MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2006

Meriwether-East
Glacier County, Montana

Prepared for:

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

Prepared by:

POST, BUCKLEY, SCHUH, AND JERNIGAN
P.O. Box 239
Helena, MT 59624

December 2006

Project No: B43054.00 - 0310

PBS&J

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1.0 INTRODUCTION

The Meriwether-East Wetland Mitigation Site was constructed during 2005 to partially mitigate for wetland impacts associated with Montana Department of Transportation (MDT) project NH 1-3(36)234F (Meriwether-East) (**Figure 1**). The Meriwether-East wetland mitigation project was constructed on-site along Highway 2 in Glacier County. It consists of two areas: Site 1 was built near milepost 236 and encompasses approximately 2.67 acres (ac) and Site 2 was built near milepost 239 and encompasses approximately 6.62 acres (**Figures 2** and **3** in **Appendix A**; **Photos 13** and **14** in **Appendix C**). Combined, the on-site mitigation project was designed to create 9.29 acres of new wetland in an area that had no prior wetlands.

Wetland hydrology was designed to be supplied from the neighboring wetlands, interception of the water table, and ponding of direct precipitation. It is anticipated that, over time, vegetation would be comprised of emergent wetland species.

2.0 METHODS

2.1 Monitoring Dates and Activities

The site was visited on August 8th to document vegetation, soil, and hydrologic conditions used to map jurisdictional wetlands. All information contained on the Wetland Mitigation Site Monitoring Form was collected at this time (**Appendix B**). 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; photograph points; functional assessment; and a non-engineering examination of dike structures.

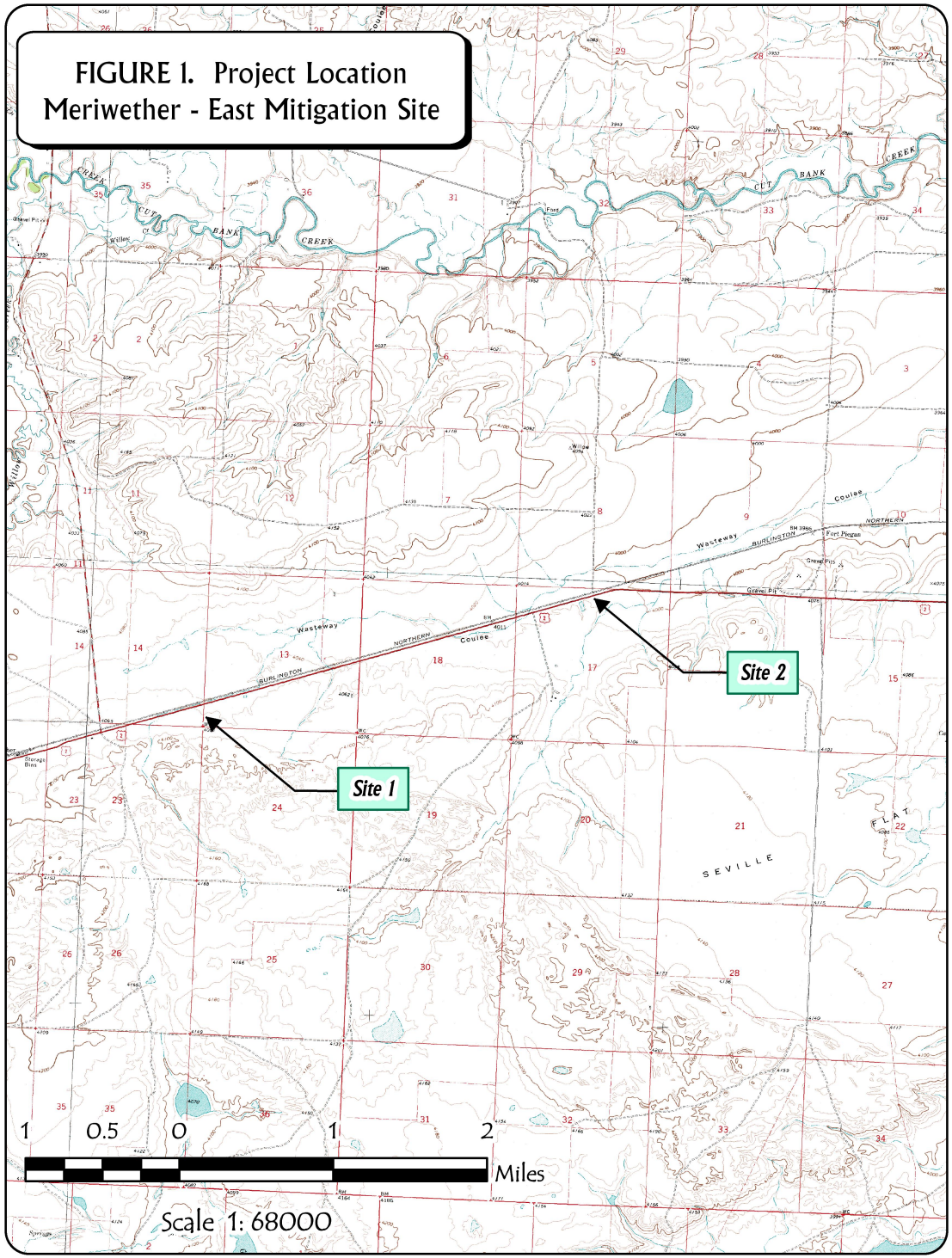
2.2 Hydrology

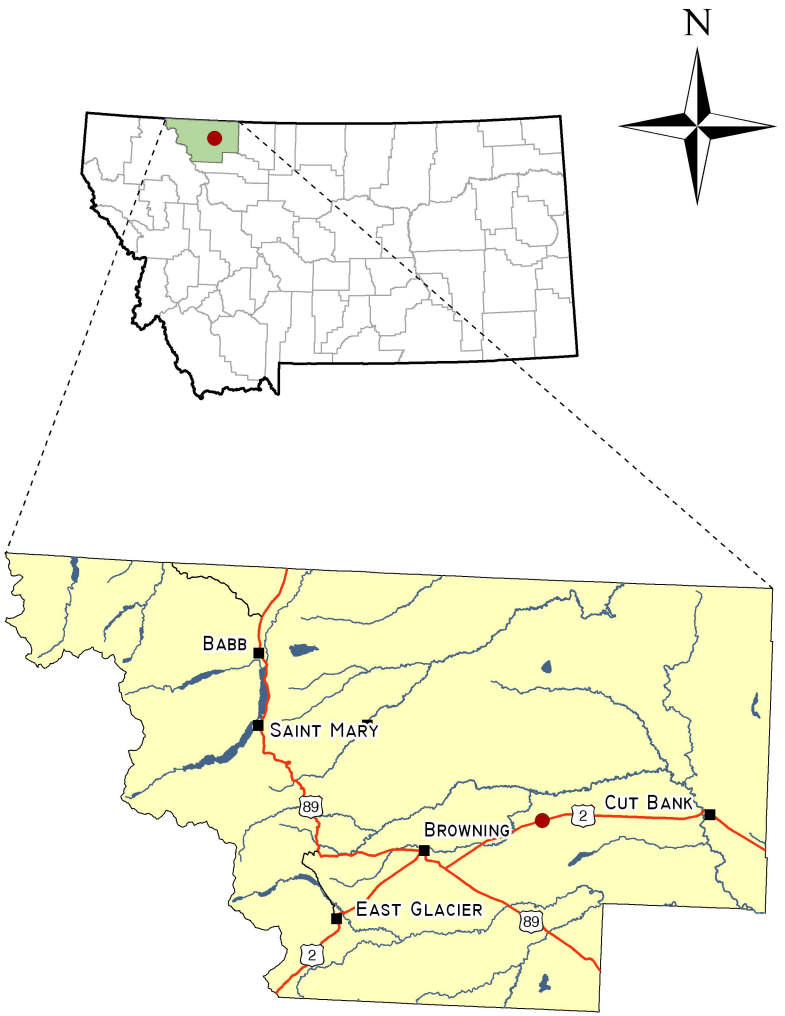
Wetland hydrology at both Sites 1 and 2 were to be provided via groundwater, seepage from the adjacent wetland, and direct precipitation. Impoundment areas are indicated on the proposed project plan sheets (**Figures 2** and **3** in **Appendix A**).

Hydrologic indicators were evaluated during the mid-season visit in 2006. Wetland hydrology indicators were recorded using procedures outlined in the COE 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Hydrology data were recorded onto COE Routine Wetland Delineation Data Forms (**Appendix B**).

There are no groundwater monitoring wells at the site. Groundwater depths were only documented if groundwater was located within 12 inches of the ground surface. Groundwater depths within soils pits were recorded onto COE Routine Wetland Delineation data forms (**Appendix B**).

FIGURE 1. Project Location
Meriwether - East Mitigation Site





PROJECT #: B43054.00 0309
DATE: November 2006
LOCATION: Meriwether East
PROJECT MANAGER: A. Pipp
DRAWN BY: MSA

PBS&J
801 N. Last Chance Gulch, Ste. 101 Helena, MT 59601

2.3 Vegetation

General dominant species-based vegetation community types were delineated on to the project plan sheets. Standardized community mapping was not employed as many of these systems are geared towards climax vegetation. Estimated percent cover of the dominant species in each community type was recorded on the Wetland Mitigation Site Monitoring Form (**Appendix B**).

A single 10-foot wide belt transect was sampled during the mid-season monitoring event at each site 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%).

Transect locations for each site are depicted on **Figures 2** and **3** in **Appendix A**. All data were recorded onto the Wetland Mitigation Site Monitoring Form (**Appendix B**). Transect photographs 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 Forms (**Appendix B**). The most current Natural Resources Conservation Service (NRCS) terminology was used to describe hydric soils (USDA 1998). The web soil survey was consulted to determine pre-construction soil types at the two sites (NRCS 2006).

2.5 Wetland Delineation

Wetland delineation was conducted during the mid-season visit according the 1987 COE Wetland Delineation Manual. All habitats 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**). Wetland delineation data collected during 2006 were compared to the pre-construction acreage of wetland in order to estimate that acreage of wetland created by each mitigation site.

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 the 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 list of wildlife species observed was created.

2.7 Birds

Bird observations were recorded during the site visit. No formal census plots, spot mapping, point counts, or strip transects were conducted. During the site visit, bird observations were recorded incidental to other monitoring activities. During all visits, observations were categorized by species, activity code, and general habitat association (**Monitoring Forms** in **Appendix B**). A comprehensive bird list was compiled using these observations. No birdhouses are currently located on the site.

2.8 Macroinvertebrates

No aquatic macroinvertebrate sample was collected from either site.

2.9 Functional Assessment

A functional assessment was completed using the 1999 MDT Montana Wetland Assessment Method (Berglund 1999). Field data necessary for this assessment were primarily collected during the mid-season site visit with the remainder of the functional assessment completed in the office. A Functional Assessment Form was completed for each wetland or groups of wetlands for Sites 1 and 2 (**Appendix B)**.

2.10 Photographs

Photographs were taken showing the current land use surrounding the site, the upland buffer, the monitored area, and each vegetation transect. One photograph point was established for each site(**Figure 2** in **Appendix A**). A panoramic photo was taken at this established point. A 2005 aerial photograph showing the landscape prior to construction of this project was obtained for each site area (NRIS 2006). A 2006 post-construction aerial photograph of Site 1 and Site 2 was not taken by MDT. All photographs pertaining to the project are in **Appendix C**.

2.11 GPS Data

During the 2006 site visit, a global positioning system (GPS) was used to mark the photograph point and transect start and end. Wetland boundaries were not located with GPS points, but were rather hand-mapped onto plan sheets.

2.12 Maintenance Needs

The boundaries of Site 1 and 2 were inspected for obvious signs of problems. This did not constitute an engineering-level structural inspection, but rather a cursory examination. Current or future potential problems were documented.

3.0 RESULTS

3.1 Hydrology

Hydrology at the Meriwether-East Mitigation Sites was designed to be supplied by groundwater seepage from adjacent wetlands and direct precipitation. Based on the period of record between December 1903 and July 2006, the mean annual precipitation at the Cut Bank weather station (#242173) was 11.45 inches (in) (WRCC 2006). The total precipitation received from January through July of 2006 was 2.70 in (WRCC 2006). The 2006 year was relatively drier than it was in 2005 (9.21), 2004 (4.57 in), and 2003 (3.63 in) (WRCC 2006). This seven month period in 2006 was also drier than the long-term January to July average of 7.94 in which has been calculated since 1903 (WRCC 2006).

Despite the relatively dry spring, a few individual storms resulted in significant precipitation. Flooding at Site 2 was documented by MDT on June 14, 2006 (**Photo 8** in **Appendix C**).

3.2 Vegetation

Vegetation community types are based on topography, hydrology, and plant composition. Vegetation community data and a list of plant species observed were recorded for each site separately (**Monitoring Forms** in **Appendix B**). A comprehensive plant list was also compiled (**Table 1**).

At Site 1 four vegetation communities were documented: Type 1 – *Transitional Upland*, Type 2 – *Disturbed Upland*, Type 3 – *Grassland Upland*, and Type 4 – *Wetland*. Types 1 and 2 occured within the created Site 1. Type 1 – *Transitional Upland* occupied a small depression that had ponded with water earlier in the season and contained a few clumps of both upland and wetland plants (**Photo 4** in **Appendix C**). The remainder of Site 1 was colonized by Type 2 – *Disturbed Upland* (**Photos 2** and **6** in **Appendix C**). Type 2 consisted of dense and diverse upland plant species, which had been seeded in Spring 2006 by MDT (**Photo 2** in **Appendix C**) (Johnson pers. comm.). Site 1 was seeded with the following species: Pryor slender wheatgrass (*Agropyron trachycaulum*), Critana thickspike wheatgrass (*A. dasystachyum*), Rosana western wheatgrass (*A. smithii*), Secar bluebunch wheatgrass (*A. spicatum*), Lodorm green needlegrass (*Stipa viridula*), rough fescue (*Festuca rubra*), prairie coneflower (*Ratibidacolumnifera*), and blanketflower (*Gaillardia aristata*) (Johnson pers. comm.). All of these plants are considered upland except for slender wheatgrass. Slender wheatgrass is a facultative (FAC) plant , meaning that it is as equally likely to occur in wetlands as it is non-wetlands (Reed 1988). In addition, kochia (*Kochia scoparia*), which is also a facultative plant was commonly found in Type 2. The site was seeded to insure that the area, which was dry at the time of seeding, would be colonized by vegetation (Johnson pers. comm.). Should the hydrology return to Site 1, wetland plants would colonize despite that upland plants had been planted (Johnson pers. comm.). In October of 2006, wetland seed was broadcasted over Site 1 by MDT and included alkali bulrush (*Scirpus maritmus*) and slough grass (Beckmannia syzigachne) (Johnson pers. comm.).

Table 1: ***Vegetation species observed in 2006 at the Meriwether-East Wetland Mitigation Site.***

Scientific Name	Region 9 (Northwest) Wetland Indicator
Agropyon trachycaulum	FAC
Agrostis alba	FACW
Agropyon spp.	---
Artemisia frigida	---
Aster adscendens (*A. chilensis*)	FAC
Aster (*pansus*)	FAC+
Bouteloua gracilis	---
Bromus tectorum	---
Carex praegracilis	FACW
Chenopodium spp.	---
Chenopodium glaucum	FAC
Chenopodium hybridum	---
Chenopodium leptophyllum	FACU
Chrysopsis villosa	---
Distichlis spicata	FAC+
Gaillardia aristata	---
Hordeum jubatum	FAC+
Juncus balticus	OBL
Juncus bufonius	FACW+
Kochia scoparia	FAC
Liatris punctata	---
Medicago sativa	---
Phleum pretense	FAC-
Plantago eriopoda	FACW
Poa pratensis	FACU+
Polygonum spp.	---
Pseudoroegneria spicata (*Agropyron spicatum*)	FACU-
Puccinellia nuttalliana	OBL
Ranunculus cymbalaria	OBL
Ratibida columnifera	---
Salicornia rubra	OBL
Setaria spp.	---
Sisymbrium spp.	---
Spergularia marina	OBL
Suaeda calceoliformis (*S. depressa*)	FACW-
Thlaspi arvense	--
Typha latifolia	OBL

Types 3 and 4 are undisturbed habitat that surround Site 1. Type 3 is upland grassland composed of wheatgrass, blue grama (*Bouteloua gracilis*), fringed sage (*Artemisia frigida*), kochia, and rangeland forbs. Type 3 borders Site 1 to the east and south. Type 4 is undisturbed wetland that was delineated (as #17) in October of 2002 by URS-BRW, Inc. (2003). Dominant plants found in Type 4 during August 2006 included Baltic rush (*Juncus balticus*), clustered field sedge (*Carex praegracilis*), wheatgrass, Kentucky bluegrass (*Poa pratensis*), foxtail barley (*Hordeum jubatum*), and long-leaved aster (*Aster adscendens*). Type 4 borders Site 1 to the north.

For Site 1, 2006 transect data (**Monitoring Forms** in **Appendix B**) was summarized in tabular format (**Table 2**) and graphically illustrated (**Charts 1** and **2)**. Photographs were taken at the

start and end of Transect 1 at Site 1 (**Photos 3** and **6** in **Appendix C**). Transect 1 traverses through three community types (**Chart 1**). Community Type 1 – *Transitional Upland* occupied the only depression found within Site 1 (**Photos 3** and **4** in **Appendix C**; **Chart 2**). This depression showed signs that water ponded earlier in the growing season and was colonized by both a wetland and an upland plant (**Monitoring Forms** in **Appendix B**). Approximately 90% of Transect 1 consisted of upland vegetation (**Chart 2**).

Table 2: ***Data summary for Transect 1 at Site 1 for the Meriwether-East Wetland Mitigation project.***

Monitoring Year	2006
Transect Length (feet)	160
# Vegetation Community Transitions along Transect	3
# Vegetation Communities along Transect	3
# Hydrophytic Vegetation Communities along Transect	0
Total Vegetative Species	17
Total Hydrophytic Species	3
Total Upland Species	14
Estimated % Total Vegetative Cover	75
% Transect Length Comprised of Hydrophytic Vegetation Communities	0
% Transect Length Comprised of Upland Vegetation Communities	100
% Transect Length Comprised of Unvegetated Open Water	0
% Transect Length Comprised of Bare Substrate	0

Chart 1: ***Transect map showing vegetation types of Transect 1 from start (0 feet) to end (160 feet) for Site 1 in 2006.***

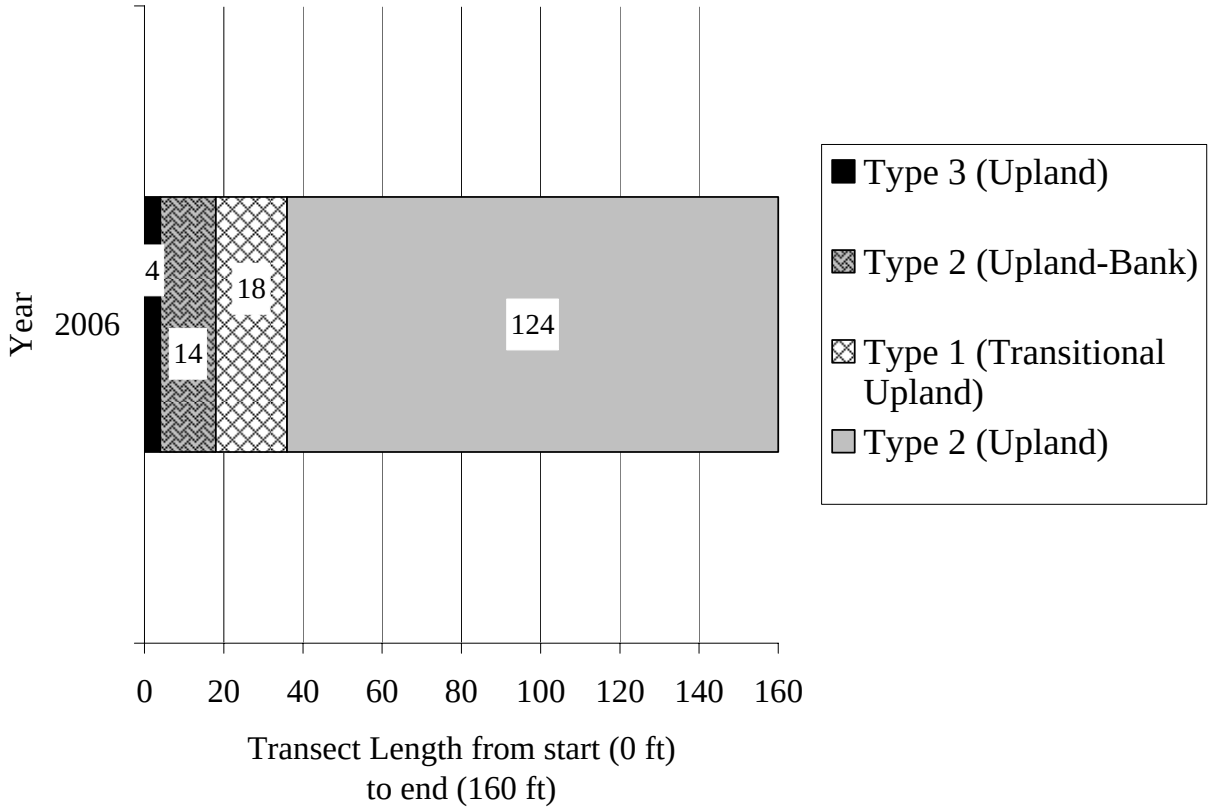
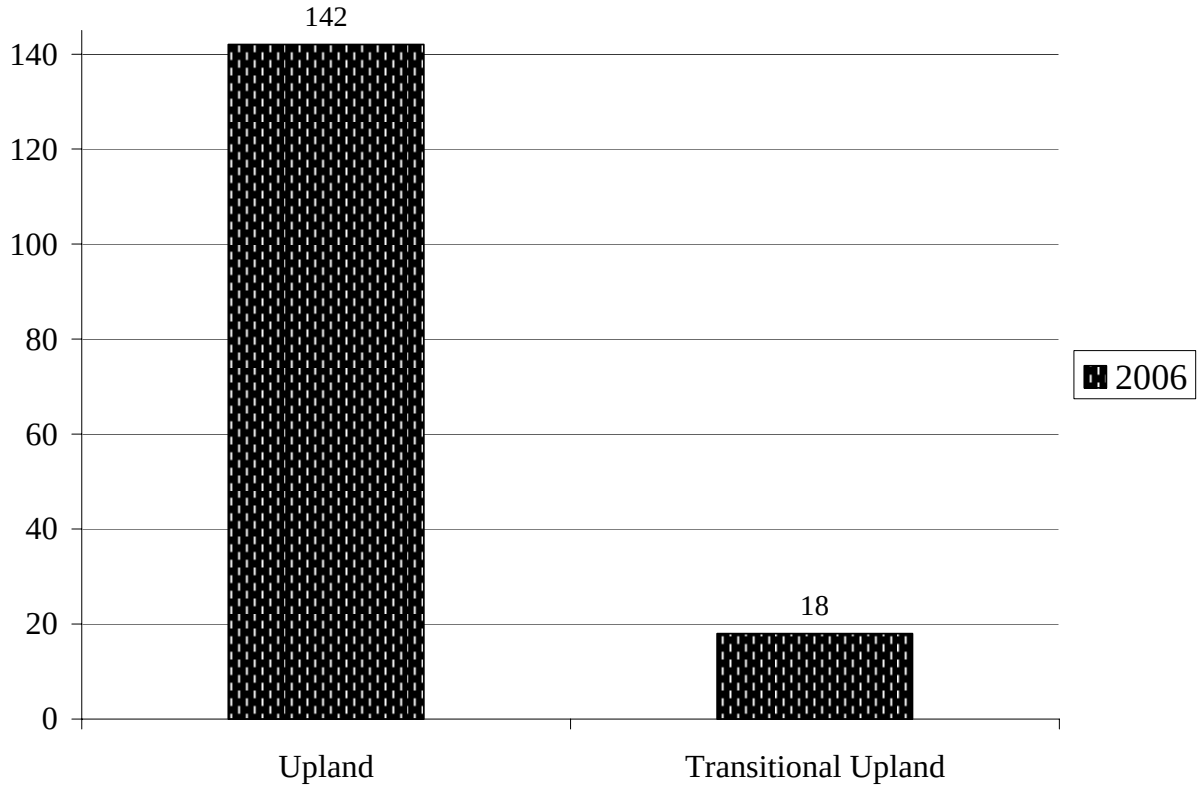


Chart 2: ***Total length of each vegetation community within Transect 1 at Site 1 in 2006.***



At Site 2, four vegetation community types were documented: Type 5 – *Wetland*, Type 6 – *Wetland*, Type 3 – *Grassland Upland*, and Type 7 – *Wetland*. In addition, areas of mudflat were mapped within Site 2. Type 5 – *Wetland* was dominated by the facultative oakleaf goosefoot (*Chenopodium glaucum*), but mixed with the facultative wetland and obligate broadleaf cattail (*Typha latifolia*) and Nuttall's alkali grass, respectively (**Photo 10** in **Appendix C**). Type 6 – *Wetland* was dominated by a facultative wetland plant, Pursh seepweed, and mixed with facultative plants of kochia and oakleaf goosefoot (**Photo 11** in **Appendix C**). Type 3 is grassland upland that borders Site 2 to the east. Type 7 is undisturbed wetland that was delineated (as #11) in October of 2002 by URS-BRW, Inc. (2003). Dominant plants found in Type 7 during August 2006 included Baltic rush, alkali bluegrass (*Poa juncifolia*), and Nuttall's alkali grass (**Photo 12** in **Appendix C**). Type 7 borders Site 2 to the east.

For Site 2, 2006 transect data (**Monitoring Forms** in **Appendix B**) were summarized in tabular format (**Table 3**) and graphically illustrated (**Charts 3** and **4)**. Photographs were taken at the start and end of the Transect 1 at Site 2 (**Photos 9** and **12**, **Appendix C**). Transect 1 traversed through dry bare ground, saturated mudflat, and three wetland communities (**Chart 3**). Two emergent wetland types accounted for 53% of the transect length (**Chart 4**). Mudflat colonized by a few sprigs of unidentifiable plants accounted for another 44% of Transect 1 (**Chart 4**). The remaining 3% of Transect 1 was erosion control matting with no plant growth (**Chart 4**). With one exception, noxious weeds were not present in and around Sites 1 and 2. Along the fence line between Site 1 and Highway 2, one spotted knapweed (*Centaurea maculosa*) plant was found. This plant had not seeded and was pulled and bagged.

Table 3: ***Data summary for Transect 1 at Site 2 for the Meriwether-East Wetland Mitigation project.***

Monitoring Year	2006
Transect Length (feet)	450
# Vegetation Community Transitions along Transect	7
# Vegetation Communities along Transect	5
# Hydrophytic Vegetation Communities along Transect	2
Total Vegetative Species	18
Total Hydrophytic Species	12
Total Upland Species	6
Estimated % Total Vegetative Cover	30
% Transect Length Comprised of Hydrophytic Vegetation Communities	53
% Transect Length Comprised of Upland Vegetation Communities	0
% Transect Length Comprised of Unvegetated Open Water / Mudflat	44
% Transect Length Comprised of Bare Substrate	3

Chart 3: ***Transect map showing vegetation types of Transect 1 from start (0 feet) to end (450 feet) for Site 2 in 2006.***

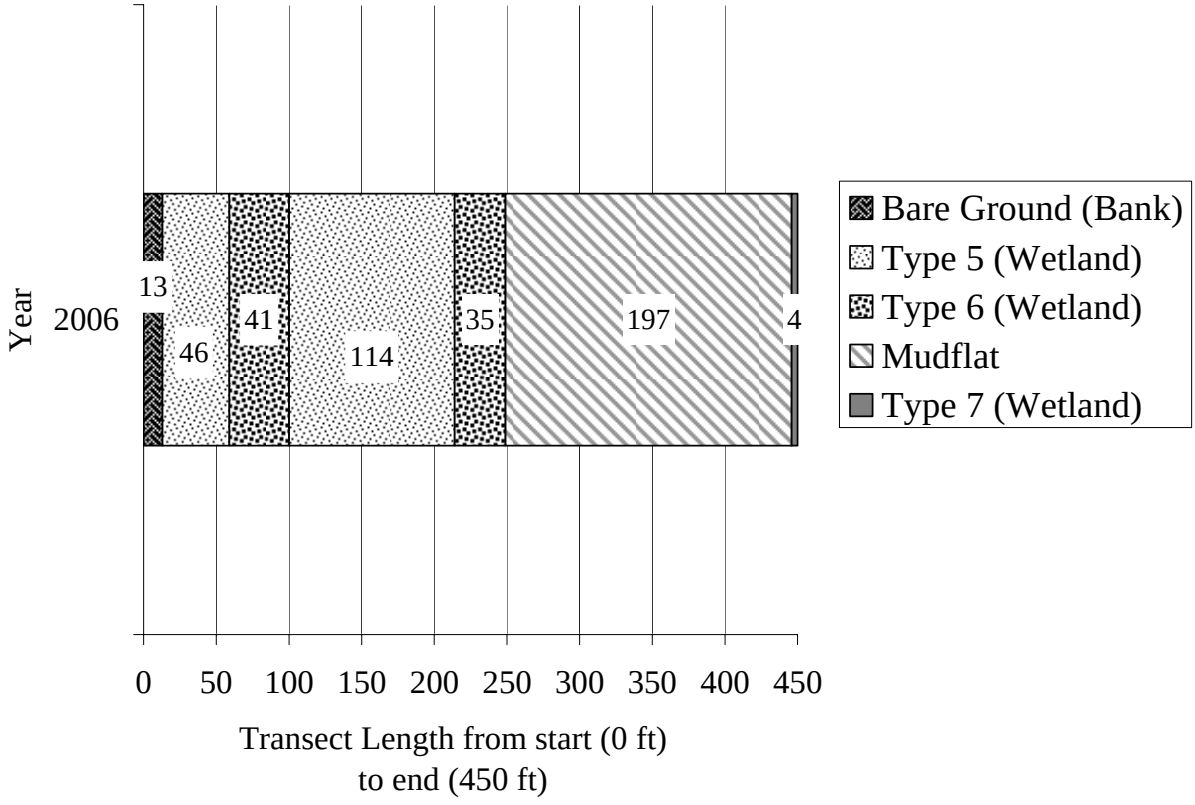
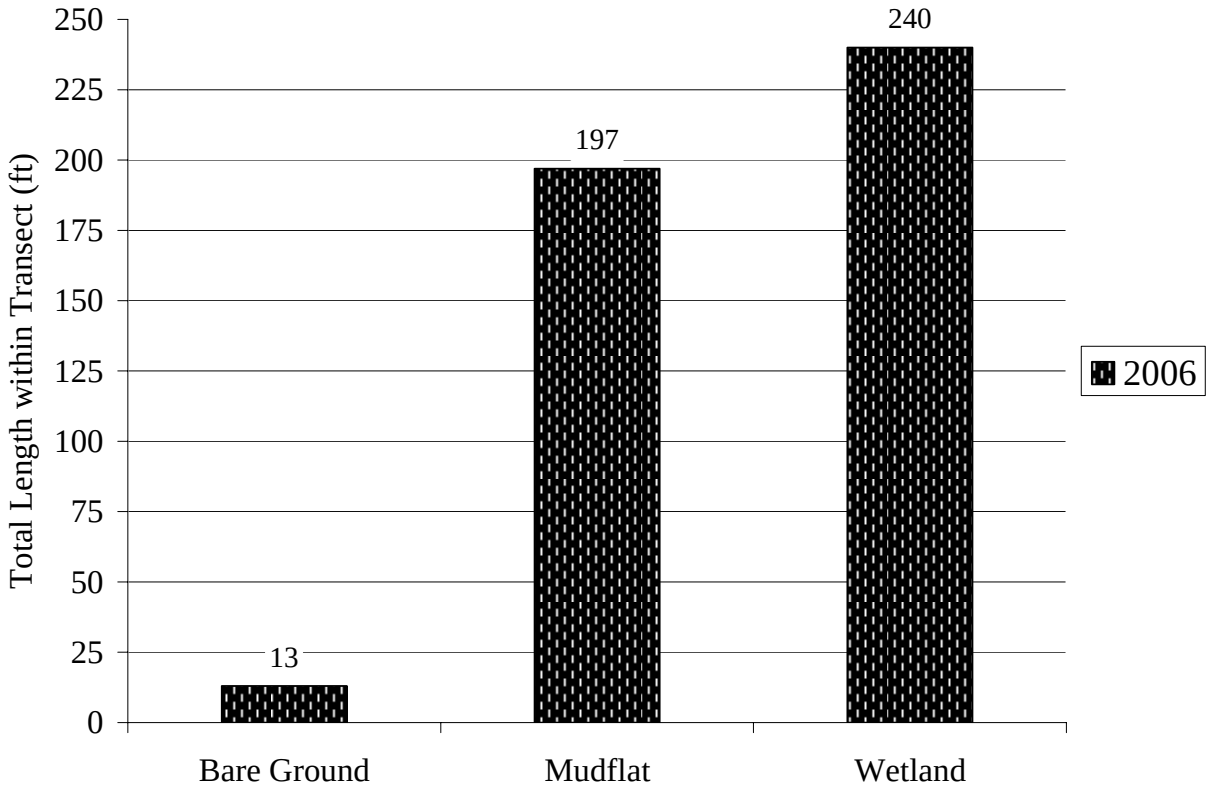


Chart 4: ***Total length of each vegetation community within Transect 1 at Site 2 in 2006.***



3.3 Soils

At Site 1 soils were mapped as Beaverton gravelly loam, 0-4% slopes, which are rated as well drained (NRCS 2006a). At Site 2 soils were mapped as Saline land, which was rated as poorly drained (NRCS 2006a). Neither of these soil types are considered hydric by the NRCS (NRCS 2006b). Excavation to create these sites has most likely removed a significant portion of these soil types.

In the depression along Transect 1 at Site 1, matrix soil colors were 10YR 4/3 with mottles of 2.5Y 4/2 and clay textures (**COE Forms** in **Appendix B**). Soils in the remainder of Site 1 were extremely dry, compacted, and difficult to dig. Consequently color and texture soil data were not recorded.

At Site 2 wetland matrix colors ranged from 2.5Y 5/2 to 10YR 3/2 with mottles ranging from 2.5Y 5/3 to 10YR 2/1 (**COE Forms** in **Appendix B**). At Site 2 soil texture was silty clay with and without gravels.

3.4 Wetland Delineation

Both sites were surveyed for wetlands. Site 1 contained no wetlands (**Figure 2** in **Appendix A**). However, it is anticipated that the Type 1 – *Transitional Upland* community may develop as wetland given adequate spring moisture in 2007 (**Figure 2** in **Appendix A**; **Table 4**). From only a vegetation perspective, wetland development within the Type 2 – *Upland* community has been set back due to planting of slender wheatgrass and colonization by numerous upland plants. This trend could reverse if the site can obtain and retain significant moisture.

Approximately 70% of Site 2 developed wetland characteristics for vegetation, soils, and hydrology (**Figure 3** in **Appendix A**; **Table 4**). The remaining approximate 30% of Site 2 is mudflat that has a very sparse presence of young and unidentifiable plant species (**Photo 7** in **Appendix A**; **Table 4**). 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. The boundary between wetland and mudflat was hand-delineated onto project plan sheets (**Figure 2** in **Appendix A**).

Table 4: ***Aerial coverage of aquatic habitats in 2006 for the Meriwether-East Wetland Mitigation Site.***

Aquatic Habitat	Site 1 (approximate acres)	Site 2 (approximate acres)
Emergent Wetland	0.00	4.63
Mudflat	0.00	1.99
TOTAL	**0.00**	**6.62**

3.5 Wildlife

A comprehensive list of wildlife species (from site observations or their sign) was compiled for Sites 1 and 2 (**Table 5**). Specific information on wildlife sightings at each of Site 1 and 2 can be found in the **Monitoring Forms** in **Appendix B**. Ungulate tracks were observed at both Sites 1 and 2 (**Monitoring Forms** in **Appendix B**). No birds were observed at Site 1 (**Monitoring Forms** in **Appendix B**). In contrast, foraging or nesting activity was displayed at Site 2 by American Avocet (*Recurvirostra americana*), Killdeer (*Charadrius vociferous*), Willet (*Catoptrophorus semipalmatus*), Wilson's Phalarope (*Phalaropus tricolor*), and an unidentified species of sparrow (**Monitoring Forms** in **Appendix B**). Numerous insects were also noted at Site 2 (see lower left corner of **Cover Photograph**).

Table 5: ***Fish and wildlife species observed at the Meriwether-East Wetland Mitigation Site in 2006.***

FISH None
AMPHIBIANS None
REPTILES None
BIRDS **American Avocet (*Recurvirostra americana*)** **Killdeer (*Charadrius vociferous*)** **Sparrow (unidentified species)** **Willet (*Catoptrophorus semipalmatus*)** **Wilson's Phalarope (*Phalaropus tricolor*)**
MAMMALS **Deer (*Odocoileus* spp.)** or **Pronghorn (*Antilocapra americana*)**

Bolded species were observed during 2006.

3.6 Macroinvertebrates

No aquatic macroinvertebrate sample was collected at Site 1 or Site 2. However, remnant pools on the mudflat were occupied by a large population of unidentified insects (see lower left corner of **Cover Photograph**).

3.7 Functional Assessment

A functional assessment was conducted for delineated wetlands at Site 2 (**Functional Assessment Form** in **Appendix B**). Site 2 rated as a Category III wetland (**Table 5**). Notable functions or values included Short and Long Term Water Storage and Groundwater Discharge/Recharge (**Table 6**).

3.8 Photographs

One photo point was established at Site 1 and at Site 2 (**Figures 2** and **3** in **Appendix A**). Panoramic photos were taken from these photo points (**Photo 1** and **7** in **Appendix C**). Representative single frame photographs were taken of the transect and conditions within Site 1 (**Photos 1** through **6**) and within Site 2 (**Photos 7** through **12**) (**Appendix C**). No aerial photograph was taken of the project site after construction by MDT. However, the approximate location of Sites 1 and 2 were drawn onto a 2005 pre-construction aerial photograph (**Photos 13** and **14** in **Appendix C)** (NRIS 2006).

3.9 Maintenance Needs/Recommendations

The dikes were surveyed for erosion problems in 2006. The dikes were covered evenly with erosion control fabric and no erosion problems were found.

Table 6: ***Summary of 2006 wetland function/value ratings and functional points at Site 2 of the Meriwether-East Wetland Mitigation Site.***

Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method[1]	2006 Site 2
Listed/Proposed T&E Species Habitat	Low (0.0)
MTNHP Species Habitat	Low (0.0)
General Wildlife Habitat	Mod (0.5)
General Fish/Aquatic Habitat	NA
Flood Attenuation	Mod (0.5)
Short and Long Term Surface Water Storage	High (0.9)
Sediment, Nutrient, Toxicant Removal	Mod (0.7)
Sediment/Shoreline Stabilization	NA
Production Export/Food Chain Support	Mod (0.6)
Groundwater Discharge/Recharge	High (1.0)
Uniqueness	Low (0.3)
Recreation/Education Potential	Low (0.3)
Actual Points/Possible Points	4.8 / 10
% of Possible Score Achieved	48%
Overall Category	III
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries (ac)	**6.62**
Functional Units (acreage x actual points)	**31.78**

3.10 Current Credit Summary

No specific performance criteria were required to be met at this site in order to document its success. Based on the first year, Site 1 will be slow to develop wetland characteristics while Site 2 has strongly developed wetland. Hydrology will be key to driving the development and maintenance of wetland habitat.

No wetland or other aquatic habitat developed at Site 1 (**Figure 2** in **Appendix A**; **Table 4**). Approximately 4.63 acres of wetland and 1.99 acres of mudflat, for a total of 6.62 acres of aquatic habitat, developed at Site 2 (**Figure 3** in **Appendix A**; **Table 4**). Consequently 6.62 acres is the maximum assignable credit at Site 2 as of 2006.

No wetlands were present prior to construction of the Meriwether-East Mitigation Site. The goal is to create 9.29 acres of wetland habitat at Sites 1 and 2. In monitoring year 1, 50% of this area had developed as wetland while another 21% had developed as mudflat. The quality of these aquatic habitats equated to a gain of 31.78 functional units (**Table 5**).

4.0 REFERENCES

Berglund, J. 1999. *MDT Montana Wetland Assessment Method*. May 25th. Prepared for Montana Department of Transportation and Morrison-Maierle, Inc. Prepared by Western EcoTech. Helena, Montana. 18 pp.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. U.S. Army Corps of Engineers. Washington, DC.

Seibert, C. 2006. MONT Herbarium Collections Manager and MT Extension Plant Taxonomist, Montana State University Herbarium, Bozeman, Montana. November 8th. Verified grass collected at the Meriwether-East Wetland Mitigation Site 1 on August 8th.

Johnson, P. 2006. Botanist, Montana Department of Transporation, Helena, Montana. Phone conversation on December 12th.

Montana Natural Resources Information Service (NRIS). 2006. 2005 Aerial photograph of the Meriwether-East Wetland Mitigation Sites 1 and 2. Downloaded on July 12th from http://maps2.nris.mt.gov.

Natural Resources Conservation Service (NRCS). 1998. *Field Indicators of Hydric Soils in the United States*, Version 4. G. Hurt, P. Whited and R. Pringle (eds.). USDA, NRCS Fort Worth, Texas.

Natural Resources Conservation Service (NRCS). 2006a. Soils information for the Meriwether-East Mitigation Site. Obtained on August 10th and 15th from the Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app).

Natural Resources Conservation Service (NRCS). 2006b. Hydric Soils for Montana. Obtained on November 14th from the Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app).

URS-BRW Inc. 2003. *Biological Resources Report for Meriwether-East (NH 1-3(36)234F, Control Number B594)*. Prepared for Montana Department of Transportation, Helena, Montana. July.

Reed, P.B. 1988. *National list of plant species that occur in wetlands: North West (Region 9).* Biological Report 88(26.9), May 1988. U.S. Fish and Wildlife Service, Washington, D.C.

Western Regional Climate Center (WRCC). 2006. Precipitation data for Cut Bank weather station, Montana (#242173). Obtained from *http://www.wrcc.dri.edu/CLIMATEDATA.html* on November 1st.

Appendix A

FIGURES 2 & 3

MDT Wetland Mitigation Monitoring
Meriwether-East
Glacier County, Montana

FIGURE 2. MERIWETHER-EAST WETLAND MITIGATION SITE 1.
Figure is not to scale.

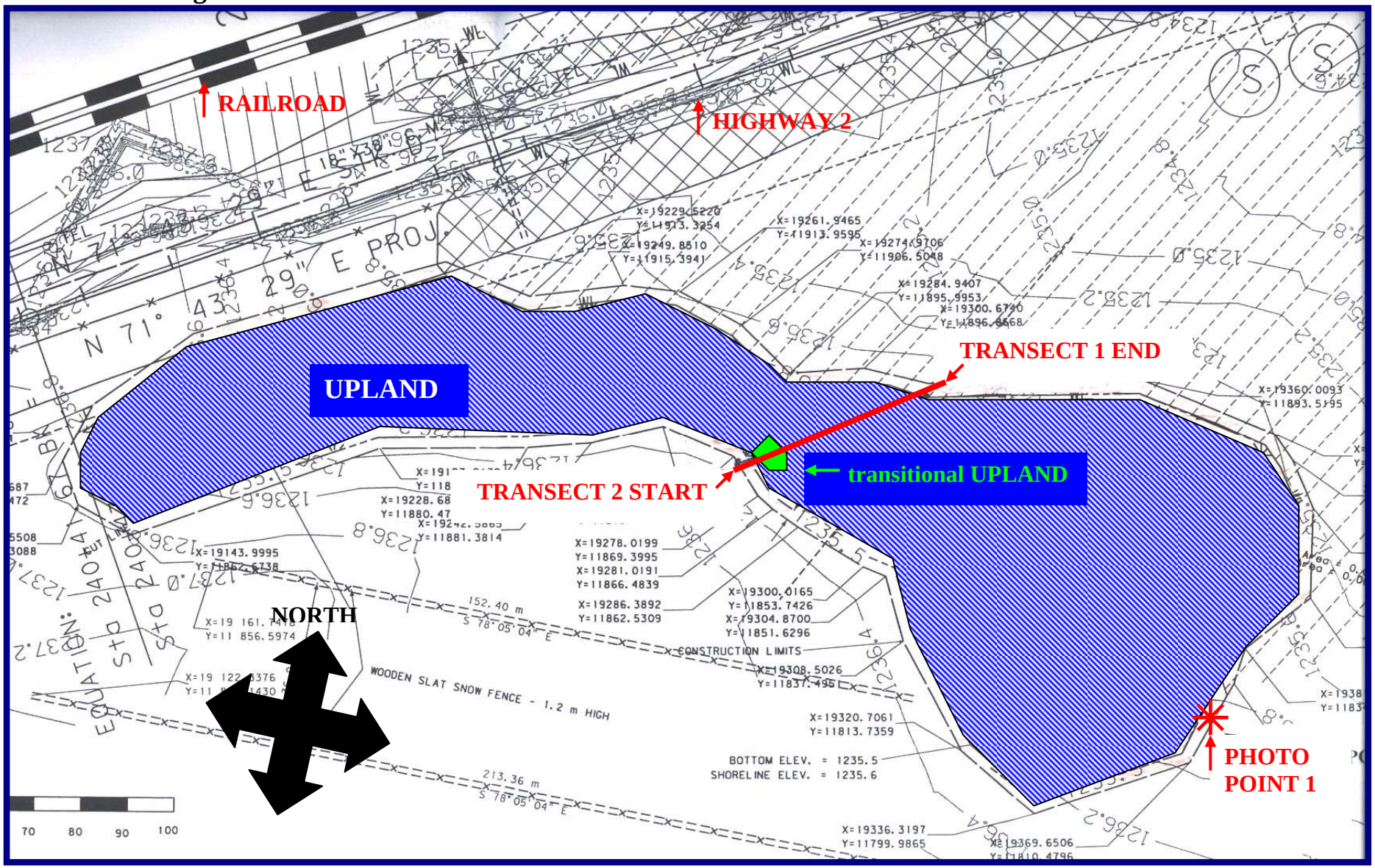
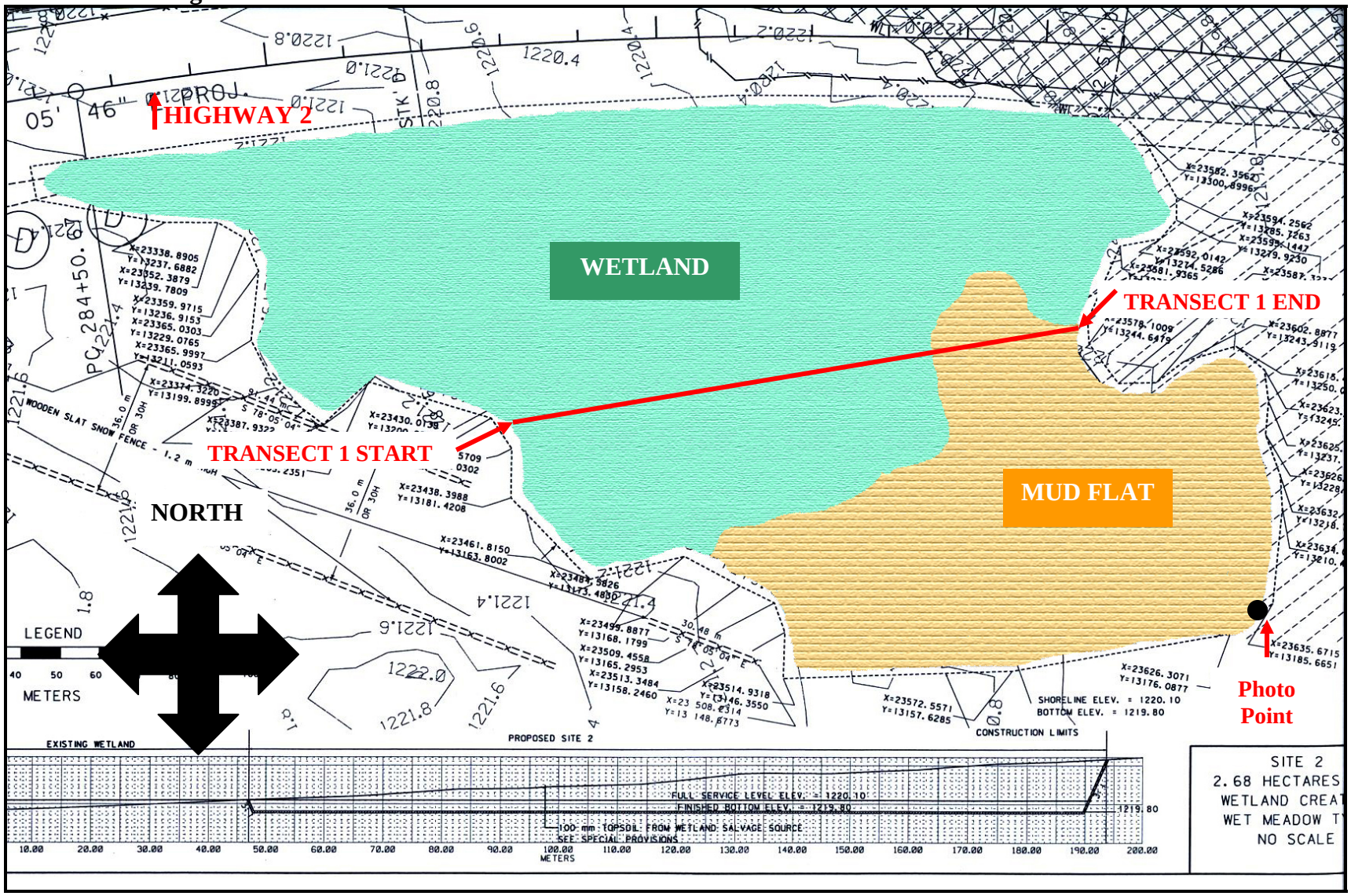


FIGURE 3. MERIWETHER-EAST WETLAND MITIGATION SITE 2.

Figure is not to scale.



Appendix B

2006 WETLAND MITIGATION SITE MONITORING FORMS
2006 BIRD SURVEY FORM
2006 COE WETLAND DELINEATION FORMS
2006 MDT FUNCTIONAL ASSESSMENT FORM

MDT Wetland Mitigation Monitoring
Meriwether-East
Glacier County, Montana

LWC / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **Meriwether-East, Site 1** Project Number: **B43054.00-0310**
Assessment Date: **August 8, 2006** Person(s) conducting the assessment: **Andrea Pipp**
Location: **Highway 2, west of Cut Bank** MDT District: **Great Falls** Milepost: _____
Legal Description: T **33N** R **9W** Section **14 T 33N R 9W** Section **13**
Weather Conditions: **partial sunny, calm, 95degrees** Time of Day: **1330 - 1600**
Initial Evaluation Date: **August 8, 2006** Monitoring Year: **2006** # Visits in Year: **1**
Size of evaluation area: **2.67 acres** Land use surrounding wetland: **highway, railroad, & rangeland**

HYDROLOGY

Surface Water Source: **groundwater & precipitation**
Inundation: **Absent** Average Depth: _____ Range of Depths: _____
Percent of assessment area under inundation: **0%**
Depth at emergent vegetation-open water boundary: **0 feet**
If assessment area is not inundated then are the soils saturated within 12 inches of surface: **No**
Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc.):
One low spot within site had cracked soil and moist soil from 5-12 inches.

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:

_____

VEGETATION COMMUNITIES

Community Number: **1** Community Title (main spp): **Type 1 - Transitional Upland**

Dominant Species	% Cover	Dominant Species	% Cover
Juncus balticus	+ = < 1%		
Polygonum spp.	+ = < 1%		
Phleum pratense	+ = < 1%		

Comments / Problems: **Surface soils were cracked 1/2 inch and were moist from 5-12 inches.**

Community Number: **2** Community Title (main spp): **Type 2 - Disturbed Upland**

Dominant Species	% Cover	Dominant Species	% Cover
Ratibida columnifera	1 = 1-5%	Sisymbium spp.	2 = 6-10%
Agropyron trachycaulum	4 = 21-50%	Hordeum jubatum	+ = < 1%
Gaillardia aristata	1 = 1-5%		
Pseudoroegneria spicata	2 = 6-10%		
Medicago sativa	1 = 1-5%		
Kochia scoparia	3 = 11-20%		

Comments / Problems: _____

Community Number: **3** Community Title (main spp): **Type 3 - Grassland Upland**

Dominant Species	% Cover	Dominant Species	% Cover
Artemisia frigida	1 = 1-5%	Chenopodium spp.	1 = 1-5%
Kochia scoparia	4 = 21-50%		
Bouteloua gracilis	2 = 6-10%		
Chrysopsis villosa	2 = 6-10%		
Liatris punctata	2 = 6-10%		
Agropyron spp.	2 = 6-10%		

Comments / Problems: _____

Community Number: **4** Community Title (main spp): **Type 4 - Wetland #17**

Dominant Species	% Cover	Dominant Species	% Cover
Juncus balticus	4 = 21-50%		
Carex praegracilis	2 = 6-10%		
Poa pratensis	2 = 6-10%		
Hordeum jubatum	2 = 6-10%		
Aster adscendens	4 = 21-50%		

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)
Hordeum jubatum	2, 4		
Pseudoroegneria spicata	2		
Agropyron trachycaulum	2		
Poa pratensis	2, 4		
Bromus tectorum	2, 4		
Phleum pratense	1		
Kochia scoparia	2, 3		
Gaillardia aristata	2		
Ratibida columnifera	2		
Medicago sativa	2		
Thlaspi arvense	2		
Sisymbium spp.	2		
Polygonum spp.	1		
Artemisia frigida	3		
Juncus balticus	1, 2		
Chrysopsis vollosa	3		
Chenopodium spp.	3		
Agropyron spp.	2, 3		

Comments / Problems: _____

PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number Observed	Mortality Causes
NONE			

Comments / Problems: _____

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
deer or pronghorn		☒	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	

Additional Activities Checklist:
NA Macroinvertebrate Sampling (if required)

Comments / Problems: _____

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: _____

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: _____

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: _____

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? **NA**
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? **NA**
If yes, are the structures working properly and in good working order? **NA**
If no, describe the problems below.

Comments / Problems: _____

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Meriwether-East Site 1** Date: **August 8, 2006** Examiner: **A. Pipp**
Transect Number: **T-1** Approximate Transect Length: **160 feet** Compass Direction from Start: **64˚** Note: **compass at 0 degrees decl.**

Vegetation Type A: **Type 3- Grassland Upland**	
Length of transect in this type: 0 - 3.5 feet	
Plant Species	**Cover**
Artemisia frigida	1 = 1-5%
Kochia scoparia	4 = 21-50%
Bouteloua gracilis	2 = 6-10%
Chrysopsis villosa	2 = 6-10%
Liatris punctata	2 = 6-10%
Agropyron spp.	2 = 6-10%
Chenopodium spp.	1 = 1-5%
Total Vegetative Cover:	90%

Vegetation Type B: **Type 2 - Upland (Bank)**	
Length of transect in this type: 3.5 - 17.8 feet	
Plant Species	**Cover**
Agropyron spp.	4 = 21-50%
Medicago sativa	1 = 1-5%
Sisymbium spp.	1 = 1-5%
Total Vegetative Cover:	40%

Vegetation Type C: **Type 1 - Transitional Upland**	
Length of transect in this type: 17.8 - 35.5 feet	
Plant Species	**Cover**
Phleum pratense	+ = < 1%
Polygonum	+ = < 1%
Juncus balticus	+ = < 1%
Total Vegetative Cover:	1%

Vegetation Type D: **Type 2 - Disturbed Upland**	
Length of transect in this type: 35.5-160 feet	
Plant Species	**Cover**
Agropyron trachycaulum	4 = 21-50%
Pseudoroegneria spicata	2 = 6-10%
Ratibida columnifera	1 = 1-5%
Gaillardia aristata	1 = 1-5%
Kochia scoparia	3 = 11-20%
Medicago sativa	2 = 6-10%
Total Vegetative Cover:	85%

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): **0%**

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: **Transect goes through lowest point in Site 1. This low point ponded water earlier in the season and had one wetland plant emerging within it. Most of the site is upland as it did not show signs of ponding water and had soils too hard to dig. An upland wheatgrass (A. trachycaulum) was planted throughout Site 1.**

BIRD SURVEY – FIELD DATA SHEET

Site: **Meriwether-East, Site 1** Date: **8/8/06**
Survey Time: **1030 am** to **1300 pm**

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
None observed							

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: **95 degrees, calm air, slightly overcast sky.**

Notes:

LWC / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **Meriwether-East, Site 2** Project Number: **B43054.00-0310**
Assessment Date: **August 8, 2006** Person(s) conducting the assessment: **Andrea Pipp**
Location: **Highway 2, west of Cut Bank** MDT District: **Great Falls** Milepost: _____
Legal Description: T **33N** R **8W** Section **8**
Weather Conditions: **partial sunny, calm, 95degrees** Time of Day: **1330 - 1600**
Initial Evaluation Date: **August 8, 2006** Monitoring Year: **2006** # Visits in Year: **1**
Size of evaluation area: **6.62 acres** Land use surrounding wetland: **highway, railroad, & rangeland**

HYDROLOGY

Surface Water Source: **groundwater & precipitation**
Inundation: **Present** Average Depth: **0.4 feet** Range of Depths: **0-6 in.**
Percent of assessment area under inundation: **0.5%**
Depth at emergent vegetation-open water boundary: **0 feet**
If assessment area is not inundated then are the soils saturated within 12 inches of surface: **Yes**
Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc.):
cracked soil; salt deposits on the soil surface.

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:

VEGETATION COMMUNITIES

Community Number: **5** Community Title (main spp): **Type 5 - Wetland**

Dominant Species	% Cover	Dominant Species	% Cover
Juncus balticus	+ = < 1%	Hordeum jubatum	1 = 1-5%
Ranunculus	+ = < 1%		
Spergularia marina	+ = < 1%		
Chenopodium glaucum	3 = 11-20%		
Typha latifolia	2 = 6-10%		
Puccinellia nuttalliana	1 = 1-5%		

Comments / Problems: **Surface soils were saturated, light colored, and covered with salt deposition.**

Community Number: **6** Community Title (main spp): **Type 6 - Wetland**

Dominant Species	% Cover	Dominant Species	% Cover
Puccinellia nuttalliana	+ = < 1%	Agropyron	+ = < 1%
Chenopodium glaucum	3 = 11-20%		
Hordeum jubatum	+ = < 1%		
Chenopodium leptophyllum	2 = 6-10%		
Suaeda depressa	4 = 21-50%		
Kochia scoparia	4 = 21-50%		

Comments / Problems: **Surface soils were darker colored with no salt deposition.**

Community Number: **3** Community Title (main spp): **Type 3 - Grassland Upland**

Dominant Species	% Cover	Dominant Species	% Cover
Artemisia frigida	1 = 1-5%		
Kochia scoparia	4 = 21-50%		
Bouteloua gracilis	2 = 6-10%		
Chrysopsis villosa	2 = 6-10%		
Liatris punctata	2 = 6-10%		
Agropyron spp.	2 = 6-10%		

Comments / Problems: _____

Community Number: **7** Community Title (main spp): **Type 7 - Wetland #11**

Dominant Species	% Cover	Dominant Species	% Cover
Poa juncifolia	4 = 21-50%		
Juncus balticus	4 = 21-50%		
Puccinellia nuttalliana	+ = < 1%		
Agropyron spp.	+ = < 1%		
Aster (pansus)	+ = < 1%		

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)
Hordeum jubatum	5, 6		
Puccinellia nuttalliana	5, 6		
Agropyron spp.	6		
Distichlis spicata	5		
Setaria spp.	5, 6		
Chenopodium glaucum	5, 6		
Kochia scoparia	6		
Chenopodium leptophyllum	6		
Suaeda depressa	6		
Spergularia marina	5		
Ranunculus cymbalaria	5		
Salicornia rubra	5		
Juncus balticus	5		
Juncus bufonius	5		
Typha latifolia	5		
Aster (pansus)	7		
Chenopodium hybridum	5, 6		

Comments / Problems: _____

PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number Observed	Mortality Causes
NONE			

Comments / Problems: _____

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
deer or pronghorn		☒	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	

Additional Activities Checklist:
NA Macroinvertebrate Sampling (if required)

Comments / Problems: No sampling occurred; however, insects were numerous in particular microsites. Around puddles were numerous winged insects that hung out on the moist soil; they would move away when approached.

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: _____

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: _____

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: _____

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? **NA**
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? **NA**
If yes, are the structures working properly and in good working order? **NA**
If no, describe the problems below.

Comments / Problems: _____

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Meriwether-East Site 2** Date: **August 8, 2006** Examiner: **A. Pipp**
Transect Number: **T-1** Approximate Transect Length: **500 feet** Compass Direction from Start: **59˚** Note: **compass at 0 degrees decl.**

Vegetation Type A: **Bank covered with erosion control**	
Length of transect in this type: 0 - 12.5 feet	
Plant Species	**Cover**
none	
Total Vegetative Cover:	%

Vegetation Type B: **Type 5 - Wetland**	
Length of transect in this type: 12.5 - 59.0 feet	
Plant Species	**Cover**
Puccinellia nuttalliana	3 = 11-20%
Hordeum jubatum	1 = 1-5%
Ranunculus cymbalaria	+ = < 1%
Typha latifolia (very young)	+ = < 1%
Juncus balticus	+ = < 1%
Juncus bufonius	+ = < 1%
Spergularia marina	+ = < 1%
Total Vegetative Cover:	20%

Vegetation Type C: **Type 6 - Wetland**	
Length of transect in this type: 59.0 - 100.0 feet	
Plant Species	**Cover**
Puccinellia nuttalliana	+ = < 1%
Chenopodium glaucum	1 = 1-5%
Hordeum jubatum	+ = < 1%
Kochia scoparia	2 = 6-10%
Chenopodium leptophyllum	1 = 1-5%
Suaeda depressa	4 = 21-50%
Distichlis spicata	+ = < 1%
Agropyron sp.	+ = < 1%
Total Vegetative Cover:	70%

Vegetation Type D: **Type 5 - Wetland**	
Length of transect in this type: 100.0 - 214.0 feet	
Plant Species	**Cover**
Polygonum (douglassii?)	+ = < 1%
Chenopodium glaucum	1 = 1-5%
Hordeum jubatum	+ = < 1%
Spergularia marina	1 = 1-5%
Puccinellia nuttalliana	1 = 1-5%
Unknown grass (fat leaves)	+ = < 1%
Total Vegetative Cover:	10%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Site 2** Date: **August 8, 2006** Examiner: **A. Pipp**
Transect Number: **T-1** Approximate Transect Length: **500 feet** Compass Direction from Start: **59˚** Note: **compass at 0 degrees decl.**

Vegetation Type E: **Type 2 - Wetland**	
Length of transect in this type: 214.0 - 249.0 feet	
Plant Species	**Cover**
Puccinellia nuttalliana	1 = 1-5%
Hordeum jubatum	+ = < 1%
Chenopodium glaucum	3 = 11-20%
Kochia scoparia	3 = 11-20%
Suaeda depressa	3 = 11-20%
Plantago eriopoda	+ = < 1%
Total Vegetative Cover:	60%

Vegetation Type F: **Mudflat**	
Length of transect in this type: 249.0 - 446.0 feet	
Plant Species	**Cover**
Hordeum jubatum (1 little sprig)	+ = < 1%
Puccinellia nuttalliana (1 little sprig)	+ = < 1%
Total Vegetative Cover:	1%

Vegetation Type G: **Type 7 - Wetland 17**	
Length of transect in this type: 446.0 - 500.0 feet	
Plant Species	**Cover**
Poa juncifolia	4 = 21-50%
Juncus balticus	4 = 21-50%
Puccinellia nuttalliana	+ = < 1%
Agropyron sp.	+ = < 1%
Aster (pansus?) white/hairy	+ = < 1%
Total Vegetative Cover:	90%

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

MDT WETLAND MONITORING – VEGETATION TRANSECT

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

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

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

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

Comments: **75% is wetland while 25% is mudflat.**

BIRD SURVEY – FIELD DATA SHEET

Site: **Meriwether-East, Site 2** Date: **8/8/06**
Survey Time: **1330 am** to **1600 pm**

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Willet	2	L N	MA				
American Avocet	1	F	MA				
Wilson's Phalarope	2	F	MA OW				
Killdeer	1	F	MA				
sparrows	10	F FO	MA				

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: **95 degrees, calm air, slightly overcast sky.**

Notes: **All shorebirds were on the eastern end of the wetland where vegetation is sparse, insects were present in wet mud, and puddles occurred. The phalaropes were swimming and splashing in shallow puddles of about 6 inches deep (OW). The willets flushed from the same spot, but did not see nest (could have been missed).**

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

Project/Site: Meriwether-East	**Project No:** B43054	**Date:** 8-Aug-2006
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Andrea Pipp		**State:** Montana
		Plot ID: Plot 1 (2006)

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

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Juncus balticus	Herb	OBL	*Phleum pratense*	Herb	FACU
Rush,Baltic			Timothy		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 1/2 = 50.00%

FAC Neutral: 1/2 = 50.00%
Numeric Index: 5/2 = 2.50

Remarks:
An unknown and young Polygonum species was also present.

HYDROLOGY

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

YES **No Recorded Data**

Field Observations

- **Depth of Surface Water:** N/A *(in.)*
- **Depth to Free Water in Pit:** N/A *(in.)*
- **Depth to Saturated Soil:** > 13 *(in.)*

Wetland Hydrology Indicators

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

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

Remarks:
Soil surface is cracked about 1/2 inch deep. Soil was dry and crumbly from 0-5 inches while it was moist from 5-12 inches.

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

Project/Site: Meriwether-East	**Project No:** B43054	**Date:** 8-Aug-2006
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Andrea Pipp		**State:** Montana
		Plot ID: Plot 1 (2006)

SOILS

Map Unit Name (Series and Phase): Beaverton gravelly loam, 0-4% slopes
Map Symbol: Bh **Drainage Class:** well drained **Mapped Hydric Inclusion?**
Taxonomy (Subgroup): Lo-skeletal, mix superactive Typic Argib **Field Observations Confirm Mapped Type?** Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-5	A	10YR4/3	N/A	N/A	N/A	Clay
5-9	B	2.5Y4/2	10YR3/1	Few	Prominent	Clay

Hydric Soil Indicators:

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

Remarks:

WETLAND DETERMINATION

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

Remarks:
Type 1 is a depression that collected water earlier in the spring. However saturated soils were not present in August. Vegetation was very sparse with both an upland and a wetland plant present. Hydric soils were present. Type 1 did not meet wetland criteria for hydrology or plants in 2006.

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

Project/Site: Meriwether-East	**Project No:** B43054	**Date:** 8-Aug-2006	
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier	
Investigators: Andrea Pipp		**State:** Montana	
		Plot ID: Plot 2 (2006)	

Do Normal Circumstances exist on the site? (Yes) No	**Community ID:** Emergent	
Is the site significantly disturbed (Atypical Situation:)? Yes (No)	**Transect ID:** Site 2	
Is the area a potential Problem Area? Yes (No)	**Field Location:**	
(If needed, explain on the reverse side)	In Type 5 on Transect 1 at Site 2.	

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Puccinellia nuttalliana	Herb	OBL	*Juncus balticus*	Herb	OBL
Grass,Nuttall's Alkali			Rush,Baltic		
Hordeum jubatum	Herb	FAC+	*Ranunculus cymbalaria*	Herb	OBL
Barley,Fox-Tail			Butter-Cup,Seaside		
Typha latifolia	Herb	OBL	*Spergularia marina*	Herb	OBL
Cattail,Broad-Leaf			Sandspurry,Saltmarsh		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 6/6 = 100.00%
FAC Neutral: 5/5 = 100.00%
Numeric Index: 8/6 = 1.33

Remarks:

HYDROLOGY

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

YES **No Recorded Data**

Field Observations

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

Wetland Hydrology Indicators

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

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

Remarks:
Soil surface has salt deposition and is cracked 1/4 inch deep.

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

Project/Site: Meriwether-East	**Project No:** B43054	**Date:** 8-Aug-2006	
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier	
Investigators: Andrea Pipp		**State:** Montana	
		Plot ID: Plot 2 (2006)	

SOILS

Map Unit Name (Series and Phase): Saline land
Map Symbol: SA **Drainage Class:** Poorly drained
Taxonomy (Subgroup): Montmorillonitic, frigid Ustic Torriorth
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-8	A	2.5Y5/2	2.5Y5/3 7.5YR5/8	Many Few	Faint Prominent	Silty clay, gravels
0-3	A	10YR4/2	N/A	N/A	N/A	Silty clay
3-12	B	2.5Y4/1	7.5YR5/8 10YR2/1	Many Many	Prominent Prominent	Silty clay

Hydric Soil Indicators:

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

Remarks:
Dug two soil pits in each 'Wetland Type 5' community along Transect 1.

WETLAND DETERMINATION

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

Remarks:

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

Project/Site: Meriwether-East	**Project No:** B43054	**Date:** 8-Aug-2006
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Andrea Pipp		**State:** Montana
		Plot ID: Plot 3 (2006)

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:** Site 2
Is the area a potential Problem Area? (If needed, explain on the reverse side)	Yes (No)	**Field Location:** In Type 6 on Transect 1 of Site 2.

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Kochia scoparia	Herb	FAC	*Chenopodium glaucum*	Herb	FAC
Summer-Cypress,Mexican			Goosefoot,Oakleaf		
Hordeum jubatum	Herb	FAC+	*Chenopodium leptophyllum*	Herb	FACU
Barley,Fox-Tail			Goosefoot,Narrow-Leaf		
Puccinellia nuttalliana	Herb	OBL	*Suaeda depressa*	Herb	FACW-
Grass,Nuttall's Alkali			Seepweed,Pursh		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 5/6 = 83.33%	**FAC Neutral:** 2/3 = 66.67% **Numeric Index:** 16/6 = 2.67

Remarks:
Distichlis spicata present, but not dominant. Agropyron present, but not dominant.

HYDROLOGY

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

YES **No Recorded Data**

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	= 5.0 *(in.)*

Wetland Hydrology Indicators

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

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

Remarks:

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

Project/Site: Meriwether-East	**Project No:** B43054	**Date:** 8-Aug-2006
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Andrea Pipp		**State:** Montana
		Plot ID: Plot 3 (2006)

SOILS

Map Unit Name (Series and Phase): Saline land
Map Symbol: SA **Drainage Class:** Poorly drained **Mapped Hydric Inclusion?**
Taxonomy (Subgroup): Montmorillonitic, frigid Ustic Torriorth **Field Observations Confirm Mapped Type?** Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-5	A	10YR3/2	N/A	N/A	N/A	Silty clay
5-10+	B	2.5Y4/2	2.5Y6/2	Many	Prominent	Silty clay, gravels

Hydric Soil Indicators:

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

Remarks:
Soil smelled like cow manure. Old cow manure appears to be on soil surface in places.

WETLAND DETERMINATION

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

Remarks:

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

1. Project Name: Meriwether-East Wetland Mitigation Site **2. Project #:** STPX-NH 0037(26) **Control #:** 5000

3. Evaluation Date: 8/8/2006 **4. Evaluator(s):** A. Pipp **5. Wetland / Site #(s):** Site 2

6. Wetland Location(s) i. T: 33 N **R:** 8 W **S:** 17 **T:** __ N **R:** __ E **S:** _____

ii. Approx. Stationing / Mileposts: ST 284+40 to ST 287+50 (R): At approximate MP 239.

iii. Watershed: 8 - Marias **GPS Reference No. (if applies):** _____

Other Location Information: _____

7. A. Evaluating Agency MDT

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

B. Purpose of Evaluation:
- ☐ Wetlands potentially affected by MDT project
- ☐ Mitigation wetlands; pre-construction
- ☒ Mitigation wetlands; post-construction
- ☐ Other

9. Assessment Area (total acres): _____ (visually estimated)
6.62 (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	Saturated	Excavated/Impounded	75
Riverine	Palustrine	None	Unconsolidated Bottom	Saturated	Excavated/Impounded	25
---	---	---	---	---	---	
---	---	---	---	---	---	

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

Comments: Unconsolidated bottom is mudflat.

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.	---	---	---
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.	---	moderate disturbance	---
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.) Livestock grazing was present prior to construction of mitigation site.

ii. Prominent weedy, alien, & introduced species: Kochia scoparia common throughout wetland.

iii. Briefly describe AA and surrounding land use / habitat: AA is an excavated area bordering an existing wetland. Highway 2 occurs on the immediately north boundary. Rangeland occurs on all other boundaries though livestock is excluded by fences.

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	_____
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	---	---	---	---	---	---	0 (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	_____
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	---	---	---	---	---	---	0 (L)

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

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)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (see 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	M	--	--
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	--	--	.5 (M)	--
Low	--	--	--	--

Comments: Willet, American Avocet, Wilson's Pharlarope, Killeer, and sparrow species were observed foraging and possibly nesting within Site 2. Many insects were present.

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 14F)

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:** Railroad, utilities, and a tank (containing either anhydrous ammonia or propane) are present.

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**	--	--	.7 (M)	--	--	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--

Comments: _____

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: _____

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	--	--	--	--	--	--	--	--	--	.6M	--	--	--	--	--	--	--	--
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 _____

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)	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (12i)	--	--	--	--	--	--	--	.3L	--
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	--	.3(L)	--

Comments: _____

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	0.00	1	
B. MT Natural Heritage Program Species Habitat	low	0.00	1	
C. General Wildlife Habitat	moderate	0.50	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	moderate	0.70	1	
H. Sediment/Shoreline Stabilization	N/A		--	
I. Production Export/Food Chain Support	moderate	0.60	1	
J. Groundwater Discharge/Recharge	high	1.00	1	
K. Uniqueness	low	0.30	1	
L. Recreation/Education Potential	low	0.30	1	
	Total:	**4.80**	**10.00**	____
		Percent of Total Possible Points:	**48%** (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

2006 REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Meriwether-East
Glacier County, Montana

2006 MERIWETHER-EAST WETLAND MITIGATION SITE 1

Photo 1: Photo-Point. Panoramic view of Site 1 taken at the east end looking westward.

Photo 2: Planted rows of slender wheatgrass (*Agropyron trachycaulum*), a facultative plant.

Photo 3: View from the start of Transect 1 at 64˚.

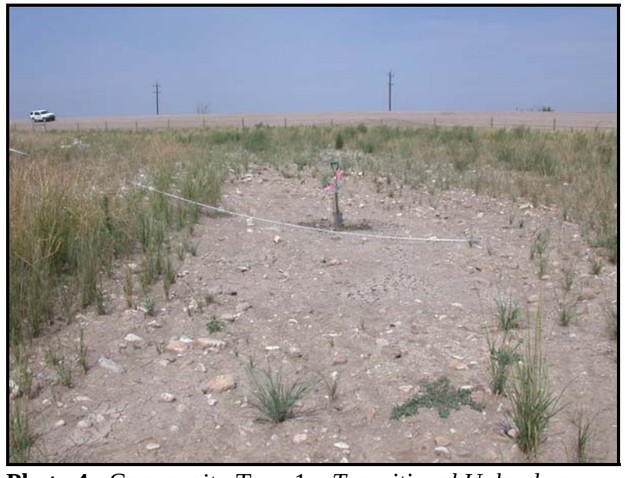


Photo 4: Community Type 1 – *Transitional Upland* on Transect 1.

Photo 5: Community Type 2 – *Disturbed Upland* along Transect 1.

Photo 6: View from the end of Transect 1 at 244˚.

2006 MERIWETHER-EAST WETLAND MITIGATION SITE 2

Photo 7: Photo-Point. Panoramic view taken at the east end of Site 2 looking westward. View is of mudflat.

Photo 8: Site 2 inundated on June 14, 2006. View is southwest. Photographed by MDT.

Photo 9: View from the start of Transect 1 at 59˚.

Photo 10: Community Type 5 – *Wetland* along Transect 1. View is northeast.

Photo 11: Community Type 6 - *Wetland*. along Transect 1View is west.

Photo 12: View from the start of Transect 1 at 239˚. Wetland #17 in foreground and mudflat in background.

Photo 13: 2005 Aerial photograph showing the Meriwether-East Wetland Mitigation Site 1 prior to construction, and relative to the existing Wetland 17.

Photo 14: 2005 Aerial photograph showing the Meriwether-East Wetland Mitigation Site 2 prior to construction, and relative to the existing Wetland 11.