MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2013

Big Muddy Creek
Roosevelt County, Montana



Prepared for:

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December 2013

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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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1. INTRODUCTION

The Big Muddy Creek Wetland Mitigation Site was completed in spring 2011. This report presents the results of the third 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, on US Highway 2, in Section 21, Township 28 North, Range 55 East, Roosevelt County, Montana (Figure 1). The overall size of the wetland mitigation site was modified in 2012 to provide compensatory mitigation for unavoidable impacts associated with the MDT Brockton – East project. The original mitigation area consisted of 10.62-acres located on the north side of Highway 2. An additional 7.25 acres to the south of Highway 2 were added in 2012. The total mitigation area monitored in 2012 and 2013 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 and are discussed below.

Figures 2 and 3 in Appendix A show the 2013 Monitoring Activity Locations and Mapped Site Features, respectively. The MDT Mitigation Site 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 provided in Appendix D.

The wetland mitigation site is situated within Watershed 12, the Lower Missouri River Basin. The MDT completed an initial feasibility study in August 2009. A 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 from the marsh into upland habitat.

The mitigation goals were to create and preserve wetland habitat functions associated with riverine and emergent wetland on the Big Muddy Creek tributary floodplain. 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.

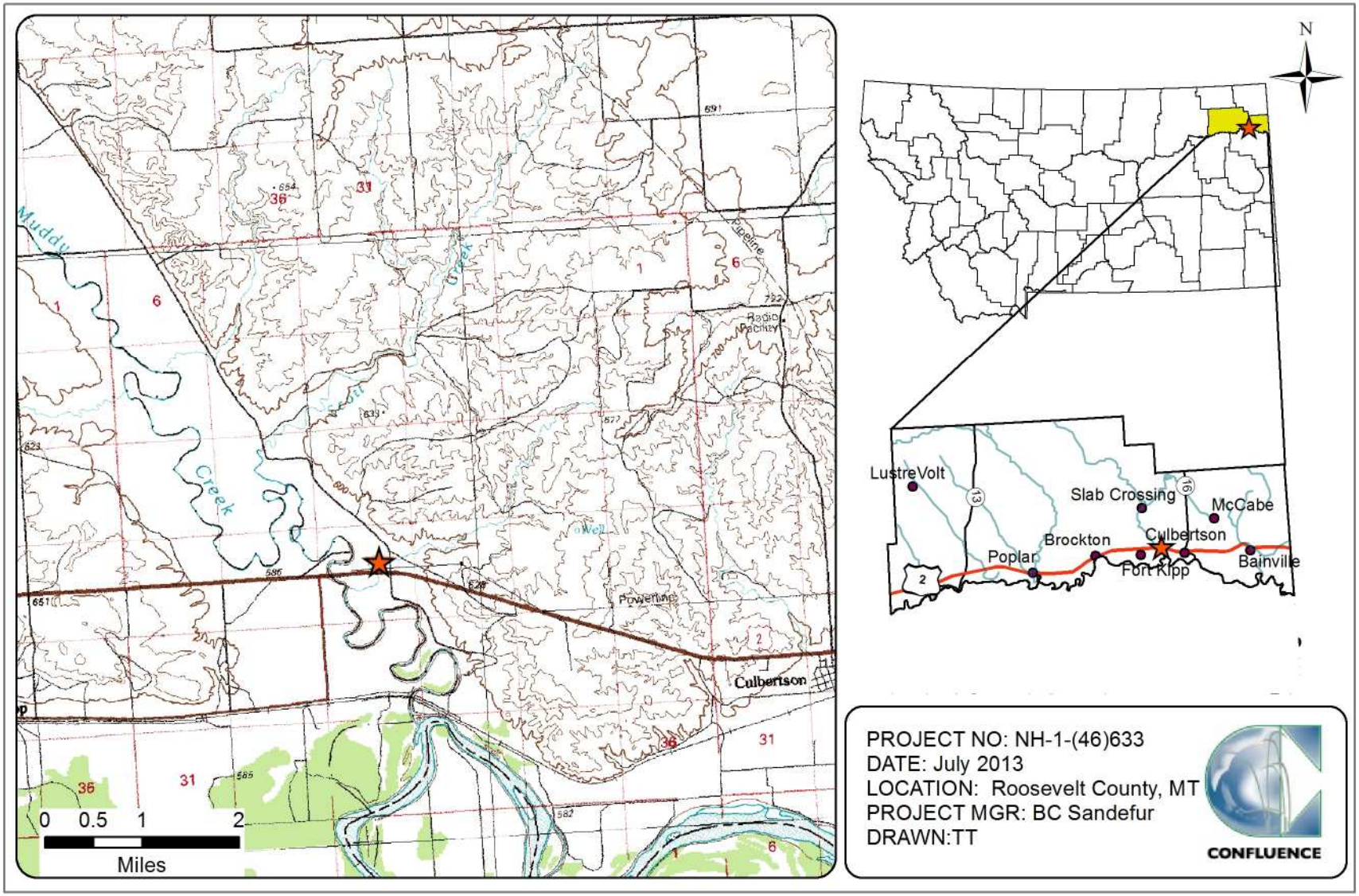


Figure 1. Project location of Big Muddy Creek Wetland Mitigation Site.

- 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.

Up to an additional 1.76 acres of emergent wetland was expected to form in the areas excavated between the three cells. The excavation was expected to facilitate saturation of the root zone via capillary action during spring and early summer of most years. 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.

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 7, 2013. Information for the Mitigation Monitoring Form and Wetland Determination Data Forms were 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) and are 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 four 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). Onsite 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 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 2013 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 2013 aerial photograph (Figure 3, Appendix B). Photographs were taken at the endpoints of the transects during the monitoring event (Appendix C).

The Montana State Noxious Weed List (September 2010), prepared by the Montana Department of Agriculture, was used to categorize weeds identified within the site. 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, 6 to 25 percent, and 26 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 surveyed with

GPS and in presented on the 2013 aerial imagery in 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 from 2011 through 2013 was compiled for this report.

2.6. Functional Assessment

The 2008 MDT MWAM was used to evaluate functions and values on the site from 2011 through 2013. 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 four 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 2011 and 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 2013 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, wetland/upland boundary 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 2012 (WRCC 2013). The annual precipitation recorded in 2010, 2011, and 2012 was 20.53 inches, 17.43 inches and 12.44 inches, respectively. The total precipitation from January to August 31 was 10.64 inches (long-term average), 16.77 inches (2010), 15.39 inches (2011), 8.98 inches (2012), and 11.25 inches (2013). These data suggest the region received above-average precipitation in 2010 and 2011, and near-average precipitation in 2012 and 2013. Hydrology at the Big Muddy wetland mitigation site is driven by precipitation and infrequent flooding by the unnamed tributary of Big Muddy Creek. Site-wide inundation and saturation levels were generally lower in 2012 and 2013 than observed within the northern parcel in 2010 and both north and south mitigation areas in 2011.

Approximately 20 percent of the site was inundated to an average depth of 0.8 foot during the 2013 investigation. Surface water depths ranged from 0.0 to 1.5 feet. Areas defined as wetlands that were not inundated exhibited saturation within 12 inches (1.0 foot) of the ground surface water marks, water-stained leaves, aquatic invertebrates, inundation and saturation visible on aerial imagery, and/or surface soil cracks. The area receives periodic overbank flow from the unnamed tributary during spring flows. The stream and constructed wetlands are hydrologically connected via groundwater. At the time of the August field survey, hydrologic indicators were present that demonstrated the site supported a higher water table during the early part of the growing season.

Four data points, BM-1w, BM-2w, BM-3w, and BM-1u, were sampled to determine the wetland and upland boundaries. Data points BM-1w to BM-3w were located in areas that met the wetland criteria. BM-1w was located in the undisturbed Community 9 in the preservation area and BM-2w was located at the edge of a constructed wetland cell. Test pit BM-3w was located near the edge of the southern excavated depression in an area of wetland expansion in 2013. Positive wetland hydrology at BM-1w was achieved wtih two secondary indicators including geomorphic position and the FAC-neutral test. Secondary indicators also provided evidence of positive wetland hydrology at BM-2w and BM-3w and included soil cracks and the FAC-neutral test. The area around BM-3w also displayed saturation on an aerial photograph. No hydrological indicators were noted at data point BM-1u, located in vegetation community Type 8 (upland).

3.2. Vegetation

Monitoring year 2013 marked the third year of post-construction monitoring at the Big Muddy Creek wetland mitigation site. Fifty-nine plant species were observed site wide from 2011 through 2013 (Table 1). Vegetation plant communities were mapped and named based on the dominant species within a community and the

results of the wetland delineation data. The five communities identified in 2013 and complete lists of the associated species are on the Monitoring Form in Appendix B and the mapped communities shown on Figure 3 in Appendix A.

Table 1. Vegetation species observed in 2011, 2012 and 2013 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
Artemisia tridentata	**Big Sagebrush**	**UPL**
Aster sp.	Aster	NL
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

[1]Draft NWPL 2012 (Lichvar and Kartesz, 2009).

New species identified in 2013 are bolded.

Table 1. (Continued). Vegetation species observed in 2011, 2012 and 2013 at the Big Muddy Wetland Mitigation Site

Scientific Names	Common Names	GP Indicator Status[1]
Lycopus americanus	**Cut-Leaf Water-Horehound**	**OBL**
Medicago sativa	Alfalfa	UPL
Melilotus officinalis	Yellow Sweet-Clover	FACU
Mentha arvensis	American Wild Mint	FACW
Opuntia polyacantha	**Plains Pricklypear**	**UPL**
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
Populus tremuloides	**Quaking Aspen**	**FAC**
Puccinellia nuttalliana	Nuttall's Alkali Grass	OBL
Rosa woodsii	**Woods' Rose**	**FACU**
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
Scutellaria galericulata	**Hooded Skullcap**	**OBL**
Sonchus arvensis	Field Sow-Thistle	FAC
Spartina pectinata	Freshwater Cord Grass	FACW
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 2013 are bolded.

The five vegetation communities identified in 2013 included four wetland types and one upland type. The wetland communities were wetland Type 3 – *Schoenoplectus* spp.; wetland Type 4 – *Spartina pectinata/ Schoenoplectus* spp.; wetland Type 9 – *Puccinellia nuttalliana*/*Iva axillaris;* and wetland Type 10 – *Puccinellia nuttalliana/Typha latifolia*. Wetland Type 10 was defined in 2013 throughout the excavated area south of Highway 2 that was incorporated into the mitigation site in 2012. The open water limits in the constructed cells are presented as polygon 6 on Figure 3 (Appendix A). Upland community Type 1 – *Elymus* spp. and upland Type 2 – *Chenopodium album* were replaced in 2013 by upland Type 8 – *Bromus inermis*/*Agropyron cristatum.*

Wetland community Type 3 – *Schoenoplectus* spp. was identified on 1.06 acres of the north site and generally included the seeded emergent community found along the margins of the open water boundary in the constructed cells. Bare ground was approximately 6 to 10 percent. The cover of desirable hydrophytic species increased and the amount of bare ground decreased from 2012 to 2013. Dominant species included saltmarsh club-rush (*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*), broad-leaf cattail (*Typha latifolia*), and lamb-quarters (*Chenopodium album*). This community is expected to continue to increase in size and may eventually dominate the open water areas.

Wetland community Type 4 – *Spartina pectinata./Schoenplectus* spp. characterized 1.15 acres of the pre-existing wetland community associated with the unnamed tributary to Big Muddy Creek that parallels the west and north boundaries of the north parcel and the west boundary of the south parcel. The dominant species in this community was freshwater cord grass (*Spartina pectinata*). Hard-stem club-rush, saltmarsh club-rush, prickly lettuce (*Lactuca serriola*), cut-leaf water-horehound (*Lycopus americanus*), broad-leaf cattail, curly dock (*Rumex crispus*), leafy tussock sedge (*Carex aquatilis*), and common duckweed (*Lemna minor*) 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 9 – *Puccinellia nutalliana/Iva axillaris* was identified on 3.8 acres of wetland located within the excavated areas between the constructed cells on the north side of Highway 2 and north and east of the cell located south of the highway. The vegetation cover was dominated by Nuttall's alkaligrass, deer root (*Iva axillaris*), with less than 5 percent cover of twelve species including arctic rush (*Juncus arcticu*s), coastal salt grass, fresh water cordgrass, and saltmarsh club-rush. Approximately 11 to 20 percent of the community was bare. Wetland Type 5, *Puccinellia nutalliana/Chenopodium album* was replaced by wetland type 9 in 2013 based on the increase in the cover of *P. nutalliana* and the decrease in the cover of *C. album.*

Wetland community Type 10 – *Puccinellia nutalliana/Typha latifolia* defined the 4.38 acre wetland depression constructed south of the highway. Dominant species included Nuttall's alkaligrass, broad-leaf cattail, and piuteweed (*Suaeda calceoliformis*). There were 10 other species identified at less than 5 percent cover including saltmarsh club-rush, hard-stem club-rush, freshwater cord grass, and quaking aspen (*Populus tremuloides*). It appears the majority of this area is inundated during seasonal high groundwater periods. A small area of inundation was present during the August 2013 field survey. Wetland Type 7 – *Chenopodium album/Typha latifolia* was replaced by wetland type 10 in 2013.

Upland Community Type 8 – *Bromus inermis/Agropyron cristatum* was found on 3.62 acres of both site perimeters upslope from the constructed wetland cells. The cover consisted of existing and seeded herbaceous species. Smooth brome (*Bromus inermis*), crested wheatgrass (*Agropyron cristatum*), curly-cup gumweed (*Grindelia squarrosa*), Kentucky bluegrass (*Poa pratensis*), creeping wild rye (*Elymus repens*, called *Agropyron repens* on 1988 list), and Nuttall's alkaligrass, dominated the upland community.

The majority of the constructed wetland cells in the north half of the mitigation site were inundated with 3.87 acres of open water. A decrease of 1.17 acres of open water from 2012 (Polygon 6) is likely the result of lower precipitation rates when compared to the 2010 and 2011 total precipitation rates. Emergent hydrophytic vegetation development was observed in the areas mapped as open water in 2012 although the majority of area formerly mapped as open water consisted of bare ground. Productivity levels in the three open water areas remained low in 2013. The rate of aquatic bed development in the open water areas of the excavated depressions will likely be limited by the intermittent water regime and high turbidity that results from wave-action along the unconsolidated clay shoreline. The accumulation of salts within the soil's rooting zone along the normally endo-saturated shoreline may also be a factor in vegetation development. It is unclear if this area will develop aquatic bed and/or emergent vegetation.

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 three vegetation communities, wetland Types 3 and 9 and upland Type 8 (Table 2 and Chart 1). Approximately 32.1 percent of Transect 1 crossed the open water in the constructed cells. Hydrophytic vegetation was identified on 49.8 percent of the transect in 2013, up from 32.1 percent in 2012. The most notable change from 2012 to 2013 was the shift from upland Type 2 – *Chenopodium* to wetland Type 9 – *Puccinellia/Iva*. The transition is illustrated on Charts 1 and 2. The percent of upland plant communities on the transect decreased from 30.1 percent to 18.1 percent from 2012 to 2013 and reflected the transition from upland to wetland.

Transect 2 was added in 2012 to monitor the additional mitigation area to the south of Highway 2 and was established across the excavated basin constructed in 2011. Transect 2 intersected wetland community Types 4 and 10 and upland community Type 8. Approximately 91.8 percent of the transect was dominated by hydrophytic species (Table 3 and Charts 3 an 4). *Puccinellia* replaced *Chenopodium* as the dominant species within the wetland cell south of the highway in 2013. The percentage of upland/wetland communities remained consistent between 2012 and 2013, primarily a result of the abrupt topographic transition into wetland.

Table 2. Data summary for Transect 1 (North Parcel) in 2011, 2012 and 2013 at the Big Muddy Wetland Mitigation Site.

Monitoring Year	2011	2012	2013
Transect Length (feet)	**647**	**647**	**647**
Vegetation Community Transitions along Transect	11	11	11
Vegetation Communities along Transect	4	4	3
Hydrophytic Vegetation Communities along Transect	2	2	2
Total Vegetative Species	21	24	20
Total Hydrophytic Species	12	11	9
Total Upland Species	9	13	11
Estimated % Total Vegetative Cover	40	50	70
% Transect Length Comprising Hydrophytic Vegetation Communities	20.7	32.1	49.8
% Transect Length Comprising Upland Vegetation Communities	29.8	30.1	18.1
% Transect Length Comprising Unvegetated Open Water	49.5	37.7	32.1
% Transect Length Comprising Bare Substrate	0.0	0.0	0.0

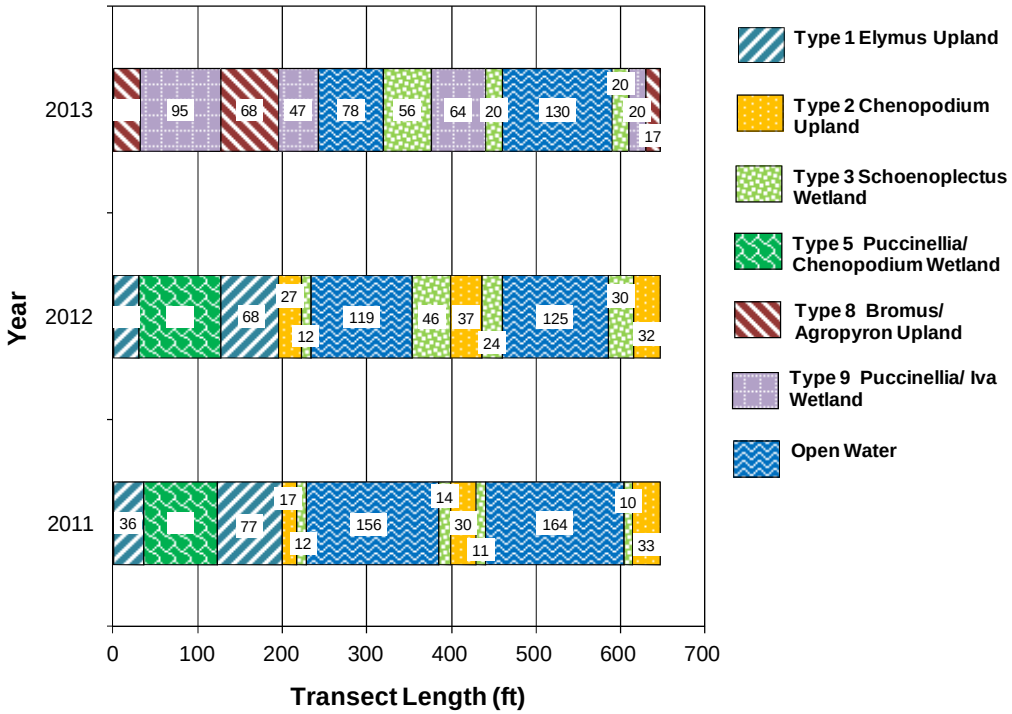


Chart 1. Transect map showing community types on Transect 1 (North Parcel) in 2011, 2012 and 2013 from start to finish at the Big Muddy Wetland Mitigation Site.

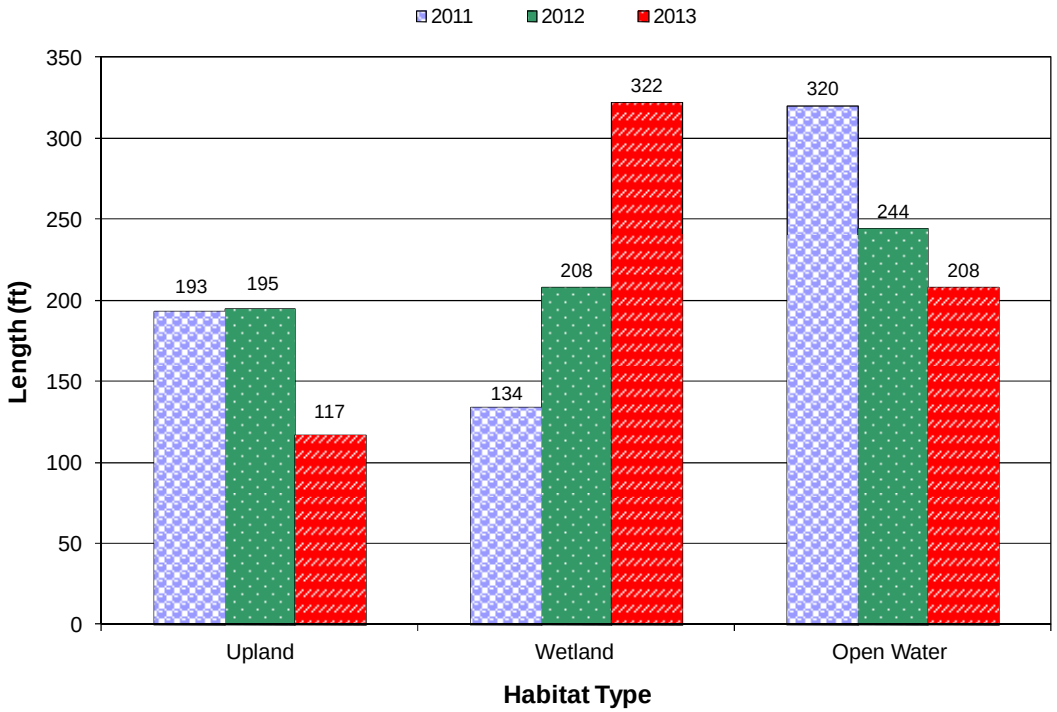


Chart 2. Length of habitat types within Transect 1 (North Parcel) in 2011, 2012 and 2013 at the Big Muddy Wetland Mitigation Site.

Table 3. Data summary for Transect 2 (South Parcel) in 2012 and 2013 at the Big Muddy Wetland Mitigation Site.

Monitoring Year	**2012**	**2013**
Transect Length (feet)	**366**	**366**
Vegetation Community Transitions along Transect	2	2
Vegetation Communities along Transect	3	3
Hydrophytic Vegetation Communities along Transect	2	2
Total Vegetative Species	21	18
Total Hydrophytic Species	11	10
Total Upland Species	10	8
Estimated % Total Vegetative Cover	90	95
% Transect Length Comprising Hydrophytic Vegetation Communities	91.3	91.8
% Transect Length Comprising Upland Vegetation Communities	8.7	8.2
% Transect Length Comprising Unvegetated Open Water	0.0	0.0
% Transect Length Comprising Bare Substrate	0.0	0.0

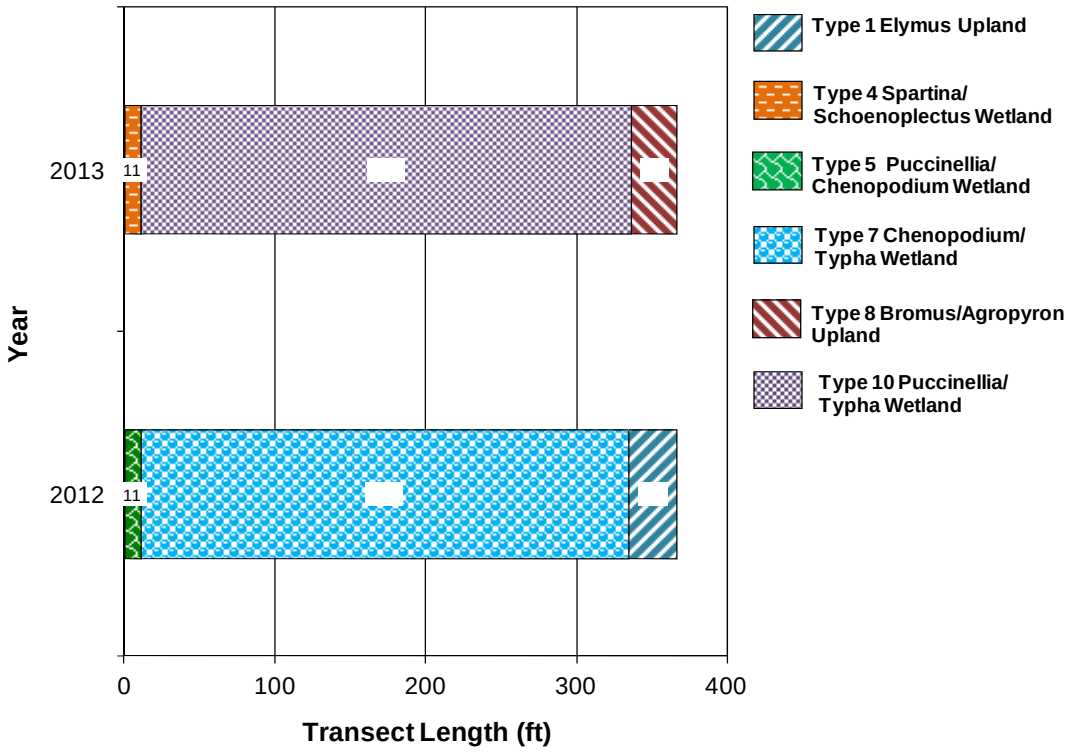


Chart 3. Transect map showing community types on Transect 2 (South Parcel) in 2012 and 2013 from start to finish at the Big Muddy Wetland Mitigation Site.

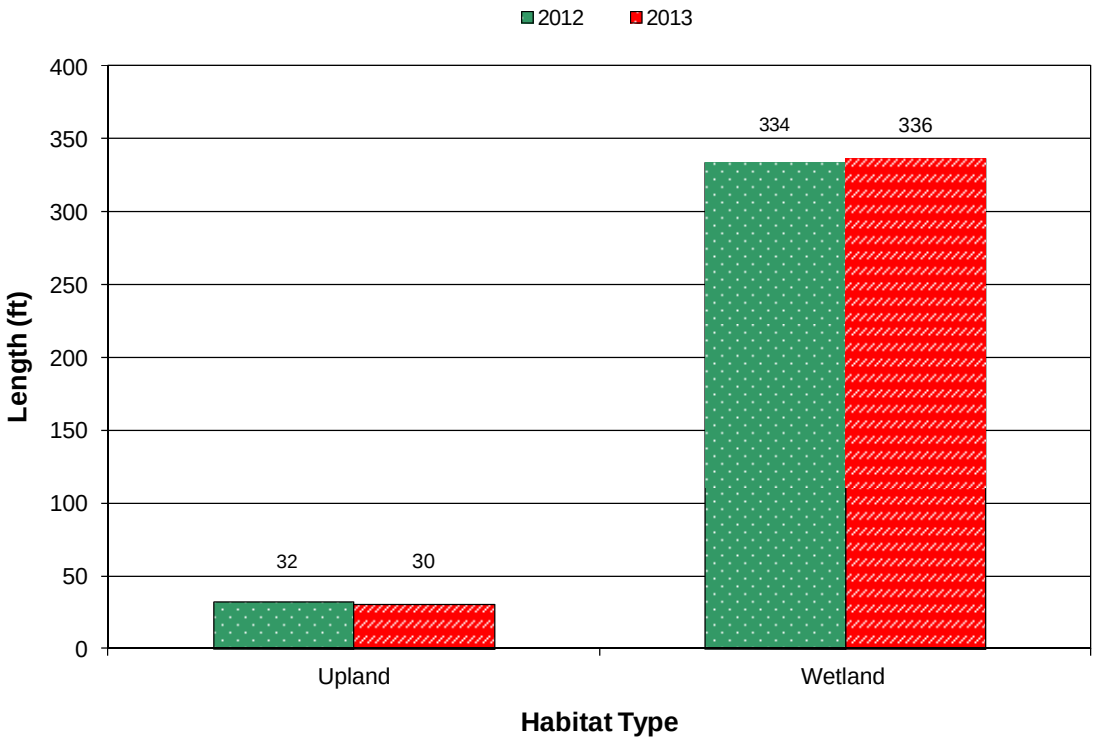


Chart 4. Length of habitat types within Transect 2 (South Parcel) in 2012 and 2013 at the Big Muddy Wetland Mitigation Site.

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. No woody species were installed on this site. Native recruitment of eastern cottonwood and quaking aspen seedlings was identified in 2013.

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 parcel. This 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 parcels. This soil is mainly found on floodplains. The Lallie series consist of very deep, poorly drained, slowly permeable soils formed in lake basins and old oxbows. It was mapped along the west boundary of the site surrounding the unnamed tributary of Big Muddy Creek. All three soil map units are included on the Montana Hydric Soils list.

Four soil pits were excavated to characterize onsite soil. Data points BM-1w, BM-2w, and BM-3w were located in areas that met the wetland criteria. The soil profile at BM-1w revealed a dark gray (10 YR 4/1) clay with 20 percent brown (7.5 YR 4/4) redoximorphic concentrations in the matrix. The profile at BM-2w was an olive gray (5Y 4/2) clay with 5 percent dark yellowish brown (10 YR 4/6) redox concentrations. The soil in test pit BM-3w was a gray (5Y 5/1) clay with brown (7.5YR 4/4) redox concentrations. The depleted matrices were positive indicators of hydric soil at these three wetland data points. Data point BM-1u was located in the upland area characterized as Community 8. The soil in this test pit BM-1u was a brown (10 YR 5/3) clay without redox features and with 5 percent sodium concentrations at the top of the seasonal groundwater elevation. The data point did not meet the wetland criteria for hydric soil but indicated seasonal high groundwater levels may reach just below one foot of the surface.

3.4. Wetland Delineation

Three data points were located within the north mitigation parcel and one data point was located in the south mitigation parcel in 2013 to help define the wetland boundaries (Figure 2, Appendix A, and Wetland Determination Data Forms, Appendix B). The 2013 wetland delineation identified a total of 14.25 acres of wetland/aquatic habitat, a 1.38 acre increase from 2012 (Table 4). The created wetland, encompassing portions of community Types 3, 9, and 10, totaled 7.82 acres. This represented a total increase of 2.56 acres in created wetland site-wide since 2012. The majority of this increase was the result of a 1.18 acre decrease in the open water habitat surveyed in 2013, allowing the development

of emergent species on the saturated soil. The areas between the excavated cells in the north parcel were characterized by a portion of community 9 and represented the expansion of wetland to the areas between the cells. The pre-existing wetlands, generally represented by Types 4 and 9, encompassed 2.56 acres. A total of 8.25 acres of wetland habitat was identified within the north parcel in 2013, an increase from 6.92 acres delineated in 2012. Within the south parcel, a total of 6.0 acres of wetland habitat were identified in 2013, a slight increase from 5.94 acres delineated in 2012.

Table 4. Total wetland acres delineated in 2011, 2012 and 2013 at the Big Muddy Wetland Mitigation Site.

Wetland and Aquatic Habitat	2011 (acres)	2012 (acres)	2013 (acres)
Created Wetland - North Parcel	1.14	1.14	3.65
Pre-Existing Wetland - North Parcel	0.73	0.73	0.73
Open Water - North Parcel	5.05	5.05	3.87
Sub-Total for North Parcel	**6.92**	**6.92**	**8.25**
Created Wetland - South Parcel	--	4.11	4.17
Pre-Existing Wetland - South Parcel	--	1.83	1.83
Open Water - South Parcel	--	0.00	0.00
Sub-Total for South Parcel	**--**	**5.94**	**6.00**
Total	**6.92**	**12.87**	**14.25**

3.5. Wildlife

A comprehensive list of birds and other wildlife species observed directly or indirectly from 2011 through 2013 is presented in Table 5 (Monitoring Form, Appendix B). Fifteen bird species were observed by Confluence biologists during the 2013 monitoring event and are shown in bold type on Table 5. Observations on the number, behavior, and habitat of the birds are detailed on the Mitigation Monitoring Form (Appendix B). Ten northern leopard frogs (*Rana pipiens*) were seen and the Boreal chorus frog (*Pseudacris maculata*) was heard vocalizing. Deer tracks were also identified.

Table 5. Wildlife species observed within the Big Muddy Wetland Mitigation Site in 2011, 2012 and 2013.

COMMON NAME	SCIENTIFIC NAME
AMPHIBIANS	
Boreal Chorus Frog	***Pseudacris maculata***
Northern Leopard Frog	***Rana pipiens***
Woodhouse's Toad	*Bufo woodhousii*
MAMMALS	
Deer Sp.	
Muskrat	*Ondatra zibethicus*
Raccoon	*Procyon lotor*
Red Fox	*Vulpes vulpes*
REPTILE	
Plains Gartersnake*	***Thamnophis radix***
Unidentified Snake	

Species identified in 2013 are bolded.
*Species identified by MDT personnel.

COMMON NAME	SCIENTIFIC NAME
BIRDS	
American Avocet	***Recurvirostra americana***
American Coot	*Fulica americana*
American Goldfinch	***Spinus tristus***
American Wigeon*	***Anas americana***
Bank Swallow	***Riparia riparia***
Blue-winged Teal	***Anas discors***
Cinnamon Teal	*Anas cyanoptera*
Common Yellowthroat	***Geothlypis trichas***
Eastern Kingbird	***Tyrannus tyrannus***
Franklin's Gull	***Leucophaeus pipixcan***
Gadwall	***Anas strepera***
Killdeer	***Charadrius vociferus***
Loggerhead Shrike*	***Lanius ludovicianus***
Mallard	***Anas platyrhynchos***
Mourning Dove	***Zenaida macroura***
Northern Pintail*	***Anas acuta***
Northern Shoveler*	***Anas clypeata***
Red-winged Blackbird	***Agelaius phoeniceus***
Spotted Sandpiper	***Actitis macularius***
Swainson's Hawk*	***Buteo swainsoni***
Western Sandpiper	***Calidris mauri***
Wilson's Phalarope	***Phalaropus tricolor***
Wilson's Snipe	*Gallinago delicata*
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*

Species identified in 2013 are bolded.
*Species identified by MDT personnel.

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. The 2008 MWAM was used to evaluate the functional values of the mitigation wetlands from 2011 through 2013 (Table 6). Four AAs were assessed in 2013 and included the created wetlands within the north parcel, preserved wetlands within the north parcel, created wetlands within the south parcel, and preserved wetlands within the south parcel. The created and preserved wetland AAs within the Big Muddy mitigation site were not separated by parcel (north/south) in 2012. The MWAM forms for the Big Muddy mitigation area completed in 2013 are located in Appendix B.

The Creation North Parcel AA encompassed 7.52 acres and included the constructed wetland cells and the excavated areas between the cells characterized by wetland and open water community Types 3, 6, and 9. This AA was rated as a Category II wetland in 2013 with 71 percent of the total possible points. This AA has shown continued improvement since construction. The functional ratings continued to improve in 2013, increasing from 66.5 percent to 71 percent as a result of improvements in the level of disturbance, general

wildlife habitat, production export/food chain support (tied to general wildlife habitat), and uniqueness (tied to disturbance level). High ratings were assessed for general wildlife habitat, short and long term surface water storage, sediment/nutrient/toxicant removal, sediment/shoreline stabilization, production export/food chain support, groundwater discharge and recharge, and recreation/education potential. This AA achieved 53.39 total functional units.

The Preservation North Parcel AA included 0.73 acres located within the floodway fringe of the existing tributary to Big Muddy Creek (wetland community Type 4). This AA was rated as a Category II wetland with 66 percent of the total possible points in 2013. The AA received high ratings in 2013 for general wildlife habitat, sediment/nutrient/toxicant removal, sediment/shoreline stabilization, production export/food chain support, groundwater recharge/discharge, and recreation/education potential and attained 4.82 total functional units. Combined, the northern parcel Creation and Preservation AAs scored a total of 58.21 functional units in 2013.

The Creation South Parcel AA included 4.17 acres within the footprint of the excavated wetland cell, dominated by vegetation community type 10. This AA was rated as a Category III wetland with 60 percent of the total possible points and 25.02 functional units.

The Preservation South Parcel AA included 1.83 acres of existing wetland and rated as a Category III wetland with 58 percent of the total possible points. The seasonal/intermittent nature of the wetland hydrology within this AA was the primary factor limiting overall functional ratings. The Creation and Preservation AAs within the parcel south of Highway 2 attained a total 35.63 functional units in 2013.

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-10 of Appendix C. Photographs of the transect end points and wetland determination data points are shown on pages C-11 and C-12 and page C-13, 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 in the northeast quadrant of the north mitigation site. The infestation covered less than 0.1 acre with a moderate cover class of 6 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. The weed has not spread to other areas in the three years of monitoring.

Table 6. Functions and Values of the Big Muddy Wetland Mitigation Site in 2011, 2012 and 2013.

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	2013 Creation North Parcel	2013 Preservation North Parcel	2013 Creation South Parcel	2013 Preservation South Parcel
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	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)	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)	High (0.9)	High (0.9)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	NA	NA	NA	NA	NA	NA	NA	NA
Flood Attenuation	Mod (0.5)	Mod (0.4)	Mod (0.5)	Mod (0.4)	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)	High (1.0)	Mod (0.4)	High (0.9)	Low (0.3)
Sediment/Nutrient/Toxicant Removal	Mod (0.7)	High (0.9)	High (1.0)	High (0.9)	High (1.0)	High (0.9)	High (1.0)	High (0.9)
Sediment/Shoreline Stabilization	Low (0.3)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (0.9)	High (1.0)
Production Export/Food Chain Support	Mod (0.5)	High (0.9)	Mod (0.6)	High (1.0)	Mod (0.7)	High (0.9)	Mod (0.4)	Mod (0.7)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	Mod (0.7)	Mod (0.7)
Uniqueness	Low (0.2)	Mod (0.4)	Low (0.2)	Mod (0.4)	Low (0.3)	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)	High (0.2)	High (0.2)	High (0.2)	High (0.15)
Actual Points/Possible Points	**5.35/10**	**6.55/10**	**6.65/10**	**7.05/10**	**7.1/10**	**6.6/10**	**6.0/10**	**5.8/10**
% of Possible Score Achieved	**53.5%**	**65.5%**	**66.5%**	**70.5%**	**71.0%**	**66.0%**	**60.0%**	**58.0%**
Overall Category	**III**	**II**	**II**	**II**	**II**	**II**	**III**	**III**
Total Acreage of Assessed Wetlands within Site Boundaries	**6.19**	**0.73**	**10.31**	**2.56**	**7.52**	**0.73**	**4.17**	**1.83**
Functional Units (acreage x actual points)	**33.12**	**4.78**	**68.56**	**18.05**	**53.39**	**4.82**	**25.02**	**10.61**

*2012 AAs included wetland areas on both sides (north/south) of Highwy 2

3.9. Current Credit Summary

Table 7 summarizes the originally proposed mitigation acreages, credit ratios, and scaled performance standards from the May 2011 Mitigation Plan. This table has been modified to include the additional acreages monitored in the south side in 2012. Table 8 summarizes the calculated credit acreages based on the 2013 wetland delineation and includes the created and pre-existing wetland acreages delineated on the north and south sides 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 was expected to develop in the excavated areas between the cells. The passive creation of an additional 1.03 acres of emergent wet meadow located at the north boundary and adjacent to the existing wet meadow in the northern parcel was to be facilitated by the overall increase in groundwater elevation.

Table 8 provides a breakdown of the acres listed for each category scaled according to the credit criteria listed in Table 7. Each mitigation category has also been identified into the respective parcel, northern or southern. The total credit acres accrued at the Big Muddy wetland mitigation area in 2013 was 9.55 acres, an increase of 0.69 credit acres from 2012.

Within the northern parcel, the number of acres of created wetland within the excavated areas between cells and passive creation increased from 0.00 to 1.76 between 2012 and 2013. Based on meeting Performance Standards 1 and 3 and making demonstrable progress on Performance Standard 2, 70 percent of the total created acreage was credited and totaled 1.23. Wetland creation within the excavated cells in the northern parcel remained consistent between 2012 and 2013, totaling 5.76 acres. The estimated credit acreage was 70 percent of the total possible, or 4.03 credits acres based on the scaled criteria for meeting standards 1 and 3 and making demonstrable progress on standard 2. The absolute vegetation cover has not achieved 70 percent. The noxious weed absolute cover is less than 5 percent. Preservation of 0.73 acres in the northern parcel has been credited 100 percent at a 4:1 ratio providing 0.18 credits.

Wetland creation within the southern parcel totaled 4.17 acres in 2013. This value decreased in response to a reevaluation of total constructed and preserved wetland acreage within the northern and southern parcels and does not represent an actual decrease of wetland acreage south of Highway 2. Similar to the northern mitigation area, credits were scaled for meeting standards 1 and 3 and making demonstrable progress on standard 2. Wetland preservation within the southern parcel totaled 1.83 acres and 0.46 credits. The three performance standards for the preservation wetland have been met in 2012 and 2013. Maintenance of the upland buffer around the southern cell generated an additional 0.25 credits in 2013. Full credit at a 5:1 ratio was attained based on meeting the success criteria for the maximum cover of noxious weeds allowed within the upland buffer.

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

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 (Northern Parcel)	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%
Upland Buffer (Southern Parcel)	5:1	NA	NA	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			**13.76 to 15.52 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, 2012 and 2013 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	2013 Delineated Acres	Scaled % Credit Standards	2013 Credit Acres
Nothern Parcel	Wetland Creation: Establishment (Area between constructed cells in Northern Parcel)	1:1	0.44	70%	0.31	0.00	0%	0.00	1.76	70%	1.23
	Wetland Creation: Establishment (wetland cells in Northern Parcel)	1:1	5.75	70%	4.03	5.76	70%	4.03	5.76	70%	4.03
	Wetland Preservation (Northern Parcel)	4:1	0.73	100%	0.18	0.73	100%	0.18	0.73	100%	0.18
	Upland Buffer (Northern Parcel)	5:1	3.70	100%	0.74	3.69	100%	0.74	2.37	100%	0.47
	Northern Subtotal		**10.62**		**5.26**	**10.18**		**4.95**	**10.62**		**5.92**
Southern Parcel	Wetland Creation: Establishment (wetland cell in Southern Parcel)	1:1	--	70%	4.03	4.55	70%	3.19	4.17	70%	2.92
	Wetland Preservation (Southern Parcel)	4:1	--	100%	--	1.83	100%	0.46	1.83	100%	0.46
	Upland Buffer (Southern Parcel)	5:1	--	100%	--	1.31	100%	0.26	1.25	100%	0.25
	Southern Subtotal					**7.69**		**3.90**	**7.25**		**3.63**
	Total		**10.62**		**9.29**	**17.87**		**8.86**	**17.87**		**9.55**

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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: 2013 Monitoring Activity Locations

PP-6
PP-7
T2-Start
T2-Finish
BM-3w
PP-5
PP-4
PP-3
Unnamed Tributary to Big Muddy Creek
T1-Finish
BM-2w
T1-Start
BM-1w
BM-1u
PP-2
PP-1

Legend

- Vegetation Transect
- Monitoring Limits
- Data Point
- Photo Point

Base Photography Date: July 16, 2013

0 125 250 500
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.

LOCATION: Roosevelt Co., MT
PROJECT NO: NH 1-10(46)633
FILE: BigMuddy/Monitor2013.mxd

Project Name: Big Muddy Creek Wetland Mitigation Site
Drawing Title: 2013 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
BCS	BV	LU

SCALE: Noted
Drawn: September 9, 2013
PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 2

REV -

Figure 3: 2013 Mapped Site Features

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 (6-25% cover)
H = High (26-100% cover)

Legend

Monitoring Limits
Wetland Limits
Open Water (6)
Vegetation Communities
Base Photography Date:
July 16, 2013

Vegetation Community Types

(3) Schoenoplectus spp.
(4) Spartina pectinata/Schoenoplectus spp.
(8) Bromus inermis/Agropyron cristatum
(9) Puccinellia nuttalliana/Iva axillaris
(10) Puccinellia nuttalliana/Typha latifolia

Acreages

Total Project Area	17.87
Total Wetlands	14.25
Open Water	3.87
Pre-existing Wetlands	2.56
Upland Buffer	3.62

LOCATION: Roosevelt Co., MT
PROJECT NO: NH 1-10(46)633
FILE: BigMuddy/Veg2013.mxd

Project Name: Big Muddy Creek Wetland Mitigation Site
Drawing Title: 2013 Mapped Site Features

DRAWN BCS | CHECKED BV | APPROVED LU
SCALE: Noted
Drawn: September 9, 2013
PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 3

REV -

Appendix B

2013 MDT Wetland Mitigation Site Monitoring Form
2013 USACE Wetland Determination Data Forms
2013 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 8/7/2013 10:41:20 AM

Person(s) conducting the assessment: B Sandefur, E Sandefur

Weather: Warm, overcast AM, partly cloudy Location: 4 miles west of Culbertson

MDT District: Glendive Milepost: ~639.75 on Hwy 2

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

Initial Evaluation Date: 8/10/2011 Monitoring Year: 3 #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: 0.8 **(ft)** Range of Depths: 0-1.5 **(ft)**

Percent of assessment area under inundation: 20 %

Depth at emergent vegetation-open water boundary: 0.2 **(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 invertebrates, inundation and saturation visible 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 constructed wetlands on both north and south side of Hwy 2. Constructed depressions with periodic to permanent inundation.

VEGETATION COMMUNITIES

Site Big Muddy

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

Community # 3 **Community Type:** Schoenoplectus spp. / **Acres** 1.06

Species	Cover class	Species	Cover class
Agropyron cristatum	0	Algae, green	1
Bare Ground	2	Chenopodium album	2
Distichlis spicata	2	Eleocharis palustris	1
Elymus trachycaulus	0	Hordeum jubatum	1
Iva axillaris	0	Juncus arcticus	0
Open Water	0	Polypogon monspeliensis	1
Puccinellia nuttalliana	1	Rumex crispus	0
Schoenoplectus acutus	1	Schoenoplectus americanu	1
Schoenoplectus maritimus	3	Sonchus arvensis	0
Spartina pectinata	1	Taraxacum officinale	0
Typha latifolia	2		

Comments:

Community # 4 **Community Type:** Spartina pectinata / Schoenoplectus spp. **Acres** 1.15

Species	Cover class	Species	Cover class
Aster sp.	0	Bassia scoparia	0
Carex aquatilis	1	Chenopodium album	0
Hordeum jubatum	0	Lactuca serriola	1
Lemna minor	1	Lycopus americanus	1
Rosa woodsii	0	Rumex crispus	1
Schoenoplectus acutus	2	Schoenoplectus maritimus	2
Scutellaria galericulata	0	Spartina pectinata	5
Symphoricarpos albus	0	Typha latifolia	1

Comments:

Community # 6 **Community Type:** Open Water / **Acres** 3.87

Species	Cover class	Species	Cover class
Algae, green	1	Bare Ground	2
Juncus arcticus	0	Open Water	5
Schoenoplectus acutus	1	Schoenoplectus maritimus	1

Comments:

Community # 8 **Community Type:** Bromus inermis / Agropyron cristatum **Acres** 3.62

Species	Cover class	Species	Cover class
Achillea millefolium	1	Agropyron cristatum	4
Artemisia cana	1	Artemisia frigida	0
Artemisia tridentata	0	Bassia scoparia	0
Bromus inermis	4	Chenopodium album	1
Cirsium arvense	0	Distichlis spicata	1
Elymus lanceolatus	1	Elymus repens	2
Elymus trachycaulus	1	Fraxinus pennsylvanica	0
Grindelia squarrosa	2	Helianthus annuus	0
Hordeum jubatum	1	Iva axillaris	0
Lactuca serriola	0	Lepidium perfoliatum	0
Opuntia polyacantha	0	Pascopyrum smithii	1
Poa pratensis	2	Puccinellia nuttalliana	2
Rumex crispus	1	Sonchus arvensis	0
Symphoricarpos albus	0	Thlaspi arvense	0

Comments:

Community # 9 **Community Type:** Puccinellia nuttalliana / Iva axillaris **Acres** 3.79

Species	Cover class	Species	Cover class
Agropyron cristatum	1	Bare Ground	3
Bassia scoparia	1	Bromus inermis	1
Chenopodium album	1	Distichlis spicata	1
Elymus trachycaulus	1	Glycyrrhiza lepidota	0
Grindelia squarrosa	1	Hordeum jubatum	0
Iva axillaris	4	Juncus arcticus	1
Lactuca serriola	1	Lepidium perfoliatum	1
Populus deltoides	0	Puccinellia nuttalliana	5
Rumex crispus	0	Schoenoplectus maritimus	1
Sonchus arvensis	1	Spartina pectinata	1
Suaeda calceoliformis	1	Typha latifolia	0

Comments:

Community # 10 **Community Type:** Puccinellia nuttalliana / Typha latifolia **Acres** 4.38

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

Comments:

Total Vegetation Community Acreage **17.87**

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

VEGETATION TRANSECTS

Site: Big Muddy Date: 8/7/2013 10:41:20 AM

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

Interval Data:

Ending Station 32 **Community Type:** Bromus inermis / Agropyron cristatum

Species	Cover class	Species	Cover class
Achillea millefolium	0	Agropyron cristatum	2
Artemisia tridentata	0	Bromus inermis	4
Chenopodium album	2	Grindelia squarrosa	1
Lactuca serriola	1	Rumex crispus	0

Ending Station 127 **Community Type:** Puccinellia nuttalliana / Iva axillaris

Species	Cover class	Species	Cover class
Chenopodium album	2	Hordeum jubatum	1
Puccinellia nuttalliana	5	Rumex crispus	0
Suaeda calceoliformis	2		

Ending Station 195 **Community Type:** Bromus inermis / Agropyron cristatum

Species	Cover class	Species	Cover class
Agropyron cristatum	2	Bromus inermis	4
Chenopodium album	1	Grindelia squarrosa	1
Hordeum jubatum	1	Lactuca serriola	0
Puccinellia nuttalliana	1	Rumex crispus	0

Ending Station 242 **Community Type:** Puccinellia nuttalliana / Iva axillaris

Species	Cover class	Species	Cover class
Bare Ground	2	Chenopodium album	1
Elymus trachycaulus	0	Puccinellia nuttalliana	4
Schoenoplectus maritimus	0	Suaeda calceoliformis	4

Ending Station 320 **Community Type:** Open Water /

Species	Cover class	Species	Cover class
Bare Ground	1	Open Water	5
Schoenoplectus maritimus	1		

Ending Station 376 **Community Type:** Schoenoplectus spp. /

Species	Cover class	Species	Cover class
Bare Ground	2	Open Water	2
Schoenoplectus maritimus	5		

Ending Station 440 **Community Type:** Puccinellia nuttalliana / Iva axillaris

Species	Cover class	Species	Cover class
Bare Ground	3	Elymus trachycaulus	0
Hordeum jubatum	1	Puccinellia nuttalliana	3
Rumex crispus	0	Suaeda calceoliformis	4

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

Species	Cover class	Species	Cover class
Algae, green	1	Bare Ground	3
Hordeum jubatum	0	Open Water	2
Rumex crispus	1	Schoenoplectus acutus	1
Schoenoplectus maritimus	4	Spartina pectinata	2

Ending Station 590 **Community Type:** Open Water /

Species	Cover class	Species	Cover class
Open Water	5	Schoenoplectus maritimus	1

Ending Station 610 **Community Type:** Schoenoplectus spp. /

Species	Cover class	Species	Cover class
Algae, green	1	Bare Ground	3
Open Water	2	Puccinellia nuttalliana	1
Schoenoplectus maritimus	4	Spartina pectinata	3

Ending Station 630 **Community Type:** Puccinellia nuttalliana / Iva axillaris

Species	Cover class	Species	Cover class
Bare Ground	4	Elymus trachycaulus	0
Grindelia squarrosa	0	Puccinellia nuttalliana	3
Sonchus arvensis	2	Suaeda calceoliformis	1

Ending Station 647 **Community Type:** Bromus inermis / Agropyron cristatum

Species	Cover class	Species	Cover class
Agropyron cristatum	3	Artemisia cana	0
Bromus inermis	5	Chenopodium album	0
Grindelia squarrosa	1	Rumex crispus	0
Sonchus arvensis	2		

Transect Notes:

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

Interval Data:

Ending Station 11 **Community Type:** Spartina pectinata / Schoenoplectus spp.

Species	Cover class	Species	Cover class
Bassia scoparia	0	Chenopodium album	0
Lactuca serriola	0	Rumex crispus	0
Spartina pectinata	5	Symphoricarpos albus	1

Ending Station 336 **Community Type:** Puccinellia nuttalliana / Typha latifolia

Species	Cover class	Species	Cover class
Bare Ground	1	Chenopodium album	1
Helianthus annuus	0	Hordeum jubatum	1
Iva axillaris	1	Lactuca serriola	0
Puccinellia nuttalliana	4	Rumex crispus	1
Schoenoplectus acutus	0	Schoenoplectus maritimus	2
Suaeda calceoliformis	1	Typha latifolia	4

Ending Station 366 **Community Type:** Bromus inermis / Agropyron cristatum

Species	Cover class	Species	Cover class
Agropyron cristatum	3	Artemisia cana	0
Bassia scoparia	1	Bromus inermis	5
Lactuca serriola	1		

Transect Notes:

PLANTED WOODY VEGETATION SURVIVAL

Big Muddy

Planting Type	#Planted	#Alive	Notes
No plantings			

Comments

No woody species were installed on this site. The wetlands were revegetated with seed and salvaged material. Numerous volunteer cottonwood seedlings were observed within the site.

Big Muddy

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	1	F	AB, OW
American Goldfinch	8	F	UP, WM
Bank Swallow	7	F, L	UP
Blue-winged Teal	40	F, L	OW
Common Yellowthroat	1	F, L	UP, WM
Eastern Kingbird	4	F, L	UP, WM
Franklin's Gull	10	F, FO, L	AB, MF, OW
Gadwall	20	L	OW
Killdeer	8	F	MF, OW
Mallard	20	F, L	OW
Mourning Dove	7	F, L	UP, WM
Red-winged Blackbird	2	L, N	MA, UP, WM
Spotted Sandpiper	2	F	MF, OW
Western Sandpiper	8	F	MF, OW
Wilson's Phalarope	5	F, L	MF, OW

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
Boreal Chorus Frog		No	No	No	Vocalization
Deer Sp.		Yes	No	No	
Northern Leopard Frog	10	No	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
1001	48.167038	-104.617645	0	PP-2
1002	48.167038	-104.617645	90	PP-2
1003	48.167038	-104.617645	180	PP-2
1004	48.167038	-104.617645	270	PP-2
1005	48.167148333	-104.618135	180	BM-1w
1006	48.16717833	-104.61785666	10	BM-1u
1007	48.167465	-104.618301	180	T-1, start
1011	48.16647	-104.618881	100	BM-2w
1015	48.165768	-104.619057	0	T-1, end
1016	48.166012	-104.619835	0	PP-4
1017	48.167038	-104.617645	45	PP-2
1017	48.166012	-104.619835	45	PP-4
1018	48.166012	-104.619835	315	PP-4
1021	48.16716	-104.619606	90	PP-3
1023	48.16716	-104.619606	270	PP-3
1024	48.16716	-104.619606	0	PP-3
1025	48.16716	-104.619606	180	PP-3
1026	48.165836	-104.617004	0	PP-1
1027	48.165836	-104.617004	315	PP-1
1028	48.165836	-104.617004	260	PP-1
1032			130	T-2, start
1034	48.163334	-104.618011	310	T-2, end
1035-38	48.162872	-104.620232	0	PP-6
1040	48.163994	-104.61705	0	BM-3w
1041-47	48.164448	-104.618835	180	PP-7

1048-52	48.164421	-104.616943	220	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: 8/7/2013

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

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): LRR F Lat: 48.16717833 Long: -104.61785666 Datum: WGS84

Soil Map Unit Name: Havrelon loam 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 upland near Puc nut community.

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. Rumex crispus	5	☐	FAC
2. Bromus inermis	65	☑	UPL
3. Puccinellia nuttalliana	10	☐	OBL
4. Grindelia squarrosa	10	☐	UPL
5. Chenopodium album	5	☐	FACU
6. Agropyron cristatum	5	☐	UPL
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−): 0 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	5	x 4 =	20
UPL species	80	x 5 =	400
Column Totals	100 (A)		445 (B)

Prevalence Index = B/A = 4.45

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-1u

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
0-2	10YR 4/2	100					Clay	
2-8	10YR 4/3	100					Clay	
8-16	10YR 5/3	95					Clay	5% sodium concentration

[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: Not hydric, NA conc likely at top of fluctuating seasonal groundwater elevation.

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 surface hydrology.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Muddy | City/County: Roosevelt | Sampling Date: 8/7/2013

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

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): LRR F | Lat: 48.1671483333333 | Long: -104.618135 | Datum: WGS84

Soil Map Unit Name: Lohler silty clay | 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 along margin of wetland boundary.

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. Puccinellia nuttalliana	70	☑	OBL
2. Chenopodium album	5	☐	FACU
3. Iva axillaris	5	☐	FAC
4. Bromus inermis	5	☐	UPL
5. Agropyron cristatum	10	☐	UPL
6. Rumex crispus	5	☐	FAC
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: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	70	x 1 =	70
FACW species	0	x 2 =	
FAC species	10	x 3 =	
FACU species	5	x 4 =	20
UPL species	15	x 5 =	75
Column Totals	100 (A)		195 (B)

Prevalence Index = B/A = 1.95

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-1w

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
0-3	10YR 3/1	90	C M	7.5YR	4/4	10	Clay	
3-13	10YR 4/1	80	C M	7.5YR	4/4	20	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: DP rarely flooded, wetland hydrology from seasonally shallow groundwater.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Muddy City/County: Roosevelt Sampling Date: 8/7/2013

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

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

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

Subregion (LRR): LRR F Lat: 48.1665466666667 Long: -104.618861666667 Datum: WGS84

Soil Map Unit Name: Lohler silty clay 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 between excavated cells..

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. Iva axillaris	30	☑	FAC
2. Puccinellia nuttalliana	20	☑	OBL
3. Elymus trachycaulus	5	☐	FACU
4.	0	☐	
5.	0	☐	
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
	55 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 45

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:
OBL species	20	x 1 =	20
FACW species	0	x 2 =	0
FAC species	30	x 3 =	90
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals	55 (A)		130 (B)

Prevalence Index = B/A = 2.36

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-2w

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	5Y 4/2	100					Clay	
8-14	5Y 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: Redox faint, hydric development from periodic saturation.

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: 8/7/2013

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

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

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

Subregion (LRR): LRR F Lat: 48.1641916666667 Long: -104.617205 Datum: WGS84

Soil Map Unit Name: Lohler silty clay 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 undisturbed wetland adjacent to excavated cell, area previously classified as upland.

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. Puccinellia nuttalliana	50	☑	OBL
2. Chenopodium album	15	☐	FACU
3. Iva axillaris	20	☐	FAC
4.	0	☐	
5.	0	☐	
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
	85 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 15

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	50	x 1 =	50
FACW species	0	x 2 =	0
FAC species	20	x 3 =	60
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals	85 (A)		170 (B)

Prevalence Index = B/A = 2

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-3w

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
0-5	5Y 4/2	95	D M	10YR	2/1	5	Clay	
5-12	5Y 5/1	95	C M	7.5YR	4/4	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:

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 hydrology from seasonal subsurface saturation.

MDT Montana Wetland Assessment Form (revised March 2008)

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

3. Evaluation Date 8/7/2013 **4. Evaluators** B Sandefur **5. Wetland/Site# (s)** North Cell - Created

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

Approx Stationing or Mileposts ~639.75 on Hwy 2

Watershed 10060006 **Watershed/County** Lower Missouri River Watershed/Roosevelt Co., MT

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 7.52

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 7.52

☐ **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/Intermittent	40
Depressional	Emergent Wetland	Excavated	Seasonal/Intermittent	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 disturbance	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)

Constructed wetland cells continue to exhibit 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 the constructed cells north of Hwy 2. Constructed cells dominated by open water, low productivity in open water. Area between constructed wetland cells and riverine wetland has gradually converted to wetland since 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: Vegetation is predominantly emergent. No woody overstory associated with creek although abundant cottonwood seedlings were observed in 2013. Aquatic bed class has yet to develop, likely inhibited by murky conditions of open water.

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 Roosevelty 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 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**

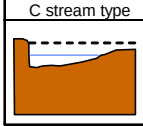
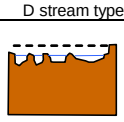
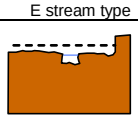
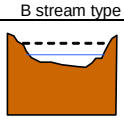
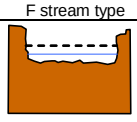
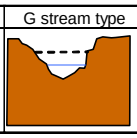
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

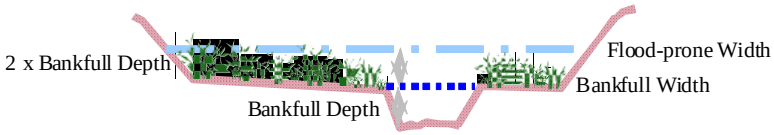
iii. Final Score and Rating: 0 NA **Comments:** Closed wetland cells with no direct surface water inlet or outlet.

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
						



Floodprone 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 not measured, 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 has 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 Schoenoplectus, 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	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.5M	.6M	.3L	.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** .7M

Comments: Vegetated wetland area ~3.65-ac; open water ~3.87-ac. Average 50 foot upland buffer surrounding mitigation site.

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

i. Discharge Indicators

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

ii. Recharge Indicators

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

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

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

Comments:

14K. Uniqueness:

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

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

Comments:

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

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

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

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

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

Comments:

MDT-owned site with known hunting.

General Site Notes

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

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	0	1	0	☐
B. MT Natural Heritage Program Species Habitat	M	.5	1	3.76	☐
C. General Wildlife Habitat	H	.9	1	6.768	☑
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	M	.5	1	3.76	☐
F. Short and Long Term Surface Water Storage	H	1	1	7.52	☑
G. Sediment/Nutrient/Toxicant Removal	H	1	1	7.52	☐
H. Sediment/Shoreline Stabilization	H	1	1	7.52	☑
I. Production Export/Food Chain Support	M	.7	1	5.264	☐
J. Groundwater Discharge/Recharge	H	1	1	7.52	☑
K. Uniqueness	L	.3	1	2.256	☐
L. Recreation/Education Potential (bonus points)	H	.2	NA	1.504	☐
Totals:		7.1	10	53.392	
Percent of Possible Score			**71** %		

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 above)

I	II	III	IV

MDT Montana Wetland Assessment Form (revised March 2008)

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

3. Evaluation Date 8/7/2013 **4. Evaluators** B Sandefur **5. Wetland/Site# (s)** North Cell - Preservation

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

Approx Stationing or Mileposts ~639.75 on Hwy 2

Watershed 1060006 **Watershed/County** Big Muddy Creek, Lower Missouri, Sheridan Co.

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 0.73

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

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

☐ **Mitigation Wetlands: pre-construction**

How assessed: Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

10. Classification of Wetland and Aquatic Habitats in AA

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

11. Estimated Relative Abundance Common

12. General Condition of AA

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

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

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 MTNHP tracker 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 Seasonal waterfowl habitat, abundant amphibian breeding areas.

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**

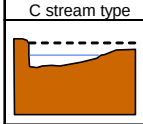
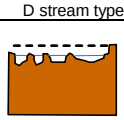
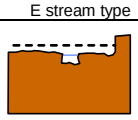
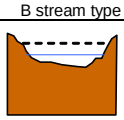
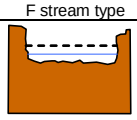
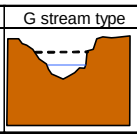
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

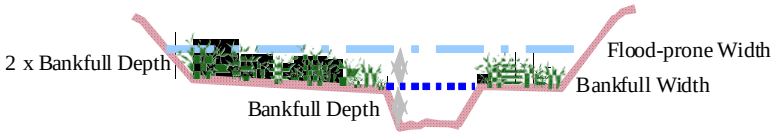
iii. Final Score and Rating: 0 NA **Comments:**

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
						



Floodprone 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: Unnamed tributary of Big Muddy Creek visually estimated as B-type stream. AA receives surface water from periodic flooding of unnamed trib.

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 0.73 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 cells and eventually converges with Big Muddy Creek. Bulrush, sedge, cattail, and rush speces 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	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

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

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

Comments:

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: Perennial saturation suspected along tributary.

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, signs of hunting.

General Site Notes

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

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	0	1	0	☐
B. MT Natural Heritage Program Species Habitat	M	.5	1	0.365	☐
C. General Wildlife Habitat	H	.9	1	0.657	☑
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	M	.4	1	0.292	☐
F. Short and Long Term Surface Water Storage	M	.4	1	0.292	☑
G. Sediment/Nutrient/Toxicant Removal	H	.9	1	0.657	☑
H. Sediment/Shoreline Stabilization	H	1	1	0.73	☐
I. Production Export/Food Chain Support	H	.9	1	0.657	☐
J. Groundwater Discharge/Recharge	H	1	1	0.73	☑
K. Uniqueness	M	.4	1	0.292	☐
L. Recreation/Education Potential (bonus points)	H	.2	NA	0.146	☐
Totals:		6.6	10	4.818	
Percent of Possible Score			**66** %		

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 above)

I	II	III	IV

MDT Montana Wetland Assessment Form (revised March 2008)

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

3. Evaluation Date 8/7/2013 **4. Evaluators** B Sandefur **5. Wetland/Site# (s)** South Cell - Created

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

Approx Stationing or Mileposts ~639.75 on Hwy 2

Watershed 10060006 **Watershed/County** Lower Missouri River Watershed/Roosevelt Co., MT

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 4.17

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 4.17

☐ **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	Emergent Wetland	Excavated	Seasonal/Intermittent	100

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 disturbance	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)

Constructed wetland cell continues to exhibit vegetation development, AA considered moderately disturbed due to recent construction of wetland area (2011). AA adjacent to Hwy 2.

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 the constructed cell south of Hwy 2. Hwy 2 and an unnamed tributary of Big Muddy borders this AA.

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 class only includes emergent wetland.

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

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 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**

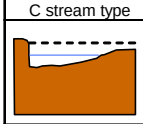
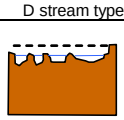
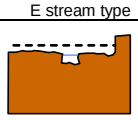
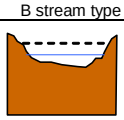
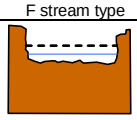
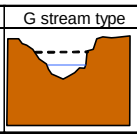
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

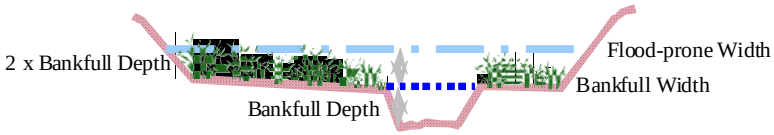
iii. Final Score and Rating: 0 NA **Comments:** Closed wetland cell with no direct surface water inlet or outlet.

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
						



Floodprone 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. Flood prone and bankfull widths were based on visually 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 cell showed signs of inundation during early growing season. Cell is 4.17-ac with storage potential >1.5ft deep.

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 within constructed cell estimated to be >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 Schoenoplectus, 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	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.5M	.6M	.3L	.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** .4M

Comments: Average 50-foot upland buffer surrounding mitigation site.

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

i. Discharge Indicators

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

ii. Recharge Indicators

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

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

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

Comments:

14K. Uniqueness:

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

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

Comments:

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

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

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

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

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

Comments:

MDT-owned site with known hunting.

General Site Notes

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

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	2.085	☐
C. General Wildlife Habitat	M	.7	1	2.919	☐
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	M	.5	1	2.085	☐
F. Short and Long Term Surface Water Storage	H	.9	1	3.753	☑
G. Sediment/Nutrient/Toxicant Removal	H	1	1	4.17	☑
H. Sediment/Shoreline Stabilization	H	.9	1	3.753	☑
I. Production Export/Food Chain Support	M	.4	1	1.668	☐
J. Groundwater Discharge/Recharge	M	.7	1	2.919	☑
K. Uniqueness	L	.2	1	0.834	☐
L. Recreation/Education Potential (bonus points)	H	.2	NA	0.834	☐
Totals:		6	10	25.02	
Percent of Possible Score			**60** %		

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 above)

I	II	III	IV

MDT Montana Wetland Assessment Form (revised March 2008)

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

3. Evaluation Date 8/7/2013 **4. Evaluators** B Sandefur **5. Wetland/Site# (s)** South Cell - Preservation

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

Approx Stationing or Mileposts ~639.75 on Hwy 2

Watershed 1060006 **Watershed/County** Big Muddy Creek, Lower Missouri, Sheridan Co.

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 1.83

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 1.83

☐ **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		Seasonal/Intermittent	35
Depressional	Emergent Wetland		Seasonal/Intermittent	65

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 disturbance	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)

Grazing eliminated within AA. AA not disturbed during construction.

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 abandonded oxbow of Big Muddy Creek and adjacent lowland.

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

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 MTNHP tracker 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

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**

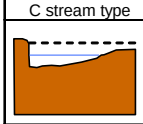
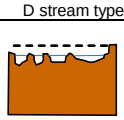
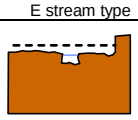
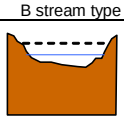
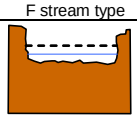
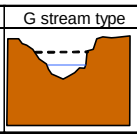
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

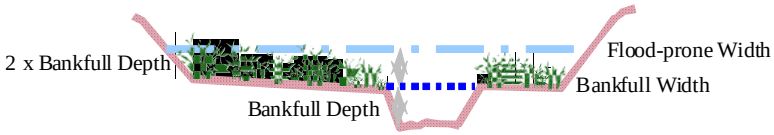
iii. Final Score and Rating: 0 NA **Comments:**

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
						



Floodprone 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: Unnamed tributary of Big Muddy Creek visually estimated as B-type stream.

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 is 1.83 acres without potential to support greater than 0.5 feet 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 greater than 70%, undisturbed during construction.

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: AA includes shoreling of unnamed tributary of Big Muddy Creek.

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	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.5M	.6M	.3L	.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** .7M

Comments:

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:

General Site Notes

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

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	0	1	0	☐
B. MT Natural Heritage Program Species Habitat	M	.5	1	0.915	☐
C. General Wildlife Habitat	M	.7	1	1.281	☐
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	M	.4	1	0.732	☐
F. Short and Long Term Surface Water Storage	L	.3	1	0.549	☐
G. Sediment/Nutrient/Toxicant Removal	H	.9	1	1.647	☐
H. Sediment/Shoreline Stabilization	H	1	1	1.83	☐
I. Production Export/Food Chain Support	M	.7	1	1.281	☐
J. Groundwater Discharge/Recharge	M	.7	1	1.281	☐
K. Uniqueness	M	.4	1	0.732	☐
L. Recreation/Education Potential (bonus points)	H	.2	NA	0.366	☐
Totals:		5.8	10	10.614	
Percent of Possible Score			**58** %		

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 above)

I	II	III	IV

Appendix C

Project Area Photographs

MDT Wetland Mitigation Monitoring
Big Muddy Creek
Roosevelt County, Montana



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



Photo Point 1 – *Photo 1*
Location: SE property corner Northern Parcel
Bearing: North
Taken in 2012



Photo Point 1 – *Photo 1*
Location: SE property corner Northern Parcel
Bearing: North
Taken in 2013



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



Photo Point 1 – *Photo 2*
Location: SE property corner Northern Parcel
Bearing: Northwest
Taken in 2012



Photo Point 1 – *Photo 2*
Location: SE property corner Northern Parcel
Bearing: Northwest
Taken in 2013



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



Photo Point 1 – *Photo 3* **Location:** SE property corner Northern Parcel
Bearing: Southwest **Taken in 2012**



Photo Point 1 – *Photo 3* **Location:** SE property corner Northern Parcel
Bearing: Southwest **Taken in 2013**



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



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



Photo Point 2 – *Photo 1* **Location:** NE property corner Northern Parcel
Bearing: North **Taken in 2013**



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



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



Photo Point 2 – *Photo 2*
Location: NE property corner Northern Parcel
Bearing: East
Taken in 2013



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



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



Photo Point 2 – *Photo 3*
Location: NE property corner Northern Parcel
Bearing: South
Taken in 2013



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



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



Photo Point 2 – *Photo 4* **Location:** NE property corner Northern Parcel
Bearing: West **Taken in 2013**



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



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



Photo Point 3 – *Photo 1* **Location:** NW property corner Northern Parcel
Bearing: East **Taken in 2013**



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



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



Photo Point 3 – *Photo 2*
Location: NW property corner Northern Parcel
Bearing: South
Taken in 2013



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



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



Photo Point 3 – *Photo 3*
Location: UT of Big Muddy Northern Parcel
Bearing: West
Taken in 2013



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



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



Photo Point 3 – *Photo 4*
Bearing: North
Location: UT of Big Muddy Northern Parcel
Taken in 2013



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



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



Photo Point 4 – *Photo 1*
Bearing: North
Location: SW property corner Northern Parcel
Taken in 2013



Photo Point 4 – *Photo 2* **Location:** SW property corner Northern Parcel
Bearing: Northeast **Taken in 2011**



Photo Point 4 – *Photo 2* **Location:** SW property corner Northern Parcel
Bearing: Northeast **Taken in 2012**



Photo Point 4 – *Photo 2* **Location:** SW property corner Northern Parcel
Bearing: Northeast **Taken in 2013**



Photo Point 4 – *Photo 3* **Location:** Existing wetland Northern Parcel
Bearing: Northwest **Taken in 2011**



Photo Point 4 – *Photo 3* **Location:** Existing wetland Northern Parcel
Bearing: Northwest **Taken in 2012**



Photo Point 4 – *Photo 3* **Location:** Existing wetland Northern Parcel
Bearing: Northwest **Taken in 2013**



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

Location: Veg Com 5, Southern Parcel
Taken in 2012



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

Location: Veg Com 9, Southern Parcel
Taken in 2013

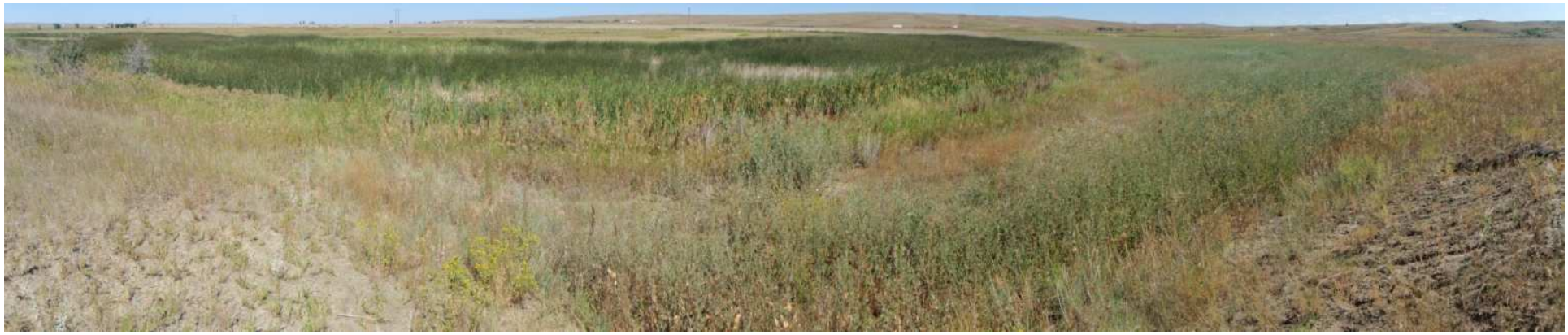


Photo Point 6 – *Photo 1*
Bearing: 0 deg

Location: Veg Com 1, Southern Parcel
Taken in 2012



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

Location: Veg Com 8, Southern Parcel
Taken in 2013



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

Location: Veg Com 7, Southern Parcel
Taken in 2012



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

Location: Veg Com 10, Southern Parcel
Taken in 2013



Transect 1 – *Start*
Bearing: 220 deg
Location: Veg Com 1 Northern Parcel
Taken in 2011



Transect 1 – *Start*
Bearing: 220 deg
Location: Veg Com 1 Northern Parcel
Taken in 2012



Transect 1 – *Start*
Bearing: 220 deg
Location: Veg Com 8 Northern Parcel
Taken in 2013



Transect 1 – *Finish*
Bearing: 0 deg
Location: Veg Com 2 Northern Parcel
Taken in 2011



Transect 1 – *Finish*
Bearing: 0 deg
Location: Veg Com 2 Northern Parcel
Taken in 2012



Transect 1 – *Finish*
Bearing: 0 deg
Location: Veg Com 8 Northern Parcel
Taken in 2013



Transect 2 – *Start*
Bearing: 130 deg
Location: Veg Com 5
Southern Parcel
Taken in 2012



Transect 2 – *Start*
Bearing: 130 deg
Location: Veg Com 4
Southern Parcel
Taken in 2013



Transect 2 – *Finish*
Bearing: 310 deg
Location: Veg Com 1
Southern Parcel
Taken in 2012



Transect 2 – *Finish*
Bearing: 310 deg
Location: Veg Com 8
Southern Parcel
Taken in 2013



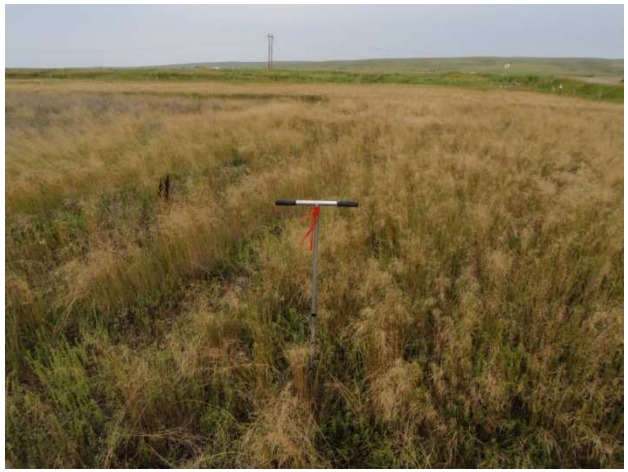
Data Point 1 – *BM-1u*
Location: Veg Com 8 Northern Parcel
Bearing: 10 deg
Taken in 2013



Data Point 2 – *BM-1w*
Location: Veg Com 8 Northern Parcel
Bearing: 180 deg
Taken in 2013



Data Point 3 – *BM-2w*
Location: Veg Com 3 Northern Parcel
Bearing: 100 deg
Taken in 2013

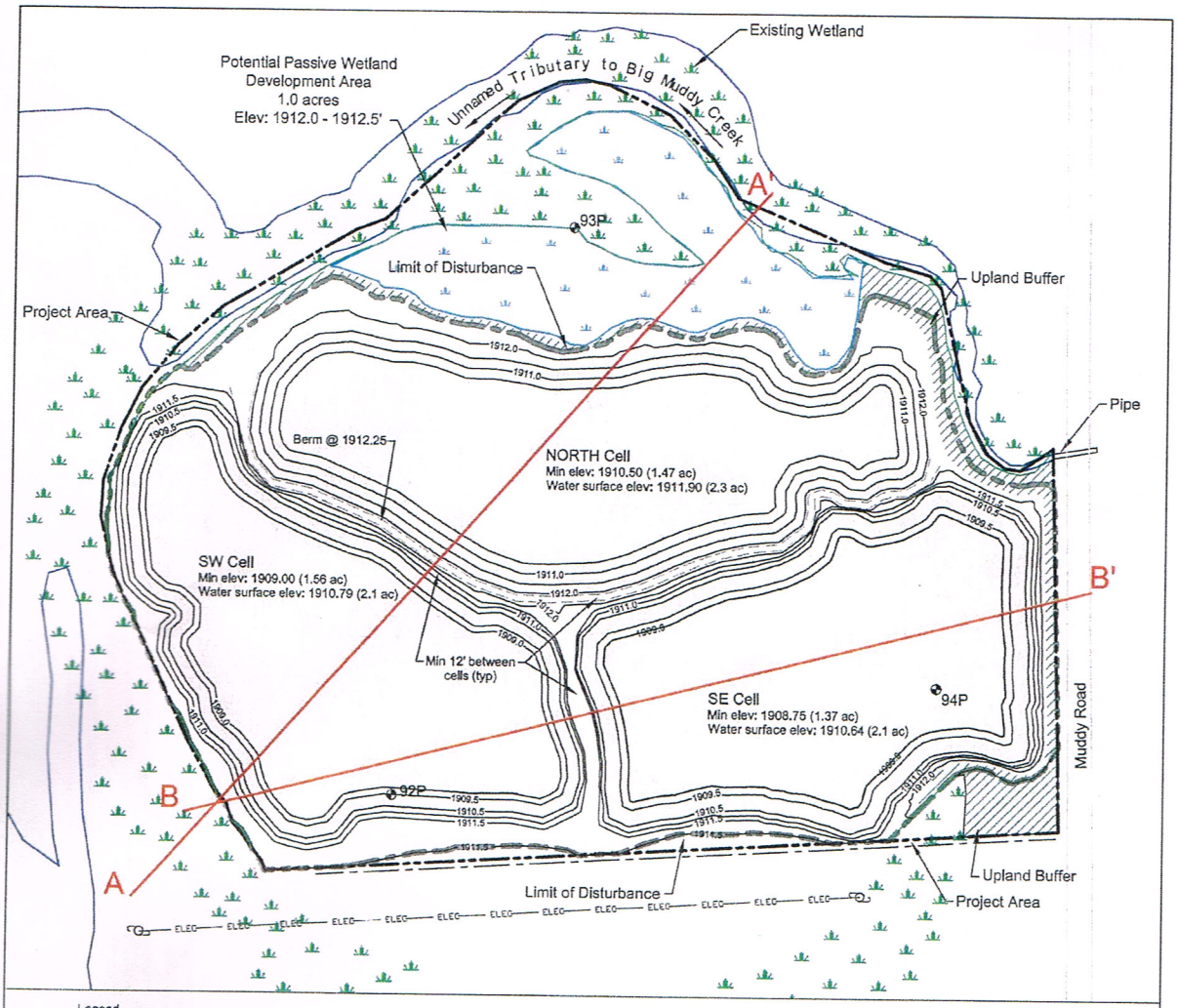


Data Point 4 – *BM-3w*
Location: Veg com 9 Southern Parcel
Bearing: 0 deg
Taken in 2013

Appendix D

Project Plan Sheet

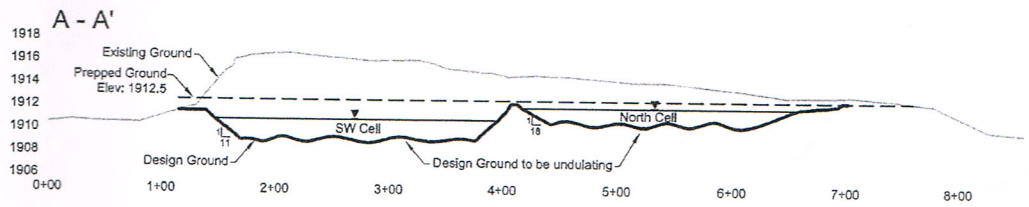
MDT Wetland Mitigation Monitoring
Big Muddy Creek
Roosevelt County, Montana



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'



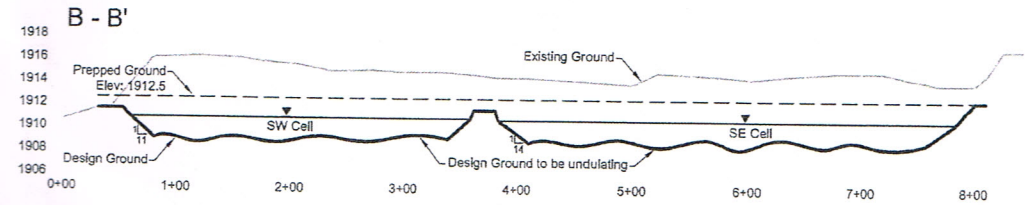


FIGURE 4
REV - 09/03/2010

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