MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2012

Big Muddy Creek
Roosevelt County, Montana



Prepared for:

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December 2012

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WETLAND MITIGATION MONITORING REPORT:

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Big Muddy Creek

Roosevelt County, Montana

MDT Project Number NH-1-(46)633
Big Muddy Creek – West
Control Number 4058-001
&
MDT Project Number NH-1-(46)626
Brockton - East
Control Number 4058

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CCI Project No: MDT.004

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1. INTRODUCTION

The Big Muddy Creek Wetland Mitigation Site was completed in spring 2011. This report presents the results of the second year of post-construction monitoring at this mitigation area. This Montana Department of Transportation (MDT) wetland mitigation project is located four miles west of Culbertson, directly along US Highway 2, in Section 21, Township 28 North, Range 55 East, Roosevelt County, Montana (Figure 1). The area of the wetland mitigation site was modified in 2012 to provide compensatory mitigation for unavoidable impacts associated with the MDT Brockton – East project. In 2012, the monitoring area was increased by 7.25 acres to include additional compensatory mitigation for wetland impacts associated with transportation projects in the Lower Missouri River Basin Watershed. The total mitigation area monitored in 2012 was approximately 17.9 acres. The monitoring criteria and protocols contained in the wetland mitigation and monitoring plan submitted on April 12, 2010, remain as originally submitted.

Figures 2 and 3 in Appendix A show the 2012 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 (MWAM) (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. The MDT completed an initial feasibility study in August 2009. The baseline delineation and Montana Wetland Assessment were completed by MDT staff in June 2010.

Approximately 0.73 acres of wetlands were delineated within the project boundary as part of the baseline assessment completed in June 2010. The wetlands encompassed an inundated, emergent marsh that extended from the banks of an unnamed tributary to Big Muddy Creek and a narrow emergent wet meadow that extended into upland habitat from the marsh.

The mitigation goals were to create and preserve wetland habitat functions associated with rangeland located adjacent to the Big Muddy Creek tributary. The project objectives include:

- 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 up to approximately 9.32 acres of wetland.
- Preserve approximately 0.73 acres of wetland through permanent protection and weed management.

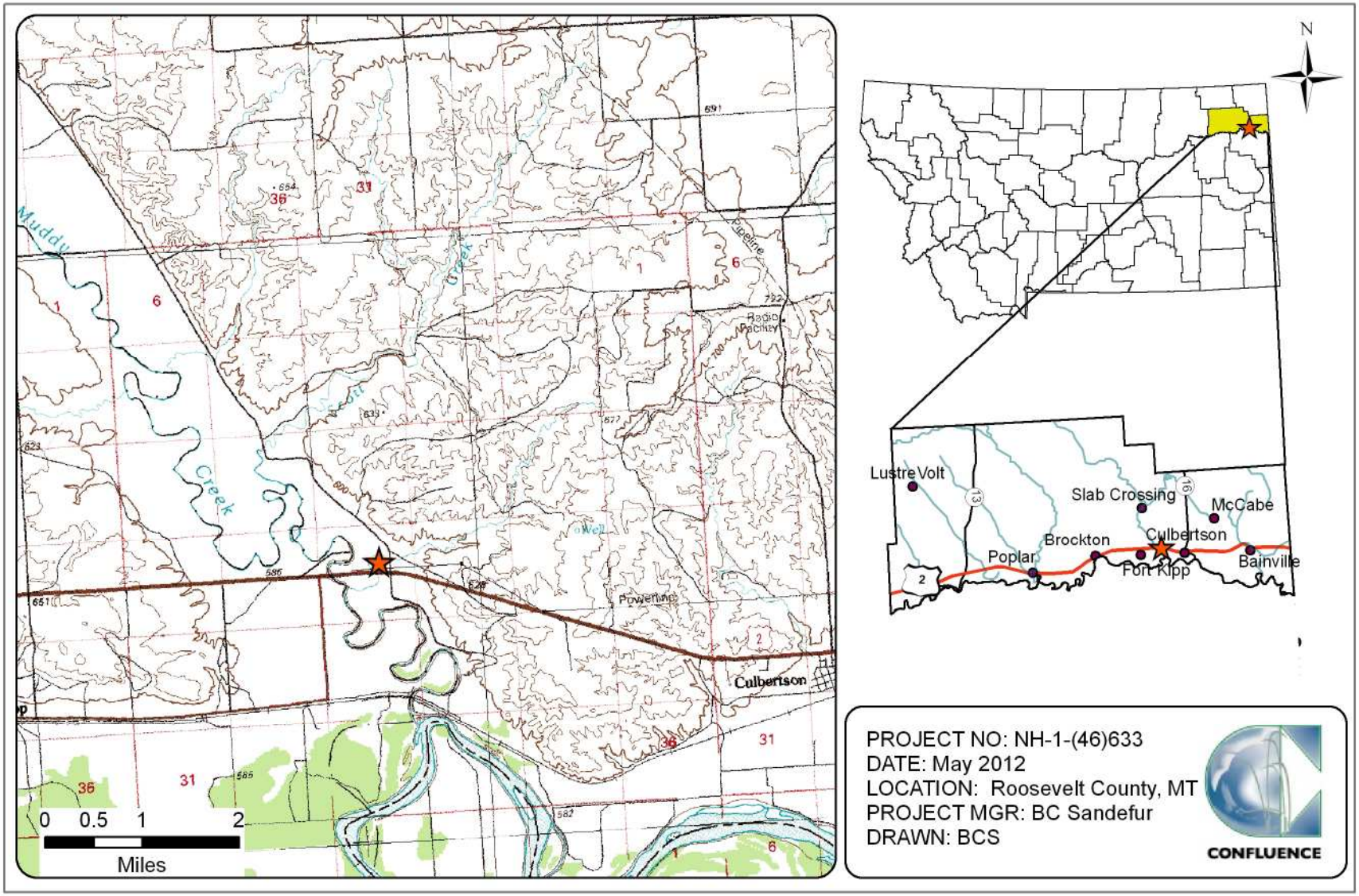


Figure 1. Project location of Big Muddy Creek Wetland Mitigation Site.

- Preserve a protected, managed 0.43-acre upland buffer adjacent to site wetlands.
- Minimize site operation and maintenance requirements.

The original 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 and provide water depths ranging from 0.5 to 2 feet. Additional hydrology was to be provided by direct precipitation and snowmelt.

The potential passive development 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 increasing/augmenting hydrology to the south within the excavated cells. Up to an additional 1.76 acres of emergent wetland may form in excavated areas between the three cells due to increased proximity to groundwater during spring/early summer of most years, allowing soil saturation within the root zone via capillary action within actually exposing groundwater in these areas.

The existing 0.73-acre emergent wetland within the project boundary was proposed for preservation. Additionally, approximately 0.43 acre of upland buffer preservation was proposed between the site border and proposed wetland areas.

The monitoring area was increased in 2012 to include an additional 7.25-acre parcel located to the south of US Hwy 2. This “revised” mitigation area was incorporated into the original mitigation plan to include the unavoidable wetland impacts associated with MDT Brockton – East project. This revision included the construction of a 5.47 acre wetland depression in 2011 along the floodplain of an unnamed tributary to Big Muddy Creek in an area delineated as upland in April 2010. Based on an MDT letter to Todd Tillinger dated June 14, 2010, this revision was a clerical and a mathematical revision based on the MDT decision to let the MDT – Brockton East and Big Muddy Creek – West projects at the same time and to construct them concurrently. A 1.83-acre pre-existing wetland was located in the additional monitoring area and was included in the preservation credit category in 2012.

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

2. METHODS

A monitoring site visit was performed on August 16, 2012. Information for the Mitigation Monitoring form and Wetland Determination 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, 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 Determination 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 Determination 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 were recorded on the Wetland Determination 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 2012 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 A).

Temporal changes in vegetation were evaluated through annual assessments of a static belt transect established in August 2011 and an additional transect added in 2012 (Figure 2, Appendix A). Vegetation composition was assessed and recorded along two approximately 10 feet wide belt transects, 647 feet long (T-1) and 366 feet long (T-2) (Figure 2, Appendix A). The transect locations were recorded with a resource-grade GPS unit. Spatial changes in the dominant vegetation communities were recorded along the stationed transects. The percent aerial cover of each vegetation species within the belt transects were estimated using the same values and cover ranges used for the polygon data on

the 2012 aerial photograph (Figure 3, Appendix B). Photographs were taken at the endpoints of the transects 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 Determination 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 name and indicator status of plant species was derived from the Draft 2012 National Wetland Plant List (NWPL) (Lichvar and Kartesz. 2009). Previous years' reports used the 1988 National List of Plant Species that Occur in Wetlands: Northwest Region 4 (Reed 1988). The 2012 NWPL scientific plant names were used in this report. Many common names used in the 2012 NWPL appear incomplete or erroneous. When used in this report, 2012 NWPL common names that appear to be incomplete or erroneous are provided with parenthetical clarification. For example, the common given name for the plant *Agrostis exarata* in the 2012 NWPL is "spiked bent". As this is likely an error, this species' common name would be reported here as "spiked bent (grass)". The Routine Level-2 On-site Determination Method (Environmental Laboratory 1987) was used to delineate jurisdictional areas as documented on the Wetland Determination 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 2012 aerial imagery and digitized into Geographic Information System (GIS) format. Wetland acreages were estimated using GIS methods.

2.5. Wildlife

Observations and other positive indicators of use of mammal, reptile, amphibian, and bird species were recorded on the Mitigation 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 and 2012 was compiled for this report.

2.6. Functional Assessment

The 2008 MDT MWAM was used to evaluate functions and values on the site in 2011 and 2012. 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 provides 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 2012 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 2012 monitoring season. Points were collected using WAAS-enabled differential correction satellites, typically improving resolution to sub-meter accuracy. The collected data were then transferred to a personal computer, imported into GIS, and presented in Montana State Plane Single Zone NAD 83 meters. Site features and survey points that were located with GPS included fence boundaries, photograph points, transect endpoints, and wetland data points.

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 2011 (WRCC 2012). The annual precipitation recorded in 2010 and 2011 was 20.53 inches and 17.43 inches, respectively. The total precipitation from January to August 31 was 10.62 inches (long-term average), 16.77 inches (2010), 15.39 inches (2011), and 8.98 inches (2012). These data indicate that precipitation rates in 2012 were slightly below the average.

Approximately 20 percent of the site was inundated to an average depth of 1.0 foot during the 2012 investigation. Surface water depths ranged from 0.0 to 1.5 feet. The depth at the emergent vegetation/open water boundary was 0.1 foot. Areas defined as wetlands that were not inundated exhibited saturation within 12 inches (1.0 foot) of the ground surface, sediment deposits, water marks, water-stained leaves, aquatic invertebrates, inundation on aerial imagery, and surface soil cracks.

Three data points, BM-1 to BM-3, were sampled to determine the wetland and 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 (wetland community Type 5). Primary hydrological indicators included sediment deposits, water-stained leaves, and aquatic invertebrates. Sample point BM-2 was located within the excavated wetland basin located south of Highway 2 (wetland community Type 7). Inundation visible on aerial imagery, surface soil cracks, and geomorphic position were indicators of wetland hydrology observed at the data point. No hydrological indicators were noted at data point BM-3, located in vegetation community Type 1 (upland).

3.2. Vegetation

Monitoring year 2012 marked the second year of post-construction monitoring at the Big Muddy Creek wetland mitigation site. Fifty-two plant species were observed site wide in 2011 and 2012 (Table 1). Vegetation plant communities were named according to plant dominance, which was defined by topography, soil, hydrology, and vegetation community composition. The communities and associated species are listed on the Monitoring Form in Appendix B. The communities are mapped on Figure 3 in Appendix A. No woody species were planted at the site. The wetlands were revegetated with seed and salvaged material.

Six vegetation communities were identified in 2012, two upland types and four wetland types. The communities were upland Type 1 – *Elymus* spp. (called *Agropyron* spp. on 1988 list), upland Type 2 – *Chenopodium album*, wetland Type 3 – *Schoenoplectus* spp. (called *Scirpus* spp. on 1988 list); wetland Type 4 – *Spartina pectinata/Schoenoplectus* spp.; wetland Type 5, *Puccinellia nutalliana/Chenopodium album,* and wetland Type 7 – *Chenopodium*

Table 1. Vegetation species observed in 2011 and 2012 at the Big Muddy Wetland Mitigation Site.

Scientific Names	Common Names	GP Indicator Status[1]
Achillea millefolium	Common Yarrow	FACU
Agropyron cristatum	Crested Wheatgrass	UPL
Algae, green	**Algae, Green**	**NL**
Artemisia cana	Coaltown Sagebrush	FACU
Artemisia frigida	Prairie Sagewort	UPL
Atriplex suckleyi	Suckley's endolepis	**UPL**
Bassia scoparia	Mexican-Fireweed	FACU
Bouteloua dactyloides	Buffalo Grass	FACU
Bouteloua gracilis	Blue Grama	NL
Bromus inermis	Smooth Brome	FAC
Carex aquatilis	Leafy Tussock Sedge	OBL
Chenopodium album	Lamb's-Quarters	FACU
Cirsium arvense	Canadian Thistle	FACU
Distichlis spicata	Coastal Salt Grass	FACW
Eleocharis palustris	Common Spike-Rush	OBL
Elymus lanceolatus	Streamside Wild Rye	FACU
Elymus repens	Creeping Wild Rye	FACU
Elymus trachycaulus	Slender Wild Rye	FACU
Equisetum arvense	Field Horsetail	FAC
Fraxinus pennsylvanica	Green Ash	FAC
Glycyrrhiza lepidota	American Licorice	FACU
Grindelia squarrosa	Curly-Cup Gumweed	FACU
Helianthus annuus	Common Sunflower	FACU
Hordeum jubatum	Fox-Tail Barley	FACW
Iva axillaris	Deer-Root	FAC
Juncus arcticus	Arctic Rush	FACW
Lactuca serriola	Prickly Lettuce	FAC
Lemna minor	Common Duckweed	OBL
Lepidium perfoliatum	**Clasping Pepperwort**	**FAC**
Medicago sativa	Alfalfa	UPL
Melilotus officinalis	Yellow Sweet-Clover	FACU
Mentha arvensis	American Wild Mint	FACW
Pascopyrum smithii	Western-Wheat Grass	FACU
Poa arida	Plains Bluegrass	FAC
Poa pratensis	Kentucky Blue Grass	FACU
Polypogon monspeliensis	Annual Rabbit's-Foot Grass	FACW
Populus deltoides	**Eastern Cottonwood**	**FAC**
Puccinellia nuttalliana	Nuttall's Alkali Grass	OBL
Rumex crispus	Curly Dock	FAC
Schoenoplectus acutus	Hard-Stem Club-Rush	OBL
Schoenoplectus americanus	**Chairmaker's Club-Rush**	**OBL**
Schoenoplectus maritimus	Saltmarsh Club-Rush	OBL
Schoenoplectus pungens	Three-Square	OBL
Sonchus arvensis	Field Sow-Thistle	FAC
Spartina pectinata	**Freshwater Cord Grass**	**FACW**

[1]Draft NWPL 2012 (Lichvar and Kartesz 2009).
New species identified in 2012 are bolded.

Table 1. (Continued). Vegetation species observed in 2011 and 2012 at the Big Muddy Wetland Mitigation Site

Scientific Names	Common Names	GP Indicator Status[1]
Suaeda calceoliformis	**Paiuteweed**	**FACW**
Symphoricarpos albus	Common Snowberry	FACU
Symphyotrichum laeve	Smooth Blue American-Aster	FACU
Taraxacum officinale	Common Dandelion	FACU
Thlaspi arvense	Field Penny-Cress	FACU
Tragopogon dubius	Yellow Salsify	UPL
Typha latifolia	Broad-Leaf Cat-Tail	OBL

[1]Draft NWPL 2012 (Lichvar and Kartesz 2009).
New species identified in 2012 are bolded.

album/Typha latifolia. The open water limits in the constructed cells are presented as polygon 6 on Figure 3 (Appendix A). Wetland Type 7 was defined in 2012 for a majority of the area south of Highway 2 that was incorporated into the mitigation site in 2012.

Upland Community Type 1 – *Elymus* spp. was found on 3.17 acres of the site perimeter, upslope from the constructed wetland cells. The cover consisted of existing and seeded herbaceous species. Crested wheatgrass (*Agropyron cristatum*), streamside wheatgrass (*Elymus lanceolatus*, called *Agropyron dasystachyum* on 1988 list), Western-wheatgrass (*Pascopyrum s*mithii, called *Agropyron smithii* on 1988 list), creeping wild rye (*Elymus repens*, called *Agropyron repens* on 1988 list), smooth brome (*Bromus inermis*), lamb's-quarters (*Chenopodium album*), Nuttall's alkaligrass (*Puccinellia nuttallliana*), curly-cup gumweed (*Grindelia squarrosa*), and Kentucky bluegrass (*Poa pratensis*) dominated the upland community.

Upland community Type 2 – *Chenopodium album* characterized 1.83 acres of the excavated areas between the wetland cells that were seeded with the wetland mix. Approximately 40 to 50 percent of the ground surface was bare. The dominant species were lamb's-quarters, crested wheatgrass, and deer-root (*Iva axillaris*). This area was proposed for wetland creation. The cover of wetland plants is expected to increase in subsequent growing seasons provided the duration and level of saturation is adequate over the long term.

Wetland community Type 3 – *Schoenoplectus* spp. was named for the 0.7 acre seeded emergent community found at the open water boundary of the constructed cells. Total cover was approximately 40 percent bare ground. Dominant species included saltmarsh club-bulrush (*Schoenoplectus maritimus*, called *Scirpus maritimus* on 1988 list), hard-stem club-rush (*Schoenoplectus acutus*, called *Scirpus acutus* on 1988 list), Chairmaker's club-rush (*Schoenoplectus americanus*, called Olney's bulrush, *Scirpus americanus* on 1988 list), coastal saltgrass (*Distichlis spicata*), and broad-leaf cattail (*Typha latifolia*).

Wetland community Type 4 – *Spartina pectinata./Schoenplectus* spp. characterized 0.73 acres of the pre-existing wetland community associated with

the unnamed tributary to Big Muddy Creek that parallels the west, north, and east boundaries. The dominant species in this community was freshwater cord grass (*Spartina pectinata*). Hard-stem club-rush, saltmarsh club-rush, broad-leaf cattail, 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 on 1.83 acres of existing wetland located at the north boundary of the area north of Highway 2 and at the north and west boundaries of the area south of the highway. The vegetation cover was dominated by Nuttall's alkaligrass, lamb's-quarters, with less cover of crested wheatgrass, creeping wild rye, smooth brome, curly-cup gumweed, deer-root, curly dock, and fox-tail barley (*Hordeum jubatum*). Lamb's-quarters is a common species that invades sites after the soil has been disturbed and gradually reduces in dominance as competition from other plants increase. Saltmarsh club-rush plants were emerging in the base of the saturated vehicle tracks that exist throughout the community in the north half of the mitigation site.

A majority of the constructed wetland cells in the north half of the mitigation site is inundated with 5.05 acres of open water (Polygon 6). Productivity levels in these three open water areas remained low in 2012. The rate of aquatic bed development in the excavated depression will likely be dependant upon the intermittent water regime and high turbidity of standing water that appears the result of wave-action along the unconsolidated clay shoreline. The accumulation of salts within the soil's rooting zone along the normally endo-saturated shoreline will also be a factor in vegetation development and it is unclear if this area will develop aquatic bed, emergent vegetation, or remain unvegetated.

Wetland community Type 7 – *Chenopodium album*/*Typha latifolia* was newly identified in 2012 to define 4.55 acres within the wetland depression south of Highway 2. Lamb's-quarters, broad-leaf cattail, paiuteweed (*Suaeda calceoliformis*), and ten other species dominated the community.

The addition of the 7.25 acres in 2012 that encompass the excavated depression south of US Highway 2 increased the extent of community Type 1 by 1.31 acres. The pre-existing Nuttall's alkaligrass community (Type 5) in the northern tract increased by 400% as a result of the additional 1.83 acres of pre-existing wetland identified in the southern tract. No changes in the extent of vegetation communities within the northern tract were documented between 2011 and 2012.

Vegetation community transitions were measured on a 647-foot transect (T-1) for the north half of the mitigation site and a 366-foot transect (T-2) for the south half of the site. Transect one (T-1) intersected four vegetation communities, upland Types 1 and 2, and wetland Types 3 and 5 (Table 2 and Chart 1). Approximately 50 percent of Transect 1 crossed the open water in the constructed cells. Hydrophytic vegetation was identified on 32.1 percent of the transect in 2012, up from 20.7 percent in 2011. The biggest change from 2011 to 2012 was a

decrease in the total length of open water from 320 feet to 244 feet and an increase in the length of wetland community Type 3 – *Schoenoplectus* spp.

Table 2. Data summary for Transect 1 in 2011 and 2012 at the Big Muddy Wetland Mitigation Site.

Monitoring Year	2011	2012
Transect Length (feet)	**647**	**647**
Vegetation Community Transitions along Transect	11	11
Vegetation Communities along Transect	4	4
Hydrophytic Vegetation Communities along Transect	2	2
Total Vegetative Species	21	24
Total Hydrophytic Species	12	11
Total Upland Species	9	13
Estimated % Total Vegetative Cover	40	50
% Transect Length Comprising Hydrophytic Vegetation Communities	20.7	32.1
% Transect Length Comprising Upland Vegetation Communities	29.8	30.1
% Transect Length Comprising Unvegetated Open Water	49.5	37.7
% Transect Length Comprising Bare Substrate	0.0	0.0

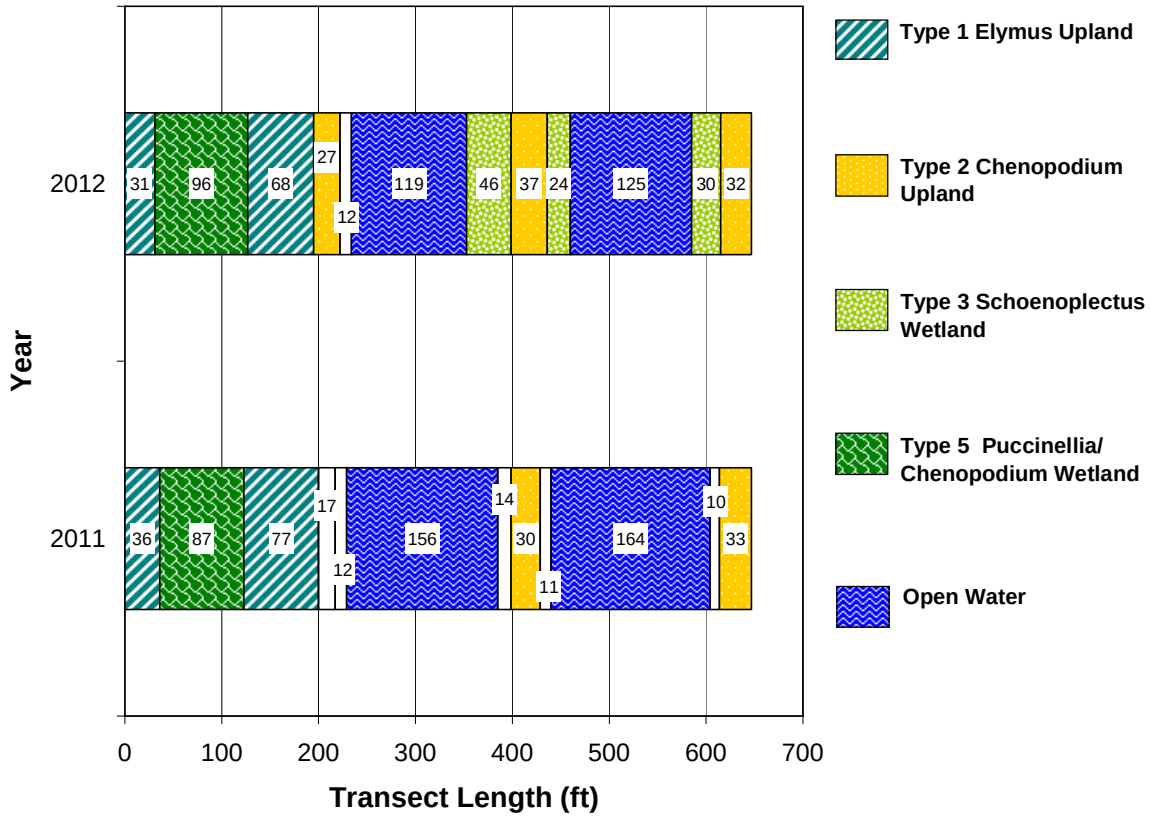


Chart 1. Transect map showing community types on Transect 1 in 2011 and 2012 from start (0 feet) to finish (647 feet) at the Big Muddy Wetland Mitigation Site.

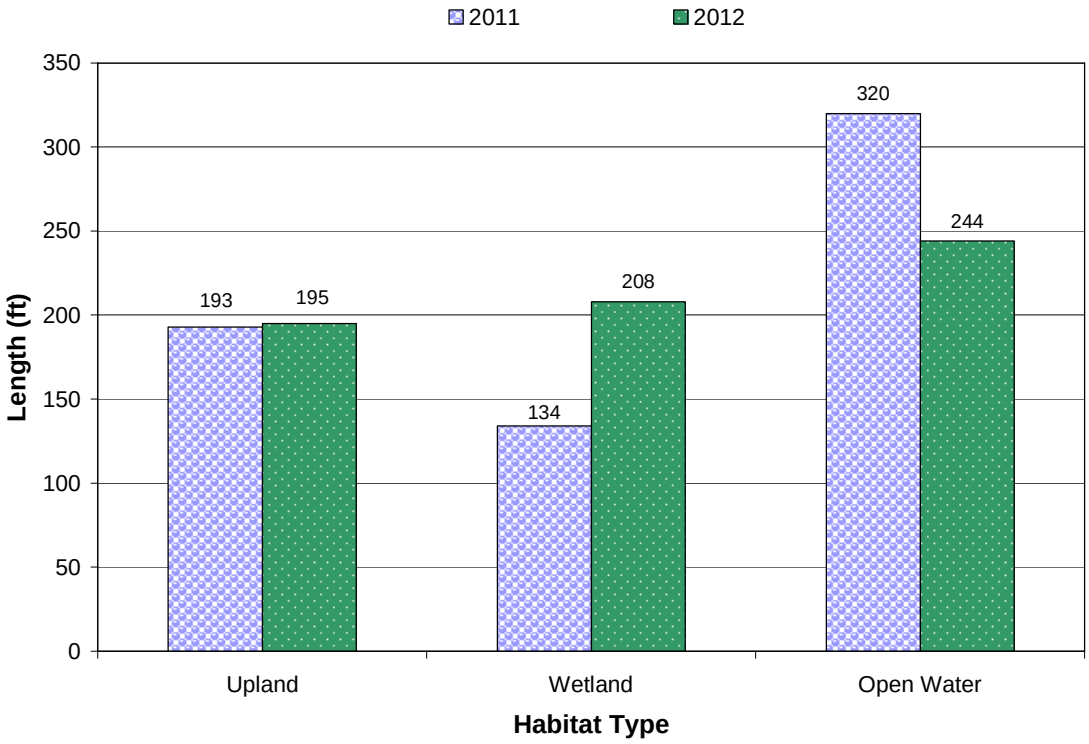


Chart 2. Length of habitat types within Transect 1 in 2011 and 2012 at the Big Muddy Wetland Mitigation Site.

Transect 2 was added in 2012 to monitor the additional mitigation area constructed in 2011. Transect 2 intercepted wetland community Types 5 and 7 and upland community Type 1. This portion of the mitigation site was monitored for the first time in 2012. Approximately 91.3 percent of the transect was dominated by hydrophytic species (Table 3 and Chart 3).

Table 3. Data summary for Transect 2 in 2012 at the Big Muddy Wetland Mitigation Site.

Monitoring Year	**2012**
Transect Length (feet)	**366**
Vegetation Community Transitions along Transect	2
Vegetation Communities along Transect	3
Hydrophytic Vegetation Communities along Transect	2
Total Vegetative Species	21
Total Hydrophytic Species	11
Total Upland Species	10
Estimated % Total Vegetative Cover	90
% Transect Length Comprising Hydrophytic Vegetation Communities	91.3
% Transect Length Comprising Upland Vegetation Communities	8.7
% Transect Length Comprising Unvegetated Open Water	0.0
% Transect Length Comprising Bare Substrate	0.0

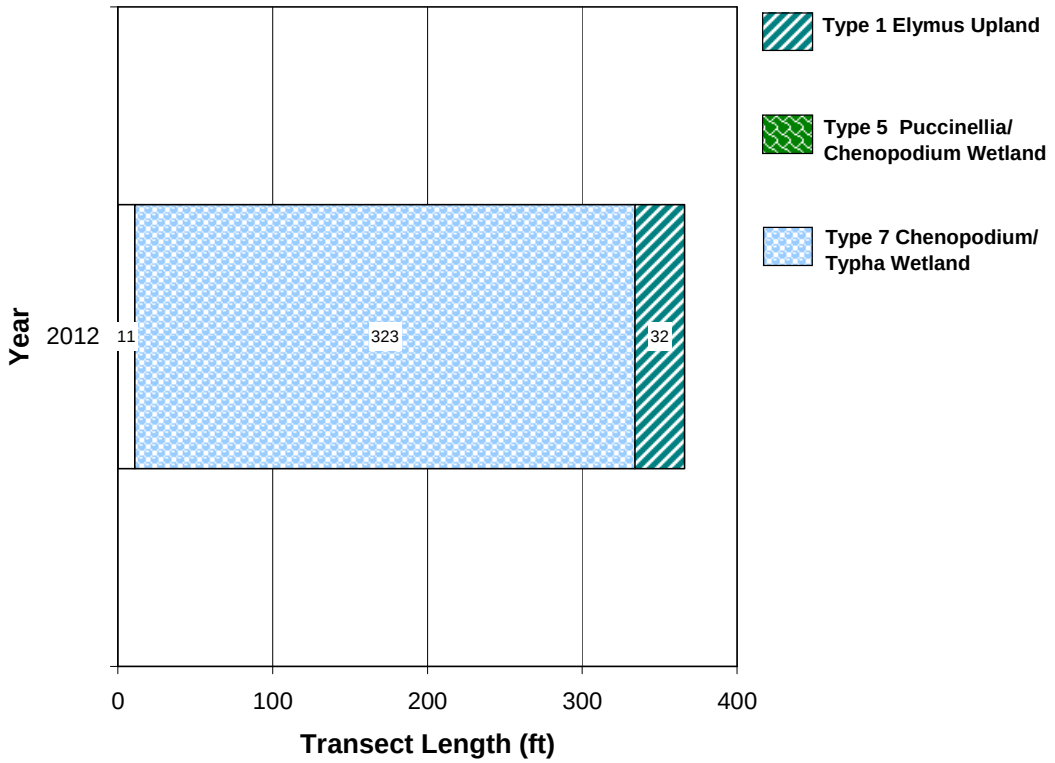


Chart 3. Transect map showing community types on Transect 2 in 2012 from start (0 feet) to finish (366 feet) at the Big Muddy Wetland Mitigation Site.

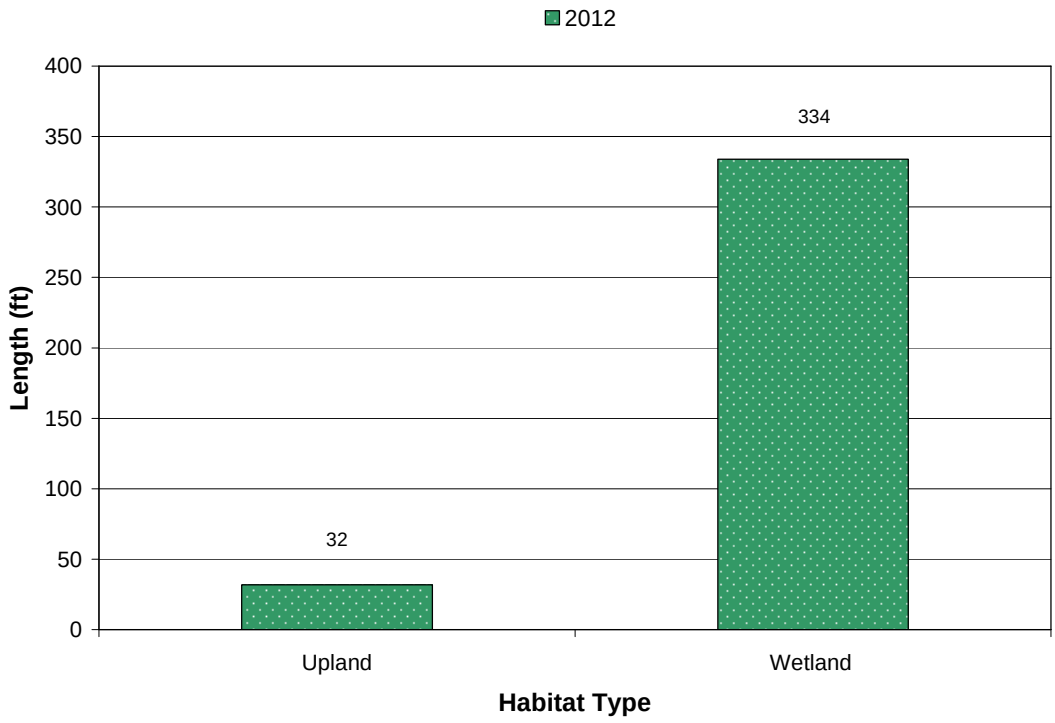


Chart 4. Length of habitat types within Transect 2 in 2012 at the Big Muddy Wetland Mitigation Site.

One infestation of Canadian thistle (*Cirsium arvense*), a Priority 2B weed, was observed at the northeast 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 for their mitigation sites that includes an annual assessment of weeds at each site.

3.3. Soil

The project site was mapped in the Roosevelt County Soil Survey (USDA 2011). Three soil series were mapped within the monitoring area and include Havrelon loam, Lallie silty clay, and Lohler silty clay. The Havrelon loam was mapped primarily in the pre-existing wetland areas in the northern monitoring tract. The series is a moderately well drained loam, taxonomically classified as a frigid Typic Ustifluvents. The Haverlon series 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, and mapped across the majority of both monitoring tracts. This soil is also found on floodplains. The Lallie series consist of very deep, poorly drained, slowly permeable soils formed in lake basins and old oxbows and was mapped along the western boundary of the site around the unnamed tributary of Bug Muddy Creek. All three soil 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 7) were located in areas that met the wetland criteria. Data point BM-3 was located in Community 1 at the edge of the wetland depression. The soil profiles at all three data points revealed dark grayish brown (10 YR 4/2) clay with 10 percent dark yellowish brown redoximorphic concentrations. The depleted matrix was a positive indicator for hydric soil. The presence of hydric soil at BM-3 was likely the result of mixing that occurred during construction of the wetland depression. The data point did not meet the wetland criteria for vegetation and hydrology.

3.4. Wetland Delineation

Three data points, BM-1 to BM-3, were located within the southern mitigation parcel first monitored in 2012 and used to help define the wetland boundaries (Figure 2, Appendix A, and Wetland Determination Data Forms, Appendix B). Data point BM-1 was situated on the non-impacted, pre-existing wetland that separates the unnamed tributary of Big Muddy Creek and the excavated wetland cell. BM-2 was located within constructed wetland. Both BM-1 and BM-2 met the wetland criteria. BM-3 was located in upland on the excavated slope along the constructed wetland. The 2012 wetland delineation identified 12.87 acres of wetlands within the project boundaries (Table 4). The created wetland, encompassing Communities 3 and 7, totaled 5.26 acres. Community 7, consisting of 4.55 acres, represented the newly developed wetlands within the southern tract. Community 3, consisting of 0.70 acres, represented the vegetated wetland fringe that has developed around the open-water excavated depressions in the northern tract. Open water, denoted by polygon 6 in Figure 3 (Appendix A), consisted of 5.05 acres that has been delineated in 2011 and

2012. The open water cells may develop into an aquatic bed wetland community as vegetation becomes established. The existing wetlands (Communities 4 and 5) encompassed 2.56 acres. The increase of existing wetlands between 2011 and 2012 was the result of the increased monitoring area to incorporate the south parcel.

Table 4. Total wetland acres delineated in 2011 and 2012 at the Big Muddy Wetland Mitigation Site.

Wetland and Aquatic Habitat	2011 (acres)	2012* (acres)
Created Wetland	1.14	5.26
Pre-Existing Wetland	0.73	2.56
Open Water	5.05	5.05
Total	6.92	12.87

*The 2012 acreages include the additional 7.25-acre mitigation area south of Highway. 2.

3.5. Wildlife

A comprehensive list of birds and other wildlife species observed directly or indirectly from 2011 to 2012 is presented in Table 5 (Monitoring Form, Appendix B). Seven bird species including an American avocet (*Recurvirostra americana*), American coot (*Fulica americana*), blue-winged teal (*Anas discors*), killdeer (*Charadrius vociferous*), red-winged blackbird (*Agelaius phoeniceus*), spotted sandpiper (*Actitis macularius*), and Wilson's snipe (*Gallinago delicata*) were observed during monitoring. One northern leopard frog (*Rana pipiens*) and deer and raccoon (*Procyon lotor*) tracks were observed in the pre-existing wetland and wetland cells.

Table 5. Wildlife species observed within the Big Muddy Wetland Mitigation Site in 2011 and 2012.

COMMON NAME	SCIENTIFIC NAME
AMPHIBIANS	
Northern Leopard Frog	***Rana pipiens***
Woodhouse's Toad	*Bufo woodhousii*
BIRDS	
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*

Species identified in 2012 are bolded.

Table 5 (cont.). Wildlife species observed within the Big Muddy Wetland Mitigation Site in 2011 and 2012.

COMMON NAME	SCIENTIFIC NAME
Red-winged Blackbird	***Agelaius phoeniceus***
Spotted Sandpiper	***Actitis macularius***
Western Sandpiper	*Calidris mauri*
Wilson's Phalarope	*Phalaropus tricolor*
Wilson's Snipe	***Gallinago delicata***
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*
MAMMALS	
Deer Sp.	
Muskrat	*Ondatra zibethicus*
Raccoon	***Procyon lotor***
Red Fox	*Vulpes vulpes*
REPTILE	
Unidentified Snake	

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 of the pre-existing wetlands would not be appropriately compared to the post-construction mitigation site. The 2008 MWAM was used to evaluate the functional values of the mitigation wetlands in 2011 and 2012 (Table 5).

The created (AA-1) and preserved (AA-2) wetlands were assessed as separate AAs. The depression characterized by wetland community Type 7 located south of Highway 2 was included in the 10.31 acre created wetland (AA-1) in 2012. AA-1 encompassed the constructed wetland cells, which included wetland and open water community Types 3, 6, and 7. AA-1 was rated as a Category II wetland in 2012 with 66.5 percent of the total possible points, a 13 percent improvement over 2011 when the created wetlands received a Category III rating. The disturbance rating improved from high to moderate in 2012 based on the increase in overall vegetation cover. The improvement in the vegetation percent cover also increased the ratings in the categories of short and long term surface water storage, sediment/nutrient/toxicant removal, and sediment/shoreline stabilization. The inclusion of the well-vegetated wetland depression located south of the highway also increased the overall functional value of the created wetland. High ratings were given for short and long term surface water storage, sediment/nutrient/toxicant removal, sediment/shoreline stabilization, and groundwater discharge and recharge. Ratings are expected to improve with increases in the cover of wetland vegetation species.

Table 6. Functions and Values of the Big Muddy Wetland Mitigation Site in 2011 and 2012.

Function and Value Parameters from the 2008 Montana Wetland Assessment Method	2011 (Creation) AA-1	2011 (Preservation) AA-2	2012 (Creation) AA-1	2012 (Preservation) AA-2
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Mod (0.5)	Mod (0.5)	Mod (0.5)	Mod (0.5)
General Wildlife Habitat	Mod (0.5)	High (0.9)	Mod (0.7)	High (0.9)
General Fish/Aquatic Habitat	NA	NA	NA	NA
Flood Attenuation	Mod (0.5)	Mod (0.4)	Mod (0.5)	Mod (0.4)
Short and Long Term Surface Water Storage	High (1.0)	Mod (0.4)	High (1.0)	High (0.8)
Sediment/Nutrient/Toxicant Removal	Mod (0.7)	High (0.9)	High (1.0)	High (0.9)
Sediment/Shoreline Stabilization	Low (0.3)	High (1.0)	High (1.0)	High (1.0)
Production Export/Food Chain Support	Mod (0.5)	High (0.9)	Mod (0.6)	High (1.0)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Mod (0.4)	Low (0.2)	Mod (0.4)
Recreation/Education Potential (bonus points[3])	High (0.15)	High (0.15)	High (0.15)	High (0.15)
Actual Points/Possible Points	**5.35/10**	**6.55/10**	**6.65/10**	**7.05/10**
% of Possible Score Achieved	**53.5%**	**65.5%**	**66.5%**	**70.5%**
Overall Category	**III**	**II**	**II**	**II**
Total Acreage of Assessed Wetlands within Site Boundaries	**6.19**	**0.73**	**10.31**	**2.56**
Functional Units (acreage x actual points)	**33.12**	**4.78**	**68.56**	**18.05**

The 2.56 acre preservation wetland (AA-2) is associated with the existing tributary to Big Muddy Creek (wetland community Type 4) and the wetland characterized by community Type 5. AA-2 was rated as a Category II wetland with 70.5 percent of the total possible points in 2012. AA-2 received 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. The functional units increased to 18.05 based on the increase in acreage resulting from the inclusion of the pre-existing wetland area south of Highway 2.

3.7. Photo Documentation

Photographs taken at photo points 1 through 7 (PP-1 through PP-7; Figure 2, Appendix A) are shown on pages C-1 to C-6 of Appendix C. Photographs of the transect end points and wetland determination data points are shown on pages C-6 and C-7 and pages C-7 and C-8, respectively (Appendix C).

3.8. Maintenance Needs

There are no diversion structures or nesting structures currently installed at the site. One infestation of Canadian 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 for their mitigation sites that includes an annual assessment of weeds identified at each location and treatment to contain and control identified populations.

3.9. Current Credit Summary

Table 7 from the May 2011 Mitigation Plan summarizes the proposed mitigation acreages, credit ratios, and scaled performance standards for the original mitigation plan. This table has been modified to include the additional acreages monitored in 2012. Table 8 summarizes the calculated credit acreages based on the 2012 wetland delineation and also includes the created and pre-existing wetland acreages delineated on the south side of Highway 2.

The original mitigation plan proposed the creation of 6.53 acres of emergent/aquatic bed shallow marsh within three wetland cells excavated north of Highway 2. An additional 1.76 acres of emergent wetland creation may develop in the excavated areas between the cells. The creation of an additional 1.03 acres of emergent wet meadow located at the north boundary and adjacent to the existing wet meadow potentially could be facilitated passively by the anticipated increased groundwater elevation within the excavated cells. The vegetation cover and hydrology in this area (upland Community Type 1 adjacent to wetland Community Type 5) did not meet the wetland criteria in 2012. The design acreage for the excavated areas between the cells (1.76 acres) was included with the passive wetland acreage (1.03) in the first row of Table 7. The

acreage of the open water and shoreline of the constructed cells was included under the second row of Table 7. The third row included the designed footprint of the wetland cell constructed in 2011 in the southern parcel. The fourth and fifth rows in Table 7 addressed the existing 0.73-acre and 1.83-acre emergent wetlands in the northern and southern parcels, respectively, proposed for preservation that were to remain intact and protected in perpetuity. The sixth row included the upland buffer within the original approved crediting associated with the northern parcel.

The total estimated credit acreage in 2012 was 8.86 acres, an increase over the 5.52 acres accrued in 2011 (Table 8) as a result of the inclusion of the wetland acreage located south of the highway. The acres listed for each category were scaled according to the credit criteria listed in Table 7. The open water (polygon 6), the emergent wetland fringe of the cells (wetland community Type 3), and the excavated depression south of the highway (wetland community Type 7) totaled 10.31 acres. The estimated credit acreage was 70 percent of the total possible, or 7.22 acres 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 2.56 acres of preservation wetland (included 1.83 acres of existing wetland located south of the highway) were met in 2012. The upland acreage site wide totaled 5.0 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 2012 estimated credit for the upland buffer was 1.0 acre, based on the less than five percent cover of noxious weeds.

Table 7. Wetland Crediting and Performance Standard Summary for the original Big Muddy Creek Wetland Mitigation Site (Atkins 2011).

Compensatory Mitigation Type	COE Mitigation Credit Ratio [1]	Proposed Acres	Preliminary Credit Estimate (Acres)	Performance Standard 1	Performance Standard 2	Performance Standard 3	Scaled % Credit Criteria [2]
Creation: Establishment [3] (Area between cells [1.76 ac] and Passive creation in northern tip of site[1.03 ac])	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: 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% Standard 1 not met and no demonstrable progress / corrective Action = 0%
Creation: Establishment (Emergent Marsh and Open Water in Northern Parcel)	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: 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% Standard 1 not met and no demonstrable progress / corrective Action = 0%
***Creation: Establishment (Emergent Marsh and Open Water in Southern Parcel)**	1:1	5.47	5.47	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: 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% Standard 1 not met and no demonstrable progress / corrective Action = 0%
Preservation (Northern Parcel)	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%
***Preservation (Southern Parcel)**	4:1	1.83	0.46	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" .

*Areas added in 2012 have been included in preliminary wetland crediting and performance standard summary approved by Corps for the Big Muddy Wetland Mitigation Project.

Table 8. Summary of wetland credits in 2011 and 2012 at the Big Muddy Wetland Mitigation Site.

Compensatory Mitigation Type	USACE Mitigation Credit Ratio	2011 Delineated Acres	Scaled % Credit Standards	2011 Credit Acres	2012 Delineated Acres	Scaled % Credit Standards	2012 Credit Acres
Wetland Creation: Establishment (Area between cells)	1:1	0.44	70%	0.31	0.00*	0%	0.00
Wetland Creation: Establishment (wetland cells)	1:1	5.75	70%	4.03	10.31	70%	7.22
Wetland Preservation	4:1	0.73*	100%	0.18	2.56**	100%	0.64*
Upland Buffer	5:1	3.70	100%	0.74	5.00	100%	1.00
Total		**10.62**		**5.26**	**17.87**		**8.86**

*0.9 acres delineated in 2011 were determined to be within excavated cells in 2012.
**Preservation wetland acreage increased in 2012 due to increased monitoring area.

4. REFERENCES

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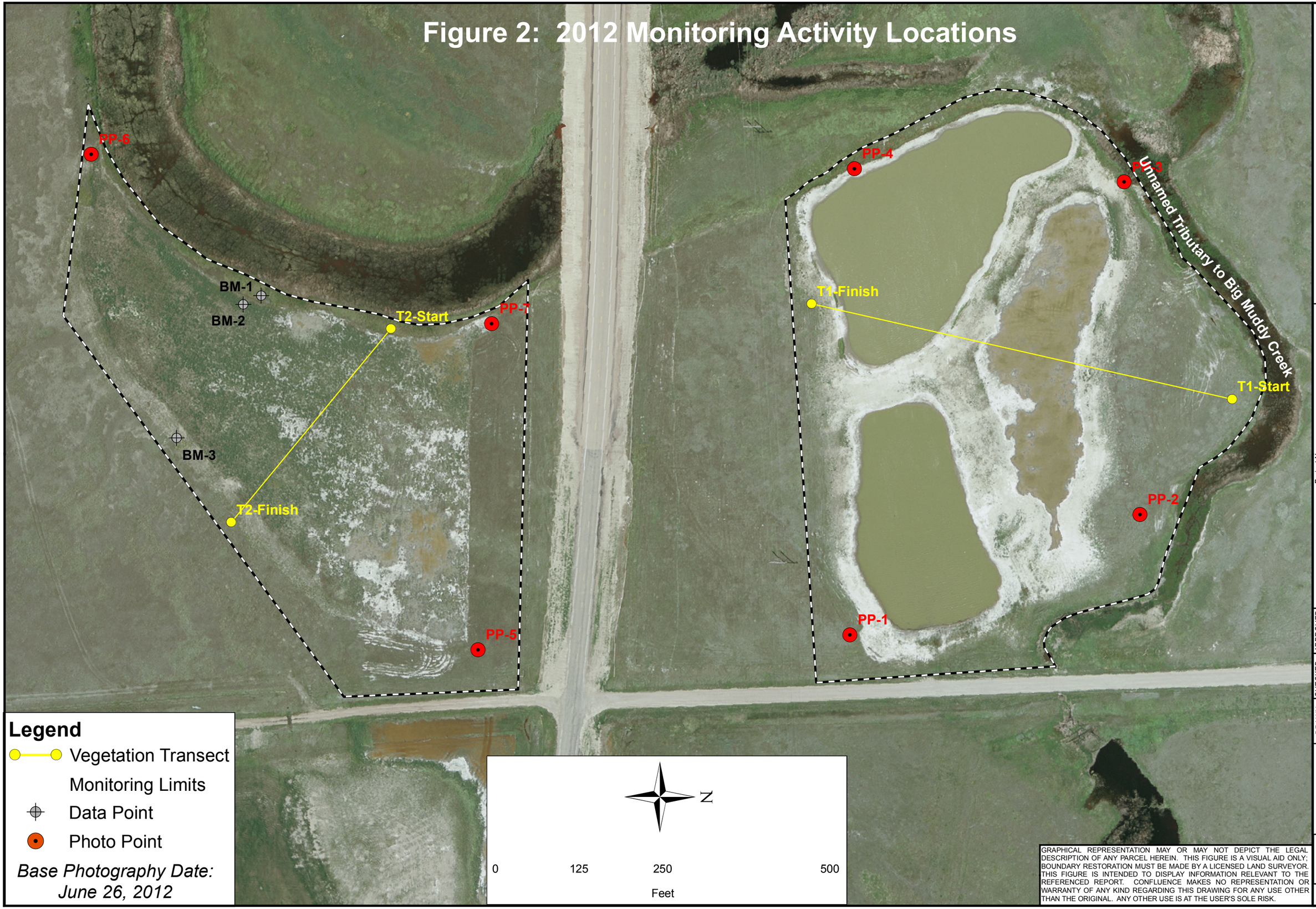
Appendix A

PROJECT AREA MAPS

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

MDT Wetland Mitigation Monitoring
Big Muddy Creek
Roosevelt County, Montana

Figure 2: 2012 Monitoring Activity Locations



GRAPHICAL REPRESENTATION MAY OR MAY NOT DEPICT THE LEGAL DESCRIPTION OF ANY PARCEL HEREIN. THIS FIGURE IS A VISUAL AID ONLY; BOUNDARY RESTORATION MUST BE MADE BY A LICENSED LAND SURVEYOR. THIS FIGURE IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. 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: NH 1-10(46)633

FILE: BigMuddy/Monitor2012.mxd

Project Name: Big Muddy Creek Wetland Mitigation Site

Drawing Title: 2012 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
BCS	BV	JJ

SCALE: Noted

Drawn: August 29, 2012

PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 2

REV -

Figure 3: 2012 Mapped Site Features

N

0 75 150 300

Feet

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.

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)

Legend

Monitoring Limits
Wetland Limits
Open Water (6)
Vegetation Communities
Base Photography Date:
June 27, 2012

Vegetation Community Types

(1) Elymus spp.
(2) Chenopodium album
(3) Schoenoplectus spp.
(4) Spartina pectinata/Schoenoplectus spp.
(5) Puccinellia nuttalliana/Chenopodium album
(7) Chenopodium album/Typha latifolia

Acreages

Total Project Area	17.87
Total Wetlands	12.87
Open Water	5.05
Existing Wetlands	0.73
Upland Buffer	5.00

LOCATION: Roosevelt Co., MT

PROJECT NO: NH 1-10(46)633

FILE: BigMuddy/Veg2012.mxd

Project Name
Big Muddy Creek
Wetland Mitigation Site

Drawing Title
2012 Mapped Site Features

DRAWN BCS	CHECKED BV	APPROVED JJ	
SCALE: Noted			
Drawn: August 29, 2012			
PROJ MGR: B Sandefur			

CONFLUENCE
consulting incorporated

Figure 3

REV -

Appendix B

2012 MDT Wetland Mitigation Site Monitoring Form
2012 USACE Wetland Determination Data Forms
2012 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 Assessment Date/Time 8/16/2012 8:23:48 AM

Person(s) conducting the assessment: B Sandefur

Weather: Sunny & mild 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: 2 #Visits in Year: 1

Size of Evaluation Area: 17.87 (acres)

Land use surrounding wetland:

Agriculture, pasture, US Hwy 2

HYDROLOGY

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

Inundation: ☑ Average Depth: 1 **(ft)** Range of Depths: 0-1.5 **(ft)**

Percent of assessment area under inundation: 20 %

Depth at emergent vegetation-open water boundary: 0.1 **(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, aquatic fauna, inundation on aerial, water-stained leaves, water marks.

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 receives periodic overbank flow from the unnamed tributary during spring flows. Groundwater connection between stream and wetland. Constructed depressions either seasonal/intermittent and permanent/perennial.

VEGETATION COMMUNITIES

Site Big Muddy

(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:** Elymus spp. / **Acres:** 3.17

Species	Cover class	Species	Cover class
Achillea millefolium	0	Agropyron cristatum	3
Artemisia cana	0	Artemisia frigida	0
Bassia scoparia	0	Bromus inermis	3
Chenopodium album	2	Cirsium arvense	0
Distichlis spicata	1	Elymus lanceolatus	2
Elymus repens	2	Elymus trachycaulus	1
Fraxinus pennsylvanica	0	Grindelia squarrosa	2
Helianthus annuus	0	Hordeum jubatum	1
Iva axillaris	0	Lepidium perfoliatum	0
Pascopyrum smithii	2	Poa pratensis	2
Puccinellia nuttalliana	2	Rumex crispus	0
Spartina pectinata	1	Symphoricarpos albus	0
Thlaspi arvense	1		

Comments:

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

Species	Cover class	Species	Cover class
Agropyron cristatum	2	Bare Ground	4
Bassia scoparia	1	Chenopodium album	4
Distichlis spicata	1	Elymus lanceolatus	0
Elymus trachycaulus	0	Glycyrrhiza lepidota	0
Grindelia squarrosa	0	Helianthus annuus	0
Hordeum jubatum	0	Iva axillaris	2
Lactuca serriola	0	Medicago sativa	0
Melilotus officinalis	1	Poa pratensis	1
Puccinellia nuttalliana	0	Rumex crispus	0
Sonchus arvensis	0	Spartina pectinata	0
Suaeda calceoliformis	0	Thlaspi arvense	0
Tragopogon dubius	0		

Comments:

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

Species	Cover class	Species	Cover class
Agropyron cristatum	0	Bare Ground	3
Chenopodium album	0	Distichlis spicata	2
Eleocharis palustris	0	Juncus arcticus	1
Polypogon monspeliensis	0	Puccinellia nuttalliana	1
Rumex crispus	1	Schoenoplectus acutus	1
Schoenoplectus americanu	1	Schoenoplectus maritimus	3
Sonchus arvensis	0	Spartina pectinata	0
Taraxacum officinale	0	Typha latifolia	2

Comments:

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

Species	Cover class	Species	Cover class
Carex aquatilis	1	Lemna minor	0
Poa pratensis	0	Rumex crispus	2
Schoenoplectus acutus	2	Schoenoplectus maritimus	2
Spartina pectinata	4	Typha latifolia	3

Comments:

Community # 5 **Community Type:** Puccinellia nuttalliana / Chenopodium album **Acres:** 1.83

Species	Cover class	Species	Cover class
Agropyron cristatum	1	Atriplex suckleyi	0
Bromus inermis	1	Chenopodium album	3
Distichlis spicata	0	Elymus lanceolatus	0
Elymus repens	1	Grindelia squarrosa	1
Hordeum jubatum	1	Iva axillaris	1
Lactuca serriola	0	Lepidium perfoliatum	0
Poa pratensis	0	Puccinellia nuttalliana	5
Schoenoplectus maritimus	0	Spartina pectinata	0
Symphoricarpos albus	0		

Comments:

Community # 6 **Community Type:** Open Water / **Acres:** 5.05

Species	Cover class	Species	Cover class
Algae, green	1	Bare Ground	2
Distichlis spicata	0	Open Water	5
Schoenoplectus acutus	0	Schoenoplectus maritimus	1
Spartina pectinata	0	Typha latifolia	1

Comments:

Community # 7 **Community Type:** Chenopodium album / Typha latifolia **Acres:** 4.55

Species	Cover class	Species	Cover class
Atriplex suckleyi	1	Bassia scoparia	1
Chenopodium album	5	Hordeum jubatum	1
Iva axillaris	1	Populus deltoides	0
Puccinellia nuttalliana	1	Rumex crispus	1
Schoenoplectus acutus	1	Schoenoplectus maritimus	1
Spartina pectinata	1	Suaeda calceoliformis	2
Typha latifolia	4		

Comments:

Total Vegetation Community Acreage **17.86**

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

VEGETATION TRANSECTS

Site: Big Muddy Date: 8/16/2012 8:23:48 AM

Transect Number: 1 **Compass Direction from Start:** 180

Interval Data:

Ending Station 31 **Community Type:** Elymus spp. /

Species	Cover class	Species	Cover class
Achillea millefolium	0	Agropyron cristatum	2
Artemisia cana	1	Bromus inermis	3
Chenopodium album	2	Elymus trachycaulus	2
Grindelia squarrosa	1	Hordeum jubatum	2
Lepidium perfoliatum	0	Poa pratensis	2

Ending Station 127 **Community Type:** Puccinellia nuttalliana / Chenopodium album

Species	Cover class	Species	Cover class
Agropyron cristatum	0	Atriplex suckleyi	0
Bromus inermis	1	Chenopodium album	1
Lepidium perfoliatum	1	Puccinellia nuttalliana	5
Rumex crispus	1	Suaeda calceoliformis	2

Ending Station 195 **Community Type:** Elymus spp. /

Species	Cover class	Species	Cover class
Agropyron cristatum	2	Bassia scoparia	1
Bromus inermis	4	Chenopodium album	1
Grindelia squarrosa	2	Puccinellia nuttalliana	1

Ending Station 222 **Community Type:** Chenopodium album /

Species	Cover class	Species	Cover class
Bare Ground	3	Bassia scoparia	4
Chenopodium album	2	Grindelia squarrosa	2
Puccinellia nuttalliana	1	Spartina pectinata	0
Suaeda calceoliformis	1		

Ending Station 234 **Community Type:** Schoenoplectus spp. /

Species	Cover class	Species	Cover class
Bare Ground	3	Bassia scoparia	2
Puccinellia nuttalliana	2	Schoenoplectus acutus	1
Schoenoplectus maritimus	1		

Ending Station 353 **Community Type:** Open Water /

Species	Cover class	Species	Cover class
Bare Ground	5	Distichlis spicata	0
Schoenoplectus acutus	0	Schoenoplectus maritimus	1

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

Species	Cover class	Species	Cover class
Bare Ground	4	Bassia scoparia	1
Chenopodium album	2	Puccinellia nuttalliana	1
Schoenoplectus acutus	1	Schoenoplectus maritimus	3

Ending Station 436 **Community Type:** Chenopodium album /

Species	Cover class	Species	Cover class
Bare Ground	5	Bassia scoparia	2
Chenopodium album	4	Elymus trachycaulus	1
Iva axillaris	1	Puccinellia nuttalliana	1

Ending Station 460 **Community Type:** Schoenoplectus spp. /

Species	Cover class	Species	Cover class
Bare Ground	3	Bassia scoparia	1
Chenopodium album	1	Puccinellia nuttalliana	1
Rumex crispus	1	Schoenoplectus maritimus	4
Spartina pectinata	1		

Ending Station 585 **Community Type:** Open Water /

Species	Cover class	Species	Cover class
Algae, green	0	Bare Ground	2
Open Water	5	Schoenoplectus maritimus	0
Spartina pectinata	0		

Ending Station 615 **Community Type:** Schoenoplectus spp. /

Species	Cover class	Species	Cover class
Bare Ground	4	Bassia scoparia	1
Chenopodium album	1	Puccinellia nuttalliana	1
Schoenoplectus maritimus	4	Spartina pectinata	1

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

Species	Cover class	Species	Cover class
Agropyron cristatum	2	Bare Ground	3
Bassia scoparia	1	Bromus inermis	2
Chenopodium album	2	Distichlis spicata	1
Elymus trachycaulus	1	Grindelia squarrosa	3
Iva axillaris	0	Lactuca serriola	1
Lepidium perfoliatum	1	Puccinellia nuttalliana	0

Transect Notes:

Transect Number: 2 **Compass Direction from Start:** 130

Interval Data:

Ending Station 11 **Community Type:** Puccinellia nuttalliana / Chenopodium album

Species	Cover class	Species	Cover class
Chenopodium album	1	Puccinellia nuttalliana	3
Rumex crispus	1	Spartina pectinata	4
Symphoricarpos albus	2		

Ending Station 334 **Community Type:** Chenopodium album / Typha latifolia

Species	Cover class	Species	Cover class
Atriplex suckleyi	1	Bare Ground	2
Bassia scoparia	1	Chenopodium album	5
Hordeum jubatum	1	Iva axillaris	1
Populus deltoides	0	Puccinellia nuttalliana	1
Rumex crispus	1	Schoenoplectus acutus	1
Schoenoplectus maritimus	1	Spartina pectinata	1
Suaeda calceoliformis	2	Typha latifolia	4

Ending Station 366 **Community Type:** Elymus spp. /

Species	Cover class	Species	Cover class
Achillea millefolium	1	Agropyron cristatum	4
Bassia scoparia	1	Bromus inermis	5
Chenopodium album	1	Grindelia squarrosa	1
Helianthus annuus	0	Lactuca serriola	1

Transect Notes:

PLANTED WOODY VEGETATION SURVIVAL

Big Muddy

Comments

No woody species were installed on the site. The wetlands were revegetated with seed and salvaged material.

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
American Avocet	6	F	MF, OW, US
American Coot	7	L	OW
Blue-winged Teal	4	L	OW
Killdeer	6	F	US
Red-winged Blackbird	12	FO, L	WM
Spotted Sandpiper	10	F	MF, OW, US
Wilson's Snipe	2	F	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
Deer Sp.		Yes	No	No	
Northern Leopard Frog	1	No	No	No	
Raccoon		Yes	No	No	

Wildlife Comments:

Big Muddy

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
9823	48.167439	-104.618324	180	T-1, start
9827	48.165768	-104.619057	0	T-1, end
9828-32	48.165836	-104.617004	315	PP-1
9836-42	48.166012	-104.619835	90	PP-4
9843-55	48.16716	-104.619606	180	PP-3
9856-67	48.167053	-104.617584	180	PP-2
9875-81	48.162868	-104.620239	0	PP-6
9882	48.163518333	-104.61927		BM-1
9883	48.163443333333	-104.6192616667		BM-2
9885-92	48.164436	-104.619064	180	PP-7
9893	48.164028	-104.619049	130	T-2, start
9894	48.163361	-104.618164	310	T-2, end
9895	48.163161666667	-104.61849		BM-3
9896-99	48.164242	-104.617058	210	PP-5

Comments:

Big Muddy

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 City/County: Roosevelt Sampling Date: 8/16/2012

Applicant/Owner: MDT State: MT Sampling Point: BM-1

Investigator(s): B Sandefur Section, Township, Range: 21 28N 55E

Landform (hillslope, terrace, etc.): Levee Local relief (concave, convex, none): flat Slope (%): 0

Subregion (LRR): 55E Lat: 48.163518333 Long: -104.61927 Datum: WGS84

Soil Map Unit Name: Lallie NWI classification: Upland

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: DP in veg com 5, area between excavated wetland basin and a natural Typha/Scho intermittent/ephemeral swale.

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: 5ft)			
1. Symphoricarpos albus	10	☐	NL
2. Spartina pectinata	25	☑	FACW
3. Rumex crispus	10	☐	FAC
4. Puccinellia nuttalliana	25	☑	OBL
5. Schoenoplectus maritimus	20	☑	OBL
6. Chenopodium album	10	☐	FACU
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
	100 = 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−): 3 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	45	x 1 =	45
FACW species	25	x 2 =	50
FAC species	10	x 3 =	30
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	90 (A)		165 (B)

Prevalence Index = B/A = 1.83333

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
0-12	10YR 4/2	90	C M	10YR	4/6	10	Clay	

[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:

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:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Muddy City/County: Roosevelt Sampling Date: 8/16/2012

Applicant/Owner: MDT State: MT Sampling Point: BM-2

Investigator(s): B Sandefur Section, Township, Range: 21 28N 55E

Landform (hillslope, terrace, etc.): Lowland Local relief (concave, convex, none): flat Slope (%): 0

Subregion (LRR): 55E Lat: 48.1634433333333 Long: -104.619261666667 Datum: WGS84

Soil Map Unit Name: Lallie NWI classification: Upland

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: DP in excavated wetland basin.

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: 5ft)			
1. Chenopodium album	50	☑	FACU
2. Typha latifolia	20	☑	OBL
3. Puccinellia nuttalliana	10	☐	OBL
4. Spartina pectinata	10	☐	FACW
5. Schoenoplectus maritimus	10	☐	OBL
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
	100 = 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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.5 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	10	x 2 =	20
FAC species	0	x 3 =	0
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	100 (A)		260 (B)

Prevalence Index = B/A = 2.6

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
0-12	10YR 4/2	95	C M	10YR	4/6	5	Clay	Similar to BM-1, likely excavated to e

[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:

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:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Muddy City/County: Roosevelt Sampling Date: 8/16/2012

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

Investigator(s): B Sandefur Section, Township, Range: 21 28N 55E

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): Slope Slope (%): 17.6

Subregion (LRR): 55E Lat: 48.1631616666667 Long: -104.61849 Datum: WGS84

Soil Map Unit Name: Lohler NWI classification: Upland

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: DP along slope of excavated wetland basin, area mapped veg com 1. Soils mapped as Lohler 0-2% slope; slope identified as data point result of recent excavation and location along side-slope. Although soils indicate hydric, veg com is upland and no positive indication of wetland hydrology identified.

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: 5ft)			
1. Elymus repens	10	☑	FACU
2. Elymus trachycaulus	10	☑	FACU
3. Bromus inermis	45	☑	UPL
4. Iva axillaris	5	☐	FAC
5. Poa pratensis	10	☑	FACU
6. Agropyron cristatum	10	☑	UPL
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
	90 = 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−): 0 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	30	x 4 =	120
UPL species	55	x 5 =	275
Column Totals:	90 (A)		410 (B)

Prevalence Index = B/A = 4.55556

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
0-6	10YR 4/3	100					Clay	
6-12	10YR 4/2	95	C M	10YR	4/6	5	Clay	

[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: Hydric soil potentially relic, although wetland boundary may transition upslope if contemporary wetland hydrology supports the development of a hydrophytic plant community.

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: No signs of wetland hydrology.

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 8/16/2012 **4. Evaluators** B Sandefur **5. Wetland/Site# (s)** Created wetlands

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 10.31

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 10.31

☐ **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	Seasonal/Intermittant	40
Depressional	Emergent Wetland	Excavated	Seasonal/Intermittant	50
Riverine	Emergent Wetland		Permanent/Perennial	10

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 recently constructed wetland cells have exhibited vegetation development. Grazing eliminated within project boundaries. Adjacent land used for agriculture, i.e. grazing. Hwy 2 bisects the mitigation site. Big Muddy Creek borders boundary of constructed wetlands.

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

Cirsium arvense

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

The AA includes four constructed wetland cells dominated by open water and additional wetland area 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. 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 USFWS database for Roosevelt 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 Roosevelt 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. Several bird species observed during site visits.

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**

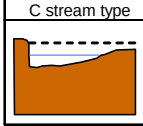
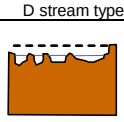
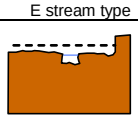
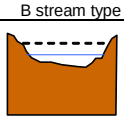
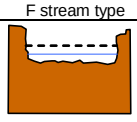
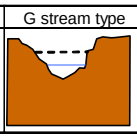
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

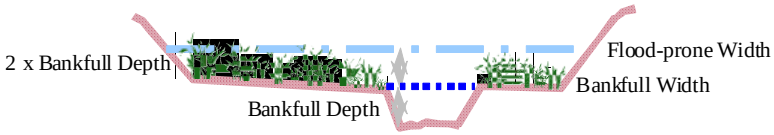
iii. Final Score and Rating: 0 NA **Comments:** Closed wetland cells with no direct surface water inlet or outlet.

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: Constructed cells were either inundated at time of site visit or showed sufficient signs of inundation during early growing season. Cells with greater than 5 ac ft of storage potential.

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 along shoreline around constructed cells have developed to greater than 70%.

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 vegetation consist 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** .6M

Comments: Average 50 foot Upland buffer surrounding mitigation site. AA is 10.31 ac. 60% of AA is vegetated = 6.2 ac.

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.

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): Created wetlands

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	5.155	☐
C. General Wildlife Habitat	M	.7	1	7.217	☐
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	M	.5	1	5.155	☐
F. Short and Long Term Surface Water Storage	H	1	1	10.31	☑
G. Sediment/Nutrient/Toxicant Removal	H	1	1	10.31	☑
H. Sediment/Shoreline Stabilization	H	1	1	10.31	☑
I. Production Export/Food Chain Support	M	.6	1	6.186	☐
J. Groundwater Discharge/Recharge	H	1	1	10.31	☑
K. Uniqueness	L	.2	1	2.062	☐
L. Recreation/Education Potential (bonus points)	H	.15	NA	1.5465	☐
Totals:		6.65	10	68.5615	
Percent of Possible Score			**66.5** %		

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 8/16/2012 **4. Evaluators** B Sandefur **5. Wetland/Site# (s)** Preservation-Existing

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 2.56

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 2.56

☐ **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 bisects the mitigation site. 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:

Cirsium arvense

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 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.

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 USFWS database for Roosevelt 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 Roosevelt 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**

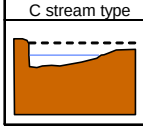
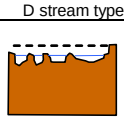
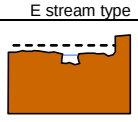
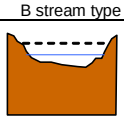
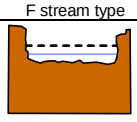
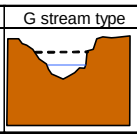
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

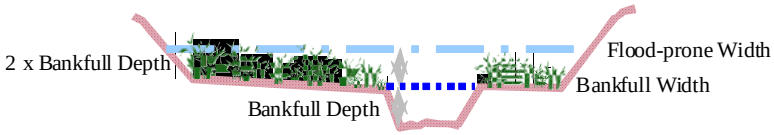
iii. Final Score and Rating: 0 NA **Comments:**

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 of AA.

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 2.56 acres without potential to support greater than 1ft of surface water.

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** 1 E

Comments: Area 2.56 acre, high biological activity, contains surface water outlet.

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 and saturated during 2012 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	1.28	☐
C. General Wildlife Habitat	H	.9	1	2.304	☑
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	M	.4	1	1.024	☐
F. Short and Long Term Surface Water Storage	H	.8	1	2.048	☐
G. Sediment/Nutrient/Toxicant Removal	H	.9	1	2.304	☑
H. Sediment/Shoreline Stabilization	H	1	1	2.56	☑
I. Production Export/Food Chain Support	E	1	1	2.56	☑
J. Groundwater Discharge/Recharge	H	1	1	2.56	☐
K. Uniqueness	M	.4	1	1.024	☐
L. Recreation/Education Potential (bonus points)	H	.15	NA	0.384	☐
Totals:		7.05	10	18.048	
Percent of Possible Score			**70.5** %		

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 1*
Bearing: North

Location: SE property corner.
Taken in 2012



Photo Point 1 – *Photo 2*
Bearing: Northwest

Location: SE property corner
Taken in 2011



Photo Point 1 – *Photo 2*
Bearing: Northwest

Location: SE property corner
Taken in 2012



Photo Point 1 – *Photo 3*
Bearing: Southwest

Location: SE property corner.
Taken in 2011



Photo Point 1 – *Photo 3*
Bearing: Southwest

Location: SE property corner.
Taken in 2012



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



Photo Point 2 – *Photo 1*
Bearing: North
Location: NE property corner.
Taken in 2012



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



Photo Point 2 – *Photo 2*
Bearing: East
Location: NE property corner.
Taken in 2012



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



Photo Point 2 – *Photo 3*
Bearing: South
Location: NE property corner.
Taken in 2012



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



Photo Point 2 – *Photo 4*
Bearing: West
Location: NE property corner.
Taken in 2012



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



Photo Point 3 – *Photo 1*
Bearing: East
Location: NW property corner.
Taken in 2012



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



Photo Point 3 – *Photo 2*
Bearing: South
Location: NW property corner.
Taken in 2012



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



Photo Point 3 – *Photo 3*
Bearing: West
Location: UT of Big Muddy
Taken in 2012



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



Photo Point 3 – *Photo 4*
Bearing: North
Location: UT of Big Muddy.
Taken in 2012



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



Photo Point 4 – *Photo 1*
Bearing: North
Location: SW property corner.
Taken in 2012



Photo Point 4 – *Photo 2*
Bearing: Northeast

Location: SW property corner.
Taken in 2011



Photo Point 4 – *Photo 2*
Bearing: Northeast

Location: SW property corner.
Taken in 2012



Photo Point 4 – *Photo 3*
Bearing: Northwest

Location: Existing wetland.
Taken in 2011



Photo Point 4 – *Photo 3*
Bearing: Northwest

Location: Existing wetland.
Taken in 2012



Photo Point 5 – *Photo 1*
Bearing: 221 deg

Location: Veg Com 5
Taken in 2012

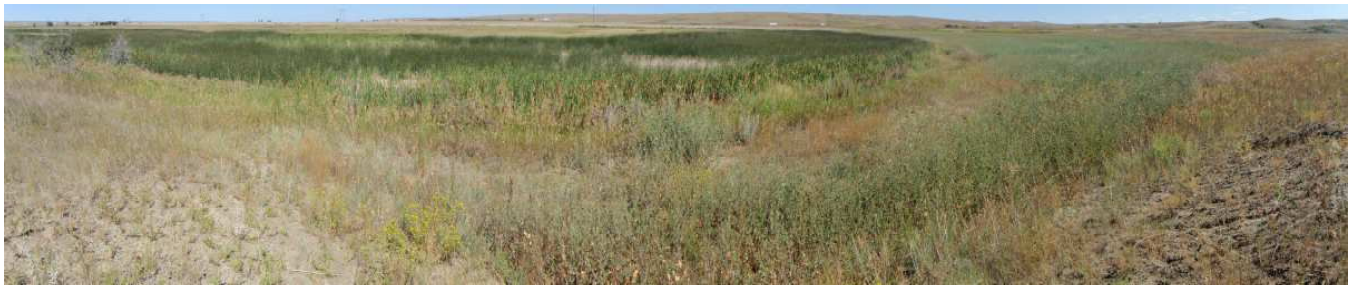


Photo Point 6 – *Photo 1*
Bearing: 0 deg

Location: Veg Com 1
Taken in 2012



Photo Point 7 – *Photo 1*
Bearing: 180 deg

Location: Veg Com 7
Taken in 2012



Transect 1 – *Start*
Bearing: 220 deg

Location: Veg Com 1
Taken in 2011



Transect 1 – *Start*
Bearing: 220 deg

Location: Veg Com 1
Taken in 2012



Transect 1 – *Finish*
Bearing: 0 deg

Location: Veg Com 2
Taken in 2011



Transect 1 – *Finish*
Bearing: 0 deg

Location: Veg Com 2
Taken in 2012



Transect 2 – *Start*
Bearing: 130 deg

Location: Veg Com 5
Taken in 2012



Transect 2 – *Finish*
Bearing: 310 deg

Location: Veg Com 1
Taken in 2012



Data Point 1 – *BM-1*
Bearing: 180 deg

Location: Veg Com 5
Taken in 2012



Data Point 2 – *BM-2*
Bearing: 200 deg

Location: Veg Com 7
Taken in 2012



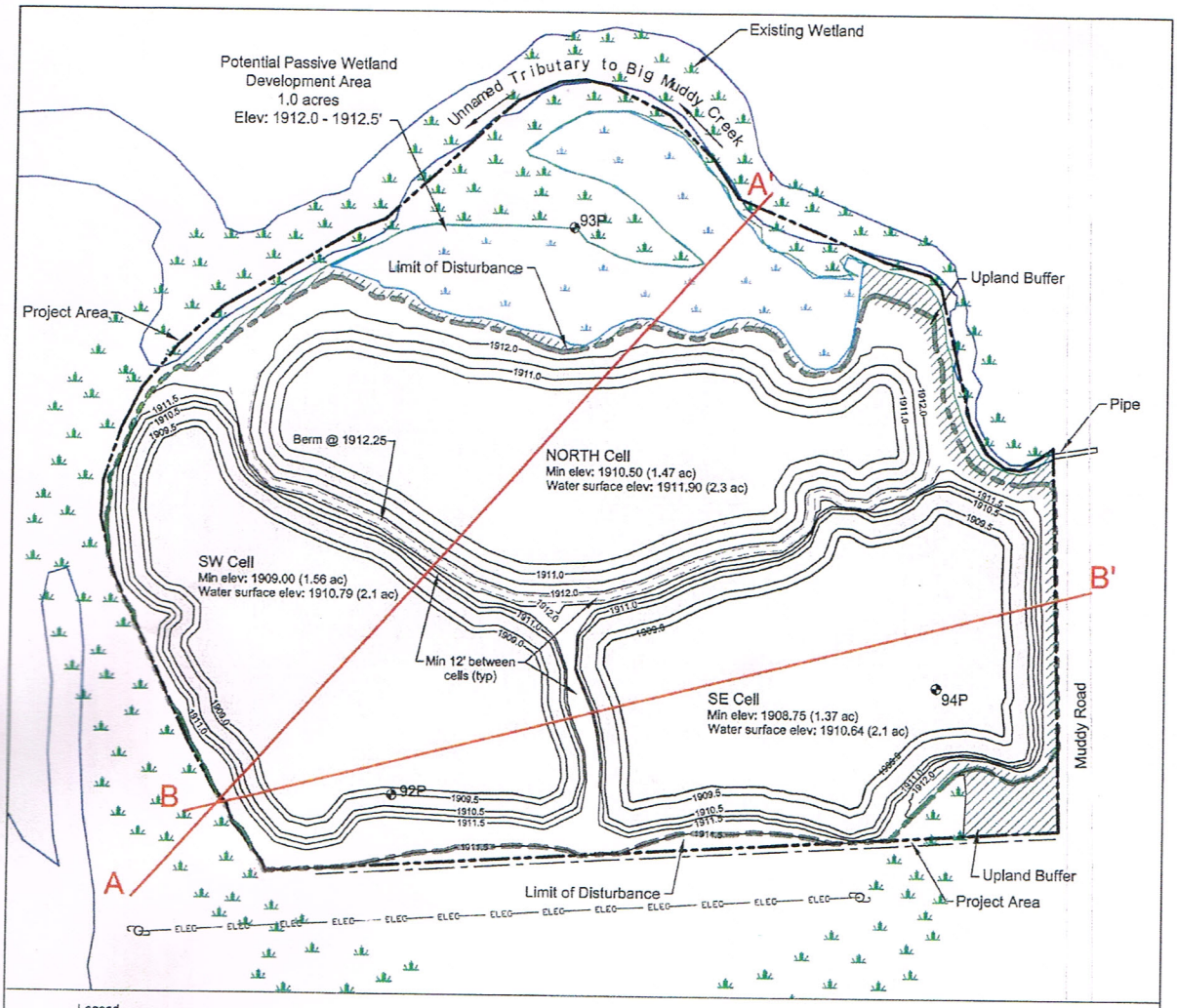
Data Point 3 – *BM-3*
Bearing: 250 deg

Location: Veg com 1
Taken in 2012

Appendix D

Project Plan Sheet

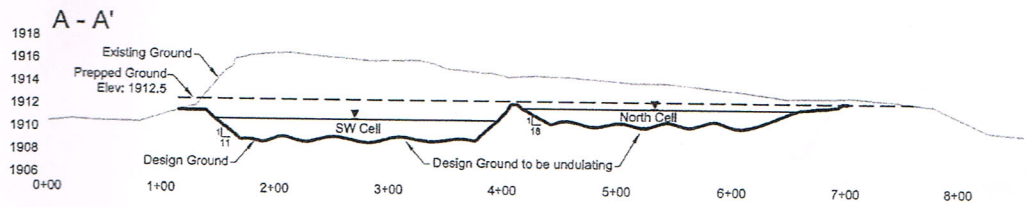
MDT Wetland Mitigation Monitoring
Big Muddy Creek
Roosevelt County, Montana



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.

SCALE: 1" = 100'



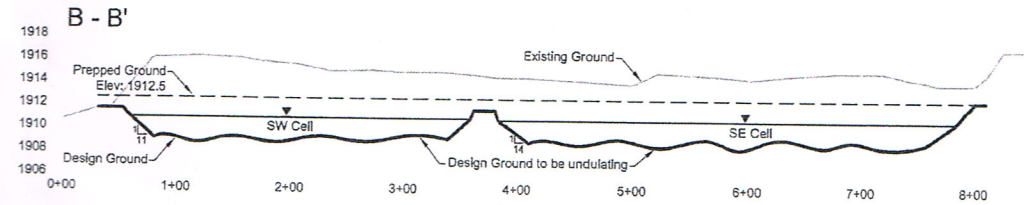


FIGURE 4
REV - 09/03/2010

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