MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2005

Perry Ranch
Glacier County, Montana

Prepared for:

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

Prepared by:

LAND & WATER CONSULTING
~ A DIVISION OF PBS&J
P.O. Box 239
Helena, MT 59624

December 2005

Project No: B43054.00 - 0306

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1.0 INTRODUCTION

The Perry Ranch wetland mitigation site was constructed during early summer 2001 to mitigate 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. Constructed in Watershed #8 (Marias) within the MDT Great Falls District, the mitigation site is located approximately 13 miles west of Browning and 4 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.

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 (see plan sheets in **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 will 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.

Approximately 2.3 acres of wetland occurred at the inner oxbow prior to construction, while approximately 1.1 acres occurred at the outer oxbow. The 27.6-acre target mitigation figure is inclusive of these 3.4 acres of existing wetlands.

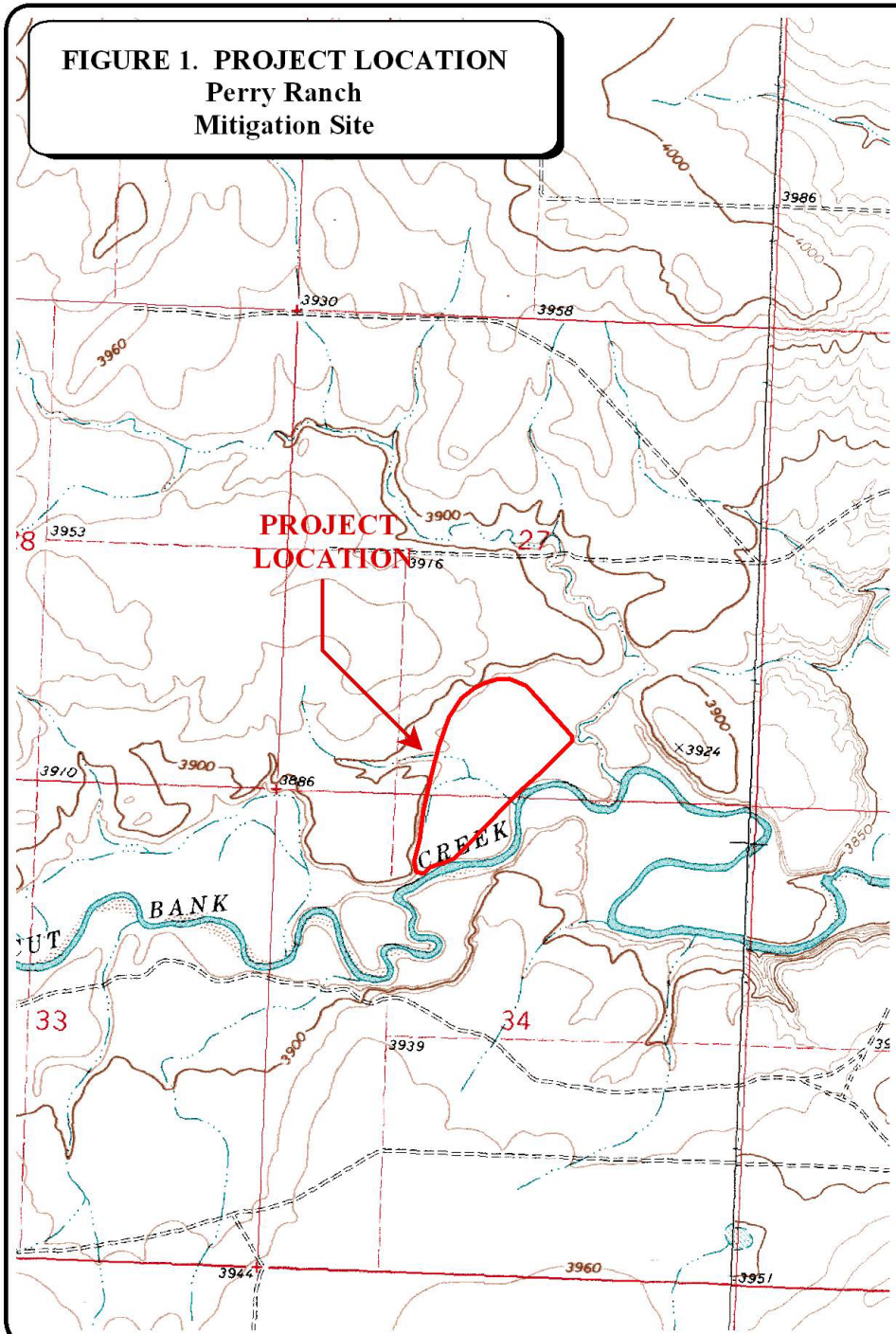
The 2005 monitoring episode was the fourth conducted at the site since its construction in 2001. This site will be monitored twice per year over the remainder of the monitoring period to document wetland and other biological attributes. No performance standards or success criteria were required by the U.S. Army Corps of Engineers (COE), MDT, Blackfeet Tribe, or other agencies. The monitoring area is illustrated in **Figure 2, Appendix B**.

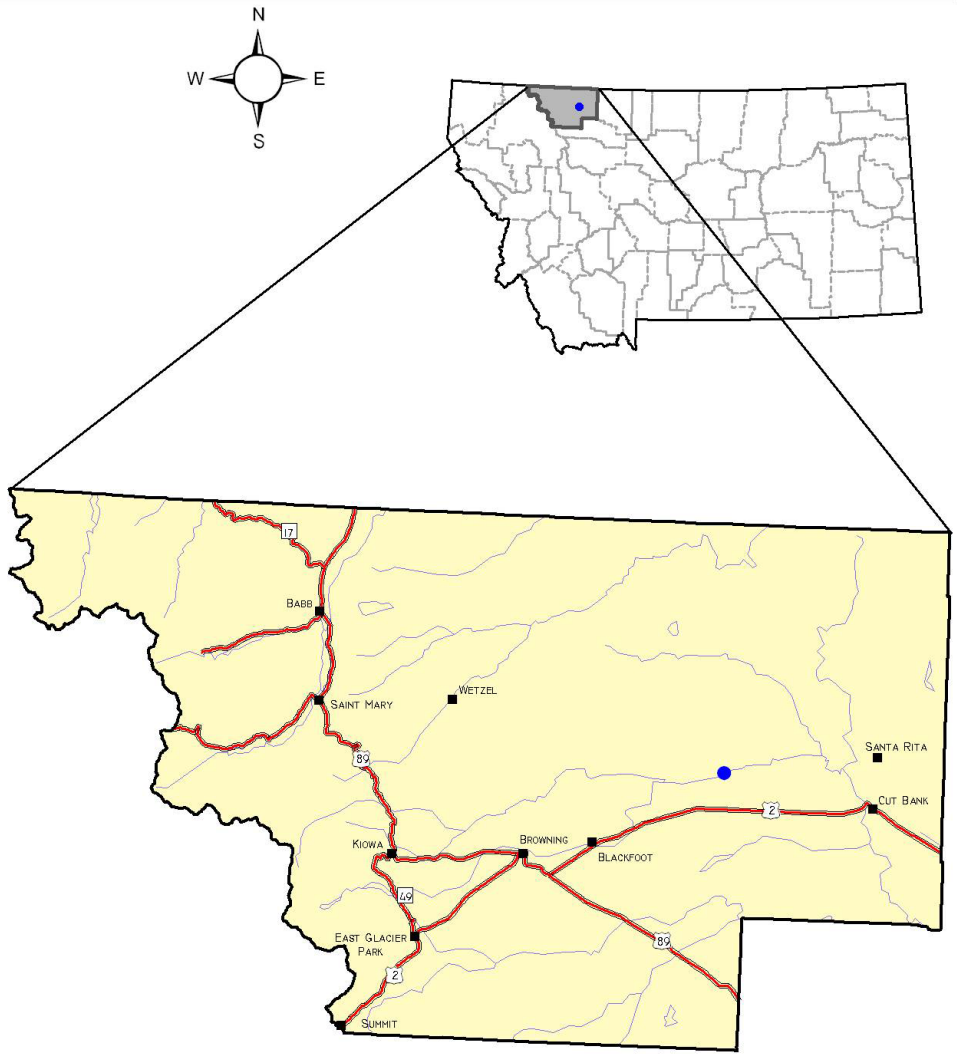
2.0 METHODS

2.1 Monitoring Dates and Activities

The site was visited on May 20th (spring) and July 13th (mid-season) of 2005. 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 #: 130091.020
DATE: DEC 2002
LOCATION:
PROJECT MANAGER: J. BERGLUND
DRAWN BY: B. NOECKER

LAND & WATER CONSULTING, INC.
1120 CEDAR PO BOX 8254 MISSOULA, MT 59807

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 and information conducted/collected included: wetland delineation; wetland/open water aquatic habitat boundary mapping; vegetation community mapping; vegetation transect; soils data; hydrology data; bird and general wildlife use; macro-invertebrate sampling; photograph points; functional assessment; and a non-engineering examination of dike structures.

2.2 Hydrology

Wetland hydrology at the inner oxbow (2.6-foot maximum depth) would be provided via overbank flood flows, alluvial flow, and precipitation; flood flows and precipitation will be the source for the outer oxbow (3-foot maximum depth). Impoundment areas are indicated on the proposed project plan sheets in **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 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 are no groundwater monitoring wells at the site. If located within 12 inches of the ground surface (soil pit depth for purposes of delineation), groundwater depths were documented on the routine wetland delineation data form at each data point.

2.3 Vegetation

General dominant species-based vegetation community types were delineated on a 2003 aerial photograph during the mid-season visit, as the 2005 aerials were not yet available and the 2003 conditions matched the observed 2005 conditions more closely than did the 2004 conditions and aerial photographs. 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 site monitoring form (**Appendix B**).

A single 10-foot wide belt transect was sampled during the mid-season monitoring event to represent the range of current vegetation conditions. 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%).

The transect location is depicted on **Figure 2** (**Appendix A**). All data were recorded on the mitigation site monitoring form. Photographs of the transect were taken from both ends during

the mid-season visit. 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 according to 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

Wetland delineation was conducted during the mid-season visit according the 1987 COE Wetland Delineation Manual. 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 on COE Routine Wetland Delineation Data Forms (**Appendix B**). In 2002, the wetland/upland boundary was delineated using a GPS unit in conjunction with hand-mapping onto an aerial photograph. In 2005, wetland mapping revisions were accomplished by hand using the 2003 aerial photograph. The wetland/upland boundary in combination with any wetland/open water habitat boundary was used to calculate the wetland area developed on the site.

Wetland delineation data collected during 2005 was compared to this pre-construction estimate 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 on the wetland monitoring form during each site visit. Indirect use indicators, including tracks; scat; burrows; eggshells; skins; bones; etc., 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 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 in **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 (see field data forms in **Appendix B**). A comprehensive bird list was compiled using these observations. No birdhouses are currently located on the site.

2.8 Macroinvertebrates

One macroinvertebrate sample was collected during the mid-season site visit at the outer oxbow in 2002 and again in 2005. However, no surface water was present during the mid-season visit in 2003 or 2004 resulting in no macro-invertebrate sample collections during these years.

2.9 Functional Assessment

Functional assessment was completed using the 1999 MDT Montana Wetland Assessment Method. Field data necessary for this assessment were primarily collected during the mid-season site visit. The remainder of the functional assessment was completed in the office.

2.10 Photographs

Photographs were taken showing the current land use surrounding the site, the upland buffer, the monitored area, and the vegetation transect. Three photograph points were established and shot each year from 2002 to 2005. The locations of these photo points are shown on **Figure 2** (**Appendix A**). Panoramic type photographs were taken at each of the three photograph points.

2.11 GPS Data

During the 2002 monitoring season, a variety of survey points were collected with a resource grade GPS unit: vegetation transect beginning and ending locations, photograph points, and the wetland boundary. No GPS data were collected during 2005 monitoring season.

2.12 Maintenance Needs

The dike along the east edge of the site was examined during the 2005 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

Based on the period of record between 1903 and July of 2005, the mean annual precipitation at the Cut Bank weather station (#242173) was 11.51 inches (in). The total precipitation received from January through July of 2005 was 9.21 inches. The 2005 year was substantially wetter during this period than it had been in 2004 (4.57 in) and in 2003 (3.63 in). The 2005 year during this period was also wetter than the calculated average since 1903 (8.0 in). This increase in spring moisture was responsible for the noticeable changes in vegetation, namely the death of foxtail barley (*Hordeum jubatum*) and kochia (*Kochia scoparia*) and the increase in creeping spikerush (*Eleocharis palustris*).

Although very little water was in the site during the May 20th visit, the 7.0 inches of precipitation received in June flooded the site, which was still observed during the July visit (**Figure 3** in **Appendix A**). In addition to annual precipitation, areas of the site also seem to receive minor discharge from groundwater sources.

3.2 Vegetation

Vegetation species were identified on the site (**Table 1** and **Appendix B**). Four wetland community types were identified and mapped in the mitigation area during 2004: Type 1 - *Juncus balticus/Carex praegracilis*, Type 2 - *Eleocharis palustris/Polygonum amphibium*, Type 4- *Hordeum jubatum*/*Equisetum/Transitional Mudflat*, and Type 5 – *Hordeum jubatum*. During 2005, drastic changes in plant composition and hydrology were noted in two of these communities. As a result Type 4 was renamed to *Hordeum jubatum/Equisetum* to reflect its stable wetland condition since 2003 (**Figure 3**, **Appendix A**). Type 5 completely lost its component of *Hordeum jubatum* and gained a dominance of *Eleocharis palustris*. The area denoted as Type 5 in 2004 was mapped as Type 2 – *Eleocharis palustris/Polygonum amphibium* in 2005 (**Figure 3**, **Appendix A**).

Community types are based on topography, hydrology, and plant composition and at Perry shifts in plant composition have been observed annually in many communities. Type 1 occurs primarily as a fringe along the deeper wetland areas of the inner oxbow (**Figure 3**, **Appendix A**). These areas flood, but surface water does not appear to remain for as long as it does in the Type 2 community. Type 2 occupies deeper wetland areas that hold the water for a long time period (**Figure 3**, **Appendix A**). Groundwater may also be influencing vegetation development in the Type 2 community. Type 2 has consistently occurred within the inundated portion of the inner oxbow and has occurred during wet years in the outer oxbow. In 2005, the outer oxbow was inundated to at least six inches during the mid-July visit. As a result of the inundation, the Type 5 community died, allowing for the re-emergence of Type 2, as was observed in 2002.

The outer oxbow appears to be wetland that shifts in community type depending upon annual moisture. In dryer years this wetland appears to hold enough moisture for *Hordeum jubatum* (Type 5) to colonize, but during wetter years it holds surface water creating conditions suitable for *Eleocharis* and *Polygonum* (Type 2) and not for *H. jubatum*. The Type 4 community occurs primarily within excavated portions of the inner oxbow, and is characterized by mudflat colonized by wetland plants (**Figure 3**, **Appendix A**). Since 2003, the Type 4 community has demonstrated significant growth in sandbar (*Salix exigua*) and peachleaf (*S. amygdaloides*) willow seedlings, field horsetail (*Equisetum arvense*), silverweed (*Potentilla anserina*), creeping spikerush, reed canary grass (*Phalaris arundinacea*), and others.

The extreme northern portion of the project area (which contains the designed island) also fluctuates in community development based on the presence of water. In 2005 this area was inundated and mapped as Open Water/Mudflat, as it was in 2003. However, in 2004 it did not receive water and was mapped as upland floodplain. It is very likely that this area would develop wetland characteristics if it received a consistent and adequate supply of water each year. Type 3 – *Upland Floodplain* was mapped in the valley amongst these other communities. Portions of Type 3 (intersected by the Transect) are considered Transitional Upland Floodplain

Table 1: ***2002-2005 Perry Ranch vegetation species list.***

Scientific Name	Region 9 (Northwest) Wetland Indicator
Achillea millefolium	FACU
Agropyron intermedium	--
Agropyron repens	FACU
Agropyron smithii	--
Agrostis alba	FACW
Alopecurus pratensis	FACW
Amaranthus retroflexus	FACU+
Artemisia frigida	--
Aster spp.	--
***Atriplex* spp.**	--
Bouteloua gracilis	--
Brassica kaber	--
Bromus inermis	--
Cardaria draba	--
Carex lanuginosa	OBL
Carex praegracilis	FACW
Chenopodium album	FAC
Cirsium arvense	FAC-
Dactylis glomerata	FACU
Descurainia pinnata	--
Distichlis spicata	FAC+
Eleocharis palustris	OBL
Epilobium ciliatum	FACW-
Equisetum arvense	FAC
Equisetum hyemale	FACW
Euphorbia esula	--
Glyceria elata	FACW+
Glycyrrhiza lepidota	FAC+
Grindelia squarrosa	--
Hordeum jubatum	FAC+
Juncus balticus	OBL
Kochia scoparia	FAC
Koeleria pyramidata	--
Medicago sativa	--
Melilotus alba	FACU
Melilotus officinalis	FACU
Mentha arvensis	**FAC**
Opuntia spp.	--
Phalaris arundinacea	FACW
Phleum pretense	FAC-
Plantago hirtella	FACW
Poa annua	FAC-
Poa pratensis	FACU+
Polygonum amphibium	OBL
Potentilla anserina	OBL
Rosa arkansana	NI
Rumex crispus	FACW
Rumex maritima	OBL
Salix amygdaloides	FACW
Salix exigua	OBL
Salix lutea	OBL

Table 1 (continued): ***2002-2005 Perry Ranch vegetation species list.***

Scientific Name	Region 9 (Northwest) Wetland Indicator
Sisymbrium altissimum	--
Solidago canadensis	FACU
Spartina pectinata	OBL
Stipa viridula	--
Symphoricarpos occidentalis	--
Taraxacum officinale	FACU
Thlaspi arvense	--
Triglochin maritimum	OBL
Typha latifolia	OBL

Bolded species indicate those documented in the analysis area for the first time in 2005.

(**Appendix B**). In these transitional areas, annual and dramatic changes in vegetation occur and are dependent upon the amount and duration of water. In 2005, the transitional area received enough water to kill the standing crop of *Kochia* and *Hordeum* and to allow *Eleocharis* to germinate (**Appendix C**). However, inundation was not of a sufficient duration to develop a dominance of wetland vegetation.

Adjacent upland communities are comprised of upland floodplain and foothill rangeland habitats. Common species include smooth brome (*Bromus inermis*), quackgrass (*Agropyron repens*), timothy (*Phleum pratense*), intermediate wheatgrass (*Agropyron intermedium*), yellow sweet clover (*Melilotus officinalis*), and kochia.

Two noxious weed species have been found on the Perry Ranch Wetland Mitigation site: Canada thistle (*Cirsium arvense*) and leafy spurge (*Euphorbia esula*). Both species are rated Category 1. The 2005 occurrence of leafy spurge had not been recorded in 2002 to 2004. Leafy spurge was found blooming as a dense patch near the two excavated ponds. Canada thistle is common throughout the site and scattered.

Vegetation transect results are detailed in **Table 2** and the Monitoring Data Form (**Appendix B**), and are graphically illustrated in **Charts 1** and **2**. In 2005, the 'thumb' of the outer oxbow was inundated such that marginal wetland characteristics developed and were accounted for along the transect. Along the transect, two other areas that were considered transitional in 2004 were also inundated long enough to kill the weedy exotics and allow *Eleocharis* to germinate. These transitional areas were not inundated long enough to develop wetland characteristics, but would likely continue on this trend if adequate spring precipitation occurs in 2006. The number of hydrophytic species along the transect decreased between 2003 and 2004, but increased from 2004 to 2005 in response to soil moisture (**Table 2**).

Table 2: ***Transect 1 data summary.***

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

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

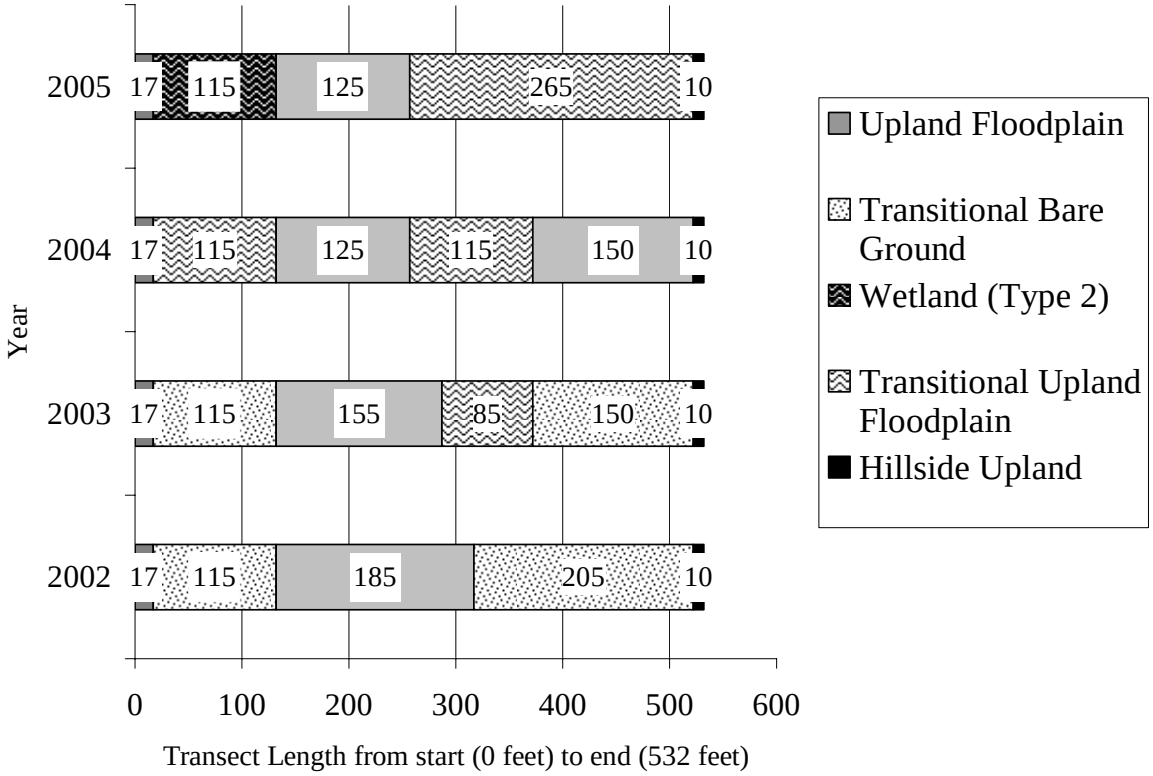
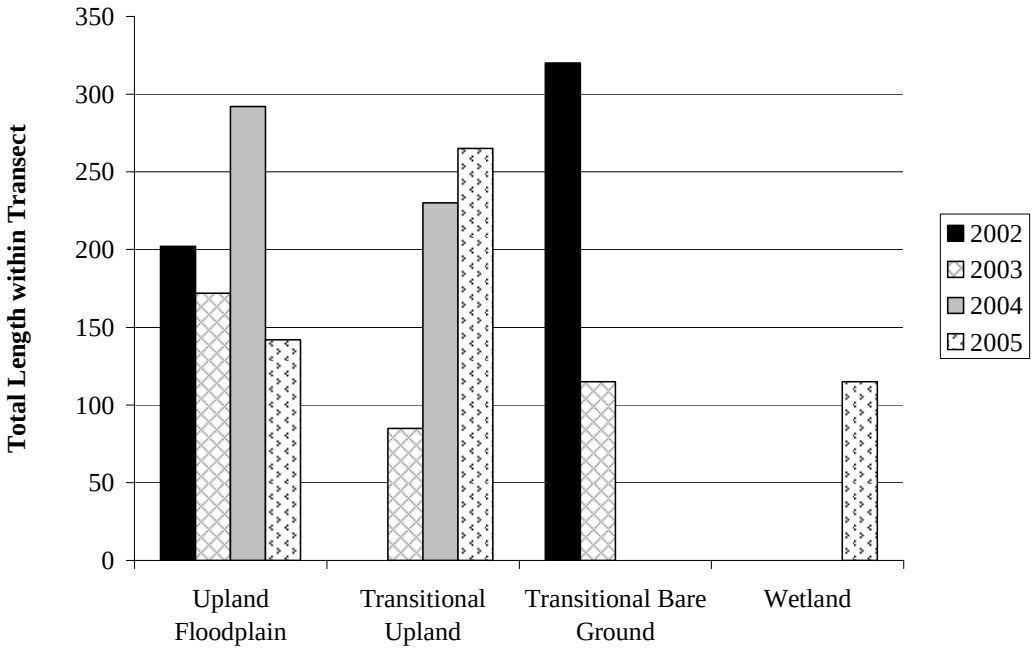


Chart 2: ***Total length of each vegetation community within Transect 1 for 2002 to 2005.***



3.3 Soils

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

B Horizon soils in wetland portions of the site ranged from silty clay loam to sandy clay loam with a matrix color ranging from 2.5Y4/1 to 10YR4/1, with mottles of 5YR4/6 occurring in one wetland. Soils near the beginning of the transect remained the same in color as 2004, but in 2005 developed oxidized rhizospheres throughout the top 12 inches; this indicates that the area was inundated with water long enough that plants transported oxygen from the leaves to the roots.

3.4 Wetland Delineation

Delineated wetland boundaries are illustrated on **Figure 3** (**Appendix A**). Completed wetland delineation forms are included in **Appendix B**. Soils, vegetation, and hydrology are discussed in preceding sections. From 2002 to 2005, the aerial extent of all aquatic habitats has been mapped and the results summarized (**Table 3**).

Table 3. ***Aerial coverage of aquatic habitats from 2002 to 2005 at Perry Ranch.***

Aquatic Habitat	2002 (acres)	2003 (acres)	2004 (acres)	2005 (acres)
Emergent Wetland	10.09	12.41	12.33	13.65
Open Water / Mudflat	7.83	6.20	0.00	6.39
TOTAL	17.92	18.61	12.33	20.04

Approximately 13.65 acres of wetlands and 6.39 acres of open water presently occur on the site (**Figure 3**, **Appendix A**). This has resulted in an increase in wetland habitat and a gain since 2002 of almost 4 acres of wetland. Although the acreage of open water/mud flat has substantially increased from 2004, it is still slightly less than that observed in 2002. The open water/mudflat area is filled with shallow water. It remains to be seen whether this open water/mudflat area will become inundated next spring and transition to wetland or remain as open water or become dry and return to mud flat as it was in 2004. Mudflats are considered "special aquatic sites" under COE regulations. As defined in 40 CFR (230.3[q-1]), "special aquatic sites" are areas possessing special characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. Special aquatic sites include sanctuaries and refuges, wetlands, mud flats, vegetated shallows, coral reefs, and riffle/pool complexes.

Approximately 3.4 acres of wetland occurred at the site prior to construction. 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 by the end of the 5-year period. As of 2005 the site has netted 10.25 wetland acres and 6.39 acres of open water/mudflat, for a net total of 16.64 acres of aquatic habitat.

3.5 Wildlife

Wildlife species and evidence of wildlife observed on the site from 2002 to 2005 are listed in **Table 4**. Specific evidence observed, as well as activity codes pertaining to birds, are provided on the completed monitoring form in **Appendix B**. The site provides habitat for several wildlife species, particularly shorebirds, waterfowl, and amphibians.

Three mammal, two amphibian, and 13 bird species were noted in mitigation site during the course of the 2005 monitoring season. No birdhouses were installed at this site.

The northern leopard frog (*Rana pipiens*) is considered a "species of special concern" by the Montana Natural Heritage Program (MTNHP), in large part because of their apparent extirpation from their distribution west of the Continental Divide. This species has been assigned a rank of S1 for west of the Continental Divide and S3 for east of the Continental Divide (MTNHP 2004). An S1 ranking indicates that the frog is at high risk because of extremely limited and/or rapidly declining numbers, range, and/or habitat making it highly vulnerable to global extinction in the state. An S3 ranking indicates that the frog is potentially at risk because of limited and/or declining numbers, range, and /or habitat, even though it may be abundant in some areas. Northern leopard frogs were observed in the outer oxbow during the mid-season visits in 2002 and again in 2005, but none were seen in 2003 or 2004. The outer oxbow is considered documented secondary habitat for this species due to the few individuals observed during 2002,

2005, and the apparent intermittent nature of surface water. Numerous western chorus frogs (*Pseudacris triseriata*) were observed in the native inlet slough of the inner oxbow during the 2004 and 2005 spring visits.

Table 4: ***Fish and wildlife species observed on the Perry Ranch Mitigation Site from 2002 to 2005.***

FISH	
None	
AMPHIBIANS	
Northern Leopard Frog (*Rana pipiens*)	
Western Chorus Frog (*Pseudacris triseriata*)	
REPTILES	
None	
BIRDS	
American Avocet (*Recurvirostra americana*)	**Mallard (*Anas platyrhynchos*)**
American Robin (*Turdus migratorius*)	Northern Harrier (*Circus cyaneus*)
American White Pelican (*Pelecanus erythrorhynchos*)	Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)
Bank Swallow (*Riparia riparia*)	**Northern Shoveler (*Anas clypeata*)**
Barn Swallow (*Hirundo rustica*)	**Red-winged Blackbird (*Agelaius phoeniceus)***
Blue-winged Teal (*Anas discors*)	Red-tailed Hawk (*Buteo jamaicensis)*
Brewer's Blackbird (*Euphagus cyanocephalus*)	**Savannah Sparrow (*Passerculus sandwichensis*)**
Canada Goose (*Branta Canadensis*)	Semipalmated Plover (*Charadrius semipalmatus*)
Chukar (*Alectoris chukar*)	Solitary Sandpiper (*Tringa solitaria*)
Cinnamon Teal (*Anas cyanoptera*)	Spotted Sandpiper (*Actitis macularia*)
Cliff Swallow (*Petrochelidon pyrrhonota*)	Vesper Sparrow (*Pooecetes gramineus*)
Common Snipe (*Gallinago gallinago*)	**Western Meadowlark (*Sturnella neglecta*)**
Eastern Kingbird (*Tyrannus tyrannus*)	Western Sandpiper (*Calidris mauri*)
Franklin's Gull (*Larus pipixcan*)	Willet (*Catoptrophorus semipalmatus*)
Great Blue Heron (*Ardea herodias*)	Wilson's Phalarope (*Phalaropus tricolor*)
Gray Partridge (*Perdix perdix*)	Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*)
Horned Lark (*Eremophila alpestris*)	
Killdeer (*Charadrius vociferous*)	
Lesser Scaup (*Aythya affinis*)	
Long-billed Dowitcher (*Limnodromus scolopaceus*)	
MAMMALS	
American Badger (*Taxidea taxus*)	
Coyote (*Canis latrans*)	
Deer (*Odocoileus* spp.)	
Raccoon *(Procyon lotor)*	
Richardson's Ground Squirrel (*Spermophilus richardsonii*)	
White-tailed Deer (*Odocoileus virginianus*)	

Bolded species were observed during 2005 monitoring. All other species were observed during one or more of the previous monitoring years, but not during 2005.

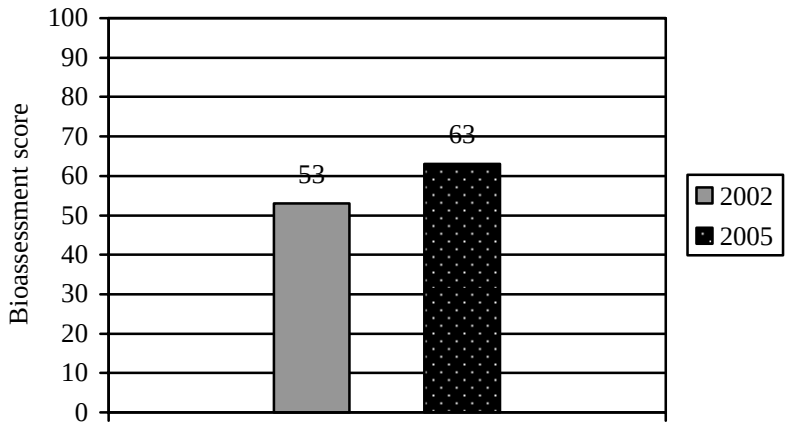
3.6 Macroinvertebrates

As with 2002, 2005 was a wet spring and much of the site was inundated. One sample of macroinvertebrates was taken in the same location as was sampled in 2002. Macroinvertebrate sampling results are provided in **Appendix F** and were summarized by Rhithron Associates (Bollman 2005) in the italicized section below:

Last sampled in 2002, the site at the Perry Ranch exhibited an improved bioassessment score in 2005. A modest improvement in taxa richness and an increase in assemblage sensitivity drove the increase in bioassessment index scores here. However, aquatic habitats appear to be monotonous in 2005, with denizens of the water column dominating other taxa in the compositional mix. Mosquito larvae and other tolerant dipteran larvae were present, suggesting that water quality was not as good as expected. Filamentous algae probably provided some habitat space. A few benthic inhabitants were also collected; most of them were hemoglobin-bearers. This finding suggests that warm water temperatures probably combined with nutrient enrichment to result in hypoxic sediments. Periodic dewatering may limit biological potential here.

Although the number of macroinvertebrate taxa increased (based on one sample in 2002 and 2005), the number of habitats available are still few. Warm temperatures are probably a result of shallow waters with little to no current. Horse dung was observed throughout the site in 2005 and would be a source of nutrient enrichment. As stated by Rhithron, the development of macroinvertebrates communities is limited by the lack of water from year to year and season to season.

Chart 3. ***Bioassessment scores at Perry Ranch in 2002 and 2005.***



3.7 Functional Assessment

Completed functional assessment forms are presented in **Appendix B**. Functional assessment results are summarized in **Table 5**. Forms were prepared for the inner and outer oxbows. Results in 2005 were similar to results in 2004 with an increasing trend in wetland development and function. The inner oxbow of the mitigation site again rated as Category III site, while the outer oxbow again rated as a Category II site using the 1999 MDT functional assessment method. Both are developing, and it is anticipated that both will receive higher wildlife habitat and other functional ratings as wetland communities continue to grow and establish with normal precipitation. Baseline functional conditions were determined by MDT using a modified 1997 MDT functional assessment method; thus, results between the two assessments are not directly comparable, but do provide a sense of where functions have improved. Prior to construction, the inner oxbow rated as a Category III site, and the outer oxbow rated as a Category IV site.

Based on functional assessment results (**Table 5)**, approximately 75 functional units have been gained thus far at the Perry Ranch mitigation site.

3.8 Photographs

Representative panoramic and single frame photographs were taken from established photo-points (**Appendix C**). A 2005 aerial photograph was also taken by MDT and used as the base photograph for **Figures 2** and **3** (**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 2005. No problems with the dike were found in 2005.

It is recommended that chemical and hand control be applied to the leafy spurge as the population is relatively small, and may be relatively new to the area. Control at this point would prevent an infestation from erupting. It is also recommended that the population be better mapped during the mid-July visit in 2006. Chemical control on Canada thistle should also be implemented once or twice during the growing season as the plant is increasing in abundance.

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 two consecutive poor precipitation years between two wet years.

Approximately 13.65 acres of wetlands and 6.39 acres of open water / mud flat, a total of 20.04 acres of aquatic habitat, presently occur on the site (**Figure 3**, **Appendix A**). Wetland acreage at the site increased by 1.32 acres in 2005 and open water/mudflat area increased by 6.39 acres in 2005. Trends should continue to improve if winter and spring precipitation is plentiful.

Approximately 3.4 acres of wetland occurred at the site prior to construction. 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 by the end of the 5-year period. As of 2005 the site has netted 10.25 wetland acres and 6.39 acres of open water/mudflat, for a net total of 16.64 acres of aquatic habitat. About 75 functional units have been gained at this site as of 2005.

Table 5: ***Summary of 2005 wetland function/value ratings and functional points [1] at the Perry Ranch Mitigation Project.***

Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method[1]	Pre-Construction (1997 method)		Post-construction (1999 method)	
	Inner Oxbow	Outer Oxbow	2005 Inner Oxbow	2005 Outer Oxbow
Listed/Proposed T&E Species Habitat	Low (0.1)	Low (0.1)	Low (0.3)	Low (0.3)
MNHP Species Habitat	None (0.0)	None (0.0)	Mod (0.6)	Mod (0.7)
General Wildlife Habitat	Mod (0.4)	Low (0.1)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	NA	NA	NA	NA
Flood Attenuation	Mod (0.5)	Low (0.2)	Mod (0.5)	Mod (0.5)
Short and Long Term Surface Water Storage	--	--	Mod (0.6)	High (0.9)
Sediment, Nutrient, Toxicant Removal	Mod (0.5)	Mod (0.5)	Mod (0.7)	High (1)
Sediment/Shoreline Stabilization	NA	NA	NA	NA
Production Export/Food Chain Support	Mod (0.7)	Mod (0.6)	Mod (0.5)	Mod (0.7)
Groundwater Discharge/Recharge	High (1.0)	Low (0.1)	High (1.0)	High (1.0)
Uniqueness	Low (0.3)	Low (0.2)	Mod (0.4)	Mod (0.4)
Recreation/Education Potential	Low (0.1)	Low (0.1)	Mod (0.7)	Mod (0.7)
Actual Points/Possible Points	4.4 / 10	2.7 /10	6.0 / 10	6.9 / 10
% of Possible Score Achieved	44%	27%	60%	69%
Overall Category	III	IV	III	II
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries (ac)	**2.30**	**1.10**	**6.25**	**7.40**
Functional Units (acreage x actual points)	**10.12**	**2.97**	**37.50**	**51.06**
Net Acreage Gain (ac)	**NA**	**NA**	6.25 – 2.30 = **3.95**	7.40 – 1.10 = **6.30**
Net Functional Unit Gain (fu)	**NA**	**NA**	37.50 - 10.12 = **27.38**	51.06 – 2.97 = **48.09**
Total Functional Unit Gain	**75.47**			

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

4.0 REFERENCES

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Appendix A

FIGURES 2 & 3

MDT Wetland Mitigation Monitoring
Perry Ranch
Glacier County, Montana

Figure 2 - Monitoring Activity Locations

PROJECT NAME
MDT Perry Ranch Wetland Mitigation

DRAWING TITLE
Monitoring Activity Locations

PROJ NO: B43054.305	DRAWN: LL		
LOCATION: Perry Ranch	PROJ MGR: J.Berglund		
SCALE: 1"=200'	CHECKED:	APPVD:	
FILE NAME: L:\B43054.305PerryRanch\dwg\TASK20BASE2005.dwg			

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P.O. BOX 8254
Missoula, MT 59807

FIGURE
2 OF -
REV -
Nov/14/2005

Figure 3 Mapped Site Features 2005

Vegetation Community Types

1. Juncus balticus/ Carex praegracilis
2. Eleocharis palustris/Polygonum amphibium
3. Upland Floodplain
3A. Upland Floodplain/Transitional
4. Hordeum jubatum/Equisetum/Transitional Mud Flat
7. Open Water/Mudflat

LEGEND

- Monitoring Area Limits
- Wetland Limits
- Vegetation Community Boundary
- Area of Inundation

Base Photograph Date: July 05, 2005

Wetland Area 2005

Gross Wetland Area 2005	13.78 Acres
Upland Islands 2005	-0.13 Acres
Net Wetland Area 2005	13.65 Acres
Open Water/Mudflat 2005	6.39 Acres

MONITORING AREA LIMITS

MONITORING AREA LIMITS

MONITORING AREA LIMITS

N W E S

Scale 1"= 200ft

PROJECT NAME
MDT Perry Ranch Wetland Mitigation

DRAWING TITLE
Mapped Site Features 2005

DRAWN: LL
PROJ MGR: J.Berglund
CHECKED: APPVD:

PROJ NO: B43054.305
LOCATION: Perry Ranch
SCALE: 1"=200'
FILE NAME: L:\B43054.305\Perry Ranch\dwg\TASK20BASE2005.dwg

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Missoula, MT 59807

FIGURE
3 OF
REV -
Nov/14/2005

Appendix B

2005 WETLAND MITIGATION SITE MONITORING FORM
2005 BIRD SURVEY FORMS
2005 WETLAND DELINEATION FORMS
2005 FUNCTIONAL ASSESSMENT FORMS

MDT Wetland Mitigation Monitoring
Perry Ranch
Glacier County, Montana

LWC / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **Perry Ranch** Project Number: **B43054.00-0306**
Assessment Date: **July 13, 2005** 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: **overcast, dry, warm** Time of Day: **0745-1330**
Initial Evaluation Date: **May 15, 2002** Monitoring Year: **4: 2004** # 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: **0-10 inch**
Percent of assessment area under inundation: **30%**
Depth at emergent vegetation-open water boundary: **0.5 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.):

_____

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, Cut Bank Creek was at the level of the intake and flowing very little. About 5-10% of the site was inundated. Inundation was at the Inner Delivery Ditch and Slough. During the July visit, both the Inner and Outer Oxbows were inundated with water; although, very little water was left in the Delivery Ditch.

VEGETATION COMMUNITIES

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

Dominant Species	% Cover	Dominant Species	% Cover
Juncus balitus	5 = > 50%	Spartina pectinata	1 = 1-5%
Carex praegracilis	5 = > 50%	Agropyron repens	1 = 1-5%
Potentilla anserina	4 = 21-50%	Carex lanuginosa	1 = 1-5%
Triglochin maritimum	+ = < 1%	Eleocharis palustris	1 = 1-5%
Equisetum arvense	3 = 11-20%	Plantago hirtella	+ = < 1%
Glycyrrhiza lepidota	1 = 1-5%	Hordeum jubatum	1 = 1-5%

Comments / Problems: _____

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

Dominant Species	% Cover	Dominant Species	% Cover
Eleocharis palustris	4 = 21-50%	Equisetum hyemale	2 = 6-10%
Polygonum amphibium	4 = 21-50%	Carex lanuginosa	+ = < 1%
Alopecurus pratensis	2 = 6-10%	Rumex crispus	2 = 6-10%
Spartina pectinata	1 = 1-5%	Glyceria elata	+ = < 1%
Phalaris arundinacea	+ = < 1%	Salix exigua	+ = < 1%
Equisteum arvense	2 = 6-10%	Potentilla anserina	4 = 21-50%

Comments / Problems: **In the outer oxbow, dense Hordeum jubatum is present, but is all dead due to the flooding in June.**

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

Dominant Species	% Cover	Dominant Species	% Cover
Kochia scoparia	2 = 6-10%	Rosa arkansana	1 = 1-5%
Agropyron intermedium	3 = 11-20%	Hordeum jubatum	3 = 11-20%
Agropyron repens	3 = 11-20%	Alopecurus pratensis	1 = 1-5%
Amaranthus retroflexus	+ = < 1%	Aster (pansus)	1 = 1-5%
Symphoricarpos occidentalis	1 = 1-5%	Carex praegracilis	2 = 6-10%
Rumex crispus	1 = 1-5%	Eleocharis palustris	1 = 1-5%

Comments / Problems: **Community Type 3 is composed of stable upland while Community Type 3A is composed of transitional upland/wetland. Species composition within the transitional area (3A) greatly changed in 2005 and is not reflected here, but is reflected in the data captured by the vegetation transect.**

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

Dominant Species	% Cover	Dominant Species	% Cover
Equisetum arvense	5 = > 50%	Salix amygdaloides (whips)	1 = 1-5%
Hordeum jubatum	1 = 1-5%	Agropyon intermedium	1 = 1-5%
Alopecurus pratensis	1 = 1-5%	Carex praegracilis	1 = 1-5%
Rumex crispus	1 = 1-5%	Eleocharus palustris	1 = 1-5%
Potentilla anserina	3 = 11-20%	Phalaris arundinacea	1 = 1-5%
Salix exigua (whips)	2 = 6-10%		

Comments / Problems: **Salix, Equisetum, Potentilla and Eleocharis were prevalent throughout. Community has continued to reflect wetland conditions; therefore, "transitional mudflat" was removed from the Community Name used in 2003 and 2004.**

VEGETATION COMMUNITIES (continued)

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

Dominant Species	% Cover	Dominant Species	% Cover
Hordeum jubatum	5 = > 50%	Agropyron intermedium	1 = 1-5%
Potentilla anserina	4 = 21-50%	Kochia scoparia	2 = 6-10%
Polygonum amphibium	3 = 11-20%	Juncus balticus	1 = 1-5%
Alopecurus pratensis	1 = 1-5%		
Rumex maritimus	3 = 11-20%		
Eleocharis palustris	1 = 1-5%		

Comments / Problems: **In 2005 this Community Type 5 transitioned to become Community Type 2. The Kochia and Hordeum was present as dead standing biomass and was replaced by an abundance of live Eleocharis palustris.**

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 upland areas on hillsides outside of the floodplain. See Transect data for additional species found in this Community Type 6.**

Community Number: **7** Community Title (main spp): **Open Water / Mudflat**

Dominant Species	% Cover	Dominant Species	% Cover
Eleocharis palustris	1 = 1-5%		
Salix exigua	1 = 1-5%		
Equisetum arvense	1 = 1-5%		

Comments / Problems: **Community was inundated with water and sparse wetland vegetation was colonizing. Sisymbrium and Hordeum was observed dead within the saturated area.**

Community Number: ___ Community Title (main spp): _____

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: _____

VEGETATION COMMUNITIES (continued)

Community Number: ___ Community Title (main spp): _____

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: _____

Community Number: ___ Community Title (main spp): _____

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: _____

Community Number: ___ Community Title (main spp): _____

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: _____

Community Number: ___ Community Title (main spp): _____

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: _____

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

Comments / Problems: *Koeleria macrantha = K. cristatum and K. pyramidata. Parenthesis are placed around Community #5 for Hordeum jubatum and Community #3 for Kochia scoparia because these species were observed as last year's stalks and were dead in 2005 from inundation. (N) means these species are state noxious.

PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number Observed	Mortality Causes

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
Badger		☐	☐	☒	
Coyote	1	☐	☐	☐	vocal all day
Northern Leopard Frog	4	☐	☐	☐	
White-tailed Deer	5	☐	☐	☐	
Pacific Chorus Frog		☐	☐	☐	Heard many
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	

Additional Activities Checklist:
Yes Macroinvertebrate Sampling (if required)

Comments / Problems: May 20th Visit: a) Pacific Chorus Frogs heard in the creek and in the wetland site, b) Horses had been in the site during the winter and/or spring as evidenced by their dung which was scattered through 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 (°)

Comments / Problems: **<u>See Photograph Sheets in Appendix C of 2005 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: **GPS unit not used in 2005; Wetland mapping modified in the field during the July visit and by hand using the 2005 July 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: **GPS unit not used in 2005; Wetland mapping modified in the field during the July visit and by hand using the 2005 July aerial photograph.**

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 13, 2005** 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: 0-17 feet	
Plant Species	**Cover**
Hordeum jubatum	2 = 6-10%
Poa pratensis	3 = 11-20%
Alopecurus pratensis	2 = 6-10%
Medicago sativa	+ = < 1%
Agropyron intermedium	3 = 11-20%
Agrostis alba	1 = 1-5%
Aster (pansus)	1 = 1-5%
Taraxacum officinale	+ = < 1%
Rumex maritimus	+ = < 1%
Thlaspi arvense	+ = < 1%
Grass (leaves without inflorescence)	4 = 21-50%
Total Vegetative Cover:	90%

Vegetation Type B: **Type 2 - Eleocharis palustris / Polygonum amphibium**	
Length of transect in this type: 17-132 feet	
Plant Species	**Cover**
Agropyron intermedium	3 = 11-20%
Hordeum jubatum (occupying space, but all DEAD!)	
Alopecurus pratensis	2 = 6-10%
Potentilla anserina	2 = 6-10%
Rumex maritimus	+ = < 1%
Eleochorus palustris	+ = < 1%
Equisetum arvense	+ = < 1%
Community is transitioning to Comm. Type 2.	
Total Vegetative Cover:	35%

Vegetation Type C: **Type 3 - Upland Floodplain**	
Length of transect in this type: 132-257 feet	
Plant Species	**Cover**
Amaranthus retroflexus	3 = 11-20%
Agropyron repens	5 = > 50%
Agropyron intermedium	5 = > 50%
Aster (pansus)	1 = 1-5%
Descurainia pinnata	+ = < 1%
Carex praegracilis	2 = 6-10%
Thlaspi arvense	+ = < 1%
Hordeum jubatum	1 = 1-5%
Poa pratensis	3 = 11-20%
Cirsium arvense	1 = 1-5%
Bromus inermis	4 = 21-50%
Rumex maritimus & Equisetum arvense EACH	+ = < 1%
Total Vegetative Cover:	100%

Vegetation Type D: **Type 3 - Upland Floodplain (transitional veg)**	
Length of transect in this type: 257-372 feet	
Plant Species	**Cover**
Hordeum jubatum	5 = > 50%
Agropyron intermedium	5 = > 50%
Rumex crispus	+ = < 1%
Salix exigua	+ = < 1%
Potentilla anserina (edge of ditch)	+ = < 1%
Cirsium arvense	+ = < 1%
Kochia scoparia (not observed)	
Alopecurus pratensis	1 = 1-5%
Atriplex spp.	+ = < 1%
Total Vegetative Cover:	90%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Perry Ranch** Date: **July 13, 2005** Examiner: **A. Pipp**
Transect Number: **1** Approximate Transect Length: **532 feet** Compass Direction from Start: **288˚** Note: _____

Vegetation Type E: **Type 3 - Upland Floodplain (transitional veg.**	
Length of transect in this type: 372-522 feet	
Plant Species	**Cover**
Kochia scoparia (occupying space, but all DEAD!)	
Hordeum jubatum	1 = 1-5%
Rumex crispus	+ = < 1%
Sisymbium altissimum (occupying space, but all DEAD!)	
Alopecurus pratensis	1 = 1-5%
Eleocharis palustris	1 = 1-5%
Grass (leaves only and no inflorescences present)	4 = 21-50%
Lots of germinated seedlings; species unknown	1 = 1-5%
Total Vegetative Cover:	50%

Vegetation Type F: **Type 6 - Hillside Upland**	
Length of transect in this type: 522-532 feet	
Plant Species	**Cover**
Kochia scoparia (occupying space, but all DEAD!)	
Rumex maritimus	+ = < 1%
Thlaspi arvense	1 = 1-5%
Hordeum jubatum	4 = 21-50%
Salix lutea	+ = < 1%
Mentha arvensis	+ = < 1%
Aster (pansus)	+ = < 1%
Grass (leaves only; no inflorescence; prob. same as E)	5 = > 50%
Family Onagraceae	1 = 1-5%
Total Vegetative Cover:	90%

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

Site: _____ Date: _____ Examiner: _____
Transect Number: _____ Approximate Transect Length: _____**feet** Compass Direction from Start: ___° Note: _____

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

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

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

Vegetation Type L:	
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): **30%**

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: **Due to inundation, transitional and upland species were dead in many areas of site in 2005. These species were being replaced by wetter species, such as Eleocharis. Two species were sprouting (grass and forb), but their identification was not possible during the mid-summer visit. Vegetation has changed dramatically from one growing season to another. Presence and absence of water also changes abrupted. Soils are not changing as rapidly - though oxidized root channels were very noticeable where they were not in 2004.**

BIRD SURVEY – FIELD DATA SHEET

Site: **Perry Ranch** Date: **5/20/05**
Survey Time: **12:45 pm** to **0300 pm**

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Brewer's Blackbird	30	F	UP	July 13, 2005:			
Barn Swallow	2	FO	UP	Common Snipe	1	FO	MA MF
Western Meadowlark	6	F	UP	Chukar	1	F	MA
American Avocet	1	FO	MA	Killdeer	10+	F FO	MA MF
Savannah Sparrow	10	F L	UP	Mallards and/or	-		
Gray Partridge	4	L	UP	Northern Shoveler	20	F L	OW
Mallard	30	L F	MA				
Northern Shoveler	1	L	MA				
Red-winged Blackbird	4	F	UP				
Canada Geese	2	FO	UP				
Killdeer	2	F L	MA 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 20th: Overcast; gentle wind; dry. July 13th: Thin cloud cover; no wind; 70's; dry.**

Notes: **May 20th survey completed by J. Berglund and A. Pipp. July 13th visit was completed by A. Pipp. A group of about 20 Mallards and/or Northern Shovelers flew out from the open water in the Inner Oxbow; it was difficult to see if the group was all one species or a mixture of these two species.**

MDT MONTANA WETLAND ASSESSMENT FORM (revised May 25, 1999)

1. Project Name: Perry Ranch Wetland Mitigation **2. Project #:** B43054.00-0306 **Control #:** NA

3. Evaluation Date: 7/13/2005 **4. Evaluator(s):** A. Pipp **5. Wetland / Site #(s):** Inner Oxbow

6. Wetland Location(s) i. T: 34 N **R:** 8 W **S:** 27, 34 **T:** __ N **R:** __ E **S:** _____

ii. Approx. Stationing / Mileposts: NA

iii. Watershed: --- **GPS Reference No. (if applies):** NA

Other Location Information: Immediately west of Cut Bank Creek ; Between Browning, and Cut Bank, Montana on the Blackfeet Indian Reservation.

7. A. Evaluating Agency MDT

B. Purpose of Evaluation:

- ☐ Wetlands potentially affected by MDT project
- ☐ Mitigation wetlands; pre-construction
- ☒ Mitigation wetlands; post-construction
- ☐ Other

8. Wetland Size (total acres): 6 ac (visually estimated)
_____ (measured, e.g. GPS)

9. Assessment Area (total acres): 6 ac (visually estimated)
_____ (measured, e.g. GPS)

Comments: _____

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA

HGM CLASS [1]	SYSTEM [2]	SUBSYSTEM [2]	CLASS [2]	WATER REGIME [2]	MODIFIER [2]	% OF AA
Riverine	Palustrine	None	Emergent Wetland	Seasonally Flooded	Excavated/Impounded	90
Riverine	Palustrine	None	Unconsolidated Bottom	Seasonally Flooded	Excavated/Impounded	10
---	---	---	---	---	---	
---	---	---	---	---	---	

[1] = Smith et al. 1995. [2] = Cowardin et al. 1979.

Comments: _____

11. ESTIMATED RELATIVE ABUNDANCE (of similarly classified sites within the same Major Montana Watershed Basin)
Common **Comments:** _____

12. GENERAL CONDITION OF AA

i. Regarding Disturbance: (Use matrix below to select appropriate response.)

Conditions Within AA	Predominant Conditions Adjacent (within 500 Feet) To AA		
	Land managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed or selectively logged or has been subject to minor clearing; contains few roads or buildings.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.
AA occurs and is managed in predominantly a natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings.	---	low disturbance	---
AA not cultivated, but moderately grazed or hayed or selectively logged or has been subject to relatively minor clearing, or fill placement, or hydrological alteration; contains few roads or buildings.	---	---	---
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.	---	---	---

Comments: (types of disturbance, intensity, season, etc.) Adjacent land is cultivated and grazed, but not substantially.

ii. Prominent weedy, alien, & introduced species: Cirsium arvense, Kochia scoparia, Bromus inermis, Melilotus officinale, M. alba, and Ephorbia esula.

iii. Briefly describe AA and surrounding land use / habitat: Wetland / Mud Flat area within Cut Bank Creek floodplain, restore 'inner oxbow', adjacent to rangeland and cropland.

13. STRUCTURAL DIVERSITY (Based on 'Class' column of #10 above.)

Number of 'Cowardin' Vegetated Classes Present in AA	≥3 Vegetated Classes or ≥ 2 if one class is forested	2 Vegetated Classes or 1 if forested	≤ 1 Vegetated Class
Select Rating	---	---	Low

Comments: _____

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

i. AA is Documented (D) or Suspected (S) to contain (check box):

Primary or Critical habitat **(list species)**	☐ D ☐ S	_____
Secondary habitat **(list species)**	☐ D ☐ S	_____
Incidental habitat **(list species)**	☐ D ☒ S	Bald Eagle, Piping Plover
No usable habitat	☐ D ☐ S	_____

ii. Rating (Based on the strongest habitat chosen in 14A(i) above, find the corresponding rating of High (H), Moderate (M), or Low (L) for this function.

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point & Rating	---	---	---	---	---	.3 (L)	---

If documented, list the source (e.g., observations, records, etc.)**:** _____

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

i. AA is Documented (D) or Suspected (S) to contain (check box):

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

ii. Rating: Based on the strongest habitat chosen in 14B(i) above, find the corresponding rating of High (H), Moderate (M), or Low (L) for this function.

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point & Rating	---	---	---	.6 (M)	---	---	---

If documented, list the source (e.g., observations, records, etc.)**:** N. Leopard Frogs observed in 'outer oxbow' in 2002 and 2005, but not in 2003 and 2004.

14C. GENERAL WILDLIFE HABITAT RATING

i. Evidence of overall wildlife use in the AA: Check either substantial, moderate, or low.

☐ **Substantial** (based on any of the following)
- ☐ 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
- ☐ interviews with local biologists with knowledge of the AA

☐ **Low** (based on any of the following)
- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interviews with local biologists with knowledge of AA

☒ **Moderate** (based on any of the following)
- ☒ 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
- ☐ interviews with local biologists with knowledge of the AA

ii. Wildlife Habitat Features: Working from top to bottom, select the AA attribute to determine the exceptional (E), high (H), moderate (M), or low (L) rating. Structural diversity is from 13. For class cover to be considered evenly distributed, vegetated classes must be within 20% of each other in terms of their percent composition in the AA (see 10). Duration of Surface Water: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; A= absent.

Structural Diversity (from 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 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	H	--	--
Moderate disturbance at AA (see 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
High disturbance at AA (see 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

iii. Rating: Use 14C(i) and 14C(ii) above and the matrix below to arrive at the functional point and rating of exceptional (E), high (H), moderate (M), or low (L) for this function.

Evidence of Wildlife Use from 14C(i)	**Wildlife Habitat Features Rating** from 14C(ii)			
	☐ **Exceptional**	☒ **High**	☐ **Moderate**	☐ **Low**
Substantial	--	--	--	--
Moderate	--	.7 (M)	--	--
Low	--	--	--	--

Comments: Scattered waterfowl and shorebird use observed in 2005.

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

If the AA is not or was not historically used by fish due to lack of habitat or excessive gradient, then check the NA box above.
Assess if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [*e.g.* fish use is precluded by perched culvert or other barrier, etc.]. If fish use occurs in the AA but is not desired from a resource management perspective (*e.g.* fish use within an irrigation canal], then Habitat Quality [14D(i)] below should be marked as "Low", applied accordingly in 14D(ii) below, and noted in the comments.

i. Habitat Quality: Pick the appropriate AA attributes in matrix to determine the quality rating of exceptional (E), high (H), moderate (M), or low (L).

Duration of Surface Water in AA	☐ **Permanent/Perennial**			☐ **Seasonal / Intermittent**			☐ **Temporary / Ephemeral**		
Cover - % of waterbody in AA containing cover objects (*e.g.* submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation)	**>25%**	**10-25%**	**<10%**	**>25%**	**10-25%**	**<10%**	**>25%**	**10-25%**	**<10%**
Shading - >75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities	--	--	--	--	--	--	--	--	--
Shading – 50 to 75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--
Shading - < 50% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--

ii. Modified Habitat Quality: Is fish use of the AA precluded or significantly reduced by a culvert, dike, other man-made structure or activity **or** is the waterbody included on the 'MDEQ list of waterbodies in need of TMDL development' with 'Probable Impaired Uses' listed as cold or warm water fishery or aquatic life support**?**
☐ **Y** ☐ **N** If yes, reduce the rating from 14D(i) by one level and check the modified habitat quality rating: ☐ E ☐ H ☐ M ☐ L

iii. Rating: Use the conclusions from 14D(i) and 14D(ii) above and the matrix below to arrive at the functional point and rating of exceptional (E), high (H), moderate (M), or low (L).

Types of Fish Known or Suspected within AA	**Modified Habitat Quality** from 14D(ii)			
	☐ **Exceptional**	☐ **High**	☐ **Moderate**	☐ **Low**
Native game fish	--	--	--	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: _____

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

Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA do not flood from in-channel or overbank flow, then check NA.

i. Rating: Working from top to bottom, mark the appropriate attributes to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Estimated wetland area in AA subject to periodic flooding	☐ **≥ 10 acres**			☒ **<10, >2 acres**			☐ **≤2 acres**		
% of flooded wetland classified as forested, scrub/shrub, or both	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**
AA contains **no outlet or restricted outlet**	--	--	--	--	--	.5 (M)	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--	--

ii. Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA? (check)
☐**Y** ☒**N** **Comments:** Floods from Cut Bank Creek.

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 NA above.

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.
P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral.

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding**.**	☐ **>5 acre feet**			☒ **<5, >1 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**	--	--	--	--	.6 (M)	--	--	--	--
Wetlands in AA flood or pond **< 5 out of 10 years**	--	--	--	--	--	--	--	--	--

Comments: _____

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

Applies to wetlands with the potential to receive excess 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 NA above.

i. Rating Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody 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 or ponding in AA	☐ **Yes**	☐ **No**	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	--	--	.7 (M)	--	--	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--

Comments: Sediment and nutrient inflow 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 that is subject to wave action. If this does not apply, then check NA above.

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating exceptional (E), high (H), moderate (M), or low (L) for this function.

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	Duration of Surface Water Adjacent to Rooted Vegetation		
	☐ Permanent / Perennial	☐ Seasonal / Intermittent	☐ Temporary / Ephemeral
≥ 65 %	--	--	--
35-64 %	--	--	--
< 35 %	--	--	--

Comments: Not applicable at this stage.

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function. **A** = acreage of vegetated component in the AA. **B** = structural diversity rating from #13. **C** = Yes (Y) or No (N) as to whether or not the AA contains a surface or subsurface outlet. **P/P** = permanent/perennial; **S/I** = seasonal/intermittent; **T/E/A**= temporary/ephemeral/absent.

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	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☒N	☐Y	☐N	☐Y	☐N	☐Y	☐N
P/P	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S/I	--	--	--	--	--	--	--	--	--	--	--	.5M	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments: _____

14J. GROUNDWATER DISCHARGE / RECHARGE (DR) (Check the indicators in i & ii below that apply to the AA.)

i. ☒ **Discharge Indicators**

- ☐ Springs 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.
- ☒ Other Some alluvial flow likely.

ii. ☐ **Recharge Indicators**

- ☐ Permeable substrate presents without underlying impeding layer.
- ☐ Wetland contains inlet but not outlet.
- ☐ Other _____

iii. Rating: Use information from 14J(i) and 14J(ii) above and the table below to arrive at the functional point and rating of high (H) or low (L) for this function.

Criteria	Functional Point and Rating
AA has known Discharge/Recharge area or one or more indicators of D/R present	1 (H)
No Discharge/Recharge indicators present	--
Available Discharge/Recharge information inadequate to rate AA D/R potential	--

Comments: _____

14K. UNIQUENESS

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

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 from 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

i. Is the AA a known recreational or educational site? ☐ **Yes** [**Rate** ☐ **High (1.0)**, then proceed to 14L(ii) only] ☒ **No** [Proceed to 14L(iii)]

ii. Check categories that apply to the AA: ☒ Educational / scientific study ☒ Consumptive rec. ☒ Non-consumptive rec. ☐ Other

iii. Based on the location, diversity, size, and other site attributes, is there a strong potential for recreational or educational use?

☒ **Yes** [Proceed to 14L (ii) and then 14L(iv)] ☐ **No** [Rate as low in 14L(iv)]

iv. Rating Use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Ownership	Disturbance at AA from 12(i)		
	☒ Low	☐ Moderate	☐ High
Public ownership	--	--	--
Private ownership	.7(M)	--	--

Comments: Tribal ownership restricts access.

FUNCTION, VALUE SUMMARY, AND OVERALL RATING

Function and Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	low	0.30	1	
B. MT Natural Heritage Program Species Habitat	moderate	0.60	1	
C. General Wildlife Habitat	moderate	0.70	1	
D. General Fish/Aquatic Habitat	N/A		--	
E. Flood Attenuation	moderate	0.50	1	
F. Short and Long Term Surface Water Storage	moderate	0.60	1	
G. Sediment/Nutrient/Toxicant Removal	moderate	0.70	1	
H. Sediment/Shoreline Stabilization	N/A		--	
I. Production Export/Food Chain Support	moderate	0.50	1	
J. Groundwater Discharge/Recharge	high	1.00	1	
K. Uniqueness	moderate	0.40	1	
L. Recreation/Education Potential	moderate	0.70	1	
	Total:	**6.00**	**10.00**	_____
		Percent of Total Possible Points:	**60%** (Actual / Possible) x 100 [rd to nearest whole #]	

Category I Wetland: (Must satisfy **one** of the following criteria. If not satisfied, proceed 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 total Possible Points is > 80%.

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following Category II criteria. If not satisfied, proceed to Category IV.)
- ☐ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
- ☐ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish/Aquatic 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 total possible points is > 65%.

☒ **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 satisfied, return to Category III.)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ "Low" rating for Production Export / Food Chain Support; **and**
- ☐ Percent of total possible points is < 30%.

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

☐ **I** ☐ **II** ☒ **III** ☐ **IV**

MDT MONTANA WETLAND ASSESSMENT FORM (revised May 25, 1999)

1. Project Name: Perry Ranch Wetland Mitigation **2. Project #:** B43054.00-0306 **Control #:** NA

3. Evaluation Date: 7/13/2005 **4. Evaluator(s):** A. Pipp **5. Wetland / Site #(s):** Outer Oxbow

6. Wetland Location(s) i. T: 34 N **R:** 8 W **S:** 27, 34 **T:** __ N **R:** __ E **S:** _____

ii. Approx. Stationing / Mileposts: NA

iii. Watershed: --- **GPS Reference No. (if applies):** NA

Other Location Information: Immediately west of Cut Bank Creek ; Between Browning, and Cut Bank, Montana on the Blackfeet Indian Reservation.

7. A. Evaluating Agency MDT

B. Purpose of Evaluation:

- ☐ Wetlands potentially affected by MDT project
- ☐ Mitigation wetlands; pre-construction
- ☒ Mitigation wetlands; post-construction
- ☐ Other

8. Wetland Size (total acres): 6 ac (visually estimated)
_____ (measured, e.g. GPS)

9. Assessment Area (total acres): 6 ac (visually estimated)
_____ (measured, e.g. GPS)

Comments: _____

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA

HGM CLASS [1]	SYSTEM [2]	SUBSYSTEM [2]	CLASS [2]	WATER REGIME [2]	MODIFIER [2]	% OF AA
Riverine	Palustrine	None	Emergent Wetland	Seasonally Flooded	Excavated/Impounded	100
---	---	---	---	---	---	
---	---	---	---	---	---	
---	---	---	---	---	---	

[1] = Smith et al. 1995. [2] = Cowardin et al. 1979.

Comments: _____

11. ESTIMATED RELATIVE ABUNDANCE (of similarly classified sites within the same Major Montana Watershed Basin)
Common **Comments:** _____

12. GENERAL CONDITION OF AA

i. Regarding Disturbance: (Use matrix below to select appropriate response.)

Conditions Within AA	Predominant Conditions Adjacent (within 500 Feet) To AA		
	Land managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed or selectively logged or has been subject to minor clearing; contains few roads or buildings.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.
AA occurs and is managed in predominantly a natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings.	---	low disturbance	---
AA not cultivated, but moderately grazed or hayed or selectively logged or has been subject to relatively minor clearing, or fill placement, or hydrological alteration; contains few roads or buildings.	---	---	---
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.	---	---	---

Comments: (types of disturbance, intensity, season, etc.) Adjacent land is cultivated and grazed, but not substantially.

ii. Prominent weedy, alien, & introduced species: Cirsium arvense, Kochia scoparia, Bromus inermis, Melilotus officinale, M. alba, and Ephorbia esula.

iii. Briefly describe AA and surrounding land use / habitat: Wetland / Mud Flat area within Cut Bank Creek floodplain, restored 'outer oxbow', adjacent to rangeland and cropland.

13. STRUCTURAL DIVERSITY (Based on 'Class' column of #10 above.)

Number of 'Cowardin' Vegetated Classes Present in AA	≥3 Vegetated Classes or ≥ 2 if one class is forested	2 Vegetated Classes or 1 if forested	≤ 1 Vegetated Class
Select Rating	---	---	Low

Comments: _____

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

i. AA is Documented (D) or Suspected (S) to contain (check box):

Primary or Critical habitat **(list species)**	☐ D ☐ S	_____
Secondary habitat **(list species)**	☐ D ☐ S	_____
Incidental habitat **(list species)**	☐ D ☒ S	Bald Eagle, Piping Plover
No usable habitat	☐ D ☐ S	_____

ii. Rating (Based on the strongest habitat chosen in 14A(i) above, find the corresponding rating of High (H), Moderate (M), or Low (L) for this function.

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point & Rating	---	---	---	---	---	.3 (L)	---

If documented, list the source (e.g., observations, records, etc.)**:** _____

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

i. AA is Documented (D) or Suspected (S) to contain (check box):

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

ii. Rating: Based on the strongest habitat chosen in 14B(i) above, find the corresponding rating of High (H), Moderate (M), or Low (L) for this function.

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point & Rating	---	---	.7 (M)	---	---	---	---

If documented, list the source (e.g., observations, records, etc.)**:** N. Leopard Frogs observed in 'outer oxbow' in 2002 and 2005, but not in 2003 and 2004. Few individuals observed.

14C. GENERAL WILDLIFE HABITAT RATING

i. Evidence of overall wildlife use in the AA: Check either substantial, moderate, or low.

☐ **Substantial** (based on any of the following)
- ☐ 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
- ☐ interviews with local biologists with knowledge of the AA

☐ **Low** (based on any of the following)
- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interviews with local biologists with knowledge of AA

☒ **Moderate** (based on any of the following)
- ☒ 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
- ☐ interviews with local biologists with knowledge of the AA

ii. Wildlife Habitat Features: Working from top to bottom, select the AA attribute to determine the exceptional (E), high (H), moderate (M), or low (L) rating. Structural diversity is from 13. For class cover to be considered evenly distributed, vegetated classes must be within 20% of each other in terms of their percent composition in the AA (see 10). Duration of Surface Water: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; A= absent.

Structural Diversity (from 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 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	H	--	--
Moderate disturbance at AA (see 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
High disturbance at AA (see 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

iii. Rating: Use 14C(i) and 14C(ii) above and the matrix below to arrive at the functional point and rating of exceptional (E), high (H), moderate (M), or low (L) for this function.

Evidence of Wildlife Use from 14C(i)	**Wildlife Habitat Features Rating** from 14C(ii)			
	☐ **Exceptional**	☒ **High**	☐ **Moderate**	☐ **Low**
Substantial	--	--	--	--
Moderate	--	.7 (M)	--	--
Low	--	--	--	--

Comments: Scattered shorebird and frog use observed in 2005.

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

If the AA is not or was not historically used by fish due to lack of habitat or excessive gradient, then check the NA box above.
Assess if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [*e.g.* fish use is precluded by perched culvert or other barrier, etc.]. If fish use occurs in the AA but is not desired from a resource management perspective (*e.g.* fish use within an irrigation canal], then Habitat Quality [14D(i)] below should be marked as "Low", applied accordingly in 14D(ii) below, and noted in the comments.

i. Habitat Quality: Pick the appropriate AA attributes in matrix to determine the quality rating of exceptional (E), high (H), moderate (M), or low (L).

Duration of Surface Water in AA	☐ **Permanent/Perennial**			☐ **Seasonal / Intermittent**			☐ **Temporary / Ephemeral**		
Cover - % of waterbody in AA containing cover objects (*e.g.* submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation)	**>25%**	**10-25%**	**<10%**	**>25%**	**10-25%**	**<10%**	**>25%**	**10-25%**	**<10%**
Shading - >75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities	--	--	--	--	--	--	--	--	--
Shading – 50 to 75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--
Shading - < 50% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--

ii. Modified Habitat Quality: Is fish use of the AA precluded or significantly reduced by a culvert, dike, other man-made structure or activity **or** is the waterbody included on the 'MDEQ list of waterbodies in need of TMDL development' with 'Probable Impaired Uses' listed as cold or warm water fishery or aquatic life support**?**
☐ **Y** ☐ **N** If yes, reduce the rating from 14D(i) by one level and check the modified habitat quality rating: ☐ E ☐ H ☐ M ☐ L

iii. Rating: Use the conclusions from 14D(i) and 14D(ii) above and the matrix below to arrive at the functional point and rating of exceptional (E), high (H), moderate (M), or low (L).

Types of Fish Known or Suspected within AA	**Modified Habitat Quality** from 14D(ii)			
	☐ **Exceptional**	☐ **High**	☐ **Moderate**	☐ **Low**
Native game fish	--	--	--	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: _____

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

Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA do not flood from in-channel or overbank flow, then check NA.

i. Rating: Working from top to bottom, mark the appropriate attributes to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Estimated wetland area in AA subject to periodic flooding	☐ **≥ 10 acres**			☒ **<10, >2 acres**			☐ **≤2 acres**		
% of flooded wetland classified as forested, scrub/shrub, or both	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**
AA contains **no outlet or restricted outlet**	--	--	--	--	--	.5 (M)	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--	--

ii. Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA? (check)
☐**Y** ☒**N** **Comments:** Floods from Cut Bank Creek.

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 NA above.

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.
P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral.

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding**.**	☒ **>5 acre feet**			☐ **<5, >1 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**	--	.9 (H)	--	--	--	--	--	--	--
Wetlands in AA flood or pond **< 5 out of 10 years**	--	--	--	--	--	--	--	--	--

Comments: _____

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

Applies to wetlands with the potential to receive excess 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 NA above.

i. Rating Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody 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 or ponding in AA	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	1 (H)	--	--	--	--	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--

Comments: Sediment and nutrient inflow 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 that is subject to wave action. If this does not apply, then check NA above.

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating exceptional (E), high (H), moderate (M), or low (L) for this function.

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	Duration of Surface Water Adjacent to Rooted Vegetation		
	☐ Permanent / Perennial	☐ Seasonal / Intermittent	☐ Temporary / Ephemeral
≥ 65 %	--	--	--
35-64 %	--	--	--
< 35 %	--	--	--

Comments: Not applicable at this stage.

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function. **A** = acreage of vegetated component in the AA. **B** = structural diversity rating from #13. **C** = Yes (Y) or No (N) as to whether or not the AA contains a surface or subsurface outlet. **P/P** = permanent/perennial; **S/I** = seasonal/intermittent; **T/E/A**= temporary/ephemeral/absent.

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	☐Y	☐N	☐Y	☐N	☒Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N
P/P	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S/I	--	--	--	--	.7M	--	--	--	--	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments: 'Outlet' is exit over dike spillway.

14J. GROUNDWATER DISCHARGE / RECHARGE (DR) (Check the indicators in i & ii below that apply to the AA.)

i. ☒ **Discharge Indicators**

- ☐ Springs 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.
- ☒ Other Some alluvial flow likely.

ii. ☐ **Recharge Indicators**

- ☐ Permeable substrate presents without underlying impeding layer.
- ☐ Wetland contains inlet but not outlet.
- ☐ Other _____

iii. Rating: Use information from 14J(i) and 14J(ii) above and the table below to arrive at the functional point and rating of high (H) or low (L) for this function.

Criteria	Functional Point and Rating
AA has known Discharge/Recharge area or one or more indicators of D/R present	1 (H)
No Discharge/Recharge indicators present	--
Available Discharge/Recharge information inadequate to rate AA D/R potential	--

Comments: _____

14K. UNIQUENESS

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

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 from 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

i. Is the AA a known recreational or educational site? ☐ **Yes** [**Rate** ☐ **High (1.0)**, then proceed to 14L(ii) only] ☒ **No** [Proceed to 14L(iii)]

ii. Check categories that apply to the AA: ☒ Educational / scientific study ☒ Consumptive rec. ☒ Non-consumptive rec. ☐ Other

iii. Based on the location, diversity, size, and other site attributes, is there a strong potential for recreational or educational use?

☒ **Yes** [Proceed to 14L (ii) and then 14L(iv)] ☐ **No** [Rate as low in 14L(iv)]

iv. Rating Use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Ownership	Disturbance at AA from 12(i)		
	☒ Low	☐ Moderate	☐ High
Public ownership	--	--	--
Private ownership	.7(M)	--	--

Comments: Tribal ownership restricts access.

FUNCTION, VALUE SUMMARY, AND OVERALL RATING

Function and Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	low	0.30	1	
B. MT Natural Heritage Program Species Habitat	moderate	0.70	1	
C. General Wildlife Habitat	moderate	0.70	1	
D. General Fish/Aquatic Habitat	N/A		--	
E. Flood Attenuation	moderate	0.50	1	
F. Short and Long Term Surface Water Storage	high	0.90	1	
G. Sediment/Nutrient/Toxicant Removal	high	1.00	1	
H. Sediment/Shoreline Stabilization	N/A		--	
I. Production Export/Food Chain Support	moderate	0.70	1	
J. Groundwater Discharge/Recharge	high	1.00	1	
K. Uniqueness	moderate	0.40	1	
L. Recreation/Education Potential	moderate	0.70	1	
	Total:	**6.90**	**10.00**	_____
		Percent of Total Possible Points:	**69%** (Actual / Possible) x 100 [rd to nearest whole #]	

Category I Wetland: (Must satisfy **one** of the following criteria. If not satisfied, proceed 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 total Possible Points is > 80%.

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following Category II criteria. If not satisfied, proceed to Category IV.)
- ☐ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
- ☐ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish/Aquatic 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 total possible points is > 65%.

☐ **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 satisfied, return to Category III.)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ "Low" rating for Production Export / Food Chain Support; **and**
- ☐ Percent of total possible points is < 30%.

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

☐ **I** ☒ **II** ☐ **III** ☐ **IV**

Appendix C

REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Perry Ranch
Glacier County, Montana

LAND & WATER

Photo Point 1: Panoramic view of northern-most excavated area on July 13, 2005. General photo aspect is south from the adjacent hillside on the north.

Photo Point 2: Panoramic view of "outer" (photo left) and "inner" (photo right) oxbows on July 13, 2005. General photo aspect is northeast to southeast from the adjacent hillside on the west.

Photo Point 3: Panoramic view of southwestern end of site on July 13, 2005. General photo aspect is northeast from the adjacent hillside on the southwest. Delivery ditch is in foreground. Cut Bank Creek is on photo right.

PERRY RANCH WETLAND MITIGATION SITE 2005

Photo taken at 288˚ from Transect start.

Photo taken at 100˚ from Transect end. Note the brown plants in background (Type E) are dead *Kochia scoparia*.

Photo looking North at Open Water / Mud Flat, near soil pit # 6.

Photo looking west at inner oxbow, taken from east end of dike.

Photo from hillside looking east into area between inner and outer oxbows.

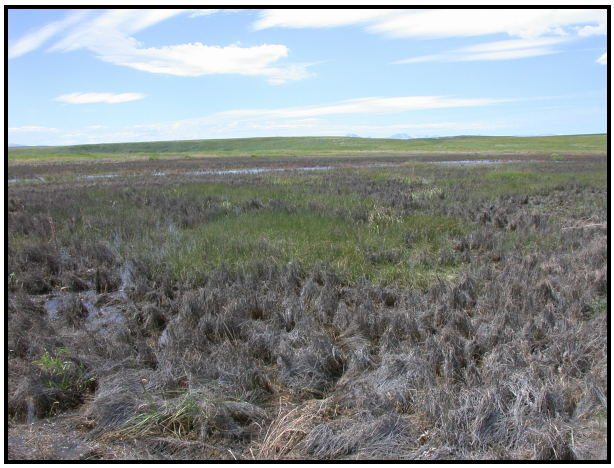


Photo looking west at area between inner and outer oxbows, taken from dike. Macroinvertebrate sample was taken near green patch of *Eleocharis*. Dead vegetation is *Hordeum jubatum*.

Appendix D

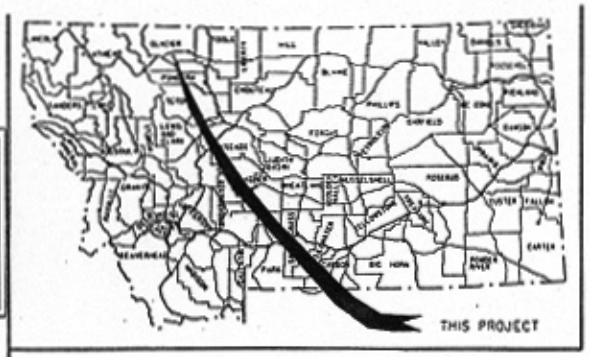
MDT PROPOSED PROJECT LAYOUT

MDT Wetland Mitigation Monitoring
Perry Ranch
Glacier County, Montana

LAND & WATER

LAND & WATER D-1

~ FL. MORSH.R



MONTANA DEPARTMENT OF TRANSPORTATION

FEDERAL AID PROJECT NO. NH 0002(232)

WETLAND MITIGATION

PERRY RANCH

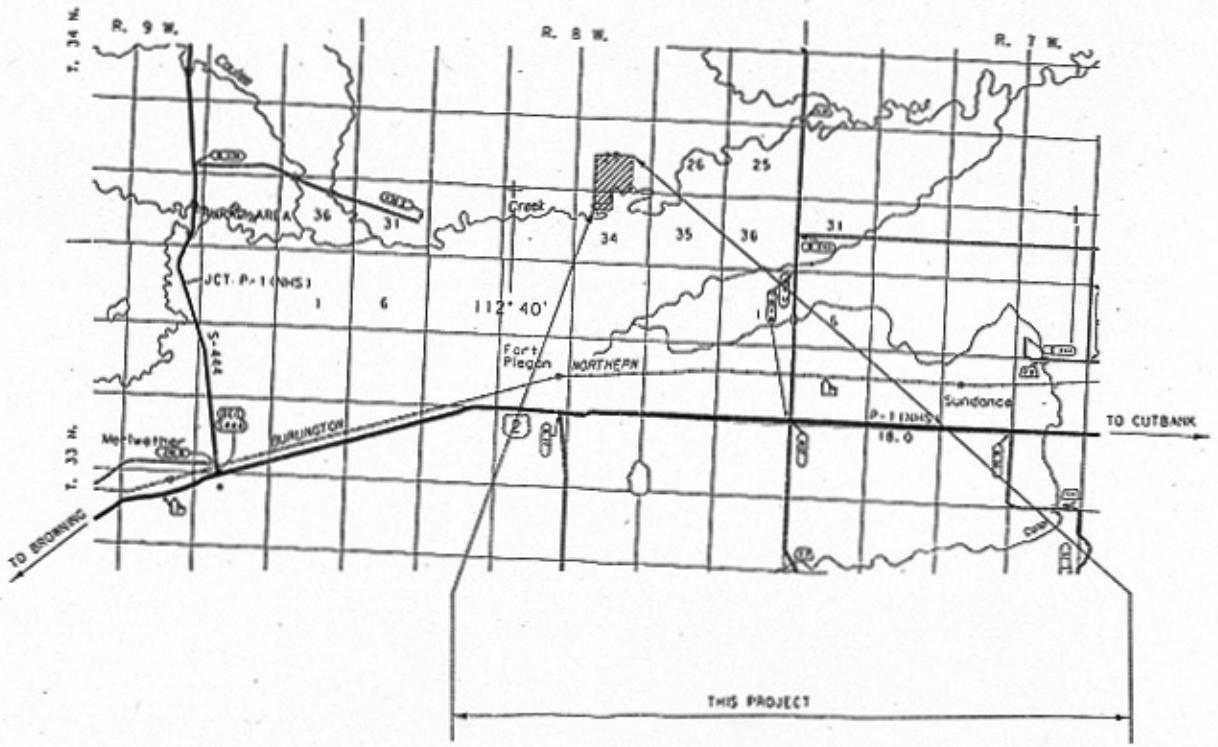
GLACIER COUNTY

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

RELATED PROJECTS

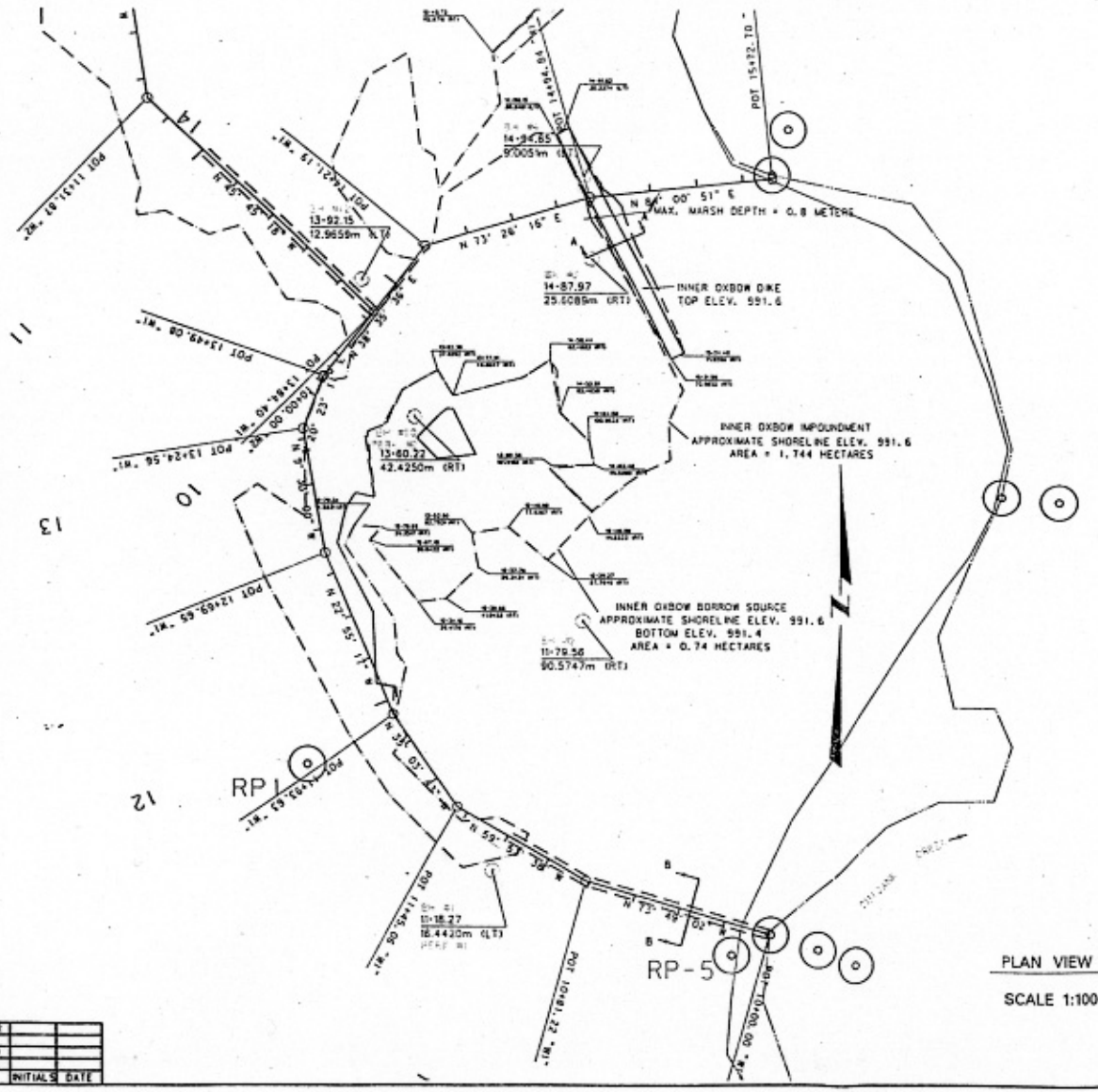
ASSOCIATED PROJECT AGREEMENT NUMBERS	
R/W & UC	
P.E.	

CONTROL NO.

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

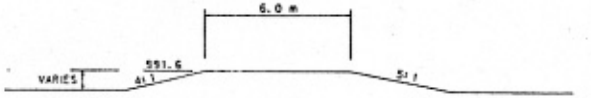
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 0002(232)	6

INNER OXBOW LAYOUT



PLAN VIEW

SCALE 1:100



SECTION A-A-SPREDER DIKE TYPICAL SECTION

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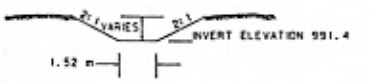


SECTION B-B-INTAKE WEIR TYPICAL SECTION

SCALE 1:10

DESIGNER		
DRAWN		
CHECKED		
REVISED		
	INITIALS	DATE

INNER OXBOW

LAYOUT DETAIL

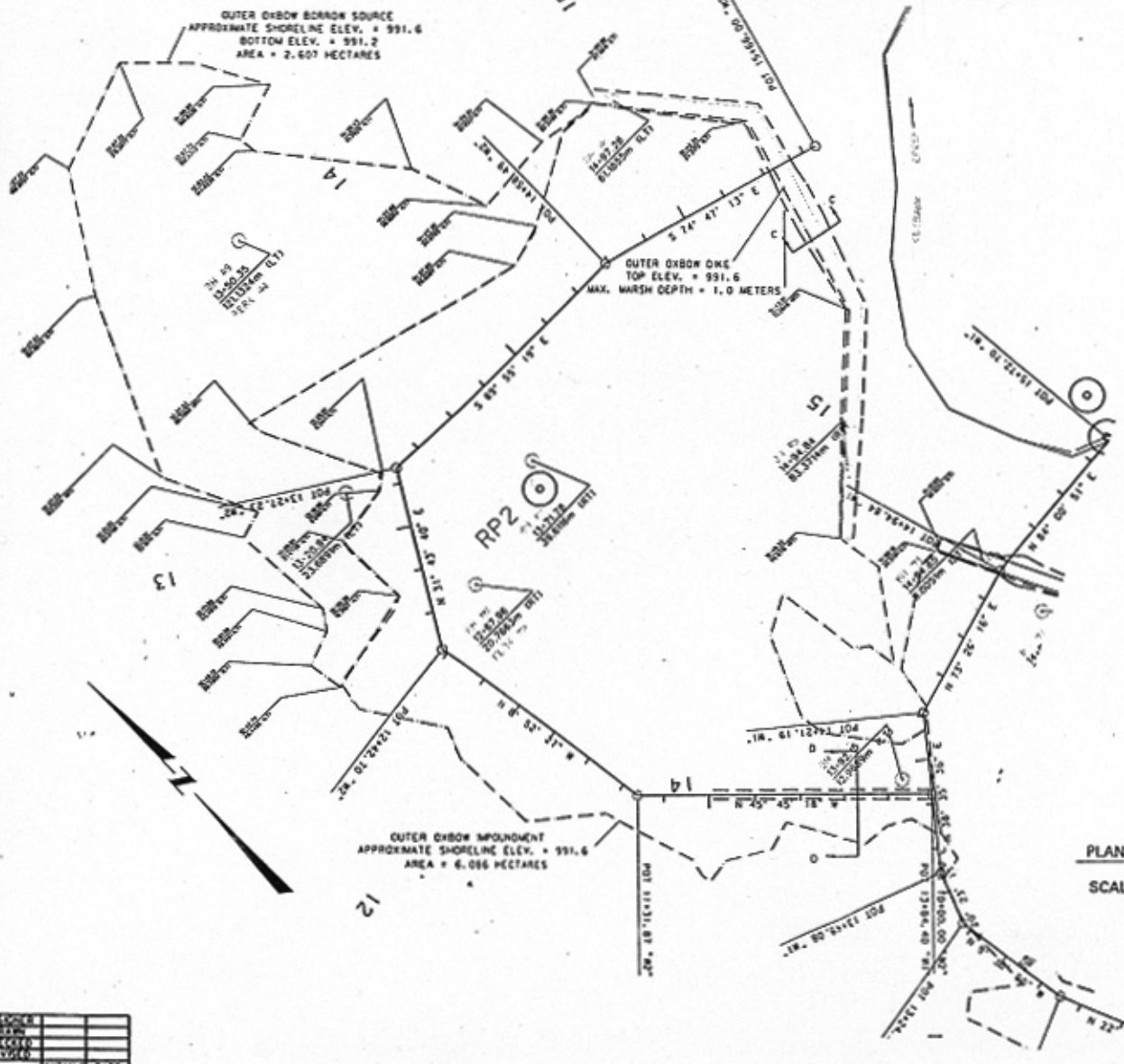
ALIGNMENT "W1"

PRELIMINARY

LAND & WATER D-3

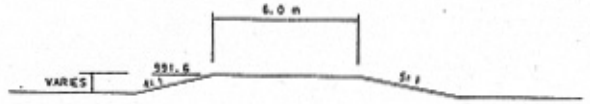
OUTER OXBOW LAYOUT

STATE	PROJECT NUMBER	SHEET
MONTANA	NH 0002(232)	7



PLAN VIEW

SCALE 1:100



SECTION C-C-SPREDER DIKE TYPICAL SECTION

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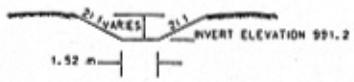

SECTION D-D-INTAKE WEIR TYPICAL SECTION

SCALE 1:10

DESIGNED		
DRAWN		
CHECKED		
RECOMMD		
	INITIALS	DATE

OUTER OXBOW
LAYOUT DETAIL
ALIGNMENT "W2"

PRELIMINARY

Appendix E

BIRD SURVEY PROTOCOL
GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Perry Ranch
Glacier County, Montana

LAND & WATER

BIRD SURVEY PROTOCOL

The following is an outline of the MDT Wetland Mitigation Site Monitoring Bird Survey Protocol. Though each site is vastly different, the bird survey data collection methods must be standardized to a certain degree to increase repeatability. An Area Search within a restricted time frame will be used to collect the following data: a bird species list, density, behavior, and habitat-type use. There will be some decisions that team members must make to fit the protocol to their particular site. Each of the following sections and the desired result describes the protocol established to reflect bird species use over time.

Species Use within the Mitigation Wetland: Survey Method

Result: To conduct a bird survey of the wetland mitigation site within a restricted period of time and the budget allotment.

Sites that can be circumambulated or walked throughout.

These types of sites will include ponds, enhanced historic river channels, wet meadows, and any area that can be surveyed from the entirety of its perimeter or walked throughout. If the wetland is not uncomfortably inundated, conduct several "meandering" transects through the site in an orderly fashion (record the number and approximate location/direction of the transects in the field notebook; they do not have to be formalized or staked). If a very small portion of the site cannot be crossed due to inundation, this method will also apply. Though the sizes of the site vary, each site will require surveying to the fullest extent possible within a set time limit. The optimum times to conduct the survey are in the morning hours. Conduct the survey from sunrise to no later than 11:00 AM. (Note: some sites may have to be surveyed in the late afternoon or evening due to time constraints or weather; if this is the case, record the time of day and include this information in your report discussion.) If the survey is completed before 11:00 AM and no additions are being made to the list, then the task is complete. The overall limiting factor regarding the number of hours that are spent conducting this survey is the number of budgeted hours; this determination must be made by site by each individual.

In many cases, binoculars will be the only instrument that is needed to identify and count the birds using the wetland. If the wetland includes deep water habitat that can not be assessed with binoculars, then a scope and tripod are necessary. If this is the case, establish as many lookout posts as necessary from key vantage points to collect the data. Depending on the size of the open water, more time may be spent viewing the mitigation area from these vantage points than is spent walking the peripheries of more shallow-water wetlands.

Sites that cannot be circumambulated.

These types of sites will include large-bodied waters, such as reservoirs, particularly those with deep water habitat (>6 ft) close to the shore and no wetland development in that area of the shoreline. If one area of the reservoir was graded in such a way to create or enhance the development of a wetland, then that will be the area in which the ambulatory bird survey is conducted. The team member must then determine the length of the shoreline that will be surveyed during each visit.

As stated above in the ambulatory site section, these large sites most likely will have to be surveyed from established vantage points.

Species Use within the Mitigation Wetland: Data Recording

Result: A complete list of bird species using the site, an estimate of bird densities and associated behaviors, and identification of habitat use.

1. Bird Species List

Record the bird species on the Bird Survey - Field Data Sheet using the appropriate 4-letter code of the common name. The coding uses the first two letters of the first two words of the birds' common name or if one name, the first four (4) letters. For example, mourning dove is coded MODO and mallard is MALL. If an unknown individual is observed, use the following protocol and define your abbreviation at the bottom of the field data sheet: unknown shorebird: UNSB; unknown brown bird (UNBR); unknown warbler (UNWA); unknown waterfowl (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 parentheses; do not fill in the habitat column. For example, a flock of black, medium-sized birds could be coded: UNBB / FO (25). You may also note on the data sheet if that particular individual is using a constructed nest box.

2. Bird Density

In the office, sum the Bird Survey – Field Data Sheet data by species and by behavior. Record this data in the Bird Summary Table.

3. Bird Behavior

Bird behavior must be identified by what is known. When a species is simply observed, the behavior that it is immediately exhibiting is what is recorded. Only behaviors that have discreet descriptive terms should be used. The following terms are recommended: breeding pair individual (BP); foraging (F); flyover (FO); loafing (L; e.g. sleeping, roosting, floating with head tucked under wing are loafing behaviors); and, nesting (N). If more behaviors are observed that do have a specific descriptive word, use them and we will add it to the protocol; descriptive words or phrases such as "migrating" or "living on site" are unknown behaviors.

4. Bird Species Habitat Use

We are interested in what bird species are using which particular habitat within the mitigation wetlands. This data is easily collected by simply recording what habitat the species was initially observed. Use the following broad category habitat classifications: aquatic bed (AB - rooted floating, floating-leaved, or submergent vegetation); forested (FO); marsh (MA – cattail, bulrush, emergent vegetation, etc. with surface water); open water (OW – primarily unvegetated); scrub-shrub (SS); and upland buffer (UP); wet meadow (WM – sedges, rushes, grasses with little to no surface water). If other categories are observed onsite that are not suggested here, we will make a new category next year.

GPS Mapping and Aerial Photo Referencing Procedure

The wetland boundaries, photograph location points and sampling locations were field located with mapping grade Trimble Geo III GPS units. The data was collected with a minimum of three positions per feature using Course/Acquisition code. The collected data was then transferred to a PC and differentially corrected to the nearest operating Community Base Station. The corrected data was then exported to ACAD drawings in Montana State Plain Coordinates NAD 83 international feet.

The GPS positions collected and processed had a 68% accuracy of 7 feet except in isolated areas of Tasks .008 and .011, where it went to 12 feet. This is within the 1 to 5 meter range listed as the expected accuracy of the mapping grade Trimble GPS.

Aerial reference points were used to position the aerial photographs. This positioning did not remove the distortion inherent in all photos; this imagery is to be used as a visual aide only. The located wetland boundaries were given a final review by the wetland biologist and adjustments were made if necessary.

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.

Appendix F

MACROINVERTEBRATE SAMPLING PROTOCOL
MACROINVERTEBRATE DATA

MDT Wetland Mitigation Monitoring
Perry Ranch
Glacier County, Montana

LAND & WATER

AQUATIC INVERTEBRATE SAMPLING PROTOCOL

Equipment List

- D-frame sampling net with 1 mm mesh. Wildco is a good source of these.
- Spare net.
- 1-liter plastic sample jars, wide-mouth. VWR has these: catalog #36319-707.
- 95% ethanol: Northwest Scientific in Billings carries this.

All these other things are generally available at hardware or sporting goods stores. Make the labels on an ink jet printer preferably.

- hip waders.
- pre-printed sample labels (printed on Rite-in-the-Rain or other coated paper, two labels per sample).
- pencil.
- plastic pail (3 or 5 gallon).
- large tea strainer or framed screen.
- towel.
- tape for affixing label to jar.
- cooler with ice for sample storage.

Site Selection

Select the sampling site with these considerations in mind:

- Select a site accessible with hip waders. If substrates are too soft, lay a wide board down to walk on.
- Determine a location that is representative of the overall condition of the wetland.

Sampling

Wetland invertebrates inhabit the substrate, the water column, the stems and leaves of aquatic vegetation, and the water surface. Your goal is to sweep the collecting net through each of these habitat types, and then to combine the resulting samples into the 1-liter sample jar.

Dip out about a gallon of water into the pail. Pour about a cup of ethanol into the sample jar. Fill out the top half of the sample labels, using pencil, since ink will dissolve in the ethanol.

Ideally, you can sample a swath of water column from near-shore outward to a depth of approximately 3 feet with a long sweep of the net, keeping the net at about half the depth of the water throughout the sweep. Sweep the water surface as well. Pull the net through a vegetated area, beneath the water surface, for at least a meter of distance.

Sample the substrate by pulling the net along the bottom, bumping it against the substrate several times as you pull.

This step is optional, but it gives you a chance to <u>see</u> that you've collected some invertebrates. Rinse the net out into the bucket, and look for insects, crustaceans, etc. If necessary, repeat the sampling process in a nearby location, and add the net contents to the bucket. Remember to sample all four environments.

Sieve the contents of the bucket through the straining device and pour or carefully scrape the contents of the strainer into the sample jar.

If you skip the bucket-and-sieve steps, simply lift handfuls of material out of the sampling net into the jars. In either case, please include some muck or mud and some vegetation in the jar. Often, you will have collected a large amount of vegetable material. If this is the case, lift out handfuls of material from the sieve into the jar, until the jar is about half full. Please limit material you include in the sample, so that there is only a single jar for each sample.

Top off the sample jar with enough ethanol to cover all the material in the jar. Leave as little headroom as possible.

It is not necessary to sample habitats in any specified order. Keep in mind that disturbing the habitats prior to sampling will chase off the animals you are trying to capture.

Complete the sample labels. Place one label inside the sample jar and tape the other label securely to the outside of the jar. Dry the jar before attaching the outer label if necessary. In some situations, it may be necessary to collect more than one sample at a site. If you take multiple samples from the same site, clearly indicate this by using individual sample numbers, along with the total number of samples collected at the site (e.g. Sample #3 of 5 total samples).

Photograph the sampled site.

Sample Handling/Shipping

- In the field, keep collected samples cool by storing them in a cooler. Only a small amount of ice is necessary.
- Inventory all samples, preparing a list of all sites and enumerating all samples, before shipping or delivering to the laboratory.
- Deliver samples to Rhithron.

MDT Mitigated Wetland Monitoring Project

Aquatic Invertebrate Monitoring
Summary 2001 - 2005

METHODS

Among other monitoring activities, aquatic invertebrate assemblages were collected at a number of mitigated wetlands throughout Montana. This report summarizes data generated from five years of collection. In 2001, 29 sites were sampled statewide. Nineteen of these sites were revisited in 2002, and 13 new sites were sampled. In 2003, 17 sites that had been visited in both 2001 and 2002 were re-sampled, and 11 sites sampled for the first time in 2001 were re-visited. In addition, 2 new sites were sampled. In 2004, 25 sites were re-visited, and 6 new sites were sampled. In 2005, an additional 2 sites were added. Over all years of sampling, a total of 151 sites were sampled for invertebrates. Table 2 summarizes sites and sampling years.

The method employed to assess these wetlands is based on an index incorporating a battery of 12 bioassessment metrics or attributes (Table 1) 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 metrics were developed by generally following the tactic used by Stribling et al. Boxplots were generated using a statistical software package (Statistica), and distributions, median values, ranges, and quartiles for each metric were examined. All sites in all years of sampling were used. Camp Creek, which was sampled in 2002, 2003, 2004, and 2005, and Kleinschmidt Creek, sampled in 2003, 2004, and 2005, were assessed using the tested metric battery developed for montane streams of Western Montana (Bollman 1998).Invertebrate assemblages at these sites were different from that of the other sites, and suggested montane or foothill stream conditions rather than wetland conditions. For the wetland sites, “optimal” scores were generally those that fell above the 75^{th} percentile (for those metrics that decrease in value in response to stress) or below the 25^{th} 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 75^{th} percentile for decreasing scores (or above the 25^{th} percentile for increasing scores) into “sub-optimal” and “poor” assessment categories. A score of 5, 3, or 1 was assigned to optimal, 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. 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.

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. The nature of the action needed is not determined solely by the index score, however, 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; our understanding of the interrelationships of natural environmental factors and anthropogenic disturbances are tentative. Thus, the further interpretive remarks accompanying the raw taxonomic and metric data are offered cautiously.

Table 1. Montana Department of Transportation Mitigated Wetlands Monitoring Project sites, 2001 – 2005.

2001	2002	2003	2004	2005
Beaverhead 1	Beaverhead 1	Beaverhead 1	Beaverhead 1	Beaverhead 1
Beaverhead 2	Beaverhead 2			
Beaverhead 3	Beaverhead 3		Beaverhead 3	Beaverhead 3
Beaverhead 4	Beaverhead 4	Beaverhead 4		
Beaverhead 5	Beaverhead 5	Beaverhead 5	Beaverhead 5	Beaverhead 5
Beaverhead 6	Beaverhead 6	Beaverhead 6	Beaverhead 6	Beaverhead 6
Big Sandy 1				
Big Sandy 2				
Big Sandy 3				
Big Sandy 4				
Johnson-Valier				
VIDA				
Cow Coulee	Cow Coulee	Cow Coulee		
Fourchette – Puffin	Fourchette - Puffin	Fourchette - Puffin	Fourchette - Puffin	
Fourchette – Flashlight	Fourchette – Flashlight	Fourchette – Flashlight	Fourchette – Flashlight	
Fourchette – Penguin	Fourchette – Penguin	Fourchette – Penguin	Fourchette – Penguin	
Fourchette – Albatross	Fourchette – Albatross	Fourchette – Albatross	Fourchette – Albatross	
Big Spring	Big Spring	Big Spring	Big Spring	Big Spring
Vince Ames				
Ryegate				
Lavinia				
Stillwater	Stillwater	Stillwater	Stillwater	Stillwater
Roundup	Roundup	Roundup	Roundup	Roundup
Wigeon	Wigeon	Wigeon	Wigeon	Wigeon
Ridgeway	Ridgeway	Ridgeway	Ridgeway	Ridgeway
Musgrave – Rest. 1	Musgrave – Rest. 1	Musgrave – Rest. 1	Musgrave – Rest. 1	Musgrave – Rest. 1
Musgrave – Rest. 2	Musgrave – Rest. 2	Musgrave – Rest. 2	Musgrave – Rest. 2	Musgrave – Rest. 2
Musgrave – Enh. 1	Musgrave – Enh. 1	Musgrave – Enh. 1	Musgrave – Enh. 1	Musgrave – Enh. 1
Musgrave – Enh. 2				
	Hoskins Landing	Hoskins Landing	Hoskins Landing	Hoskins Landing
	Peterson - 1	Peterson – 1	Peterson – 1	Peterson – 1
	Peterson – 2		Peterson – 2	Peterson – 2
	Peterson – 4	Peterson – 4	Peterson – 4	Peterson – 4
	Peterson – 5	Peterson – 5	Peterson – 5	Peterson – 5
	Jack Johnson - main	Jack Johnson - main		
	Jack Johnson - SW	Jack Johnson - SW		
	Creston	Creston	Creston	Creston
	Lawrence Park			
	Perry Ranch			Perry Ranch
	SF Smith River	SF Smith River	SF Smith River	SF Smith River
	Camp Creek	Camp Creek	Camp Creek	Camp Creek
	Kleinschmidt	Kleinschmidt – pond	Kleinschmidt – pond	Kleinschmidt – pond
		Kleinschmidt – stream	Kleinschmidt – stream	Kleinschmidt – stream
		Ringling - Galt		
			Circle	
			Cloud Ranch Pond	Cloud Ranch Pond
			Cloud Ranch Stream	
			Colloid	Colloid
			Jack Creek	Jack Creek
			Norem	Norem
				Rock Creek Ranch
				Wagner Marsh

Sample Processing

Aquatic invertebrate samples were collected at mitigation wetland sites in the summer months of 2001, 2002, 2003, 2004, and 2005 by personnel of Land and Water Consulting, Inc. Sampling procedures utilized were based on the protocols developed by the Montana Department of Environmental Quality (MT DEQ). Sampling consisted of D-frame net sweeps through emergent vegetation (when present), the water column, over the water surface, and included disturbing and scraping substrates at each sampled sites. Samples were preserved in ethanol at each wetland site and subsequently delivered to Rhithron Associates, Inc. for processing, taxonomic determinations, and data analysis.

At Rhithron's laboratory, Caton subsamplers and stereomicroscopes with 10X magnification were used to randomly select a minimum of 100 organisms, when possible, from each sample. In some cases, the entire sample contained fewer than 100 organisms; in these cases, all organisms from the sample were taken. Taxa were identified in general accordance with the taxonomic resolution standards set out in the MT DEQ Standard Operating Procedures for Sampling and Sample Analysis (Bukantis 1998). All samples were re-identified by a second taxonomist for quality assurance purposes. The identified samples have been archived at Rhithron's laboratory. Taxonomic data and organism counts were entered into an Excel 2000 spreadsheet, and metrics were calculated and scored using spreadsheet formulae.

Bioassessment Metrics

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 (the 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.

Metric scoring criteria were re-examined each year as new data was added. For 2005, all 151 records were utilized. Ranges of individual metrics, as well as median metric values remained remarkably consistent over all 5 years of analysis. Since metric value distributions changed insignificantly with the addition of the 2005 data, no changes were made to scoring criteria this year. Summary metric values and scores for the 2005 samples are given in Tables 3a-3d.

Table 2. Aquatic invertebrate metrics employed in the MTDT mitigation wetland monitoring study, 2001-2005.

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 times that taxon's modified Hilsenhoff Biotic Index 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 Land &Water Consulting / PBS&J and are included in the Macro-Invertebrate sections of individual reports. Summary tables are provided on the following pages.*)

Table 3a. Metric values and scores for Montana Department of Transportation mitigated wetland sites in 2005.

	BEAVERHEAD #1	BEAVERHEAD #3	BEAVERHEAD #5	BEAVERHEAD #6	BIG SPRING CREEK	STILLWATER	ROUNDUP	WIDGEON
Total taxa	22	9	14	18	28	17	7	19
POET	2	0	0	2	4	4	0	0
Chironomidae taxa	7	4	4	4	9	5	3	11
Crustacea + Mollusca	4	3	1	4	7	5	2	4
% Chironomidae	59.80%	7.55%	50.00%	16.67%	33.65%	9.43%	22.22%	76.47%
Orthocladiinae/Chir	0.197	0.625	0.059	0.067	0.457	0.500	0.000	0.205
%Amphipoda	1.96%	0.94%	0.00%	1.11%	18.27%	7.55%	0.00%	10.78%
%Crustacea + %Mollusca	10.78%	90.57%	2.94%	55.56%	33.65%	53.77%	72.65%	15.69%
HBI	7.71	7.88	7.88	7.98	7.55	7.28	8.33	8.25
%Dominant taxon	34.31%	76.42%	35.29%	25.56%	18.27%	33.02%	71.79%	44.12%
%Collector-Gatherers	56.86%	93.40%	47.06%	21.11%	70.19%	64.15%	82.05%	26.47%
%Filterers	0.00%	0.00%	0.00%	0.00%	0.96%	3.77%	0.00%	6.86%
Total taxa	5	1	1	3	5	3	1	3
POET	1	1	1	1	5	5	1	1
Chironomidae taxa	5	3	3	3	5	3	3	5
Crustacea + Mollusca	3	1	1	3	5	3	1	3
% Chironomidae	1	5	1	5	3	5	3	1
Orthocladiinae/Chir	3	5	1	1	5	5	1	3
%Amphipoda	5	5	5	5	3	3	5	3
%Crustacea + %Mollusca	5	1	5	3	3	3	1	5
HBI	1	1	1	1	3	3	1	1
%Dominant taxon	3	1	3	5	5	5	1	3
%Collector-Gatherers	3	5	3	1	3	3	5	1
%Filterers	3	3	3	3	3	3	3	1
Total score	**38**	**32**	**28**	**34**	**48**	**44**	**26**	**30**
Percent of maximum score	**0.633333**	**0.533333**	**0.466667**	**0.566667**	**0.8**	**0.733333**	**0.433333**	**0.5**
Impairment classification	**sub-optimal**	**poor**	**poor**	**sub-optimal**	**optimal**	**optimal**	**poor**	**poor**

Table 3b. Metric values and scores for Montana Department of Transportation mitigated wetland sites in 2005.

	RIDGEWAY	MUSGRAVE REST. 1	MUSGRAVE REST. 2	MUSGRAVE ENH. 1	HOSKINS LANDING	PETERSON RANCH 1	PETERSON RANCH 2	PETERSON RANCH 4	PETERSON RANCH 5
Total taxa	19	19	23	19	27	29	16	25	16
POET	3	1	3	1	5	4	2	4	4
Chironomidae taxa	6	6	8	3	6	11	6	8	7
Crustacea + Mollusca	5	5	3	7	6	6	5	6	2
% Chironomidae	9.26%	14.55%	22.00%	2.80%	17.58%	17.48%	13.91%	24.55%	16.96%
Orthocladiinae/Chir	0.600	0.750	0.136	0.667	0.188	0.556	0.563	0.630	0.632
%Amphipoda	6.48%	3.64%	0.00%	0.93%	0.00%	0.97%	7.83%	1.82%	8.04%
%Crustacea + %Mollusca	22.22%	30.91%	38.00%	58.88%	27.47%	31.07%	72.17%	20.00%	8.93%
HBI	7.71	7.22	7.77	7.16	6.81	7.16	7.43	7.65	8.08
%Dominant taxon	53.70%	21.82%	35.00%	28.04%	14.29%	26.21%	33.04%	18.18%	31.25%
%Collector-Gatherers	68.52%	40.00%	15.00%	11.21%	31.87%	59.22%	28.70%	43.64%	68.75%
%Filterers	0.00%	0.00%	0.00%	2.80%	0.00%	4.85%	33.91%	5.45%	1.79%
Total taxa	3	3	5	3	5	5	3	5	3
POET	3	1	3	1	5	5	1	5	5
Chironomidae taxa	3	3	5	3	3	5	3	5	5
Crustacea + Mollusca	3	3	1	5	5	5	3	5	1
% Chironomidae	5	5	3	5	5	5	5	3	5
Orthocladiinae/Chir	5	5	1	5	3	5	5	5	5
%Amphipoda	3	5	5	5	5	5	3	5	3
%Crustacea + %Mollusca	5	5	3	3	5	5	1	5	5
HBI	1	3	1	3	5	3	3	1	1
%Dominant taxon	1	5	3	5	5	5	5	5	5
%Collector-Gatherers	3	1	1	1	1	3	1	1	3
%Filterers	3	3	3	3	3	3	1	3	3
Total score	**38**	**42**	**34**	**42**	**50**	**54**	**34**	**48**	**44**
Percent of maximum score	**0.633333**	**0.7**	**0.566667**	**0.7**	**0.833333**	**0.9**	**0.566667**	**0.8**	**0.733333**
Impairment classification	**sub-optimal**	**optimal**	**sub-optimal**	**optimal**	**optimal**	**optimal**	**sub-optimal**	**optimal**	**optimal**

Table 3c. Metric values and scores for Montana Department of Transportation mitigated wetland sites in 2005.

	CRESTON	PERRY RANCH	SOUTH FORK SMITH RIVER	CAMP CREEK	KLEINSCH MIDT POND	KLEINSCH MIDT STREAM	CLOUD RANCH POND	COLLOID	JACK CREEK
Total taxa	16	18	19	36	27	23	22	9	16
POET	0	0	4	14	6	5	2	1	1
Chironomidae taxa	4	8	6	13	6	9	11	4	9
Crustacea + Mollusca	6	4	5	0	2	3	3	1	4
% Chironomidae	27.62%	43.69%	21.67%	45.54%	8.85%	45.08%	37.50%	25.83%	29.41%
Orthocladiinae/Chir	0.931	0.622	0.192	0.804	0.200	0.473	0.256	0.000	0.467
%Amphipoda	0.00%	0.00%	29.17%	0.00%	5.31%	0.82%	0.00%	0.00%	0.98%
%Crustacea + %Mollusca	52.38%	38.83%	62.50%	0.00%	7.96%	3.28%	7.69%	67.50%	41.18%
HBI	7.52	7.31	7.54	5.06	7.40	5.83	6.96	8.53	7.39
%Dominant taxon	25.71%	25.24%	29.17%	18.81%	30.09%	32.79%	41.35%	67.50%	35.29%
%Collector-Gatherers	64.76%	47.57%	65.00%	47.52%	37.17%	50.82%	75.96%	88.33%	91.18%
%Filterers	6.67%	27.18%	8.33%	5.94%	0.88%	2.46%	2.88%	0.00%	2.94%
Total taxa	3	3	3	5	5	5	5	1	3
POET	1	1	5	5	5	5	1	1	1
Chironomidae taxa	3	5	3	5	3	5	5	3	5
Crustacea + Mollusca	5	3	3	1	1	1	1	1	3
% Chironomidae	3	1	3	1	5	1	3	3	3
Orthocladiinae/Chir	5	5	3	5	3	5	3	1	1
%Amphipoda	5	5	1	5	3	5	5	5	5
%Crustacea + %Mollusca	3	3	3	5	5	5	5	1	3
HBI	3	3	3	5	3	5	3	1	3
%Dominant taxon	5	5	5	5	5	5	3	1	3
%Collector-Gatherers	3	3	3	3	1	3	3	5	5
%Filterers	1	1	1	3	3	3	3	3	3
Total score	**40**	**38**	**36**	**48**	**42**	**48**	**40**	**26**	**38**
Percent of maximum score	**0.666667**	**0.633333**	**0.6**	**0.8**	**0.7**	**0.8**	**0.666667**	**0.433333**	**0.633333**
Impairment classification	**sub-optimal**	**sub-optimal**	**sub-optimal**	**optimal**	**optimal**	**optimal**	**sub-optimal**	**poor**	**sub-optimal**

Table 3d. Metric values and scores for Montana Department of Transportation mitigated wetland sites in 2005.

	NOREM	ROCK CREEK RANCH	WAGNER MARSH
Total taxa	4	24	23
POET	0	2	5
Chironomidae taxa	2	8	8
Crustacea + Mollusca	2	4	5
% Chironomidae	37.50%	22.00%	24.00%
Orthocladiinae/Chir	0.000	0.318	0.167
%Amphipoda	0.00%	3.00%	7.00%
%Crustacea + %Mollusca	62.50%	40.00%	19.00%
HBI	7.50	7.61	8.58
%Dominant taxon	56.25%	18.00%	38.00%
%Collector-Gatherers	6.25%	57.00%	40.00%
%Filterers	0.00%	0.00%	3.00%
Total taxa	1	5	5
POET	1	1	5
Chironomidae taxa	1	5	5
Crustacea + Mollusca	1	3	3
% Chironomidae	3	3	3
Orthocladiinae/Chir	1	3	1
%Amphipoda	5	5	3
%Crustacea + %Mollusca	3	3	5
HBI	3	1	1
%Dominant taxon	1	5	3
%Collector-Gatherers	1	3	1
%Filterers	3	3	3
Total score	**24**	**40**	**38**
Percent of maximum score	**0.4**	**0.666667**	**0.633333**
Impairment classification	**poor**	**sub-optimal**	**sub-optimal**

Literature Cited

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McCune, B. and J.B. Grace. 2002. Analysis of Ecological Communities. MjM Software Design, Gleneden Beach, Oregon, USA.

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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: MDT05LW
RAI No.: MDT05LW002

RAI No.: MDT05LW002 **Sta. Name:** PERRY RANCH
Client ID:
Date Coll.: 7/13/2005 **No. Jars:** 1 **STORET ID:**

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Cladocera	26	25.49%	Yes	Unknown		8	CF
Copepoda	12	11.76%	Yes	Unknown		8	CG
Ostracoda	1	0.98%	Yes	Unknown		8	CG
Enchytraeidae							
Enchytraeidae	1	0.98%	Yes	Unknown		4	CG
Lumbriculidae							
Lumbriculidae	4	3.92%	Yes	Unknown		4	CG
Lymnaeidae							
Stagnicola sp.	1	0.98%	Yes	Unknown		6	SC
Coleoptera							
Dytiscidae							
Dytiscidae	5	4.90%	Yes	Larva	Larva	5	PR
Hydrophilidae							
Hydrophilidae	5	4.90%	Yes	Larva	Larva	5	PR
Diptera							
Culicidae							
Culicidae	2	1.96%	Yes	Larva	Larva	10	CG
Ephydridae							
Ephydridae	1	0.98%	Yes	Larva	Larva	6	CG
Chironomidae							
Chironomidae							
Chironomus sp.	9	8.82%	Yes	Larva		10	CG
Corynoneura sp.	1	0.98%	Yes	Larva		7	CG
Cricotopus (Isocladius) sp.	13	12.75%	Yes	Larva		7	SH
Cricotopus bicinctus	1	0.98%	Yes	Larva		7	SH
Cryptotendipes sp.	4	3.92%	Yes	Larva		6	CG
Polypedilum sp.	1	0.98%	Yes	Larva		6	SH
Psectrocladius sp.	13	12.75%	Yes	Larva		8	CG
Tanytarsus sp.	2	1.96%	Yes	Larva		6	CF
Sample Count	**102**						

Metrics Report

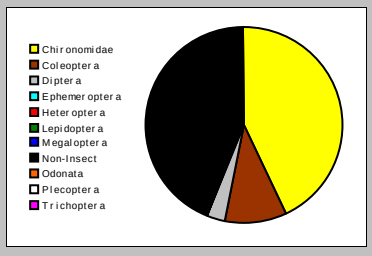
Project ID: MDT05LW
RAI No.: MDT05LW002
Sta. Name: PERRY RANCH
Client ID:
STORET ID
Coll. Date: 7/13/2005

Abundance Measures

Sample Count:	102	
Sample Abundance:	153.00	66.67% of sample used
Total Abundance:	205.79	
Coll. Procedure:		
Sample Notes:		

Taxonomic Composition

Category	R	A	PRA
Non-Insect	6	45	44.12%
Odonata			
Ephemeroptera			
Plecoptera			
Heteroptera			
Megaloptera			
Trichoptera			
Lepidoptera			
Coleoptera	2	10	9.80%
Diptera	2	3	2.94%
Chironomidae	8	44	43.14%

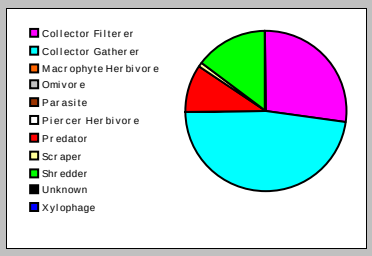


Dominant Taxa

Category	A	PRA
Cladocera	26	25.49%
Psectrocladius	13	12.75%
Cricotopus (Isocladius)	13	12.75%
Copepoda	12	11.76%
Chironomus	9	8.82%
Hydrophilidae	5	4.90%
Dytiscidae	5	4.90%
Lumbriculidae	4	3.92%
Cryptotendipes	4	3.92%
Tanytarsus	2	1.96%
Culicidae	2	1.96%
Stagnicola	1	0.98%
Polypedilum	1	0.98%
Enchytraeidae	1	0.98%
Corynoneura	1	0.98%

Functional Composition

Category	R	A	PRA
Predator	2	10	9.80%
Parasite			
Collector Gatherer	10	48	47.06%
Collector Filterer	2	28	27.45%
Macrophyte Herbivore			
Piercer Herbivore			
Xylophage			
Scraper	1	1	0.98%
Shredder	3	15	14.71%
Omivore			
Unknown			



Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
Composition					
Taxa Richness	18	1	2		0
Non-Insect Percent	44.12%				
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	4.90%				
Baetidae/Ephemeroptera	0.000				
Hydropsychidae/Trichoptera	0.000				
Dominance					
Dominant Taxon Percent	25.49%		3		2
Dominant Taxa (2) Percent	38.24%				
Dominant Taxa (3) Percent	50.98%	3			
Dominant Taxa (10) Percent	91.18%				
Diversity					
Shannon H (loge)	2.361				
Shannon H (log2)	3.406		3		
Margalef D	3.676				
Simpson D	0.120				
Evenness	0.081				
Function					
Predator Richness	2		0		
Predator Percent	9.80%	1			
Filterer Richness	2				
Filterer Percent	27.45%			0	
Collector Percent	74.51%		2		1
Scraper+Shredder Percent	15.69%		2		0
Scraper/Filterer	0.036				
Scraper/Scraper+Filterer	0.034				
Habit					
Burrower Richness	1				
Burrower Percent	8.82%				
Swimmer Richness	0				
Swimmer Percent	0.00%				
Clinger Richness	4	1			
Clinger Percent	16.67%				
Characteristics					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	3				
Hemoglobin Bearer Percent	13.73%				
Air Breather Richness	3				
Air Breather Percent	11.76%				
Voltinism					
Univoltine Richness	5				
Semivoltine Richness	2	1			
Multivoltine Percent	81.37%		0		
Tolerance					
Sediment Tolerant Richness	2				
Sediment Tolerant Percent	4.90%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	4.414				
Pollution Sensitive Richness	0	1		0	
Pollution Tolerant Percent	33.33%	3		1	
Hilsenhoff Biotic Index	7.402		0		0
Intolerant Percent	0.00%				
Supertolerant Percent	61.76%				
CTQa	101.455				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	14	28.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	12	40.00%	Moderate
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	1	5.56%	Severe
MTM	Montana DEQ Mountains (Bukantis 1998)	3	14.29%	Severe