list.***

Scientific Name	Region 9 (Northwest) Wetland Indicator	Scientific Name	Region 9 (Northwest) Wetland Indicator
Achillea millefolium	FACU	*Hordeum jubatum*	FAC+
Agropyron intermedium	--	*Juncus balticus*	OBL
Agropyron repens	FACU	*Kochia scoparia*	FAC
Agropyron smithii	FACU	*Koeleria pyramidata*	--
Agropyon trachycaulum	FAC	*Medicago sativa*	--
Agrostis alba	FACW	*Melilotus alba*	FACU
Alopecurus pratensis	FACW	*Melilotus officinalis*	FACU
Amaranthus retroflexus	FACU+	*Mentha arvensis*	FAC
Artemisia frigida	--	*Opuntia polyacantha*	--
Artemisia ludoviciana	--	*Phalaris arundinacea*	FACW
Aster pansus	FAC+	*Phleum pratense*	FACU
Atriplex spp.	--	*Plantago hirtella*	FACW
Bouteloua gracilis	--	*Plantago major*	FAC+
Brassica kaber	--	*Poa annua*	FAC-
Bromus inermis	--	*Poa pratensis*	FACU+
Cardaria draba	--	*Polygonum amphibium*	OBL
Carex lanuginosa	OBL	*Potentilla anserina*	OBL
Carex praegracilis	FACW	*Potentilla* (*gracilis*)	(FAC)
Chenopodium album	FAC	*Rosa arkansana*	NI
Cirsium arvense	FACU+	*Rumex crispus*	FACW
Cynoglossum officinale	--	*Rumex maritimus*	FACW
Dactylis glomerata	FACU	*Salix amygdaloides*	FACW
Descurainia pinnata	--	*Salix exigua*	OBL
Distichlis spicata	FAC+	*Salix lutea*	OBL
Eleocharis acicularis	OBL	*Sisymbrium altissimum*	FACU-
Eleocharis palustris	OBL	*Solidago canadensis*	FACU
Epilobium ciliatum	FACW-	*Smilacina stellata*	FAC-
Equisetum arvense	FAC	*Spartina pectinata*	OBL
Equisetum hyemale	FACW	*Stipa viridula*	--
Euphorbia esula	--	*Symphoricarpos occidentalis*	--
Gaillardia aristata	---	*Taraxacum officinale*	FACU
Glyceria elata	FACW+	*Thlaspi arvense*	NI
Glycyrrhiza lepidota	FAC+	*Triglochin maritimum*	OBL
Grindelia squarrosa	FACU	*Typha latifolia*	OBL

Vegetation Community Type 1 previously occurred as a fringe along the deeper wetland areas of the inner oxbow (**Figure 3** in **Appendix A**). It has decreased in area over the monitoring period as soils have dried and noxious weeds and grasses have invaded. In 2008, a small polygon of Type 1 that occurs along the inlet channel re-emerged as wetland (**Photo 8** in **Appendix C**). Soils had been inundated and wetland plants were more prevalent than upland plants (**Soil Pit 5** in **COE Forms** of **Appendix B**).

Vegetation Community Type 2 occupied deeper wetland areas that retain surface water for longer durations. The Type 2 plant community is found within the Inner and Outer Oxbows (**Figure 3** in **Appendix A; Photos 6, 7**, and **9** in **Appendix C**). The Type 2 community has

always been a strong-hold for obligate wetland plants (e.g. *Polygonum amphibium, Potentilla anserina,* and *Eleocharis palustris*) because groundwater supports the soils, even in dry years. In 2008 this area was deeply inundated and wetland plant growth was more dense and tall, especially for *Phalaris, Alopecurus, Polygonum, and Eleocharis.* As a result of more water this year, the Type 2 community expanded. Type 3A and a portion of Type 4 exhibited characteristics more similar to Type 2.

Vegetation Community Type 3 is upland floodplain habitat (**Figure 3** in **Appendix A**). It is dominated by *Symphoricarpos occidentalis, Rosa spp., Bromus inermis, Agropyron repens, Euphorbia esula, Cirsium arvense.* Several facultative and upland plants observed in drier years were either uncommon or absent in 2008. This includes plants such as *Phleum pratense, Agropyron* spp., *Melilotus officinalis,* and *Kochia scoparia.*

Vegetation Community Type 4 occurs within excavated portions of the inner oxbow, and is characterized by mudflat colonized by wetland plants (**Figure 3** in **Appendix A**; **Photo 10** in **Appendix C**). A portion of this community was re-delineated as Type 2 wetland because it lacked the *Hordeum* and *Equisetum* plants. In 2008 Type 4 continued to develop as a scrub-shrub \ emergent wetland community (**Photo 10** in **Appendix C**). Soils were inundated in 2008. In drier years, soils have been saturated within the 12-inch soil profile. Prior to 2006 the plant community was dominated by *Equisetum arvense* and *Hordeum jubatum*. Since 2006 the plant community has consistently been comprised of these plants plus *Salix exigua, S. lutea, Potentilla anserina,* and *Phalaris arundinacea*. Despite the wetland development, leafy spurge and Canada thistle are present within and along the Type 4 community.

The Northern Excavated Area has fluctuated the most in plant community development (**Figure 3** in **Appendix A**). The plant community is driven by hydrology. In 2002 and 2003 it was mapped as Open Water / Mudflat. In 2004 it became upland though *Hordeum jubatum* began to colonize. In 2005 it reverted to Open Water/Mudflat because the inundation drowned the stand of *H. jubatum*. In 2006 and 2007 the *H. jubatum* community developed as a marginal wetland with adequate, although minimal soil saturation. A ring of *Salix* whips had also been developing around the excavated area. Based on the soil pits dug through the years it seemed that groundwater flow may be becoming more shallow. In 2008 the area was inundated, up to 12 inches in places (**Photo 4** in **Appendix C**). An assemblage of *H. jubatum, E. palustris, E. arvense,* and stressed *Cirsium arvense* ringed by *Salix* whips was prevalent throughout the Northern Excavated Area (**Photo 5** in **Appendix C**). The island remained dominated by *C. arvense*.

Vegetation Community Type 6 is upland habitat that occupies the slopes north and west of the project area (**Figure 3** in **Appendix A**). These adjacent slopes are primarily colonized by native species, such as phlox (*Phlox* spp.), prickly pear (*Opuntia polyacantha*), blanket flower (*Gaillardia aristata*), lupine (*Lupinus* spp.), and blue grama (*Bouteloua gracilis*).

Two noxious weed species were found on the Perry Ranch Wetland Mitigation site in 2008: Canada thistle and leafy spurge. Their populations were partially mapped (**Figure 3** in **Appendix A**). Both species are rated as Category 1 noxious weeds (Porkorny and Mangold 2008). In 2007 MDT and the Blackfeet Tribe released bio-control and created four photo points

to monitor their effect (**Figure 2** in **Appendix A**). Blackfeet weed control personnel are trying to avoid the use of herbicides at this site due to its proximity to Cut Bank Creek.

Leafy spurge was first documented as a small occurrence in Community Type 4 in 2005. In 2006 it was commonly found in Community Types 1, 3, and 4 within the southern half of the project area; in 2007 and 2008 its population remained abundant. Leafy Spurge Flea Beetles (*Aphthona* spp.) were released on July 19, 2007 at two locations within and at two locations outside the Perry Ranch Mitigation Site (Bandel pers. comm.). Adult flea beetles feed on foliage during the summer while larvae feed on root hairs and young roots, which compromise the plant's ability to take up water and nutrients (Integrated Weed Control 2007). In late July, the MDT Wetland Mitigation Specialist visited the site and found spurge hawk-moth caterpillars (*Hyles euphorbiae*) feeding on the leafy spurge plants in a few areas (Urban pers. comm.). Larvae of the spurge hawk-moth have been used as biological pest control for leafy spurge (Wikipedia 2008). Since 2007 photographs have been taken at Weed Photo Points 2-4 to monitor the effectiveness of the bio-control (**Figure 2** in **Appendix A**; **Photos 16-23** in **Appendix C**).

Canada thistle has been common throughout the site. It is primarily found in the Type 3 community where soils are drier. The Canada thistle stem mining weevil (*Hadroplontus litura*) was released at two areas within the mitigation site in mid-September 2007. Young larvae hatch on young leaves and stem tissue and bore into the main stem of the plant; older larvae feed on the stem, crown, and root (Integrated Weed Control 2007). Research completed in Canada showed that a rust fungus disease, fatal for the thistle, more than doubled on plants where this weevil was present (Integrated Weed Control 2007). A photograph was taken at Weed Photo Point 1 to monitor the effectiveness of the bio-control (**Figure 2** in **Appendix A**; **Photos 13-15** in **Appendix C**).

In 2007, two hound's-tongue (*Cynoglossum officinale*) plants were found on the boundary of Type 2 and Type 3 communities. The above ground biomass was destroyed with a shovel in 2007. A quick survey in 2008 did not re-locate the plants. Wet soil conditions and vigorous growth of wetland grasses may have out-competed the plant this year.

From 2002 to 2006 vegetation data have been recorded from the same transect (**Monitoring Data Forms** in **Appendix B**), summarized in tabular format (**Table 2**), and graphically illustrated (**Charts 1** and **2)**. Photographs were taken at the start and end of the transect (**Photos 11 - 12** in **Appendix C**). In 2008 the transect was inundated prior to the July 7th aerial photograph (**Figure 2** in **Appendix A**). This correlated with the largest gain in wetland habitat measured along the transect since 2002 (**Table 2**). It also correlated to the largest percentage of hydrophytic plant species found along the transect (**Table 2**). The increase in wetland habitat came from Type 3A – *Transitional Upland Floodplain* developing into Type 2 - *Eleocharis palustris/Polygonum amphibium* wetland and from a small reduction in Type 6 – *Upland* habitat (**Chart 1**). Since 2002 *Transitional Bare Ground* has given way to floodplain upland and wetland habitats (**Chart 2**). Since 2002 Transitional Upland and Floodplain Upland has fluctuated while wetland habitat increased or was static on an annual basis (**Chart 2**).

Table 2: ***Transect 1 data summary for each year monitored.***

Monitoring Year	2002	2003	2004	2005	2006	2007	2008
Transect Length (feet)	532	532	532	532	532	532	532
# Vegetation Community Transitions along Transect	4	5	5	4	4	4	4
# Vegetation Communities along Transect	3	3	3	4	4	4	3
# Hydrophytic Vegetation Communities along Transect	0	0	0	1	1	1	1
Total Vegetative Species	18	25	20	26	28	30	26
Total Hydrophytic Species	6	14	10	13	15	11	16
Total Upland Species	12	11	10	13	13	19	10
Estimated % Total Vegetative Cover	35	45	90	80	90	95	75
% Transect Length Comprised of Hydrophytic Vegetation Communities	0	0	0	22	23	23	60
% Transect Length Comprised of Upland Vegetation Communities	40	50	100	78	77	77	40
% Transect Length Comprised of Unvegetated Open Water	0	0	0	0	0	0	0
% Transect Length Comprised of Bare Substrate	60	50	0	0	0	0	0

Chart 1: ***Transect maps showing vegetation types of Transect 1 from start (0 feet) to end (532 feet) for each year monitored.***

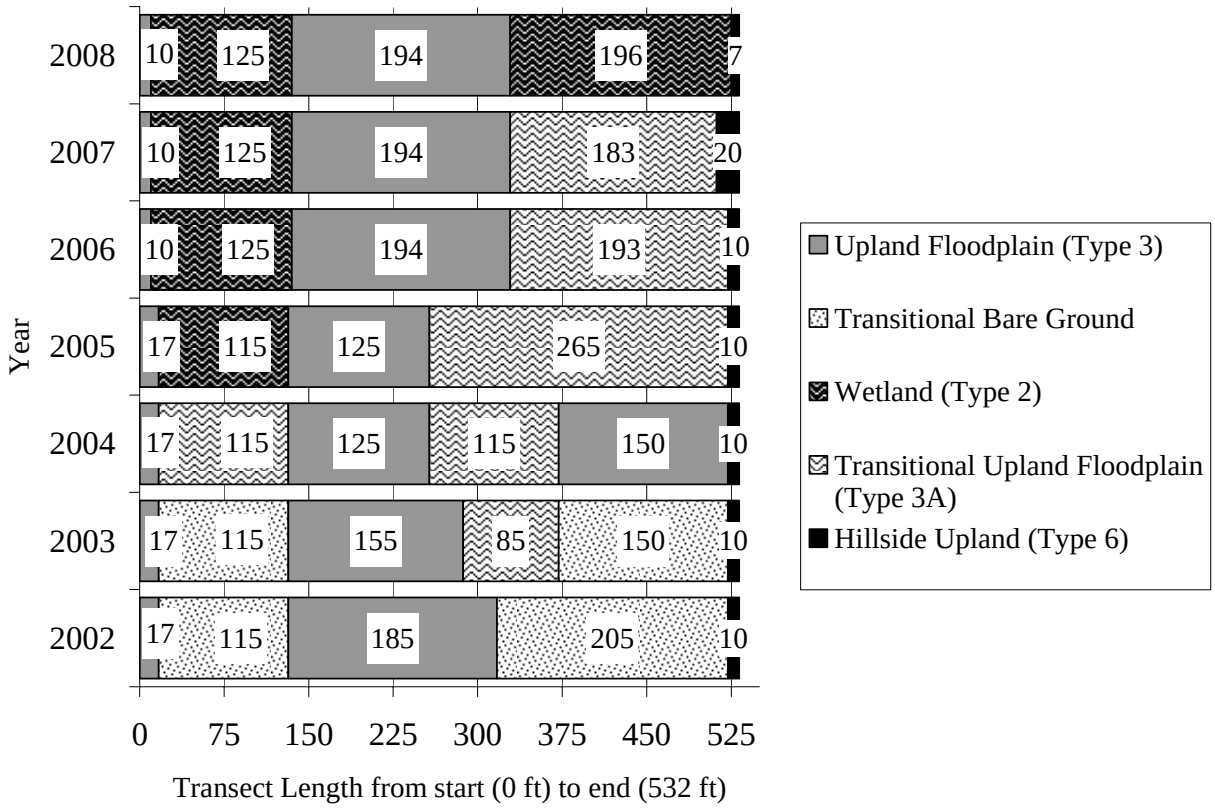
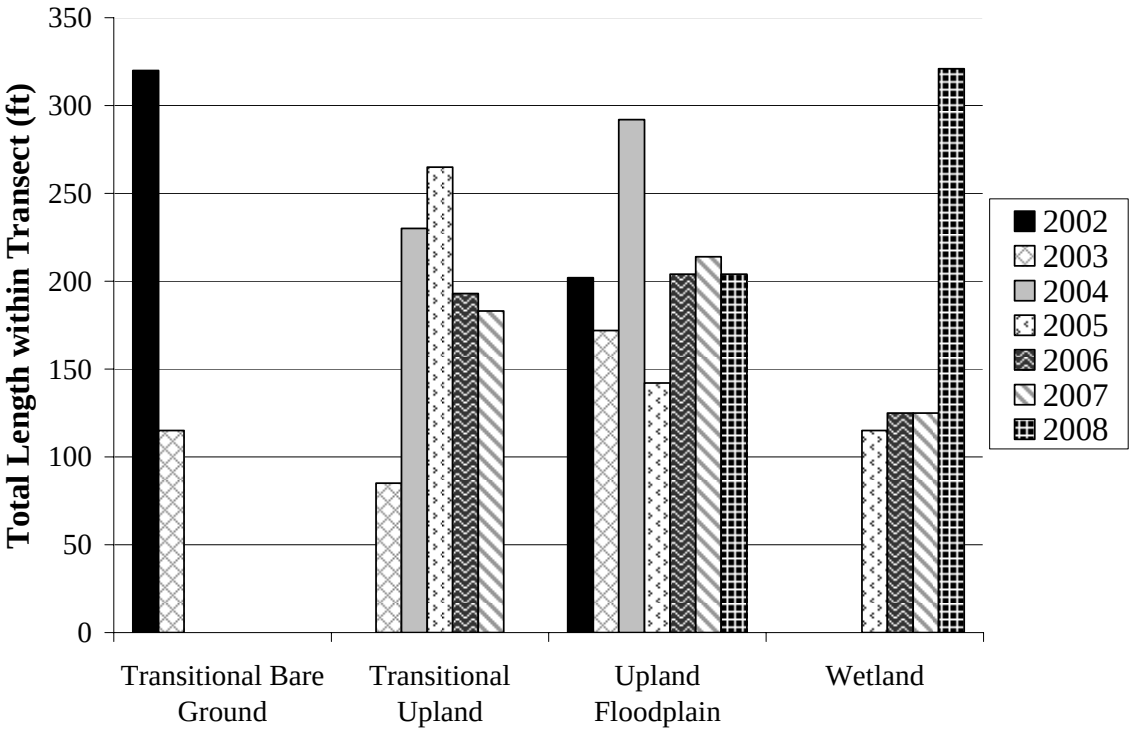


Chart 2: ***Total length of each vegetation community within Transect 1 for 2002 to 2008.***



3.3 Soils

Soils on the vast majority of the site were mapped as Kiwanis fine sandy loam, 0-2 percent slopes (NRCS 1980). This well drained soil typically occurs on terraces and is subject to flooding as a result of winter ice jams (NRCS 1980). The Kiwanis soil type is generally considered non-hydric by the NRCS (NRCS 2006).

Matrix soil colors and textures in the Inner Oxbow and Northern Excavated Area have remained fairly stable during the five years of monitoring. Matrix soil colors in the Outer Oxbow became slightly darker in 2008. The B Horizon soils in wetland portions of the project area ranged from silty clay loam to sandy clay loam with a matrix color ranging from 2.5Y3/1, 2.5Y4/2, to 10YR3/1 (**COE Forms** in **Appendix B**). Mottles in the matrix soil indicate a fluctuating water table. Mottles of 10YR4/6 and 7.5YR4/6 were present in vegetation communities Type 1 (small polygon only), Type 2, Type 4, and Type 5 (**COE Forms** in **Appendix B**).

Since 2002, soil matrix colors in the Type 2 community along Transect 1 have developed very slowly. Soil matrix colors from 2002 to 2004 remained as 10YR3/2. From 2005 to 2007, soil matrix colors did not change, but the presence of oxidized rhizospheres were observed. Oxidized rhizospheres indicate that the soil had been flooded with water long enough that the plants transported oxygen from the leaves to the roots. In 2008 oxidized rhizospheres were absent, and the soil matrix color changed hues and developed a darker chroma to 2.5Y4/1 (**COE Forms** in **Appendix B**).

3.4 Wetland Delineation

Wetland boundaries were re-delineated in 2008, based upon vegetation, soil, and hydrological data taken from 11 soil pit locations (**Figure 3** in **Appendix A**; **COE Forms** in **Appendix B)**. The aerial extent of all aquatic and wetland habitats have been mapped and summarized annually (**Table 3**).

Table 3. ***Aerial coverage of aquatic habitats prior to construction and from 2002 to 2008 at the Perry Ranch Wetland Mitigation Site.***

Aquatic Habitat	Pre-Construction (acre)	2002 (acre)	2003 (acre)	2004 (acre)	2005 (acre)	2006 (acre)	2007 (acre)	2008 (acre)
Wetland	3.40	10.09	12.41	12.33	13.65	18.97	19.96	22.41
Open Water / Mudflat	0.00	7.83	6.20	0.00	6.39	0.00	0.00	0.00
TOTAL	**3.40**	**17.92**	**18.61**	**12.33**	**20.04**	**18.97**	**19.96**	**22.41**

In 2008 the mitigation site produced the greatest amount of wetland acreage. More than 22 acres of wetland developed as of 2008, which is 2.45 acres more than what had developed as of 2007 (**Table 3**; **Figure 3** in **Appendix A**). Wetland habitat was found in the Inner Oxbow, Outer Oxbow, and Northern Excavated Area. Wetland development has been slowly advancing since 2002 as it takes times for plants to colonize and germinate. Wetland development has advanced the most during wet years (i.e., 2002, 2005, and 2008).

Approximately 3.4 acres of wetland occurred at the site prior to construction (**Table 3**). The 27.6-acre mitigation goal is inclusive of these 3.4 acres of pre-existing wetlands. Consequently, the net goal for this project is to create 24.2 wetland acres. As of 2008 the site has netted 19.01 wetland acres, or 79% of the project target.

3.5 Wildlife

A comprehensive list of wildlife species (or their sign) observed at the project site has been maintained from 2002 to 2008 (**Table 4**). For each bird species observed, information on their activity and habitat use was also recorded (**Bird Survey Form** in **Appendix B**). The site provides habitat for many types of wildlife. More wildlife species were observed during 2008 than any other year since 2002. About seven white-tailed deer and one ground-squirrel were observed directly; signs of coyote, fox, and badger were also observed (**MDT Monitoring Form** in **Appendix B**). The first observation of a reptile was made in 2008 (**Table 4**). It is assumed that the increase in fauna use is a result of abundant moisture in 2008 and vegetation that has established.

From 2002 through 2008, between ten and 29 bird species have been observed at the Perry Ranch mitigation site. The record of 29 bird species occurred in this year of 2008 (**Table 4**; **Bird Survey Forms** in **Appendix B**). In addition, many ducklings and Killdeer broods were observed at the Inner Oxbow, Outer Oxbow, and Northern Excavated Area in 2008. Waterfowl species were abundant and nesting, loafing, and foraging behaviors were observed. No birdhouses have been installed at this site.

Table 4: ***Fish and wildlife species observed on the Perry Ranch Mitigation Site from 2002 to 2008.***

FISH	
None	
AMPHIBIAN	
Northern Leopard Frog (*Rana pipiens*)	Western Chorus Frog (*Pseudacris triseriata*)
REPTILE	
Western Terrestrial Garter Snake (*Thamnophis elegans*)	
BIRD	
American Avocet (*Recurvirostra americana*)	Lesser Scaup (*Aythya affinis*)
American Goldfinch (*Carduelis tristis*)	Long-billed Dowitcher (*Limnodromus scolopaceus*)
American Robin (*Turdus migratorius*)	**Longspur spp. (*Calcarius* spp.)**
American White Pelican (*Pelecanus erythrorhynchos*)	**Mallard (*Anas platyrhynchos*)**
Bank Swallow (*Riparia riparia*)	**Northern Harrier (*Circus cyaneus*)**
Barn Swallow (*Hirundo rustica*)	Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)
Black Tern (*Chlidonias niger*)	**Northern Shoveler (*Anas clypeata*)**
Blue-winged Teal (*Anas discors*)	**Red-winged Blackbird (*Agelaius phoeniceus*)**
Brewer's Blackbird (*Euphagus cyanocephalus*)	Red-tailed Hawk (*Buteo jamaicensis*)
Canada Goose (*Branta Canadensis*)	**Savannah Sparrow (*Passerculus sandwichensis*)**
Chukar (*Alectoris chukar*)	Semipalmated Plover (*Charadrius semipalmatus*)
Cinnamon Teal (*Anas cyanoptera*)	Solitary Sandpiper (*Tringa solitaria*)
Cliff Swallow (*Petrochelidon pyrrhonota*)	**Spotted Sandpiper (*Actitis macularia*)**
Common Nighthawk (*Chordeiles minor*)	**Tree Swallow (*Tachycineta bicolor*)**
Common Snipe (*Gallinago gallinago*)	**Vesper Sparrow (*Pooecetes gramineus*)**
Double-crested Cormorant (*Phalacrocorax auritus*)	**Western Meadowlark (*Sturnella neglecta*)**
Eastern Kingbird (*Tyrannus tyrannus*)	Western Sandpiper (*Calidris mauri*)
Franklin's Gull (*Larus pipixcan*)	**Willet (*Catoptrophorus semipalmatus*)**
Gadwall (*Anas strepera*)	**Wilson's Phalarope (*Phalaropus tricolor*)**
Great Blue Heron (*Ardea herodias*)	Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*)
Greater Scaup (*Aythya marila*)	**Yellowlegs species (*Tringa* spp.)**
Green-winged Teal (*Anas crecca*)	
Gray Partridge (*Perdix perdix*)	
Horned Lark (*Eremophila alpestris*)	
Killdeer (*Charadrius vociferous*)	
MAMMAL	
American Badger (*Taxidea taxus*)	**Richardson's Ground Squirrel (*Spermophilus richardsonii*)**
Coyote (*Canis latrans*)	**White-tailed Deer (*Odocoileus virginianus*)**
Deer (*Odocoileus* spp.)	
Fox (species unknown)	
Raccoon (*Procyon lotor*)	

Bolded species were observed during 2008. All other species were observed during one or more of the previous monitoring years, but not during 2008.

The northern leopard frog (*Rana pipiens*) is globally ranked as a G5 indicating it is globally common, widespread, and abundant. In Montana, this species has been assigned the rank of S1 (critically imperiled) in the intermountain valleys (MTNHP 2008). The inner and outer oxbow are considered documented primary habitat for this species because the areas consistently yield sightings during wet years and represent good breeding habitat. Casual observations

documented 6-8 frogs in 2002, four frogs in 2005, one frog in 2006, and at least three frogs in 2008. The northern leopard frog as also been observed in 2006 near the Northern Excavated Area; however, it is only suspected that this area serves as primary habitat because breeding habitat is not as developed as in the Inner and Outer Oxbows.

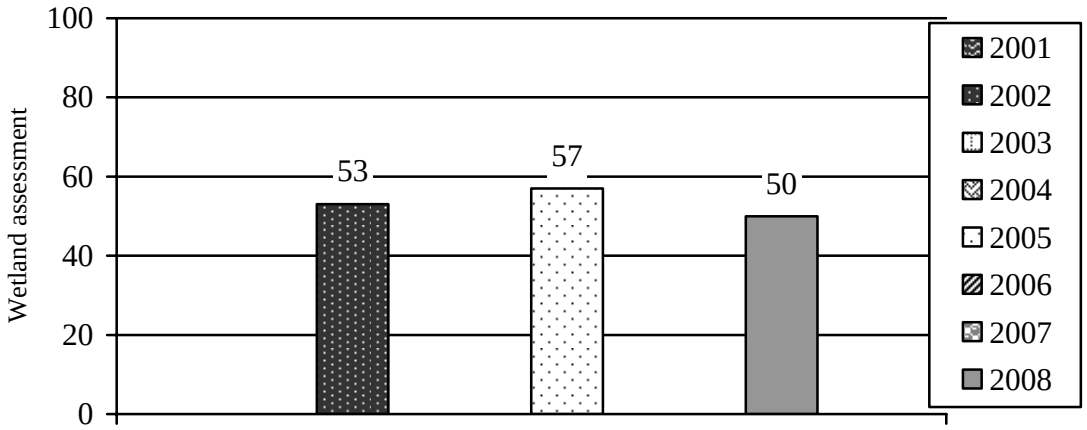
3.6 Macroinvertebrates

One macroinvertebrate sample was collected in the Outer Oxbow during the July 2008 site visit (**Figure 2** in **Appendix A**). Macroinvertebrates have been sampled during years when the Outer Oxbow has been inundated: 2002, 2005, and 2008. Conversely, macroinvertebrates could not be sampled during the drier years of 2003, 2004, 2006, and 2007. The 2008 macroinvertebrate sampling results are provided in **Appendix D** and Rhithron Associates' summary is presented below in italics (Bollman 2008).

> *Although invertebrates were abundant at the Perry Ranch site, the diversity of the fauna was low. The assemblage was dominated by midges in the Cricotopus (*Isocladius*) group, suggesting the presence of filamentous algae. Nutrient enrichment may be implicated by these findings, as well as by the common presence of both hemoglobin-bearers (especially* Psectrocladius *sp. and* Glyptotendipes *sp.) and air-breathers. Predators were less abundant than expected. Aquatic habitats may have been limited.*

Bioassessment scores for 2002, 2005, and 2008 have been similar (**Chart 3**) and are reflective of periodic inundation. All three sampling years have resulted in low fauna diversity. Monotonous habitats and poor water quality appear to limit fauna diversity. The sampling results have also consistently implied that warm water temperatures and nutrient enrichment have resulted in relatively poor wetland water quality. During the past two springs horses and cows have grazed within the site; their dung would contribute to nutrient enrichment. Periods of no surface water also lead to monotonous habitats.

Chart 3. ***Bioassessment scores using the wetland index at the Perry Ranch Wetland Mitigation Site from 2002 to 2008.***



3.7 Functional Assessment

Functional assessment forms were completed for the Inner Oxbow, Outer Oxbow, and the Northern Excavated Area (**Appendix B)** and the results were summarized (**Table 5**). As wetlands have developed within the oxbows and northern excavated area, so have their associated functions and values. However, the methods for assessing wetland functions and values have also changed. Pre-construction conditions were assessed using the 1997 MDT Montana Wetland Assessment Method (MWAM); 2002 through 2007 conditions were assessed using the 1999 MDT MWAM; and the 2008 conditions were assessed using the 2008 MDT MWAM. Despite this, general trends in wetland functional development can still be determined (**Table 5**). In 2008, the Inner Oxbow continued to rate as Category II site (**Table 5**). Both scrub-shrub (willow) and emergent wetland habitats continue to develop within the Inner Oxbow (**Functional Assessment Form** in **Appendix B**). In 2008, the Outer Oxbow continued to rate as a Category II wetland, providing emergent wetland habitat. The Northern Excavated Area continued to rate as a Category III wetland, also providing emergent wetland habitat (**Table 5**).

Table 5: ***Summary of baseline and 2008 wetland function/value ratings and functional points at the Perry Ranch Mitigation Project.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method[1]	Pre-Construction (1997 method)		Post-Construction (2008 method)		
	Inner Oxbow	Outer Oxbow	2008 Inner Oxbow	2008 Outer Oxbow	2008 Northern Excavated Area
Listed/Proposed TE Species Habitat	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)
MTNHP Species Habitat	None (0.0)	None (0.0)	High (1.0)	High (0.8)	Mod (0.8)
General Wildlife Habitat	Mod (0.4)	Low (0.1)	High (0.9)	High (0.9)	Mod (0.7)
General Fish/Aquatic Habitat	NA	NA	NA	NA	NA
Flood Attenuation	Mod (0.5)	Low (0.2)	High (0.9)	Mod (0.6)	Mod (0.6)
Short and Long Term Surface Water Storage	--	--	High (0.9)	High (0.9)	High (0.9)
Sediment, Nutrient, Toxicant Removal	Mod (0.5)	Mod (0.5)	High (1.0)	High (1.0)	Mod (0.7)
Sediment/Shoreline Stabilization	NA	NA	NA	NA	NA
Production Export/Food Chain Support	Mod (0.7)	Mod (0.6)	Mod (0.6)	Mod (0.6)	Mod (0.4)
Groundwater Discharge/Recharge	High (1.0)	Low (0.1)	Mod (0.7)	Mod (0.7)	Mod (0.7)
Uniqueness	Low (0.3)	Low (0.2)	Mod (0.4)	Mod (0.4)	Mod (0.4)
Recreation/Education Potential	Low (0.1)	Low (0.1)	Low (0.05)	Low (0.05)	Low (0.05)
Actual Points/Possible Points	4.4 / 10	2.7 /10	6.55 / 9	6.05 / 9	5.35 / 9
% of Possible Score Achieved	44%	27%	73%	67%	59%
Overall Category	III	IV	II	II	III
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries (ac)	**2.30**	**1.10**	**5.20**	**10.39**	**6.81**
Functional Units (acreage x actual points)	**10.12**	**2.97**	**34.06**	**62.86**	**36.43**
Net Acreage Gain (ac)	**NA**	**NA**	5.20 – 2.30 = **2.90**	10.39 – 1.10 = **9.29**	6.81 - 0.00 = **6.81**
Net Functional Unit Gain (fu)	**NA**	**NA**	34.06-10.12 = **23.94**	62.86 – 2.97 = **59.89**	36.43 – 0.00 = **36.43**
Total Functional Unit Gain	**120.26**				

[1] See completed MDT functional assessment forms in **Appendix B** for further detail.

Since pre-construction the entire project has gained 120.26 functional units as of 2008 (**Table 5**). The Inner and Outer Oxbows have achieved a net gain of about 24 and 50 functional units, respectively. The Northern Excavated Area had no pre-existing wetlands, but has developed wetlands and about 36 functional units.

3.8 Photographs

A 2008 aerial photograph was taken by MDT and used as the base photograph for **Figures 2** and **3** (**Appendix A**). Representative panoramic and single frame photographs were taken from established photo-points (**Appendix C)**.

3.9 Maintenance Needs/Recommendations

Several dike problems were noted during the 2002 summer visit, repaired during 2003, and have been stable into 2008. The Blackfeet Tribe and MDT have developed a weed plan for the Perry Ranch site. Bio-control was established for leafy spurge and Canada thistle and has been monitored through aerial photograph assessments and at three established Weed Photo Points. Leafy spurge is fairly apparent on the 2006, 2007, and 2008 aerial photographs as bright yellow-green patches. Canada thistle populations cannot be interpreted based on color or texture on the aerial photographs.

3.10 Current Credit Summary

No specific performance criteria were required to be met at this site in order to document its success. In general, the site appears to be developing as designed, subject to the limitations of dry and wet years.

Approximately 22.4 acres of wetlands presently occur on the site (**Table 3**; **Figure 3** in **Appendix A**). Approximately 3.4 acres of wetland occurred at the site prior to construction (**Table 3**). The 27.6-acre mitigation goal is inclusive of these 3.4 acres of pre-existing wetlands. Consequently, the net goal for this project is to create 24.2 acres. As of 2008 the site has netted about 19 wetland acres, or 79% of the project target.

4.0 REFERENCES

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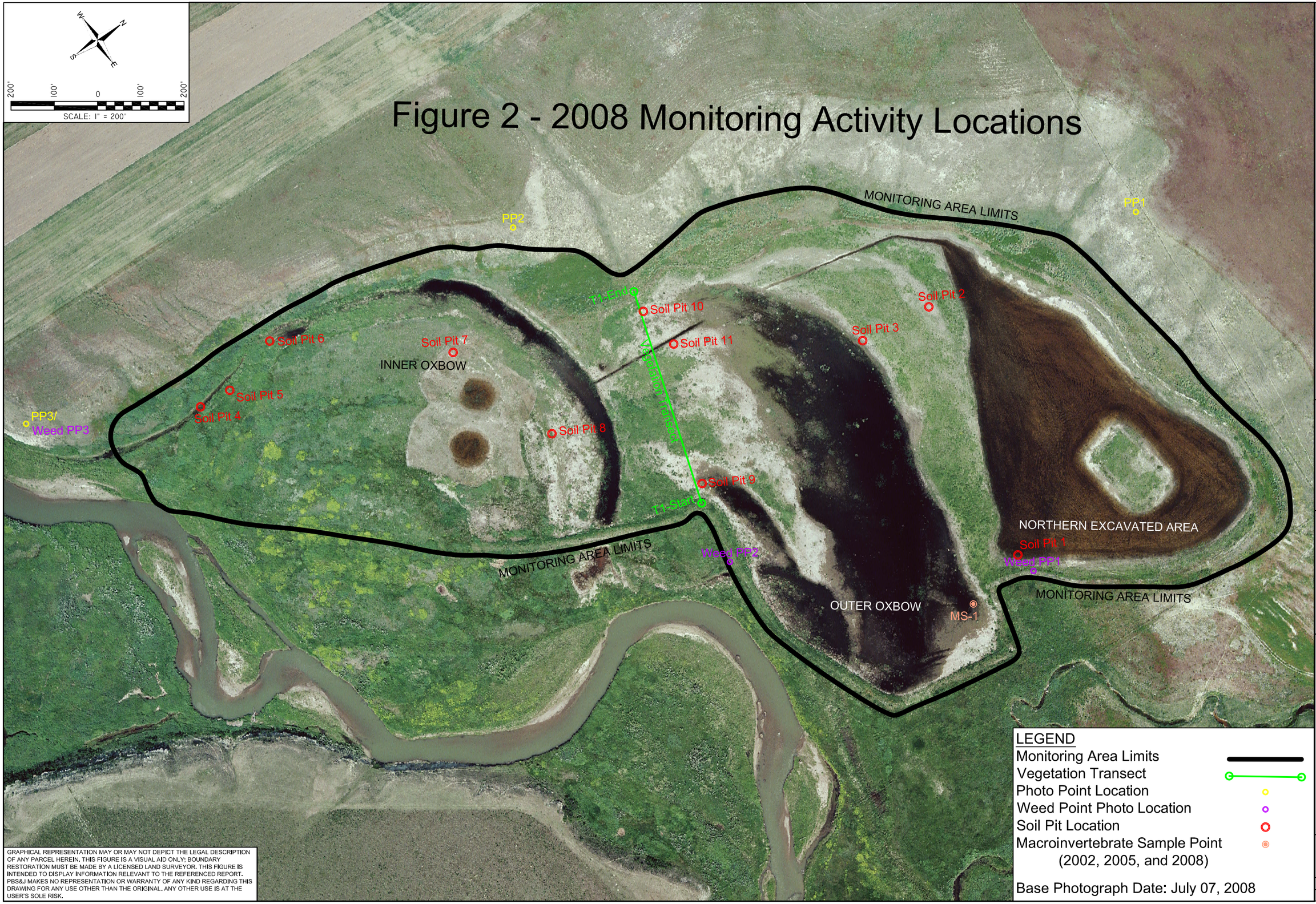
Appendix A

FIGURES 2 & 3

MDT Wetland Mitigation Monitoring
Perry Ranch
Glacier County, Montana

Figure 2 - 2008 Monitoring Activity Locations



GRAPHICAL REPRESENTATION MAY OR MAY NOT DEPICT THE LEGAL DESCRIPTION OF ANY PARCEL HEREIN. THIS FIGURE IS A VISUAL AID ONLY; BOUNDARY RESTORATION MUST BE MADE BY A LICENSED LAND SURVEYOR. THIS FIGURE IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. PBS&J MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND REGARDING THIS DRAWING FOR ANY USE OTHER THAN THE ORIGINAL. ANY OTHER USE IS AT THE USER'S SOLE RISK.

LEGEND

- Monitoring Area Limits
- Vegetation Transect
- Photo Point Location
- Weed Point Photo Location
- Soil Pit Location
- Macroinvertebrate Sample Point (2002, 2005, and 2008)

Base Photograph Date: July 07, 2008

PERRY RANCH WETLAND MITIGATION SITE

2008 MONITORING ACTIVITY LOCATIONS

DRAWN: JR
PROJ MGR: J. BERGLUND
CHECKED: AP
APPVD: JB
PLOTTED: Nov/19/2008

PROJ NO: 0B4308801 04.05
LOCATION: CUT BANK, MT
SCALE: NOTED
FILE NAME: BASE 2008.dwg

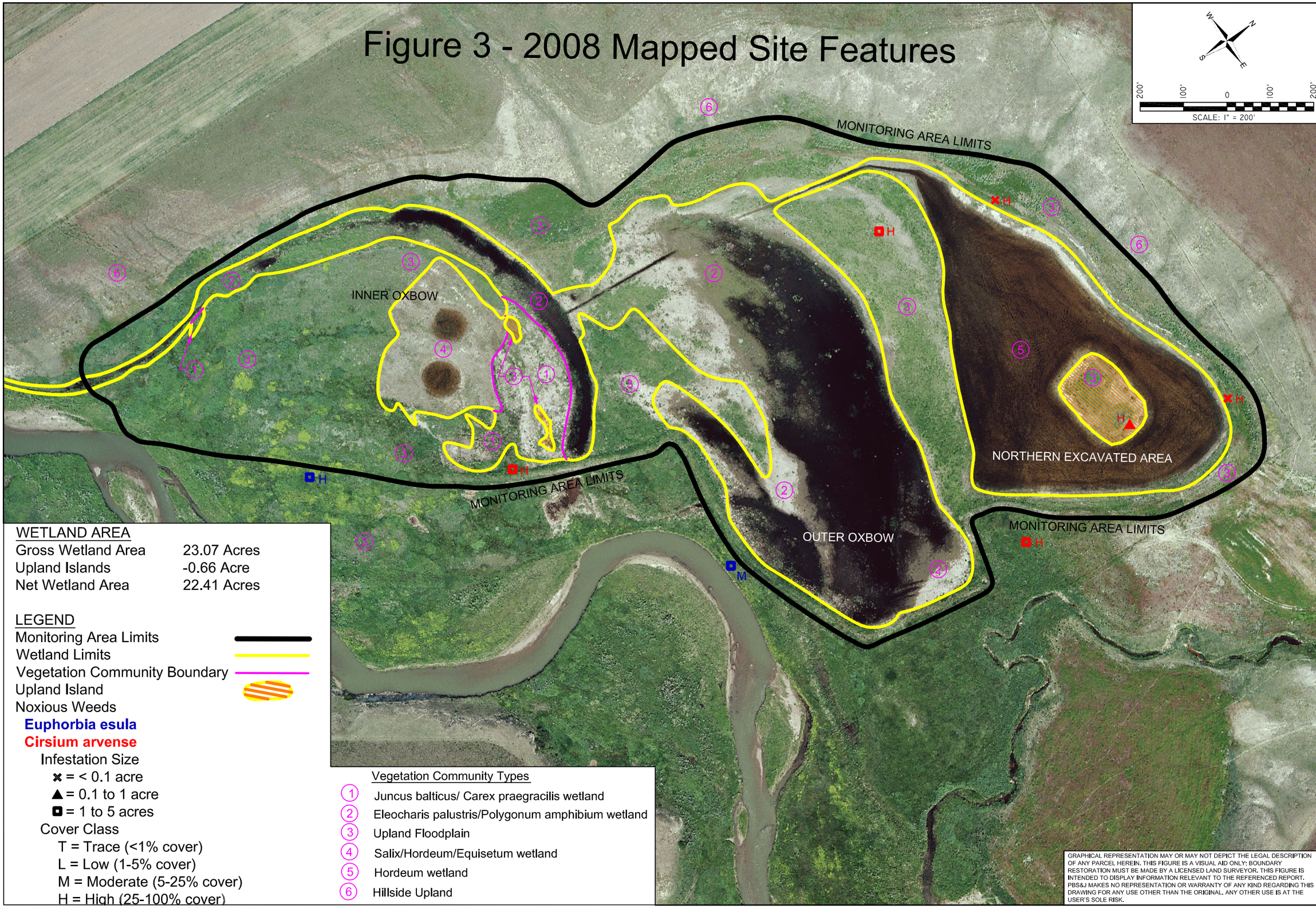
801 N. Last Chance Gulch
Suite 101
Helena, MT 59601
PBSJ

FIGURE 2

REV -

DATE 11/07/2008

Figure 3 - 2008 Mapped Site Features



WETLAND AREA

Gross Wetland Area	23.07 Acres
Upland Islands	-0.66 Acre
Net Wetland Area	22.41 Acres

LEGEND

- Monitoring Area Limits
- Wetland Limits
- Vegetation Community Boundary
- Upland Island
- Noxious Weeds
  - **Euphorbia esula**
  - **Cirsium arvense**
    - Infestation Size
      - ✖ = < 0.1 acre
      - ▲ = 0.1 to 1 acre
      - ◘ = 1 to 5 acres
    - Cover Class
      - T = Trace (<1% cover)
      - L = Low (1-5% cover)
      - M = Moderate (5-25% cover)
      - H = High (25-100% cover)

Vegetation Community Types

1. Juncus balticus/ Carex praegracilis wetland
2. Eleocharis palustris/Polygonum amphibium wetland
3. Upland Floodplain
4. Salix/Hordeum/Equisetum wetland
5. Hordeum wetland
6. Hillside Upland

PERRY RANCH WETLAND MITIGATION SITE

2008 MAPPED SITE FEATURES

DRAWN: JR
PROJ MGR: J. BERGLUND
CHECKED: AP
APPVD: JB
PLOTTED: Nov/19/2008

PROJ NO: 0B4308801 04.05
LOCATION: CUT BANK, MT
SCALE: NOTED
FILE NAME: BASE 2008.dwg

801 N. Last Chance Gulch
Suite 101
Helena, MT 59601
PBSJ

FIGURE 3

REV -

DATE 11/06/2008

Appendix B

2008 WETLAND MITIGATION SITE MONITORING FORM
2008 BIRD SURVEY FORM
2008 COE WETLAND DELINEATION FORMS
2008 FUNCTIONAL ASSESSMENT FORMS

MDT Wetland Mitigation Monitoring
Perry Ranch
Glacier County, Montana

PBS&J / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **Perry Ranch** Project Number: **0B4308801-04.05**
Assessment Date: **July 9, 2008** Person(s) conducting the assessment: **A. Pipp**
Location: **Cut Bank Creek** MDT District: **Great Falls** Milepost: _____
Legal Description: T **34N** R **8W** Section **27, 34**
Weather Conditions: **sunny, 80's deg., calm wind** Time of Day: **0800-1700**
Initial Evaluation Date: **May 15, 2002** Monitoring Year: **7** # Visits in Year: **2**
Size of evaluation area: **30 acres** Land use surrounding wetland: **rangeland and Cut Bank Creek**

HYDROLOGY

Surface Water Source: **seasonal flooding via Cut Bank Creek**
Inundation: **Present** Average Depth: **0.4 feet** Range of Depths: **0-1 foot**
Percent of assessment area under inundation: **40%**
Depth at emergent vegetation-open water boundary: **NA feet**
If assessment area is not inundated then are the soils saturated within 12 inches of surface: _
Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc.):
drift lines, matted vegetation, tracks

Groundwater Monitoring Wells: **Absent**
Record depth of water below ground surface (in feet):

Well Number	Depth	Well Number	Depth	Well Number	Depth

Additional Activities Checklist:
☒ Map emergent vegetation-open water boundary on aerial photograph.
☒ Observe extent of surface water during each site visit and look for evidence of past surface water elevations (drift lines, erosion, vegetation staining, etc.)
☐ Use GPS to survey groundwater monitoring well locations, if present.

COMMENTS / PROBLEMS:
During the May visit the entire site was dry except for 3 small pools of water within the Inlet Channel. About 10 cows, 5 calves, and 3 horses were grazing within the site. On the July visit the Northern Excavated Area, Outer Oxbow, Inner Oxbow, Inlet Channel, and the two depressions of the Inner Oxbow were inundated. No cows or horses were in the site.

VEGETATION COMMUNITIES

Community Number: **1** Community Title (main spp): **Juncus balticus / Carex praegracilis**

Dominant Species	% Cover	Dominant Species	% Cover
Juncus balticus	5 = > 50%	Hordeum jubatum	+ = < 1%
Carex praegracilis	5 = > 50%	Agropyron repens	1 = 1-5%
Potentilla anserina	4 = 21-50%	Eleocharis palustris	1 = 1-5%
Artemisia ludoviciana	1 = 1-5%		
Equisetum arvense	3 = 11-20%		
Glycyrrhiza lepidota	1 = 1-5%		

Comments / Problems: **This wetland community is slowly drying out and shrinking. Symphoricarpos occidentalis, Rosa arkansana, Euphorbia esula, Bromus inermis, Poa pratensis, and Cirsium arvense are invading. Area mapped in 2007 is smaller than in 2006 or 2005.**

Community Number: **2** Community Title (main spp): **Eleocharis palustris / Polygonum amphibium**

Dominant Species	% Cover	Dominant Species	% Cover
Eleocharis palustris	3 = 11-20%	Hordeum jubatum	3 = 11-20%
Polygonum amphibium	3 = 11-20%	Typha latifolia	+ = < 1%
Alopecurus pratensis	4 = 21-50%	Rumex crispus	2 = 6-10%
Rumex maritimus	2 = 6-10%	Juncus balticus	1 = 1-5%
Phalaris arundinacea	2 = 6-10%	Agropryon trachycaulum	2 = 6-10%
Equisteum arvense	2 = 6-10%	Potentilla anserina	2 = 6-10%

Comments / Problems: **Soils appear to remain saturated or inundated enough that the community flourishes. In 2008 Alopecurus pratensis dominated in portions that were saturated, but not inundated. A portion of Type 4 was combined with Type 2 in 2008.**

Community Number: **3A** Community Title (main spp): **Transitional Upland Floodplain**

Dominant Species	% Cover	Dominant Species	% Cover
Agropyron trachycaulum	1 = 1-5%	Rumex maritimus	1 = 1-5%
Agropyron intermedium	2 = 6-10%	Hordeum jubatum	5 = > 50%
Agropyron repens	1 = 1-5%	Alopecurus pratensis	3 = 11-20%
Artemisia ludoviciana	1 = 1-5%	Aster pansus	1 = 1-5%
Symphoricarpos occidentalis	1 = 1-5%	Salix exigua	+ = < 1%
Rumex crispus	1 = 1-5%	Poa pratensis	+ = < 1%

Comments / Problems: **This is a transitional upland/wetland. In 2007, this community was dominated with H. jubatum and scattered with upland and wetland plants; soils were dry; plants east of the channel were brown and cured while those west of the channel were still green and fruiting. In 2008, this plant community was inundated partially, saturated completely, exhibited hydric soils, and was dominated by wetlands plants; hence, it was mapped as Type 2.**

VEGETATION COMMUNITIES (continued)

Community Number: **4** Community Title (main spp): **Salix/Hordeum/Equisteum Wetland**

Dominant Species	% Cover	Dominant Species	% Cover
Equisetum arvense	4 = 21-50%	Salix amygdaloides	3 = 11-20%
Hordeum jubatum	4 = 21-50%	Agropyon intermedium	1 = 1-5%
Alopecurus pratensis	2 = 6-10%	Carex praegracilis	1 = 1-5%
Rumex crispus	1 = 1-5%	Eleocharus palustris	1 = 1-5%
Potentilla anserina	3 = 11-20%	Phalaris arundinacea	2 = 6-10%
Salix exigua	4 = 21-50%	Typha latifolia	+ = < 1%

Comments / Problems: **in 2008, Salix, Equisetum, Potentilla, and Hordeum continued to flourish around the excavated ponds. A portion of Type 4 converted to Type 2.**

Community Number: **3** Community Title (main spp): **Upland Floodplain**

Dominant Species	% Cover	Dominant Species	% Cover
Agropyron trachycaulum	3 = 11-20%	Euphorbia esula	4 = 21-50%
Agropyron smithii	3 = 11-20%	Cirsium arvense	4 = 21-50%
Agropyron intermedium	3 = 11-20%	Bromus inermis	2 = 6-10%
Hordeum jubatum	4 = 21-50%	Aster pansus	3 = 11-20%
Rosa arkansas	3 = 11-20%	Bromus inermis	1 = 1-5%
Symphoricarpos occidentalis	4 = 21-50%		

Comments / Problems: **Occupies the flood prone area.**

Community Number: **6** Community Title (main spp): **Hillside Upland**

Dominant Species	% Cover	Dominant Species	% Cover
Stipa viridula	5 = > 50%	Koeleria macranta (K. cristata)	2 = 6-10%
Agropyron smithii	4 = 21-50%	Symphoricarpos occidentale	3 = 11-20%
Agropyron intermedia	4 = 21-50%	Rosa arkansana	3 = 11-20%
Artemisia frigida	3 = 11-20%	Bromus inermis	1 = 1-5%
Grindelia squarrosa	3 = 11-20%	Bouteloua gracilis	2 = 6-10%
Opuntia spp.	2 = 6-10%		

Comments / Problems: **Consists of native upland plants on hillsides, outside of the floodplain and cultivated fields.**

Community Number: **5** Community Title (main spp): **Hordeum jubatum**

Dominant Species	% Cover	Dominant Species	% Cover
Hordeum jubatum	5 = > 50%	Salix lutea	1 = 1-5%
Salix exigua	3 = 11-20%	Cirsium arvense	2 = 6-10%
Rumex maritimus	+ = < 1%	Alopecurus pratensis	+ = < 1%
Rumex crispus	+ = < 1%	Equisetum arvense	+ = < 1%
Lactuca serriola	+ = < 1%	Eleocharis palustris	1 = 1-5%
Thlaspi arvense	+ = < 1%		

Comments / Problems: **In 2008, wetland quality increased from marginal to good. Plant diversity is still low and C. arvense was stressed, but still threatens plant community. E. palustris was present in patches for the 1st time.**

Additional Activities Checklist:

☒ Record and map vegetative communities on aerial photograph.

COMPREHENSIVE VEGETATION LIST

Plant Species	Vegetation Community Number (s)	Plant Species	Vegetation Community Number (s)
Achillea millefolium	3, 6	Medicago sativa	3, 6
Agropyron intermedium	1, 3, 4, 5, 6	Melilotus alba	3, 6
Agropyron repens	3	Melilotus officinalis	3, 6
Agropyron smithii	3, 6	Mentha arvensis	3
Agropyron trachycaulum	1, 2, 3, 3A	Opuntia polyacantha	6
Agrostis alba	2, 3	Phalaris arundinacea	1, 2, 4, 6
Alopecurus pratensis	2, 3, 4, 5	Phleum pratense	3, 6
Amaranthus retroflexus (1)	3, 6	Plantago hirtella	1
Artemisia frigida	6	Plantago major	1, 2
Artemisia ludoviciana	1, 3, 3A	Poa annua	(2), 3, (3A), (4)
Aster (pansus)	3, 6	Poa pratensis	3, 6
Atriplex spp.	3, 6	Polygonum amphibium	1, 2
Bouteloua gracilis	6	Potentilla (gracilis)	1, 3
Brassica kaber	6	Potentilla anserina	1, 2, 3, 4
Bromus inermis	3, 6	Ranunculus cymbalaria	4
Cardaria draba	6	Rosa arkansana	1, 3, 6
Carex lanuginosa	1, 2	Rumex crispus	2, 3, 4, 5
Carex praegracilis	1, 3, 4	Rumex maritimus	2, 3, 3A, 5
Chenopodium album	3, 6	Salix amygdaloides	3, 4
Cirsium arvense (N)	3, 4, 6	Salix exigua	2, 3, 3A, 4, 5
Cynoglossum officinale (N) (1)	border 3/4	Salix lutea	2, 3, 3A, 4, 5
Dactylis glomerata	3	Sisymbium altissimum	3
Descurainia pinnata	3, 6	Smilacina stellata	1
Distichlis spicata	1	Solidago canadensis	1, 3
Eleocharis acicularis	2	Spartina pectinata	1, 2
Eleocharis palustris	1, 2, 3, 4, 5	Stipa viridula	6
Epilobium ciliatum	1	Symphoricarpos occidentalis	1, 3, 6
Equisetum arvense	1, 2, 3, 4	Taraxacum officinale	3, 6
Equisetum hyemale	2	Thlaspi arvense	3, 5, 6
Euphorbia esula (N)	1, 3, 4	Triglochin maritimum	1, 2
Glyceria elata	2	Typha latifolia	2, 4
Glycyrrhiza lepidota	1, 3		
Grindelia squarrosa	3, 6		
Hordeum jubatum	1, 2, 3/3A,4, 5		
Juncus balticus	1		
Kochia scoparia	3		
Koeleria macrantha	6		

Comments / Problems: <u>Parenthesis placed around specific epithets indicates an uncertainty in the species identification. (N) indicates a Montana State Noxious plant. (1) indicates that the species was not observed in 2008.</u>

PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number Observed	Mortality Causes
N/A			

Comments / Problems: **No species were planted.**

WILDLIFE

Birds

Were man-made nesting structures installed? **No**
If yes, type of structure: _____ How many? _____
Are the nesting structures being used? **NA**
Do the nesting structures need repairs? _____

Mammals and Herptiles

Mammal and Herptile Species	Number Observed	Indirect Indication of Use			
		Tracks	Scat	Burrows	Other
White-tailed Deer(1, 2)	7	☒	☐	☐	
Badger (1)	0	☐	☐	☒	+/- fresh burrow
Ground Squirrel (1)	1	☐	☐	☒	
Coyote (2)	0	☒	☒	☐	
Fox (2)	0	☒	☐	☐	
Raccoon (2)	0	☒	☐	☐	
Beaver (3)	0	☐	☐	☐	scent piles
Spurge Hawk Moth Caterpillar (4)	0	☐	☐	☐	
western garter snake (2)	1	☐	☐	☐	
northern leopard frog (2)	1	☐	☐	☐	

Additional Activities Checklist:
NA Macroinvertebrate Sampling (if required)

Comments / Problems: On the May 6th visit, PBS&J found about 10 cows, 5 calves, and 3 horses were grazing within the site. (1): Animals observed by PBS&J on the July 9th visit; no cows or horses present. (2): Animals observed by MDT on a late July visit. (3): Scent piles observed along Cut Bank Creek by MDT on the late July visit. (4): Bio-control insects observed by MDT on the late July visit; insects were eating leafy spurge plants in a few areas of the site.

PHOTOGRAPHS

Using a camera with a 50mm lens and color film take photographs of the following permanent reference points listed in the check list below. Record the direction of the photograph using a compass. When at the site for the first time, establish a permanent reference point by setting a ½ inch rebar or fencepost extending 2-3 feet above ground. Survey the location with a resource grade GPS and mark the location on the aerial photograph.

Photograph Checklist:

- ☒ One photograph for each of the four cardinal directions surrounding the wetland.
- ☒ At least one photograph showing upland use surrounding the wetland. If more than one upland exists then take additional photographs.
- ☒ At least one photograph showing the buffer surrounding the wetland.
- ☒ One photograph from each end of the vegetation transect, showing the transect.

Location	Photograph Frame #	Photograph Description	Compass Reading (°)
		See Photo Sheets	

Comments / Problems: **<u>See Photograph Sheets in Appendix C of the 2008 report.</u>**

GPS SURVEYING

Using a resource grade GPS survey the items on the checklist below. Collect at least 3 location points set at a 5 second recording rate. Record file numbers for site in designated GPS field notebook.

GPS Checklist:

- ☒ Jurisdictional wetland boundary.
- ☒ 4-6 landmarks that are recognizable on the aerial photograph.
- ☒ Start and End points of vegetation transect(s).
- ☒ Photograph reference points.
- ☐ Groundwater monitoring well locations.

Comments / Problems: **Communities and boundaries were mapped using the GPS and some hand-mapping onto the 2008 aerial photograph.**

WETLAND DELINEATION

(attach COE delineation forms)

At each site conduct these checklist items:

- ☒ Delineate wetlands according to the 1987 Army COE manual.
- ☒ Delineate wetland – upland boundary onto aerial photograph.
- **NA** Survey wetland – upland boundary with a resource grade GPS survey.

Comments / Problems: **The GPS unit and hand-mapping onto the aerial photograph were used to delineate wetland boundaries.**

FUNCTIONAL ASSESSMENT

(Complete and attach full MDT Montana Wetland Assessment Method field forms.)
(Also attach any completed abbreviated field forms, if used)

Comments / Problems: _____

MAINTENANCE

Were man-made nesting structure installed at this site? **No**
If yes, do they need to be repaired? **NA**
If yes, describe the problems below and indicate if any actions were taken to remedy the problems.

Were man-made structures built or installed to impound water or control water flow into or out of the wetland? **Yes**
If yes, are the structures working properly and in good working order? **Yes**
If no, describe the problems below.

Comments / Problems: _____

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Perry Ranch** Date: **July 9, 2008** Examiner: **A. Pipp**
Transect Number: **1** Approximate Transect Length: **532 feet** Compass Direction from Start: **288˚** Note: _____

Vegetation Type A: **Type 3 - Upland Floodplain**	
Length of transect in this type: 0-10 feet	
Plant Species	**Cover**
Hordeum jubatum (not seen in 2008)	
Kochia scoparia	+ = < 1%
Alopecurus pratensis	3 = 11-20%
Medicago sativa	1 = 1-5%
Agropyron intermedium	3 = 11-20%
Thlaspi arvense	+ = < 1%
Aster pansus	3 = 11-20%
Agropyron trachycaulum	2 = 6-10%
Rumex maritimus	+ = < 1%
Bromus inermis	2 = 6-10%
Total Vegetative Cover:	90%

Vegetation Type B: **Type 2 - E. palustris / P. amphibium Wetland**	
Length of transect in this type: 10-135 feet	
Plant Species	**Cover**
Cirsium arvense & Salix exigua	1 = 1-5%
Hordeum jubatum	+ = < 1%
Alopecurus pratensis	1 = 1-5%
Potentilla anserina	+ = < 1%
Rumex maritimus	+ = < 1%
Equisetum arvense ABSENT	
Juncus balticus & Glycyrrhiza lepidota EACH	+ = < 1%
Carex lanuginosa & Agropyron trachycaulum ABSENT	
Eleocharis palustris & Phalaris arundinacea	1 = 1-5%
Taraxacum officinale & Thlaspi arvense EACH	+ = < 1%
Descurainia pinnata & Chenopodium album ABSENT	
Total Vegetative Cover:	15%

Vegetation Type C: **Type 3 - Upland Floodplain**	
Length of transect in this type: 135 - 329 feet	
Plant Species	**Cover**
Agropyron trachycaulum & A. intermedium together	5 = > 50%
Bromus inermis	3 = 11-20%
Hordeum jubatum	1 = 1-5%
Thlaspi arvense	+ = < 1%
Descurainia pinnata & Lactuca serriola (not seen in 2008)	
Chenopodium album & Phalaris arundinacea (not seen in 2008)	
Taraxacum officinale	1 = 1-5%
Cirsium arvense	2 = 6-10%
Aster pansus	1 = 1-5%
Alopecurus pratensis & Agropyron smithii EACH	1 = 1-5%
Rumex maritimus & Equisetum arvense EACH	+ = < 1%
Total Vegetative Cover:	100%

Vegetation Type D: **Type 2 - E. palustris / P. amphibium Wetland**	
Length of transect in this type: 329 - 525 feet	
Plant Species	**Cover**
Hordeum jubatum	3 = 11-20%
Agropyron trachycaulum & A. intermedium EACH	2 = 6-10%
Rumex maritimus & R. crispus TOGETHER	2 = 6-10%
Alopecurus pratensis	5 = > 50%
Descurainia pinnata	1 = 1-5%
Salix exigua	1 = 1-5%
Salix lutea	1 = 1-5%
Artemisia ludoviciana	+ = < 1%
Poa pratensis	+ = < 1%
Lactuca serriola (not observed in 2008)	
Grindelia squarrosa (not observed in 2008)	
Total Vegetative Cover:	80%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Perry Ranch** Date: **July 9, 2008** Examiner: **A. Pipp**
Transect Number: **1** Approximate Transect Length: **532 feet** Compass Direction from Start: **288˚** Note: _____

Vegetation Type E: **Type 6 - Hillside Upland**	
Length of transect in this type: 525-532 feet	
Plant Species	**Cover**
Kochia scoparia & Cirsium arvense EACH	+ = < 1%
Rumex maritimus & R. crispus TOGETHER	+ = < 1%
Thlaspi arvense & Descurainia pinnata EACH	+ = < 1%
Hordeum jubatum & Alopecurus pratensis EACH	+ = < 1%
Salix lutea & S. exigua EACH	+ = < 1%
Mentha arvensis	2 = 6-10%
Aster pansus & Poa pratensis EACH	1 = 1-5%
Agropyron smithii	4 = 21-50%
Family Onagraceae	+ = < 1%
Phalaris arundinacea & Carex spp. EACH	+ = < 1%
Potentilla anserina	+ = < 1%
Total Vegetative Cover:	100%

Vegetation Type F:	
Length of transect in this type: feet	
Plant Species	**Cover**
Total Vegetative Cover:	%

Vegetation Type G:	
Length of transect in this type: feet	
Plant Species	**Cover**
Total Vegetative Cover:	%

Vegetation Type H:	
Length of transect in this type: feet	
Plant Species	**Cover**
Total Vegetative Cover:	%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Cover Estimate		**Indicator Class**	**Source**
+ = < 1%	3 = 11-10%	+ = Obligate	P = Planted
1 = 1-5%	4 = 21-50%	- = Facultative/Wet	V = Volunteer
2 = 6-10%	5 = > 50%	0 = Facultative	

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): **75%**

Establish transects perpendicular to the shoreline (or saturated perimeter). The transect should begin in the upland area. Permanently mark this location with a standard metal fencepost. Extend the imaginary transect line towards the center of the wetland, ending at the 3 foot depth (in open water), or at the point where water depths or saturation are maximized. Mark this location with another metal fencepost.

Estimate cover within a 10 foot wide "belt" along the transect length. At a minimum, establish a transect at the windward and leeward sides of the wetland. Remember that the purpose of this sampling is to monitor, not inventory, representative portions of the wetland site.

Comments: _____

BIRD SURVEY – FIELD DATA SHEET

Site: **Perry Ranch** Date: **5/6/08**
Survey Time: **12:15 pm** to **2:30 pm**

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Horned Lark	4	FO BD	UP MA				
Western Meadowlark	8	FO BD	UP MA				
Savannah Sparrow	3	F FO BD	UP MA				
Gray Partridge (1)	4	L	UP				
Northern Harrier (2)	2	FO	UP OW				
Northern Shoveler	3	FO	MA				
Longspur (3)	1	F	UP				

BEHAVIOR CODES
BP = One of a breeding pair
BD = Breeding display
F = Foraging
FO = Flyover
L = Loafing
N = Nesting

HABITAT CODES
AB = Aquatic bed
FO = Forested
I = Island
MA = Marsh
MF = Mud Flat
OW = Open Water
SS = Scrub/Shrub
UP = Upland buffer
WM = Wet meadow
US = Unconsolidated shore

Weather: **May 6th: Cloudy sky with intervals of sunshine; 60 degrees; winds about 15 mph; no precipitation during visit. Site was dry. Surface water present in three small ponds within the inner oxbow and inlet channel.**

Notes: **May 6th: About 10 cows and 5 calves and 3 horsees were grazing in the site. (1) Gray partridge were bedded down in tall grass - could be nesting. (2) The Northern Harriers were between the site and Cutbank Creek. (3) A female Longspur was observed, but unknown if it was a Chestnut-collared or McCown's species. Amphibians were not seen or heard (wind could have prevented their calls from being heard). Canada Geese, Northern Shovellers, and Mallards were observed on Cut Bank Creek, but were not counted in this bird survey.**

BIRD SURVEY – FIELD DATA SHEET

Site: **Perry Ranch** Date: **7/9/08**
Survey Time: **7:20 am** to **4:30 pm**

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Mallard (1, 2, 3)	40	F L	MA	Shorebird spp. (3)	2	F	MA
Greater Scaup (1, 2)	5	F L	MA				
Killdeer (1, 2, 3)	22	F FO N	UP MA US				
Wilson's Phalarope (1,2)	11	F L	UP MA				
Cinnamon Teal (1)	2	F L	MA				
Willet (1, 3)	7	F	MA				
Duckling spp. (1, 2, 3)	20	F L	MA				
Cliff Swallows (1, 2, 3)	4	F FO	MA UP				
Great Blue Heron (2)	3	F	MA				
Am. White Pelican (2)	1	L	MA				
Northern Shoveler (2)	4	F L	MA				
Gray Partridge (2)	2	L	UP				
Northern Harrier (3)	2	FO	MA UP				
Blue-winged Teal (2)	4	L F	MA				
Gadwall (2)	4	F L	MA				
Common Snipe (3)	2	FO	MA UP				
Black Tern (1, 2)	1	FO F	MA				
Red-winged Blackbird (3)	4	L F	MA				
Green-winged Teal (3)	4	F	MA				
Sandpiper spp. (3)	10	FO F	MA US UP				

BEHAVIOR CODES
BP = One of a breeding pair
BD = Breeding display
F = Foraging
FO = Flyover
L = Loafing
N = Nesting

HABITAT CODES
AB = Aquatic bed
FO = Forested
I = Island
MA = Marsh
MF = Mud Flat
OW = Open Water
SS = Scrub/Shrub
UP = Upland buffer
WM = Wet meadow
US = Unconsolidated shore

Weather: **July 9th: Sunny; temperature in the 80's; calm wind. Surface water present in Excavated Area (island still exposed), Inner Oxbow, and Outer Oxbow.**

Notes: **No cows or horses present. (1) Observed only in Excavated Area; (2) Observed only in Inner Oxbow; (3) Observed within general project area. Many young ducks, young shore birds, and female ducks were observed; numbers on this form are probably underestimated.**

BIRD SURVEY – FIELD DATA SHEET

Site: **Perry Ranch (1)** Date: **Late July 2008**
Survey Time: **_____ pm** to **_____ pm**

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Horned Lark							
Western Meadowlark							
Canada Geese	40-50						
Mallard							
Blue-winged Teal							
Green-winged Teal with brood							
Killdeer with young	20-25						
Wilson's Phalarope							
Spotted Sandpiper							
Lesser/Greater Yellowleg							
American Goldfinch							
Vesper Sparrow							
Bank Swallow							
Tree Swallow							

BEHAVIOR CODES
BP = One of a breeding pair
BD = Breeding display
F = Foraging
FO = Flyover
L = Loafing
N = Nesting

HABITAT CODES
AB = Aquatic bed
FO = Forested
I = Island
MA = Marsh
MF = Mud Flat
OW = Open Water
SS = Scrub/Shrub
UP = Upland buffer
WM = Wet meadow
US = Unconsolidated shore

Weather: **Site was observed by MDT Wetland Mitigation Specialist in late July of 2008.**

Notes: _____

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008	
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier	
Investigators: Pipp		**State:** Montana	
		Plot ID: Soil Pit 1	

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area? (If needed, explain on the reverse side)	Yes (No)	**Field Location:** In Type 5; N. Excavated Area.

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Eleocharis palustris	Herb	OBL	*Cirsium arvense*	Shrub	FACU+
Spikerush,Creeping			Thistle,Creeping		
Salix exigua	Shrub	OBL			
Willow,Sandbar					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 2/3 = 66.67%	**FAC Neutral:** 2/3 = 66.67% **Numeric Index:** 6/3 = 2.00

Remarks:
C. arvense was exhibiting a stressed growth form (very long stalk with a tuft of leaves at the tip).

HYDROLOGY

NO Recorded Data(Describe in Remarks): N/A Stream, Lake or Tide Gauge N/A Aerial Photographs N/A Other YES No Recorded Data Field Observations Depth of Surface Water: = 5.0 *(in.)* Depth to Free Water in Pit: N/A *(in.)* Depth to Saturated Soil: N/A *(in.)*	**Wetland Hydrology Indicators** **Primary Indicators** YES Inundated YES Saturated in Upper 12 Inches NO Water Marks NO Drift Lines NO Sediment Deposits NO Drainage Patterns in Wetlands **Secondary Indicators** NO Oxidized Root Channels in Upper 12 Inches NO Water-Stained Leaves NO Local Soil Survey Data YES FAC-Neutral Test NO Other(Explain in Remarks)

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008	
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier	
Investigators: Pipp		**State:** Montana	
		Plot ID: Soil Pit 1	

SOILS

Map Unit Name (Series and Phase): Kiwanis fine sandy loam
Map Symbol: KS **Drainage Class:** well drained
Taxonomy (Subgroup): Mixed Frigid Typic Ustifluvents
Profile Description
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-5	A	2.5Y4/2	N/A	N/A	N/A	Silty clay loam
5-12	B	2.5Y4/2	10YR4/6	Few	Faint	Silty clay loam

Hydric Soil Indicators:

NO Histosol	NO Concretions
NO Histic Epipedon	NO High Organic Content in Surface Layer in Sandy Soils
NO Sulfidic Odor	NO Organic Streaking in Sandy Soils
NO Aquic Moisture Regime	NO Listed on Local Hydric Soils List
NO Reducing Conditions	NO Listed on National Hydric Soils List
YES Gleyed or Low Chroma Colors	NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:

WetForm™

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008	
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier	
Investigators: Pipp		**State:** Montana	
		Plot ID: Soil Pit 2	

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area? (If needed, explain on the reverse side)	Yes (No)	**Field Location:** Betw. North Excavated Area & Outer Oxbow

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Hordeum jubatum	Herb	FAC+	*Cirsium arvense*	Herb	FACU+
Barley,Fox-Tail			Thistle,Creeping		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 1/2 = 50.00%	**FAC Neutral:** 0/1 = 0.00% **Numeric Index:** 7/2 = 3.50

Remarks:

HYDROLOGY

NO **Recorded Data(Describe in Remarks):**
- N/A **Stream, Lake or Tide Gauge**
- N/A **Aerial Photographs**
- N/A **Other**

YES **No Recorded Data**

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	= 1.0 *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO **Inundated**
- YES **Saturated in Upper 12 Inches**
- NO **Water Marks**
- YES **Drift Lines**
- NO **Sediment Deposits**
- NO **Drainage Patterns in Wetlands**

Secondary Indicators
- NO **Oxidized Root Channels in Upper 12 Inches**
- NO **Water-Stained Leaves**
- NO **Local Soil Survey Data**
- NO **FAC-Neutral Test**
- NO **Other(Explain in Remarks)**

Remarks:
Evidence of drift lines and matted vegetation indicates the area was flooded prior to field visit.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008	
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier	
Investigators: Pipp		**State:** Montana	
		Plot ID: Soil Pit 2	

SOILS

Map Unit Name (Series and Phase): Kiwanis fine sandy loam
Map Symbol: KS **Drainage Class:** well drained
Taxonomy (Subgroup): Mixed Frigid Typic Ustifluvents
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-5	A	10YR3/1	N/A	N/A	N/A	Clay
5-12	B	2.5Y4/2	N/A	N/A	N/A	Silty clay

Hydric Soil Indicators:
- NO **Histosol**
- NO **Histic Epipedon**
- NO **Sulfidic Odor**
- NO **Aquic Moisture Regime**
- NO **Reducing Conditions**
- NO **Gleyed or Low Chroma Colors**
- NO **Concretions**
- NO **High Organic Content in Surface Layer in Sandy Soils**
- NO **Organic Streaking in Sandy Soils**
- NO **Listed on Local Hydric Soils List**
- NO **Listed on National Hydric Soils List**
- NO **Other (Explain in Remarks)**

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No)	Is the Sampling Point within the Wetland? Yes (No)
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	Yes (No)	

Remarks:

WetForm™

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Pipp		**State:** Montana
		Plot ID: Soil Pit 3

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area? (If needed, explain on the reverse side)	Yes (No)	**Field Location:** In Inner Oxbow (NW side)

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Rumex crispus	Herb	FACW	*Rumex maritimus*	Herb	FACW+
Dock,Curly			Dock,Golden		
Eleocharis palustris	Herb	OBL	*Juncus balticus*	Herb	OBL
Spikerush,Creeping			Rush,Baltic		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 4/4 = 100.00%

FAC Neutral: 4/4 = 100.00%
Numeric Index: 6/4 = 1.50

Remarks:
Also dominant was a sedge with no inflorescences.

HYDROLOGY

NO Recorded Data(Describe in Remarks):
- N/A Stream, Lake or Tide Gauge
- N/A Aerial Photographs
- N/A Other

YES No Recorded Data

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	= 9.0 *(in.)*
Depth to Saturated Soil:	= 0.0 *(in.)*

Wetland Hydrology Indicators
Primary Indicators
- NO Inundated
- YES Saturated in Upper 12 Inches
- NO Water Marks
- NO Drift Lines
- NO Sediment Deposits
- NO Drainage Patterns in Wetlands

Secondary Indicators
- YES Oxidized Root Channels in Upper 12 Inches
- NO Water-Stained Leaves
- NO Local Soil Survey Data
- YES FAC-Neutral Test
- NO Other(Explain in Remarks)

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Pipp		**State:** Montana
		Plot ID: Soil Pit 3

SOILS

Map Unit Name (Series and Phase): Kiwanis fine sandy loam
Map Symbol: KS **Drainage Class:** well drained **Mapped Hydric Inclusion?**
Taxonomy (Subgroup): Mixed Frigid Typic Ustifluvents **Field Observations Confirm Mapped Type?** Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-12	A	10YR3/1	N/A	N/A	N/A	Clay loam, Oxidized rhizospheres

Hydric Soil Indicators:

NO Histosol	NO Concretions
NO Histic Epipedon	NO High Organic Content in Surface Layer in Sandy Soils
NO Sulfidic Odor	NO Organic Streaking in Sandy Soils
NO Aquic Moisture Regime	NO Listed on Local Hydric Soils List
NO Reducing Conditions	NO Listed on National Hydric Soils List
YES Gleyed or Low Chroma Colors	NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Pipp		**State:** Montana
		Plot ID: Soil Pit 4

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		In Inlet Channel.

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Eleocharis palustris	Herb	OBL	*Alopecurus pratensis*	Herb	FACW
Spikerush,Creeping			Foxtail,Meadow		
Salix exigua	Herb	OBL			
Willow,Sandbar					

Percent of Dominant Species that are OBL, FACW or FAC:	**FAC Neutral:** 3/3 = 100.00%
(excluding FAC-) 3/3 = 100.00%	**Numeric Index:** 4/3 = 1.33

Remarks:

HYDROLOGY

NO Recorded Data(Describe in Remarks):	**Wetland Hydrology Indicators**
N/A Stream, Lake or Tide Gauge	**Primary Indicators**
N/A Aerial Photographs	YES Inundated
N/A Other	YES Saturated in Upper 12 Inches
YES No Recorded Data	NO Water Marks
	NO Drift Lines
Field Observations	NO Sediment Deposits
	NO Drainage Patterns in Wetlands
Depth of Surface Water: = 3.0 *(in.)*	**Secondary Indicators**
	NO Oxidized Root Channels in Upper 12 Inches
Depth to Free Water in Pit: N/A *(in.)*	NO Water-Stained Leaves
	NO Local Soil Survey Data
Depth to Saturated Soil: N/A *(in.)*	YES FAC-Neutral Test
	NO Other(Explain in Remarks)

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Pipp		**State:** Montana
		Plot ID: Soil Pit 4

SOILS

Map Unit Name (Series and Phase): Kiwanis fine sandy loam
Map Symbol: KS **Drainage Class:** well drained **Mapped Hydric Inclusion?**
Taxonomy (Subgroup): Mixed Frigid Typic Ustifluvents **Field Observations Confirm Mapped Type?** Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
0-12	A	2.5Y4/2	7.5YR4/6	Common Prominent	Sandy clay loam

Hydric Soil Indicators:

NO Histosol	NO Concretions
NO Histic Epipedon	NO High Organic Content in Surface Layer in Sandy Soils
NO Sulfidic Odor	NO Organic Streaking in Sandy Soils
NO Aquic Moisture Regime	NO Listed on Local Hydric Soils List
NO Reducing Conditions	NO Listed on National Hydric Soils List
YES Gleyed or Low Chroma Colors	NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	Project No:	Date: 9-Jul-2008
Applicant/Owner: -Montana Department of Transportation-		County: Glacier
Investigators: Pipp		State: Montana
		Plot ID: Soil Pit 5

Do Normal Circumstances exist on the site?	(Yes) No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	Transect ID:
Is the area a potential Problem Area?	Yes (No)	Field Location:
(If needed, explain on the reverse side)		Area of drying wetland.

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Juncus balticus	Herb	OBL	*Agropyron smithii*	Herb	FACU
Rush,Baltic			Wheatgrass,Western		
Potentilla anserina	Herb	OBL			
Silverweed					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 2/3 = 66.67%

FAC Neutral: 2/3 = 66.67%
Numeric Index: 6/3 = 2.00

Remarks:
Also dominant was a Carex and a Poa, but species were not identifed because specimens were left at the site.

HYDROLOGY

NO Recorded Data(Describe in Remarks):
- N/A Stream, Lake or Tide Gauge
- N/A Aerial Photographs
- N/A Other

YES No Recorded Data

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	= 0.0 *(in.)*

Wetland Hydrology Indicators
- Primary Indicators
  - NO Inundated
  - YES Saturated in Upper 12 Inches
  - NO Water Marks
  - NO Drift Lines
  - NO Sediment Deposits
  - NO Drainage Patterns in Wetlands
- Secondary Indicators
  - YES Oxidized Root Channels in Upper 12 Inches
  - NO Water-Stained Leaves
  - NO Local Soil Survey Data
  - YES FAC-Neutral Test
  - NO Other(Explain in Remarks)

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	Project No:	Date: 9-Jul-2008
Applicant/Owner: -Montana Department of Transportation-		County: Glacier
Investigators: Pipp		State: Montana
		Plot ID: Soil Pit 5

SOILS

Map Unit Name (Series and Phase): Kiwanis fine sandy loam
Map Symbol: KS Drainage Class: well drained
Taxonomy (Subgroup): Mixed Frigid Typic Ustifluvents
Mapped Hydric Inclusion? Field Observations Confirm Mapped Type? Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-8	A	10YR3/2	N/A	N/A	N/A	Sandy clay loam, Oxidized rhizospheres
8-12	B	10YR5/1	N/A	N/A	N/A	Sandy clay loam, gravels
8-12	B	10YR3/2	10YR4/6	Common	Faint	Sandy clay loam

Hydric Soil Indicators:
- NO Histosol
- NO Histic Epipedon
- NO Sulfidic Odor
- NO Aquic Moisture Regime
- NO Reducing Conditions
- YES Gleyed or Low Chroma Colors
- NO Concretions
- NO High Organic Content in Surface Layer in Sandy Soils
- NO Organic Streaking in Sandy Soils
- NO Listed on Local Hydric Soils List
- NO Listed on National Hydric Soils List
- NO Other (Explain in Remarks)

Remarks:
The 10YR 5/1 and 10YR 3/2 matrices co-dominate the 8-12 inch layer.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008
Applicant/Owner:	-Montana Department of Transportation-		**County:** Glacier
Investigators:	Pipp		**State:** Montana
			Plot ID: Soil Pit 6

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area? (If needed, explain on the reverse side)	Yes (No)	**Field Location:** In Type 2 along the Inlet Channel.

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Phalaris arundinacea	Herb	FACW	*Alopecurus pratensis*	Herb	FACW
Grass,Reed Canary			Foxtail,Meadow		
Polygonum amphibium	Herb	OBL			
Smartweed,Water					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 3/3 = 100.00%	**FAC Neutral:** 3/3 = 100.00% **Numeric Index:** 5/3 = 1.67

Remarks:
Also dominant was a robust Carex, but the species was not identifiable.

HYDROLOGY

NO Recorded Data(Describe in Remarks): N/A Stream, Lake or Tide Gauge N/A Aerial Photographs N/A Other YES No Recorded Data Field Observations Depth of Surface Water: N/A *(in.)* Depth to Free Water in Pit: N/A *(in.)* Depth to Saturated Soil: = 0.0 *(in.)*	**Wetland Hydrology Indicators** Primary Indicators NO Inundated YES Saturated in Upper 12 Inches NO Water Marks NO Drift Lines NO Sediment Deposits NO Drainage Patterns in Wetlands Secondary Indicators YES Oxidized Root Channels in Upper 12 Inches NO Water-Stained Leaves NO Local Soil Survey Data YES FAC-Neutral Test NO Other(Explain in Remarks)

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008
Applicant/Owner:	-Montana Department of Transportation-		**County:** Glacier
Investigators:	Pipp		**State:** Montana
			Plot ID: Soil Pit 6

SOILS

Map Unit Name (Series and Phase): Kiwanis fine sandy loam
Map Symbol: KS **Drainage Class:** well drained **Mapped Hydric Inclusion?**
Taxonomy (Subgroup): Mixed Frigid Typic Ustifluvents **Field Observations Confirm Mapped Type?** Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-4	A	2.5Y4/1	N/A	N/A	N/A	Clay loam, Roots & organics
4-12	B	2.5Y4/2	N/A	N/A	N/A	Sandy loam, Oxidized rhizospheres

Hydric Soil Indicators:

NO Histosol	NO Concretions
NO Histic Epipedon	NO High Organic Content in Surface Layer in Sandy Soils
NO Sulfidic Odor	NO Organic Streaking in Sandy Soils
NO Aquic Moisture Regime	NO Listed on Local Hydric Soils List
NO Reducing Conditions	NO Listed on National Hydric Soils List
YES Gleyed or Low Chroma Colors	NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland?	(Yes) No
Wetland Hydrology Present?	(Yes) No		
Hydric Soils Present?	(Yes) No		

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Pipp		**State:** Montana
		Plot ID: Soil Pit 7

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Emergent / Scrub-Shrub
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		In Inner Oxbow (Type 5).

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Salix exigua	Shrub	OBL	*Hordeum jubatum*	Herb	FAC+
Willow,Sandbar			Barley,Fox-Tail		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 2/2 = 100.00%

FAC Neutral: 1/1 = 100.00%
Numeric Index: 4/2 = 2.00

Remarks:
Also dominant is a wheatgrass, probably A. trachycaulum.

HYDROLOGY

NO Recorded Data(Describe in Remarks):
- N/A Stream, Lake or Tide Gauge
- N/A Aerial Photographs
- N/A Other

YES No Recorded Data

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	= 0.0 *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO Inundated
- YES Saturated in Upper 12 Inches
- NO Water Marks
- NO Drift Lines
- NO Sediment Deposits
- NO Drainage Patterns in Wetlands

Secondary Indicators
- YES Oxidized Root Channels in Upper 12 Inches
- NO Water-Stained Leaves
- NO Local Soil Survey Data
- YES FAC-Neutral Test
- NO Other(Explain in Remarks)

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Pipp		**State:** Montana
		Plot ID: Soil Pit 7

SOILS

Map Unit Name (Series and Phase): Kiwanis fine sandy loam
Map Symbol: KS **Drainage Class:** well drained
Taxonomy (Subgroup): Mixed Frigid Typic Ustifluvents
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
0-5	A	2.5Y4/1	10YR4/6	Common Prominent	Sandy clay loam
5-10+	B	2.5Y5/1	N/A	N/A N/A	Silty clay loam, gravels

Hydric Soil Indicators:
- NO Histosol
- NO Histic Epipedon
- NO Sulfidic Odor
- NO Aquic Moisture Regime
- NO Reducing Conditions
- YES Gleyed or Low Chroma Colors
- NO Concretions
- NO High Organic Content in Surface Layer in Sandy Soils
- NO Organic Streaking in Sandy Soils
- NO Listed on Local Hydric Soils List
- NO Listed on National Hydric Soils List
- NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Pipp		**State:** Montana
		Plot ID: Soil Pit 8

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		In Inner Oxbow (Type 2).

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Carex praegracilis	Herb	FACW	*Juncus effusus*	Herb	FACW+
Sedge,Clustered Field			Rush,Soft		
Alopecurus pratensis	Herb	FACW	*Rumex crispus*	Herb	FACW
Foxtail,Meadow			Dock,Curly		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 4/4 = 100.00%

FAC Neutral: 4/4 = 100.00%
Numeric Index: 8/4 = 2.00

Remarks:

HYDROLOGY

NO Recorded Data(Describe in Remarks):
- N/A Stream, Lake or Tide Gauge
- N/A Aerial Photographs
- N/A Other

YES No Recorded Data

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	= 12.0 *(in.)*
Depth to Saturated Soil:	N/A *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO Inundated
- YES Saturated in Upper 12 Inches
- NO Water Marks
- NO Drift Lines
- NO Sediment Deposits
- NO Drainage Patterns in Wetlands

Secondary Indicators
- YES Oxidized Root Channels in Upper 12 Inches
- NO Water-Stained Leaves
- NO Local Soil Survey Data
- YES FAC-Neutral Test
- NO Other(Explain in Remarks)

Remarks:

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Pipp		**State:** Montana
		Plot ID: Soil Pit 8

SOILS

Map Unit Name (Series and Phase): Kiwanis fine sandy loam
Map Symbol: KS **Drainage Class:** well drained
Taxonomy (Subgroup): Mixed Frigid Typic Ustifluvents
Profile Description

Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-4	A	2.5Y3/1	N/A	N/A	N/A	Silty clay loam, Oxidized rhizospheres
4-12	B	2.5Y3/1	N/A	N/A	N/A	Silty clay loam, Oxidized rhizospheres & gravels

Hydric Soil Indicators:
- NO Histosol
- NO Histic Epipedon
- NO Sulfidic Odor
- NO Aquic Moisture Regime
- NO Reducing Conditions
- YES Gleyed or Low Chroma Colors
- NO Concretions
- NO High Organic Content in Surface Layer in Sandy Soils
- NO Organic Streaking in Sandy Soils
- NO Listed on Local Hydric Soils List
- NO Listed on National Hydric Soils List
- NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	Project No:	Date: 9-Jul-2008
Applicant/Owner: -Montana Department of Transportation-		County: Glacier
Investigators: Pipp		State: Montana
		Plot ID: Soil Pit 9

Do Normal Circumstances exist on the site?	(Yes) No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	Transect ID:
Is the area a potential Problem Area? (If needed, explain on the reverse side)	Yes (No)	Field Location: In thumb of Outer Oxbow on Transect 1.

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Eleocharis palustris Spikerush,Creeping	Herb	OBL	*Cirsium arvense* Thistle,Creeping	Herb	FACU+
Phalaris arundinacea Grass,Reed Canary	Herb	FACW			

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 2/3 = 66.67%

FAC Neutral: 2/3 = 66.67%
Numeric Index: 7/3 = 2.33

Remarks:

HYDROLOGY

NO Recorded Data(Describe in Remarks):
- N/A Stream, Lake or Tide Gauge
- N/A Aerial Photographs
- N/A Other

YES No Recorded Data

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	= 12 *(in.)*

Wetland Hydrology Indicators
Primary Indicators
- NO Inundated
- YES Saturated in Upper 12 Inches
- NO Water Marks
- NO Drift Lines
- NO Sediment Deposits
- NO Drainage Patterns in Wetlands

Secondary Indicators
- NO Oxidized Root Channels in Upper 12 Inches
- NO Water-Stained Leaves
- NO Local Soil Survey Data
- YES FAC-Neutral Test
- NO Other(Explain in Remarks)

Remarks:
Very moist from 0-12 inches.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	Project No:	Date: 9-Jul-2008
Applicant/Owner: -Montana Department of Transportation-		County: Glacier
Investigators: Pipp		State: Montana
		Plot ID: Soil Pit 9

SOILS

Map Unit Name (Series and Phase): Kiwanis fine sandy loam
Map Symbol: KS Drainage Class: well drained
Taxonomy (Subgroup): Mixed Frigid Typic Ustifluvents
Profile Description
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
0-6	A	2.5Y3/1	N/A	N/A N/A	Clay loam
6-12	B	2.5Y4/1	10YR4/6	Common Faint	Sandy clay loam

Hydric Soil Indicators:
- NO Histosol
- NO Histic Epipedon
- NO Sulfidic Odor
- NO Aquic Moisture Regime
- NO Reducing Conditions
- YES Gleyed or Low Chroma Colors
- NO Concretions
- NO High Organic Content in Surface Layer in Sandy Soils
- NO Organic Streaking in Sandy Soils
- NO Listed on Local Hydric Soils List
- NO Listed on National Hydric Soils List
- NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:

WetForm™

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Pipp		**State:** Montana
		Plot ID: Soil Pit 10

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		On T-1 and west of Inlet Channel.

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Eleocharis palustris	Herb	OBL	*Rumex crispus*	Herb	FACW
Spikerush,Creeping			Dock,Curly		
Alopecurus arundinaceus	Herb	NI			
Foxtail,Creeping					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 2/2 = 100.00%

FAC Neutral: 2/2 = 100.00%
Numeric Index: 3/2 = 1.50

Remarks:
Also dominant was a wheatgrass, probably Agropyron trachycaulum.

HYDROLOGY

NO Recorded Data(Describe in Remarks):
- N/A Stream, Lake or Tide Gauge
- N/A Aerial Photographs
- N/A Other

YES No Recorded Data

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	= 11.0 *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO Inundated
- YES Saturated in Upper 12 Inches
- NO Water Marks
- NO Drift Lines
- NO Sediment Deposits
- NO Drainage Patterns in Wetlands

Secondary Indicators
- YES Oxidized Root Channels in Upper 12 Inches
- NO Water-Stained Leaves
- NO Local Soil Survey Data
- YES FAC-Neutral Test
- NO Other(Explain in Remarks)

Remarks:
Only a few oxidized rhizospheres were present. Soil was very moist from 0-11 inches.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Pipp		**State:** Montana
		Plot ID: Soil Pit 10

SOILS

Map Unit Name (Series and Phase): Kiwanis fine sandy loam
Map Symbol: KS **Drainage Class:** well drained
Taxonomy (Subgroup): Mixed Frigid Typic Ustifluvents
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-12	A	2.5Y3/1	N/A	N/A	N/A	Silty clay loam, Oxidized rhizospheres

Hydric Soil Indicators:

- NO Histosol
- NO Histic Epipedon
- NO Sulfidic Odor
- NO Aquic Moisture Regime
- NO Reducing Conditions
- YES Gleyed or Low Chroma Colors
- NO Concretions
- NO High Organic Content in Surface Layer in Sandy Soils
- NO Organic Streaking in Sandy Soils
- NO Listed on Local Hydric Soils List
- NO Listed on National Hydric Soils List
- NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Pipp		**State:** Montana
		Plot ID: Soil Pit 11

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area? (If needed, explain on the reverse side)	Yes (No)	**Field Location:** East of Inlet Channel in Outer Oxbow.

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Hordeum jubatum	Herb	FAC+	*Alopecurus pratensis*	Herb	FACW
Barley,Fox-Tail			Foxtail,Meadow		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 2/2 = 100.00%	**FAC Neutral:** 1/1 = 100.00% **Numeric Index:** 5/2 = 2.50

Remarks:

HYDROLOGY

NO Recorded Data(Describe in Remarks):	**Wetland Hydrology Indicators**
N/A Stream, Lake or Tide Gauge	**Primary Indicators**
N/A Aerial Photographs	NO Inundated
N/A Other	YES Saturated in Upper 12 Inches
YES No Recorded Data	NO Water Marks
	NO Drift Lines
Field Observations	NO Sediment Deposits
Depth of Surface Water: N/A *(in.)*	NO Drainage Patterns in Wetlands
Depth to Free Water in Pit: N/A *(in.)*	**Secondary Indicators**
Depth to Saturated Soil: = 6.0 *(in.)*	NO Oxidized Root Channels in Upper 12 Inches
	NO Water-Stained Leaves
	NO Local Soil Survey Data
	YES FAC-Neutral Test
	NO Other(Explain in Remarks)

Remarks:

WetForm™

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Perry Ranch - 2008	**Project No:**	**Date:** 9-Jul-2008
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Pipp		**State:** Montana
		Plot ID: Soil Pit 11

SOILS

Map Unit Name (Series and Phase): Kiwanis fine sandy loam
Map Symbol: KS **Drainage Class:** well drained
Taxonomy (Subgroup): Mixed Frigid Typic Ustifluvents
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-12	A	2.5Y3/1	N/A	N/A	N/A	Silty clay loam

Hydric Soil Indicators:

NO Histosol	NO Concretions
NO Histic Epipedon	NO High Organic Content in Surface Layer in Sandy Soils
NO Sulfidic Odor	NO Organic Streaking in Sandy Soils
NO Aquic Moisture Regime	NO Listed on Local Hydric Soils List
NO Reducing Conditions	NO Listed on National Hydric Soils List
YES Gleyed or Low Chroma Colors	NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:

WetForm™

MDT MONTANA WETLAND ASSESSMENT FORM (revised March 2008)

1. Project Name: Perry Ranch **2. MDT Project #:** NH 0002(232) **3. Control #:** 0703

3. Evaluation Date: July 9, 2008 **4. Evaluator(s):** Andrea Pipp **5. Wetland/Site #(s):** Inner Oxbow

6. Wetland Location(s): Township 34 N, Range 8 W, Section 27, 34; Township ___ N, Range ___ E, Section _____

Approximate Stationing or Roadposts: NA

Watershed: 8 - Marias **County:** Glacier _ _ _____

7. Evaluating Agency: MDT

Purpose of Evaluation:

- ☐ **Wetland potentially affected by MDT project**
- ☐ **Mitigation wetlands; pre-construction**
- ☒ **Mitigation wetlands; post-construction**
- ☐ **Other** _____

8. Wetland Size (acre): _____ (visually estimated)
5.20 (measured, e.g. GPS)

9. Assessment Area (AA) Size (acre): _____ (visually estimated)
(see manual for determining AA) 5.20 (measured, e.g. GPS)

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA (See manual for definitions.)

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% OF AA
Riverine	Emergent Wetland	Excavated	Seasonal / Intermittent	65
Riverine	Scrub-Shrub Wetland	Excavated	Seasonal / Intermittent	30
Riverine	Unconsolidated Bottom	Excavated	Seasonal / Intermittent	5

Comments: _____

11. ESTIMATED RELATIVE ABUNDANCE (of similarly classified sites within the same Major Montana Watershed Basin; see manual.)
common

12. GENERAL CONDITION OF AA

i. Disturbance: Use matrix below to select the appropriate response; see manual for Montana listed noxious weed and aquatic nuisance vegetation species lists.

Conditions within AA	Predominant Conditions Adjacent to (within 500 feet of) AA		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is ≤15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is ≤15%.	---	low disturbance	---
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	---	---	---
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.	---	---	---

Comments (types of disturbance, intensity, season, etc.)**:** _____

ii. Prominent noxious, aquatic nuisance, and other exotic vegetation species: Cirsium arvense, Euphorbia esula, Melilotus officinale, & Bromus inermis; Cynoglossum officinale observed in 2007, but not observed in 2008.

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: _____

13. STRUCTURAL DIVERSITY (Based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes]; see #10 above.)

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management preventing (passive) existence of additional vegetated classes?		Modified Rating
≥3 (or 2 if one is forested) classes	---	NA	NA	NA
2 (or 1 if forested) classes	mod	NA	NA	NA
1 class, but not a monoculture	---	←NO	YES→	---
1 class, monoculture (1 species comprises ≥90% of total cover)	---	NA	NA	NA

Comments: _____

Wetland/Site #(s): Inner Oxbow

14A. HABITAT FOR FEDERALLY LISTED OR PROPOSED THREATENED OR ENDANGERED PLANTS OR ANIMALS

i. AA is Documented (D) or Suspected (S) to contain: Check box based on definitions in manual.

Primary or critical habitat (**list species**) ☐ D ☐ S _____
Secondary habitat (**list species**) ☐ D ☐ S _____
Incidental habitat (**list species**) ☐ D ☒ S Piping Plover
No usable habitat ☐ S

ii. Rating: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
Functional Point/Rating	---	---	---	---	---	.1L	---

Sources for documented use (e.g. observations, records): _____

14B. HABITAT FOR PLANTS OR ANIMALS RATED S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM
Do not include species listed in 14A above.

i. AA is Documented (D) or Suspected (S) to contain: Check box based on definitions in manual.

Primary or critical habitat (**list species**) ☒ D ☐ S Northern Leopard Frog
Secondary habitat (**list species**) ☐ D ☐ S _____
Incidental habitat (**list species**) ☐ D ☐ S _____
No usable habitat ☐ S

ii. Rating: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
S1 Species Functional Point/Rating	1H	---	---	---	---	---	---
S2 and S3 Species Functional Point/Rating	---	---	---	---	---	---	---

Sources for documented use (e.g. observations, records): Northern leopard frogs have been observed in early (by PBS&J) and late (by MDT) July of 2008 and in the summers of 2006, 2005, and 2002. From 1 to 8 individuals have been observed during these years.

14C. GENERAL WILDLIFE HABITAT RATING

i. Evidence of Overall Wildlife Use in the AA: Check substantial, moderate, or low based on supporting evidence.

☒ ***Substantial:*** Based on any of the following [check].
- ☒ observations of abundant wildlife #s or high species diversity (during any period)
- ☒ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☒ presence of extremely limiting habitat features not available in the surrounding area
- ☐ interview with local biologist with knowledge of the AA

☐ ***Minimal:*** Based on any of the following [check].
- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interview with local biologist with knowledge of AA

☐ ***Moderate:*** Based on any of the following [check].
- ☐ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- ☐ common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☐ adequate adjacent upland food sources
- ☐ interview with local biologist with knowledge of the AA

ii. Wildlife Habitat Features: Working from top to bottom, check appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent **vegetated** classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see manual for further definitions of these terms].

Structural Diversity (see #13)	☐ **High**								☒ **Moderate**								☐ **Low**			
Class Cover Distribution (all vegetated classes)	☐ **Even**				☐ **Uneven**				☐ **Even**				☒ **Uneven**				☐ **Even**			
Duration of Surface Water in ≥ 10% of AA	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**
☒ **Low Disturbance** at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	H	---	---	---	---	---	---
☐ **Moderate Disturbance** at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
☐ **High Disturbance** at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

iii. Rating: Use the conclusions from i and ii above and the matrix below to select the functional point and rating.

Evidence of Wildlife Use (i)	**Wildlife Habitat Features Rating (ii)**			
	☐ **Exceptional**	☒ **High**	☐ **Moderate**	☐ **Low**
☒ **Substantial**	---	.9H	---	---
☐ **Moderate**	---	---	---	---
☐ **Minimal**	---	---	---	---

Comments: In 2008 a variety of shorebirds, ducks, and killdeer were observed foraging and with broods; songbirds, geese, herons, and peilicans were also using the site. In 2008 a variety of amphibians, reptiles, and mammals were observed directly or indirectly. In addition, wildlife species were numerous.

Wetland/Site #(s): Inner Oxbow

14D. GENERAL FISH HABITAT ☒ **NA** (proceed to 14E)

If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then check the NA box and proceed to 14E.

Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier].

Type of Fishery: ☐ Cold Water (**CW**) ☐ Warm Water (**WW**) **Use the CW or WW guidelines in the manual to complete the matrix.**

i. Habitat Quality and Known / Suspected Fish Species in AA: Use matrix to select the functional point and rating.

Duration of Surface Water in AA	☐ **Permanent / Perennial**						☐ **Seasonal / Intermittent**						☐ **Temporary / Ephemeral**					
Aquatic Hiding / Resting / Escape Cover	☐ **Optimal**		☐ **Adequate**		☐ **Poor**		☐ **Optimal**		☐ **Adequate**		☐ **Poor**		☐ **Optimal**		☐ **Adequate**		☐ **Poor**	
Thermal Cover: optimal / suboptimal	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**
FWP Tier I fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier II or **Native Game** fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier III or **Introduced Game** fish	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Non-Game Tier IV or **No** fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Sources used for identifying fish spp. potentially found in AA: _____

ii. Modified Rating: NOTE: Modified score cannot exceed 1.0 or be less than 0.1.

a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity, ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* ☐ **YES**, reduce score in **i** by 0.1 = __ or ☐ **N0**

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area; specify in comments) for native fish or introduced game fish? ☐ **YES**, add to score in **i** or **iia** 0.1 = __ or ☐ **N0**

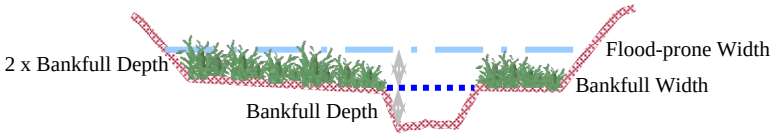
iii. Final Score and Rating: _ **Comments:** _____

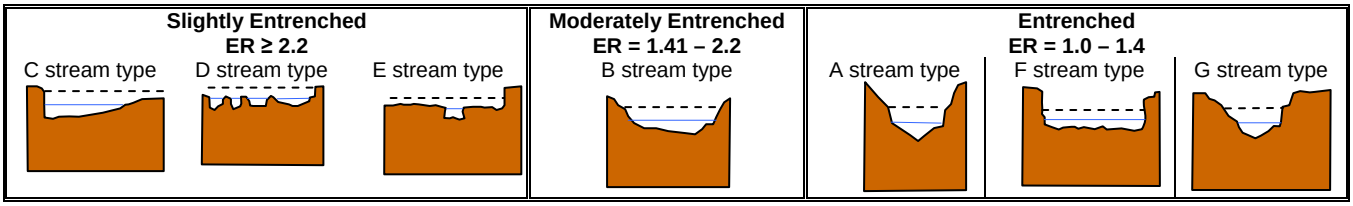
14E. FLOOD ATTENUATION ☐ **NA** (proceed to 14F)

Applies only to wetlands that are subject to flooding via in-channel or overbank flow.
If wetlands in AA are not flooded from in-channel or overbank flow, check the NA box and proceed to 14F.

Entrenchment Ratio (ER) Estimation (see manual for additional guidance). Entrenchment ratio = (flood-prone width) / (bankfull width).
Flood-prone width = estimated horizontal projection of where 2 X maximum bankfull depth elevation intersects the floodplain on each side of the stream.

_____ / _____ = _____
flood prone width / bankfull width = entrenchment ratio





i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	☒ Slightly Entrenched C, D, E stream types			☐ Moderately Entrenched B stream type			☐ Entrenched A, F, G stream types		
Percent of Flooded Wetland Classified as Forested and/or Scrub/Shrub	☐ 75%	☒ 25-75%	☐ <25%	☐ 75%	☐ 25-75%	☐ <25%	☐ 75%	☐ 25-75%	☐ <25%
AA contains **no outlet or restricted outlet**	---	.9H	---	---	---	---	---	---	---
AA contains **unrestricted outlet**	---	---	---	---	---	---	---	---	---

ii. Are ≥10 acres of wetland in the AA subject to flooding AND are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA? ☐ YES ☒ NO **Comments:** _____

Wetland/Site #(s): Inner Oxbow

14F. SHORT AND LONG TERM SURFACE WATER STORAGE ☐ **NA** (proceed to 14G)

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, then check the NA box and proceed to 14G.

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see manual for further definitions of these terms].

Estimated Maximum Acre Feet of Water Contained in Wetlands within the AA that are Subject to Periodic Flooding or Ponding	☐ **>5 acre feet**			☐ **1.1 to 5 acre feet**			☐ **≤1 acre foot**		
Duration of Surface Water at Wetlands within the AA	☐ **P/P**	☒ **S/I**	☐ **T/E**	☐ **P/P**	☐ **S/I**	☐ **T/E**	☐ **P/P**	☐ **S/I**	☐ **T/E**
Wetlands in AA flood or pond **≥ 5 out of 10 years**	---	.9H	---	---	---	---	---	---	---
Wetlands in AA flood or pond **< 5 out of 10 years**	---	---	---	---	---	---	---	---	---

Comments: Site floods when water levels in Cut Bank Creek exceed a certain threshold. Site acts as a backwater channel for Cut Bank Creek.

14G. SEDIMENT / NUTRIENT / TOXICANT / RETENTION AND REMOVAL ☐ **NA** (proceed to 14H)

Applies to wetland with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input.
If no wetlands in the AA are subject to such input, check the NA box and proceed to 14H.

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Sediment, Nutrient, and Toxicant Input Levels within AA	**AA receives or surrounding land use has potential to deliver sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.**				**Waterbody is on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.**			
% Cover of Wetland Vegetation in AA	☒ **≥ 70%**		☐ **< 70%**		☐ **≥ 70%**		☐ **< 70%**	
Evidence of Flooding / Ponding in AA	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	1H	---	---	---	---	---	---	---
AA contains **unrestricted outlet**	---	---	---	---	---	---	---	---

Comments: Site can receive sediment and nutrients from Cut Bank Creek.

14H. SEDIMENT / SHORELINE STABILIZATION ☒ **NA** (proceed to 14I)

Applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action.
If 14H does not apply, check the NA box and proceed to 14I.

% Cover of Wetland Streambank or Shoreline by Species with Stability Ratings of ≥6 (see Appendix F).	**Duration of Surface Water Adjacent to Rooted Vegetation**		
	☐ **Permanent / Perennial**	☐ **Seasonal / Intermittent**	☐ **Temporary / Ephemeral**
☐ **≥ 65%**	---	---	---
☐ **35-64%**	---	---	---
☐ **< 35%**	---	---	---

Comments: _____

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

i. Level of Biological Activity: Synthesis of wildlife and fish habitat rates (select).

General Fish Habitat Rating (14Diii)	**General Wildlife Habitat Rating (14Ciii)**		
	☒ **E/H**	☐ **M**	☐ **L**
☐ **E/H**	---	---	---
☐ **M**	---	---	---
☐ **L**	---	---	---
☐ **NA**	H	---	---

ii. Rating: Working from top to bottom, use the matrix below to select the functional point and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14Ii); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to the duration of surface water in the AA, where P/P, S/I, and T/E were previously defined, and A = "absent" [see manual for further definitions of these terms].

A	☒ **Vegetated Component >5 acres**						☐ **Vegetated Component 1-5 acres**						☐ **Vegetated Component <1 acre**					
B	☒ **High**		☐ **Moderate**		☐ **Low**		☐ **High**		☐ **Moderate**		☐ **Low**		☐ **High**		☐ **Moderate**		☐ **Low**	
C	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
P/P	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S/I	---	.6M	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
T/E/A	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Wetland/Site #(s): Inner Oxbow

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT (continued)

iii. Modified Rating: Note: Modified score cannot exceed 1.0 or be less than 0.1.

Vegetated Upland Buffer: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, AND that is not subjected to periodic mechanical mowing or clearing (unless for weed control).
Is there an average ≥ 50-foot wide vegetated upland buffer around ≥ 75% of the AA's perimeter? ☐ **YES**, add 0.1 to score in **ii** = ___ ☒ **NO**

iv. Final Score and Rating: .6M **Comments:** Upland buffer contains substantial amount of leafy spurge and Canada thistle.

14J. GROUNDWATER DISCHARGE / RECHARGE
Check the appropriate indicators in i and ii below.

i. Discharge Indicators
- ☐ The AA is a slope wetland.
- ☐ Springs or seeps are known or observed.
- ☐ Vegetation growing during dormant season/drought.
- ☐ Wetland occurs at the toe of a natural slope.
- ☐ Seeps are present at the wetland edge.
- ☐ AA permanently flooded during drought periods.
- ☐ Wetland contains an outlet, but no inlet.
- ☒ Shallow water table and the site is saturated to the surface.
- ☒ Other: Alluvial flow enters into site.

ii. Recharge Indicators
- ☐ Permeable substrate present without underlying impeding layer.
- ☐ Wetland contains inlet but no outlet.
- ☐ Stream is a known 'losing' stream. Discharge volume decreases.
- ☐ Other: _____

iii. Rating: Use the information from i and ii above and the table below to select the functional point and rating.

Criteria	Duration of Saturation at AA Wetlands ***FROM GROUNDWATER DISCHARGE*** or ***WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM***			
	☐ **P/P**	☒ **S/I**	☐ **T**	☐ **None**
☒ **Groundwater Discharge or Recharge**	---	.7M	---	---
☐ **Insufficient Data/Information**	---			

Comments: _____

14K. UNIQUENESS

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Replacement Potential	**AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland** OR **plant association listed as "S1" by the MTNHP**			**AA does not contain previously cited rare types** AND **structural diversity (#13) is high** OR **contains plant association listed as "S2" by the MTNHP**			**AA does not contain previously cited rare types** OR **associations** AND **structural diversity (#13) is low-moderate**		
Estimated Relative Abundance (#11)	☐ Rare	☐ Common	☐ Abundant	☐ Rare	☐ Common	☐ Abundant	☐ Rare	☒ Common	☐ Abundant
☒ **Low Disturbance** at AA (#12i)	---	---	---	---	---	---	---	.4M	---
☐ **Moderate Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---
☐ **High Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---

Comments: _____

14L. RECREATION / EDUCATION POTENTIAL ☐ NA (proceed to Overall Summary and Rating page)
Affords 'bonus' points if AA provides a recreational or educational opportunity.

i. Is the AA a known or potential recreational or educational site? ☒ **YES**, go to ii. ☐ **NO**, check the NA box.

ii. Check categories that apply to the AA: ☒ Educational/Scientific Study ☐ Consumptive Recreational ☐ Non-consumptive recreational
☐ Other: _____

iii. Rating: Use the matrix below to select the functional point and rating.

Known or Potential Recreational or Educational Area	**Known**	**Potential**
Public ownership or public easement with general public access (no permission required)	---	---
Private ownership with general public access (no permission required)	---	---
Private or public ownership without general public access, or requiring permission for public access	---	.05L

Comments: Tribal ownership restricts access.

15. GENERAL SITE NOTES: _____

Wetland/Site #(s): Inner Oxbow

Function & Value Variables	Rating – Actual Functional Points	Possible Functional Points	Functional Units: Actual Points x Estimated AA Acreage	Indicate the Four Most Prominent Functions with an Asterisk
A. Listed / Proposed T&E Species Habitat	low 0.10	1.00		
B. MT Natural Heritage Program Species Habitat	high 1.00	1.00		
C. General Wildlife Habitat	high 0.90	1.00		
D. General Fish Habitat	NA	---		
E. Flood Attenuation	high 0.90	1.00		
F. Short and Long Term Surface Water Storage	high 0.90	1.00		
G. Sediment / Nutrient / Toxicant Removal	high 1.00	1.00		
H. Sediment / Shoreline Stabilization	NA	---		
I. Production Export / Food Chain Support	mod 0.60	1.00		
J. Groundwater Discharge / Recharge	mod 0.70	1.00		
K. Uniqueness	mod 0.40	1.00		
L. Recreation / Education Potential (bonus point)	low 0.05			
Total Points	**6.55**	**9.0**	**Total Functional Units**	
Percent of Possible Score 73% (round to nearest whole number)				

Category I Wetland: (must satisfy **one** of the following criteria; otherwise go to Category II)
- ☐ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
- ☐ Score of 1 functional point for Uniqueness; **or**
- ☐ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
- ☐ Percent of possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; otherwise go to Category IV)
- ☒ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**
- ☒ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish Habitat; **or**
- ☐ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
- ☐ Score of .9 functional point for Uniqueness; **or**
- ☒ Percent of possible score > 65% (round to nearest whole #).

☐ **Category III Wetland:** (Criteria for Categories I, II, or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if not go to Category III)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
- ☐ Percent of possible score < 35% (round to nearest whole #).

OVERALL ANALYSIS AREA (AA) RATING: Check the appropriate category based on the criteria outlined above.

☐ **I** ☒ **II** ☐ **III** ☐ **IV**

MDT MONTANA WETLAND ASSESSMENT FORM (revised March 2008)

1. Project Name: Perry Ranch **2. MDT Project #:** NH 0002(232) **3. Control #:** 0703

3. Evaluation Date: July 9, 2008 **4. Evaluator(s):** Andrea Pipp **5. Wetland/Site #(s):** Outer Oxbow

6. Wetland Location(s): Township 34 N, Range 8 W, Section 27, 34; Township ___ N, Range ___ E, Section _____

Approximate Stationing or Roadposts: NA

Watershed: 8 - Marias **County:** Glacier _ _ _____

7. Evaluating Agency: MDT

Purpose of Evaluation:

- ☐ **Wetland potentially affected by MDT project**
- ☐ **Mitigation wetlands; pre-construction**
- ☒ **Mitigation wetlands; post-construction**
- ☐ **Other** _____

8. Wetland Size (acre): _____ (visually estimated)
10.39 (measured, e.g. GPS)

9. Assessment Area (AA) Size (acre): _____ (visually estimated)
(see manual for determining AA) 10.39 (measured, e.g. GPS)

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA (See manual for definitions.)

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% OF AA
Riverine	Emergent Wetland	Excavated	Seasonal / Intermittent	100

Comments: _____

11. ESTIMATED RELATIVE ABUNDANCE (of similarly classified sites within the same Major Montana Watershed Basin; see manual.)
common

12. GENERAL CONDITION OF AA

i. Disturbance: Use matrix below to select the appropriate response; see manual for Montana listed noxious weed and aquatic nuisance vegetation species lists.

Conditions within AA	Predominant Conditions Adjacent to (within 500 feet of) AA		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is ≤15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is ≤15%.	---	low disturbance	---
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	---	---	---
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.	---	---	---

Comments (types of disturbance, intensity, season, etc.)**:** _____

ii. Prominent noxious, aquatic nuisance, and other exotic vegetation species: Cirsium arvense, Melilotus officinale, & Bromus inermis.

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: _____

13. STRUCTURAL DIVERSITY (Based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes]; see #10 above.)

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management preventing (passive) existence of additional vegetated classes?		Modified Rating
≥3 (or 2 if one is forested) classes	---	NA	NA	NA
2 (or 1 if forested) classes	---	NA	NA	NA
1 class, but not a monoculture	mod	←NO	YES→	---
1 class, monoculture (1 species comprises ≥90% of total cover)	---	NA	NA	NA

Comments: _____

Wetland/Site #(s): Outer Oxbow

14A. HABITAT FOR FEDERALLY LISTED OR PROPOSED THREATENED OR ENDANGERED PLANTS OR ANIMALS

i. AA is Documented (D) or Suspected (S) to contain: Check box based on definitions in manual.

Primary or critical habitat (**list species**) ☐ D ☐ S _____
Secondary habitat (**list species**) ☐ D ☐ S _____
Incidental habitat (**list species**) ☐ D ☒ S Piping Plover
No usable habitat ☐ S

ii. Rating: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
Functional Point/Rating	---	---	---	---	---	.1L	---

Sources for documented use (e.g. observations, records): _____

14B. HABITAT FOR PLANTS OR ANIMALS RATED S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM
Do not include species listed in 14A above.

i. AA is Documented (D) or Suspected (S) to contain: Check box based on definitions in manual.

Primary or critical habitat (**list species**) ☐ D ☒ S Northern Leopard Frog
Secondary habitat (**list species**) ☐ D ☐ S _____
Incidental habitat (**list species**) ☐ D ☐ S _____
No usable habitat ☐ S

ii. Rating: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
S1 Species Functional Point/Rating	---	.8H	---	---	---	---	---
S2 and S3 Species Functional Point/Rating	---	---	---	---	---	---	---

Sources for documented use (e.g. observations, records): Northern leopard frogs have been observed in the Inner Oxbow and in the uplands around the Northern Excavated Area and it is suspected that primary/critical habitat is provided at the Outer Oxbow. The frogs have been observed in July of 2008 and in the summers of 2006, 2005, and 2002. From 1 to 8 individuals have been observed during these years.

14C. GENERAL WILDLIFE HABITAT RATING

i. Evidence of Overall Wildlife Use in the AA: Check substantial, moderate, or low based on supporting evidence.

☒ ***Substantial:*** Based on any of the following [check].
- ☒ observations of abundant wildlife #s or high species diversity (during any period)
- ☒ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☒ presence of extremely limiting habitat features not available in the surrounding area
- ☐ interview with local biologist with knowledge of the AA

☐ ***Minimal:*** Based on any of the following [check].
- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interview with local biologist with knowledge of AA

☐ ***Moderate:*** Based on any of the following [check].
- ☐ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- ☐ common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☐ adequate adjacent upland food sources
- ☐ interview with local biologist with knowledge of the AA

ii. Wildlife Habitat Features: Working from top to bottom, check appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent **vegetated** classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see manual for further definitions of these terms].

Structural Diversity (see #13)	☐ **High**								☐ **Moderate**								☒ **Low**			
Class Cover Distribution (all vegetated classes)	☐ **Even**				☐ **Uneven**				☐ **Even**				☐ **Uneven**				☒ **Even**			
Duration of Surface Water in ≥ 10% of AA	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**
☒ **Low Disturbance** at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	H	---	---
☐ **Moderate Disturbance** at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
☐ **High Disturbance** at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

iii. Rating: Use the conclusions from i and ii above and the matrix below to select the functional point and rating.

Evidence of Wildlife Use (i)	**Wildlife Habitat Features Rating (ii)**			
	☐ **Exceptional**	☒ **High**	☐ **Moderate**	☐ **Low**
☒ **Substantial**	---	.9H	---	---
☐ **Moderate**	---	---	---	---
☐ **Minimal**	---	---	---	---

Comments: In 2008 a variety of shorebirds, ducks, and killdeer were observed foraging and with broods; songbirds, geese, herons, and peilicans were also using the site. In 2008 a variety of amphibians, reptiles, and mammals were observed directly or indirectly to be numerous.

Wetland/Site #(s): Outer Oxbow

14D. GENERAL FISH HABITAT ☒ **NA** (proceed to 14E)

If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then check the NA box and proceed to 14E.

Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier].

Type of Fishery: ☐ Cold Water (**CW**) ☐ Warm Water (**WW**) **Use the CW or WW guidelines in the manual to complete the matrix.**

i. Habitat Quality and Known / Suspected Fish Species in AA: Use matrix to select the functional point and rating.

Duration of Surface Water in AA	☐ **Permanent / Perennial**						☐ **Seasonal / Intermittent**						☐ **Temporary / Ephemeral**					
Aquatic Hiding / Resting / Escape Cover	☐ **Optimal**		☐ **Adequate**		☐ **Poor**		☐ **Optimal**		☐ **Adequate**		☐ **Poor**		☐ **Optimal**		☐ **Adequate**		☐ **Poor**	
Thermal Cover: optimal / suboptimal	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**
FWP Tier I fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier II or **Native Game** fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier III or **Introduced Game** fish	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Non-Game Tier IV or **No** fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Sources used for identifying fish spp. potentially found in AA: _____

ii. Modified Rating: NOTE: Modified score cannot exceed 1.0 or be less than 0.1.

a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity, ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* ☐ **YES**, reduce score in **i** by 0.1 = __ or ☐ **N0**

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area; specify in comments) for native fish or introduced game fish? ☐ **YES**, add to score in **i** or **iia** 0.1 = __ or ☐ **N0**

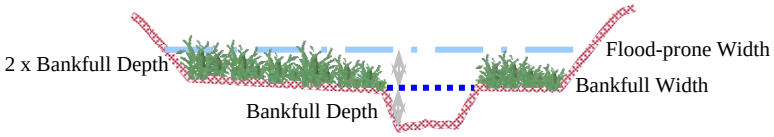
iii. Final Score and Rating: _ **Comments:** _____

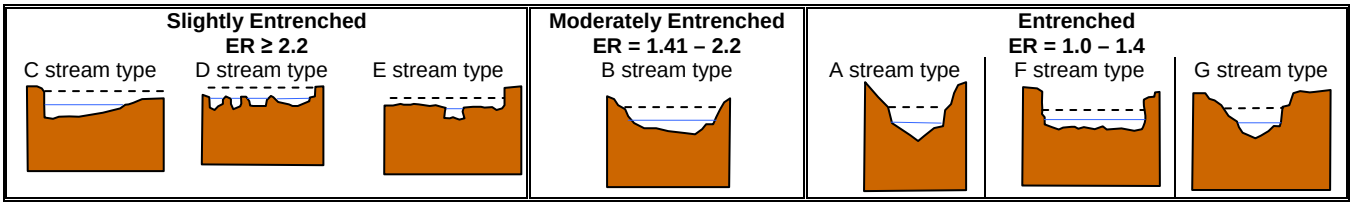
14E. FLOOD ATTENUATION ☐ **NA** (proceed to 14F)

Applies only to wetlands that are subject to flooding via in-channel or overbank flow.
If wetlands in AA are not flooded from in-channel or overbank flow, check the NA box and proceed to 14F.

Entrenchment Ratio (ER) Estimation (see manual for additional guidance). Entrenchment ratio = (flood-prone width) / (bankfull width).
Flood-prone width = estimated horizontal projection of where 2 X maximum bankfull depth elevation intersects the floodplain on each side of the stream.

_____ / _____ = _____
flood prone width / bankfull width = entrenchment ratio





i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	☒ Slightly Entrenched C, D, E stream types			☐ Moderately Entrenched B stream type			☐ Entrenched A, F, G stream types		
Percent of Flooded Wetland Classified as Forested and/or Scrub/Shrub	☐ 75%	☐ 25-75%	☒ <25%	☐ 75%	☐ 25-75%	☐ <25%	☐ 75%	☐ 25-75%	☐ <25%
AA contains **no outlet or restricted outlet**	---	---	.6M	---	---	---	---	---	---
AA contains **unrestricted outlet**	---	---	---	---	---	---	---	---	---

ii. Are ≥10 acres of wetland in the AA subject to flooding AND are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA? ☐ YES ☒ NO **Comments:** _____

Wetland/Site #(s): Outer Oxbow

14F. SHORT AND LONG TERM SURFACE WATER STORAGE ☐ **NA** (proceed to 14G)

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, then check the NA box and proceed to 14G.

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see manual for further definitions of these terms].

Estimated Maximum Acre Feet of Water Contained in Wetlands within the AA that are Subject to Periodic Flooding or Ponding	☐ **>5 acre feet**			☐ **1.1 to 5 acre feet**			☐ **≤1 acre foot**		
Duration of Surface Water at Wetlands within the AA	☐ **P/P**	☒ **S/I**	☐ **T/E**	☐ **P/P**	☐ **S/I**	☐ **T/E**	☐ **P/P**	☐ **S/I**	☐ **T/E**
Wetlands in AA flood or pond **≥ 5 out of 10 years**	---	.9H	---	---	---	---	---	---	---
Wetlands in AA flood or pond **< 5 out of 10 years**	---	---	---	---	---	---	---	---	---

Comments: Site floods when water levels in Cut Bank Creek exceed a certain threshold. Site acts as a backwater channel for Cut Bank Creek.

14G. SEDIMENT / NUTRIENT / TOXICANT / RETENTION AND REMOVAL ☐ **NA** (proceed to 14H)

Applies to wetland with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input.
If no wetlands in the AA are subject to such input, check the NA box and proceed to 14H.

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Sediment, Nutrient, and Toxicant Input Levels within AA	**AA receives or surrounding land use has potential to deliver sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.**				**Waterbody is on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.**			
% Cover of Wetland Vegetation in AA	☒ **≥ 70%**		☐ **< 70%**		☐ **≥ 70%**		☐ **< 70%**	
Evidence of Flooding / Ponding in AA	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	1H	---	---	---	---	---	---	---
AA contains **unrestricted outlet**	---	---	---	---	---	---	---	---

Comments: Site can receive sediment and nutrients from Cut Bank Creek.

14H. SEDIMENT / SHORELINE STABILIZATION ☒ **NA** (proceed to 14I)

Applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action.
If 14H does not apply, check the NA box and proceed to 14I.

% Cover of Wetland Streambank or Shoreline by Species with Stability Ratings of ≥6 (see Appendix F).	**Duration of Surface Water Adjacent to Rooted Vegetation**		
	☐ **Permanent / Perennial**	☐ **Seasonal / Intermittent**	☐ **Temporary / Ephemeral**
☐ **≥ 65%**	---	---	---
☐ **35-64%**	---	---	---
☐ **< 35%**	---	---	---

Comments: _____

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

i. Level of Biological Activity: Synthesis of wildlife and fish habitat rates (select).

General Fish Habitat Rating (14Diii)	**General Wildlife Habitat Rating (14Ciii)**		
	☒ **E/H**	☐ **M**	☐ **L**
☐ **E/H**	---	---	---
☐ **M**	---	---	---
☐ **L**	---	---	---
☒ **NA**	H	---	---

ii. Rating: Working from top to bottom, use the matrix below to select the functional point and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14Ii); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to the duration of surface water in the AA, where P/P, S/I, and T/E were previously defined, and A = "absent" [see manual for further definitions of these terms].

A	☒ **Vegetated Component >5 acres**						☐ **Vegetated Component 1-5 acres**						☐ **Vegetated Component <1 acre**					
B	☒ **High**		☐ **Moderate**		☐ **Low**		☐ **High**		☐ **Moderate**		☐ **Low**		☐ **High**		☐ **Moderate**		☐ **Low**	
C	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
P/P	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S/I	---	.6M	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
T/E/A	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Wetland/Site #(s): Outer Oxbow

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT (continued)

iii. Modified Rating: Note: Modified score cannot exceed 1.0 or be less than 0.1.

Vegetated Upland Buffer: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, AND that is not subjected to periodic mechanical mowing or clearing (unless for weed control).
Is there an average ≥ 50-foot wide vegetated upland buffer around ≥ 75% of the AA's perimeter? ☐ **YES**, add 0.1 to score in **ii** = ___ ☒ **NO**

iv. Final Score and Rating: .6M **Comments:** Upland buffer contains substantial amount of leafy spurge and Canada thistle.

14J. GROUNDWATER DISCHARGE / RECHARGE
Check the appropriate indicators in i and ii below.

i. Discharge Indicators
- ☐ The AA is a slope wetland.
- ☐ Springs or seeps are known or observed.
- ☐ Vegetation growing during dormant season/drought.
- ☐ Wetland occurs at the toe of a natural slope.
- ☐ Seeps are present at the wetland edge.
- ☐ AA permanently flooded during drought periods.
- ☐ Wetland contains an outlet, but no inlet.
- ☒ Shallow water table and the site is saturated to the surface.
- ☒ Other: Alluvial flow enters into site.

ii. Recharge Indicators
- ☐ Permeable substrate present without underlying impeding layer.
- ☐ Wetland contains inlet but no outlet.
- ☐ Stream is a known 'losing' stream. Discharge volume decreases.
- ☐ Other: _____

iii. Rating: Use the information from i and ii above and the table below to select the functional point and rating.

Criteria	Duration of Saturation at AA Wetlands ***FROM GROUNDWATER DISCHARGE*** or ***WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM***			
	☐ **P/P**	☒ **S/I**	☐ **T**	☐ **None**
☒ **Groundwater Discharge or Recharge**	---	.7M	---	---
☐ **Insufficient Data/Information**	---			

Comments: _____

14K. UNIQUENESS

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Replacement Potential	**AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland** OR **plant association listed as "S1" by the MTNHP**			**AA does not contain previously cited rare types** AND **structural diversity (#13) is high** OR **contains plant association listed as "S2" by the MTNHP**			**AA does not contain previously cited rare types** OR **associations** AND **structural diversity (#13) is low-moderate**		
Estimated Relative Abundance (#11)	☐ Rare	☐ Common	☐ Abundant	☐ Rare	☐ Common	☐ Abundant	☐ Rare	☒ Common	☐ Abundant
☒ **Low Disturbance** at AA (#12i)	---	---	---	---	---	---	---	.4M	---
☐ **Moderate Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---
☐ **High Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---

Comments: _____

14L. RECREATION / EDUCATION POTENTIAL ☐ NA (proceed to Overall Summary and Rating page)
Affords 'bonus' points if AA provides a recreational or educational opportunity.

i. Is the AA a known or potential recreational or educational site? ☒ **YES**, go to ii. ☐ **NO**, check the NA box.

ii. Check categories that apply to the AA: ☒ Educational/Scientific Study ☐ Consumptive Recreational ☐ Non-consumptive recreational ☐ Other: _____

iii. Rating: Use the matrix below to select the functional point and rating.

Known or Potential Recreational or Educational Area	**Known**	**Potential**
Public ownership or public easement with general public access (no permission required)	---	---
Private ownership with general public access (no permission required)	---	---
Private or public ownership without general public access, or requiring permission for public access	---	.05L

Comments: Tribal ownership restricts access.

15. GENERAL SITE NOTES: _____

Wetland/Site #(s): Outer Oxbow

Function & Value Variables	Rating – Actual Functional Points	Possible Functional Points	Functional Units: Actual Points x Estimated AA Acreage	Indicate the Four Most Prominent Functions with an Asterisk
A. Listed / Proposed T&E Species Habitat	low 0.10	1.00		
B. MT Natural Heritage Program Species Habitat	high 0.80	1.00		
C. General Wildlife Habitat	high 0.90	1.00		
D. General Fish Habitat	NA	---		
E. Flood Attenuation	mod 0.60	1.00		
F. Short and Long Term Surface Water Storage	high 0.90	1.00		
G. Sediment / Nutrient / Toxicant Removal	high 1.00	1.00		
H. Sediment / Shoreline Stabilization	NA	---		
I. Production Export / Food Chain Support	mod 0.60	1.00		
J. Groundwater Discharge / Recharge	mod 0.70	1.00		
K. Uniqueness	mod 0.40	1.00		
L. Recreation / Education Potential (bonus point)	low 0.05			
Total Points	**6.05**	**9.0**	**Total Functional Units**	
Percent of Possible Score 67% (round to nearest whole number)				

Category I Wetland: (must satisfy **one** of the following criteria; otherwise go to Category II)
- ☐ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
- ☐ Score of 1 functional point for Uniqueness; **or**
- ☐ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
- ☐ Percent of possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; otherwise go to Category IV)
- ☐ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**
- ☒ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish Habitat; **or**
- ☐ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
- ☐ Score of .9 functional point for Uniqueness; **or**
- ☒ Percent of possible score > 65% (round to nearest whole #).

☐ **Category III Wetland:** (Criteria for Categories I, II, or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if not go to Category III)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
- ☐ Percent of possible score < 35% (round to nearest whole #).

OVERALL ANALYSIS AREA (AA) RATING: Check the appropriate category based on the criteria outlined above.

☐ **I** ☒ **II** ☐ **III** ☐ **IV**

MDT MONTANA WETLAND ASSESSMENT FORM (revised March 2008)

1. Project Name: Perry Ranch **2. MDT Project #:** NH 0002(232) **3. Control #:** 0703

3. Evaluation Date: July 9, 2008 **4. Evaluator(s):** Andrea Pipp **5. Wetland/Site #(s):** Northern Excavated Area

6. Wetland Location(s): Township 34 N, Range 8 W, Section 27, 34; Township ___ N, Range ___ E, Section _____

Approximate Stationing or Roadposts: NA

Watershed: 8 - Marias **County:** Glacier _ _ _____

7. Evaluating Agency: MDT

Purpose of Evaluation:

- ☐ **Wetland potentially affected by MDT project**
- ☐ **Mitigation wetlands; pre-construction**
- ☒ **Mitigation wetlands; post-construction**
- ☐ **Other** _____

8. Wetland Size (acre): _____ (visually estimated)
6.81 (measured, e.g. GPS)

9. Assessment Area (AA) Size (acre): _____ (visually estimated)
(see manual for determining AA) 6.81 (measured, e.g. GPS)

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA (See manual for definitions.)

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% OF AA
Riverine	Emergent Wetland	Excavated	Seasonal / Intermittent	90
Riverine	Scrub-Shrub Wetland	Excavated	Seasonal / Intermittent	10

Comments: _____

11. ESTIMATED RELATIVE ABUNDANCE (of similarly classified sites within the same Major Montana Watershed Basin; see manual.)
common

12. GENERAL CONDITION OF AA

i. Disturbance: Use matrix below to select the appropriate response; see manual for Montana listed noxious weed and aquatic nuisance vegetation species lists.

Conditions within AA	Predominant Conditions Adjacent to (within 500 feet of) AA		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is ≤15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is ≤15%.	---	low disturbance	---
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	---	---	---
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.	---	---	---

Comments (types of disturbance, intensity, season, etc.)**:** _____

ii. Prominent noxious, aquatic nuisance, and other exotic vegetation species: Cirsium arvense, Melilotus officinale, & Bromus inermis.

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: _____

13. STRUCTURAL DIVERSITY (Based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes]; see #10 above.)

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management preventing (passive) existence of additional vegetated classes?		Modified Rating
≥3 (or 2 if one is forested) classes	---	NA	NA	NA
2 (or 1 if forested) classes	mod	NA	NA	NA
1 class, but not a monoculture	---	←NO	YES→	---
1 class, monoculture (1 species comprises ≥90% of total cover)	---	NA	NA	NA

Comments: _____

Wetland/Site #(s): Northern Excavated Area

14A. HABITAT FOR FEDERALLY LISTED OR PROPOSED THREATENED OR ENDANGERED PLANTS OR ANIMALS

i. AA is Documented (D) or Suspected (S) to contain: Check box based on definitions in manual.

Primary or critical habitat (**list species**) ☐ D ☐ S _____
Secondary habitat (**list species**) ☐ D ☐ S _____
Incidental habitat (**list species**) ☐ D ☒ S Piping Plover
No usable habitat ☐ S

ii. Rating: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
Functional Point/Rating	---	---	---	---	---	.1L	---

Sources for documented use (e.g. observations, records): _____

14B. HABITAT FOR PLANTS OR ANIMALS RATED S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM
Do not include species listed in 14A above.

i. AA is Documented (D) or Suspected (S) to contain: Check box based on definitions in manual.

Primary or critical habitat (**list species**) ☐ D ☒ S Northern Leopard Frog
Secondary habitat (**list species**) ☐ D ☐ S _____
Incidental habitat (**list species**) ☐ D ☐ S _____
No usable habitat ☐ S

ii. Rating: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
S1 Species Functional Point/Rating	---	.8H	---	---	---	---	---
S2 and S3 Species Functional Point/Rating	---	---	---	---	---	---	---

Sources for documented use (e.g. observations, records): Northern leopard frogs have been observed in the Inner Oxbow and in the uplands around the Northern Excavated Area and it is suspected that primary/critical habitat is provided at the N. Excavated Area. The frogs have been observed in July of 2008 and in the summers of 2006, 2005, and 2002. From 1 to 8 individuals have been observed during these years.

14C. GENERAL WILDLIFE HABITAT RATING

i. Evidence of Overall Wildlife Use in the AA: Check substantial, moderate, or low based on supporting evidence.

☐ ***Substantial:*** Based on any of the following [check].
- ☐ observations of abundant wildlife #s or high species diversity (during any period)
- ☐ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☐ presence of extremely limiting habitat features not available in the surrounding area
- ☐ interview with local biologist with knowledge of the AA

☐ ***Minimal:*** Based on any of the following [check].
- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interview with local biologist with knowledge of AA

☒ ***Moderate:*** Based on any of the following [check].
- ☒ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- ☒ common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☒ adequate adjacent upland food sources
- ☐ interview with local biologist with knowledge of the AA

ii. Wildlife Habitat Features: Working from top to bottom, check appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent **vegetated** classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see manual for further definitions of these terms].

Structural Diversity (see #13)	☐ **High**								☒ **Moderate**								☐ **Low**			
Class Cover Distribution (all vegetated classes)	☐ **Even**				☐ **Uneven**				☐ **Even**				☒ **Uneven**				☐ **Even**			
Duration of Surface Water in ≥ 10% of AA	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**
☒ **Low Disturbance** at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	H	---	---	---	---	---	---
☐ **Moderate Disturbance** at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
☐ **High Disturbance** at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

iii. Rating: Use the conclusions from i and ii above and the matrix below to select the functional point and rating.

Evidence of Wildlife Use (i)	**Wildlife Habitat Features Rating (ii)**			
	☐ **Exceptional**	☒ **High**	☐ **Moderate**	☐ **Low**
☐ **Substantial**	---	---	---	---
☒ **Moderate**	---	.7M	---	---
☐ **Minimal**	---	---	---	---

Comments: In 2008 a variety of shorebirds and ducks were observed foraging and with broods. Bird use was high, but less than what was observed for the Inner & Outer Oxbows.

Wetland/Site #(s): Northern Excavated Area

14D. GENERAL FISH HABITAT ☒ **NA** (proceed to 14E)

If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then check the NA box and proceed to 14E.

Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier].

Type of Fishery: ☐ Cold Water (**CW**) ☐ Warm Water (**WW**) **Use the CW or WW guidelines in the manual to complete the matrix.**

i. Habitat Quality and Known / Suspected Fish Species in AA: Use matrix to select the functional point and rating.

Duration of Surface Water in AA	☐ **Permanent / Perennial**						☐ **Seasonal / Intermittent**						☐ **Temporary / Ephemeral**					
Aquatic Hiding / Resting / Escape Cover	☐ **Optimal**		☐ **Adequate**		☐ **Poor**		☐ **Optimal**		☐ **Adequate**		☐ **Poor**		☐ **Optimal**		☐ **Adequate**		☐ **Poor**	
Thermal Cover: optimal / suboptimal	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**
FWP Tier I fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier II or **Native Game** fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier III or **Introduced Game** fish	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Non-Game Tier IV or **No** fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Sources used for identifying fish spp. potentially found in AA: _____

ii. Modified Rating: NOTE: Modified score cannot exceed 1.0 or be less than 0.1.

a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity, ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* ☐ **YES**, reduce score in **i** by 0.1 = __ or ☐ **N0**

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area; specify in comments) for native fish or introduced game fish? ☐ **YES**, add to score in **i** or **iia** 0.1 = __ or ☐ **N0**

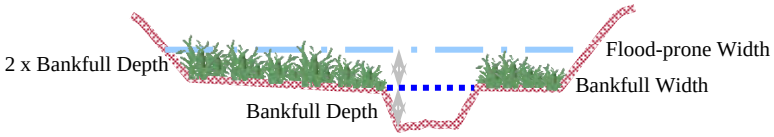
iii. Final Score and Rating: _ **Comments:** _____

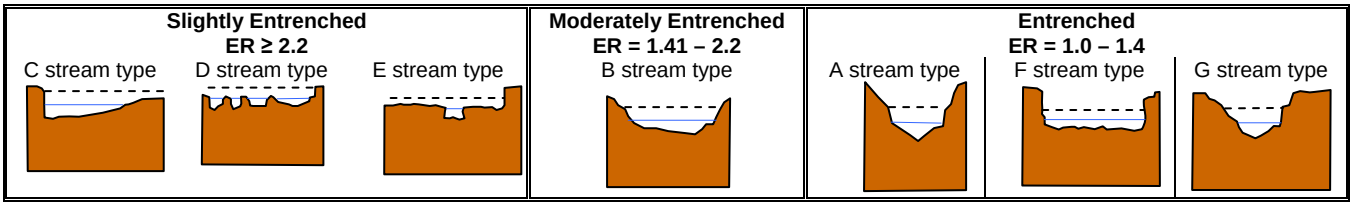
14E. FLOOD ATTENUATION ☐ **NA** (proceed to 14F)

Applies only to wetlands that are subject to flooding via in-channel or overbank flow.
If wetlands in AA are not flooded from in-channel or overbank flow, check the NA box and proceed to 14F.

Entrenchment Ratio (ER) Estimation (see manual for additional guidance). Entrenchment ratio = (flood-prone width) / (bankfull width).
Flood-prone width = estimated horizontal projection of where 2 X maximum bankfull depth elevation intersects the floodplain on each side of the stream.

_____ / _____ = _____
flood prone width / bankfull width = entrenchment ratio





i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	☒ Slightly Entrenched C, D, E stream types			☐ Moderately Entrenched B stream type			☐ Entrenched A, F, G stream types		
Percent of Flooded Wetland Classified as Forested and/or Scrub/Shrub	☐ 75%	☐ 25-75%	☒ <25%	☐ 75%	☐ 25-75%	☐ <25%	☐ 75%	☐ 25-75%	☐ <25%
AA contains **no outlet or restricted outlet**	---	---	.6M	---	---	---	---	---	---
AA contains **unrestricted outlet**	---	---	---	---	---	---	---	---	---

ii. Are ≥10 acres of wetland in the AA subject to flooding AND are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA? ☐ YES ☒ NO **Comments:** _____

Wetland/Site #(s): Northern Excavated Area

14F. SHORT AND LONG TERM SURFACE WATER STORAGE ☐ **NA** (proceed to 14G)

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, then check the NA box and proceed to 14G.

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see manual for further definitions of these terms].

Estimated Maximum Acre Feet of Water Contained in Wetlands within the AA that are Subject to Periodic Flooding or Ponding	☒ **>5 acre feet**			☐ **1.1 to 5 acre feet**			☐ **≤1 acre foot**		
Duration of Surface Water at Wetlands within the AA	☐ **P/P**	☒ **S/I**	☐ **T/E**	☐ **P/P**	☐ **S/I**	☐ **T/E**	☐ **P/P**	☐ **S/I**	☐ **T/E**
Wetlands in AA flood or pond **≥ 5 out of 10 years**	---	.9H	---	---	---	---	---	---	---
Wetlands in AA flood or pond **< 5 out of 10 years**	---	---	---	---	---	---	---	---	---

Comments: Site floods when water levels in Cut Bank Creek exceed a certain threshold. Site acts as a backwater channel for Cut Bank Creek.

14G. SEDIMENT / NUTRIENT / TOXICANT / RETENTION AND REMOVAL ☐ **NA** (proceed to 14H)

Applies to wetland with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input.
If no wetlands in the AA are subject to such input, check the NA box and proceed to 14H.

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Sediment, Nutrient, and Toxicant Input Levels within AA	**AA receives or surrounding land use has potential to deliver sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.**				**Waterbody is on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.**			
% Cover of Wetland Vegetation in AA	☐ **≥ 70%**		☒ **< 70%**		☐ **≥ 70%**		☐ **< 70%**	
Evidence of Flooding / Ponding in AA	☐ **Yes**	☐ **No**	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	---	---	.7M	---	---	---	---	---
AA contains **unrestricted outlet**	---	---	---	---	---	---	---	---

Comments: Site can receive sediment and nutrients from Cut Bank Creek.

14H. SEDIMENT / SHORELINE STABILIZATION ☒ **NA** (proceed to 14I)

Applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action.
If 14H does not apply, check the NA box and proceed to 14I.

% Cover of Wetland Streambank or Shoreline by Species with Stability Ratings of ≥6 (see Appendix F).	**Duration of Surface Water Adjacent to Rooted Vegetation**		
	☐ **Permanent / Perennial**	☐ **Seasonal / Intermittent**	☐ **Temporary / Ephemeral**
☐ **≥ 65%**	---	---	---
☐ **35-64%**	---	---	---
☐ **< 35%**	---	---	---

Comments: _____

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

i. Level of Biological Activity: Synthesis of wildlife and fish habitat rates (select).

General Fish Habitat Rating (14Diii)	**General Wildlife Habitat Rating (14Ciii)**		
	☐ **E/H**	☒ **M**	☐ **L**
☐ **E/H**	---	---	---
☐ **M**	---	---	---
☐ **L**	---	---	---
☒ **NA**	---	M	---

ii. Rating: Working from top to bottom, use the matrix below to select the functional point and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14Ii); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to the duration of surface water in the AA, where P/P, S/I, and T/E were previously defined, and A = "absent" [see manual for further definitions of these terms].

A	☒ **Vegetated Component >5 acres**						☐ **Vegetated Component 1-5 acres**						☐ **Vegetated Component <1 acre**					
B	☐ **High**		☒ **Moderate**		☐ **Low**		☐ **High**		☐ **Moderate**		☐ **Low**		☐ **High**		☐ **Moderate**		☐ **Low**	
C	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
P/P	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S/I	---	---	---	.4M	---	---	---	---	---	---	---	---	---	---	---	---	---	---
T/E/A	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Wetland/Site #(s): Northern Excavated Area

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT (continued)

iii. Modified Rating: Note: Modified score cannot exceed 1.0 or be less than 0.1.

Vegetated Upland Buffer: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, AND that is not subjected to periodic mechanical mowing or clearing (unless for weed control).
Is there an average ≥ 50-foot wide vegetated upland buffer around ≥ 75% of the AA's perimeter? ☐ **YES**, add 0.1 to score in **ii** = ___ ☒ **NO**

iv. Final Score and Rating: .4M **Comments:** Upland buffer contains substantial amounts of Canada thistle.

14J. GROUNDWATER DISCHARGE / RECHARGE
Check the appropriate indicators in i and ii below.

i. Discharge Indicators
- ☐ The AA is a slope wetland.
- ☐ Springs or seeps are known or observed.
- ☐ Vegetation growing during dormant season/drought.
- ☐ Wetland occurs at the toe of a natural slope.
- ☐ Seeps are present at the wetland edge.
- ☐ AA permanently flooded during drought periods.
- ☐ Wetland contains an outlet, but no inlet.
- ☒ Shallow water table and the site is saturated to the surface.
- ☒ Other: Alluvial flow enters into site.

ii. Recharge Indicators
- ☐ Permeable substrate present without underlying impeding layer.
- ☐ Wetland contains inlet but no outlet.
- ☐ Stream is a known 'losing' stream. Discharge volume decreases.
- ☐ Other: _____

iii. Rating: Use the information from i and ii above and the table below to select the functional point and rating.

Criteria	Duration of Saturation at AA Wetlands ***FROM GROUNDWATER DISCHARGE*** or ***WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM***			
	☐ **P/P**	☒ **S/I**	☐ **T**	☐ **None**
☒ **Groundwater Discharge or Recharge**	---	.7M	---	---
☐ **Insufficient Data/Information**	---			

Comments: _____

14K. UNIQUENESS

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Replacement Potential	**AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland** OR **plant association listed as "S1" by the MTNHP**			**AA does not contain previously cited rare types** AND **structural diversity (#13) is high** OR **contains plant association listed as "S2" by the MTNHP**			**AA does not contain previously cited rare types** OR **associations** AND **structural diversity (#13) is low-moderate**		
Estimated Relative Abundance (#11)	☐ Rare	☐ Common	☐ Abundant	☐ Rare	☐ Common	☐ Abundant	☐ Rare	☒ Common	☐ Abundant
☒ **Low Disturbance** at AA (#12i)	---	---	---	---	---	---	---	.4M	---
☐ **Moderate Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---
☐ **High Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---

Comments: _____

14L. RECREATION / EDUCATION POTENTIAL ☐ NA (proceed to Overall Summary and Rating page)
Affords 'bonus' points if AA provides a recreational or educational opportunity.

i. Is the AA a known or potential recreational or educational site? ☒ **YES**, go to ii. ☐ **NO**, check the NA box.

ii. Check categories that apply to the AA: ☒ Educational/Scientific Study ☐ Consumptive Recreational ☐ Non-consumptive recreational
☐ Other: _____

iii. Rating: Use the matrix below to select the functional point and rating.

Known or Potential Recreational or Educational Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	---	---
Private ownership with general public access (no permission required)	---	---
Private or public ownership without general public access, or requiring permission for public access	---	.05L

Comments: Tribal ownership restricts access.

15. GENERAL SITE NOTES: _____

Wetland/Site #(s): Northern Excavated Area

Function & Value Variables	Rating – Actual Functional Points	Possible Functional Points	Functional Units: Actual Points x Estimated AA Acreage	Indicate the Four Most Prominent Functions with an Asterisk
A. Listed / Proposed T&E Species Habitat	low 0.10	1.00		
B. MT Natural Heritage Program Species Habitat	high 0.80	1.00		
C. General Wildlife Habitat	mod 0.70	1.00		
D. General Fish Habitat	NA	---		
E. Flood Attenuation	mod 0.60	1.00		
F. Short and Long Term Surface Water Storage	high 0.90	1.00		
G. Sediment / Nutrient / Toxicant Removal	mod 0.70	1.00		
H. Sediment / Shoreline Stabilization	NA	---		
I. Production Export / Food Chain Support	mod 0.40	1.00		
J. Groundwater Discharge / Recharge	mod 0.70	1.00		
K. Uniqueness	mod 0.40	1.00		
L. Recreation / Education Potential (bonus point)	low 0.05			
Total Points	**5.35**	**9.0**	**Total Functional Units**	
Percent of Possible Score 59% (round to nearest whole number)				

Category I Wetland: (must satisfy **one** of the following criteria; otherwise go to Category II)
- ☐ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
- ☐ Score of 1 functional point for Uniqueness; **or**
- ☐ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
- ☐ Percent of possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; otherwise go to Category IV)
- ☐ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish Habitat; **or**
- ☐ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
- ☐ Score of .9 functional point for Uniqueness; **or**
- ☐ Percent of possible score > 65% (round to nearest whole #).

☒ **Category III Wetland:** (Criteria for Categories I, II, or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if not go to Category III)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
- ☐ Percent of possible score < 35% (round to nearest whole #).

OVERALL ANALYSIS AREA (AA) RATING: Check the appropriate category based on the criteria outlined above.

☐ **I** ☐ **II** ☒ **III** ☐ **IV**

Appendix C

2008 REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Perry Ranch
Glacier County, Montana

PERRY RANCH WETLAND MITIGATION SITE 2008

Photo Point 1: Panoramic view showing the Northern Excavated Area (foreground) and Outer Oxbow (background) on July 9, 2008. View is south.

Photo Point 2: Panoramic view showing the Outer Oxbow (photo left) and Inner Oxbow (photo right) on July 9, 2008. View is southeast.

Photo Point 3: Panoramic view showing the southwestern end of the site on July 9, 2008. Delivery ditch is in the foreground. Cut Bank Creek is on photo right. View is east.

PERRY RANCH WETLAND MITIGATION SITE 2008

Photo 4: View is northwest at Soil Pit 1 in the Northern Excavated Area (Type 5).

Photo 5: View is north at the Northern Excavated Area. Note the stressed Canada thistle - long stalks with a tuft of leaves.

Photo 6: View is west at Soil Pit 3 along north side of the Outer Oxbow.

Photo 7: View is southwest at the macroinvertebrate sampling location in the Outer Oxbow.

Photo 8: View is northwest at Soil Pit 5 (Type 1) where wetland plants dominated in 2008.

Photo 9: At east end of dike facing the Inner Oxbow View is west.

PERRY RANCH WETLAND MITIGATION SITE 2008

Photo 10: View is east at the Excavated Ponds of the Inner Oxbow.

Photo 11: From start of Transect 1 at 288˚.

Photo 12: From end of Transect 1 at 108˚.

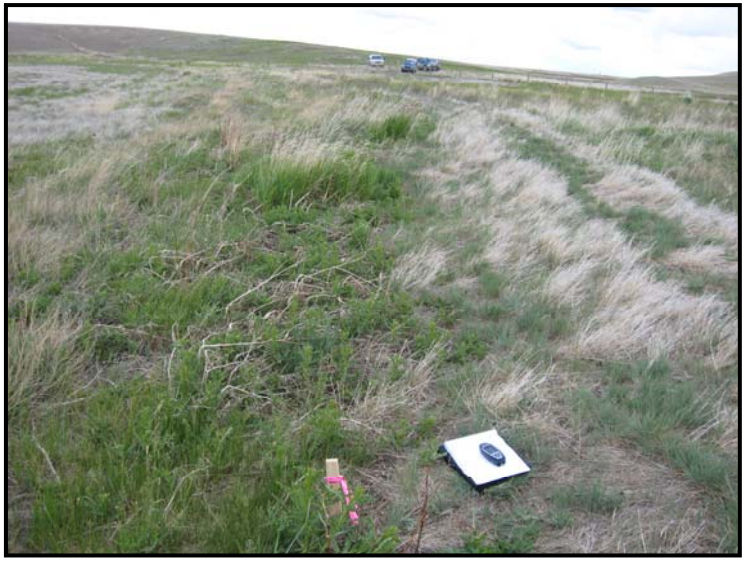


Photo 13: June 18, 2007.

Photo 14: August 21, 2007.

Photo 15: July 9, 2008

Photos 13-15: Weed Photo Point 1. View is northeast at a patch of Canada thistle.

PERRY RANCH WETLAND MITIGATION SITE 2008

Photo 16: June 18, 2007.

Photo 17: August 21, 2007.

Photo 18: July 9, 2008.

Photos 16-18: Weed Photo Point 2. View is east showing leafy spurge (white arrows).

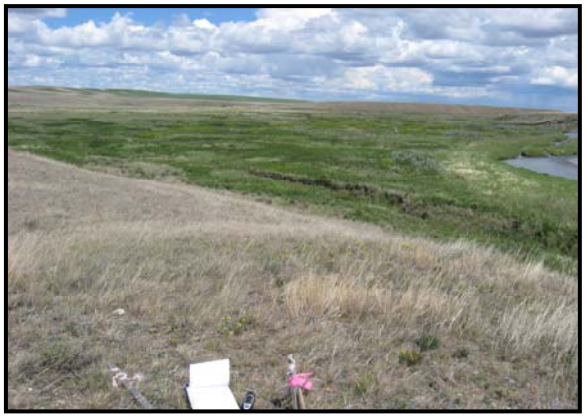


Photo 19: June 18, 2007.

Photo 20: August 21, 2007.

Photo 21: July 9, 2008

Photos 19-21: Weed Photo Point 3. View is northeast showing a large leafy spurge infestation (brighter yellow-green patches in background).

Photo 22:
June 18, 2007.
Weed Photo Point 4.
View is south at leafy spurge plants (yellow-green).

Photo 23:
August 21, 2007.
Weed Photo Point 4.
View is south at leafy spurge plants (yellow-green).

SEVEN-YEAR AERIAL PHOTOGRAPH COMPARISON – PERRY RANCH WETLAND MITIGATION SITE

July 23, 2002

July 27, 2003

July 24, 2004

July 5, 2005

July 7, 2006

July 5, 2007

July 7, 2008

Appendix D

2008 MACROINVERTEBRATE SAMPLING PROTOCOL AND DATA

MDT Wetland Mitigation Monitoring
Alkali Lake
Pondera County, Montana

AQUATIC INVERTEBRATE SAMPLING PROTOCOL

Equipment List

- D-frame sampling net with 1 mm mesh.
- 1-liter, wide-mouth, plastic sample jars provided by Rhithron Associates, Inc. (Quart sized, wide-mouthed canning jars can be substituted.)
- 95% ethanol (alternatively isopropyl alcohol).
- Pre-printed sample labels (printed on rite-in-the-rain paper); two labels per sample.
- Pencil.
- Clear packaging tape.
- 3-5 gallon plastic pail.
- Large tea strainer or framed screen.
- Cooler with ice for storing sample.

Site Selection

Select a site that is accessible with hip waders or rubber boots. If the substrate is too soft, place a wide board down to walk on. Choose a site that is representative of the overall condition of the wetland. Annual sampling should occur at the same site within the wetland.

Sampling Procedure

Wetland invertebrates (macroinvertebrates) inhabit the substrate, the water column, the stems and leaves of aquatic vegetation, and the water surface. At the given location, each habitat type is sampled and combined into a single 1-liter sample jar. Pre-cautions are made to minimize disturbing the sample site in order to maximize the number of animals collected.

Fill the pail with approximately 1 gallon of wetland water. Ideally, sample the water column from near-shore outward to a depth of 3 feet. Sample the water column using a long sweep of the net, keeping the net at about half the depth of the water. Sample the water surface with a long sweep of the net. Aquatic vegetation is sampled by pulling the net beneath the water surface, for at least a meter in distance. The substrate is sampled by pulling the net along the bottom, bumping it against the substrate several times as you pull. Be sure to place some muck, mud, and/or vegetation into the jar. After sampling a habitat, rinse the net in the bucket and look for insects, crustaceans, and other aquatic invertebrates. It is not necessary to sample habitats in any specific order, but all habitats, if present, are to be sampled. Habitats can be sampled more than once.

Fill about 1 cup of ethanol into the sample jar. Sieve the contents of the bucket through the straining device and pour or carefully scrape the contents of the strainer into the sample jar. Top off the jar with enough ethanol to cover all the material and leave as little headroom as possible. Alternatively, sampled materials can be lifted out of the net and put directly into the jar. Be sure to include some muck, mud, and/or vegetation into the jar. Each macroinvertebrate sampling site should have only one sampling jar.

Using pencil, complete two labels with the required information: project name, project number, date, collector's name, and habitats sampled. Do not complete the label with ink as it will dissolve in ethanol. For wetlands with at least two macroinvertebrate sampling sites, number the site consecutively followed by the total number of sites (e.g. Sample 2 of 3 sites). Place one label into the jar and seal the jar. Dry the jar off, if necessary, and tape the second label to the outside of the jar.

Photograph each macroinvertebrate sampling site.

Sample Handling/Delivery

In the field, keep sample jars cool by placing in a cooler with a small amount of ice.
Deliver samples to the PBS&J office in Missoula, where they will be inventoried and delivered to Rhithron Associates, Inc.

MDT Mitigated Wetland Monitoring Project: Aquatic Invertebrate Monitoring
Summary 2001 – 2008

Prepared for Post, Buckley, Schuh, and Jernigan (PBS&J)
Prepared by W. Bollman, Rhithron Associates, Inc.

INTRODUCTION

This report summarizes data generated from eight years of mitigated wetland monitoring from sites throughout the State of Montana. Over all years of sampling, a total of 210 invertebrate samples have been collected. Table 1 lists the currently monitored sites at which aquatic invertebrates were collected in 2008, and summarizes the sampling history of each.

METHODS

Sample processing

Aquatic invertebrate samples were collected at mitigated wetland sites in the summer months of 2001, 2002, 2003, 2004, 2005, 2006, 2007, and 2008 by personnel of PBS&J (Table 1). Sampling procedures were based on the protocols developed by the Montana Department of Environmental Quality (MDEQ) for wetland sampling. Sampling consisted of D-frame net sweeps through emergent vegetation (when present), the water column, and over the water surface, and included disturbing and scraping substrates at each sampled site. These sample components were composited and preserved in ethanol at each wetland site. Samples were delivered to Rhithron Associates, Inc. for processing, taxonomic determinations, and data analysis.

Standard sorting protocols were applied to achieve representative subsamples of a minimum of 100 organisms. Caton sub-sampling devices (Caton 1991), divided into 30 grids, each approximately 5 cm by 6 cm, were used. Grid contents were examined under stereoscopic microscopes using 10x-30x magnification. All aquatic invertebrates from each selected grid were sorted from the substrate, and placed in 95% ethanol for subsequent identification. Grid selection, examination, and sorting continued until at least 100 organisms were sorted. A large/rare search was conducted to collect any taxa not found in the subsampling procedure.

Organisms were individually examined using 10x – 80x stereoscopic dissecting scopes (Leica S8E and S6E) and identified to the lowest practical taxonomic levels using appropriate published taxonomic references. Identification, counts, life stages, and information about the condition of specimens were recorded on bench sheets. To obtain accuracy in richness measures, organisms that could not be identified to the target level specified in MDEQ protocols were designated as “not unique” if other specimens from the same group could be taken to target levels. Organisms designated as “unique” were those that could be definitively distinguished from other organisms in the sample. Identified organisms were preserved in 95% ethanol in labeled vials, and archived at the Rhithron laboratory. Midges were morphotyped using 10x – 80x stereoscopic dissecting microscopes (Leica S8E and S6E) and representative specimens were slide mounted and examined at 200x – 1000x magnification using an Olympus BX 51 compound microscope. Slide mounted organisms were also archived at the Rhithron laboratory.

Assessment

The method employed to assess these wetlands is based on an index incorporating a battery of 12 bioassessment metrics or attributes (Table 2) tested and recommended by Stribling et al. (1995) in a report to the Montana Department of Health and Environmental Science. In that study, it was determined that some of the metrics were of limited use in some geographic regions, and for some wetland types. Despite that finding, all 12 metrics are used in this evaluation of mitigated wetlands, since detailed geographic information and wetland classifications were unavailable. Scoring criteria for the 12 metrics were developed specifically for this project, since mitigated wetlands were not included in original criteria development.

Scoring criteria for wetland metrics were developed by generally following the tactic used by Stribling et al. (1995). Boxplots were generated using a statistical software package (Statistica™), and distributions, median values, ranges, and quartiles for each metric were examined. For the wetland sites, “good” scores were generally

those that fell above the 75th percentile (for those metrics that decrease in value in response to stress) or below the 25th percentile (for metrics that respond to stress by an increase in value) of all scores. Additional scoring ranges were established by bisecting the range below the 75th percentile for decreasing scores (or above the 25th percentile for increasing scores) into "sub-optimal" and "poor" assessment categories. A score of 5, 3, or 1 was assigned to good, sub-optimal, and poor metric performance, respectively. In this way, metric values were translated into normalized metric scores, and scores for all metrics were summed to produce a total bioassessment score, which is expressed as a percentage of the maximum possible score (60). Total bioassessment scores were classified according to a similar process, using the ranges and distributions of total scores for all sites studied in all years. Data from a total of 167 samples were used to develop criteria.

Six sites in this study supported aquatic fauna characteristic of lotic habitats rather than lentic wetland habitats; these sites were excluded from mitigated wetland scoring criteria development, and were evaluated with a metric battery specific to flowing water habitats. In 2008, the lotic sites were Camp Creek (2 sites), Cloud Ranch stream, Jack Creek – McKee Spring, and Jocko Spring Creek (2 sites). Invertebrate assemblages at these sites were generally characteristic of montane or foothill stream conditions and were assessed using the tested metric battery developed for montane streams of Western Montana (MVFP index: Bollman 1998).

The purpose of constructing an index from biological attributes or metrics is to provide a means of integrating information to facilitate the determination of whether management action is needed. However, the nature of the action needed is not determined solely by the index score or impairment classification, but by consideration of an analysis of the component metrics, the taxonomic composition of the assemblages, and other issues. The diagnostic functions of the metrics and taxonomic data need more study since our understanding of the interrelationships of natural environmental factors and anthropogenic disturbances is tentative. Thus, the further interpretive remarks accompanying the raw taxonomic and metric data in this summary are offered cautiously. Year-to-year comparisons depend on an assumption that specific sites were revisited in each year, and that equivalent sampling methods were utilized at each site revisit.

Bioassessment metrics – wetlands

An index based on the performance of 12 metrics was constructed, as described above. Table 2 lists those metrics, describes their calculation and the expected response of each to increased degradation or impairment of the wetland.

In addition to the summed scores of each metric and the associated impairment classification described above, each individual metric informs the bioassessment to some degree. The four richness metrics (Total taxa, POET, Chironomidae taxa, and Crustacea taxa + Mollusca taxa) can be interpreted to express habitat complexity as well as water quality. Complex, diverse habitats consist of variable substrates, emergent vegetation, variable water depths and other factors, and are potential features of long-established stable wetlands with minimal human disturbance. In the study conducted by Stribling et al. (1995), all four richness metrics were found to be significantly associated with water quality parameters including conductance, salinity, and total dissolved solids.

Four composition metrics (%Chironomidae, %Orthocladiinae of Chironomidae, %Crustacea + %Mollusca, and %Amphipoda) measure the relative contributions of certain taxonomic groups that may have significant responses to habitat and/or water quality impacts. For example, amphipods have been demonstrated to increase in abundance in alkaline conditions. Short-lived, relatively mobile taxa such as chironomids dominate ephemeral environments; many are hemoglobin-bearers capable of tolerating de-oxygenated conditions.

Two tolerance metrics (Hilsenhoff Biotic Index and %Dominant taxon) were included in the bioassessment battery. The HBI indicates the overall invertebrate assemblage tolerance to nutrient enrichment, warm water, and/or low dissolved oxygen conditions. The percent abundance of the dominant taxon has been demonstrated to be strongly associated with pH, conductance, salinity, total organic carbon, and total dissolved solids.

Two trophic measures (%Collector-gatherers and %Filterers) may be helpful in expressing functional integrity of the invertebrate assemblage, which can be impacted by poor water quality or habitat degradation. High proportions of filtering organisms suggest nutrient and/or organic enrichment, while abundant collectors suggest

more positive functional conditions and well-developed wetland morphology. These organisms graze periphyton growing on stable surfaces such as macrophytes.

Summary metric values and scores for the 2008 samples are given in Tables 4a-4c and 5. Thermal preference of invertebrate assemblages was calculated using Brandt 2001.

Bioassessment metrics – lotic habitats

For sites supporting rheophilic invertebrate assemblages, bioassessment was based on a metric battery and scoring criteria developed for montane regions of Montana (MVFP index: Bollman 1998). The six metrics constituting the bioassessment index used for MVFP sites in this study were selected because, both individually and as an integrated metric battery, they are robust at distinguishing impaired sites from relatively unimpaired sites (Bollman 1998). They have been demonstrated to be more variable with anthropogenic disturbance than with natural environmental gradients (Bollman 1998). Each of the six metrics, and their expected responses to various stressors is described below.

1. Ephemeroptera (mayfly) taxa richness. The number of mayfly taxa declines as water quality diminishes. Impairments to water quality which have been demonstrated to adversely affect the ability of mayflies to flourish include elevated water temperatures, heavy metal contamination, increased turbidity, low or high pH, elevated specific conductance and toxic chemicals. Few mayfly species are able to tolerate certain disturbances to instream habitat, such as excessive sediment deposition.

2. Plecoptera (stonefly) taxa richness. Stoneflies are particularly susceptible to impairments that affect a stream on a reach-level scale, such as loss of riparian canopy, streambank instability, channelization, and alteration of morphological features such as pool frequency and function, riffle development and sinuosity. Just as all benthic organisms, they are also susceptible to smaller scale habitat loss, such as by sediment deposition, loss of interstitial spaces between substrate particles, or unstable substrate.

3. Trichoptera (caddisfly) taxa richness. Caddisfly taxa richness has been shown to decline when sediment deposition affects habitat. In addition, the presence of certain case-building caddisflies can indicate good retention of woody debris and lack of scouring flow conditions.

4. Number of sensitive taxa. Sensitive taxa are generally the first to disappear as anthropogenic disturbances increase. The list of sensitive taxa used here includes organisms sensitive to a wide range of disturbances, including warmer water temperatures, organic or nutrient pollution, toxic pollution, sediment deposition, substrate instability and others. Unimpaired streams of western Montana typically support at least four sensitive taxa (Bollman 1998).

5. Percent filter feeders. Filter-feeding organisms are a diverse group; they capture small particles of organic matter, or organically enriched sediment material, from the water column by means of a variety of adaptations, such as silken nets or hairy appendages. In forested montane streams, filterers are expected to occur in insignificant numbers. Their abundance increases when canopy cover is lost and when water temperatures increase and the accompanying growth of filamentous algae occurs. Some filtering organisms, specifically the Arctopsychid caddisflies (*Arctopsyche* spp. and *Parapsyche* spp.) build silken nets with large mesh sizes that capture small organisms such as chironomids and early-instar mayflies. Here they are considered predators, and, in this study, their abundance does not contribute to the percent filter feeders metric.

6. Percent tolerant taxa. Tolerant taxa are ubiquitous in stream sites, but when disturbance increases, their abundance increases proportionately. The list of taxa used here includes organisms tolerant of a wide range of disturbances, including warmer water temperatures, organic or nutrient pollution, toxic pollution, sediment deposition, substrate instability and others.

Table 1. Montana Department of Transportation Mitigated Wetlands Monitoring Project sites: sampling history. Only those sites sampled in 2008 are included. An asterisk indicates lotic sites.

Site Identifier	2001	2002	2003	2004	2005	2006	2007	2008
Roundup	+	+	+	+	+	+	+	+
Hoskins Landing MS-1		+	+	+	+	+	+	+
Peterson Ranch Pond 2		+		+	+	+	+	+
Peterson Ranch Pond 4		+	+	+	+	+	+	+
Perry Ranch		+			+			+
Camp Creek MS-1*		+	+	+	+	+	+	+
Camp Creek MS-2*						+	+	+
Cloud Ranch Pond				+	+		+	+
Cloud Ranch Stream*				+			+	+
Jack Creek – Pond				+	+	+	+	+
Jack Creek – McKee*							+	+
Norem				+	+	+	+	+
Rock Creek Ranch					+	+	+	+
Wagner Marsh					+	+	+	+
Alkali Lake 1						+	+	+
West Fork of Charley Creek							+	+
Woodson Pond MI 1							+	+
Woodson Stream MI 2*							+	+
Little Muddy Creek							+	+
Selkirk Ranch							+	+
DH Ranch							+	+
Jocko Spring Creek MS-1								+
Jocko Spring Creek MS-2								+
Sportsman's Campground Site #1								+
Sportsman's Campground Site #2								+
Sportsman's Campground Site #3								+
Lonepine #1								+
Lonepine #2								+

Table 2. Aquatic invertebrate metrics employed for wetland (lentic) invertebrate assemblages in the MDT mitigated wetlands study, 2001 – 2008.

Metric	Metric Calculation	Expected response to degradation or impairment
Total taxa	Count of unique taxa identified to lowest recommended taxonomic level	Decrease
POET	Count of unique Plecoptera, Trichoptera, Ephemeroptera, and Odonata taxa identified to lowest recommended taxonomic level	Decrease
Chironomidae taxa	Count of unique midge taxa identified to lowest recommended taxonomic level	Decrease
Crustacea taxa + Mollusca taxa	Count of unique Crustacea taxa and Mollusca taxa identified to lowest recommended taxonomic level	Decrease
% Chironomidae	Percent abundance of midges in the subsample	Increase
Orthocladiinae / Chironomidae	Number of individual midges in the sub-family Orthocladiinae / total number of midges in the subsample.	Decrease
% Amphipoda	Percent abundance of amphipods in the subsample	Increase
% Crustacea + % Mollusca	Percent abundance of crustaceans in the subsample plus percent abundance of molluscs in the subsample	Increase
HBI	Relative abundance of each taxon multiplied by that taxon's modified Hilsenhoff Biotic Index (tolerance) value. These numbers are summed over all taxa in the subsample.	Increase
%Dominant taxon	Percent abundance of the most abundant taxon in the subsample	Increase
%Collector-Gatherers	Percent abundance of organisms in the collector-gatherer functional group	Decrease
%Filterers	Percent abundance of organisms in the filterer functional group	Increase

RESULTS

(Note: Individual site discussions were removed from this report by PBS&J and are included in the macroinvertebrate sections of individual monitoring reports. Summary tables for lentic (4a – 4c) and lotic (5) sites and project specific taxa listing(s) and metrics report(s) are provided on the following pages.)

Table 4a. Metric values and scores for wetland (lentic) sites in the MDT mitigated wetland study – 2008 sampling.

METRIC	Roundup	Hoskins Landing MS 1	Peterson Ranch Pond 2	Peterson Ranch Pond 4	Perry Ranch	Cloud Ranch Pond	Jack Creek Pond	Norem
Total taxa	9	18	13	25	11	27	21	14
POET	0	2	1	3	0	5	2	0
Chironomidae taxa	4	5	3	6	5	14	7	6
Crustacea + Mollusca	3	6	3	5	2	4	6	2
% Chironomidae	80.37%	17.00%	3.70%	13.21%	88.79%	49.53%	42.86%	34.69%
Orthocladiinae/Chir	0.63	0.18	1.50	0.21	0.82	0.66	0.40	0.53
% Amphipoda	0.00%	8.00%	0.00%	0.00%	0.00%	6.54%	15.24%	0.00%
% Crustacea + % Mollusca	15.89%	48.00%	86.11%	43.40%	6.54%	10.28%	30.48%	26.53%
HBI	8.01	7.62	7.85	7.40	7.37	5.94	8.17	7.61
% Dominant taxon	50.47%	27.00%	84.26%	25.47%	62.62%	13.08%	19.05%	26.53%
% Collector-Gatherers	31.78%	54.00%	87.96%	20.75%	20.56%	56.07%	65.71%	44.90%
% Filterers	2.80%	10.00%	0.00%	1.89%	0.00%	3.74%	1.90%	0.00%
Total taxa	1	3	1	5	1	5	5	1
POET	1	1	1	3	1	5	1	1
Chironomidae taxa	3	3	3	3	3	5	5	3
Crustacea + Mollusca	1	5	1	3	1	3	5	1
% Chironomidae	1	5	5	5	1	1	1	3
Orthocladiinae/Chir	5	1	5	3	5	5	3	5
% Amphipoda	5	3	5	5	5	3	3	5
% Crustacea + % Mollusca	5	3	1	3	5	5	5	5
HBI	1	1	1	3	3	5	1	1
% Dominant taxon	1	5	1	5	1	5	5	5
% Collector-Gatherers	1	3	5	1	1	3	3	1
% Filterers	3	1	3	3	3	3	3	3
Total Score	**28**	**34**	**32**	**42**	**30**	**48**	**40**	**34**
Percent of Maximum Score	**46.67%**	**56.67%**	**53.33%**	**70.00%**	**50.00%**	**80.00%**	**66.67%**	**56.67%**
Impairment Classification	**poor**	**sub-optimal**	**sub-optimal**	**good**	**poor**	**good**	**sub-optimal**	**sub-optimal**

Table 4b. Metric values and scores for wetland (lentic) sites in the MDT mitigated wetland study – 2008 sampling.

METRIC	Rock Creek Ranch	Wagner Marsh	Alkali Lake	West Fork of Charley Creek	Woodson Pond	Woodson Stream	Little Muddy Creek	Selkirk Ranch
Total taxa	23	11	10	9	13	7	14	17
POET	1	4	0	0	1	3	1	1
Chironomidae taxa	5	2	2	1	7	0	2	8
Crustacea + Mollusca	5	2	3	3	2	2	3	5
% Chironomidae	28.97%	2.83%	5.41%	0.91%	60.00%	0.00%	55.00%	23.38%
Orthocladiinae/Chir	0.97	0.00	0.00	0.00	0.52	0	0.64	0.33
% Amphipoda	0.00%	0.00%	0.00%	67.27%	0.00%	7.69%	0.00%	5.19%
% Crustacea + % Mollusca	28.97%	39.62%	32.43%	70.91%	25.45%	15.38%	17.00%	48.05%
HBI	6.91	7.45	8.57	8.19	8.14	4.62	6.97	7.76
% Dominant taxon	22.43%	48.11%	48.65%	67.27%	25.45%	30.77%	35.00%	32.47%
% Collector-Gatherers	30.84%	52.83%	21.62%	68.18%	86.36%	23.08%	29.00%	16.88%
% Filterers	1.87%	0.00%	0.00%	0.00%	0.00%	30.77%	0.00%	32.47%
Total taxa	5	1	1	1	1	1	1	3
POET	1	5	1	1	1	3	1	1
Chironomidae taxa	3	1	1	1	5	1	1	5
Crustacea + Mollusca	3	1	1	1	1	1	1	3
% Chironomidae	3	5	5	5	1	5	1	3
Orthocladiinae/Chir	5	1	1	1	5	Not Scored	5	3
% Amphipoda	5	5	5	1	5	3	5	3
% Crustacea + % Mollusca	5	3	5	1	5	5	5	3
HBI	3	3	1	1	1	5	3	1
% Dominant taxon	5	3	3	1	5	5	3	5
% Collector-Gatherers	1	3	1	3	5	1	1	1
% Filterers	3	3	3	3	3	1	3	1
Total Score	**42**	**34**	**28**	**20**	**38**	**31**	**30**	**32**
Percent of Maximum Score	**70.00%**	**56.67%**	**46.67%**	**33.33%**	**63.33%**	**56.36%**	**50.00%**	**53.33%**
Impairment Classification	**good**	**sub-optimal**	**poor**	**poor**	**sub-optimal**	**sub-optimal**	**poor**	**sub-optimal**

Table 4c. Metric values and scores for wetland (lentic) sites in the MDT mitigated wetland study – 2008 sampling.

METRIC	DH Ranch	Sportsman's Campground Site # 1	Sportsman's Campground Site # 2	Sportsman's Campground Site # 3	Lonepine # 1	Lonepine # 2
Total taxa	15	16	9	12	18	4
POET	1	1	0	0	2	0
Chironomidae taxa	6	6	3	7	12	3
Crustacea + Mollusca	2	5	3	4	1	1
% Chironomidae	52.29%	10.91%	41.18%	69.09%	81.82%	57.14%
Orthocladiinae/Chir	0.09	0.17	0.00	0.25	0.13	0.00
% Amphipoda	0.00%	24.55%	5.88%	27.27%	0.00%	0.00%
% Crustacea + % Mollusca	30.28%	83.64%	23.53%	29.09%	7.27%	42.86%
HBI	7.33	7.55	8.76	7.55	7.60	8.14
% Dominant taxon	33.03%	56.36%	29.41%	25.45%	25.45%	42.86%
% Collector-Gatherers	49.54%	20.91%	11.76%	57.27%	55.45%	28.57%
% Filterers	0.92%	63.64%	11.76%	25.45%	22.73%	42.86%
Total taxa	3	3	1	1	3	1
POET	1	1	1	1	1	1
Chironomidae taxa	3	3	3	5	5	3
Crustacea + Mollusca	1	3	1	3	1	1
% Chironomidae	1	5	3	1	1	1
Orthocladiinae/Chir	1	1	1	3	1	1
% Amphipoda	5	1	3	1	5	5
% Crustacea + % Mollusca	5	1	5	5	5	3
HBI	3	3	1	3	3	1
% Dominant taxon	5	1	5	5	5	3
% Collector-Gatherers	3	1	1	3	3	1
% Filterers	3	1	1	1	1	1
Total Score	**34**	**24**	**26**	**32**	**34**	**22**
Percent of Maximum Score	**56.67%**	**40.00%**	**43.33%**	**53.33%**	**56.67%**	**36.67%**
Impairment Classification	**sub-optimal**	**poor**	**poor**	**sub-optimal**	**sub-optimal**	**poor**

Table 5. Metric values and scores for stream (lotic) sites in the MDT mitigated wetland study – 2008 sampling.

METRIC	Camp Creek MS-1	Camp Creek MS-2	Cloud Ranch Stream	Jack Creek – McKee Spring	Jocko Spring Creek MS-1	Jocko Spring Creek MS-2
E Richness	7	5	4	1	0	1
P Richness	2	2	0	0	0	1
T Richness	4	6	5	3	2	5
Pollution Sensitive Richness	0	1	0	0	0	0
Filterer Percent	29.00%	37.00%	5.00%	40.00%	15.00%	11.00%
Pollution Tolerant Percent	5.00%	3.00%	28.00%	1.00%	62.00%	15.00%
E Richness	3	2	2	0	0	0
P Richness	2	2	0	0	0	1
T Richness	2	3	3	2	1	3
Pollution Sensitive Richness	0	1	0	0	0	0
Filterer Percent	1	0	3	0	1	1
Pollution Tolerant Percent	3	3	0	3	0	1
Total score	**11**	**11**	**8**	**5**	**2**	**6**
Percent of maximum score	**61%**	**61%**	**44%**	**28%**	**11%**	**33%**
Impairment classification	**slight**	**slight**	**moderate**	**moderate**	**severe**	**moderate**

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Bollman, W. 1998. Montana Valleys and Foothill Prairies Ecoregion. Master's Thesis. (M.S.) University of Montana, Missoula, Montana.

Brandt, D. 2001. Temperature Preferences and Tolerances for 137 Common Idaho Macroinvertebrate Taxa. Report to the Idaho Department of Environmental Quality, Coeur d' Alene, Idaho.

Caton, L. W. 1991. Improving subsampling methods for the EPA's "Rapid Bioassessment" benthic protocols. Bulletin of the North American Benthological Society, 8(3): 317-319.

Stribling, J.B., J. Lathrop-Davis, M.T. Barbour, J.S. White, and E.W. Leppo. 1995. Evaluation of environmental indicators for the wetlands of Montana: the multimetric approach using benthic macroinvertebrates. Report to the Montana Department of Health and Environmental Science, Helena, Montana.

Taxa Listing

Project ID: MDT08PBSJ
RAI No.: MDT08PBSJ003

RAI No.: MDT08PBSJ003 **Sta. Name:** Perry Ranch
Client ID:
Date Coll.: 7/9/2008 **No. Jars:** 1 **STORET ID:**

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Copepoda	1	0.93%	Yes	Unknown		8	CG
Enchytraeidae							
Enchytraeus sp.	2	1.87%	Yes	Unknown		4	CG
Lymnaeidae							
Lymnaeidae	5	4.67%	No	Immature		6	SC
Stagnicola sp.	1	0.93%	Yes	Unknown		6	SC
Coleoptera							
Dytiscidae							
Dytiscidae	1	0.93%	Yes	Larva		5	PR
Hydrophilidae							
Berosus sp.	1	0.93%	Yes	Larva		5	PR
Hydrophilidae	1	0.93%	Yes	Larva		5	PR
Chironomidae							
Chironomidae							
Apedilum sp.	2	1.87%	Yes	Larva		11	CG
Chironomidae	1	0.93%	No	Pupa		10	CG
Chironomus sp.	5	4.67%	Yes	Larva		10	CG
Cricotopus (Isocladius) sp.	67	62.62%	Yes	Larva		7	SH
Glyptotendipes sp.	9	8.41%	Yes	Larva		10	SH
Psectrocladius sp.	11	10.28%	Yes	Larva		8	CG
Sample Count	**107**						

Metrics Report

Project ID: MDT08PBSJ
RAI No.: MDT08PBSJ003
Sta. Name: Perry Ranch
Client ID:
STORET ID:
Coll. Date: 7/9/2008

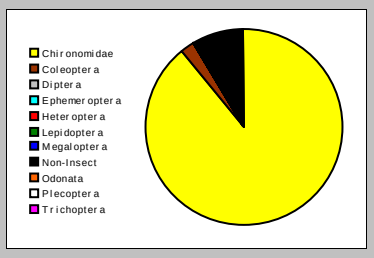
Abundance Measures

Sample Count: 107
Sample Abundance: 1,605.00 6.67% of sample used

Coll. Procedure:
Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	3	9	8.41%
Odonata			
Ephemeroptera			
Plecoptera			
Heteroptera			
Megaloptera			
Trichoptera			
Lepidoptera			
Coleoptera	3	3	2.80%
Diptera			
Chironomidae	5	95	88.79%

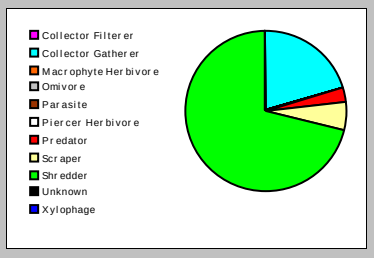


Dominant Taxa

Category	A	PRA
Cricotopus (Isocladius)	67	62.62%
Psectrocladius	11	10.28%
Glyptotendipes	9	8.41%
Lymnaeidae	5	4.67%
Chironomus	5	4.67%
Enchytraeus	2	1.87%
Apedilum	2	1.87%
Stagnicola	1	0.93%
Hydrophilidae	1	0.93%
Dytiscidae	1	0.93%
Copepoda	1	0.93%
Chironomidae	1	0.93%
Berosus	1	0.93%

Functional Composition

Category	R	A	PRA
Predator	3	3	2.80%
Parasite			
Collector Gatherer	5	22	20.56%
Collector Filterer			
Macrophyte Herbivore			
Piercer Herbivore			
Xylophage			
Scraper	1	6	5.61%
Shredder	2	76	71.03%
Omivore			
Unknown			

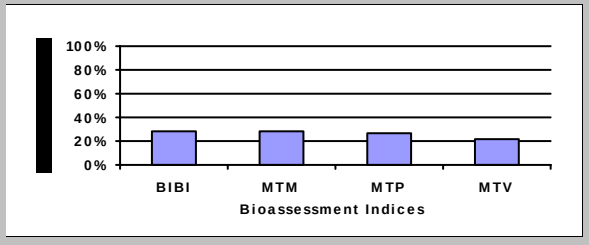


Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
Composition					
Taxa Richness	11	1	0		0
Non-Insect Percent	8.41%				
E Richness	0	1		0	
P Richness	0	1		0	
T Richness	0	1		0	
EPT Richness	0		0		0
EPT Percent	0.00%		0		0
Oligochaeta+Hirudinea Percent	1.87%				
Baetidae/Ephemeroptera	0.000				
Hydropsychidae/Trichoptera	0.000				
Dominance					
Dominant Taxon Percent	62.62%		0		0
Dominant Taxa (2) Percent	72.90%				
Dominant Taxa (3) Percent	81.31%	1			
Dominant Taxa (10) Percent	97.20%				
Diversity					
Shannon H (loge)	1.262				
Shannon H (log2)	1.820		1		
Margalef D	2.167				
Simpson D	0.458				
Evenness	0.100				
Function					
Predator Richness	3		1		
Predator Percent	2.80%	1			
Filterer Richness	0				
Filterer Percent	0.00%			3	
Collector Percent	20.56%		3		3
Scraper+Shredder Percent	76.64%		3		3
Scraper/Filterer	0.000				
Scraper/Scraper+Filterer	0.000				
Habit					
Burrower Richness	2				
Burrower Percent	13.08%				
Swimmer Richness	1				
Swimmer Percent	0.93%				
Clinger Richness	1	1			
Clinger Percent	62.62%				
Characteristics					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	3				
Hemoglobin Bearer Percent	14.95%				
Air Breather Richness	3				
Air Breather Percent	2.80%				
Voltinism					
Univoltine Richness	2				
Semivoltine Richness	3	3			
Multivoltine Percent	89.72%		0		
Tolerance					
Sediment Tolerant Richness	1				
Sediment Tolerant Percent	5.61%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	4.000				
Pollution Sensitive Richness	0	1		0	
Pollution Tolerant Percent	22.43%	3		1	
Hilsenhoff Biotic Index	7.371		0		0
Intolerant Percent	0.00%				
Supertolerant Percent	25.23%				
CTQa	94.500				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	14	28.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	8	26.67%	Moderate
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	4	22.22%	Moderate
MTM	Montana DEQ Mountains (Bukantis 1998)	6	28.57%	Moderate



Appendix E

MDT PROPOSED PROJECT LAYOUT

MDT Wetland Mitigation Monitoring
Perry Ranch
Glacier County, Montana

LAND & WATER D-1

~ FT. PECK

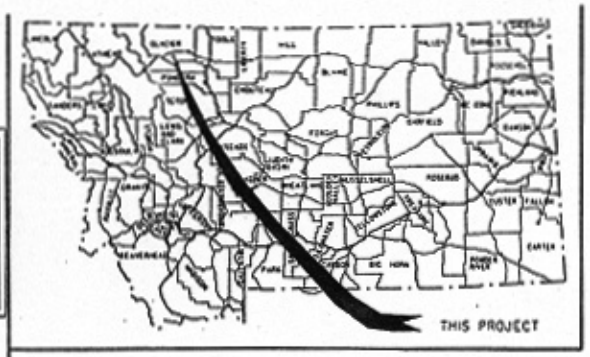
MONTANA DEPARTMENT OF TRANSPORTATION

FEDERAL AID PROJECT NO. NH 0002(232)

WETLAND MITIGATION

PERRY RANCH

GLACIER COUNTY



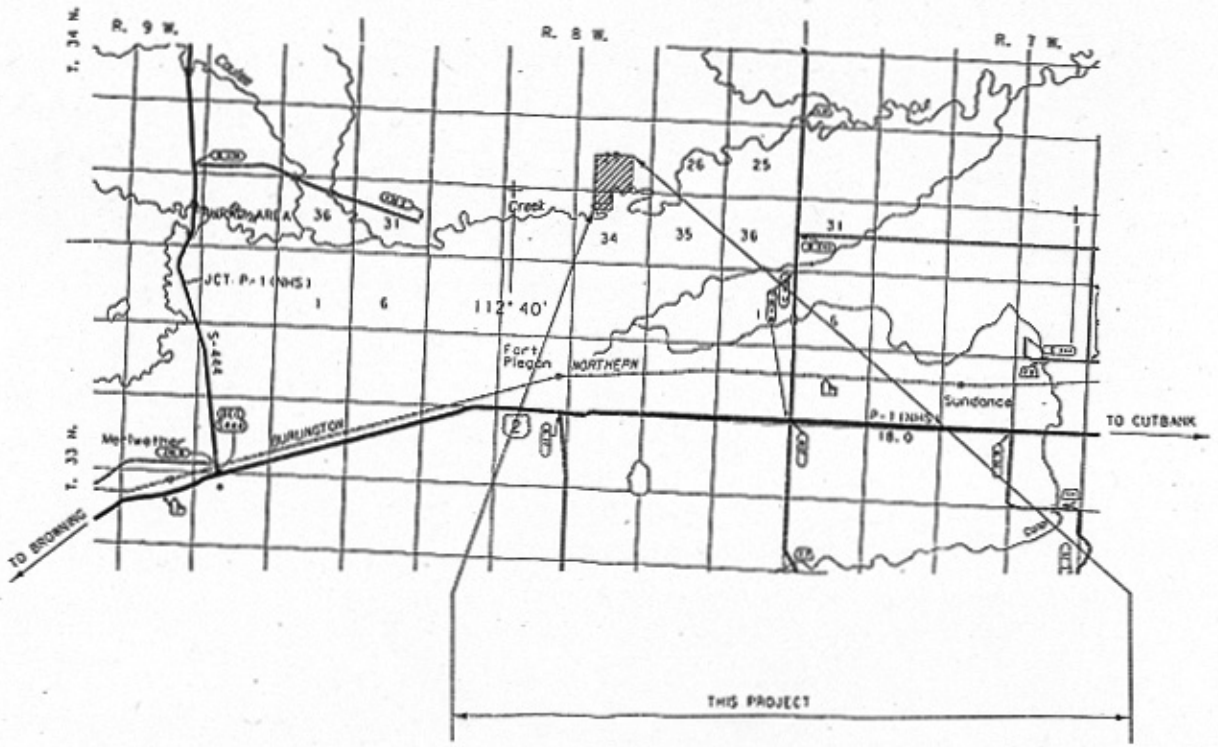
DESIGN DATA

A.D.T. =
A.D.T. =
D.H.V. =
D. =
T. =
V. =
ALL TRUCKS =
ESAL'S =
GROWTH RATE =

LETTING DATE = _____

LENGTH **kilometers**

SCALES
VERTICAL: 1 :
HORIZONTAL: 1 :
CROSS SECTION – HORIZONTAL & VERTICAL: 1 :
REDUCED PRINTS APPROXIMATELY 1/2 ORIGINAL SCALE



PRELIMINARY
FOR PLAN IN HAND ONLY

MONTANA DEPARTMENT OF TRANSPORTATION
APPROVED :
DIRECTOR OF TRANSPORTATION
BY _____
ADMINISTRATOR HIGHWAY DIVISION – ENGINEERING
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED :
DIVISION ADMINISTRATOR — DATE

RELATED PROJECTS

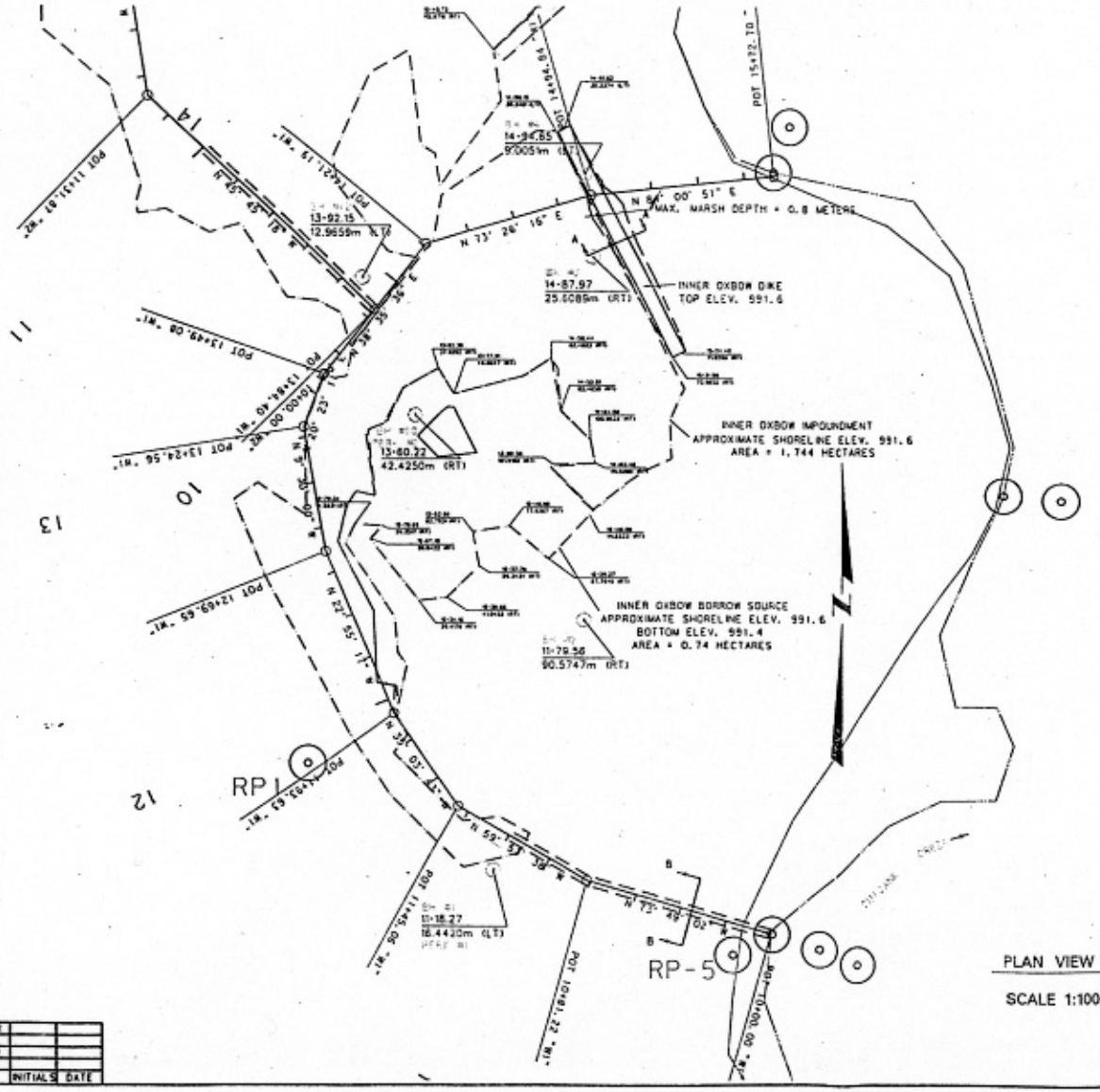
ASSOCIATED PROJECT AGREEMENT NUMBERS

R/W & UC	
P.E.	

CONTROL NO.

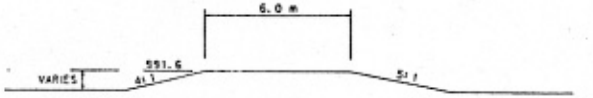
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 0002(232)	6

INNER OXBOW LAYOUT



PLAN VIEW

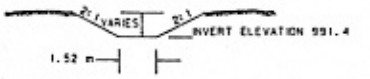
SCALE 1:100



SECTION A–A–SPREDER DIKE TYPICAL SECTION

SCALE 1:10

STA. 10+00 TO STA. 11+20



SECTION B–B–INTAKE WEIR TYPICAL SECTION

SCALE 1:10

DESIGNED		
DRAWN		
CHECKED		
REVISED		
	INITIALS	DATE

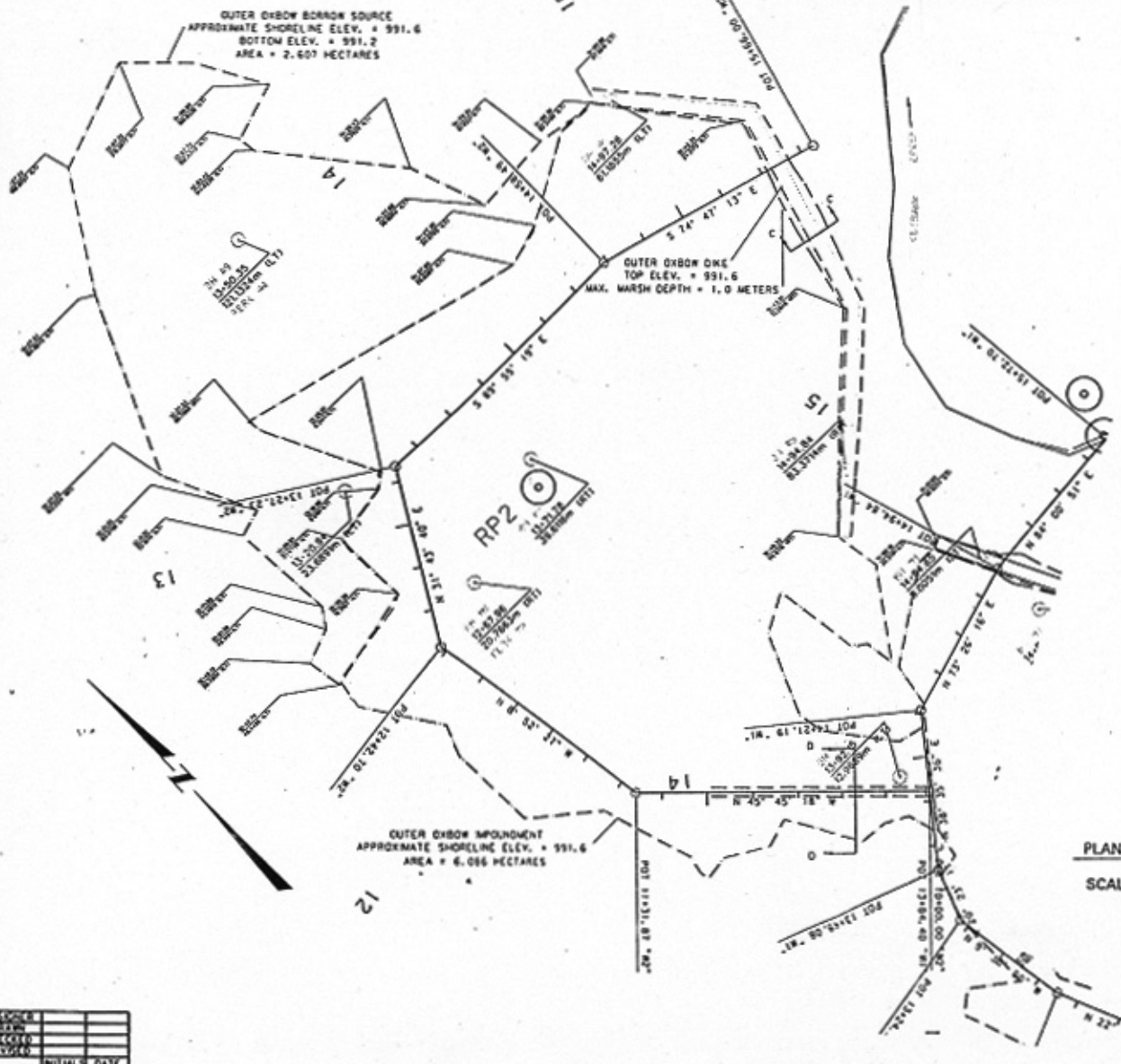
INNER OXBOW
LAYOUT DETAIL
ALIGNMENT "W1"

PRELIMINARY

LAND & WATER D-3

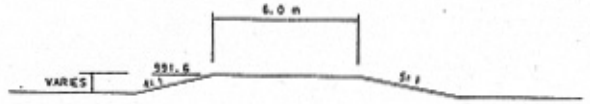
OUTER OXBOW LAYOUT

STATE	PROJECT NUMBER	SHEET
MONTANA	NH 0002(232)	7



PLAN VIEW

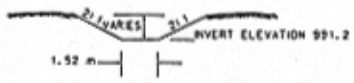
SCALE 1:100



SECTION C-C-SPREDER DIKE TYPICAL SECTION

SCALE 1:10

STA. 10+00 TO STA. 11+00



SECTION D-D-INTAKE WEIR TYPICAL SECTION

SCALE 1:10

DESIGNED		
DRAWN		
CHECKED		
RECOMMD		
	INITIALS	DATE

OUTER OXBOW
LAYOUT DETAIL
ALIGNMENT "W2"

PRELIMINARY

Appendix F

BIRD SURVEY PROTOCOL
GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Perry Ranch
Glacier County, Montana

BIRD SURVEY PROTOCOL

This protocol was developed by the Montana Department of Transportation (MDT) to monitor bird use within their Wetland Mitigation Sites. Though each wetland mitigation site is vastly different, the bird survey data collection methods were standardized to order to increase repeatability. The protocol uses an "area search within a restricted time frame" to collect data on bird species, density, behavior, and habitat-type use.

Survey Area

Sites that can be entirely walked: Sites where the entire perimeter or area can be walked include, but are not limited to: small ponds, enhanced historic river channels, and wet meadows. If the wetland is not uncomfortably inundated, walk several meandering transects to sufficiently cover the wetland. Meandering transects can be used, even if a small portion of the area is inaccessible (e.g. cannot cross due to inundation). Use binoculars to identify the bird species, to count the number of individuals, and to identify their behavior and habitat type. Data can be recorded directly onto the bird survey form or into a field notebook. The number of meandering transects and their direction (or location) should be recorded in the field notebook and/or drawn onto the aerial photograph or topographic map. Meandering transects are not formal and should not be staked. Each site should be walked and surveyed to the fullest extent within the set time limit.

Sites than cannot be entirely walked: Sites where the entire perimeter or area cannot be walked include, but are not limited to: very large sites (i.e. perimeter of 2-3 miles), and large-bodied waters (i.e. reservoirs), where deep water habitat (> 6 feet) is close to shore. For large-bodied waters where only one area was graded to create or enhance the development of wetland, bird surveys should be walked along meandering transects within or around the graded area (see above.). For sites that cannot be walked, bird surveys should be conducted from many lookout posts, established at key vantage points. The general location of lookout posts should be recorded in the field notebook or drawn onto the aerial photograph or topographic map. Lookout post locations do not need to be staked. Both binoculars and spotting scopes may be used in order to accurately identify and count the birds. Depending upon the size of the open water, more time may be spent viewing the mitigation area from lookout posts than is spent traveling between posts.

Survey Time

Ideally, bird surveys should be conducted in the morning hours when bird activity is often greatest (i.e. sunrise to no later than 11:00 am). Surveys can be completed before 11am if all transects have been walked or all lookout posts have been viewed with no new bird activity observed. For some sites bird surveys may need to be performed in the late afternoon or evening due to traveling constraints or weather. The overall limiting time factor will be the number of budgeted hours for the project.

Data Recording

Bird Species List: Record each bird species observed onto the Bird Survey-Field Data Sheet (or field notebook). Record the bird's common name using the appropriate 4-letter code. The 4-letter code uses the first two letters of the first two word's of the bird's common name or if one name, the first four letters. For example, Mourning Dove is coded as MODO while Mallard is coded as MALL. If an unknown individual is observed, use the 4-letter protocol, but define your

abbreviation at the bottom of the field data sheet. For example, unknown shorebird is UNSB; unknown brown bird is UNBR; unknown warbler is UNWA; and unknown waterfowl is UNWF. For a flyover of a flock of unknown species, use a term that describes the birds' general characteristics and include the approximate flock size in parenthesis; do not fill in the habitat column. For example, a flock of black, medium-sized birds could be coded as UNBB / FO (25).

Bird Density: For each observation record the actual or estimated number of individuals observed per species and per behavior. Totals can be tallied in the office and entered onto the Bird Survey-Field Data Sheet.

Bird Behavior: Bird behavior must be identified by what is known. When a species is observed, the behavior that is immediately exhibited is recorded. Only behaviors that have discreet descriptive terms should be used. The following terms are recommended: breeding pair (BP); foraging (F); flyover (FO); loafing (L), which is defined as sleeping, roosting, or floating with head tucked under wing; and nesting (N). If other behaviors that have a specific descriptive word are observed then it can be used and should later be added to the protocol. Descriptive words or phrases such as "migrating" or "living on site" are unknown behaviors.

Bird Species Habitat Use: When a species is observed, the habitat is also recorded. The following broad habitat categories are used:

- aquatic bed (AB), defined as rooted-floating, floating-leaved, or submergent vegetation.
- marsh (MA), defined as emergent (e.g. cattail, bulrush) vegetation with surface water.
- wet meadow (WM), defined as grasses, sedges, or rushes with little to no surface water.
- scrub-shrub (SS), defined as shrub covered wetland.
- forested (FO), defined as tree covered wetland.
- open water (OW), defined as unvegetated surface water.
- upland (UP), defined as the upland buffer.

Other categories can be used and defined on the data sheet and should later be added to the protocol.

Other Fields

Bird Visit: Each bird survey (i.e. spring, fall, and mid-season) should be completed on separate Bird Survey-Field Data Sheets.

Time: Record the start time and end time on the Bird Survey-Field Data Sheet.

Date: Record the date of the bird survey.

Weather: Record the weather conditions (i.e. temperature, wind, condition).

Notes: Note if a particular individual bird is using a constructed nest box and note the condition of constructed nest box(es). Also record any comments about the site, wildlife, wetland conditions, etc.

GPS MAPPING AND AERIAL PHOTO REFERENCING PROCEDURE

From 2001 through 2006, PBS&J mapped the vegetation community boundaries, photograph points, and other sampling locations in the field using the resource-grade Trimble GEO III GPS (Global Positioning System) unit. The data were collected with a minimum of three positions per feature using Course/Acquisition code. The collected data were then transferred to a personal computer (PC) and differentially corrected to the nearest operating Community Base Station. The corrected data were then exported to ACAD drawings in Montana State Plain Coordinates NAD 83 international feet. The Trimble GEO III GPS unit was also used for some sites in 2007.

The collected and processed Trimble Geo III GPS positions had a 68% accuracy of 7 feet except in isolated areas where accuracy fell to 12 feet. This is within the 1 to 5 meter range listed as the expected accuracy of the mapping grade Trimble GPS.

In 2007 and 2008 sites were mapped using the resource-grade Magellan MobileMapper Office GPS unit. The Magellan GPS unit has a comparable accuracy level to the Trimble Geo III unit.

Each year, MDT photographs each mitigation site from the air. These aerial photographs are not geo-referenced, but serve as a visual aid to map wetland development and vegetation communities, and to show approximate locations for various monitoring activities (i.e. photograph points, transects, or macroinvertebrate sampling). Reference points that are observable on the aerial photo (i.e. road, stream channel, or fence) were also marked with the GPS unit in order to better position the aerial photograph. This positioning did not remove any of the distortion inherent to all photos. All mapped features and community boundaries were reviewed by the wetland biologist, to increase the figure's accuracy.

Any relationship of features located to easement or property lines are not to be construed from these figures. These relationships can only be determined with a survey by a licensed surveyor.