MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2015

Big Muddy Creek
Roosevelt County, Montana



Prepared for:

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December 2015

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WETLAND MITIGATION MONITORING REPORT:

YEAR 2015

Big Muddy Creek
Roosevelt County, Montana
Constructed: 2011

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

USACE: NWO-2009-01515-MTB

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CCI Project No: MDT.006

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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 fifth 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 located south of Highway 2 were added in 2012. The total mitigation area monitored since 2012 has been 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 2015 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. The MDT staff completed a baseline delineation and Montana Wetland Assessment 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.

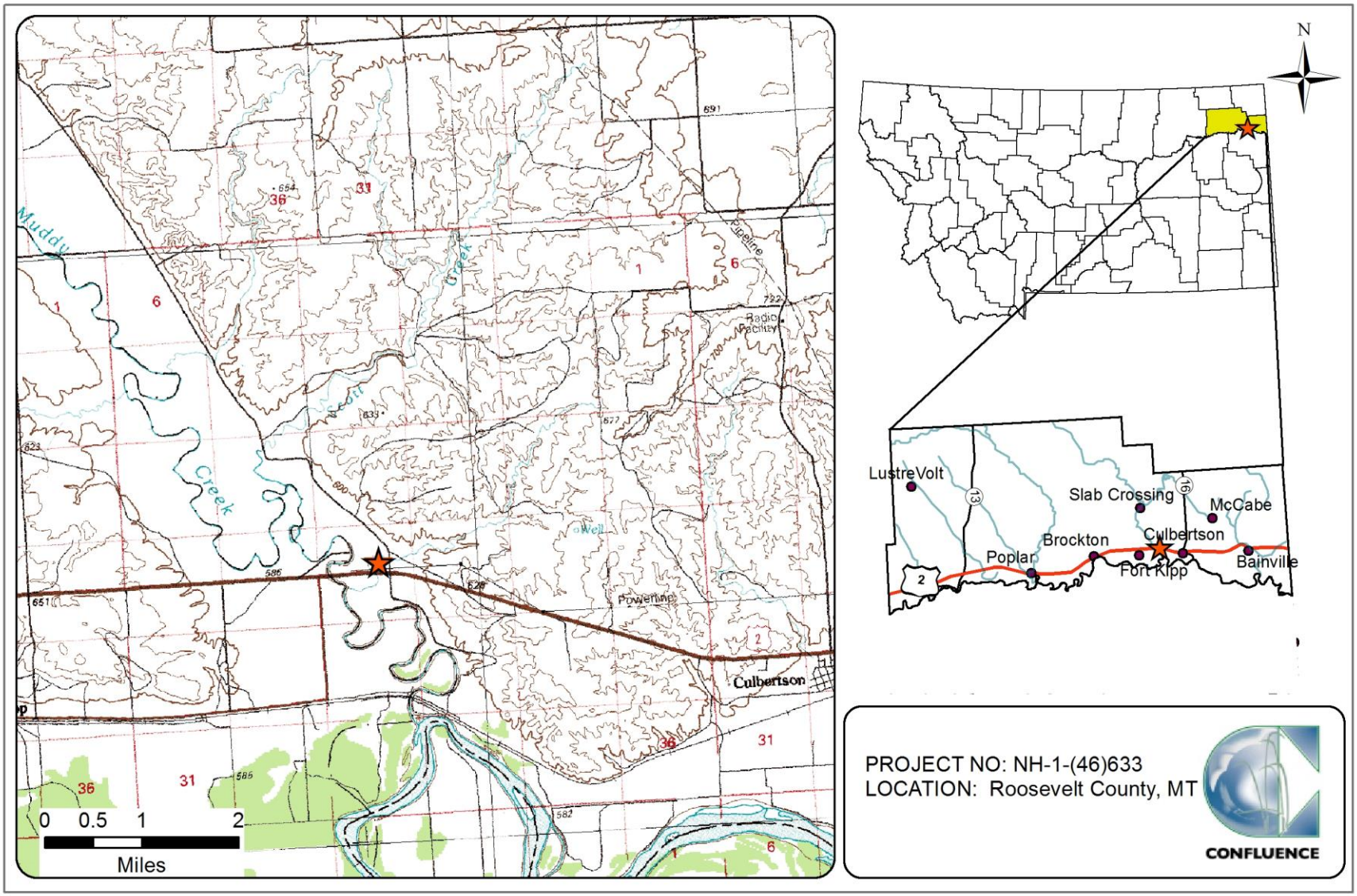


Figure 1. Project location of Big Muddy Creek Wetland Mitigation Site.

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The original 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 for the northern tract 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.
- 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 were 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 and 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 a MDT letter to Todd Tillinger dated June 14, 2010, this revision was a clerical and mathematical revision based on the MDT decision to let the MDT Brockton – East and Big Muddy Creek – West projects proceed 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. The construction of the Big

Muddy mitigation project was authorized under the authority of Section 404 of the Clean Water Act via permit NWO-2009-01515-MTB.

2. METHODS

The 2015 monitoring event was completed on June 30, 2015. Information for the Mitigation Monitoring Form and Wetland Determination Data Forms was recorded in the field during the site investigation (Appendix B). Monitoring activity sites, located with a global positioning system (GPS), 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 and 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).

In 2015, two previously unmonitored groundwater wells were observed on site. Groundwater well locations were recorded with a resource-grade GPS unit (Figure 2, Appendix A). Groundwater level was measured and recorded at the well in the northern parcel, while it could not be measured at the well in the southern parcel because the well was locked. Results are reported in section 3.1 of this report and on the Mitigation Monitoring Form (Appendix B). Future monitoring efforts may consider measuring groundwater levels at these wells, as

the results provide additional information for assessing hydrologic conditions at the site.

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 2015 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 established in 2012 (Figure 2, Appendix A). Vegetation composition was assessed and recorded along two approximately 10-foot 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 vegetation community polygon data on the 2015 aerial photograph (Figure 3, Appendix B). Photographs were taken at the transect endpoints during the monitoring event (Appendix C).

The Montana State Noxious Weed List (July 2015), 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 with noxious weed species color-coded (Figure 3, Appendix A). The locations are denoted with the symbol "**x**", "▲", or "■" representing 0 to 0.1 acre, 0.1 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 to the Corps of Engineers

Wetland Delineation Manual: Great Plains Region (USACE 2010). The technical criteria for hydrophytic vegetation, hydric soil, and wetland hydrology must be satisfied to delineate a representative area as a jurisdictional wetland. The name and indicator status of plant species was derived from the 2014 National Wetland Plant List (NWPL) (Lichvar *et al*. 2014). Following USACE guidance, the 2014 NWPL scientific and common plant names were used in this report. 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 boundaries were surveyed using resource-grade GPS and imported into Geographic Information System (GIS) format. Wetland areas reported have been calculated using GIS spatial quantification methodology.

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, burrows, 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 2015 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 2015. 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 (North/South) 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 area. Photographs were taken at photo points established in 2011 (north site) and 2012 (south site) 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 2015 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, bird boxes 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 13.6 inches from December 1900 to November 2015 (WRCC 2015). The annual precipitation recorded in the years 2010, 2011, 2012, 2013, and 2014 was 20.53 inches, 17.43 inches, 12.44 inches, 19.82, and 12.51 inches, respectively. The historic precipitation average from January to August 31 was 10.68 inches. Precipitation in recent years for the same period was 16.77 inches (2010), 15.39 inches (2011), 8.98 inches (2012), 11.25 inches (2013), 10.73 inches (2014), and 10.46 inches (2015). These data suggest the region received above-average precipitation in 2010 and 2011, and near-average precipitation in 2012 to 2015. Precipitation and infrequent flooding of the unnamed tributary of Big Muddy Creek drive hydrology at the Big Muddy wetland mitigation site. Site-wide inundation and saturation levels were generally lower in 2012 through 2015 than observed within the north parcel in 2010 and the north and south parcels in 2011.

Approximately 15 percent of the entire site was inundated during the 2015 field survey, which included approximately 25% of the northern parcel and less than one percent of the southern parcel. The depth of water within the northern parcel averaged 1 foot with surface water depths up to 1.5 feet. Many areas defined as wetlands across both sides of the mitigation area were not inundated but

exhibited periodic saturation within 12 inches (1.0 foot) of the ground. Other signs of hydrology included water marks, salt crust, geomorphic position, positive FAC-neutral test, inundation and saturation visible on aerial imagery, and surface soil cracks. Both the north and south parcels receive periodic overbank flow from the unnamed tributary during spring flows. The constructed wetlands and adjacent stream are hydrologically connected via groundwater. The constructed depressions in the northern tract exhibit periodic to permanent inundation. The north cell in the north parcel and the cell in the south parcel were dry at the time of the June 2015 survey.

Four data points, SP1-w, SP2-u, SP3-u, and SP4-w, were sampled to determine the wetland and upland boundaries. Data points SP1-w and SP4-w were located in areas that met the wetland criteria. SP1-w was located in the excavated basin south of the highway and SP4-w was located in a concave, depressional salt flat in the northern parcel. Evidence of positive wetland hydrology at SP1-w included a salt crust, surface soil cracks, geomorphic position, and a positive FAC-neutral test. Wetland hydrology indicators at SP4-w included saturation to ground surface, water marks, salt crust, surface soil cracks, saturation visible on aerial imagery, geomorphic position, and a positive FAC-neutral test. No primary or secondary indicators of wetland hydrology were observed at SP2-u or SP3-u, located upslope of data points SP1-w and SP4-w, respectively.

Groundwater was measured at 0.19 feet (2.25 inches) below the ground surface at the well in the northern parcel. This data reveals groundwater within 12 inches of the soil surface, indicating that the area in which the well is located meets the hydrology criteria (Figure 2, Appendix B).

3.2. Vegetation

Monitoring year 2015 marked the fifth year of post-construction monitoring at the north parcel and the fourth year at the south parcel of the Big Muddy Creek wetland mitigation site. Seventy-five plant species were observed site wide from 2011 through 2015 (Table 1). Vegetation plant communities were mapped and named by plant composition and dominance. The nine communities identified in 2015 and complete lists of the associated species are included on the Monitoring Form in Appendix B and the mapped communities shown on Figure 3 in Appendix A.

Six vegetation communities were observed on the north parcel in 2015 and included five wetland types and one upland type. The wetland communities were Type 3 – *Schoenoplectus* spp., Type 4 – *Spartina pectinata/ Schoenoplectus* spp., Type 9 – *Puccinellia nuttalliana*/*Iva axillaris*, Type 15 – Bare Ground/*Schoenoplectus* spp, and Type 18 – Open Water/*Schoenoplectus* spp. Upland community Type 16 – *Bromus inermis*/*Pascopyrum smithii* represented the drier areas bordering the excavated depressions. The north cell on the north parcel was dry during the June 2015 monitoring event.

Three vegetation communities were observed on the south parcel in 2015 and included two wetland types and one upland type. The wetland communities were Type 12 – *Puccinellia nuttalliana/Iva axillaris* and Type 17 – *Teucrium canadense/Chenopodium album*. Community Type 14 – *Agropyron cristatum/Bromus inermis* represented the only upland community in the southern parcel. The excavated depression in the south mitigation area was dry during the June 2015 monitoring event. Communities in the northern and southern parcels are discussed below.

Wetland community Type 3 – *Schoenoplectus* spp. replaced upland community Type 1 – *Elymus* spp. and upland Type 2 – *Chenopodium album* in 2013. The community was identified on 1.2 acres of the north parcel in 2015 and generally included the seeded emergent vegetation found along the margins of the open water boundary in the constructed cells. Dominant species included saltmarsh club-rush (*Schoenoplectus maritimus*), hard-stem club-rush (*Schoenoplectus acutus*), Chairmaker's club-rush (*Schoenoplectus americanus*), coastal salt grass (*Distichlis spicata*), freshwater cord grass (*Spartina pectinata*), broad-leaf cat-tail (*Typha latifolia*), and 16 other species observed at less than five percent cover. The cover class for bare ground was estimated at 6 to 10 percent. This community is expected to continue to expand in size and may eventually dominate the open water areas. A natural recruitment area comprising Eastern cottonwood (*Populus deltoides*) and willow (*Salix* spp.) seedlings was identified along the eastern boundary of this community.

Wetland community Type 4 – *Spartina pectinata/Schoenoplectus* spp. characterized 0.78 acres of the pre-existing wetland community, adjacent to the unnamed tributary to Big Muddy Creek that parallels the west and north boundaries of the north parcel. The vegetation was dominated by freshwater cord grass, saltmarsh club-rush, hard-stem club-rush, field sow-thistle (*Sonchus arvensis*), creeping meadow-foxtail (*Alopecurus arundinaceus*), fox-tail barley (*Hordeum jubatum*), and six other species observed at less than five percent cover. Inundated areas were observed in this community during the 2015 site visit, with water levels ranging from 1 to 1.5 feet deep.

Wetland community Type 9 – *Puccinellia nutalliana/Iva axillaris* (N) was identified on 2.47 acres of wetland located within the excavated areas between the constructed cells on the north side of Highway 2. This community replaced wetland Type 5 – *Puccinellia nutalliana/Chenopodium album* in 2013 due the shift in dominance from lamb's-quarters (*Chenopodium album*) to deer-root (*Iva axillaris*). The vegetation cover was dominated by Nuttall's alkali grass (*Puccinellia nutalliana*), deer-root, western-wheat grass (*Pascopyrum smithii*), and coastal salt grass (*Distichlis spicata*) combined with 16 other species. Bare ground decreased from 11 to 20 percent in 2014 to an estimated 6 to 10 percent in 2015.

Table 1. Vegetation species observed from 2011 through 2015 at the Big Muddy Wetland Mitigation Site.

Scientific Names	Common Names	GP Indicator Status[1]
Achillea millefolium	Common Yarrow	FACU
Agropyron cristatum	Crested Wheatgrass	NL
Algae, green	Algae, green	NL
Alopecurus arundinaceus	**Creeping Meadow-Foxtail**	**FACW**
Apocynum cannabinum	**Indian-Hemp**	**FAC**
Aquatic macrophytes	**Aquatic macrophytes**	**NL**
Artemisia cana	Coaltown Sagebrush	FACU
Artemisia frigida	Fringed Sage	NL
Artemisia tridentata	Big Sagebrush	NL
Aster sp.	Aster	NL
***Astragalus* sp.**	**Milkvetch**	**NL**
Atriplex suckleyi	Suckley's Saltbush	NL
Bassia scoparia	Mexican-Fireweed	FACU
Bouteloua dactyloides	Buffalo Grass	FACU
Bouteloua gracilis	Blue Gramma	NL
Bromus inermis	Smooth Brome	UPL
Carex aquatilis	Leafy Tussock Sedge	OBL
Chenopodium album	Lamb's-Quarters	FACU
***Chenopodium* sp.**	**Goosefoot**	**NL**
Cirsium arvense	Canadian Thistle	FACU
Convolvulus arvensis	**Field Bindweed**	**NL**
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	UPL
Helianthus annuus	Common Sunflower	FACU
Hordeum jubatum	Fox-Tail Barley	FACW
Iva axillaris	Deer-Root	FAC
Juncus balticus	Baltic Rush	FACW
Lactuca serriola	Prickly Lettuce	FAC
Lactuca tatarica	**Russian Blue Lettuce**	**UPL**
Lemna minor	Common Duckweed	OBL
Lepidium densiflorum	**Miner's Pepperwort**	**FAC**
Lepidium perfoliatum	Clasping Pepperwort	FAC
Linum lewisii	Prairie Flax	NL
Lupinus argenteus	**Silvery Lupine**	**NL**
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	NL
Pascopyrum smithii	Western-Wheat Grass	FACU
Poa arida	Prairie Blue Grass	FAC

[1]2014 NWPL (Lichvar *et al* , 2014).

New species identified in 2015 are **bolded**.

Table 1. (Continued). Vegetation species observed from 2011 through 2015 at the Big Muddy Wetland Mitigation Site

Scientific Names	Common Names	GP Indicator Status[1]
Poa pratensis	Kentucky Blue Grass	FACU
Polypogon monspeliensis	Annual Rabbit's-Foot Grass	FACW
Populus deltoides	Eastern Cottonwood	FAC
Populus tremuloides	Quaking Aspen	FAC
Potentilla anserina	Silverweed	FACW
Puccinellia nuttalliana	Nuttall's Alkali Grass	OBL
Rosa woodsii	Woods' Rose	FACU
Rumex crispus	Curly Dock	FAC
Salix amygdaloides	Peach-Leaf Willow	FACW
Salix exigua	**Narrow-Leaf Willow**	**FACW**
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
Stipa viridula	**Green Needlegrass**	**NL**
Suaeda calceoliformis	Paiuteweed	FACW
Symphoricarpos albus	Common Snowberry	UPL
Symphyotrichum laeve	Smooth Blue American-Aster	FACU
Taraxacum officinale	Common Dandelion	FACU
Teucrium canadense	**American Germander**	**FACW**
Thlaspi arvense	Field Pennycress	FACU
Tragopogon dubius	Meadow Goat's-beard	NL
Typha latifolia	Broad-Leaf Cat-Tail	OBL
Vicia americana	**American Purple Vetch**	**FACU**

[1]2014 NWPL (Lichvar *et al* , 2014).

New species identified in 2015 are **bolded**.

Wetland Community Type 11 – *Puccinellia nutalliana/Hordeum jubatum*, located in the south parcel and newly defined in 2014, was combined with wetland community Type 12 – *Puccinellia nutalliana/Iva axillaris* (S) in 2015 due to high similarity in species composition and associated cover classes. Wetland Community Type 12 – *Puccinellia nutalliana/Iva axillaris* (S) now represents 5.7 acres of the south parcel, which includes the excavated wetland depression and areas north and northeast of the constructed cell. Dominant species included Nuttall's alkali grass, deer-root, fox-tail barley, and seven other species.

Wetland Community Type 15 – Bare Ground/*Schoenoplectus* spp. was observed on 0.76 acres in 2015, located in the north cell of the north parcel. The community was not inundated during the June 2015 monitoring event although several indicators of wetland hydrology provided evidence that the extent of inundation was greater earlier in the growing season. Bare ground represented more than 50 percent of the excavated depression. Dominant species included saltmarsh club-rush and Nuttall's alkali grass, with lesser cover from coastal salt

grass, fox-tail barley, and paiuteweed (*Suaeda caleoliformis*). As a result of the increase in overall species cover for this community in 2015, it is now considered a wetland type rather than a mudflat on the Transect 1 intervals.

Wetland Community Type 17 – *Teucrium canadense/Chenopodium album* was identified on 0.3 acres along the existing wetland fringe, west of the excavated depression on the south parcel. This community replaced wetland Type 13 – *Spartina pectinata* as species composition and their associated cover classes were different during the 2015 survey. The vegetation was dominated by American germander (*Teucrium canadense*), lamb's quarters, freshwater cord grass, Russian blue lettuce (*Lactuca tatarica*), common spike-rush (*Eleocharis palustris*), and 14 other species.

Wetland Community Type 18 – Open Water/*Schoenoplectus* spp. was identified on 2.91 acres in the two southern wetland cells on the north parcel. This community replaced open water Type 6 due to a decrease in the open water component and an increase in wetland vegetation cover during the 2015 survey. Saltmarsh club-rush comprised more than 50 percent of this new wetland community, with lesser cover from hard-stem club-rush, freshwater cord grass, aquatic macrophytes, and green algae (a protist). Open water represented between 21 and 50 percent of this wetland community. If open water continues to decrease and *Schoenoplectus* spp. continues to increase in cover, this community will likely be merged with adjacent wetland Type 3 – *Schoenoplectus* spp. in subsequent monitoring years.

Upland Community Type 14 – *Agropyron cristatum/Bromus inermis* characterized the 1.25-acre upland located south and east of the constructed cell on the south parcel. Dominant species included crested wheatgrass (*Agropyron cristatum*), smooth brome (*Bromus inermis*), deer-root, and 16 other species.

Upland Community Type 16 – *Bromus inermis/Pascopyrum smithii* was identified on 2.51 acres, an increase of 0.14 acres since 2014, and represents the drier areas bordering the excavated depressions in the north parcel. This community replaced upland Type 8 – *Bromus inermis/Agropyron cristatum* as species composition and their associated cover classes had shifted during the 2015 survey. The vegetation was dominated by smooth brome, western-wheat grass, crested wheatgrass, deer-root, curly-cup gumweed (*Grindelia squarrosa*), and 21 other species.

Vegetation community transitions were measured along 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 (Figure 2, Appendix A). Transect one (T-1) intersected five vegetation communities, including wetland Types 3, 9, 15, 18 and upland Type 16 (Table 2 and Charts 1 and 2). Due to the replacement of open water Type 6 with wetland Type 18, T-1 had no open water component in 2015. Also, as a result of the increase in vegetation cover in wetland Type 15 in 2015, it is now

considered a wetland rather than a mudflat for T-1 intervals. The wetland Type 18 community replacement and shift from mudflat to wetland in wetland Type 15 led to an increase in hydrophytic vegetation along the transect, from 51.6 percent in 2014 to 83 percent in 2015. The percent of upland community identified along the transect decreased from 30.1 percent in 2012 to 17.0 percent in 2015, reflecting the transition from upland to wetland vegetation cover.

Table 2. Data summary for Transect 1 (North Parcel) from 2011 through 2015 at the Big Muddy Wetland Mitigation Site.

Monitoring Year	2011	2012	2013	2014	2015
Transect Length (feet)	647	647	647	647	647
Vegetation Community Transitions along Transect	11	11	11	11	11
Vegetation Communities along Transect	4	4	3	4	5
Hydrophytic Vegetation Communities along Transect	2	2	2	2	4
Total Vegetative Species	21	24	20	25	29
Total Hydrophytic Species	12	11	9	10	12
Total Upland Species	9	13	11	15	17
Estimated % Total Vegetative Cover	40	50	70	70	70
Estimated % Unvegetated	60	50	30	30	30
% Transect Length Comprising Hydrophytic Vegetation Communities	20.7	32.1	49.8	51.6	83.0
% Transect Length Comprising Upland Vegetation Communities	29.8	30.1	18.1	18.1	17.0
% Transect Length Comprising Unvegetated Open Water	49.5	37.7	32.1	20.1	0
% Transect Length Comprising Mudflat	0.0	0.0	0.0	10.2	0

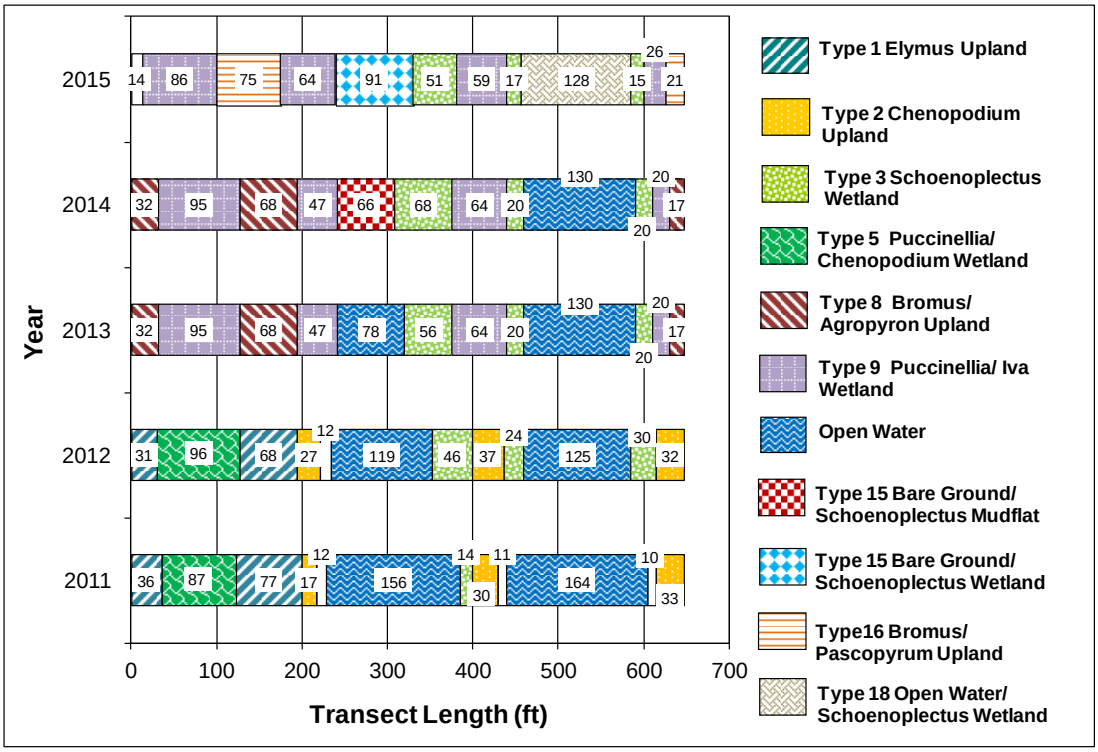


Chart 1. Transect map showing community types on Transect 1 (North Parcel) from 2011 through 2015 from start to finish at the Big Muddy Wetland Mitigation Site.

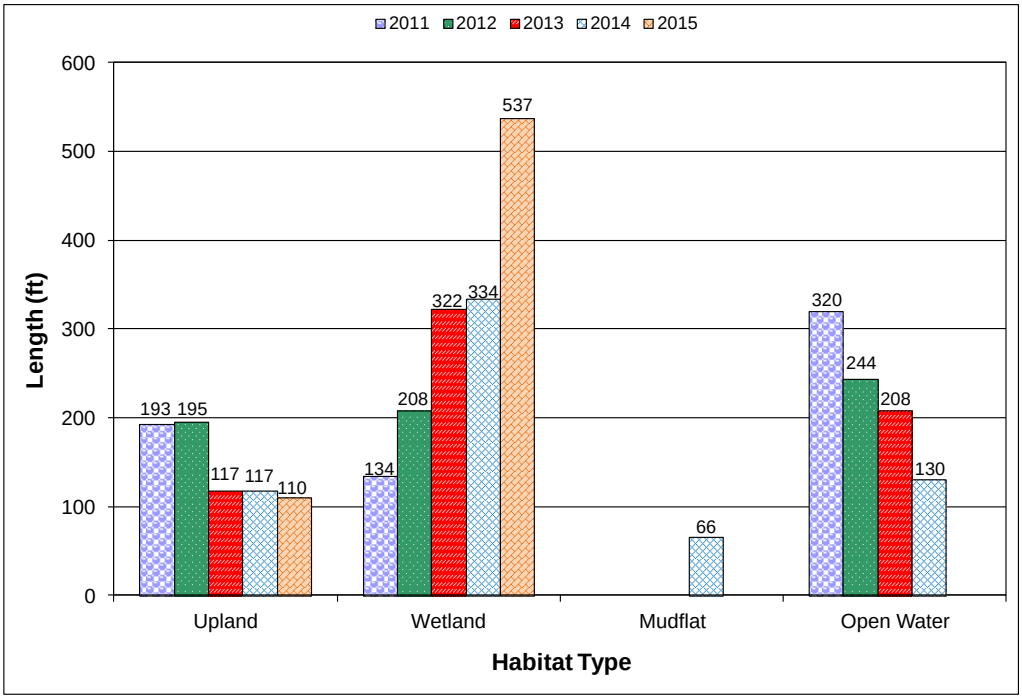


Chart 2. Length of habitat types within Transect 1 (North Parcel) from 2011 through 2015 at the Big Muddy Wetland Mitigation Site.

Transect 2 (T-2) was added in 2012 to monitor the additional mitigation area south of Highway 2 and was established across the excavated basin constructed in 2011. Transect 2 intersected wetland Types 12 and 17, and upland Type 14. Hydrophytic vegetation has remained constant from 2012 through 2015, comprising approximately 91.8 percent of the transect (Table 3 and Charts 3 and 4). Nuttall's alkali grass remained the dominant species within the constructed wetland cell south of the highway in 2015. Upland vegetation also remained constant from 2012 through 2015, comprising approximately 8.2 percent of the transect, primarily the result of the abrupt topographic transition into wetland.

Table 3. Data summary for Transect 2 (South Parcel) from 2012 through 2015 at the Big Muddy Wetland Mitigation Site.

Monitoring Year	2012	2013	2014	2015
Transect Length (feet)	**366**	**366**	**366**	**366**
Vegetation Community Transitions along Transect	2	2	2	2
Vegetation Communities along Transect	3	3	3	3
Hydrophytic Vegetation Communities along Transect	2	2	2	2
Total Vegetative Species	21	18	17	15
Total Hydrophytic Species	11	10	7	4
Total Upland Species	10	8	10	11
Estimated % Total Vegetative Cover	90	95	95	95
Estimated % Unvegetated	10	5	5	5
% Transect Length Comprising Hydrophytic Vegetation Communities	91.3	91.8	91.8	91.8
% Transect Length Comprising Upland Vegetation Communities	8.7	8.2	8.2	8.2
% Transect Length Comprising Unvegetated Open Water	0.0	0.0	0	0
% Transect Length Comprising Mudflat	0.0	0.0	0	0

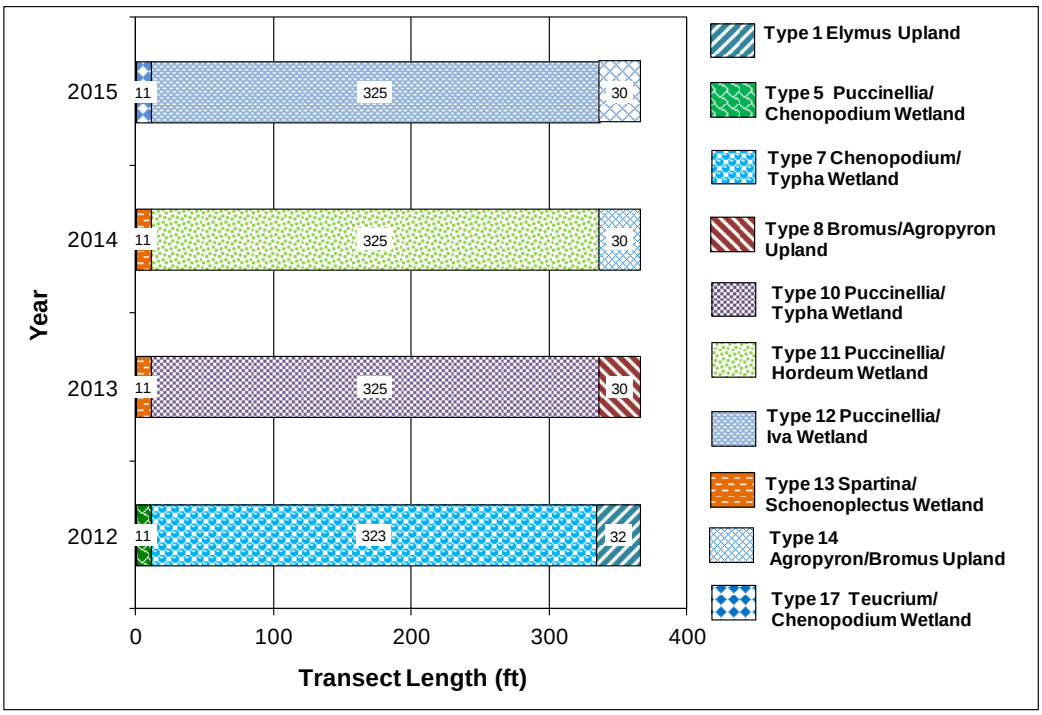


Chart 3. Transect map showing community types on Transect 2 (South Parcel) from 2012 through 2015 from start to finish at the Big Muddy Wetland Mitigation Site.

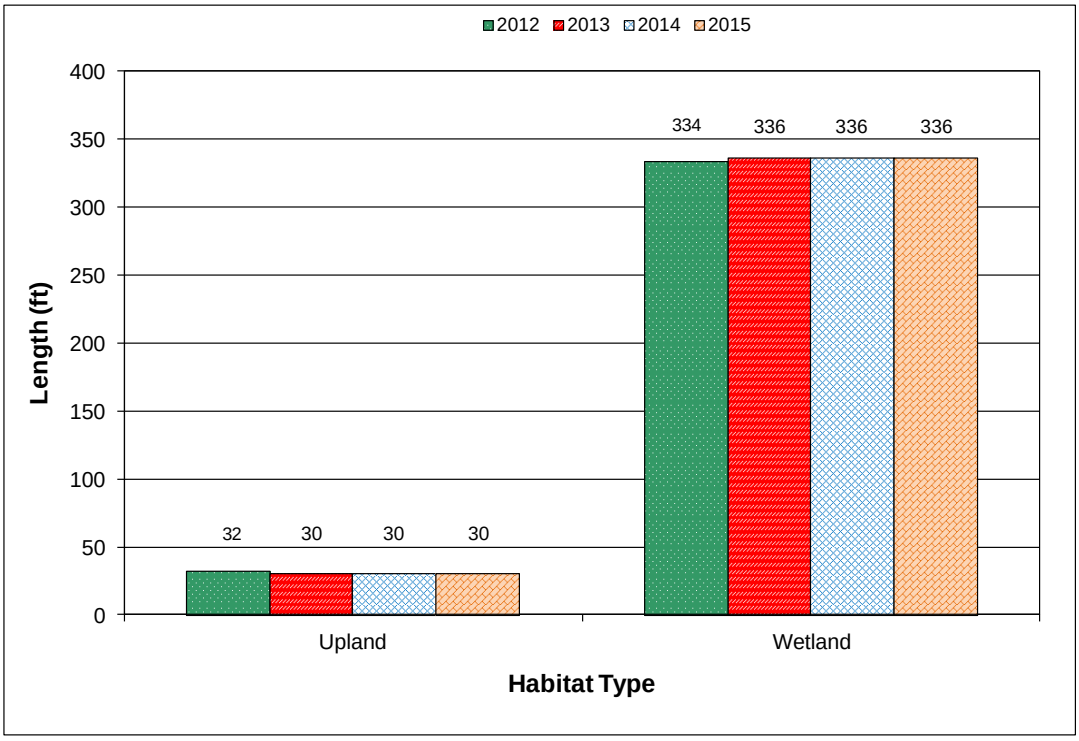


Chart 4. Length of habitat types within Transect 2 (South Parcel) from 2012 through 2015 at the Big Muddy Wetland Mitigation Site.

Two infestations of Canadian thistle (*Cirsium arvense*), a Priority 2B noxious weed, were observed at the northeast edge of the unnamed tributary on the north parcel. The infestations each covered less than 0.1 acre with trace and moderate cover classes. Two infestations of field bindweed (*Convovulus arvensis)*, a Priority 2B noxious weed, were observed in the southern cell. The infestations each covered less than 0.1 acre with trace and low cover classes. 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 at either location within this mitigation site, any woody species identified is due to natural recruitment. A natural recruitment area comprising Eastern cottonwood (*Populus deltoides*) and willow (*Salix* spp.) seedlings was identified within wetland Type 3 in the north parcel from 2013 through 2015.

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 the Havrelon loam, Lallie silty clay, and Lohler silty clay. The Havrelon loam was mapped primarily in the pre-existing wetland areas in the north parcel. This series is a moderately well drained loam, taxonomically classified as a frigid Typic Ustifluvents. The Havrelon 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. The three soil map units are included on the Montana Hydric Soils list.

Soil test pits were excavated at four locations, all within what was originally mapped as the Lohler silty clay soil series (SP1-w, SP2-u, SP3-u, and SP4-w; Figure 2, Appendix A). The presence of the Lohler silty clay soil series was confirmed through observations at all four data points during the 2015 monitoring event. Data points SP1-w and SP4-w were located in areas that met the wetland criteria. The upper horizon of the soil profile at SP1-w revealed eight inches of a very dark gray (2.5 Y 3/1) silty clay with five percent yellowish red (5 YR 4/6) redox concentrations in the matrix. The lower horizon consisted of an olive brown (2.5Y 4/3) silty clay with 30 percent very dark gray (Gley 1 3/N) gleyed concentrations in the matrix. This soil met the criteria for redox dark surface and classification as a hydric soil. The soil profile at SP4-w revealed a dark grayish brown (10YR 4/2) silty clay with one percent strong brown (7.5 YR 4/6) redox concentrations in the matrix. This soil did not meet the criteria for any hydric soil indicators, likely due its location in a recently constructed wetland where soils may be too young to have formed hydric indicators (Problematic Hydric Soils: Recently Developed Wetlands, USACE 2010). This soil meets the National Technical Committee for Hydric Soils (NTCHS) technical standard for hydric soil as it was saturated to surface with evidence of inundation earlier in the year. The soil profile at SP2-u, located in the adjacent upland approximately 20 feet

upslope of SP1-w, was a very dark gray (2.5Y 3/1) silty clay loam. There were no hydric soil indicators observed in this soil profile. The soil profile at SP3-u, located in the adjacent upland approximately 30 feet upslope of SP4-w, was a dark grayish brown (10YR 4/2) silty clay. There were no hydric soil indicators observed in this soil profile.

3.4. Wetland Delineation

Two data points (SP3-u and SP4-w) located within the north mitigation parcel and two data points (SP1-w and SP2-u) located in the south mitigation parcel were evaluated to confirm the wetland boundary determinations (Figure 2, Appendix A; Wetland Determination Data Forms, Appendix B). The 2015 wetland delineation identified a total of 14.12 acres of wetland/aquatic habitat, a decrease of 0.13 acres since 2014 (Table 4). This change was the result of a newly defined upland area observed in the center of the north parcel in wetland Type 9 during the 2015 survey. Due to increased hydrophytic vegetation cover and corresponding decrease in open water, the open water component in the north parcel was replaced with wetland Type 18. The shift from open water to wetland Type 18 increased the north parcel's created wetland acreage to 7.39 acres, an increase of 2.78 acres since 2014. A total of 8.12 acres of wetland habitat was identified in the north parcel in 2015. The 6.0-acre extent of overall wetland and aquatic habitat in the south parcel remained constant from 2013 through 2015.

Table 4. Total wetland acres delineated from 2011 through 2015 at the Big Muddy Wetland Mitigation Site.

Wetland and Aquatic Habitat	2011 (acres)	2012 (acres)	2013 (acres)	2014 (acres)	2015 (acres)
Created Wetland - North Parcel	1.14	1.14	3.65	4.61	7.39
Pre-Existing Wetland - North Parcel	0.73	0.73	0.73	0.73	0.73
Open Water - North Parcel	5.05	5.05	3.87	2.91	0.00
Sub-Total for North Parcel	**6.92**	**6.92**	**8.25**	**8.25**	**8.12**
Created Wetland - South Parcel	--	4.11	4.17	4.17	4.17
Pre-Existing Wetland - South Parcel	--	1.83	1.83	1.83	1.83
Open Water - South Parcel	--	0.00	0.00	0.00	0.00
Sub-Total for South Parcel	**--**	**5.94**	**6.00**	**6.00**	**6.00**
Total	**6.92**	**12.87**	**14.25**	**14.25**	**14.12**

3.5. Wildlife

A comprehensive list of birds and other wildlife species observed directly or indirectly from 2011 through 2015 is presented in Table 5 (Monitoring Form, Appendix B). Eight bird species were observed in 2015, including killdeer (*Charadrius vociferus*), red-winged blackbird (*Agelaius phoeniceus*), barn swallow (*Hirundo rustica*), Franklin's gull (*Leucophaeus pipixcan*), mallard (*Anas platyrhynchos*), western meadowlark (*Sturnella neglecta*), Wilson's snipe (*Gallinago delicata*), and yellow headed blackbird (*Xanthocephalus xanthocephalus)*. One white-tailed deer fawn (*Odocoileus virginianus*) and the tracks of raccoon (*Procyon loter*) and deer (*Odocoileus* spp.) were observed during the 2015 survey.

Table 5. Wildlife species observed within the Big Muddy Wetland Mitigation Site from 2011 through 2015.

COMMON NAME	SCIENTIFIC NAME
AMPHIBIANS	
Boreal Chorus Frog	*Pseudacris maculata*
Northern Leopard Frog	*Rana pipiens*
Woodhouse's Toad	*Bufo woodhousii*
MAMMALS	
White-tailed Deer	***Odocoileus virginianus***
Deer sp.	***Odocoileus* sp.**
Muskrat	*Ondatra zibethicus*
Raccoon	***Procyon lotor***
Red Fox	*Vulpes vulpes*
REPTILE	
Plains Gartersnake*	*Thamnophis radix*
Prairie Rattlesnake	*Crotalus viridis*
Unknown Snake	
BIRDS	
American Avocet	*Recurvirostra americana*
American Coot	*Fulica americana*
American Goldfinch	*Spinus tristus*
American Wigeon	*Anas americana*
Bank Swallow	*Riparia riparia*
Barn Swallow	***Hirundo rustica***
Blue-winged Teal	*Anas discors*
Cinnamon Teal	*Anas cyanoptera*
Cliff Swallow	*Petrochelidon pyrrhonota*
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 Meadowlark	***Sturnella neglecta***
Western Sandpiper	*Calidris mauri*
Wilson's Phalarope	*Phalaropus tricolor*
Wilson's Snipe	***Gallinago delicata***
Yellow-headed Blackbird	***Xanthocephalus xanthocephalus***

Species identified in 2015 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 has also been used to evaluate the functional values of the mitigation wetlands from 2011 through 2015 (Table 6). Four AAs were assessed in 2015 that 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 2015 are located in Appendix B.

The Creation North Parcel AA encompassed 7.39 acres and included the constructed wetland cells and excavated areas between the cells, characterized by wetland community Types 3, 9, 15, and 18. This AA was rated as a Category II wetland with 72 percent of the total possible points in 2015, an increase of one percent since 2014. The AA has shown continued improvement since construction in 2011. The functional ratings improved after 2012, increasing from 66.5 percent to 72 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 increased hydrophytic vegetation), 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, groundwater discharge/recharge, production export/food chain support, and recreation/education potential. This AA achieved 53.21 total functional units in 2015, a decrease by 0.18 functional units since 2014, and was a result of the decline in wetland acreage in this AA by 0.13 acres since 2014.

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 III wetland with 56 percent of the total possible points and 4.09 functional units in 2015. The total possible points and functional units achieved decreased within this AA in 2014 due to re-evaluation of the water regime (changed from perennial to seasonal) and surface water outlet (changed from unrestricted to restricted outlet). The AA received high ratings in 2015 for sediment/nutrient/toxicant removal, sediment/shoreline stabilization and recreation/education potential. The North Parcel Creation and Preservation AAs scored 53.21 and 4.09 functional units, respectively. Combined, the North Parcel Creation and Preservation AAs scored a total of 57.3 functional units in 2015.

The Creation South Parcel AA encompassed 4.17 acres within the footprint of the excavated wetland cell and was dominated by wetland community Type 12. The AA was rated as a Category III wetland with 61 percent of the total possible

points and 25.44 functional units in 2015, the same as 2014. The AA received high ratings for short and long term surface water storage, sediment/nutrient/toxicant removal, sediment/shoreline stabilization, and recreation/education potential.

The Preservation South Parcel AA identified in 2015 included 1.83 acres of existing wetland and 10.61 functional units. The AA was rated as a Category III wetland with 58 percent of the total possible points from 2013 through 2015. The seasonal/intermittent nature of the wetland hydrology within this AA was the primary factor limiting overall functional ratings. The AA received high ratings for sediment/shoreline stabilization, sediment/nutrient/toxicant removal, and recreation/education potential. The South Parcel Creation and Preservation AAs scored 25.44 and 10.61 functional units, respectively. Combined, the South Parcel Creation and Preservation AAs attained a total 36.05 functional units in 2015.

Table 6. Functions and Values of the Big Muddy Wetland Mitigation Site from 2011 through 2015.

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)	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 Highway 2

Function and Value Parameters from the 2008 Montana Wetland Assessment Method	2014 Creation North Parcel	2014 Preservation North Parcel	2014 Creation South Parcel	2014 Preservation South Parcel	2015 Creation North Parcel	2015 Preservation North Parcel	2015 Creation South Parcel	2015 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	High (0.9)	Mod (0.7)	Mod (0.7)	Mod (0.7)	High (0.9)	Mod (0.7)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	NA	NA	NA	NA	NA	NA	NA	NA
Flood Attenuation	Mod (0.5)	Mod (0.5)	Mod (0.5)	Mod (0.4)	Mod (0.5)	Mod (0.5)	Mod (0.5)	Mod (0.4)
Short and Long Term Surface Water Storage	High (1.0)	Low (0.3)	High (0.9)	Low (0.3)	High (1.0)	Low (0.3)	High (0.9)	Low (0.3)
Sediment/Nutrient/Toxicant Removal	High (1.0)	High (1.0)	High (1.0)	High (0.9)	High (1.0)	High (1.0)	High (1.0)	High (0.9)
Sediment/Shoreline Stabilization	High (1.0)	High (0.9)	High (0.9)	High (1.0)	High (1.0)	High (0.9)	High (0.9)	High (1.0)
Production Export/Food Chain Support	Mod (0.7)	Mod (0.4)	Mod (0.4)	Mod (0.7)	High (0.8)	Mod (0.4)	Mod (0.4)	Mod (0.7)
Groundwater Discharge/Recharge	High (1.0)	Mod (0.7)	Mod (0.7)	Mod (0.7)	High (1.0)	Mod (0.7)	Mod (0.7)	Mod (0.7)
Uniqueness	Low (0.3)	Mod (0.4)	Low (0.3)	Mod (0.4)	Low (0.3)	Mod (0.4)	Low (0.3)	Mod (0.4)
Recreation/Education Potential (bonus points)	High (0.2)	High (0.2)	High (0.2)	High (0.2)	High (0.2)	High (0.2)	High (0.2)	High (0.2)
Actual Points/Possible Points	**7.1/10**	**5.6/10**	**6.1/10**	**5.8/10**	**7.2/10**	**5.6/10**	**6.1/10**	**5.8/10**
% of Possible Score Achieved	**71.0%**	**56.0%**	**61.0%**	**58.0%**	**72.0%**	**56.0%**	**61.0%**	**58.0%**
Overall Category	**II**	**III**	**III**	**III**	**II**	**III**	**III**	**III**
Total Acreage of Assessed Wetlands within Site Boundaries	**7.52**	**0.73**	**4.17**	**1.83**	**7.39**	**0.73**	**4.17**	**1.83**
Functional Units (acreage x actual points)	**53.39**	**4.09**	**25.44**	**10.61**	**53.21**	**4.09**	**25.44**	**10.61**

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-17 of Appendix C. Photographs of the transect end points and wetland determination data points are shown on pages C-18 through C-21, and page C-22, respectively (Appendix C).

3.8. Maintenance Needs

There are no diversion structures or nesting structures currently installed at the site. Two infestations of Canadian thistle, a Priority 2B noxious weed, were observed at the edge of the unnamed tributary in the northeast quadrant of the north mitigation site. The infestations each covered less than 0.1 acre with trace to moderate cover classes. Two infestations of field bindweed, a Priority 2B noxious weed, were observed in the southern cell. The infestations each covered less than 0.1 acre with a trace to low cover class. The MDT has an ongoing weed control program for their mitigation sites that includes an annual assessment of weeds identified at each location and treatment to contain and control identified populations.

3.9. Current Credit Summary

Table 7 summarizes the originally proposed mitigation acreages, credit ratios, and scaled performance standards from the May 2011 Mitigation Plan. This table was modified in 2012 to include the additional acreages monitored within the southern parcel. Table 8 presents a summary of the site's progress in relation to the established performance standards. Table 9 provides a breakdown of the credit acreages (based on the 2015 delineation) listed for each category scaled according to the credit criteria listed in Table 7. Each mitigation category has been divided into the respective parcels, northern or southern. The total credit acres accrued at the Big Muddy wetland mitigation area in 2015 was 12.95 acres, an increase of 1.62 credit acres from 2014.

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]
Northern Parcel	**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%
	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%
	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%
Southern Parcel	***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 (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 (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 performance standards for Big Muddy credit areas.

	Compensatory Mitigation Type	Performance Standard 1	Performance Standard 2	Performance Standard 3	Discussion
Northern Parcel	**Creation: Establishment [3] (Area between cells [1.76 ac] and Passive creation in northern tip of site[1.03 ac])**	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%	Performance Standards 1, 2 and 3 met. Full credit allocated.
	Creation: Establishment (Emergent Marsh and Open Water in Northern Parcel)	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%	Performance Standards 1, 2 and 3 met. Full credit allocated.
	Preservation (Northern Parcel)	Satisfy 1987 Manual and Regional Supplement Wetland Hydrology Wetland Soils Hydrophytic Vegetation Criteria	NA	Noxious Weed Absolute Cover <5%	Performance Standards 1 and 3 met. Full credit allocated.
	Upland Buffer (Northern Parcel)	NA	NA	Noxious Weed Absolute Cover <5%	Performance Standard 3 met. Full credit allocated.
Southern Parcel	***Creation: Establishment (Emergent Marsh and Open Water in Southern Parcel)**	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%	Performance Standards 1, 2 and 3 met. Full credit allocated.
	***Preservation (Southern Parcel)**	Satisfy 1987 Manual and Regional Supplement Wetland Hydrology Wetland Soils Hydrophytic Vegetation Criteria	NA	Noxious Weed Absolute Cover <5%	Performance Standards 1 and 3 met. Full credit allocated.
	Upland Buffer (Southern Parcel)	NA	NA	Noxious Weed Absolute Cover <5%	Performance Standard 3 met. Full credit allocated.

Table 9. Summary of wetland credits from 2011 through 2015 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	2014 Delineated Acres	Scaled % Credit Standards	2014 Credit Acres	2015 Delineated Acres	Scaled % Credit Standards	2015 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	1.76	100%	1.76	1.63	100%	1.63
	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	5.76	70%	4.03	5.76	100%	5.76
	Wetland Preservation (Northern Parcel)	4:1	0.73	100%	0.18	0.73	100%	0.18	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	2.37	100%	0.47	2.50	100%	0.50
	Northern Subtotal		**10.62**		**5.26**	**10.18**		**4.95**	**10.62**		**5.92**	**10.62**		**6.45**	**10.62**		**8.07**
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	4.17	100%	4.17	4.17	100%	4.17
	Wetland Preservation (Southern Parcel)	4:1	--	100%	--	1.83	100%	0.46	1.83	100%	0.46	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	1.25	100%	0.25	1.25	100%	0.25
	Southern Subtotal					**7.69**		**3.90**	**7.25**		**3.63**	**7.25**		**4.88**	**7.25**		**4.88**
	Total		**10.62**		**9.29**	**17.87**		**8.86**	**17.87**		**9.55**	**17.87**		**11.33**	**17.87**		**12.95**

Within the northern parcel, the number of acres of created wetland within the excavated areas between cells and passive creation was 1.63 in 2015. Based on meeting Performance Standards 1 through 3, 100 percent of the total created acreage was credited and totaled 1.63. The area between the excavated cells within the northern parcel exhibited greater than 70 percent cover by hydrophytic vegetation, less than 20 percent bare ground, and no noxious weeds. Wetland creation within the excavated cells in the northern parcel remained consistent from 2012 through 2015, totaling 5.76 acres. The estimated credit acreage was 100 percent of the total possible, or 5.76 credit acres based on the scaled criteria for meeting standards 1, 2, and 3. The absolute cover of hydrophytic vegetation within the excavated wetland cells increased in 2015, achieving 70 percent cover and meeting performance standard 2, with noxious weed cover observed at less than five percent. Preservation of 0.73 acres in the north parcel has been credited 100 percent at a 4:1 ratio providing 0.18 credits based on continued delineation as wetland habitat and noxious weed absolute cover less than five percent.

Wetland creation within the southern parcel totaled 4.17 acres in 2015, the same as 2013 and 2014. This value decreased in 2013 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 north mitigation area, 100 percent of wetland credits were allocated for meeting standards 1 through 3. Wetlands created in the southern parcel satisfy the criteria for wetland hydrology, hydric soils, and hydrophytic vegetation. Estimated vegetation cover within this excavated basin is approximately 95 percent, with 5 percent bare ground. No noxious weeds were identified within the created wetland. Wetland preservation within the southern parcel totaled 1.83 acres and provided 0.46 credits. The three performance standards for the preservation wetland have been met since 2012. The preservation wetland within the southern parcel continues to satisfy wetland hydrology, hydric soils, and hydrophytic vegetation criteria, absolute cover of FAC or wetter plants is estimated at nearly 100 percent, and less than five percent noxious weed cover has been identified. Maintenance of the upland buffer around the southern parcel generated an additional 0.25 credits in 2013 through 2015. Full credit at a 5:1 ratio was attained through meeting the success criteria for noxious weed cover below five percent within the upland buffer.

4. REFERENCES

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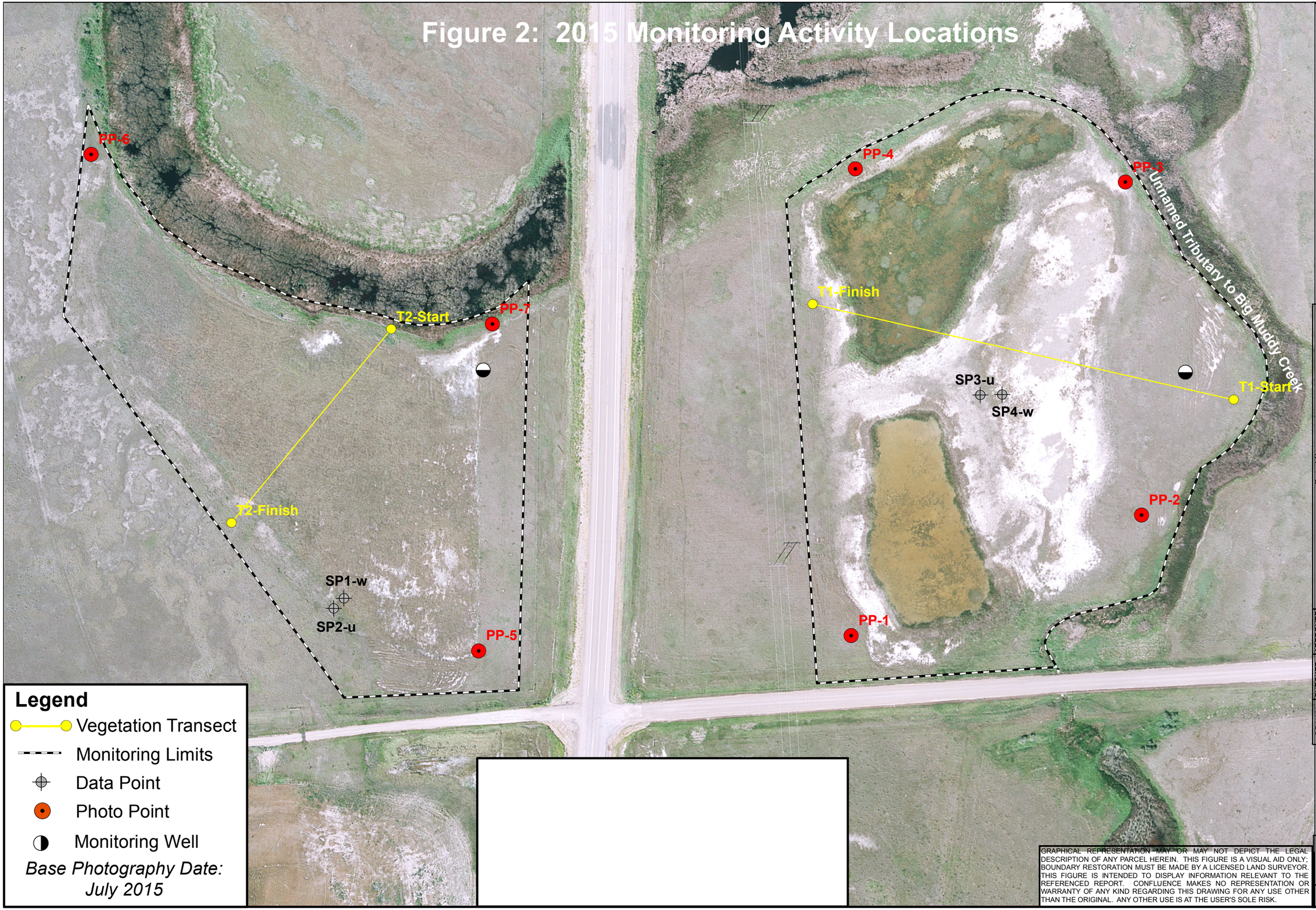
Appendix A

PROJECT AREA MAPS

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

MDT Wetland Mitigation Monitoring
Big Muddy Creek
Roosevelt County, Montana

Figure 2: 2015 Monitoring Activity Locations



Legend

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

Base Photography Date: July 2015

LOCATION: Roosevelt Co., MT

PROJECT NO: NH 1-10(46)633

FILE: BigMuddy/Monitor2015.mxd

Project Name: Big Muddy Creek Wetland Mitigation Site

Drawing Title: 2015 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
RQ	JJ	JJ

SCALE: As Shown

Drawn: August 19, 2015

PROJ MGR: J. Johnson

CONFLUENCE consulting incorporated

Figure 2

REV -

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

Figure 3: 2015 Mapped Site Features

N

0 75 150 300
Feet

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

Noxious Weeds
um arvense
Convolvulus arvensis
Infestation Size
X = <0.1 acre

Cover Class
T = Trace (<1% cover)
L = Low (1-5% cover)
M = Moderate (6-25% cover)
H = High (26-100% cover)

Wetland Limits
Vegetation Communities
Base Photography Date:
July 2015

ta ect	
ta Wetlands	14.12
Pre-existing Wetlands	2.56
Upland Buffer	3.76

Vegetation Community Types

2 Schoenoplectus spp.
4 Spar
9
15 Bare Ground/Schoenoplectus spp.
16 Bromus inermis/Pascopyrum smithii
17 Teucrium canadense/Chenopodium album
18 Open Water/Schoenoplectus spp.

LOCATION: Roosevelt Co., MT
PROJECT NO: NH 1-10(46)633
FILE: BigMuddy/Veg2015.mxd

Project Name
Big Muddy Creek
Wetland Mitigation Site

Drawing Title
2015 Mapped Site Features

DRAWN RQ | CHECKED JJ | APPROVED JJ
SCALE: As Shown
Drawn: August 19, 2015
PROJ MGR: J. Johnson

CONFLUENCE
consulting incorporated

Figure 3

REV -

Appendix B

2015 MDT Wetland Mitigation Site Monitoring Form
2015 USACE Wetland Determination Data Forms
2015 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 6/30/2015

Person(s) conducting the assessment: R Quire, R McEldowney

Weather: Warm, hazy with smoke from Alb 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: 5 #Visits in Year: 1

Size of Evaluation Area: 17.87 (acres)

Land use surrounding wetland:

Agriculture, pasture, US Hwy 2

HYDROLOGY

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

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

Percent of assessment area under inundation: 15 %

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, salt crust, geomorphic position, inundation and saturation visible on aerial, FAC-neutral test, water marks.

Groundwater Monitoring Wells

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

Well ID	Water Surface Depth (ft)
Well 1	0.19
Well 2	

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 and large storm events. Groundwater connection between stream and constructed wetlands on both north and south side of Hwy 2. Constructed depressions with periodic to permanent inundation. Well 1 located in northern tract, Well 2 located in southern tract. Unable to open Well 2 to measure water depth, as the well was locked.

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** 1.2

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	1	Bare Ground	2
Chenopodium album	0	Chenopodium sp.	1
Distichlis spicata	2	Eleocharis palustris	1
Glycyrrhiza lepidota	0	Grindelia squarrosa	0
Hordeum jubatum	1	Iva axillaris	0
Juncus balticus	1	Populus deltoides	0
Puccinellia nuttalliana	1	Rumex crispus	0
Salix amygdaloides	0	Salix exigua	0
Schoenoplectus acutus	1	Schoenoplectus americanus	1
Schoenoplectus maritimus	3	Sonchus arvensis	1
Spartina pectinata	2	Suaeda calceoliformis	0
Typha latifolia	2		

Comments:

Community # 4 **Community Type:** Spartina pectinata / Schoenoplectus spp. **Acres** 0.78

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	2	Bassia scoparia	0
Chenopodium sp.	0	Elymus trachycaulus	1
Hordeum jubatum	2	Lycopus americanus	0
Puccinellia nuttalliana	1	Schoenoplectus acutus	1
Schoenoplectus maritimus	4	Sonchus arvensis	3
Spartina pectinata	4	Typha latifolia	1

Comments:

Community # 9 **Community Type:** Puccinellia nuttalliana / Iva axillaris **Acres** 2.47

Species	Cover class	Species	Cover class
Agropyron cristatum	1	Bare Ground	2
Bassia scoparia	1	Bromus inermis	1
Chenopodium album	1	Chenopodium sp.	0
Distichlis spicata	4	Elymus trachycaulus	1
Grindelia squarrosa	2	Hordeum jubatum	1
Iva axillaris	4	Juncus balticus	0
Pascopyrum smithii	3	Populus deltoides	0
Puccinellia nuttalliana	5	Rumex crispus	0
Schoenoplectus maritimus	1	Sonchus arvensis	1
Spartina pectinata	1	Suaeda calceoliformis	1
Taraxacum officinale	0		

Comments:

Community located in northern tract.

Community # 12 **Community Type:** Puccinellia nuttalliana / Iva axillaris **Acres** 5.7

Species	Cover class	Species	Cover class
Bare Ground	1	Bassia scoparia	1
Chenopodium album	2	Distichlis spicata	1
Hordeum jubatum	4	Iva axillaris	4
Puccinellia nuttalliana	5	Rumex crispus	0
Schoenoplectus maritimus	0	Spartina pectinata	1
Suaeda calceoliformis	1		

Comments:

Vegetation community 11 merged into vegetation community 12 due to high similarity in species composition and their associated cover classes. Community located in southern tract.

Community # 14 **Community Type:** Agropyron cristatum / Bromus inermis **Acres** 1.25

Species	Cover class	Species	Cover class
Achillea millefolium	0	Agropyron cristatum	4
Artemisia cana	0	Artemisia frigida	0
Astragalus sp.	0	Bassia scoparia	0
Bromus inermis	5	Grindelia squarrosa	1
Hordeum jubatum	1	Iva axillaris	2
Linum lewisii	0	Lupinus argenteus	0
Medicago sativa	0	Melilotus officinalis	0
Melilotus officinalis	0	Poa pratensis	1
Stipa viridula	0	Symphoricarpos albus	0
Vicia americana	0		

Comments:

Community # 15 Community Type: Bare Ground / Schoenoplectus spp. **Acres** 0.76

Species	Cover class	Species	Cover class
Bare Ground	5	Distichlis spicata	1
Hordeum jubatum	1	Puccinellia nuttalliana	2
Schoenoplectus maritimus	3	Suaeda calceoliformis	0

Comments:

Community # 16 Community Type: Bromus inermis / Pascopyrum smithii **Acres** 2.51

Species	Cover class	Species	Cover class
Achillea millefolium	0	Agropyron cristatum	2
Artemisia cana	0	Bassia scoparia	0
Bromus inermis	4	Chenopodium sp.	1
Cirsium arvense	0	Distichlis spicata	1
Elymus repens	0	Elymus trachycaulus	1
Grindelia squarrosa	2	Hordeum jubatum	1
Iva axillaris	2	Lactuca serriola	0
Medicago sativa	0	Melilotus officinalis	0
Opuntia polyacantha	0	Pascopyrum smithii	3
Poa pratensis	1	Puccinellia nuttalliana	1
Rumex crispus	0	Sonchus arvensis	0
Spartina pectinata	1	Symphoricarpos albus	0
Thlaspi arvense	0	Tragopogon dubius	0

Comments:

Community # 17 Community Type: Teucrium canadense / Chenopodium album **Acres** 0.3

Species	Cover class	Species	Cover class
Apocynum cannabinum	1	Bassia scoparia	0
Chenopodium album	3	Convolvulus arvensis	1
Distichlis spicata	1	Eleocharis palustris	2
Iva axillaris	1	Lactuca tatarica	2
Lepidium densiflorum	1	Puccinellia nuttalliana	1
Rosa woodsii	0	Schoenoplectus acutus	0
Sonchus arvensis	0	Spartina pectinata	2
Symphoricarpos albus	1	Symphyotrichum sp.	0
Teucrium canadense	4	Thlaspi arvense	1
Typha latifolia	0		

Comments:

Community # 18 **Community Type:** Open Water / Schoenoplectus spp. **Acres** 2.91

Species	Cover class	Species	Cover class
Algae, green	2	Aquatic macrophytes	3
Open Water	4	Schoenoplectus acutus	1
Schoenoplectus maritimus	5	Spartina pectinata	0

Comments:

Orginially vegetation community #6 (Open Water). If Open Water cover class decreases and Schoenoplectus spp. cover class increases in upcoming survey years, this vegetation community will likely be merged into the adjacent vegetation community #3 (Schoenoplectus spp.).

Total Vegetation Community Acreage **17.88**

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

VEGETATION TRANSECTS

Site: Big Muddy Date: 6/30/2015

Transect Number: 1 **Compass Direction from Start:** 198

Interval Data:

Ending Station 14 **Community Type:** Bromus inermis / Pascopyrum smithii

Species	Cover class	Species	Cover class
Achillea millefolium	0	Agropyron cristatum	2
Artemisia cana	2	Bromus inermis	2
Chenopodium sp.	1	Distichlis spicata	5
Grindelia squarrosa	0	Hordeum jubatum	1
Lactuca serriola	0	Pascopyrum smithii	3
Poa pratensis	0	Puccinellia nuttalliana	0
Rumex crispus	0		

Ending Station 100 **Community Type:** Puccinellia nuttalliana / Iva axillaris

Species	Cover class	Species	Cover class
Bassia scoparia	0	Bromus inermis	1
Chenopodium sp.	1	Distichlis spicata	5
Grindelia squarrosa	0	Hordeum jubatum	1
Iva axillaris	3	Puccinellia nuttalliana	5
Suaeda calceoliformis	2	Taraxacum officinale	0

Ending Station 175 **Community Type:** Bromus inermis / Pascopyrum smithii

Species	Cover class	Species	Cover class
Agropyron cristatum	2	Bassia scoparia	0
Bromus inermis	4	Chenopodium sp.	1
Distichlis spicata	4	Grindelia squarrosa	1
Iva axillaris	3	Pascopyrum smithii	3
Puccinellia nuttalliana	1		

Ending Station 239 **Community Type:** Puccinellia nuttalliana / Iva axillaris

Species	Cover class	Species	Cover class
Bare Ground	3	Bassia scoparia	1
Chenopodium sp.	1	Distichlis spicata	3
Grindelia squarrosa	2	Hordeum jubatum	1
Pascopyrum smithii	1	Puccinellia nuttalliana	4

Ending Station 330 **Community Type:** Bare Ground / Schoenoplectus spp.

Species	Cover class	Species	Cover class
Bare Ground	5	Distichlis spicata	1
Puccinellia nuttalliana	1	Schoenoplectus maritimus	1
Suaeda calceoliformis	0		

Ending Station 381 **Community Type:** Schoenoplectus spp. /

Species	Cover class	Species	Cover class
Bare Ground	3	Chenopodium album	0
Distichlis spicata	1	Hordeum jubatum	1
Puccinellia nuttalliana	4	Schoenoplectus maritimus	2
Suaeda calceoliformis	1		

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

Species	Cover class	Species	Cover class
Bare Ground	5	Distichlis spicata	3
Grindelia squarrosa	0	Hordeum jubatum	1
Iva axillaris	3	Juncus balticus	0
Pascopyrum smithii	0	Puccinellia nuttalliana	2
Suaeda calceoliformis	4		

Ending Station 457 **Community Type:** Schoenoplectus spp. /

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	1	Bare Ground	1
Eleocharis palustris	1	Hordeum jubatum	1
Puccinellia nuttalliana	1	Rumex crispus	0
Schoenoplectus acutus	1	Schoenoplectus maritimus	1
Sonchus arvensis	1	Spartina pectinata	3

Ending Station 585 **Community Type:** Open Water / Schoenoplectus spp.

Species	Cover class	Species	Cover class
Open Water	5	Schoenoplectus acutus	0
Schoenoplectus maritimus	5	Spartina pectinata	0

Ending Station 600 **Community Type:** Schoenoplectus spp. /

Species	Cover class	Species	Cover class
Bare Ground	5	Hordeum jubatum	1
Puccinellia nuttalliana	2	Schoenoplectus acutus	1
Schoenoplectus maritimus	1	Spartina pectinata	3

Ending Station 626 **Community Type:** Puccinellia nuttalliana / Iva axillaris

Species	Cover class	Species	Cover class
Bare Ground	4	Distichlis spicata	3
Grindelia squarrosa	0	Hordeum jubatum	0
Puccinellia nuttalliana	2	Sonchus arvensis	3

Ending Station 647 **Community Type:** Bromus inermis / Pascopyrum smithii

Species	Cover class	Species	Cover class
Agropyron cristatum	1	Bromus inermis	4
Grindelia squarrosa	2	Iva axillaris	2
Medicago sativa	0	Pascopyrum smithii	1
Sonchus arvensis	0	Tragopogon dubius	0

Transect Notes:

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

Interval Data:

Ending Station 11 **Community Type:** Teucrium canadense / Chenopodium album

Species	Cover class	Species	Cover class
Chenopodium album	1	Iva axillaris	2
Rosa woodsii	0	Spartina pectinata	2
Symphoricarpos albus	2	Symphyotrichum sp.	0
Teucrium canadense	1		

Ending Station 336 **Community Type:** Puccinellia nuttalliana / Iva axillaris

Species	Cover class	Species	Cover class
Bare Ground	1	Chenopodium album	2
Hordeum jubatum	3	Iva axillaris	1
Puccinellia nuttalliana	5	Suaeda calceoliformis	1

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

Species	Cover class	Species	Cover class
Achillea millefolium	0	Agropyron cristatum	2
Bromus inermis	5	Grindelia squarrosa	0
Iva axillaris	1	Symphoricarpos albus	0
Vicia americana	0		

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 seedlings (less than 1-inch diameter) were observed within the site, including cottonwoods, aspen, and willows.

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
Barn Swallow	2		UP, WM,
Franklin's Gull	3		AB, AB, MF, OW,
Killdeer	4		MF, OW,
Mallard	6		MA, OW, UP,
Red-winged Blackbird	15		MA, UP,
Western Meadowlark	3		UP, WM,
Wilson's Snipe	3		MA, OW, UP,
Yellow-headed Blackbird	1		MA, UP,

Bird Comments

BEHAVIOR CODES

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

HABITAT CODES

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

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

Mammals and Herptiles

Species	# Observed	Tracks	Scat	Burrows	Comments
Deer sp.		Yes	No	No	
Raccoon		Yes	No	No	
White-tailed Deer	1	No	No	No	fawn

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
020086-102008	48.163785	-104.61745		SP1-w
020088-102008	48.163729	-104.617384		SP2-u
1020090	48.163334	-104.618011	310	T-2, end
1020091	48.164039	-104.619043	130	T-2, start
1020092	48.167246	-104.618505		Well 2
1136-1137	48.164421	-104.616943		PP-5 Pano
1138,1140,1141	48.162872	-104.620232		PP-6 Pano
1143,1144,1145	48.164448	-104.618835		PP-7 Pano
8403	48.165768	-104.619057	0	T-1, end
8407	48.164405	-104.618807		Well 1
8408	48.167465	-104.618301	220	T-1, start
8413, 8414, 841	48.166432	-104.618452		SP3-u
8417, 8419	48.166514	-104.618436		SP4-w
8421-8423	48.165836	-104.617004		PP-1
8424-8427	48.167038	-104.617645		PP-2
8430-8433	48.16716	-104.619606		PP-3
8435-8437	48.166012	-104.619835		PP-4

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: 6/30/2015

Applicant/Owner: MDT State: MT Sampling Point: SP1-w

Investigator(s): R Quire, R McEldowney Section, Township, Range: 21 28N 55E

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

Subregion (LRR): LRR F Lat: 48.163785 Long: -104.61745 Datum: WGS84

Soil Map Unit Name: Lohler silty clay NWI classification: Not Mapped

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

Remarks: Data point in excavated basin south of highway, on southeastern edge of wetland cell.

VEGETATION - Use scientific names of plant

Tree Stratum Plot size (30 Foot Radius)

	Absolute % Cover:	Domiant Species?	Indicator Status

Sapling/Shrub Stratum Plot size (15 Foot Radius)

Herbaceous Stratum Plot size (5 Foot Radius)

Hordeum jubatum	35	☑	FACW
Iva axillaris	2	☐	FAC
Puccinellia nuttalliana	50	☑	OBL

Woody Vine Stratum Plot size (30 Foot Radius)

Percent Bare Ground 13

Dominance Test worksheet

Number of Dominant Species that are OBL, FACW or FAC: 2 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet

Total % Cover of:			Multiply by:
OBL species	50	X 1	50
FACW species	35	X 2	70
FAC species	2	X 3	6
FACU species	0	X 4	0
UPL species	0	X 5	0
Column Totals	87 (A)		126 (B)

Prevalence Index = B/A = 1.45

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is <= 3.0
- ☐ 4 - Morphological Adaptations (Provide supporting data in remarks or on separate sheet.
- ☐ 5 - Wetland Non-Vascular Plants
- ☐ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric sil and wetland hydrology must be present, unless disturbed or problematic for #3, 4, 5.

Hydrophytic Vegetation Present? Yes ☑ NO ☐

Remarks:

SOIL

Sampling Point: SP1-w

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	2.5Y 3/1	95	5YR 4/6	5	C	M	Silty Clay	
8-16	2.5Y 4/3	70		30	C	M	Silty Clay	**Redox color: (Gley 1) 3/N**

[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: Soil moist to surface.

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: 6/30/2015

Applicant/Owner: MDT State: MT Sampling Point: SP2-u

Investigator(s): R Quire, R McEldowney Section, Township, Range: 21 28N 55E

Landform (hillslope, terrace, etc.): Shoulder slope Local relief (concave, convex, none): flat Slope (%): 10

Subregion (LRR): LRR F Lat: 48.163729 Long: -104.617384 Datum: WGS84

Soil Map Unit Name: Lohler silty clay NWI classification: Not Mapped

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

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

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

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

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

Remarks: Data point in upland, vegetation community 14.

VEGETATION - Use scientific names of plant

Tree Stratum Plot size (30 Foot Radius)

	Absolute % Cover:	Domiant Species?	Indicator Status

Sapling/Shrub Stratum Plot size (15 Foot Radius)

Herbaceous Stratum Plot size (5 Foot Radius)

Agropyron cristatum	10	☐	NL
Bromus inermis	45	☑	UPL
Grindelia squarrosa	5	☐	UPL
Hordeum jubatum	2	☐	FACW
Iva axillaris	5	☐	FAC
Lactuca tatarica	1	☐	UPL
Pascopyrum smithii	25	☑	FACU
Symphoricarpos albus	1	☐	UPL

Woody Vine Stratum Plot size (30 Foot Radius)

Percent Bare Ground 7

Dominance Test worksheet

Number of Dominant Species that are OBL, FACW or FAC: 0 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

Prevalence Index worksheet

Total % Cover of:			Multiply by:
OBL species	0	X 1	0
FACW species	2	X 2	4
FAC species	5	X 3	15
FACU species	25	X 4	100
UPL species	62	X 5	310
Column Totals	94 (A)		429 (B)

Prevalence Index = B/A = 4.56

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is <= 3.0
- ☐ 4 - Morphological Adaptations (Provide supporting data in remarks or on separate sheet.
- ☐ 5 - Wetland Non-Vascular Plants
- ☐ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric sil and wetland hydrology must be present, unless disturbed or problematic for #3, 4, 5.

Hydrophytic Vegetation Present? Yes ☐ NO ☑

Remarks:

SOIL

Sampling Point: SP2-u

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
0-16	2.5Y 3/1	100					Silty Clay Loam	

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

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

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

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☑

Remarks: No hydric soil indicators observed during field survey.

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 evidence of hydrologic indicators observed during field survey.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Muddy City/County: Roosevelt Sampling Date: 6/30/2015

Applicant/Owner: MDT State: MT Sampling Point: SP3-u

Investigator(s): R Quire, R McEldowney Section, Township, Range: 21 28N 55E

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

Subregion (LRR): LRR F Lat: 48.166432 Long: -104.618452 Datum: WGS84

Soil Map Unit Name: Lohler silty clay NWI classification: Not Mapped

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

Remarks: Data point located in upland area between wetland depressions.

VEGETATION - Use scientific names of plant

Tree Stratum Plot size (30 Foot Radius)

	Absolute % Cover:	Domiant Species?	Indicator Status

Sapling/Shrub Stratum Plot size (15 Foot Radius)

Herbaceous Stratum Plot size (5 Foot Radius)

Bromus inermis	5	☐	UPL
Distichlis spicata	30	☑	FACW
Grindelia squarrosa	10	☐	UPL
Pascopyrum smithii	15	☑	FACU

Woody Vine Stratum Plot size (30 Foot Radius)

Percent Bare Ground 40

Dominance Test worksheet

Number of Dominant Species that are OBL, FACW or FAC: 1 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0 % (A/B)

Prevalence Index worksheet

Total % Cover of:			Multiply by:
OBL species	0	X 1	0
FACW species	30	X 2	60
FAC species	0	X 3	0
FACU species	15	X 4	60
UPL species	15	X 5	75
Column Totals	60 (A)		195 (B)

Prevalence Index = B/A = 3.25

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is <= 3.0
- ☐ 4 - Morphological Adaptations (Provide supporting data in remarks or on separate sheet.
- ☐ 5 - Wetland Non-Vascular Plants
- ☐ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric sil and wetland hydrology must be present, unless disturbed or problematic for #3, 4, 5.

Hydrophytic Vegetation Present? Yes ☐ NO ☑

Remarks:

SOIL

Sampling Point: SP3-u

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
0-16	10YR 4/2	100					Silty Clay	**Soil was moist.**

[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: No hydric soil indicators observed during field survey.

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 evidence of wetland hydrology observed during field survey.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Big Muddy City/County: Roosevelt Sampling Date: 6/30/2015

Applicant/Owner: MDT State: MT Sampling Point: SP4-w

Investigator(s): R Quire, R McEldowney Section, Township, Range: 21 28N 55E

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

Subregion (LRR): LRR F Lat: 48.166514 Long: -104.618436 Datum: WGS84

Soil Map Unit Name: Lohler silty clay NWI classification: Not Mapped

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

Remarks: Data point located on concave, depressional salt flat.

VEGETATION - Use scientific names of plant

Tree Stratum Plot size (30 Foot Radius)

	Absolute % Cover:	Domiant Species?	Indicator Status

Sapling/Shrub Stratum Plot size (15 Foot Radius)

Herbaceous Stratum Plot size (5 Foot Radius)

Chenopodium sp.	5	☐	NL
Distichlis spicata	20	☑	FACW
Puccinellia nuttalliana	25	☑	OBL
Suaeda calceoliformis	5	☐	FACW

Woody Vine Stratum Plot size (30 Foot Radius)

Percent Bare Ground 45

Dominance Test worksheet

Number of Dominant Species that are OBL, FACW or FAC: 2 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet

Total % Cover of:			Multiply by:
OBL species	25	X 1	25
FACW species	25	X 2	50
FAC species	0	X 3	0
FACU species	0	X 4	0
UPL species	5	X 5	25
Column Totals	55 (A)		100 (B)

Prevalence Index = B/A = 1.82

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is <= 3.0
- ☐ 4 - Morphological Adaptations (Provide supporting data in remarks or on separate sheet.
- ☐ 5 - Wetland Non-Vascular Plants
- ☐ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric sil and wetland hydrology must be present, unless disturbed or problematic for #3, 4, 5.

Hydrophytic Vegetation Present? Yes ☑ NO ☐

Remarks:

SOIL

Sampling Point: SP4-w

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
0-15	10YR 4/2	99	7.5YR 4/6	1	C	M	Silty Clay	**Soil is more moist than SP3-u.**

[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: Soil meets NTCHS technical standard for hydric soil. Soil was saturated to surface and had been inundated earlier in the spring. The wetland likely needs more time to develop more prominent hydric soil indicators. If soil had 2% redox concentrations rather than the 1% observed during survey, it would have meet the requirements for Depleted Matrix indicator.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

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

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks:

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 6/30/2015 **4. Evaluators** R McEldowney, R Quire **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 7.39

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 7.39

☐ **Mitigation Wetlands: pre-construction**

How assessed: Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Depressional	Unconsolidated Bottom	Excavated	Permanent/Perennial	40
Depressional	Emergent Wetland	Excavated	Seasonal/Intermittent	59
Riverine	Emergent Wetland		Permanent/Perennial	1

11. Estimated Relative Abundance Abundant

12. General Condition of AA

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

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

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

Constructed wetland cells continue to exhibit vegetation development. Grazing eliminated within project boundaries. Adjacent land used for agriculture (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, Convolvulus arvensis

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.

SECTION PERTAINING to FUNCTIONS VALUES ASSESSMENT

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

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

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

Secondary habitat (list Species) ◉ D ◉ S

Incidental habitat (list species) ◉ D ◉ S

No usable habitat ☑ S

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

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

Sources for documented use USFWS database for Roosevelt County

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

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

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

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

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

No usable habitat ☐ S

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

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

Sources for documented use Suspected species identified by MTNHP for Roosevelt County

14C. General Wildlife Habitat Rating:

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

Moderate

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

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

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

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

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

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

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

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

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

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

Comments Several bird species and animal tracks 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**

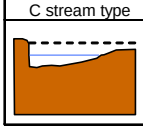
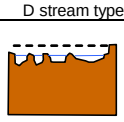
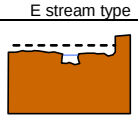
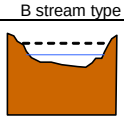
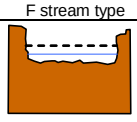
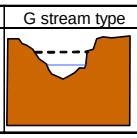
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

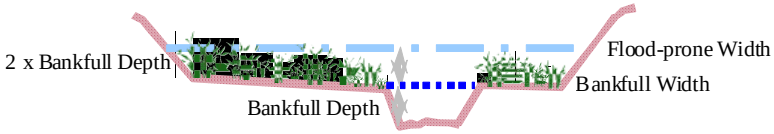
iii. Final Score and Rating: 0 NA **Comments:** Closed wetland cells with no direct surface water inlet or outlet.

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 within MDT conservation 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 consists 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** .8H

Comments: Vegetated wetland area ~5.93-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	3.695	☐
C. General Wildlife Habitat	H	.9	1	6.651	☑
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	M	.5	1	3.695	☐
F. Short and Long Term Surface Water Storage	H	1	1	7.39	☑
G. Sediment/Nutrient/Toxicant Removal	H	1	1	7.39	☐
H. Sediment/Shoreline Stabilization	H	1	1	7.39	☑
I. Production Export/Food Chain Support	H	.8	1	5.912	☐
J. Groundwater Discharge/Recharge	H	1	1	7.39	☑
K. Uniqueness	L	.3	1	2.217	☐
L. Recreation/Education Potential (bonus points)	H	.2	NA	1.478	☐
Totals:		7.2	10	53.208	
Percent of Possible Score			**72** %		

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

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

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

☐

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

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

I	II	III	IV

MDT Montana Wetland Assessment Form (revised March 2008)

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

3. Evaluation Date 6/30/2015 **4. Evaluators** R McEldowney, R Quire **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 10060006 **Watershed/County** Lower Missouri River Watershed, Roosevelt Co., MT

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		Seasonal/Intermittent	100

11. Estimated Relative Abundance Common

12. General Condition of AA

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

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

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

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, Convolvulus arvensis

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**

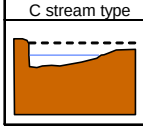
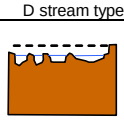
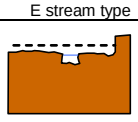
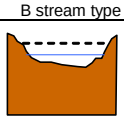
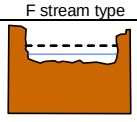
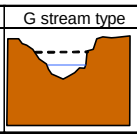
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

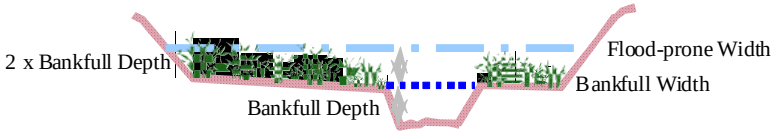
iii. Final Score and Rating: 0 NA **Comments:**

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 not physically measured, but the channel cross-section most resembles "Moderately entrenched/B stream type", which has an entrenchment ratio ranging from 1.41 to 2.2. AA receives

---

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 0.73 acres, without potential to support greater than 1 ft 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 Creek, culvert under highway considered restricted 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 species provide stability.

14I. Production Export/Food Chain Support:

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

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

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

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

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: Surface water not present perennially, but saturation is present year round 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	M	.7	1	0.511	☑
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	M	.5	1	0.365	☐
F. Short and Long Term Surface Water Storage	L	.3	1	0.219	☑
G. Sediment/Nutrient/Toxicant Removal	H	1	1	0.73	☑
H. Sediment/Shoreline Stabilization	H	.9	1	0.657	☐
I. Production Export/Food Chain Support	M	.4	1	0.292	☐
J. Groundwater Discharge/Recharge	M	.7	1	0.511	☑
K. Uniqueness	M	.4	1	0.292	☐
L. Recreation/Education Potential (bonus points)	H	.2	NA	0.146	☐
Totals:		5.6	10	4.088	
Percent of Possible Score			**56** %		

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

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

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

☑

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

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

I	II	III	IV

MDT Montana Wetland Assessment Form (revised March 2008)

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

3. Evaluation Date 6/30/2015 **4. Evaluators** R McEldowney, R Quire **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	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 with continued vegetation development. AA adjacent to Hwy 2.

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

Cirsium arvense, Convolvulus arvensis

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 Greater Sage-Grouse (S2)

No usable habitat ☐ S

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

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

Sources for documented use Suspected species identified by MTNHP for Roosevelt County

14C. General Wildlife Habitat Rating:

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

Moderate

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

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

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

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

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

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

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

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

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

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

Comments Several bird species and signs of wildlife 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**

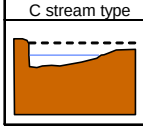
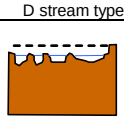
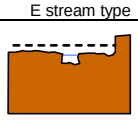
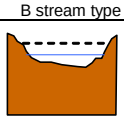
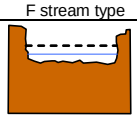
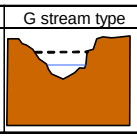
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

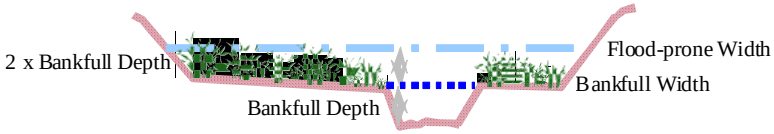
iii. Final Score and Rating: 0 NA **Comments:** Closed wetland cell with no direct surface water inlet or outlet.

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: Unnamed tributary of Big Muddy Creek not physically measured, but the channel cross-section most resembles "Moderately entrenched/B stream type", which has an entrenchment ratio ranging from 1.41 to 2.2. AA is

---

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 >1.5 ft 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 consists of Schoenoplectus, Distichlis, and Puccinellia.

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	.3	1	1.251	☐
L. Recreation/Education Potential (bonus points)	H	.2	NA	0.834	☐
Totals:		6.1	10	25.437	
Percent of Possible Score			**61** %		

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

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

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

☑

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

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

I	II	III	IV

MDT Montana Wetland Assessment Form (revised March 2008)

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

3. Evaluation Date 6/30/2015 **4. Evaluators** R McEldowney, R Quire **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** Lower Missouri River Watershed, Roosevelt Co., MT

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	30
Depressional	Emergent Wetland		Seasonal/Intermittent	70

11. Estimated Relative Abundance Common

12. General Condition of AA

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

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

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

Grazing eliminated within AA. AA not disturbed during construction.

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

Cirsium arvense, Convolvulus arvensis

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 located in the southern parcel.

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

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**

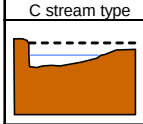
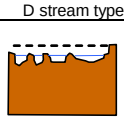
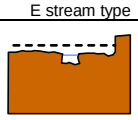
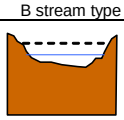
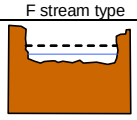
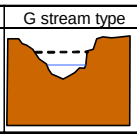
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

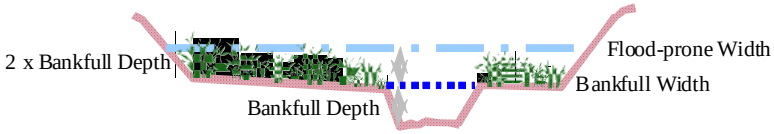
iii. Final Score and Rating: 0 NA **Comments:**

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 not physically measured, but the channel cross-section most resembles "Moderately entrenched/B stream type", which has an entrenchment ratio ranging from 1.41 to 2.2.

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 0.3 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 shoreline 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:

MDT-owned site with known hunting.

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

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 2013



Photo Point 1 – *Photo 1*

Location: SE property corner Northern Parcel

Bearing: North

Taken in 2014



Photo Point 1 – *Photo 1*

Location: SE property corner Northern Parcel

Bearing: North

Taken in 2015



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 2013**



Photo Point 1 – *Photo 2* **Location:** SE property corner Northern Parcel

Bearing: Northwest **Taken in 2014**



Photo Point 1 – *Photo 2* **Location:** SE property corner Northern Parcel

Bearing: Northwest **Taken in 2015**



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 2013**



Photo Point 1 – *Photo 3* **Location:** SE property corner Northern Parcel

Bearing: Southwest **Taken in 2014**



Photo Point 1 – *Photo 3* **Location:** SE property corner Northern Parcel

Bearing: Southwest **Taken in 2015**



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 2013**



Photo Point 2 – *Photo 1* **Location:** NE property corner Northern Parcel

Bearing: North **Taken in 2014**



Photo Point 2 – *Photo 1* **Location:** NE property corner Northern Parcel

Bearing: North **Taken in 2015**



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 2013



Photo Point 2 – *Photo 2*

Location: NE property corner Northern Parcel

Bearing: East

Taken in 2014



Photo Point 2 – *Photo 2*

Location: NE property corner Northern Parcel

Bearing: East

Taken in 2015



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 2013**



Photo Point 2 – *Photo 3* **Location:** NE property corner Northern Parcel

Bearing: South **Taken in 2014**



Photo Point 2 – *Photo 3* **Location:** NE property corner Northern Parcel

Bearing: South **Taken in 2015**



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 2013**



Photo Point 2 – *Photo 4* **Location:** NE property corner Northern Parcel

Bearing: West **Taken in 2014**



Photo Point 2 – *Photo 4* **Location:** NE property corner Northern Parcel

Bearing: West **Taken in 2015**



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 2013**



Photo Point 3 – *Photo 1* **Location:** NW property corner Northern Parcel

Bearing: East **Taken in 2014**



Photo Point 3 – *Photo 1* **Location:** NW property corner Northern Parcel

Bearing: East **Taken in 2015**



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 2013**



Photo Point 3 – *Photo 2* **Location:** NW property corner Northern Parcel

Bearing: South **Taken in 2014**



Photo Point 3 – *Photo 2* **Location:** NW property corner Northern Parcel

Bearing: South **Taken in 2015**



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 2013



Photo Point 3 – *Photo 3*

Location: UT of Big Muddy Northern Parcel

Bearing: West

Taken in 2014



Photo Point 3 – *Photo 3*

Location: UT of Big Muddy Northern Parcel

Bearing: West

Taken in 2015



Photo Point 3 – *Photo 4* **Location:** UT of Big Muddy Northern Parcel

Bearing: North **Taken in 2011**



Photo Point 3 – *Photo 4* **Location:** UT of Big Muddy Northern Parcel

Bearing: North **Taken in 2013**



Photo Point 3 – *Photo 4* **Location:** UT of Big Muddy Northern Parcel

Bearing: North **Taken in 2014**



Photo Point 3 – *Photo 4* **Location:** UT of Big Muddy Northern Parcel

Bearing: North **Taken in 2015**



Photo Point 4 – *Photo 1* **Location:** SW property corner Northern Parcel

Bearing: North **Taken in 2011**



Photo Point 4 – *Photo 1* **Location:** SW property corner Northern Parcel

Bearing: North **Taken in 2013**



Photo Point 4 – *Photo 1* **Location:** SW property corner Northern Parcel

Bearing: North **Taken in 2014**



Photo Point 4 – *Photo 1* **Location:** SW property corner Northern Parcel

Bearing: North **Taken in 2015**



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 2013**



Photo Point 4 – *Photo 2* **Location:** SW property corner Northern Parcel

Bearing: Northeast **Taken in 2014**



Photo Point 4 – *Photo 2* **Location:** SW property corner Northern Parcel

Bearing: Northeast **Taken in 2015**



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 2013**



Photo Point 4 – *Photo 3* **Location:** Existing wetland Northern Parcel

Bearing: Northwest **Taken in 2014**



Photo Point 4 – *Photo 3* **Location:** Existing wetland Northern Parcel

Bearing: Northwest **Taken in 2015**



Photo Point 5 – *Photo 1* **Location:** Veg Comm 5, Southern Parcel **Bearing:** 221 deg **Taken in 2012**



Photo Point 5 – *Photo 1* **Location:** Veg Comm 9, Southern Parcel **Bearing:** 221 deg **Taken in 2013**



Photo Point 5 – *Photo 1* **Location:** Veg Comm 12, Southern Parcel **Bearing:** 221 deg **Taken in 2014**



Photo Point 5 – *Photo 1* **Location:** Veg Comm 12, Southern Parcel **Bearing:** 221 deg **Taken in 2015**

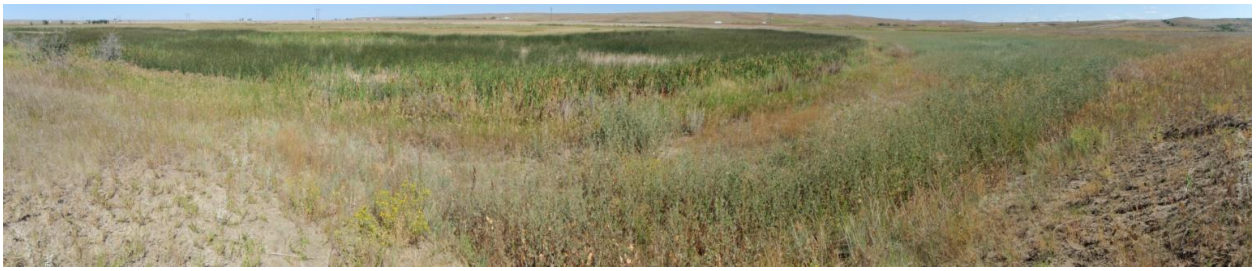


Photo Point 6 – *Photo 1* **Location:** Veg Comm 1, Southern Parcel **Bearing:** 0 deg **Taken in 2012**



Photo Point 6 – *Photo 1* **Location:** Veg Comm 8, Southern Parcel **Bearing:** 0 deg **Taken in 2013**



Photo Point 6 – *Photo 1* **Location:** Veg Comm 14, Southern Parcel **Bearing:** 0 deg **Taken in 2014**



Photo Point 6 – *Photo 1* **Location:** Veg Comm 14, Southern Parcel **Bearing:** 0 deg **Taken in 2015**



Photo Point 7 – *Photo 1* **Location:** Veg Comm 7, Southern Parcel **Bearing:** 180 deg **Taken in 2012**



Photo Point 7 – *Photo 1* **Location:** Veg Comm 10, Southern Parcel **Bearing:** 180 deg **Taken in 2013**



Photo Point 7 – *Photo 1* **Location:** Veg Comm 11, Southern Parcel **Bearing:** 180 deg **Taken in 2014**



Photo Point 7 – *Photo 1* **Location:** Veg Comm 12, Southern Parcel **Bearing:** 180 deg **Taken in 2015**

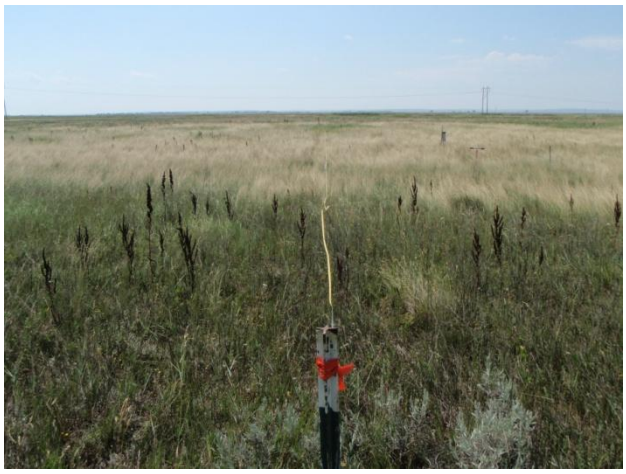


Transect 1 – *Start*

Location: Veg Comm 1
Northern Parcel

Bearing: 220 deg

Taken in 2011



Transect 1 – *Start*

Location: Veg Comm 6
Northern Parcel

Bearing: 220 deg

Taken in 2013



Transect 1 – *Start*

Location: Veg Comm 8
Northern Parcel

Bearing: 220 deg

Taken in 2014



Transect 1 – *Start*

Location: Veg Comm 16
Northern Parcel

Bearing: 220 deg

Taken in 2015

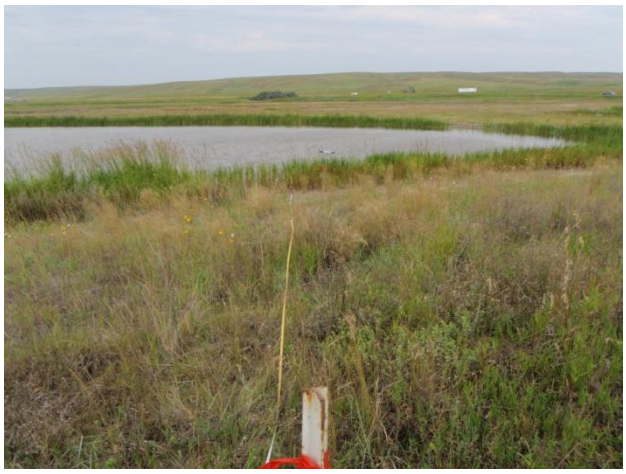


Transect 1 – *Finish*

Location: Veg Comm 1 Northern Parcel

Bearing: 0 deg

Taken in 2011



Transect 1 – *Finish*

Location: Veg Comm 6 Northern Parcel

Bearing: 0 deg

Taken in 2013



Transect 1 – *Finish*

Location: Veg Comm 8 Northern Parcel

Bearing: 0 deg

Taken in 2014

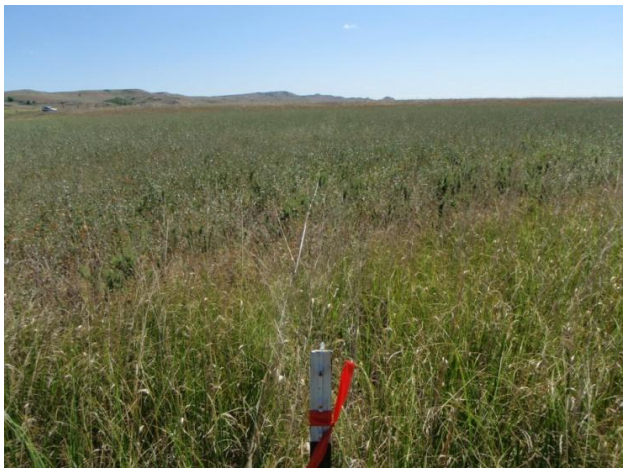


Transect 1 – *Finish*

Location: Veg Comm 16 Northern Parcel

Bearing: 0 deg

Taken in 2015



Transect 2 – *Start*

Location: Veg Comm 5 Southern Parcel

Bearing: 130 deg

Taken in 2012



Transect 2 – *Start*

Location: Veg Comm Southern Parcel

Bearing: 130 deg

Taken in 2013



Transect 2 – *Start*

Location: Veg Comm 13 Southern Parcel

Bearing: 130 deg

Taken in 2014

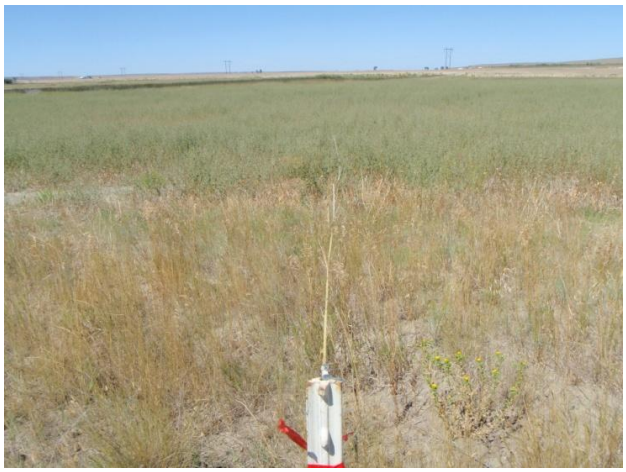


Transect 2 – *Start*

Location: Veg Comm 17 Southern Parcel

Bearing: 130 deg

Taken in 2015



Transect 2 – *Finish*

Location: Veg Comm 1 Southern Parcel

Bearing: 310 deg

Taken in 2012

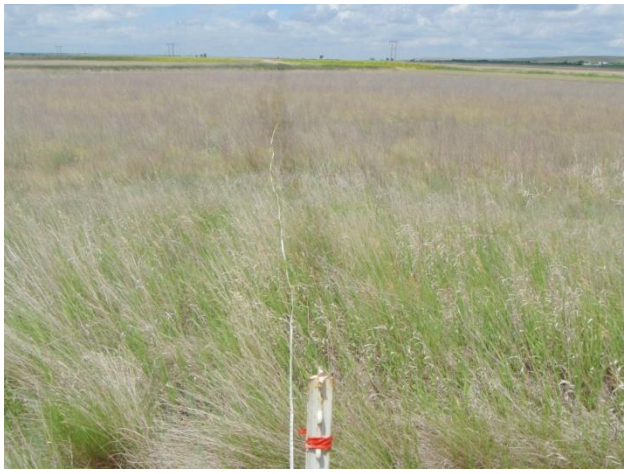


Transect 2 – *Finish*

Location: Veg Comm 8 Southern Parcel

Bearing: 310 deg

Taken in 2013



Transect 2 – *Finish*

Location: Veg Comm 14 Southern Parcel

Bearing: 310 deg

Taken in 2014



Transect 2 – *Finish*

Location: Veg Comm 14 Southern Parcel

Bearing: 310 deg

Taken in 2015



Data Point – *SP1-w* **Location:** Veg Comm 12

Taken in 2015



Data Point – *SP2-u* **Location:** Veg Comm 14

Taken in 2015



Data Point – *SP3-u* **Location:** Veg Comm 16

Taken in 2015



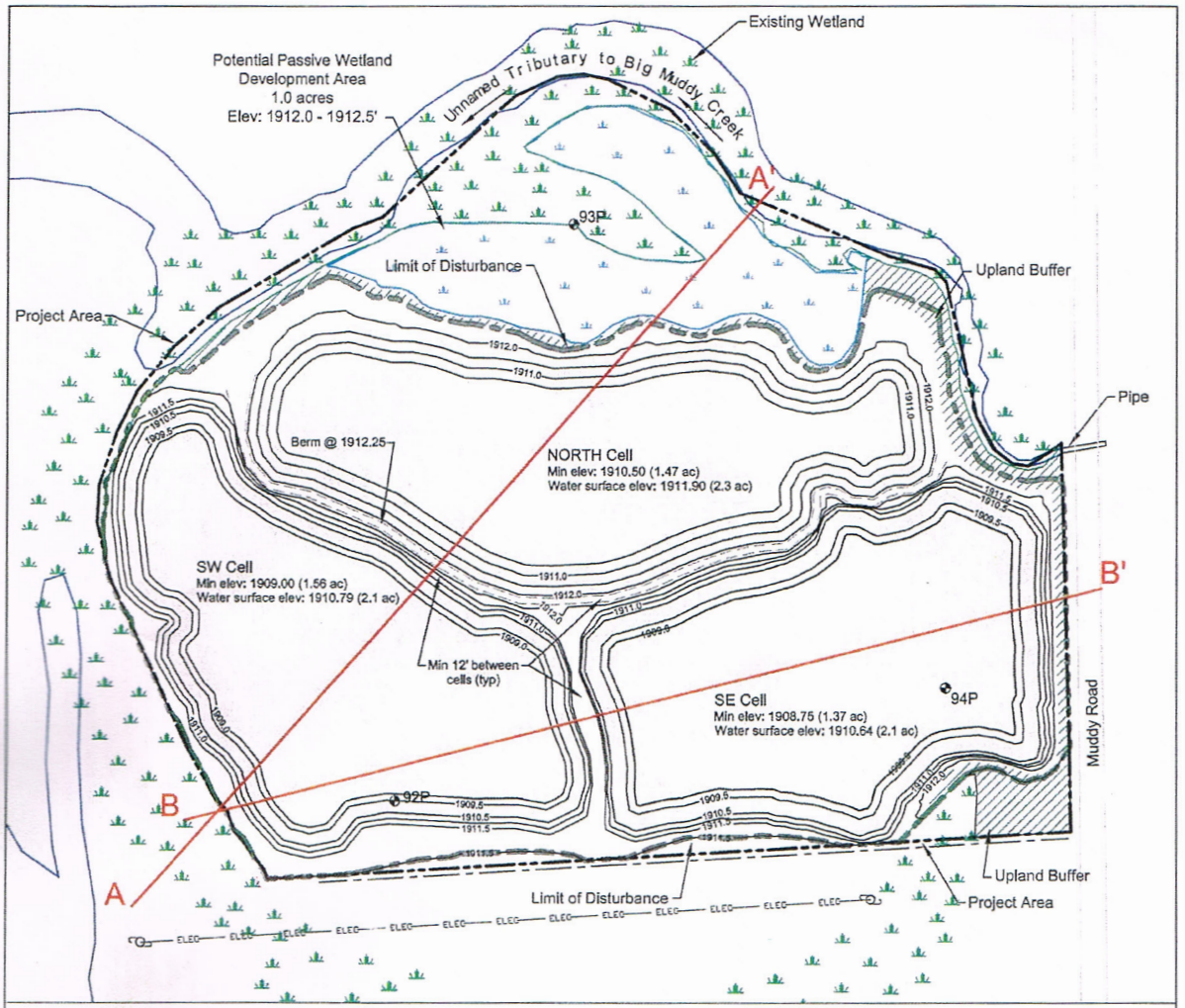
Data Point – *SP4-w* **Location:** Veg Comm 3

Taken in 2015

Appendix D

Project Plan Sheet

MDT Wetland Mitigation Monitoring
Big Muddy Creek
Roosevelt County, Montana



Legend

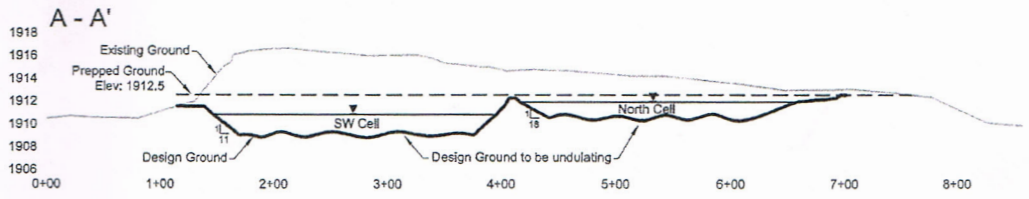
- Approximate Site Border
- Limits of Disturbance
- Existing Wetland
- Potential Passive Wetland
- Upland Buffer
- Extents of Cell Surface Water
- Cross Section Location
- Well Location
- Northerly Extents of Utility Easement

N W E S

100' 50' 0 50' 100'

SCALE: 1" = 100'

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



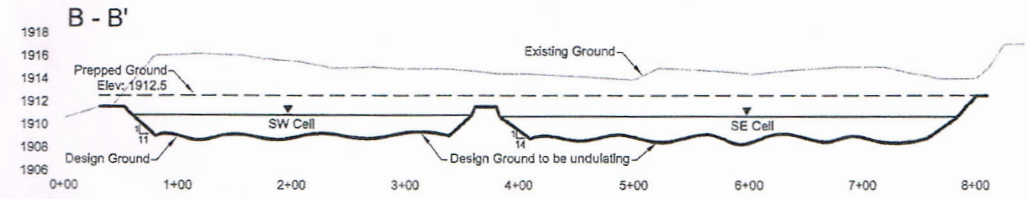


FIGURE 4 REV - Dec2002010	PBSJ 1120 Cedar Missoula, MT 59802	PROJ NO: 100015542	DRAWN: JR	PROJECT NAME: BIG MUDDY CREEK WETLAND MITIGATION SITE
		LOCATION: ROOSEVELT CO., MT	PROJ MGR: J. BERGLUND	
		SCALE: NOTED	CHECKED: LL APPVD: DM	DRAWING TITLE: FIGURE 4. PRELIMINARY DESIGN - PLAN & PROFILE
		FILE NAME: design_prelim_R02_1.dwg		