MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2007

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

December 2007

PBS&J Project No: B43088.00 - 0408

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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 along Highway 2 in Glacier County. It consists of two areas: Site 1 was built near milepost 236 and was designed to encompass approximately 2.67 acres (ac) and Site 2 was built near milepost 239 and was designed to encompass 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 areas 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 July 16, 2007 to document vegetation, soil, and hydrologic conditions that are used to map jurisdictional wetlands. All information contained on the Wetland Mitigation Site Monitoring Form was collected at this time (**Appendix B**). Activities conducted and information collected included: wetland delineation; vegetation community mapping; vegetation transect monitoring; soils data collection; hydrology data collection; bird and wildlife use documentation; macroinvertebrate sampling; and photographing.

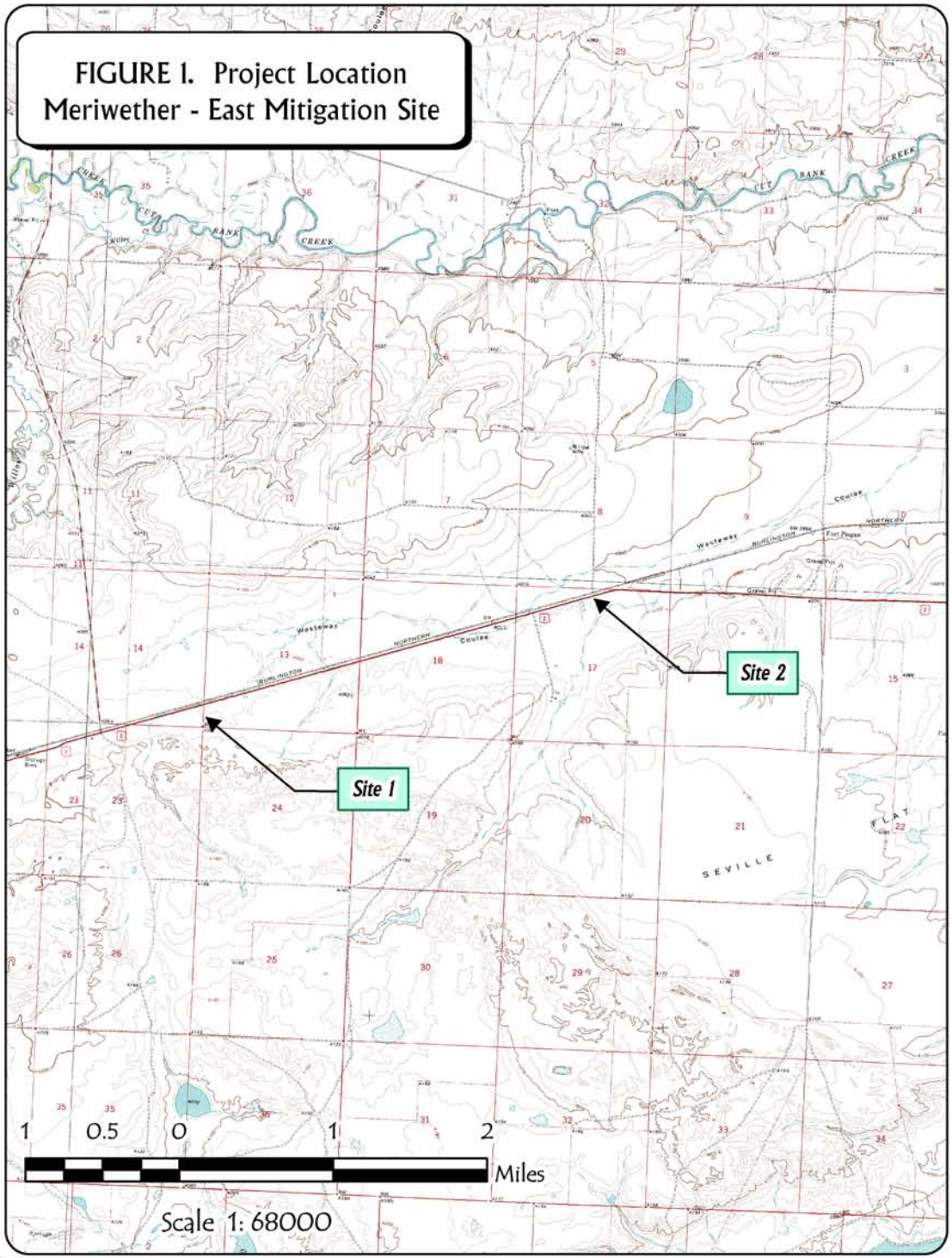
2.2 Hydrology

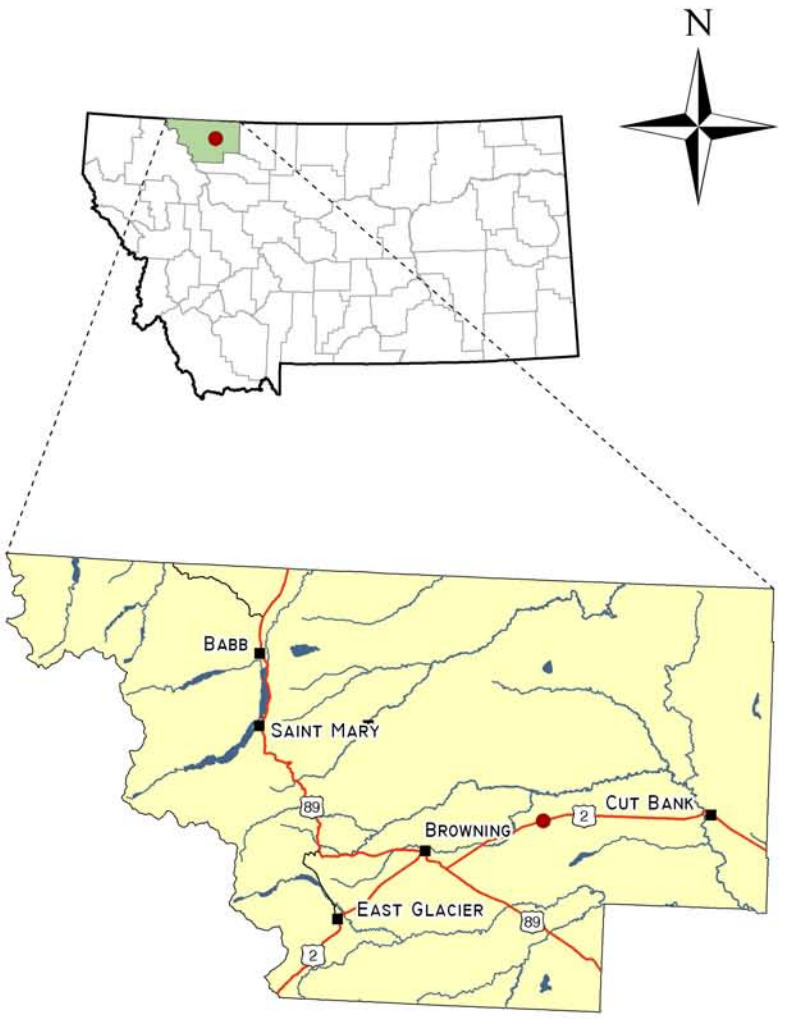
Wetland hydrology at both Sites 1 and 2 were to be provided via groundwater, seepage from the adjacent wetland, and direct precipitation. Impoundment areas are indicated on the proposed project plan sheets (**Figures 2** and **3** in **Appendix A**).

Hydrologic indicators were evaluated during the mid-season visit in 2007. 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 onto 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. Algae identification was made by Loren Bahls (2007).

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 2007 were compared to the pre-construction acreage of wetland in order to estimate that acreage of wetland created at 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 2007 post-construction aerial photograph of Site 1 and Site 2 was taken by MDT and used to map features and community boundaries. All photographs pertaining to the project are in **Appendix C**.

2.11 GPS Data

During the 2007 site visit, a global positioning system (GPS) along with hand-mapping was used to mark each photograph point, transect start and end, community boundaries, soil pits, and other features.

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, surface runoff from snow melt and other storm events, and direct precipitation. Although it was inundated in June 2006, Site 1 showed no signs of inundation in 2007. No saturation was observed within the upper 12 inches of the soil profile in 2007. Site 2 showed signs of 2007 inundation, including a large dried green algae mat. Soils at Site 2 were saturated in the upper 12 inches of the profile during the monitoring visit.

It was assumed that precipitation levels measured at the Cut Bank FAA Airport would serve as an indicator of precipitation received at the mitigation sites. The total precipitation received at this station from January through July of 2007 was 1.17 in (WRCC 2007). This was only 15% of the mean precipitation (7.86 inches) recorded between January and July from 1903 to July 2007. This period during 2007 was also much drier than the same period in 2006 (2.70 in), 2005 (9.21 in), 2004 (4.57 in), and 2003 (3.63 in) (WRCC 2007).

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 has been compiled since 2006 (**Table 1**).

As in 2006, four vegetation communities were documented at Site 1 in 2007: Type 1 – *Transitional Upland*, Type 2 – *Disturbed Upland*, Type 3 – *Grassland Upland*, and Type 4 – *Wetland*. Types 1 and 2 occurred within the created Site 1. Type 1 – *Transitional Upland* occupied a small depression. This depression had ponded water earlier in the season, but by July the soil was very dry and compacted and was colonized by mostly upland plants with a few facultative (FAC) wetland plants (**Photo 4** in **Appendix C**).

The remainder of Site 1 was colonized by Type 2 – *Disturbed Upland* (**Photos 1** to **3** in **Appendix C**). Type 2 had been seeded with native plants in the spring of 2006 by MDT: 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.). In 2007 these species were growing abundantly, but were mixed with increasing amounts of kochia (*Kochia scoparia*) and yellow sweet clover (*Melilotus officinalis*). All of these plants are considered upland except for slender wheatgrass and kochia. Slender wheatgrass and kochia are facultative plants, meaning that they are equally as likely to occur in wetlands as in non-wetlands (Reed 1988). 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 the site even in the presence of upland plants (Johnson pers. comm.). In October of 2006, wetland seed was broadcasted over Site 1 by MDT and included

Table 1: ***Vegetation species observed in 2006 - 2007 at the Meriwether-East Wetland Mitigation Sites.***

Scientific Name	Region 9 (Northwest) Wetland Indicator	Scientific Name	Region 9 (Northwest) Wetland Indicator
Achillea millifolium	FACU	*Kochia scoparia*	FAC
Agropyon smithii	FACU	*Liatris punctata*	---
Agropyon trachycaulum	FAC	*Medicago sativa*	---
Agrostis alba	**FACW**	***Melilotus officinale***	**FACU**
Alopecurus pretensis	**FACW**	*Phleum pratense*	FAC-
Artemisia dracunculus	---	*Plantago eriopoda*	FACW
Artemisia frigida	---	*Poa pratensis*	FACU+
Aster ascendens (syn. *A. chilensis*)	FAC	*Polygonum* spp.	---
Aster pansus	FAC+	***Polypogon monspeliensis***	**FACW+**
Beckmannia syzigachne	**OBL**	*Pseudoroegneria spicata* (syn. *Agropyron spicatum*)	FACU-
Bouteloua gracilis	---	*Puccinellia nuttalliana*	OBL
Bromus tectorum	---	*Ranunculus cymbalaria*	OBL
Carex praegracilis	FACW	***Ranunculus sceleratus***	**OBL**
Centaurea maculosa	---	*Ratibida columnifera*	---
Chenopodium album	---	***Rhizoclonium* spp. (a green algae)**	---
Chenopodium capitatum	---	***Rumex crispus***	**FACW**
Chenopodium glaucum	FAC	*Salicornia rubra*	OBL
Chenopodium hybridum	---	***Salix exigua***	**OBL**
Chenopodium leptophyllum	FACU	***Salix* spp.**	---
Cirsium undulatum	**FACU+**	***Scirpus acutus***	**OBL**
Distichlis spicata	FAC+	***Scirpus maritimus***	**OBL**
Eleocharis palustris	**OBL**	***Scirpus pungens***	**OBL**
Gaillardia aristata	---	*Sisymbrium* spp.	---
Grindelia squarrosa	FACU	***Sonchus arvensis***	**FACU+**
Heterotheca villosa (syn. *Chrysopsis villosa*)	---	*Spergularia marina*	OBL
Hordeum brachyantherum	**FACW**	*Suaeda calceoliformis* (syn. *S. depressa*)	FACW-
Hordeum jubatum	FAC+	*Thlaspi arvense*	---
Juncus balticus	OBL	*Typha latifolia*	OBL
Juncus bufonius	FACW+		

Bolded species were observed for the first time in 2007.

alkali bulrush (*Scirpus maritmus*) and slough grass (*Beckmannia syzigachne*) (Johnson pers. comm.); however, these species were not observed in 2007.

Types 3 and 4 are undisturbed habitats that surround Site 1. Type 3 is native upland grassland composed of wheatgrass, blue grama (*Bouteloua gracilis*), fringed sage (*Artemisia frigida*), kochia, and native rangeland forbs (**Photo 5** in **Appendix C**). 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 ascendens*). Type 4 borders Site 1 to the north.

For Site 1, 2007 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 2, 3,** and **4** in **Appendix C**). Transect 1 traverses through three upland community types (**Chart 1**). Community Type 1 – *Transitional Upland* occupied the only depression found within Site 1 (**Photo 4** in **Appendix C**; **Chart 2**). This depression showed signs that water ponded earlier in the growing season, but was colonized by primarily upland plants (**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	2007
Transect Length (feet)	127	127
# Vegetation Community Transitions along Transect	3	3
# Vegetation Communities along Transect	3	3
# Hydrophytic Vegetation Communities along Transect	0	0
Total Vegetative Species	17	30
Total Hydrophytic Species	3	6
Total Upland Species	14	24
Estimated % Total Vegetative Cover	75	85
% Transect Length Comprised of Hydrophytic Vegetation Communities	0	0
% Transect Length Comprised of Upland Vegetation Communities	100	100
% Transect Length Comprised of Unvegetated Open Water	0	0
% Transect Length Comprised of Bare Substrate	0	0

Chart 1: ***Transect maps showing vegetation types of Transect 1 from start (0 feet) to end (127 feet) for Site 1 in 2006 to 2007.***

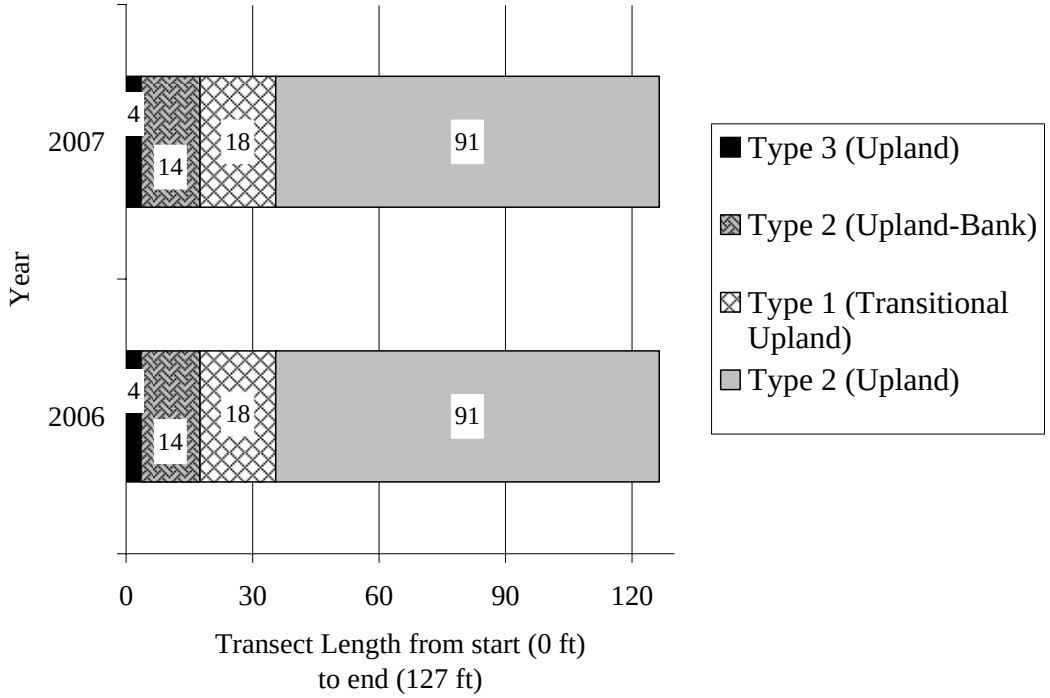
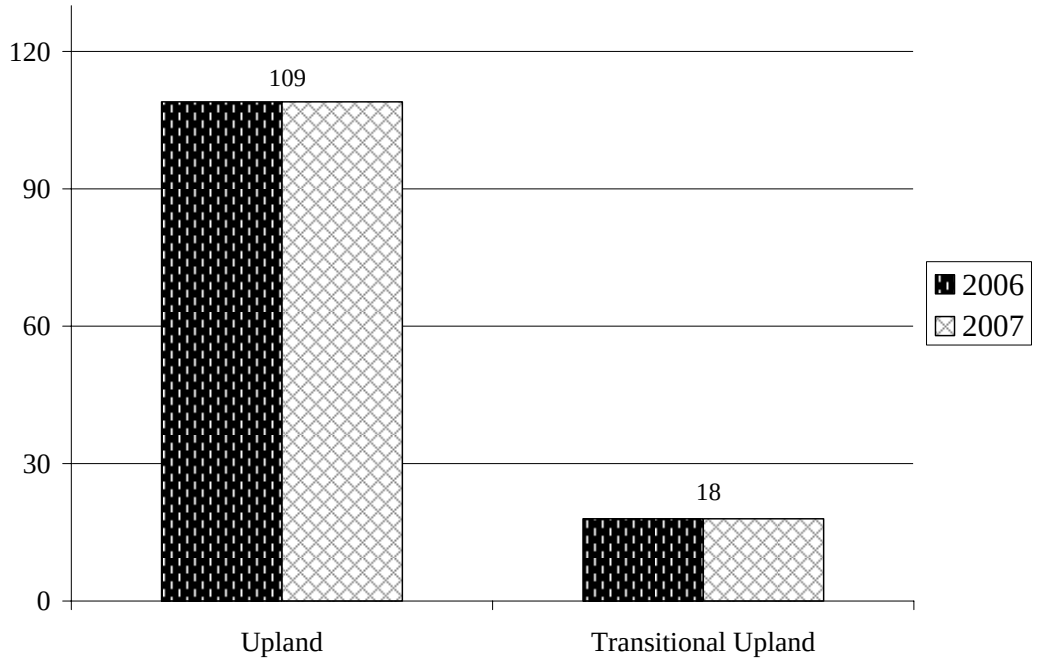


Chart 2: ***Total length of each vegetation community within Transect 1 at Site 1 in 2006 to 2007.***



At Site 2, three vegetation community types were documented in 2007: Type 3 – *Grassland Upland*, Type 5/6 – *Wetland*, and Type 7 – *Wetland*. In addition, mudflat was also mapped. In 2006 Types 5 and 6 were observed to be separate; however, in 2007 they were combined because the plant communities had intertwined. Thus the four habitats were the same in 2006 and 2007. Type 5/6 – *Wetland* was dominated by the facultative oakleaf goosefoot (*Chenopodium glaucum*) and foxtail barley (*Hordeum jubatum*) and the obligate Nuttall's alkali grass (*Puccinellia nuttalliana*) (**Photos 7** to **9** in **Appendix C**). *Hordeum jubatum* was far more abundant in 2007, possibly because of drier soil conditions (**Monitoring Form** in **Appendix B**). In addition, three *Scirpus* species were apparent and some springs of *Salix exigua* and an unidentified *Salix* species were observed within Type 5/6 (**Monitoring Forms** in **Appendix B**). Type 3 is upland grassland that borders Site 2 to the west and southwest and also occupies the upland buffer along the west and southwest sides (**Figure 3** in **Appendix A**). Type 7 is undisturbed wetland that was delineated (as #11) in October of 2002 by URS-BRW, Inc. (2003) and borders Site 2 to the east (**Figure 3** in **Appendix A**). Dominant plants found in Type 7 during August 2007 included Baltic rush, alkali bluegrass (*Poa juncifolia*), and Nuttall's alkali grass (**Photo 12** in **Appendix C**).

For Site 2, 2007 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 7** and **9** in **Appendix C**). Transect 1 traversed through an upland community, two wetland communities, and mudflat (**Chart 3**). In general transect lengths for each community type remained the same (**Chart 4**). However, plant density did increase slightly within vegetation communities. Likewise, the length of mudflat along the transect remained the same as in 2006 (**Chart 4**). The dense mat of *Rhizoclonium* spp. at Site 2

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

Monitoring Year	2006	2007
Transect Length (feet)	450	
# Vegetation Community Transitions along Transect	7	3
# Vegetation Communities along Transect	5	3
# Hydrophytic Vegetation Communities along Transect	2	2
Total Vegetative Species	18	18
Total Hydrophytic Species	12	13
Total Upland Species	6	5
Estimated % Total Vegetative Cover	30	50
% Transect Length Comprised of Hydrophytic Vegetation Communities	48	48
% Transect Length Comprised of Upland Vegetation Communities	0	3
% Transect Length Comprised of Unvegetated Open Water / Mudflat	49	49
% Transect Length Comprised of Bare Substrate	3	0

may be impeding vascular plant establishment in some areas. During the site visit it was observed that plants were germinating beneath the mat, and it seemed they were being suffocated by it and not able to puncture through.

Chart 3: ***Transect map showing vegetation types of Transect 1 from start (0 feet) to end (500 feet) for Site 2 in 2006 to 2007.***

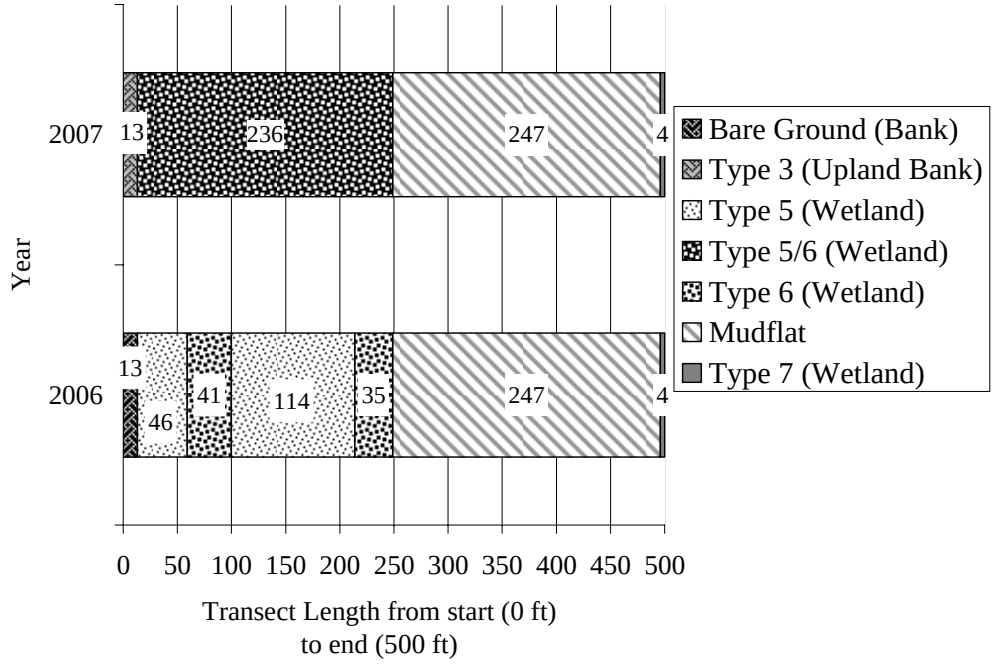
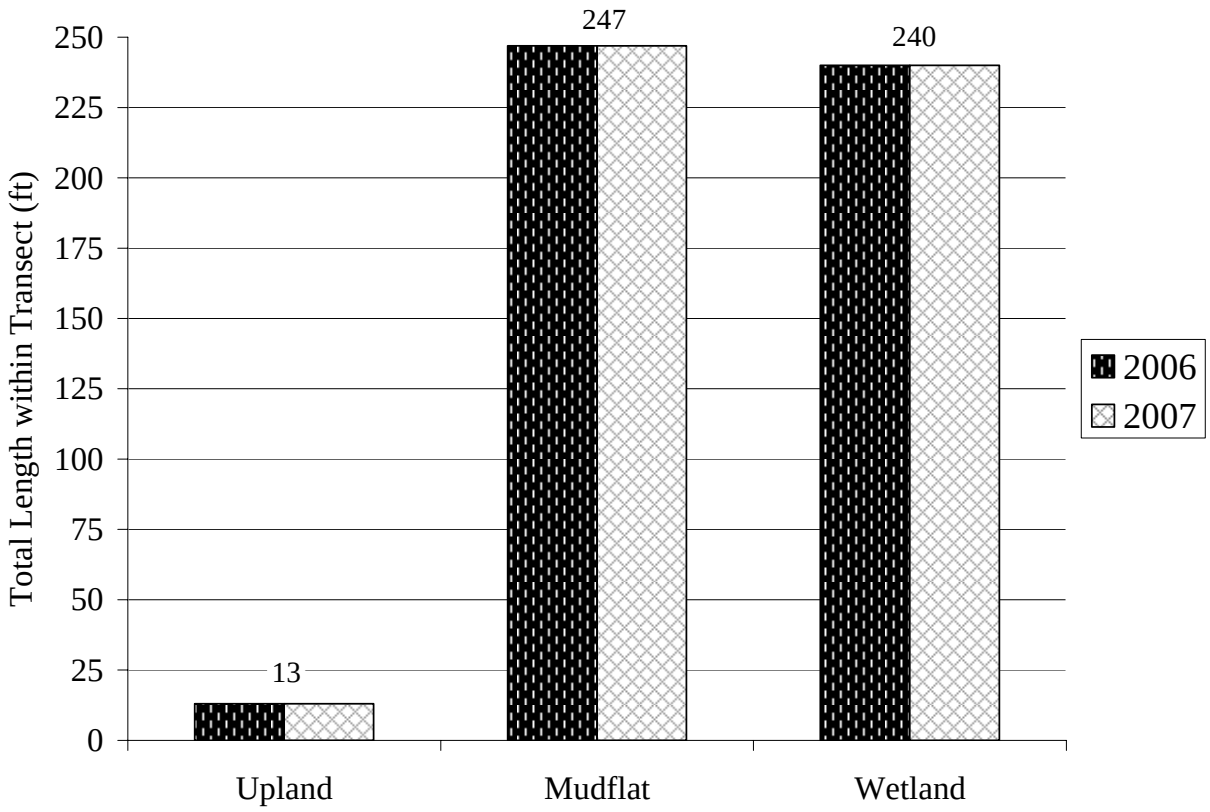


Chart 4: ***Total length of each vegetation community within Transect 1 at Site 2 in 2006 to 2007.***



One noxious weed, spotted knapweed (*Centaurea maculosa*), was found and mapped within Site 1 (**Figure 3** in **Appendix A**). The Botanist pulled two of the 4 foot tall plants, but was unable to pull the remaining four plants. It will be important to pull these plants during the 2008 monitoring year. Likewise, MDT could spot spray these plants. At Site 2, Canada thistle (*Cirsium arvense*) was observed between the snow fences in the Type 3 – *Upland* habitat, but was not mapped.

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, the matrix surface soil color was 10YR 3/2 with no mottles and with a clay textures (**COE Forms** in **Appendix B**). The soil color and lack of mottles differed from the 2006 soil profile because soils were very dry and compacted and the pit could only be dug to 3 inches deep in 2007.

At Site 2 wetland matrix colors ranged from 2.5Y 5/2 to 10YR 3/2 with mottles ranging from 2.5Y 5/6 to 7.5YR 4/6 (**COE Forms** in **Appendix B**). Mudflat soils were very dark (10YR 2/1) and mottled (2.5Y 7/3 and 7.5YR 4/6) indicating hydric soil. At Site 2 soil texture was clay and with gravels. Soils were basically the same in 2006 and 2007.

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 would develop as wetland, given prolonged spring moisture (**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 seeding and colonization by a variety of upland plants. However, this trend could reverse if the site obtained significant moisture.

Approximately 69% of Site 2 developed characteristics of wetland vegetation, soils, and hydrology (**Figure 3** in **Appendix A**; **Table 4**). The remaining approximate 31% of Site 2 is mudflat that has a sparse presence of plants (**Figure 3** in **Appendix A**; **Table 4**) (**Photo 6)**. 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.

Table 4: ***Aerial coverage of aquatic habitats in 2007 for the Meriwether-East Wetland Mitigation Sites.***

Aquatic Habitat	Site 1 (acre)	Site 2 (acre)
Emergent Wetland	0.00	4.55
Mudflat	0.00	2.09
TOTAL	**0.00**	**6.64**

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**. In 2007 very few mammal and bird species were observed at either site (**Monitoring Forms** in **Appendix B**).

3.6 Macroinvertebrates

No aquatic macroinvertebrate samples were collected at Site 1 or Site 2.

Table 5: ***Fish and wildlife species observed at the Meriwether-East Wetland Mitigation Sites in 2006 to 2007.***

FISH	
None	
AMPHIBIAN	
None	
REPTILE	
None	
BIRD	
American Avocet (*Recurvirostra americana*)	**Sandpiper (unidentified species)**
Dark-eyed Junco (*Junco hyemalis*)	Sparrow (unidentified species)
Horned Lark (*Eremophila alpestris*)	Willet (*Catoptrophorus semipalmatus*)
Killdeer (*Charadrius vociferous*)	Wilson's Phalarope (*Phalaropus tricolor*)
MAMMAL	
Deer (*Odocoileus* spp.) or Pronghorn (*Antilocapra americana*)	

Bolded species were observed for the first time in 2007.

3.7 Functional Assessment

A functional assessment was conducted for delineated wetlands at Site 2 (**Functional Assessment Form** in **Appendix B**), but not at Site 1 as no wetlands had developed as of 2007. As in 2006, Site 2 continued to rate as a Category III wetland (**Table 6**). Notable functions or values included Short and Long Term Water Storage and Groundwater Discharge/Recharge (**Table 6**). The functional assessment score decreased by two points because general wildlife habitat was deemed low quality in 2007. In 2007 the site lacked patches of surface water that had attracted several shorebirds and insect species in 2006. As a result the total functional units decreased slightly in 2007 (**Table 6**). On the contrary, aquatic habitat increased in size by approximately 0.02 acre; however, this was most likely a result of different mapping techniques. In 2006 the project acreage was provided by MDT (based on design) and in 2007 it was mapped with a GPS unit and overlaid onto an unrectified 2007 aerial photograph (**Appendix D**).

3.8 Photographs

A 2007 aerial photograph was used to create **Figures 2** and **3** in **Appendix A**. One photo point was established at Site 1 and at Site 2 (**Figures 2** and **3** in **Appendix A**). A panoramic photo was taken from each photo point (**Photo 1** and **6** in **Appendix C**). Representative single frame photographs were taken of the transect and conditions within Site 1 (**Photos 1** through **5**) and within Site 2 (**Photos 6** through **14**) (**Appendix C**).

Table 6: ***Summary of 2006 to 2007 wetland function/value ratings and functional points at Site 2 of the Meriwether-East Wetland Mitigation Project.***

Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method[1]	2006 Site 2	2007 Site 2
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Low (0.0)	Low (0.0)
General Wildlife Habitat	Mod (0.5)	Low (0.2)
General Fish/Aquatic Habitat	NA	NA
Flood Attenuation	Mod (0.5)	Mod (0.5)
Short and Long Term Surface Water Storage	High (0.9)	High (0.9)
Sediment, Nutrient, Toxicant Removal	Mod (0.7)	Mod (0.7)
Sediment/Shoreline Stabilization	NA	NA
Production Export/Food Chain Support	Mod (0.6)	Mod (0.6)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Low (0.3)	Low (0.3)
Recreation/Education Potential	Low (0.1)	Low (0.1)
Actual Points/Possible Points	4.6 / 10	4.3 / 10
% of Possible Score Achieved	46%	43%
Overall Category	III	III
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries (ac)	**6.62**	**6.64**
Functional Units (acreage x actual points)	**30.45**	**28.5**

3.9 Maintenance Needs/Recommendations

The dikes were surveyed for erosion problems in 2007. The dikes were covered evenly with erosion control fabric and no erosion problems were found.

3.10 Current Credit Summary

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. No specific performance criteria were required to be met at this site in order to document its success. Based on the second 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.

At Site 1, no wetland or other aquatic habitat developed (**Figure 2** in **Appendix A**; **Table 4**). At Site 2, approximately 4.55 acres of wetland and 2.09 acres of mudflat developed (**Figure 3** in **Appendix A**; **Table 4**). Although it appeared that mudflat was being colonized by vegetation, the area of wetland decreased and mudflat increased when compared to 2006. This is most likely a result of mapping technology. It is assumed that acreage calculations in 2007 were more accurate than in 2006. Consequently 6.64 acres is the maximum assignable credit at Site 2 as of 2007. The quality of these aquatic habitats equated to a gain of 28.5 functional units (**Table 5**).

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Appendix A

SITE 1: FIGURES 2 & 3
SITE 2: FIGURES 2 & 3

MDT Wetland Mitigation Monitoring
Meriwether-East
Glacier County, Montana

Figure 2 - Monitoring Activity Locations

N
W E
S

35' 0 35' 70'
1" = 70'

Railroad Tracks

Highway 2

Monitoring Limits

T1 End

Soil Pit 1

T1 Start

PP

Legend

Monitoring Area Limits

Vegetation Transect

Photo Point Location

Soil Pit Location

Base Photograph Date: July 14, 2007

PROJECT NAME
Meriwether-East Wetland Mitigation Site 1

DRAWING TITLE
2007 Monitoring Activity Locations

DRAWN: LLL
PROJ MGR: J. Berglund
CHECKED: APP'D:
SCALE: 1"=70'
FILENAME: L:\B43088.408\Meriwether\dwg\Meriwether2007.dwg

PROJ NO: B43088
LOCATION:

PBS&J
1120 Cedar
Missoula, MT 59802

FIGURE
2E OF 3
REV -
Oct/18/2007

Figure 3 - Mapped Site Features

Legend
- Monitoring Area Limits
- Vegetation Communities
- Centaurea maculosa location
- Base Photograph Date: July 14, 2007

N
W E
S
1" = 70'

Railroad Tracks

Highway 2

Monitoring Limits

1
2
3
4

Vegetation Types
- Type 1 - Transitional Upland
- Type 2 - Disturbed Upland
- Type 3 - Grassland Upland
- Type 4 - Pre-existing Wetland #17

Areas

Project area	2.80 acres
Wetland area	0.00 acre
Upland area	2.80 acres

PROJECT NAME
Meriwether-East Wetland Mitigation Site 1
DRAWING TITLE
2007 Mapped Site Features

DRAWN: LLL
PROJ MGR: J.Berglund
CHECKED: APPVD:
PROJ NO: B43088
LOCATION:
SCALE: 1"=70'
FILE NAME: L:\B43088.408\Meriwether\dwg\Meriwether2007.dwg

PBS J
1120 Cedar
Missoula, MT 59802

FIGURE
3E OF 3
REV -
Dec/06/2007

Figure 2 - Monitoring Activity Locations

Legend
Monitoring Area Limits
Vegetation Transect
Photo Point Location
Soil Pit Location
Base Photograph Date: July 14, 2007

Highway 2
Monitoring Limits
T2 End
Soil Pit 3
Soil Pit 2
Soil Pit 1
T2 Start
PP

N
W
E
S
80' 40' 0 40' 80'
1" = 80'

PROJECT NAME
Meriwether-East Wetland Mitigation Site 2
DRAWING TITLE
2007 Monitoring Activity Locations

DRAWN: LLL
PROJ MGR: J. Berglund
CHECKED: APP'VD:
PROJ NO: B43088
LOCATION:
SCALE: 1"=80'
FILENAME: L:\B43088.408\Meriwether\dwg\Meriwether2007.dwg

PBSJ
1120 Cedar
Missoula, MT 59802

FIGURE
2W OF 3
REV -
Dec/06/2007

Figure 3 - Mapped Site Features

Legend
Monitoring Area Limits
Vegetation Communities
Wetland Area
Base Photograph Date: July 14, 2007

Highway 2

Monitoring Limits

5/6

7

3

Mudflat

N
W
E
S

80' 40' 0 40' 80'
1" = 80'

Vegetation Types
Type 3 - Grassland Upland
Type 5/6 - Wetland
Type 7 - Pre-existing Wetland #11
Mudflat

Areas	
Project area	6.64 acres
Wetland area	4.55 acres
Mudflat area	2.09 acres

PROJECT NAME
Meriwether-East Wetland Mitigation Site 2
DRAWING TITLE
2007 Mapped Site Features

DRAWN: LLL
PROJ MGR: J. Berglund
CHECKED: APP'D:
PROJ NO: B43088
LOCATION:
SCALE: 1"=80'
FILE NAME: L:\B43088.408\Meriwether\dwg\Meriwether2007.dwg

PBSJ
1120 Cedar
Missoula, MT 59802

FIGURE
3W OF 3
REV -
Dec/06/2007

Appendix B

2007 WETLAND MITIGATION SITE MONITORING FORMS
2007 BIRD SURVEY FORM
2007 COE WETLAND DELINEATION FORMS
2007 MDT FUNCTIONAL ASSESSMENT FORM

MDT Wetland Mitigation Monitoring
Meriwether-East
Glacier County, Montana

PBS&J / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **Meriwether-East, Site 1** Project Number: **B43088.00-0310**
Assessment Date: **July 16, 2007** 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: **sunny, calm, 95degrees** Time of Day: **1330 - 1600**
Initial Evaluation Date: **August 8, 2006** Monitoring Year: **2** # 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 1/4 inch deep cracked soil, but was very dry and hard.

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%	Chenopodium album	1 = 1-5%
Polygonum spp.	1 = 1-5%	Taraxacum officinale	+ = < 1%
Phleum pratense	1 = 1-5%	Ratibida columnifera	+ = < 1%
Kochia scoparia	4 = 21-50%	Hordeum jubatum	1 = 1-5%
Thlaspi arvense	1 = 1-5%	Poa pratensis	+ = < 1%
Descurainia (pinnata)	1 = 1-5%	Agropyron smithii	3 = 11-20%
Gaillardia aristata		Artemisia dracunculus	+ = < 1%

Comments / Problems: **Surface soils were cracked 1/4 inch and were very dry and compacted.**

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

Dominant Species	% Cover	Dominant Species	% Cover
Ratibida columnifera	1 = 1-5%	Sisymbium spp.	+ = < 1%
Agropyron trachycaulum	3 = 11-20%	Hordeum jubatum	+ = < 1%
Gaillardia aristata	1 = 1-5%	Achillea millifolium	+ = < 1%
Pseudoroegneria spicata	2 = 6-10%	Cirsium undulatum	+ = < 1%
Medicago sativa	2 = 6-10%	Hordeum brachyantherum	+ = < 1%
Kochia scoparia	3 = 11-20%	Melilotus officinalis	3 = 11-20%
Artemisia frigida	+ = < 1%	Agropyron smithii	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%	Chenopodium spp. (not obs. in 2007)	1 = 1-5%
Kochia scoparia	1 = 1-5%	Melilotus officinalis	1 = 1-5%
Bouteloua gracilis (not obs. in 2007)		Agropyron trachycaulum	3 = 11-20%
Chrysopsis villosa	2 = 6-10%	Pseudoroegneria spicata	3 = 11-20%
Liatris punctata	1 = 1-5%	Koeleria macrantha	1 = 1-5%
Agropyron smithii	1 = 1-5%	Potentilla (arguta)	+ = < 1%
Aster pansus	+ = < 1%	Family Asteraceae	+ = < 1%

Comments / Problems: _____

VEGETATION COMMUNITIES (continued)

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)
Achillea millifolium	2		
Agropyron smithii	2, 3		
Agropyron trachycaulum	2, 3		
Artemisia dracunculus	2		
Artemisia frigida	3		
Astragalus spp.	2		
Bromus inermis	2		
Bromus tectorum	2, 4		
Centaurea maculosa	2		
Chenopodium album	1-3		
Cirsium undulatum	2		
Descurainia (pinnata)	1		
Gaillardia aristata	1-3		
Grindelia squarrosa	2		
Heterotheca (Chrysopsis) villosa	3		
Hordeum brachyantherum	2		
Hordeum jubatum	1-4		
Juncus balticus	1		
Kochia scoparia	1-3		
Koeleria macrantha	2, 3		
Medicago sativa	2		
Melilotus officinale	2, 3		
Phleum pratense	1		
Poa pratensis	1, 2, 4		
Polygonum spp.	1		
Pseudoroegneria spicata	2, 3		
Ratibida columnifera	1-3		
Sisymbium spp.	2		
Taraxacum officinale	1		
Thlaspi arvense	1, 2		

Comments / Problems: _____

PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number Observed	Mortality Causes
Not Applicable			

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
None Observed in 2007		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	

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 (°)
		see photo sheets	

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? **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? **No**
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: **July 16, 2007** Examiner: **A. Pipp**
Transect Number: **T-1** Approximate Transect Length: **124 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, Aster pansus, Potentilla (arguta) EACH	+ = < 1%
Kochia scoparia	1 = 1-5%
Bouteloua gracilis (not observed in 2007)	
Chrysopsis villosa	2 = 6-10%
Liatris punctata	1 = 1-5%
Agropyron trachycaulum & Koeleria macrantha EACH	3 = 11-20%
Chenopodium spp.	1 = 1-5%
Pseudoroegneria spicata	3 = 11-20%
Family Asteraceae	+ = < 1%
Melilotus officinale	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 smithii	4 = 21-50%
Medicago sativa (not observed in 2007)	
Melilotus officinale	3 = 11-20%
Gaillardia aristata	+ = < 1%
Ratibida columnifera	1 = 1-5%
Astragalus spp.	+ = < 1%
Bromus inermis	+ = < 1%
Hordeum jubatum	+ = < 1%
Heterotheca (Chrysopsis) villosa	+ = < 1%
Total Vegetative Cover:	50%

Vegetation Type C: **Type 1 - Transitional Upland**	
Length of transect in this type: 17.8 - 33 feet	
Plant Species	**Cover**
Phleum pratense	1 = 1-5%
Polygonum spp.	1 = 1-5%
Juncus balticus	+ = < 1%
Kochia scoparia	4 = 21-50%
Thlaspi arvense	1 = 1-5%
Descurainia (pinnata)	1 = 1-5%
Chenopodium album	1 = 1-5%
Taraxacum officinale	+ = < 1%
Ratitbida columnifera & Gaillardia aristata EACH	+ = < 1%
Hordeum jubatum	1 = 1-5%
Artemisia dracunculus & Poa pratensis EACH	+ = < 1%
Agropryon smithii	3 = 11-20%
Total Vegetative Cover:	55%

Vegetation Type D: **Type 2 - Disturbed Upland**	
Length of transect in this type: 33-124 feet	
Plant Species	**Cover**
Agropyron trachycaulum	3 = 11-20%
Pseudoroegneria spicata	2 = 6-10%
Ratibida columnifera	1 = 1-5%
Gaillardia aristata	1 = 1-5%
Kochia scoparia (not observed in 2007)	
Medicago sativa (not observed in 2007)	
Agropyron smithii	3 = 11-20%
Achillea millifolium	+ = < 1%
Cirsium undulatum	+ = < 1%
Hordeum jubatum & H. brachyantherum EACH	+ = < 1%
Melilotus officinale	1 = 1-5%
Artemisia frigida	+ = < 1%
Total Vegetative Cover:	90%

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 may have ponded water for a short duration, but facultative and upland plants are colonizing it. Most of the site is upland and did not show signs of ponding water. A variety of uplands plants were seeded in rows throughout Site 1 in 2005.**

BIRD SURVEY – FIELD DATA SHEET

Site: **Meriwether-East, Site 1** Date: **7/16/07**
Survey Time: **115 pm** to **330 pm**

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Dark-eyed Junco	1	F N L	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: **95 degrees, calm air, sunny.**

Notes:

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

Project/Site: Meriwether-East: 2007	**Project No:** B43088-408	**Date:** 16-Jul-2007
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Andrea Pipp		**State:** Montana
		Plot ID: Soil Pit 1 of Site 1

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

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Kochia scopania	Herb	FAC	*Chenopodium album*	Herb	FAC
Summer-Cypress,Mexican			Goosefoot,White		
Thlaspi arvense	Herb	NI	*Phleum pratense*	Herb	FACU
Penny-Cress,Field			Timothy		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 2/3 = 66.67%	**FAC Neutral:** 0/1 = 0.00% **Numeric Index:** 10/3 = 3.33

Remarks:
Polygonum spp. present in 2006 is larger in size in 2007; Plant was just beginning to flower and cannot be identified without seeds. Juncus balticus was present as a few stems and not considered dominant.

HYDROLOGY

NO Recorded Data(Describe in Remarks):	**Wetland Hydrology Indicators**
N/A Stream, Lake or Tide Gauge	**Primary Indicators**
N/A Aerial Photographs	NO Inundated
N/A Other	NO Saturated in Upper 12 Inches
YES No Recorded Data	NO Water Marks
	NO Drift Lines
Field Observations	NO Sediment Deposits
	NO Drainage Patterns in Wetlands
Depth of Surface Water: N/A *(in.)*	**Secondary Indicators**
	NO Oxidized Root Channels in Upper 12 Inches
Depth to Free Water in Pit: N/A *(in.)*	NO Water-Stained Leaves
	NO Local Soil Survey Data
Depth to Saturated Soil: > 13 *(in.)*	NO FAC-Neutral Test
	NO Other(Explain in Remarks)

Remarks:
Community occurs within a depression. Soil cracked 1/4 inch deep. The top 3 inches of soil was dry and crumbly.

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

Project/Site: Meriwether-East: 2007	**Project No:** B43088-408	**Date:** 16-Jul-2007
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Andrea Pipp		**State:** Montana
		Plot ID: Soil Pit 1 of Site 1

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
0-3	A	10YR3/2	N/A	N/A	N/A	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
NO Gleyed or Low Chroma Colors	NO Other (Explain in Remarks)

Remarks:
Soil very compacted, hard, and very dry; could not dig deeper.

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:
Site is not a wetland based on hydrology and vegetation.

PBS&J / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **Meriwether-East, Site 2** Project Number: **B43088.00-0408**
Assessment Date: **July 16, 2007** 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: **sunny, calm, 95degrees** Time of Day: **1600-1900**
Initial Evaluation Date: **August 8, 2006** Monitoring Year: **2006** # Visits in Year: **1**
Size of evaluation area: **6.64 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: **Yes**
Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc.):
Soil covered with a thick matt of Rhizoclonium, a species of green algae.

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: **In 2006, 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: **In 2006, 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: **Present in 2006-2007.**

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: **Present in 2006-2007.**

VEGETATION COMMUNITIES (continued)

Community Number: **5/6** Community Title (main spp): **Type 5 / 6 - Wetland**

Dominant Species	% Cover	Dominant Species	% Cover
Juncus balticus	1 = 1-5%	Hordeum jubatum	3 = 11-20%
Ranunculus cymbalaria	1 = 1-5%	Chenopodium album	1 = 1-5%
Spergularia marina	+ = < 1%	Suaeda calceoliformis	2 = 6-10%
Chenopodium glaucum	3 = 11-20%	Eleocharis palustris	1 = 1-5%
Typha latifolia	1 = 1-5%	Scirpus maritimus & S. americana	1 = 1-5%
Puccinellia nuttalliana	3 = 11-20%	Hordeum brachyantherum	+ = < 1%

Comments / Problems: **In 2007 Community Types 5 and 6 were present, but not distinguishable, so they were combined into a single community. Only the old stalks of Kochia scoparia were present in 2007.**

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: ______

COMPREHENSIVE VEGETATION LIST

Plant Species	Vegetation Community Number (s)	Plant Species	Vegetation Community Number (s)
Agropyron smithii	3	Rhizoclonium spp. (green algal spp.)	mudflat, 5/6
Agropyron trachycaulum	5/6		
Agrostis alba	5/6		
Alopecurus pratensis	5/6		
Aster pansus	7		
Beckmannia syzigachne	5/6		
Chenopodium album	5/6		
Chenopodium capitatum	5/6		
Chenopodium glaucum	5, 6		
Chenopodium hybridum	5, 6		
Chenopodium leptophyllum	6		
Cirsium arvense	3		
Distichlis spicata	5/6		
Eleocharis palustris	5/6		
Gaillardia aristata	3		
Hordeum brachyantherum	5/6		
Hordeum jubatum	5, 6		
Juncus balticus	5/6		
Juncus bufonius	5/6		
Kochia scoparia	6		
Polygonum spp.	5/6		
Polypogon monspeliensis	5/6		
Puccinellia nuttalliana	5, 6		
Ranunculus cymbalaria	5/6		
Ranunculus sceleratus	5/6		
Ratabida columnifera	3		
Salicornia rubra	5/6		
Salix exigua	5/6		
Salix spp.	5/6		
Salsola iberica	3		
Scirpus acutus	5/6		
Scirpus americana	5/6		
Scirpus maritimus	5/6		
Sonchus arvensis	3		
Spergularia marina	5/6		
Suaeda calceoliformis (syn. S. depressa)	5/6		
Typha latifolia	5/6		

Comments / Problems: _____

PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number Observed	Mortality Causes
NONE PLANTED			

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
None Observed		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	

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 (°)
		See photo sheets	

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.

Yes 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? **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? **No**
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: **July 16, 2007** 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**
Agropyron smithii	4 = 21-50%
Hordeum jubatum	2 = 6-10%
Gaillardia aristata	1 = 1-5%
Suaeda calceoliformis	+ = < 1%
Ratitbida columnifera	1 = 1-5%
Salsola iberica	+ = < 1%
Total Vegetative Cover:	40%

Vegetation Type B: **Type 5/6 - Wetland**	
Length of transect in this type: 12.5 - 335 feet	
Plant Species	**Cover**
Puccinellia nuttalliana	4 = 21-50%
Hordeum jubatum	4 = 21-50%
Ranunculus cymbalaria	1 = 1-5%
Typha latifolia	+ = < 1%
Juncus balticus	1 = 1-5%
Chenopodium glaucum	2 = 6-10%
Eleocharis palustris	1 = 1-5%
Hordeum brachyantherum	+ = < 1%
Agrostis alba	+ = < 1%
Polypogon monspeliensis	+ = < 1%
Alopecurus pratensis	+ = < 1%
Total Vegetative Cover:	70%

Vegetation Type C: **Mudflat**	
Length of transect in this type: 335-496 feet	
Plant Species	**Cover**
Hordeum jubatum (1 little sprig)	+ = < 1%
Total Vegetative Cover:	0%

Vegetation Type D: **Type 7 - Wetland 17**	
Length of transect in this type: 496-500 feet	
Plant Species	**Cover**
Poa juncifolia	4 = 21-50%
Juncus balticus	4 = 21-50%
Puccinellia nuttalliana	+ = < 1%
Agropyron smithii	+ = < 1%
Aster pansus	1 = 1-5%
Hordeum jubatum	+ = < 1%
Aster spp.	+ = < 1%
Suaeda calceoliformis	1 = 1-5%
Grindelia squarrosa	+ = < 1%
Total Vegetative Cover:	90%

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

BIRD SURVEY – FIELD DATA SHEET

Site: **Meriwether-East, Site 2** Date: **7/16/07**
Survey Time: **400 pm** to **700 pm**

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Horned Lark	1	L F	MA UP				
Sandpiper (species unk.)	2	N	UP				
Killdeer	4	F	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: **95 degrees, calm air, sunny**

Notes: **The two sandpipers exhibited nesting behavior on the bank around the wetland.**

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

Project/Site: Meriwether-East: 2007	**Project No:** B43088-408	**Date:** 16-Jul-2007
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Andrea Pipp		**State:** Montana
		Plot ID: Soil Pit 1 of Site 2

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area? (If needed, explain on the reverse side)	Yes (No)	**Field Location:** In Wetland Type 5/6 along Transect 1.

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+			
Barley,Fox-Tail					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 3/3 = 100.00%	FAC Neutral: 2/2 = 100.00% Numeric Index: 5/3 = 1.67

Remarks:

HYDROLOGY

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

Remarks:

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

Project/Site: Meriwether-East: 2007	**Project No:** B43088-408	**Date:** 16-Jul-2007
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Andrea Pipp		**State:** Montana
		Plot ID: Soil Pit 1 of Site 2

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	2.5Y4/2	N/A	N/A N/A	Clay
8-11	B	2.5Y4/2	2.5Y5/6	Common Distinct	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:
Rocky soil from 0-11+ with 0.5 to 3.0 inch sized rock. Difficult to dig.

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:
Pit was dug in what was considered Community Type 8 in 2006.

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

Project/Site: Meriwether-East: 2007	**Project No:** B43088-408	**Date:** 16-Jul-2007
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Andrea Pipp		**State:** Montana
		Plot ID: Soil Pit 2 of Site 2

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area? (If needed, explain on the reverse side)	Yes (No)	**Field Location:** In wetland Type 5/6 along Transect 1.

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Chenopodium glaucum	Herb	FAC	*Hordeum jubatum*	Herb	FAC+
Goosefoot,Oakleaf			Barley,Fox-Tail		
Puccinellia nuttalliana	Herb	OBL			
Grass,Nuttall's Alkali					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 3/3 = 100.00%

FAC Neutral: 1/1 = 100.00%
Numeric Index: 7/3 = 2.33

Remarks:

HYDROLOGY

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

YES No Recorded Data

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	= 3.0 *(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 difficult to dig with 0.5 to 3.0 inch cobbles. A thick, fibrous mat of Rhizoclonium species (Division Chlorophyta = green algae) covered the entire soil surface. This indicates that the site was at least shallowly inundated with water of a high nutrient load.

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

Project/Site: Meriwether-East: 2007	**Project No:** B43088-408	**Date:** 16-Jul-2007
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Andrea Pipp		**State:** Montana
		Plot ID: Soil Pit 2 of Site 2

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
0-5	A	10YR3/2	10YR5/2	Few Distinct	Clay
5-10	B	2.5Y5/2	7.5YR4/6	Many 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:
Soil hard to dig with 0.5 to 3.0 inch cobbles. From 0-6 inches there are decomposed peices of organic material coloring as 10YR2/1.

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:
Pit was dug in what was considered Community Type 5 in 2006.

WetForm™

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

Project/Site: Meriwether-East: 2007	**Project No:** B43088-408	**Date:** 16-Jul-2007
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Andrea Pipp		**State:** Montana
		Plot ID: Soil Pit 3 of Site 2

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

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 0/0 = 0.00%

FAC Neutral: 0/0 = 0.00%

Numeric Index: 0/0 = 0.00

Remarks:
No vascular plant vegetation present. A green algae (Division Chlorophyta) of the genus Rhizoclonium covered the ground as a thick mat. However, this species does not have an indicator status.

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
- NO FAC-Neutral Test
- YES Other(Explain in Remarks)

Remarks:
The presence of Rhizoclonium indicates that the site was at least shallowly flooded with water of loaded with (a) high nutrient(s).

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

Project/Site: Meriwether-East: 2007	**Project No:** B43088-408	**Date:** 16-Jul-2007
Applicant/Owner: -Montana Department of Transportation-		**County:** Glacier
Investigators: Andrea Pipp		**State:** Montana
		Plot ID: Soil Pit 3 of Site 2

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
0-12	A	10YR2/1	2.5Y7/3	Common Prominent	Clay
			7.5YR4/6	Common Prominent	

Hydric Soil Indicators:

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

Remarks:

WETLAND DETERMINATION

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

Remarks:
Site is classified as Mudflat due to a lack of vegetation.

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: 7/16/2007 **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)
6.64 (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)
6.64 (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 in 2006, but nearly absent in 2007. Some Sonchus arvensis and Salsola iberica present in upland around 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	--	--	--	--
Low	--	--	.2 (L)	--

Comments: Very few signs of animal species.

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	--	--	.1(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	low	0.20	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	0.10	1	
	Total:	**4.30**	**10.00**	____
		Percent of Total Possible Points:	**43%** (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

2007 REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Meriwether-East
Glacier County, Montana

MERIWETHER-EAST WETLAND MITIGATION SITE 1 – 2007

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

Photo 2: View is east-northeast from the start of Transect 1.

Photo 3: View is west-southwest from the end of Transect 1. Photo shows Type 2 – Upland.

Photo 4: View is west-southwest. Photo shows that Type 1 – Upland has colonized the depression.

Photo 5: View is northwest at the Type 3 – Upland. This upland consists of many native plant species.

MERIWETHER-EAST WETLAND MITIGATION SITE 2 – 2007

Photo 6: Photo-Point. Panoramic view taken from the east end of Site 2 and looking westward. View is of mudflat covered with a thick fibrous mat of a green alga species (*Rhizoclonium*). The mat is white because the *Rhizoclonium* is primarily dead.

Photo 7: View is northeast from start of Transect 1.

Photo 8: View is of Type 5/6– Wetland on Transect 1.

Photo 9: View is of Type 7-Wetland, Mudflat, and Type 5/6-Wetland from end of Transect 1 towards start.

MERIWETHER-EAST WETLAND MITIGATION SITE 2 – 2007

Photo 10: Mudflat covered by a *Rhizoclonium* sp. Note how the *Rhizoclonium* grew up along the base of each plant (red arrows).

Photo 11: Mudflat with *Scirpus maritimus*.

Photo 12: Boundary between non-vegetated mudflat and former mudflat colonized by Type 5/6 wetland vegetation.

Photo 13: This black insect was found feeding on exotic *Sonchus arvensis* and were numerous in number.

Photo 14: View is east from the west side of Site 2. Photos shows Type 5/6 – Wetland.