MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2011

Big Muddy Creek
Roosevelt County, Montana



Prepared for:

MONTANA DEPARTMENT OF TRANSPORTATION

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December 2011

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Roosevelt County, Montana

MDT Project Number NH-1-10(626)
Control Number 4058-001

MFWP:
USACE:
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CCI Project No: MDT.004

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Cover: Photo of constructed wetland cell from northeast property corner.

1. INTRODUCTION

The Big Muddy Creek wetland mitigation project was completed in the spring of 2011 and this report initiates the post-construction monitoring phase by establishing baseline conditions to compare with future monitoring reports.

This Montana Department of Transportation (MDT) wetland mitigation project is located four miles west of Culbertson and on the north side of Highway 2, in Section 21, Township 28 North, Range 55 East, Roosevelt County, Montana (Figure 1). The wetland conservation easement area encompasses approximately 10.6 acres that abut an unnamed tributary to Big Muddy Creek.

Figures 2 and 3 in Appendix A show the 2011 Monitoring Activity Locations and Mapped Site Features, respectively. The MDT Mitigation Monitoring Form, US Army Corps of Engineers (USACE) Wetland Determination Data Forms for the Great Plains Region (USACE 2010), and the 2008 MDT Montana Wetland Assessment Forms (Berglund and McEldowney 2008) are included in Appendix B. Project site photographs are included in Appendix C and the Preliminary Design – Plan and Profile is presented in Appendix D.

The wetland restoration site is situated within Watershed 12, the Lower Missouri River Basin. Wetlands developed at this location were to provide compensatory mitigation for wetland impacts associated with transportation improvement projects in the Glendive District including Brockton-East and Big Muddy-West. The MDT completed an initial feasibility study in August 2009. The baseline delineation and Montana Wetland Assessment were completed by MDT forces in June 2010. The Big Muddy Creek mitigation site was constructed in spring 2011.

Approximately 0.73 acres of wetlands were delineated in June 2010 within the site boundaries for the baseline assessment. The wetlands encompassed an inundated, emergent marsh that extended from the banks of the unnamed tributary and a narrow emergent wet meadow that extended into upland habitat from the marsh.

The mitigation project was developed to create and preserve wetland habitat functions associated with rangeland located adjacent to the Big Muddy Creek tributary. The project objectives are listed below.

- Maximize the development of emergent and aquatic bed wetlands, general wildlife habitat, short and long-term surface water storage, sediment/nutrient/toxicant removal, and production export/food chain support.
- Create approximately 9.32 acres of wetland.
- Preserve approximately 0.73 acres of wetland through permanent protection and weed management.
- Preserve a protected and managed 0.43-acre upland buffer adjacent to site wetlands.
- Minimize site operation and maintenance requirements.

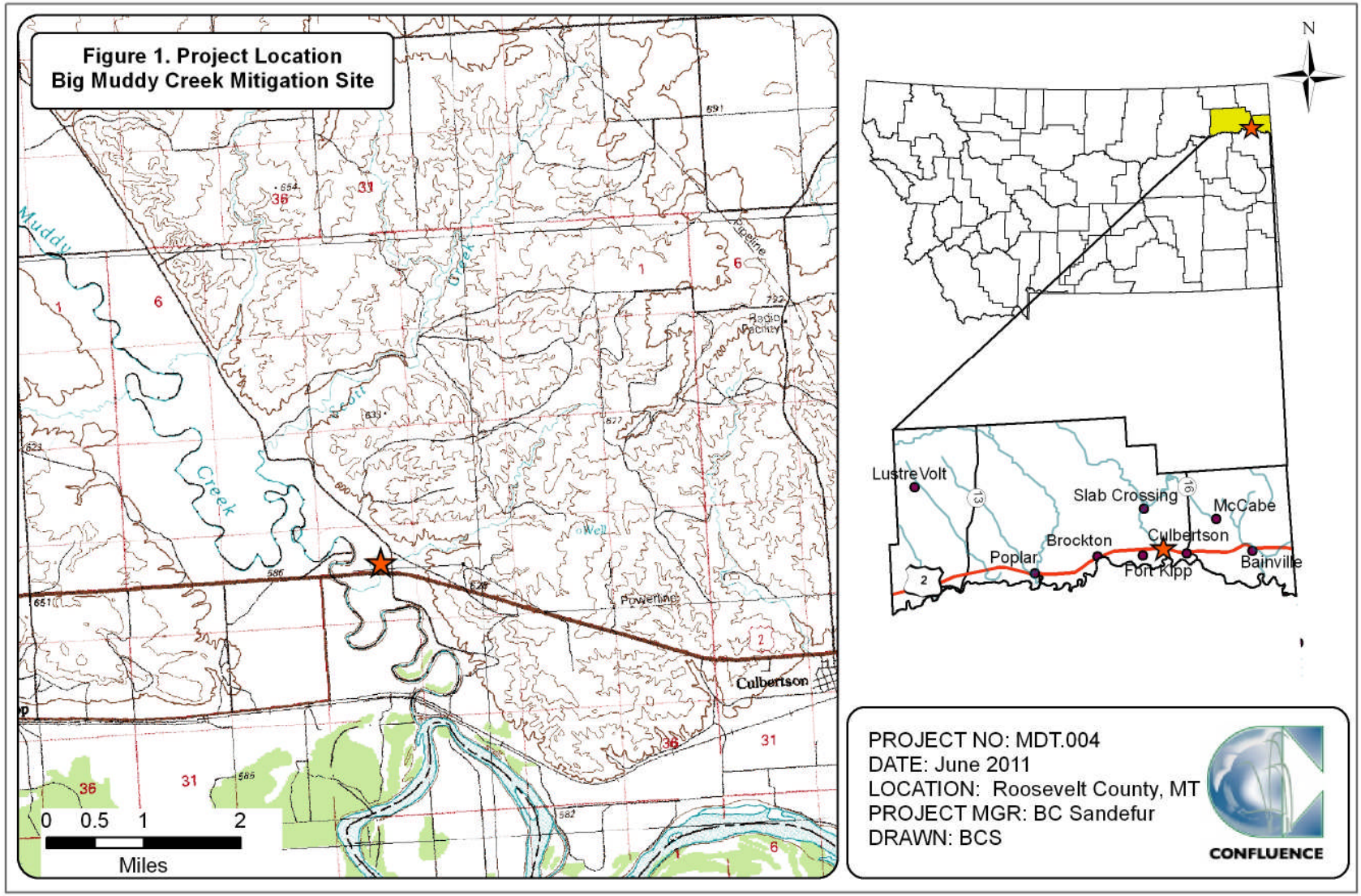


Figure 1. Project location of Big Muddy Creek Mitigation Site.

The mitigation plan proposed the creation of 6.53 acres of emergent/aquatic bed shallow marsh within three wetland cells. The cells were to be excavated to intersect groundwater to provide water depths ranging from 0.5 to 2 feet. Additional hydrology was to be provided by direct precipitation and snowmelt. The formation of an additional 1.76 acres of emergent wetland was proposed for the excavated areas between the cells.

The creation/restoration of approximately 1.03 acres of emergent wet meadow located at the north boundary and adjacent to the existing wet meadow was to be facilitated by excavating the ground surface to intercept groundwater hydrology. The created wetlands and upland buffer were to be revegetated by seeding with wetland and upland mixes, respectively, and natural colonization. The existing 0.73-acre emergent wetland proposed for preservation was to remain intact.

The project credit ratios approved by the USACE and included in the 2011 Mitigation Plan are shown on Table 7 of Section 3.9. The performance standards for each mitigation feature are included in the table.

2. METHODS

The post-construction baseline monitoring was completed on August 10, 2011. Information for the Mitigation Monitoring form and Wetland Data Form was entered electronically in the field on a personal digital assistant (PDA) palmtop computer during the field investigation (Appendix B). Monitoring activity sites were located with a global positioning system (GPS) as shown on Figure 2 (Appendix A). Information included completion of a wetland delineation, vegetation community mapping, vegetation transect monitoring, soil and hydrology data collection, bird and wildlife use and photo documentation, and a non-engineering examination of the infrastructure established within the mitigation project area.

2.1. Hydrology

The presence of hydrological indicators as outlined on the Wetland Data Form was assessed at three data points established within the project area. The hydrologic indicators were evaluated according to features observed during the site visit. The data were recorded on the electronic Wetland Data Form (Appendix B). Hydrologic assessments allow evaluation of mitigation goals addressing inundation/saturation requirements.

Technical criteria for wetland hydrology guidelines have been established as “permanent or periodic inundation, or soil saturation within 12 inches of the ground surface for a significant period (12.5 percent of the growing season) during the growing season” (USACE 2010). Systems with continuous inundation or saturation for greater than 12.5 percent of the growing season are considered jurisdictional wetlands. The growing season is approximated for purposes of this report as the number of days where there is a 50 percent probability that the minimum daily temperature is greater than or equal to 28 degrees Fahrenheit (USACE 2010). The growing season recorded for the predominant soil map units, Havrelon loam and Lohler silty clay, averages 113 days (USDA 2011).

Areas defined as wetlands would require 14 days of inundation or saturation within 12 inches of the ground surface to meet the hydrology criteria.

Soil pits excavated during the wetland delineation were used to evaluate groundwater levels within 18 inches of the ground surface. The data was recorded on the Wetland Data Form (Appendix B).

2.2. Vegetation

The boundaries of the dominant species-based vegetation communities were determined in the field during the active growing season and subsequently delineated on the 2011 aerial photograph. Percent cover of the dominant species within a community type was estimated and recorded using the following values: 0 (less than 1 percent), 1 (1 to 5 percent), 2 (6 to10 percent), 3 (11 to 20 percent), 4 (21 to 50 percent), and 5 (greater than 50 percent) (Appendix B). Community types were named based on the predominant vegetation species that characterized each mapped polygon (Figure 3, Appendix).

Temporal changes in vegetation will be evaluated through annual assessments of a static belt transect established in August 2011 (Figure 2, Appendix A). Vegetation composition was assessed and recorded along one vegetation belt transect (T-1) approximately 10 feet wide and 647 feet long, (Figure 2, Appendix A). The transect location was recorded with a resource-grade GPS unit. Spatial changes in the dominant vegetation communities were recorded along the stationed transect. The percent aerial cover of each vegetation species within the belt transect was estimated using the same values and cover ranges used for the polygon data on the 2011 aerial photograph (Figure 3, Appendix B). Photographs were taken at the endpoints of the transect during the monitoring event (Appendix C).

The location of noxious weeds was noted in the field and mapped on the aerial photo (Figure 3, Appendix A). The noxious weed species identified are color-coded. The locations are denoted with the symbol "**X**", "▲", or "■" representing 0 to 0.1 acre, .1 to 1 acre, or greater than 1 acre in extent, respectively. Cover classes are represented by T, L, M, or H, for less than 1 percent, 1 to 5 percent, 2 to 25 percent, and 25 to 100 percent, respectively.

2.3. Soil

Soil information was obtained from the *Soil Survey for Roosevelt County Area* (USDA 2011) and *in situ* soil descriptions. Soil cores were excavated using a hand auger and evaluated according to procedures outlined in the 1987 Manual and 2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (USACE 2010). A description of the soil profile, including hydric soil indicators when present, was recorded on the Wetland Data Form for each profile (Appendix B).

2.4. Wetland Delineation

Waters of the US including special aquatic sites and jurisdictional wetlands were delineated throughout the project area in accordance with criteria established in the 1987 Manual and the 2010 Regional Supplement. The technical criteria for

hydrophytic vegetation, hydric soil, and wetland hydrology must be satisfied to delineate a representative area as jurisdictional. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: Northern Plains Region 4 (Reed 1988). The Routine Level-2 On-site Determination Method (Environmental Laboratory 1987) was used to delineate jurisdictional areas as documented on the Wetland Data Form (Appendix B).

The wetland boundary was determined in the field based on changes in plant communities and/or hydrology, and changes in soil characteristics. Topographic relief boundaries within the project area were also examined and cross referenced with soil and vegetation communities as supportive information for the delineation. Vegetation composition, soil characteristics, and hydrology were assessed at likely wetland and adjacent upland locations. If all three parameters met the criteria, the area was designated as wetland and mapped by vegetation community type. If any one of the parameters did not exhibit positive wetland indicators, the area was determined to be upland unless the site was classified as an atypical situation, potential problem area for vegetation, soil or hydrology, or special aquatic site, i.e., mudflat. The wetland boundary was delineated on the 2011 aerial imagery and digitized into Geographic Information System (GIS) format. Wetland areas reported were estimated using GIS methodology.

2.5. Wildlife

Observations and other positive indicators of use of mammal, reptile, amphibian, and bird species were recorded on the wetland monitoring form during the site visit. Indirect use indicators, including tracks, scat, burrow, eggshells, skins, and bones, were also recorded. These signs were recorded while traversing the site for other required activities. Direct sampling methods, such as snap traps, live traps, and pitfall traps, were not used. A comprehensive wildlife species list of animals observed in 2011 was compiled for this report.

2.6. Functional Assessment

The 2008 MDT Montana Wetland Assessment method (MWAM) (Berglund and McEldowney 2008) was used to evaluate functions and values on the site in 2011. This method provides an objective means of assigning wetlands an overall rating and provides regulators a means of assessing mitigation success based on wetland functions. Functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society and relate to ecological significance without regard to subjective human values (Berglund and McEldowney 2008). Field data for this assessment were collected during the site visit. A Wetland Assessment Form was completed for two assessment areas (AA), the created wetlands and the existing wetlands (Appendix B).

2.7. Photo Documentation

Monitoring at photo points provided supplemental information documenting conditions of the site wetlands, uplands, and vegetation transects; site trends; and current land uses surrounding the project. Photographs were taken at photo

points established in 2011 during the site visit (Appendix C). Photo point locations were recorded with a resource grade GPS unit (Figure 2, Appendix A).

2.8. GPS Data

Site features and survey points were collected with a resource grade Thales Pro Mark III GPS unit during the 2011 monitoring season. Points were collected using WAAS-enabled differentially corrected satellites, typically improving resolution to sub-meter accuracy. The GPS data were subsequently exported into GIS and drawn in Montana State Plane Single Zone NAD 83 meters. In addition to GPS, some site features within the site were hand-mapped onto an aerial photograph, then digitized. Site features and survey points that were mapped included fence boundaries, photograph points, transect endpoints, wetland boundaries, and vegetation community boundaries.

2.9. Maintenance Needs

Channels, engineered structures, fencing, birdboxes and other features, if present, were examined during the site visit for obvious signs of breaching, damage, or other problems. This was a cursory examination and did not constitute an engineering-level structural inspection.

3. RESULTS

3.1. Hydrology

Climate data from the meteorological station at Culbertson Coop, Montana (242122), recorded an average annual precipitation rate of 13.48 inches from December 1900 to December 2010 (WRCC 2011). The annual precipitation recorded in 2010 was 20.53 inches, 7.05 inches above the 53 year average for the period of record. Cumulative precipitation from January to May 2011 was 10.01 inches (NCDC 2011).

Approximately 70 percent of the site was inundated to an average depth of 1.0 foot during the 2011 investigation. Surface water depths ranged from 0.5 to 3.0 feet. The depth at the emergent vegetation/open water boundary was 0.75 feet. Areas defined as wetlands that were not inundated exhibited saturation within 12 inches (1.0 foot) of the ground surface, a salt crust, and/or two secondary indicators including surface soil cracks, drainage patterns, and the FAC-Neutral test.

Three data points, BM-1 to BM-3, were sampled to determine the wetland/upland boundaries. Data points BM-1 and BM-2 were located in areas that met the wetland criteria. Data point BM-1 was located near a remnant wetland (Community Type 5). Secondary indicators included surface soil cracks, drainage patterns, and the FAC-neutral test. Sample point BM-2 was located within the saturated shoreline of an open water cell. Saturation to the ground surface was observed in the test pit. There was insufficient time for groundwater to enter the open pit as a result of low permeability soils. Data point BM-3 was excavated upslope from the edge of the open water cell. Surface soil cracks

were the only secondary indicator. The data point did not meet the wetland hydrology criteria.

3.2. Vegetation

Monitoring year 2011 marks the first year of post-construction monitoring of the Big Muddy Creek wetland mitigation site that was completed in May 2011 for the purpose of establishing baselines. Forty-five plant species were observed site wide in 2011 (Table 1). Vegetation plant communities were defined by plant dominance and composition, topography, and hydrology. The communities and associated species are listed on the Monitoring Form in Appendix B. The communities are mapped on Figure 3 in Appendix A.

Five vegetation communities were identified in 2011, two upland and three wetland. The communities were upland Type 1 – *Agropyron* spp., upland Type 2 – *Chenopodium album*, wetland Type 3 – *Scirpus* spp., wetland Type 4 – *Spartina pectinata/Scirpus* spp., and wetland Type 5, *Puccinellia nutalliana/Chenopodium album*. The open water limits in the constructed cells were identified on Figure 3 (Appendix A) by polygon 6.

Upland Community Type 1 – *Agropyron* spp. was found in the site perimeter, upslope from the constructed wetland cells. The cover consisted of existing and seeded herbaceous species. Crested wheatgrass (*Agropyron cristatum*), thickspike wheatgrass (*Agropyron dasystachyum*), Western wheatgrass (*Agropyron smithii*), quackgrass (*Agropyron trachycaulum*), curly-cup gumweed (*Grindelia squarrosa*), white goosefoot (*Chenopodium album*), seashore saltgrass (*Distichlis spicata*), and Nuttall‘s alkaligrass (*Puccinellia nuttallliana*) dominated the upland community.

Upland community Type 2 – *Chenopodium album* characterized the excavated areas between the wetland cells that were seeded with the wetland mix. Approximately 60 percent of the community was bare ground. The dominant species were white goosefoot, crested wheatgrass, small-flower sumpweed (*Iva axillaris*), yellow sweet clover (*Melilotus officinalis*), seashore saltgrass, Mexican summer-cypress (*Kochia scoparia*), and Kentucky bluegrass (*Poa pratensis*). This area was proposed for wetland creation. Data point B-3 located in this community exhibited a single hydrology indicator, surface soil cracks. The cover of wetland plants is expected to increase in subsequent growing seasons provided the duration and level of saturation is adequate long term.

Wetland community Type 3 – *Scirpus* spp. was named for the seeded emergent community found at the open water boundary of the constructed cells. Approximately 50 percent of the community was bare ground. The dominant species were saltmarsh bulrush (*Scirpus maritimus*), hard-stem bulrush (*Scirpus acutus*), Olney’s bulrush (*Scirpus americanus*), seashore saltgrass, and broad-leaf cattail (*Typha latifolia*). The percent vegetation cover is expected to increase in subsequent years based on the current level of inundation and saturation.

Table 1. Vegetation species observed in 2011 at the Big Muddy Wetland Mitigation site.

SCIENTIFIC NAME	COMMON NAME	REGION 4 INDICATOR STATUS[1]
Achillea millefolium	yarrow,common	FACU
Agropyron cristatum	crested wheatgrass	NL
Agropyron dasystachyum	wheatgrass,thick-spike	FAC
Agropyron repens	quackgrass	FAC
Agropyron smithii	wheatgrass,western	FACU
Agropyron trachycaulum	wheatgrass,slender	FACU
Artemisia cana	sagebrush,silver	FACU
Artemisia frigida	prairie sagewort	NL
Bromus inermis	smooth brome	NL
Buchloe dactyloides	grass,buffalo	FACU-
Carex aquatilis	sedge,water	OBL
Chenopodium album	goosefoot,white	FAC
Cirsium arvense	thistle,Canada	FACU
Distichlis spicata	saltgrass,seashore	NI
Eleocharis palustris	spikerush,creeping	OBL
Equisetum arvense	horsetail,field	FAC
Fraxinus pennsylvanica	ash,green	FAC
Glycyrrhiza lepidota	licorice,American	FACU
Grindelia squarrosa	gumweed,curly-cup	UPL
Helianthus annuus	sunflower,common	FACU
Hordeum jubatum	barley,fox-tail	FACW
Iva axillaris	sumpweed,small-flower	FACU
Juncus balticus	rush,Baltic	OBL
Kochia scoparia	summer-cypress,Mexican	FAC
Lactuca serriola	lettuce,prickly	FACU
Lemna minor	duckweed,lesser	OBL
Medicago sativa	alfalfa	NL
Melilotus officinalis	sweetclover,yellow	FACU-
Mentha arvensis	mint,field	FACW
Poa arida	bluegrass,plains	FAC
Poa pratensis	bluegrass,Kentucky	FACU
Polypogon monspeliensis	grass,annual rabbit-foot	OBL
Puccinellia nuttalliana	grass,Nuttall's alkali	OBL
Rumex crispus	dock,curly	FACW
Scirpus acutus	bulrush,hard-stem	OBL
Scirpus americanus	bulrush,Olney's	OBL
Scirpus maritimus	bulrush,saltmarsh	NI
Sonchus arvensis	sowthistle,field	FAC
Spartina pectinata	prairie cordgrass	FACW
Symphoricarpos albus	snowberry	FACU-
Symphyotrichum laeve	smooth blue aster	NL
Taraxacum officinale	dandelion,common	FACU
Thlaspi arvense	penny-cress,field	NI
Tragopogon dubius	yellow salsify	NL
Typha latifolia	cattail,broad-leaf	OBL

[1]Region 4: Northern Plains (Reed 1988).

Wetland community Type 4 – *Spartina pectinata./Scirpus* spp. characterized the pre-existing wetland community associated with the unnamed tributary to Big Muddy Creek that parallels the west, north, and east boundaries. Blue grama (*Bouteloua gracilis*) had been recorded on the field form as the dominant species within this community during the site visit. Upon review of the photos of this community and the ecology of blue grama, it was determined that the dominant species in this community was likely not blue grama but instead prairie cordgrass (*Spartina pectinata*). Hard-stem bulrush, broad-leaf cattail, minor duckweed (*Lemna minor*), and curly dock (*Rumex crispus*) were additional components of this vegetation community. The community contained inundated areas with water levels ranging from one to two feet deep.

Wetland community Type 5 – *Puccinellia nutalliana/Chenopodium album* was identified near the remnant wetland located at the north boundary. This was described in the mitigation plan as passive creation. The vegetation cover was dominated by Nuttall's alkaligrass, white goosefoot, with minor amounts of crested wheatgrass, quackgrass, smooth brome (*Bromus inermis*), curly cup gumweed, small-flower sumpweed, curly dock, and foxtail barley (*Hordeum jubatum*). White goosefoot invades sites after disturbance. Saltmarsh bulrush plants were emerging in the base of the saturated constructed trenches.

Approximately five acres of open water (Polygon 6) were identified for most of the area associated with the constructed wetland cells. Productivity levels in the open water areas were still low as a result of the recent construction. The open water cells are expected to develop into an aquatic bed community as the percent cover of aquatic macrophytes and algae increases.

One infestation of Canada thistle (*Cirsium arvense*), a Priority 2B weed, was observed at the edge of the unnamed tributary. The infestation covered less than 0.1 acre with a moderate cover class of 5 to 25 percent. The MDT has an ongoing weed control program that includes an annual assessment through the monitoring program of weeds indentified within the site.

Transitions in the vegetation communities were measured along a single 647-foot transect. The transect intersected four vegetation communities, upland Type 1, upland Type 2, wetland Type 3, and wetland Type 5. Approximately 50 percent of the transect crossed open water in the constructed cells. Hydrophytic vegetation was identified on 20.7 percent of the transect. This is the first growing season following construction, completed in spring 2011. The percent cover of emergent vegetation, aquatic macrophytes, and algae in the open water is expected to increase in subsequent growing seasons.

Table 2. Data summary for Transect 1 in 2011 at the Big Muddy Wetland Mitigation Site.

Monitoring Year	2011
Transect Length (feet)	647
Vegetation Community Transitions along Transect	11
Vegetation Communities along Transect	4
Hydrophytic Vegetation Communities along Transect	2
Total Vegetative Species	21
Total Hydrophytic Species	12
Total Upland Species	9
Estimated % Total Vegetative Cover	40
% Transect Length Comprising Hydrophytic Vegetation Communities	20.7
% Transect Length Comprising Upland Vegetation Communities	29.8
% Transect Length Comprising Unvegetated Open Water	49.5
% Transect Length Comprising Bare Substrate	0.0

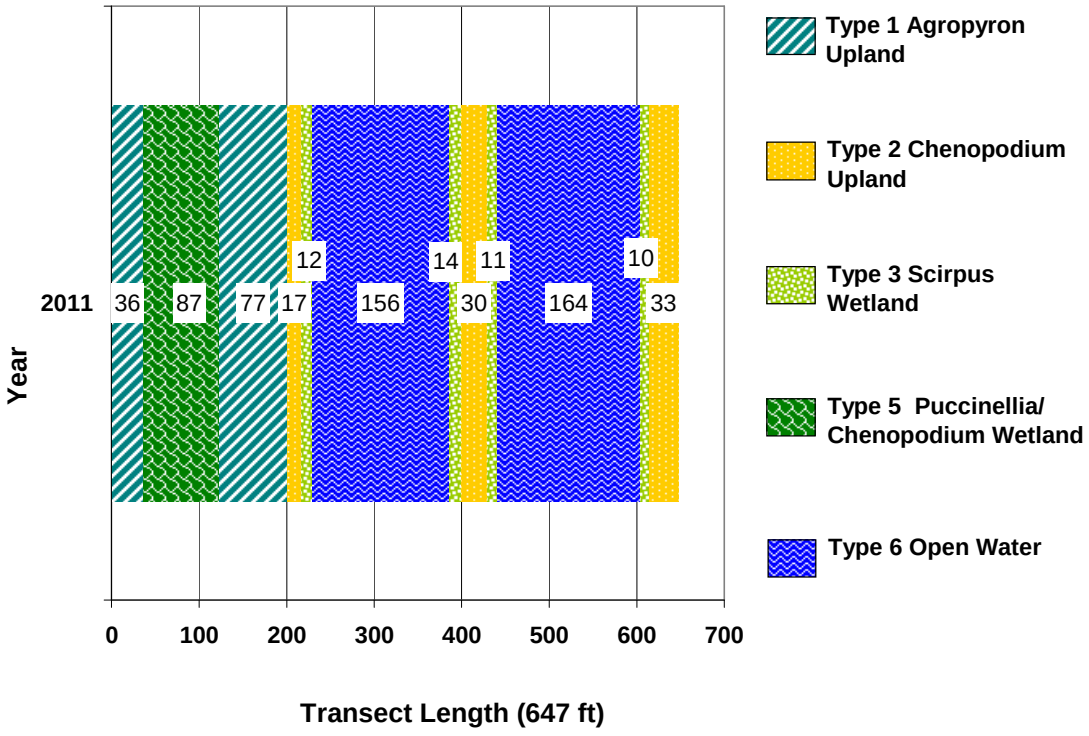


Chart 1. Transect map showing community types on Transect 1 in 2011 from start (0 feet) to finish (647 feet) at Big Muddy.

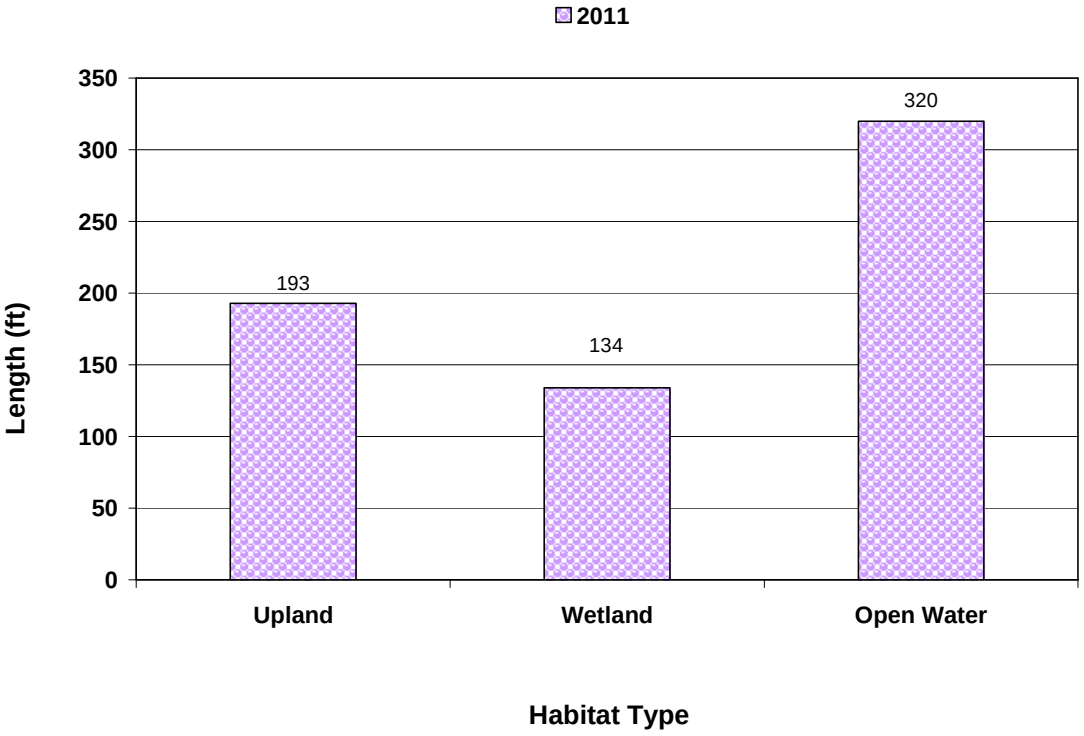


Chart 2. Length of habitat types within Transect 1 in 2011 at Big Muddy.

3.3. Soil

The project site was mapped in the Roosevelt County Soil Survey (USDA 2011). Two main soil types were identifed within the monitoring area, the Havrelon loam found on 0 to 2 percent slopes and the Lohler silty clay also found on 0 to 2 percent slopes. The Havrelon loam was mapped primarily in the pre-existing wetland areas. The series is a moderately well drained loam, taxonomically classified as a frigid Typic Ustifluvents. The soil is found on floodplains of major streams and tributaries. The Lohler silty clay is a slowly permeable soil, taxonomically classified as a frigid Vertic Ustifluvents. The soil is found on floodplains with slopes ranging from 0 to 6 inches. The map units are included on the Montana Hydric Soils list.

Three soil pits were excavated to characterize the site soil. Data points BM-1 (Community 5) and BM-2 (Community 3) were located in areas that met the wetland criteria. Data point BM-3 was located upslope from the water's edge in upland Community 2. The profile in BM-1 revealed a dark gray (10 YR 4/1) clay loam without redoximorphic features. The soil was considered problematic based on the recent disturbance resulting from the construction of shallow trenches intended to augment water levels in the passively created wetland. Positive indicators of hydrophytic vegetation and wetland hydrology were present. Profile BM-2 exhibited a dark grayish brown (10 YR 4/2) clay loam soil with five percent redox concentrations (2.5 YR 5/6) in the matrix. The depleted

matrix was a positive indicator of hydric soil. Profile BM-3 revealed a light gray (10YR 4/2) silty clay loam without redox concentrations. There were no hydric soil indicators and the vegetation and hydrology did not meet the wetland criteria.

3.4. Wetland Delineation

Three data points, BM-1 to BM-3, were used to determine the wetland boundaries (Figure 2, Appendix A, and Wetland Data Forms, Appendix B). Data points BM-1 and BM-2 were located within areas that met the wetland criteria. The 2011 wetland delineation identified 6.92 acres of waters of the US including wetlands within the project boundaries (Table 4). The existing wetland located on the west and north boundaries (Community 4) encompassed 0.73 acres. The created wetland, communities 3 and 5, totaled 1.14 acres and the open water in the constructed wetland cells encompassed 5.05 acres. The open water cells are expected to develop into an aquatic bed wetland community as the percent cover of emergent vegetation and aquatic macrophytes increases.

Table 3. Total wetland acres delineated in August 2011 at Big Muddy.

Wetlands and Aquatic Habitat	2011 (acres)
Created Wetland	1.14
Existing Wetland	0.73
Open Water	5.05
Total	6.92

3.5. Wildlife

A comprehensive list of birds and other wildlife species observed directly or indirectly during the 2011 monitoring visit is presented in Table 5 (Monitoring Form, Appendix B). Five bird species, including the blue-winged teal, killdeer, mallard, red-winged blackbird and 20 Wilson's phalarope, were observed during monitoring. Temperatures rose to the low 90's during the investigation, which may have limited wildlife use during the timeframe of the investigation. Twenty northern leopard frogs were observed in the pre-existing wetland and wetland cells and raccoon tracks were observed along the shoreline of the constructed cells.

Table 4. Wildlife species observed within the Big Muddy Mitigation Site in 2011.

COMMON NAME	SCIENTIFIC NAME
AMPHIBIAN	
Northern Leopard Frog*	*Rana*
BIRD	
American Avocet*	*Recurvirostra americana*
American Coot*	*Fulica americana*
American Wigeon*	*Anas americana*
Blue-winged Teal	*Anas discors*
Cinnamon Teal*	*Anas cyanoptera*
Gadwall*	*Anas strepera*
Killdeer	*Charadrius vociferus*
Mallard	*Anas platyrhynchos*
Northern Shoveler*	*Anas clypeata*
Red-winged Blackbird	*Agelaius phoeniceus*
Spotted Sandpiper*	*Actitis macularius*
Wilson's Phalarope	*Phalaropus tricolor*
Wilson's Snipe*	*Gallinago delicata*
Western Sandpiper*	*Erolia mauri*
Yellow-headed Blackbird*	*Xanthocephalus xanthocephalus*
MAMMAL	
Deer sp.*	
Raccoon	*Procyon lotor*
Red Fox*	*Vulpes vulpes*
Muskrat*	*Ondatra zibethicus*
REPTILE	
Unidentified Snake*	

*Species identified in 2011 by MDT.

3.6. Functional Assessment

The 2008 MWAM was used in the May 2011 Mitigation Plan to evaluate 8 acres of the existing riverine wetland associated with the tributary to Big Muddy Creek and 2 acres of the remnant wet meadow located north and south of the mitigation site. Both AAs extended outside the current project boundaries. Consequently, the functional points and values could not be compared to the post-construction mitigation site.

The 2008 MWAM was used to evaluate the functional values of the mitigation site wetlands in 2011 (Table 5). The created and preserved wetlands were assessed on separate forms. The 6.19-acre created wetland AA included the constructed wetland cells and the potential passive wetland development area. The creation AA was rated as a Category III wetland in 2011 with 53.5 percent of the total possible points. High ratings were given for short and long term surface water storage, groundwater discharge and recharge, and recreation/education

potential. Ratings were moderate for Montana Natural Heritage Program (MTNHP) habitat, general wildlife habitat, flood attenuation, sediment/nutrient/toxicant removal, and production export/food chain support. Ratings are expected to improve with increases in the percent cover of wetland vegetation species.

The 0.73 acre preservation wetland associated with the tributary to Big Muddy Creek was rated as a Category II wetland with 65.5 percent of the total possible points. The rating was based on a high (0.9) score for general wildlife habitat. High scores were also given for sediment/nutrient/toxicant removal, sediment/shoreline stabilization, production export/food chain support, groundwater recharge/discharge, and recreation/education potential.

Table 5. Functions and Values of Big Muddy Wetlands in 2011.

Function and Value Parameters from the 2008 Montana Wetland Assessment Method	2011 (Creation)	2011 (Preservation)
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Mod (0.5)	Mod (0.5)
General Wildlife Habitat	Mod (0.5)	High (0.9)
General Fish/Aquatic Habitat	NA	NA
Flood Attenuation	Mod (0.5)	Mod (0.4)
Short and Long Term Surface Water Storage	High (1.0)	Mod (0.4)
Sediment/Nutrient/Toxicant Removal	Mod (0.7)	High (0.9)
Sediment/Shoreline Stabilization	Low (0.3)	High (1.0)
Production Export/Food Chain Support	Mod (0.5)	High (0.9)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Mod (0.4)
Recreation/Education Potential (bonus points[3])	High (0.15)	High (0.15)
Actual Points/Possible Points	**5.35/10**	**6.55/10**
% of Possible Score Achieved	**53.5%**	**65.5%**
Overall Category	**III**	**II**
Total Acreage of Assessed Wetlands within Site Boundaries	**6.19**	**0.73**
Functional Units (acreage x actual points)	**33.12**	**4.78**

3.7. Photo Documentation

Photographs taken at photo points one through four (PP-1 through PP-4; Figure 2, Appendix A) are shown on pages C-1 to C-3 of Appendix C. Photographs of the transect end points and data points are shown on page C-3 and pages C-3 and C-4, respectively (Appendix C).

3.8. Maintenance Needs

There are no diversion structures or nesting structures currently installed at the site. One infestation of Canada thistle (*Cirsium arvense*), a Priority 2B weed, was observed at the edge of the unnamed tributary. The infestation covered less than 0.1 acre with a moderate cover class of 5 to 25 percent. The MDT has an

ongoing weed control program that includes an annual assessment through the monitoring program of weeds identified within the site.

3.9. Current Credit Summary

Table 6 taken from the May 2011 Mitigation Plan summarizes the proposed mitigation acreages, credit ratios, and scaled performance standards. Table 7 summarizes the estimated credit acreages based on the 2011 wetland delineation. The mitigation plan proposed the creation of 6.53 acres of emergent/aquatic bed shallow marsh within three wetland cells. An additional 1.76 acres of emergent wetland creation was planned for the excavated areas between the cells. The creation/restoration of approximately 1.03 acres of emergent wet meadow located at the north boundary and adjacent to the existing wet meadow was to be facilitated by excavating the ground surface by approximately 0.5 feet. The design acreage for the excavated areas between the cells was included with the passive wetland acreage in the first row of Table 6. The acreage of the open water and shoreline of the constructed cells was addressed under the second row of creation establishment. The existing 0.73-acre emergent wetland proposed for preservation was to remain intact and protected in perpetuity.

The total estimated credit acreage in 2011 was 5.26 acres (Table 7). The acres listed for each category were scaled according to the credit criteria listed in Table 6. The passive wetland located primarily on the north boundary and characterized by Community 5 encompassed 0.44 acres in 2011. The estimated credit acreage based on meeting performance standard 1 and making demonstrable progress on standards 2 and 3 was 0.31 acres. The absolute cover of hydrophytic vegetation within the restored wetland was approximately 60 percent and the absolute cover of noxious weeds was less than 5 percent.

The acreage of the open water and emergent wetland fringe of the cells (polygon 6 and Community 3) totaled 5.75 acres. The estimated credit acreage was 4.03 based on the scaled criteria for meeting standards 1 and 3 and making demonstrable progress on standard 2. The absolute cover has not achieved 70 percent. Bare ground accounted for greater than 50 percent of total cover. The noxious weed absolute cover is less than 5 percent.

The three performance standards for the 0.73 acre preservation wetland were met in 2011. The upland acreage site wide totaled 3.7 acres, which included the buffer located south of the cells, the non-wetland area targeted for passive wetland creation, and the excavated area between the cells that did not meet the wetland criteria. The 2011 estimated credit for the upland buffer was 0.74 acres, based on the absolute cover noxious weeds being less than five percent.

Table 6. Wetland Crediting and Performance Standard Summary for the Big Muddy Creek Wetland Mitigation Project (Atkins 2011).

Compensatory Mitigation Type [a]	COE Mitigation Credit Ratio [1]	Acres	Preliminary Credit Estimate (Acres)	Performance Standard 1	Performance Standard 2	Performance Standard 3	Scaled % Credit Criteria [2]
Creation: Establishment [3]	1:1	1.03 to 2.79	1.03 to 2.79	Satisfy 1987 Manual and Regional Supplement Wetland Hydrology Wetland Soils Hydrophytic Vegetation Criteria	Achieve 70% Absolute Cover of FAC or Wetter Plants	Noxious Weed Absolute Cover <5%	Features constructed / implemented and:Features constructed / implemented and: All standards met = 100% Standard 1 met and demonstrable progress on 2-3 = 70% Standard 1 not met but demonstrable progress on 1-3 = 50% Standard 1 met but lack of progress / corrective action on 2-3 = 30% Stand 1 not met and no demonstrable progress / corrective Action = 0%
Creation: Establishment[c]	1:1	6.53	6.53	Satisfy 1987 Manual and Regional Supplement Wetland Hydrology Wetland Soils Hydrophytic Vegetation Criteria (excluding open water areas)	Achieve 70% Absolute Cover of FAC or Wetter Plants (excluding open water areas)	Noxious Weed Absolute Cover <5%	Features constructed / implemented and:Features constructed / implemented and: All standards met = 100% Standard 1 met and demonstrable progress on 2-3 = 70% Standard 1 not met but demonstrable progress on 1-3 = 50% Standard 1 met but lack of progress / corrective action on 2-3 = 30% Stand 1 not met and no demonstrable progress / corrective Action = 0%
Preservation	4:1	0.73	0.18	Satisfy 1987 Manual and Regional Supplement Wetland Hydrology Wetland Soils Hydrophytic Vegetation Criteria	NA	Noxious Weed Absolute Cover <5%	All standards met = 100% Standard 1 met and demonstrable progress on 3 = 75% Standard 1 not met but demonstrable progress on 1 and 3 = 50% Standard 1 met but lack of progress on 3 = 30% Standard 1 not met = 0%
Upland Buffer	5:1	0.43	0.09	NA	NA	Noxious Weed Absolute Cover <5%	Standard 3 met = 100% Standard 3 not met but with demonstrable progress = 30% Standard 3 not met with no demonstrable progress = 0%
Total			**7.83 to 9.59 acres**				

[1]Corps of Engineers 2005 Wetland Compensatory Mitigation Ratios, Montana Regulatory Program.
[2]Percentages to be applied to credit estimate acres in Column 5.
[3]Incidentally created wetlands will be credited according to parameters listed under “Creation: Establishment”.

Table 7. Summary of wetland credits as of 2011.

Compensatory Mitigation Type	USACE Mitigation Credit Ratio	Proposed Acres	Preliminary Credit Estimate (Acres)	2011 Delineated Acres	Scaled % Credit Standards	2011 Credit Acres
Creation: Establishment (cell perimeters)	1:1	1.03 to 2.79	1.03 to 2.79	0.44	70%	0.31
Creation: Establishment (wetland cells)	1:1	6.53	6.53	5.75	70%	4.03
Preservation	4:1	0.73	0.18	0.73	100%	0.18
Upland Buffer	5:1	0.43	0.09	3.70	100%	0.74
Total			**7.83 to 9.59 acres**	**10.62**		**5.26**

4. REFERENCES

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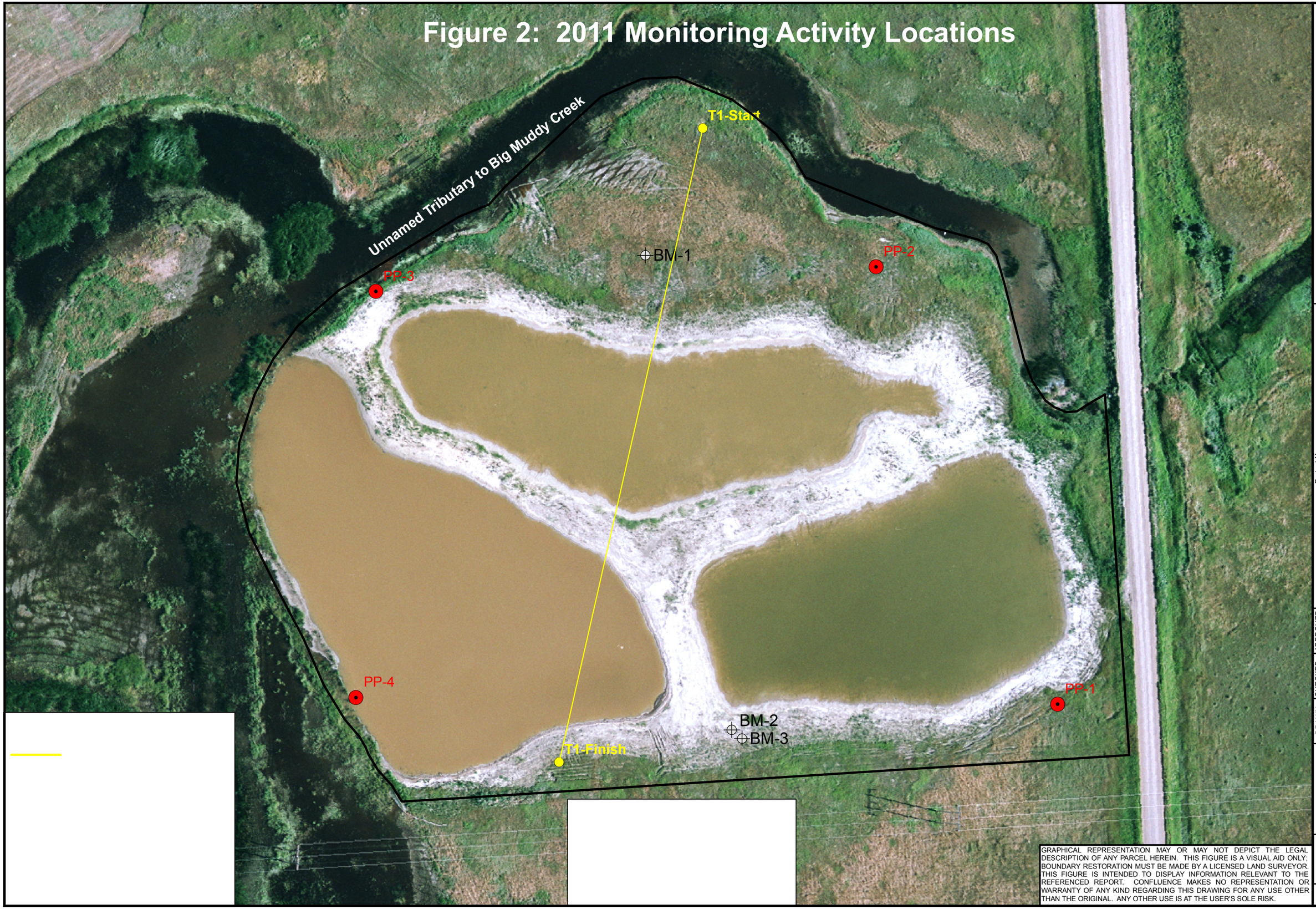
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Appendix A

Figure 2 – Monitoring Activity Locations
Figure 3 – Mapped Site Features

MDT Wetland Mitigation Monitoring
Big Muddy Creek
Roosevelt County, Montana

Figure 2: 2011 Monitoring Activity Locations



LOCATION: Roosevelt Co., MT

PROJECT NO: MDT.004

FILE: BigMuddy/Monitor2011.mxd

Project Name: Big Muddy Mitigation Site

Drawing Title: 2011 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
BV	BCS	JJ

SCALE: Noted

Drawn: September 15, 2011

PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 2

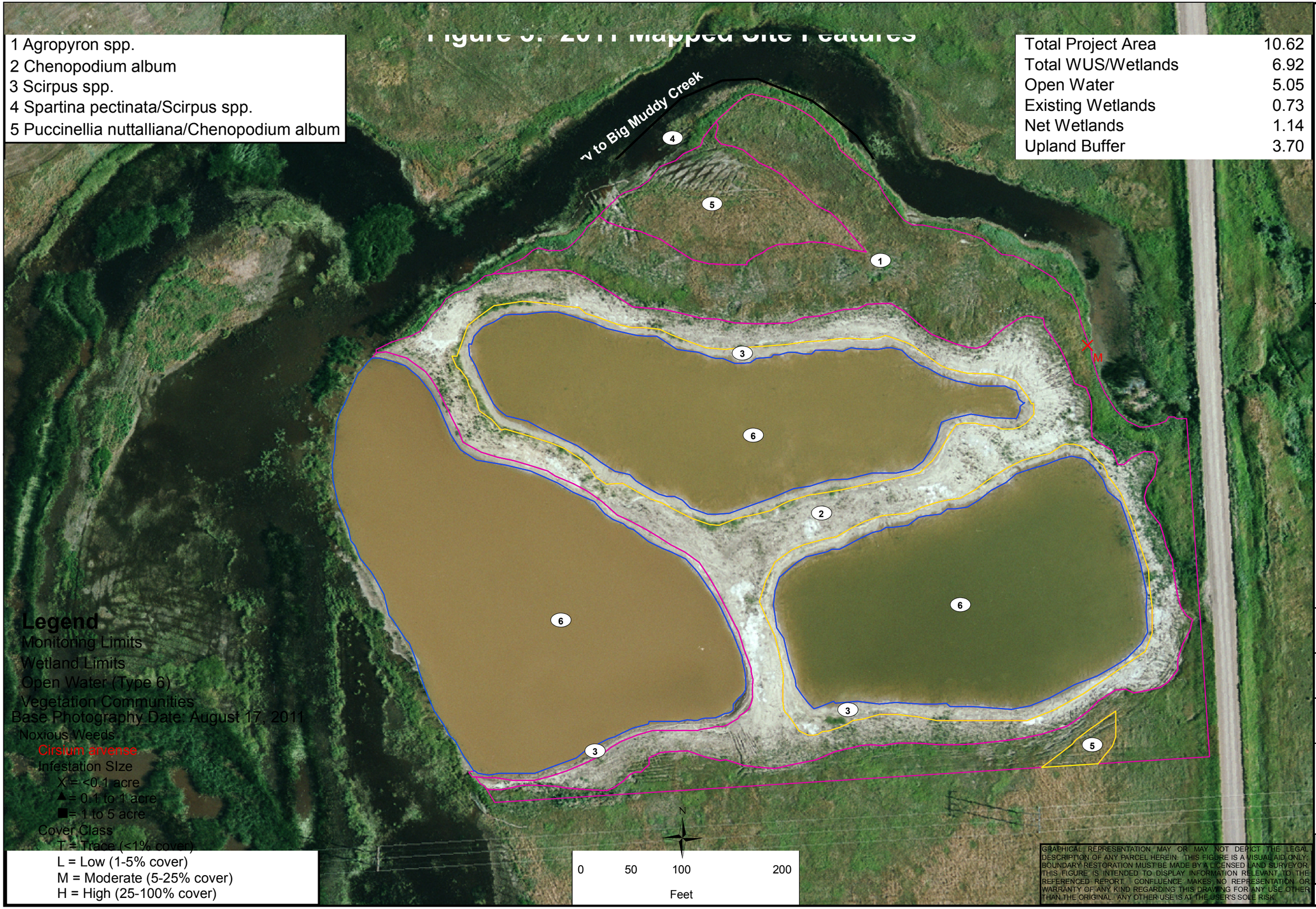
REV -

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

Figure 3: 2011 Mapped Site Features

1 Agropyron spp.
2 Chenopodium album
3 Scirpus spp.
4 Spartina pectinata/Scirpus spp.
5 Puccinellia nuttalliana/Chenopodium album

Total Project Area	10.62
Total WUS/Wetlands	6.92
Open Water	5.05
Existing Wetlands	0.73
Net Wetlands	1.14
Upland Buffer	3.70



Legend
- Monitoring Limits
- Wetland Limits
- Open Water (Type 6)
- Vegetation Communities

Base Photography Date: August 17, 2011

Noxious Weeds
- Cirsium arvense
  - Infestation SIze
    - X = <0.1 acre
    - ▲= 0.1 to 1 acre
    - ■= 1 to 5 acre
  - Cover Class
    - T = Trace (<1% cover)
    - L = Low (1-5% cover)
    - M = Moderate (5-25% cover)
    - H = High (25-100% cover)

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

LOCATION: Roosevelt Co., MT
PROJECT NO: MDT.004
FILE: BigMuddy/Veg2011.mxd

Project Name: Big Muddy Creek Wetland Mitigation Site
Drawing Title: 2011 Mapped Site Features

DRAWN BCV | CHECKED BCS | APPROVED JJ
SCALE: Noted
Drawn: September 15, 2011
PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 3

REV -

Appendix B

2011 MDT Wetland Mitigation Site Monitoring Form
2011 USACE Wetland Determination Data Forms
2011 MDT Montana Wetland Assessment Forms

MDT Wetland Mitigation Monitoring
Big Muddy Creek
Roosevelt County, Montana

MDT WETLAND MITIGATION SITE MONITORING FORM

Project Site: Big Muddy Creek Assessment Date/Time 8/10/2011 9:35:52 AM

Person(s) conducting the assessment: B. Vaughn/ B. Schultz

Weather: clear, sunny, 75 Location: 4 miles west of Culbertson

MDT District: Glendive Milepost:

Legal Description: T 28N R 55E Section(s) 21

Initial Evaluation Date: 8/10/2011 Monitoring Year: 1 #Visits in Year: 1

Size of Evaluation Area: 10.5 (acres)

Land use surrounding wetland:

agricultural, pasture

HYDROLOGY

Surface Water Source: Unnamed trib to Big Muddy Creek, precipitation, groundwater

Inundation: ☑ Average Depth: 1 **(ft)** Range of Depths: 0.5-3.0 **(ft)**

Percent of assessment area under inundation: 70 %

Depth at emergent vegetation-open water boundary: 0.75 **(ft)**

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**:**

Surface soil cracks,salt crust, drainage pattern. Soil saturated within 12 inches in wetlands that are not inundated.

Groundwater Monitoring Wells

Record depth of water surface below ground surface, in feet.

Well ID	**Water Surface Depth (ft)**
No Wells	

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.

Hydrology Notes:

Area appeared to receive overbank flow from the unnamed tributary during spring flows. No surface flow entering wetland complex at time of survey. Presumed groundwater connection between stream and wetland.

VEGETATION COMMUNITIES

Site Big Muddy Creek

(Cover Class Codes **0** = < 1%, **1** = 1-5%, **2** = 6-10%, **3** = 11-20%, **4** = 21-50% , **5** = >50%)

* Indicates accepted spp name not on '88 list.

Community # 1 **Community Type:** Agropyron spp. / **Acres** 1.87

Species	Cover class	Species	Cover class
Achillea millefolium	1	Agropyron cristatum	3
Agropyron dasystachyum	2	Agropyron repens	2
Agropyron smithii	2	Agropyron trachycaulum	1
Artemisia cana	1	Artemisia frigida	1
Bromus inermis	1	Buchloe dactyloides	1
Chenopodium album	2	Cirsium arvense	1
Distichlis spicata	2	Equisetum arvense	0
Fraxinus pennsylvanica	0	Grindelia squarrosa	2
Hordeum jubatum	0	Mentha arvensis	0
Poa arida	1	Poa pratensis	0
Puccinellia nuttalliana	2	Rumex crispus	0
Spartina pectinata	1	Symphoricarpos albus	1
Thlaspi arvense	1		

Comments:

Existing and seeded upland bordering remnant alkaligrass wetland in south east property corner and north of constructed cells.

Community # 2 **Community Type:** Chenopodium album / **Acres** 1.83

Species	Cover class	Species	Cover class
Agropyron cristatum	2	Agropyron dasystachyum	0
Bare ground	5	Chenopodium album	4
Distichlis spicata	1	Glycyrrhiza lepidota	0
Grindelia squarrosa	0	Helianthus annuus	0
Hordeum jubatum	0	Iva axillaris	2
Kochia scoparia	1	Lactuca serriola	0
Medicago sativa	0	Melilotus officinalis	1
Poa pratensis	1	Puccinellia nuttalliana	0
Rumex crispus	0	Sonchus arvensis	0
Spartina pectinata	0	Symphyotrichum laeve	0
Thlaspi arvense	0	Tragopogon dubius	0

Comments:

Seeded area between upland and Comm 3. Approx 50% bare ground.

Community # 3 Community Type: Scirpus spp. / **Acres** 0.7

Species	Cover class	Species	Cover class
Agropyron smithii	0	Bare ground	4
Chenopodium album	0	Distichlis spicata	2
Eleocharis palustris	0	Juncus balticus	1
Open water	1	Polypogon monspeliensis	0
Puccinellia nuttalliana	1	Rumex crispus	1
Scirpus acutus	1	Scirpus americanus	1
Scirpus maritimus	2	Sonchus arvensis	0
Taraxacum officinale	0	Typha latifolia	2

Comments:

Emergent vegetation community located at open water boundary. Approx. 50% bare ground within emergent community located at edge of open water.

Community # 4 Community Type: Spartina pectinata / Scirpus spp. **Acres** 0.73

Species	Cover class	Species	Cover class
Carex aquatilis	1	Lemna minor	2
Poa pratensis	0	Rumex crispus	2
Scirpus acutus	3	Scirpus maritimus	1
Spartina pectinata	5	Typha latifolia	3

Comments:

Existing wetland community associated with UT of Big Muddy Creek located on the west, north, and east boundaries.

Community # 5 Community Type: Puccinellia nuttalliana / Chenopodium album **Acres** 0.44

Species	Cover class	Species	Cover class
Agropyron cristatum	1	Agropyron dasystachyum	0
Agropyron repens	1	Bromus inermis	1
Buchloe dactyloides	0	Chenopodium album	3
Distichlis spicata	0	Grindelia squarrosa	1
Hordeum jubatum	1	Iva axillaris	1
Lactuca serriola	0	Poa pratensis	0
Puccinellia nuttalliana	5	Rumex crispus	1
Scirpus maritimus	1	Spartina pectinata	0

Comments:

Community encompasses an area with many tracks of construction equipment. Scir mar emerging within base of equipment tracks.

Total Vegetation Community Acreage **5.57**

(Note: some area within the project bounds may be open water or other non-vegetative ground cover.

VEGETATION TRANSECTS

Site: Big Muddy Creek Date: 8/10/2011 9:35:52 AM

Transect Number: 1 **Compass Direction from Start:** 220

Interval Data:

Ending Station 36 **Community Type:** Agropyron spp. /

Species	Cover class	Species	Cover class
Achillea millefolium	0	Agropyron cristatum	1
Agropyron repens	2	Agropyron smithii	4
Artemisia cana	1	Bromus inermis	2
Chenopodium album	0	Grindelia squarrosa	1
Hordeum jubatum	1	Poa pratensis	1
Rumex crispus	0		

Ending Station 123 **Community Type:** Puccinellia nuttalliana / Chenopodium album

Species	Cover class	Species	Cover class
Bromus inermis	0	Chenopodium album	0
Distichlis spicata	2	Grindelia squarrosa	0
Hordeum jubatum	1	Lactuca serriola	0
Puccinellia nuttalliana	5	Rumex crispus	0

Ending Station 200 **Community Type:** Agropyron spp. /

Species	Cover class	Species	Cover class
Achillea millefolium	0	Agropyron cristatum	2
Agropyron dasystachyum	2	Bromus inermis	1
Chenopodium album	2	Distichlis spicata	1
Equisetum arvense	0	Grindelia squarrosa	0
Hordeum jubatum	1	Mentha arvensis	0
Poa pratensis	2	Puccinellia nuttalliana	1
Rumex crispus	0		

Ending Station 217 **Community Type:** Chenopodium album /

Species	Cover class	Species	Cover class
Agropyron cristatum	1	Agropyron dasystachyum	0
Chenopodium album	3	Distichlis spicata	1
Grindelia squarrosa	1	Iva axillaris	0
Kochia scoparia	2	Puccinellia nuttalliana	2
Rumex crispus	0		

Ending Station 229 **Community Type:** Scirpus spp. /

Species	Cover class	Species	Cover class
Bare ground	2	Distichlis spicata	1
Puccinellia nuttalliana	1	Rumex crispus	0
Scirpus maritimus	2	Typha latifolia	1

Ending Station 385 **Community Type:** Open Water /

Species	Cover class	Species	Cover class
Open water	5		

Ending Station 399 **Community Type:** Scirpus spp. /

Species	Cover class	Species	Cover class
Bare ground	2	Distichlis spicata	1
Rumex crispus	1	Scirpus maritimus	2

Ending Station 429 **Community Type:** Chenopodium album /

Species	Cover class	Species	Cover class
Bare ground	4	Chenopodium album	2
Distichlis spicata	1	Hordeum jubatum	1
Iva axillaris	1	Rumex crispus	1

Ending Station 440 **Community Type:** Scirpus spp. /

Species	Cover class	Species	Cover class
Bare ground	3	Distichlis spicata	1
Rumex crispus	1	Scirpus maritimus	2

Ending Station 604 **Community Type:** Open Water /

Species	Cover class	Species	Cover class
Open water	5		

Ending Station 614 **Community Type:** Scirpus spp. /

Species	Cover class	Species	Cover class
Bare ground	2	Distichlis spicata	1
Puccinellia nuttalliana	1	Rumex crispus	1
Scirpus maritimus	2		

Ending Station 647 **Community Type:** Chenopodium album /

Species	Cover class	Species	Cover class
Agropyron dasystachyum	1	Bare ground	4
Chenopodium album	2	Distichlis spicata	1
Lactuca serriola	0	Rumex crispus	1

Transect Notes:

PLANTED WOODY VEGETATION SURVIVAL

Big Muddy Creek

Planting Type	#Planted	#Alive	Notes

Comments

No woody species were installed on the site. The wetland were revegetated with seed or salvaged materials.

Big Muddy Creek

WILDLIFE

Birds

Were man-made nesting structures installed? No

If yes, type of structure: _____

How many? _____

Are the nesting structures being used? No

Do the nesting structures need repairs? No

Nesting Structure Comments:

Species	#Observed	Behavior	Habitat
Blue-winged Teal	2	FO, L	I, MA, WM
Killdeer	6	F	MA, OW
Mallard	10	L	MA, OW
Red-winged Blackbird	1	FO	MA, OW, WM
Wilson's Phalarope	20	FO, L	MA, OW, US

Bird Comments

BEHAVIOR CODES

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

HABITAT CODES

AB = Aquatic bed **SS** = Scrub/Shrub **FO** = Forested **UP** = Upland buffer **I** = Island

WM = Wet meadow **MA** = Marsh **US** = Unconsolidated shore **MF** = Mud Flat **OW** = Open Water

Mammals and Herptiles

Species	# Observed	Tracks	Scat	Burrows	Comments
Northern Leopard Frog	20	No	No	No	
Raccoon		Yes	No	No	

Wildlife Comments:

Big Muddy Creek

PHOTOGRAPHS

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.

Photo #	Latitude	Longitude	Bearing	Description
1199	48.16584	-104.617012	0	pp1-n
1200	48.16584	-104.617012	315	pp1-nw
1201	48.16584	-104.617012	240	pp1- sw
1202	48.165977	-104.619858	0	pp 4- n
1203	48.165977	-104.619858	45	pp4- ne
1204	48.165977	-104.619858	315	pp4- nw
1205	48.167076	-104.619675	90	pp3 e
1206	48.167076	-104.619675	180	pp3 s
1207	48.167076	-104.619675	270	pp3 w
1208	48.167076	-104.619675	0	pp3 n
1209	48.167057	-104.617638	0	pp2 n
1210	48.167057	-104.617638	90	pp2 e
1211	48.167057	-104.617638	180	pp2 s
1212	48.167057	-104.617638	270	pp2 w
1215	48.167465	-104.618248	220	start t1
1216	48.167202	-104.6185	300	bm-1
1217	48.16571	-104.61908	20	end t1
1218	48.166031	-104.618362	0	bm-2
1219	48.165859	-104.617783	330	bm-3

Comments:

Big Muddy Creek

ADDITIONAL ITEMS CHECKLIST

Hydrology

☐ Map emergent vegetation/open water boundary on aerial photos.
☐ Observe extent of surface water. Look for evidence of past surface water elevations (e.g. drift lines, vegetation staining, erosion, etc).

Photos

☐ One photo from the wetland toward each of the four cardinal directions
☐ One photo showing upland use surrounding the wetland.
☐ One photo showing the buffer around the wetland
☐ One photo from each end of each vegetation transect, toward the transect

Vegetation

☑ Map vegetation community boundaries

☑ Complete Vegetation Transects

Soils

☑ Assess soils

Wetland Delineations

☑ Delineate wetlands according to applicable USACE protocol (1987 form or Supplement)
☑ Delineate wetland – upland boundary onto aerial photograph.

Wetland Delineation Comments

Functional Assessments

☑ Complete and attach full MDT Montana Wetland Assessment Method field forms.

Functional Assessment Comments:

Maintenance

Were man-made nesting structure installed at this site? No

If yes, do they need to be repaired?

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 in need of repair?

If yes, describe the problems below.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Muddy Creek | City/County: Roosevelt | Sampling Date: 8/10/2011

Applicant/Owner: MDT | State: Montana | Sampling Point: BM-1

Investigator(s): B.Vaughn, B.Schultz | Section, Township, Range: 21 28N 55E

Landform (hillslope, terrace, etc.): Terrace | Local relief (concave, convex, none): flat | Slope (%):

Subregion (LRR): LRR F | Lat: 48.1671283333333 | Long: -104.618571666667 | Datum: WGS 84

Soil Map Unit Name: Lohler silty clay | NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☑, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☑

Are Vegetation ☐, Soil ☑, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑ No ☐	**Is the Sampled Area within a Wetland?** Yes ☑ No ☐
Hydric Soil Present?	Yes ☑ No ☐	
Wetland Hydrology Present?	Yes ☑ No ☐	

Remarks: Data point located at outside edge of comm.5 in transition zone of remnant wetland near original MW 93 (May 2011 Mitigation Plan). Narrow trenches were constructed in wetland to augment surface water flow. Considered passive restoration.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. Puccinellia nuttalliana	90	☑	OBL
2. Bromus inermis	1	☐	NL
3. Hordeum jubatum	5	☐	FACW
4. Chenopodium album	1	☐	FAC
5. Poa pratensis	1	☐	FACU
6. Agropyron dasystachyum	1	☐	FAC
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
	99 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	90	x 1 =	
FACW species	5	x 2 =	
FAC species	2	x 3 =	6
FACU species	1	x 4 =	4
UPL species	0	x 5 =	0
Column Totals:	98 (A)		110 (B)

Prevalence Index = B/A = 1.12

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: BM-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 4/3	100					Clay Loam	
7-13	10YR 4/1							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☑ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☑ No ☐

Remarks: Low chroma and no redox features observed. Dense clay. Test pit located at edge of remnant wetland where trenches were constructed to augment surface water infiltration. Problematic soil as a result of recent disturbance. Hydric soil determination based on fact that there was a dominance of OBL vegetation and >2 secondary wetland hydrological indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): _____

Water Table Present? Yes ☐ No ☑ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☑ Depth (inches): _____

Wetland Hydrology Present? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Remnant wetland. Saturation levels on ground surface (gs) may be decreasing as a result of shallow, constructed trenches. Base of trenches saturated to gs. Ground surface above shallow trenches not saturated at 12 inches bgs. There was evidence of SW drainage through network of trenches.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Muddy Creek | City/County: Roosevelt | Sampling Date: 8/10/2011

Applicant/Owner: MDT | State: Montana | Sampling Point: BM-2

Investigator(s): B. Vaughn, B.Schultz | Section, Township, Range: 21 28N 55E

Landform (hillslope, terrace, etc.): Shoreline | Local relief (concave, convex, none): concave | Slope (%): _____

Subregion (LRR): LRR F | Lat: 48.165825 | Long: -104.618341666667 | Datum: WGS 84

Soil Map Unit Name: Lohler silty clay | NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☑, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☑

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑ No ☐	**Is the Sampled Area within a Wetland?** Yes ☑ No ☐
Hydric Soil Present?	Yes ☑ No ☐	
Wetland Hydrology Present?	Yes ☑ No ☐	

Remarks: Test pit located within saturated shoreline of open water cell in Community 3. Wetland cells recently constructed.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. Scirpus maritimus	50	☑	OBL
2. Typha latifolia	5	☑	OBL
3. Scirpus acutus	5	☑	OBL
4. Distichlis spicata	3	☐	FACW
5. Chenopodium album	4	☐	FAC
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
	67 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 33

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	60	x 1 =	60
FACW species	3	x 2 =	6
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	68 (A)		81 (B)

Prevalence Index = B/A = 1.19

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: BM-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR 4/2	98	C M	2.5YR	5/6	2	Clay Loam	
9-12	10YR 4/2	95	C M	2.5YR	5/6	5	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☑ No ☐

Remarks: Although wetland was recently constructed, the data point area was saturated and redox features were present. The features may be a relic of hydric soils from the adjacent wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☑ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): _____

Water Table Present? Yes ☐ No ☑ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 0

Wetland Hydrology Present? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

There was insufficient time for groundwater to enter open pit as a result of tight clay soil.

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Muddy Creek City/County: Roosevelt Sampling Date: 8/10/2011

Applicant/Owner: MDT State: Montana Sampling Point: BM-3

Investigator(s): B.Vaughn, B. Schultz Section, Township, Range: 21 28N 55E

Landform (hillslope, terrace, etc.): Shoreline Local relief (concave, convex, none): concave Slope (%): _____

Subregion (LRR): LRR F Lat: 48.1658 Long: -104.618301666667 Datum: WGS 84

Soil Map Unit Name: Lohler clay loam NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☑, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☑

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑	No ☐
Hydric Soil Present?	Yes ☐	No ☑
Wetland Hydrology Present?	Yes ☐	No ☑

Is the Sampled Area within a Wetland? Yes ☐ No ☑

Remarks: Data point located upslope from water's edge and Comm 3 in seeded area named as Community 2.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. Chenopodium album	40	☑	FAC
2. Kochia scoparia	15	☑	FAC
3. Distichlis spicata	7	☐	FACW
4. Rumex crispus	3	☐	FACW
5.	0	☐	
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
	65 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 35

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	55	x 3 =	165
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	65 (A)		185 (B)

Prevalence Index = B/A = 2.85

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: BM-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/2	100					Silty Clay Loam	
8-12	10YR 4/2	100					Silty Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ☑

Remarks: Chroma of 2 (4/2) w/o redox features.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry-Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No ☑ Depth (inches): _____

Water Table Present? Yes _____ No ☑ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ☑ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Single secondary indicator - surface soil cracks.

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name Big Muddy Creek Mitigation Site **2. MDT project#** NH 1-10(626) **Control#** 4058-001

3. Evaluation Date 8/10/2011 **4. Evaluators** B.Vaughn, B.Schultz **5. Wetland/Site# (s)** Creation, cells and passive

6. Wetland Location(s): **T** 28N **R** 55E **Sec1** 21 **T** **R** **Sec2**

Approx Stationing or Mileposts

Watershed 10060006 **Watershed/County** Lower Missouri River Watershed/Roosevelt County

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 6.19

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 6.19

☐ **Mitigation Wetlands: pre-construction**

How assessed: Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Depressional	Unconsolidated Bottom	Excavated	Permanent/Perennial	73
Depressional	Emergent Wetland	Excavated	Permanent/Perennial	11
Riverine	Emergent Wetland		Seasonal/Intermittant	16

11. Estimated Relative Abundance Abundant

12. General Condition of AA

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) lists)

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

Comments: (types of disturbance, intensity, season, etc)

The wetland cells were constructed in spring 2011and were still highly disturbed, exhibiting a low vegetation cover. Grazing eliminated within project boundaries. Adjacent land used for agriculture, i.e. grazing. Hwy 2 borders south boundary. Big Muddy Creek borders north boundary.

ii. Prominent noxious, aquatic nuisance, other exotic species:

Cirsium arvense (noxious), and exotic species, Chenopodium album, Iva axillaris, and Lactuca serriola.

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

The AA includes three constructed wetland cells dominated by open water and a created passive wetland that extends from the existing riverine wetland dominated by alkaligrass located near the north boundary. Low productivity in open water. Perimeter (shoreline) of wetland cells greater than 50% bare ground. Area between shoreline and upland dominated by Chenopodium album.

13. Structural Diversity: (based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes], see #10 above)

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management preventing (passive) existence of additional vegetated classes?		Modified Rating
>=3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	<NO	YES>	L
1 class, monoculture (1 species comprises>=90% of total cover)	L	NA	NA	NA

Comments: Vegetation is predominantly emergent. No woody overstory assoc. with creek. Cell constructed in 2011. Aquatic bed class not developed yet.

SECTION PERTAINING to FUNCTIONS VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species)	◉ D ◉ S	
Secondary habitat (list Species)	◉ D ◉ S	
Incidental habitat (list species)	◉ D ◉ S	
No usable habitat	☑ S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
Functional Points and Rating	1H	.9H	.8H	.7M	.3L	.1L	0L

Sources for documented use Not listed for county by USFWS T&E list.

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species)	◉ D ◉ S	
Secondary habitat (list Species)	○ D ◉ S	Blue Heron (S3)
Incidental habitat (list species)	○ D ◉ S	Greater Sage-Grouse (S2)
No usable habitat	☐ S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
S1 Species: *Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
S2 and S3 Species: *Functional Points and Rating*	.9H	.7M	.6M	.5M	.2L	.1L	0L

Sources for documented use Suspected species identified by MTNHP for this County.

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (check substantial, moderate, or low based on supporting evidence): Moderate

Substantial (based on any of the following [check]):

- ☐ observations of abundant wildlife #s or high species diversity (during any period)
- ☐ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☐ presence of extremely limiting habitat features not available in the surrounding area
- ☐ interviews with local biologists with knowledge of the AA

Minimal (based on any of the following [check]):

- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):

- ☑ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- ☑ common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☐ adequate adjacent upland food sources
- ☐ interviews with local biologists with knowledge of the AA

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

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [check] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1E	.9H	.8H	.7M
Moderate	.9H	.7M	.5M	.3L
Minimal	.6M	.4M	.2L	.1L

Comments Raccoon and deer tracks observed. Five bird species observed including 20 Wilson's phalarope and several mallards.

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then check ☑ **NA** here and proceed to 14E.)

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [check the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)
a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* **Y** ◯ **N** ◉ *If yes, reduce score in* ***i*** *above by 0.1:* **Modified Rating**

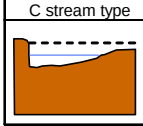
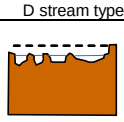
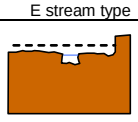
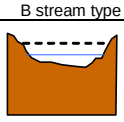
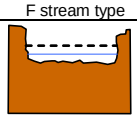
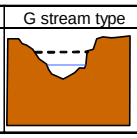
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

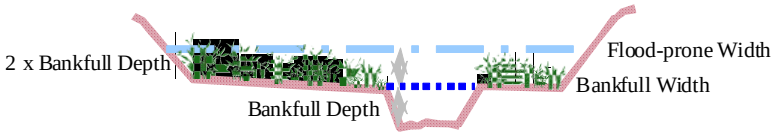
iii. Final Score and Rating: 0 NA **Comments:** Closed wetland cells with no direct surface water inlet or outlet.

14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, click ☐ **NA** here and proceed to 14F.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% of flooded wetland classified as forested and/or scrub/shrub	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	.1L

Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						



Floodrpone width / **Bankfull width** = **Entrenchment ratio**

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (check)? **Y** ◯ **N** ◉

Comments: AA is adjacent to unnamed tributary of Big Muddy Creek and contains no outlet. Unnamed tributary is outside mitigation area. Floodprone and bankfull widths were visual estimation of B stream type.

14F. Short and Long Term Surface Water Storage: (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, click ☐ **NA** here and proceed to 14G.)

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

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			1.1 to 5 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond **≥ 5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments: AA (wetland cells) still inundated during August 2011. Assumed approx. 6.12 acres of wetland flooded to a depth of 2.0 feet.

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, click ☐ **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating [H = high, M = moderate, or L = low])

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody 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 with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments: Vegetation cover on shoreline of wetland cells less than 50%

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, click ☐ **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of ≥6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
≥ 65%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments: Shoreline of wetland cells exhibits sparsely vegetated stands of Scirpus, Distichlis, and Typha.

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [check])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	L

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

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1E	.7H	.8H	.5M	.6M	.4M	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9	.6M	.7H	.4	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8	.5M	.6M	.3	.4M	.2L	.7H	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB)**: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).

a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** ◉ **N** ○ *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:* **Modified Rating** .5M

Comments: Vegetation cover on shoreline of wetland cells less than 50%. Average 50 foot Upland buffer surrounding mitigation site.

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

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

ii. Recharge Indicators

- ☐ Permeable substrate present without underlying impeding layer
- ☐ Wetland contains inlet but no outlet
- ☐ Stream is a known 'losing' stream; discharge volume decreases
- ☐ Other:

iii. Rating (use the information from i and ii above and the table below to arrive at [check] the functional points and rating)

	Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*			
Criteria	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information		NA		

Comments:

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MTNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MTNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7H	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments:

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (check) **Y** ◉ **N** ○ (if 'Yes' continue with the evaluation; if 'No' then click ☐ **NA** here and proceed to the overall summary and rating page)

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

iii. Rating (use the matrix below to arrive at [check] the functional points and rating)

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments:

MDT owned site. Small area.

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): Creation, cells and passive

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	0	1	0	☐
B. MT Natural Heritage Program Species Habitat	M	.5	1	3.095	☐
C. General Wildlife Habitat	M	.5	1	3.095	☑
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	M	.5	1	3.095	☐
F. Short and Long Term Surface Water Storage	H	1	1	6.19	☑
G. Sediment/Nutrient/Toxicant Removal	M	.7	1	4.333	☑
H. Sediment/Shoreline Stabilization	L	.3	1	1.857	☐
I. Production Export/Food Chain Support	M	.5	1	3.095	☐
J. Groundwater Discharge/Recharge	H	1	1	6.19	☑
K. Uniqueness	L	.2	1	1.238	☐
L. Recreation/Education Potential (bonus points)	H	.15	NA	0.9285	☐
Totals:		5.35	10	33.1165	
Percent of Possible Score			**53.5** %		

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

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

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

☑

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

OVERALL ANALYSIS AREA RATING:
(check appropriate category based on the criteria outlined

I	II	III	IV

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name Big Muddy Creek Mitigation Site **2. MDT project#** NH 1-10(626) **Control#** 4058-001

3. Evaluation Date 8/10/2011 **4. Evaluators** B.Vaughn, B.Schultz **5. Wetland/Site# (s)** Preservation-Existing

6. Wetland Location(s): **T** 28 **R** 55 **Sec1** 21 **T** **R** **Sec2**

Approx Stationing or Mileposts

Watershed 10060006 **Watershed/County** Lower Missouri River Watershed/Roosevelt County

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 0.73

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 0.73

☐ **Mitigation Wetlands: pre-construction**

How assessed: Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Riverine	Emergent Wetland		Permanent/Perennial	100

11. Estimated Relative Abundance Common

12. General Condition of AA

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) lists)

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

Comments: (types of disturbance, intensity, season, etc)

Hwy 2 borders south boundary. Grazing eliminated within project area. Grazing still occurs on the pastures located north of the project site. Existing wetland associated with Big Muddy Creek.

ii. Prominent noxious, aquatic nuisance, other exotic species:

Canada thistle observed in northeast corner of site along creek corridor.

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

AA encompasses existing emergent wetland associated with an abandoned oxbow of Big Muddy Creek that borders mitigation site on west and north boundaries. The wetland within the mitigation site is currently managed in natural state. The area surrounding the mitigation site continues to be used for grazing. The preservation AA was not disturbed during construction.

13. Structural Diversity: (based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes], see #10 above)

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management preventing (passive) existence of additional vegetated classes?		Modified Rating
>=3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	<NO	YES>	L
1 class, monoculture (1 species comprises>=90% of total cover)	L	NA	NA	NA

Comments: Emergent vegetation class. The existing wetland contains few woody species.

SECTION PERTAINING to FUNCTIONS VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species) ◉ D ◉ S

Secondary habitat (list Species) ◉ D ◉ S

Incidental habitat (list species) ◉ D ◉ S

No usable habitat ☑ S

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
Functional Points and Rating	1H	.9H	.8H	.7M	.3L	.1L	0L

Sources for documented use Not listed on USFWS for County

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species) ◉ D ◉ S

Secondary habitat (list Species) ○ D ◉ S Blue Heron (S3)

Incidental habitat (list species) ○ D ◉ S Greater Sage-Grouse (S2)

No usable habitat ☐ S

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
S1 Species: *Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
S2 and S3 Species: *Functional Points and Rating*	.9H	.7M	.6M	.5M	.2L	.1L	0L

Sources for documented use Suspected species identified by MTNHP for this County.

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (check substantial, moderate, or low based on supporting evidence):

Moderate

Substantial (based on any of the following [check]):

- ☐ observations of abundant wildlife #s or high species diversity (during any period)
- ☐ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☐ presence of extremely limiting habitat features not available in the surrounding area
- ☐ interviews with local biologists with knowledge of the AA

Minimal (based on any of the following [check]):

- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):

- ☑ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- ☐ common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☑ adequate adjacent upland food sources
- ☐ interviews with local biologists with knowledge of the AA

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

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [check] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1E	.9H	.8H	.7M
Moderate	.9H	.7M	.5M	.3L
Minimal	.6M	.4M	.2L	.1L

Comments Several species of birds and shorebirds (Wilson's phalarope) observed during site visit.

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then check ☑ **NA** here and proceed to 14E.)

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [check the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)
a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* **Y** ◯ **N** ◉ *If yes, reduce score in* ***i*** *above by 0.1:* **Modified Rating**

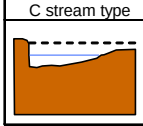
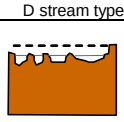
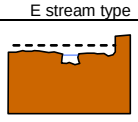
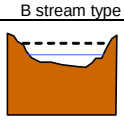
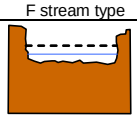
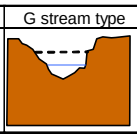
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

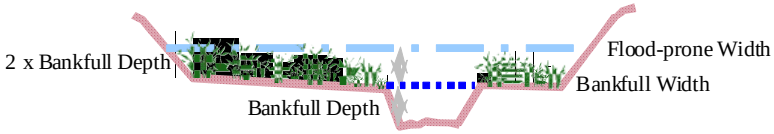
iii. Final Score and Rating: 0 NA **Comments:**

14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, click ☐ **NA** here and proceed to 14F.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% of flooded wetland classified as forested and/or scrub/shrub	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	.1L

Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						



Floodrpone width / **Bankfull width** = **Entrenchment ratio**

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (check)? **Y** ◯ **N** ◉

Comments: The pre-existing wetland converges with an unnamed tributary of Big Muddy Creek at the northwest end of the AA. The unnamed trib is broad and shallow (moderately entrenched) and outside the mitigation area.

14F. Short and Long Term Surface Water Storage: (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, click ☐ **NA** here and proceed to 14G.)

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

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			1.1 to 5 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond **≥ 5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments: Assumed 0.62 acres in extent at 1.5 feet of water depth.

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, click ☐ **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating [H = high, M = moderate, or L = low])

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody 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 with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments: Cover of veg in existing riverine wetland >70%. Wetland converges with unnamed tributary of Big Muddy, unrestricted outlet.

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, click ☐ **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of ≥6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
≥ 65%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments: Existing wetland forms shoreline on west side of constructed cell and eventually converges with Big Muddy Creek on northwest property boundary. Bulrush, sedge, cattail, and rush species provide stability.

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [check])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	L

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

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1E	.7H	.8H	.5M	.6M	.4M	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9	.6M	.7H	.4	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8	.5M	.6M	.3	.4M	.2L	.7H	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB)**: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).

a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** ◉ **N** ○ *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:* **Modified Rating** .9H

Comments: Area < 1 acre, high biological activity, contains surface water outlet, flooded during August 2011 site visit.

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

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

ii. Recharge Indicators

- ☐ Permeable substrate present without underlying impeding layer
- ☐ Wetland contains inlet but no outlet
- ☐ Stream is a known 'losing' stream; discharge volume decreases
- ☐ Other:

iii. Rating (use the information from i and ii above and the table below to arrive at [check] the functional points and rating)

	Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*			
Criteria	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information		NA		

Comments: Existing wetland inundated during 2011 visit.

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MTNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MTNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7H	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments:

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (check) **Y** ◉ **N** ○ (if 'Yes' continue with the evaluation; if 'No' then click ☐ **NA** here and proceed to the overall summary and rating page)

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

iii. Rating (use the matrix below to arrive at [check] the functional points and rating)

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments:

MDT owned.

General Site Notes

Small size of the existing wetlands limits the ratings of several functions.

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): Preservation-Existing

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	0	1	0	☐
B. MT Natural Heritage Program Species Habitat	M	.5	1	0.365	☐
C. General Wildlife Habitat	H	.9	1	0.657	☑
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	M	.4	1	0.292	☐
F. Short and Long Term Surface Water Storage	M	.4	1	0.292	☐
G. Sediment/Nutrient/Toxicant Removal	H	.9	1	0.657	☑
H. Sediment/Shoreline Stabilization	H	1	1	0.73	☑
I. Production Export/Food Chain Support	H	.9	1	0.657	☑
J. Groundwater Discharge/Recharge	H	1	1	0.73	☐
K. Uniqueness	M	.4	1	0.292	☐
L. Recreation/Education Potential (bonus points)	H	.15	NA	0.1095	☐
Totals:		6.55	10	4.7815	
Percent of Possible Score			**65.5** %		

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

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

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

☐

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

OVERALL ANALYSIS AREA RATING:
(check appropriate category based on the criteria outlined

I	II	III	IV

Appendix C

Project Area Photographs

MDT Wetland Mitigation Monitoring
Big Muddy Creek
Roosevelt County, Montana



Photo Point 1 – *Photo 1*
Bearing: North
Location: SE property corner.
Taken in 2011



Photo Point 1 – *Photo 2*
Bearing: Northwest
Location: SE property corner
Taken in 2011



Photo Point 1 – *Photo 3*
Bearing: Southwest
Location: SE property corner.
Taken in 2011



Photo Point 2 – *Photo 1*
Bearing: North
Location: NE property corner.
Taken in 2011



Photo Point 2 – *Photo 2*
Bearing: East
Location: NE property corner.
Taken in 2011



Photo Point 2 – *Photo 3*
Bearing: South
Location: NE property corner.
Taken in 2011



Photo Point 2 – *Photo 4*
Bearing: West
Location: NE property corner.
Taken in 2011



Photo Point 3 – *Photo 1*
Bearing: East
Location: NW property corner.
Taken in 2011



Photo Point 3 – *Photo 2*
Bearing: South
Location: NW property corner.
Taken in 2011



Photo Point 3 – *Photo 3*
Bearing: West
Location: UT of Big Muddy
Taken in 2011



Photo Point 3 – *Photo 4*
Bearing: North
Location: UT of Big Muddy.
Taken in 2011



Photo Point 4 – *Photo 1*
Bearing: North
Location: SW property corner.
Taken in 2011



Photo Point 4 – *Photo 2*
Bearing: Northeast

Location: SW property corner.
Taken in 2011



Photo Point 4 – *Photo 3*
Bearing: Northwest

Location: Existing wetland.
Taken in 2011



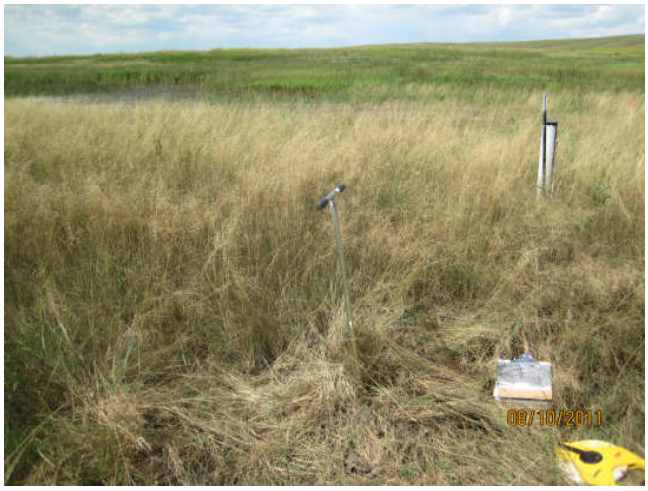
Transect 1 – *Start*
Bearing: 220 deg

Location:
Taken in 2011



Transect 1 – *Finish*
Bearing:

Location:
Taken in 2011



Data Point 1 – *BM-1*
Bearing: 300 deg

Location: Community 5
Taken in 2011



Data Point 2 – *BM-2*
Bearing: 0 deg

Location: Community 3
Taken in 2011



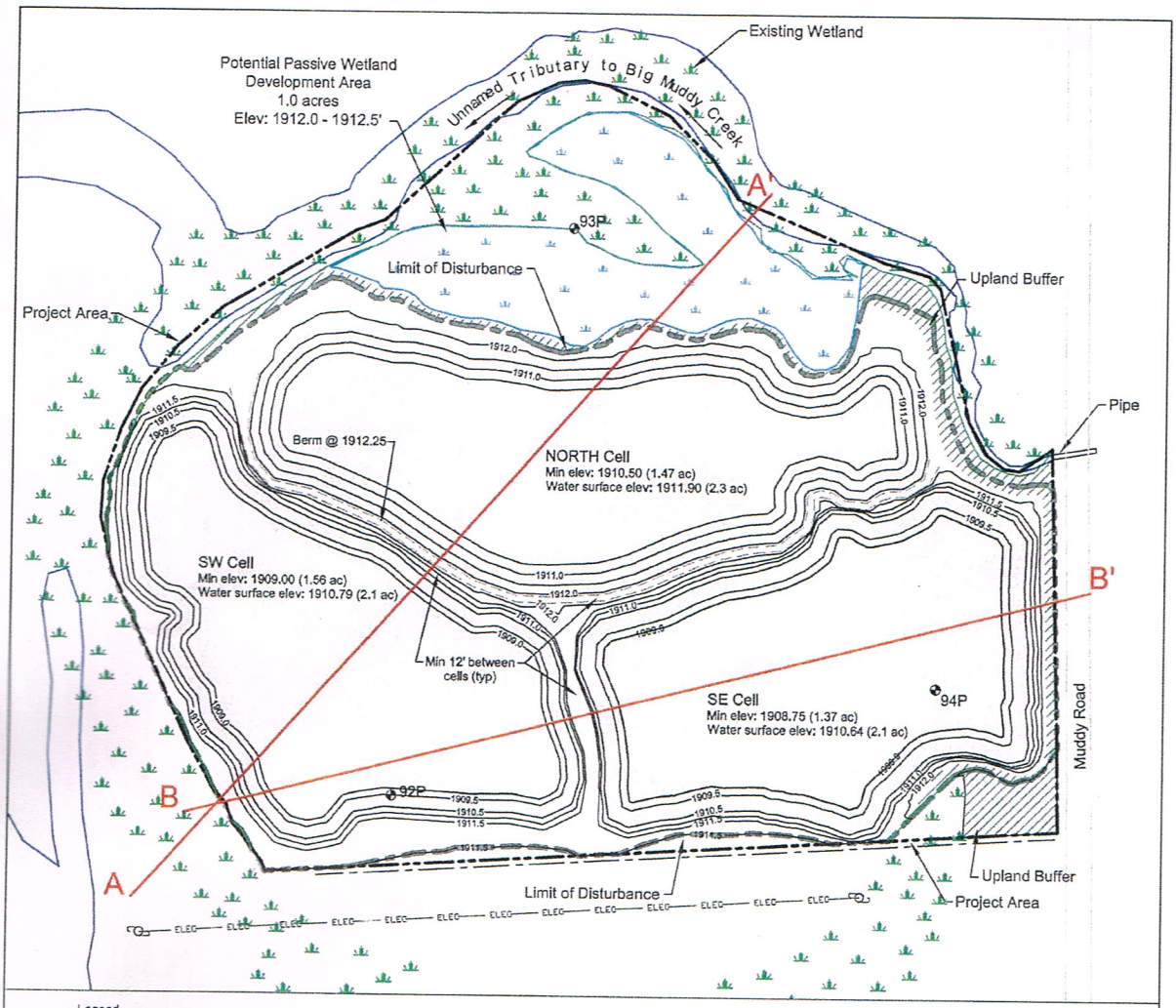
Data Point 1 – *BM-3*
Bearing: 300 deg

Location: Community 2
Taken in 2011

Appendix D

Project Plan Sheet

MDT Wetland Mitigation Monitoring
Big Muddy Creek
Roosevelt County, Montana



Legend

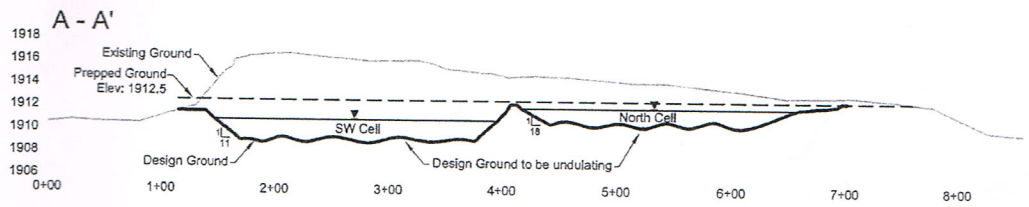
- Approximate Site Border
- Limits of Disturbance
- Existing Wetland
- Potential Passive Wetland
- Upland Buffer
- Extents of Cell Surface Water
- Cross Section Location
- Well Location
- Northerly Extents of Utility Easement

Note: All elevations are final. Will require over-excavation for topsoil replacement.

N W E S

100' 50' 0 50' 100'

SCALE: 1" = 100'



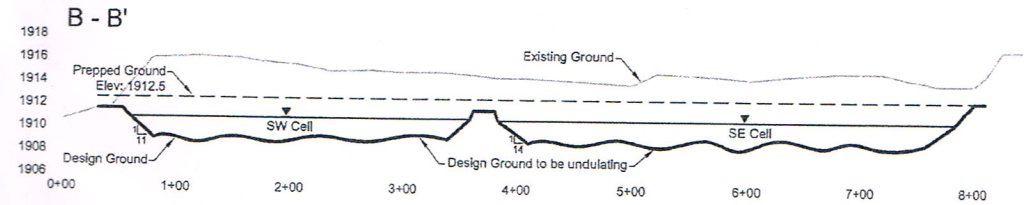


FIGURE 4 REV - Dec/2010	PBSJ 1120 Cedar Missoula, MT 59802	PROJ NO: 100015542 DRAWN: JR LOCATION: ROOSEVELT CO., MT PROJ MGR: J. BERGLUND SCALE: NOTED CHECKED: LL APPVD: DM FILE NAME: design_prelim_R02_1.dwg	PROJECT NAME: BIG MUDDY CREEK WETLAND MITIGATION SITE DRAWING TITLE: FIGURE 4. PRELIMINARY DESIGN - PLAN & PROFILE