
MONTANA DEPARTMENT OF TRANSPORTATION

WETLAND MITIGATION MONITORING REPORT

BIG MUDDY CREEK MITIGATION SITE

ROOSEVELT COUNTY, MONTANA

PROJECT CONSTRUCTED: 2011/2012

MONITORING REPORT #7: DECEMBER 2017



Prepared for:



2701 Prospect Avenue
Helena, Montana 59620

Prepared by:



820 North Montana Ave, Suite A
Helena, Montana 59601

MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2017

BIG MUDDY CREEK MITIGATION SITE ROOSEVELT COUNTY, MONTANA

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

MDT Project Number NH-1- (46) 626
Brockton – East
Control Number 4058

USACE: NWO-2009-01515-MTB

prepared for

Montana Department of Transportation
2701 Prospect Avenue
Helena, Montana 59620

prepared by

RESPEC
820 North Montana Avenue, Suite A
Helena, Montana 59601

December 2017

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1.0 INTRODUCTION

The north parcel of the Big Muddy Creek Wetland Mitigation Site was completed in spring 2011 and the south parcel was completed in 2012. This report presents the results of the seventh year of post-construction monitoring at the north parcel and the sixth year at the south parcel. Because the site has met all performance and acreage goals, 2017 is the final year of monitoring at this site. This Montana Department of Transportation (MDT) wetland mitigation project is located 4 miles west of Culbertson, on US Highway 2, in Section 21, Township 28 North, Range 55 East, Roosevelt County, Montana, as illustrated in Figure 1-1. The overall size of the 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 US Highway 2. An additional 7.25 acres located south of US 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 A-2 and A-3 in Appendix A show the 2017 monitoring activity locations and mapped site features, respectively. The MDT Mitigation Site Monitoring form [Berglund and McEldowney, 2008], US Army Corps of Engineers (USACE) Wetland Determination Data forms for the Great Plains (GP) Region [USACE, 2010], and the 2008 MDT Montana Wetland Assessment Method (MWAM) forms [Berglund and McEldowney, 2008] are included in Appendix B. Project site photographs are included in Appendix C, and the project plan sheets are provided in Appendix D.

The site is situated within Watershed #12 – the Lower Missouri River Basin. MDT completed an initial feasibility study in August 2009. MDT staff completed a baseline delineation and MWAM in June 2010.

Approximately 0.73 acre of wetlands was 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, as well as a narrow emergent wet meadow that extended from the marsh into upland habitat.

The original mitigation goals were to create and preserve wetland habitat functions associated with riverine and emergent wetlands on the Big Muddy Creek tributary floodplain. The project objectives for the north parcel include the following:

- 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 acre 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.

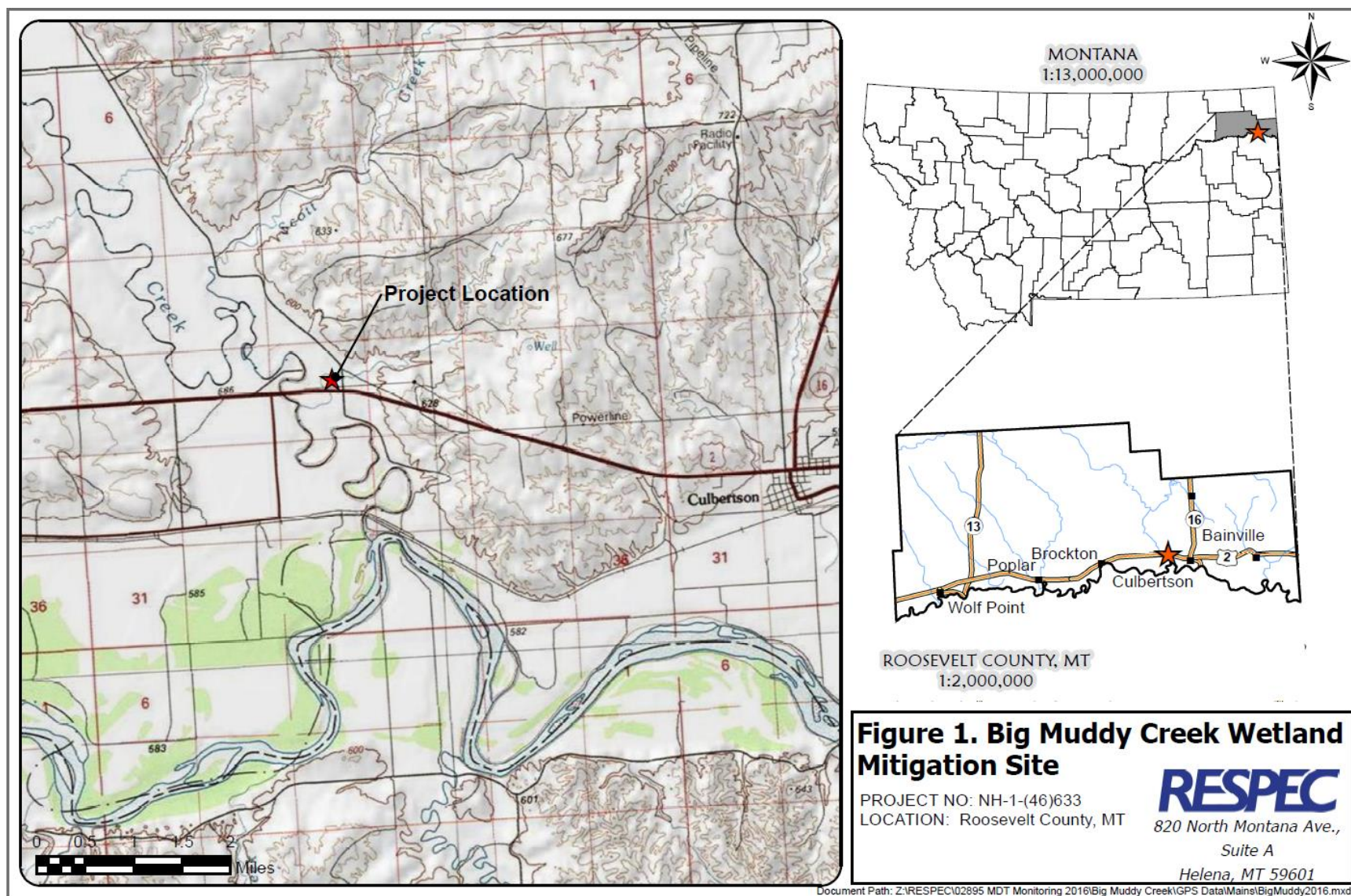


Figure 1-1. Project Location of the Big Muddy Creek Site.

The original mitigation plan proposed creating 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 that ranged from 0.5 to 2 feet. Additional hydrology was to be provided by direct precipitation and snowmelt. Up to 1.76 additional acres of emergent wetland were expected to form in the excavated areas between the three cells. The excavation was expected to facilitate saturation of the root zone via capillary action during the spring and early summer of most years. The potential passive development of approximately 1.03 acres of emergent wet meadow that is 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 Highway 2. This revised mitigation area was incorporated into the original mitigation plan to include the unavoidable wetland impacts associated with the MDT Brockton – East project. This revision included constructing a 5.47-acre wetland depression within the south parcel in 2011 along the floodplain of an unnamed tributary to Big Muddy Creek in an area that was delineated as upland in April 2010. According to an MDT letter to Mr. Todd Tillinger of the USACE dated June 14, 2010 [Tillinger, 2010], this revision was a clerical and mathematical revision based on MDT's 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 preexisting wetland was located in the south parcel monitoring area and was included in the preservation credit category in 2012.

The performance standards for each mitigation feature are included in Section 3.9 of this report. The project credit ratios that were approved by the USACE and presented in the *Big Muddy Creek Wetland Mitigation Plan* [Atkins and Post, Buckley, Schuh, & Jernigan, 2011] are also shown in Section 3.9. 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.

2.0 METHODS

The 2017 monitoring event was completed on July 12, 2017. Information for the Wetland Mitigation Site Monitoring form and Wetland Determination Data forms was recorded in the field during the site investigation (Appendix B). Monitoring activity sites were located with a global positioning system (GPS) and are illustrated on Figure A-2 (Appendix A). Data-collection activities included a wetland delineation, vegetation community mapping, vegetation transect monitoring, soil and hydrology data collection, bird- and wildlife-use documentation, photographic documentation, functional assessment, and a nonengineering 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 in situ during the site visit. The data were recorded on the Wetland Determination Data forms (Appendix B). Hydrologic assessments allow mitigation goals that address inundation and saturation requirements to be evaluated.

Technical criteria for wetland hydrology guidelines have been established as “permanent or periodic inundation, or soil saturation within 12 inches of the ground surface for a significant period (12.5 percent of the growing season) during the growing season” [USACE, 2010]. Systems with continuous inundation or saturation for greater than 12.5 percent of the growing season are considered jurisdictional wetlands. The growing season is defined for purposes of this report as the number of days when a 50 percent probability exists that the minimum daily temperature is greater than or equal to 28.5 degrees Fahrenheit [USACE, 2010]. The growing season that was recorded for the predominant soil map units (Havrelon loam and Lohler silty clay) averages 113 days [US Department of Agriculture, 2011]. Areas that are 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 that were 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 forms (Appendix B). A pair of groundwater monitoring wells are located within the monitoring area, one each on the north and south parcels (Figure A-2, Appendix A). These wells have not been monitored regularly by MDT and were not monitored in 2017.

2.2 VEGETATION

The boundaries of general dominant-species-based vegetation communities were determined in the field during the active growing season and subsequently delineated on the 2017 aerial photographs. The percent cover of dominant species within a community type was estimated and recorded using the following values: 0 (< 1 percent), 1 (1–5 percent), 2 (6–10 percent), 3 (11–20 percent), 4 (21–50 percent), and 5 (> 50 percent) (Appendix B). Community types were named based on the predominant vegetation species that characterized each mapped polygon (Figure A-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 A-2, Appendix A). Vegetation composition was assessed and recorded along two approximately 10-foot-wide belt transects (T-1 and T-2) that were 647 feet long and 366 feet long, respectively (Figure A-2, Appendix A). The transect endpoints were recorded with a resource-grade GPS unit.

Spatial changes in the dominant vegetation communities were recorded along the stationed transect. The percent aerial cover of each vegetation species within the belt transect was estimated using the same values and cover ranges that were used for the vegetation community polygon data (Appendix B). Photographs were taken at the transect endpoints during the monitoring event (Appendix C).

The *Montana Noxious Weed List* (February 2017), prepared by the Montana Department of Agriculture [2015], was used to categorize weeds identified within the site. The location of noxious weeds was noted in the field and mapped on the aerial photograph with noxious weed species color-coded (Figure A-3, Appendix A). Cover classes are represented by a T, L, M, or H, which represent less than 1 percent, 1–5 percent, 6–25 percent, and 26–100 percent, respectively. Before the 2017 field season, monitoring crews attended a 1-day training hosted by MDT to ensure that field staff are adequately trained in judging total percent cover of noxious weeds both at the individual infestation level and

across entire sites. The total cover by noxious weeds overall across the site was estimated based on the noxious weed cover classes and project acreage.

2.3 SOIL

Soil information was obtained from the *Web Soil Survey for Roosevelt County, Montana* [US Department of Agriculture, 2011] and in situ soil descriptions. Soil cores were excavated by using a Montana sharpshooter shovel and evaluated according to procedures outlined in the 1987 *Corps of Engineers Wetland Delineation Manual* (1987 Wetland Manual) [Environmental Laboratory, 1987] and the 2010 *Regional Supplement to the Corps of Engineers Manual: Great Plains Region* (2010 GP Regional Supplement) [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 according to criteria established in the 1987 Wetland Manual and the 2010 GP Regional Supplement. The technical criteria for hydrophytic vegetation, hydric soil, and wetland hydrology that were described in the 2010 *Regional Supplement to the Corps of Engineers Manual: Great Plains Region* (2010 GP Regional Supplement) [USACE, 2010] must be satisfied to delineate a representative area as jurisdictional. The name and indicator status of plant species was derived from the 2016 National Wetland Plant List (NWPL) [Lichvar et al., 2016]. A routine level-2 on-site determination method [Environmental Laboratory, 1987] was used to delineate jurisdictional areas within the project boundaries. The information was recorded onto Wetland Determination Data forms (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 this 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, or special aquatic site (i.e., mudflat). The wetland boundary was surveyed and identified on the 2017 aerial photographs. Wetland areas were calculated using GIS methods.

2.5 WILDLIFE

Observations and other positive indicators of use by mammal, reptile, amphibian, and bird species were recorded on the Wetland Mitigation Site Monitoring forms during each of the site visits. 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 2017 was compiled for this report.

2.6 FUNCTIONAL ASSESSMENT

The MDT MWAM [Berglund and McEldowney, 2008] was used to evaluate functions and values on the sites. This method provides an objective means of assigning an overall rating to wetlands and provides regulators with 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. MWAM forms were completed for four assessment areas (AAs), the created wetlands (north/south) and the existing wetlands (Appendix B).

2.7 PHOTOGRAPHIC DOCUMENTATION

Monitoring at photo points provided supplemental information that documented wetland, upland, and transect conditions; site trends; and current land uses that surround the site. Photographs were taken at established photo points throughout the site during the site visit (Appendix C). Photo-point locations were recorded with a resource-grade GPS unit (Figure A-2, Appendix A).

2.8 GLOBAL POSITIONING SYSTEM DATA

Site features and survey points were collected using a resource-grade (± 1 meter) Trimble R1 GNSS GPS receiver and companion Android tablet during the 2017 monitoring season. The collected data were then transferred to a personal computer, imported into GIS, and projected in Montana State Plane Single Zone NAD 83 meters. Site features and survey points that were located with GPS included wetland boundaries, fence boundaries, photo points, transect endpoints, noxious weed infestations, and wetland data points.

2.9 MAINTENANCE NEEDS

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

3.0 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 August 2017 [Western Regional Climate Center, 2017]. The annual precipitation recorded in the years 2010, 2011, 2012, 2013, 2014, 2015, and 2016 was 20.53, 17.43, 12.44, 19.82, 12.51, 13.18, and 17.75 inches, respectively. The historic precipitation average from January to August 31 was 10.63 inches. Precipitation in recent years for the same period was 16.77 (2010), 15.39 (2011), 8.98 (2012), 11.25 (2013), 10.73 (2014), 10.46 (2015), 11.28 inches (2016), and 5.13 (2017). These data suggest that the region received above-average precipitation in 2010 and 2011, below-average precipitation in 2012 and 2017, and near-average precipitation from 2013 through 2016. Precipitation at this location in 2017 through August (5.13 inches) was 5.5 inches below the long-term average of 10.63 inches.

Precipitation and infrequent flooding of the unnamed tributary of Big Muddy Creek drive hydrology at the Big Muddy site.

Less than 1 percent of the entire site was inundated during the 2016 and 2017 field surveys, which is a significant reduction from previous monitoring years (15 percent in 2015). The excavated cells in the north parcel had no standing water during the 2017 monitoring for the second time since monitoring began in 2010. 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. Evidence of this happening in 2017 was lacking from both sites during monitoring. The constructed wetlands and adjacent stream are hydrologically connected via groundwater. Nearby, Big Muddy Creek appeared to be running at well-below-average levels during the July site visit, which is likely a result of well-below-average precipitation in the region between December and July in the watershed. In coordination with the Montana Governor's Drought and Water Supply Advisory Committee, the Montana State Library publishes monthly maps of moisture by county. The July 2017 map shows Roosevelt County to be Extremely Dry. Additionally, the governor of Montana issued Executive Order 5-2017 on June 23, 2017, declaring a drought emergency to exist in northeast Montana. Later, under Executive Order No. 6-2017, the governor declared a drought disaster in Roosevelt County and 13 other counties in NE Montana [DNRC, 2017].

Four data points (DP-1W, DP-1U, DP-2U, and DP-2W) were sampled to determine the wetland and upland boundaries. DP-1W and DP-2W are located in areas that met the wetland criteria. DP-1W is located in the excavated basin south of the highway, and DP-2W is located in a concave, depressional salt flat in the north parcel. Evidence of positive wetland hydrology at DP-1W included a salt crust, surface soil cracks, geomorphic position, and a positive FAC-neutral test. Wetland hydrology indicators at DP-2W included saturation to near the 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 DP-1U or DP-2U, which are located upslope of DP-1W and DP-2W, respectively.

3.2 VEGETATION

Monitoring year 2017 marked the seventh year of post-construction monitoring at the north parcel and the sixth year at the south parcel of the Big Muddy Creek site. A total of 75 plant species were observed site wide from 2011 through 2017, as provided in Table 3-1. Vegetation plant communities were mapped and named by plant composition and dominance. The nine communities that were identified in 2017 and complete lists of the associated species are included on the Wetland Mitigation Site Monitoring form (Appendix B) and the mapped communities shown on Figure A-3 (Appendix A).

Table 3-1. Vegetation Species Observed From 2011 Through 2017 at the Big Muddy Site (Page 1 of 2)

Scientific Names	Common Names	GP Indicator Status ^(a)
<i>Achillea millefolium</i>	Common Yarrow	FACU
<i>Agropyron cristatum</i>	Crested Wheatgrass	NL
Algae, green	Algae, green	NL
<i>Alopecurus arundinaceus</i>	Creeping Meadow-Foxtail	FACW
<i>Apocynum cannabinum</i>	Indian Hemp	FAC
Aquatic macrophytes	Aquatic macrophytes	NL
<i>Artemisia cana</i>	Coaltown Sagebrush	FACU
<i>Artemisia frigida</i>	Fringed Sage	NL
<i>Artemisia tridentata</i>	Big Sagebrush	NL
<i>Aster</i> sp.	Aster	NL
<i>Astragalus</i> sp.	Milkvetch	NL
<i>Atriplex suckleyi</i>	Suckley's Saltbush	FAC
<i>Bassia scoparia</i>	Mexican-Fireweed	FACU
<i>Bouteloua dactyloides</i>	Buffalo Grass	FACU
<i>Bouteloua gracilis</i>	Blue Gramma	NL
<i>Bromus inermis</i>	Smooth Brome	UPL
<i>Carex aquatilis</i>	Leafy Tussock Sedge	OBL
<i>Chenopodium album</i>	Lamb's-Quarters	FACU
<i>Chenopodium</i> sp.	Goosefoot	NL
<i>Cirsium arvense</i>	Canadian Thistle	FACU
<i>Convolvulus arvensis</i>	Field Bindweed	NL
<i>Distichlis spicata</i>	Coastal Salt Grass	FACW
<i>Eleocharis palustris</i>	Common Spike-Rush	OBL
<i>Elymus lanceolatus</i>	Streamside Wild Rye	FACU
<i>Elymus repens</i>	Creeping Wild Rye	FACU
<i>Elymus trachycaulus</i>	Slender Wild Rye	FACU
<i>Equisetum arvense</i>	Field Horsetail	FAC
<i>Fraxinus pennsylvanica</i>	Green Ash	FAC
<i>Glycyrrhiza lepidota</i>	American Licorice	FACU
<i>Grindelia squarrosa</i>	Curly-Cup Gumweed	UPL
<i>Helianthus annuus</i>	Common Sunflower	FACU
<i>Hordeum jubatum</i>	Fox-Tail Barley	FACW
<i>Iva axillaris</i>	Deer-Root	FAC
<i>Juncus balticus</i>	Baltic Rush	FACW
<i>Lactuca serriola</i>	Prickly Lettuce	FAC
<i>Lactuca tatarica</i>	Russian Blue Lettuce	UPL
<i>Lemna minor</i>	Common Duckweed	OBL
<i>Lepidium densiflorum</i>	Miner's Pepperwort	FAC
<i>Lepidium perfoliatum</i>	Clasping Pepperwort	FAC
<i>Linum lewisii</i>	Prairie Flax	NL
<i>Lupinus argenteus</i>	Silvery Lupine	NL
<i>Lycopus americanus</i>	Cut-Leaf Water-Horehound	OBL

Table 3-1. Vegetation Species Observed From 2011 Through 2017 at the Big Muddy Site (Page 2 of 2)

Scientific Names	Common Names	GP Indicator Status ^(a)
<i>Medicago sativa</i>	Alfalfa	UPL
<i>Melilotus officinalis</i>	Yellow Sweet-Clover	FACU
<i>Mentha arvensis</i>	American Wild Mint	FACW
<i>Nassella viridula</i>	Green Needlegrass	NL
<i>Opuntia polyacantha</i>	Plains Pricklypear	NL
<i>Pascopyrum smithii</i>	Western-Wheat Grass	FACU
<i>Poa arida</i>	Prairie Blue Grass	FAC
<i>Poa pratensis</i>	Kentucky Blue Grass	FACU
<i>Polypogon monspeliensis</i>	Annual Rabbit's-Foot Grass	FACW
<i>Populus deltoides</i>	Eastern Cottonwood	FAC
<i>Populus tremuloides</i>	Quaking Aspen	FAC
<i>Potentilla anserina</i>	Silverweed	FACW
<i>Puccinellia nuttalliana</i>	Nuttall's Alkali Grass	OBL
<i>Rosa woodsii</i>	Woods' Rose	FACU
<i>Rumex crispus</i>	Curly Dock	FAC
<i>Salix amygdaloides</i>	Peach-Leaf Willow	FACW
<i>Salix exigua</i>	Narrow-Leaf Willow	FACW
<i>Schoenoplectus acutus</i>	Hard-Stem Club-Rush	OBL
<i>Schoenoplectus americanus</i>	Chairmaker's Club-Rush	OBL
<i>Schoenoplectus maritimus</i>	Saltmarsh Club-Rush	OBL
<i>Schoenoplectus pungens</i>	Three-Square	OBL
<i>Scutellaria galericulata</i>	Hooded Skullcap	OBL
<i>Sonchus arvensis</i>	Field Sow-Thistle	FAC
<i>Spartina pectinata</i>	Freshwater Cord Grass	FACW
<i>Suaeda calceoliformis</i>	Paiuteweed	FACW
<i>Symphoricarpos albus</i>	Common Snowberry	UPL
<i>Symphyotrichum laeve</i>	Smooth Blue American-Aster	FACU
<i>Taraxacum officinale</i>	Common Dandelion	FACU
<i>Teucrium canadense</i>	American Germander	FACW
<i>Thlaspi arvense</i>	Field Pennycress	FACU
<i>Tragopogon dubius</i>	Meadow Goat's-Beard	NL
<i>Typha latifolia</i>	Broad-Leaf Cat-Tail	OBL
<i>Vicia americana</i>	American Purple Vetch	FACU

(a) 2016 NWPL [Lichvar et al., 2016].
New species that were identified in 2017 are **bolded**.

Five vegetation communities were observed on the north parcel in 2017 and included four wetland types and one upland type. Wetland types that have (N) or (S) after the name indicates that the community type is specific to the north or south parcels, respectively.

- Wetland Type 3 – *Schoenoplectus* spp.
- Wetland Type 4 – *Spartina pectinata*/ *Schoenoplectus* spp.

- Wetland Type 9 – *Puccinellia nuttalliana*/*Iva axillaris*
- Wetland Type 15 – Bare Ground/*Schoenoplectus meritimus*
- Upland Type 16 – *Bromus inermis*/*Pascopyrum smithii*.

Type 16 represented the drier areas that border the excavated depressions. All of the cells on the north parcel lacked standing water in 2017, so community Type 18 – Open Water/*Schoenoplectus* spp. was absent from the site. Aerial photos from June 26, 2017 show standing water and inundation in the western and eastern cells and the ground surface was cracked during the July field survey, indicating that surface water and inundation was present earlier in the growing season.

Three vegetation communities were observed on the south parcel in 2017: two wetland types and one upland type.

- Wetland Type 12 – *Puccinellia nuttalliana*/*Iva axillaris*
- Wetland Type 17 – *Teucrium canadense*/*Chenopodium album*
- Upland Type 14 – *Agropyron cristatum*/*Bromus inermis*.

The excavated depression in the south parcel was dry during the July 2017 monitoring event but had surface soil cracks in some areas, indicating that inundation was likely present towards the ground surface earlier in the growing season. Extreme drought conditions prevented this site from retaining water into the summer and fall periods. Communities in the north and south 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 1.81 acres of the north parcel in 2017 and generally included the emergent vegetation found along the margins of the constructed cells. This community type expanded in 2017 because of 2 consecutive years of low water levels in the excavated cells. Dominant species included saltmarsh club-rush (*Schoenoplectus maritimus*), hard-stem club-rush (*Schoenoplectus acutus*), Chairmaker's club-rush (*Schoenoplectus americanus*), coastal saltgrass (*Distichlis spicata*), freshwater cordgrass (*Spartina pectinata*), and broad-leaf cat-tail (*Typha latifolia*). The cover class for bare ground was estimated at 6–10 percent. A natural recruitment area that consisted of Eastern cottonwood (*Populus deltoides*) and willow (*Salix* spp.) seedlings and saplings was identified along the eastern boundary of this community.

Wetland community Type 4 – *Spartina pectinata*/*Schoenoplectus* spp. characterized 0.78 acre of the preexisting wetland community, adjacent to the unnamed tributary to Big Muddy Creek that parallels the western and northern boundaries of the north parcel. The vegetation was dominated by freshwater cordgrass, 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 5 percent cover. Inundated areas were observed in this community during the 2016 site visit, with water levels that ranged from 0 to 1.0 foot deep.

Wetland community Type 9 – *Puccinellia nuttalliana*/*Iva axillaris* (N) was identified on 3.80 acres of wetland located within the excavated areas between the constructed cells on the northern side of US Highway 2. This community replaced wetland Type 5 – *Puccinellia nuttalliana*/*Chenopodium album*

in 2013 because of 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 nuttalliana*), deer-root, western-wheat grass (*Pascopyrum smithii*), and coastal salt grass (*Distichlis spicata*), and 16 other species. This community increased in 2016 into the northernmost excavated cell on the north parcel, which is experiencing a gradual drying out.

Wetland community Type 12 – *Puccinellia nuttalliana*/*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 meritimus* was observed on 1.75 acres in 2017 and is located in the two southern cells of the north parcel. The community was not inundated during the July 2017 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 saltgrass, fox-tail barley, and pauteweed (*Suaeda caelestiformis*). Areas that were identified as Type 15 in 2017 had been identified as Type 18 – Open Water/*Schoenoplectus* spp. in previous years.

Wetland community Type 17 – *Teucrium canadense*/*Chenopodium album* was identified on 0.3 acre along the existing wetland fringe, west of the excavated depression on the south parcel. The vegetation was dominated by American germander (*Teucrium canadense*), lamb's quarters, freshwater cordgrass, Russian blue lettuce (*Lactuca tatarica*), common spike-rush (*Eleocharis palustris*), and 14 other species.

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 2.49 acres, which is an increase of 0.14 acre since 2014 and represents the drier areas that border the excavated depressions in the north parcel. This community replaced upland Type 8 – *Bromus inermis*/*Agropyron cristatum* because species composition and their associated cover classes had shifted during the 2015 survey. The vegetation was dominated by smooth brome, western wheatgrass, 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 northern half of the site and a 366-foot transect (T-2) for the southern half of the site (Figure A-2, Appendix A). T-1 intersected three vegetation communities, including wetland Types 3 – *Schoenoplectus* spp. and 9 – *Puccinellia nuttalliana*/*Iva axillaris*, and upland Type 16 – *Bromus inermis*/*Pascopyrum smithii*. The data recorded on T-1 are summarized in tabular and graphical formats in Table 3-2 and Charts 3-1 and 3-2, respectively. Because of low groundwater levels during the 2017 monitoring event, vegetation community changes occurred along T-1 with community Type 3 increasing from 4 percent in 2016 to

23 percent in 2017. Wetland Type 15 – Bare Ground/*Schoenoplectus maritimus* decreased from 19 percent in 2016 to 0 percent in 2017. The percent of upland community that was identified along the transect decreased from 30.1 percent in 2012 to 19.6 percent in 2017, which reflects the transition from upland to wetland vegetation cover.

Table 3-2. Data Summary for T-1 (North Parcel) From 2012 Through 2017 at the Big Muddy Site

Monitoring Year	2012	2013	2014	2015	2016	2017
Transect Length (feet)	647	647	647	647	647	647
Vegetation Community Transitions Along Transect	11	11	11	11	8	6
Vegetation Communities Along Transect	4	3	4	5	4	3
Hydrophytic Vegetation Communities Along Transect	2	2	2	4	3	2
Total Vegetative Species	24	20	25	29	21	18
Total Hydrophytic Species	11	9	10	12	10	10
Total Upland Species	13	11	15	17	11	8
Estimated % Total Vegetative Cover	50	70	70	70	70	85
Estimated % Unvegetated	50	30	30	30	30	15
% Transect Length Comprising Hydrophytic Vegetation Communities	32.1	49.8	51.6	83.0	80	80
% Transect Length Comprising Upland Vegetation Communities	30.1	18.1	18.1	17.0	20	20
% Transect Length Comprising Unvegetated Open Water	37.7	32.1	20.1	0	0	0
% Transect Length Comprising Mudflat	0.0	0.0	10.2	0	0	0

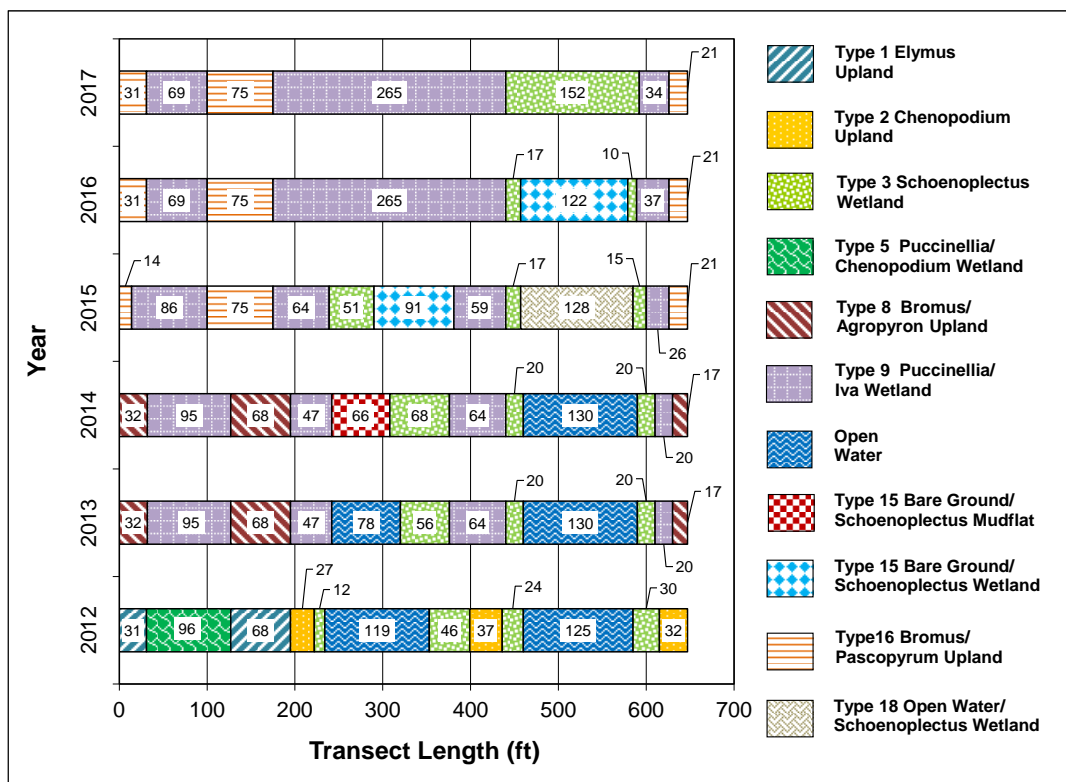


Chart 3-1. Transect Map Showing Community Types on T-1 (North Parcel) From 2012 Through 2017.

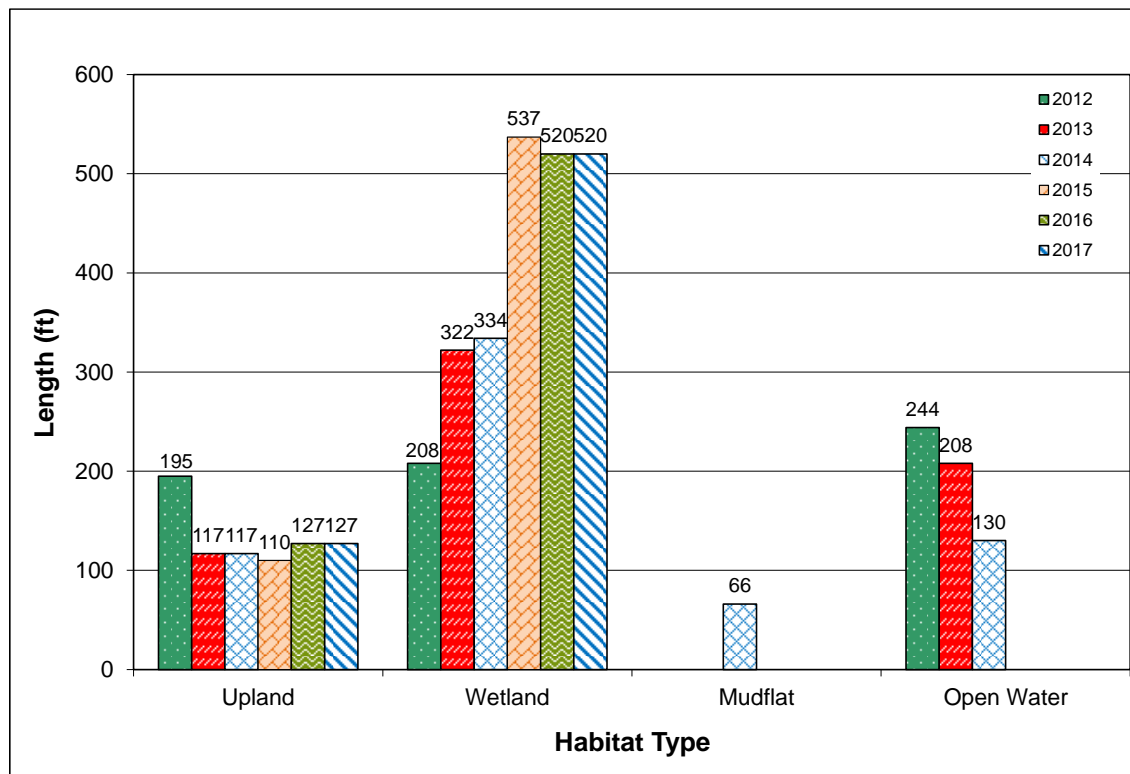


Chart 3-2. Length of Habitat Types Within T-1 (North Parcel) From 2012 Through 2017 at the Big Muddy Site.

Table 3-3. Data Summary for T-2 (South Parcel) From 2012 Through 2017 at the Big Muddy Site

Monitoring Year	2012	2013	2014	2015	2016	2017
Transect Length (feet)	366	366	366	366	366	366
Vegetation Community Transitions Along Transect	2	2	2	2	2	2
Vegetation Communities Along Transect	3	3	3	3	3	3
Hydrophytic Vegetation Communities Along Transect	2	2	2	2	2	2
Total Vegetative Species	21	18	17	15	16	16
Total Hydrophytic Species	11	10	7	4	4	4
Total Upland Species	10	8	10	11	12	12
Estimated % Total Vegetative Cover	90	95	95	95	95	95
Estimated % Unvegetated	10	5	5	5	5	5
% Transect Length Comprising Hydrophytic Vegetation Communities	91.3	91.8	91.8	91.8	91.8	91.8
% Transect Length Comprising Upland Vegetation Communities	8.7	8.2	8.2	8.2	8.2	8.2
% Transect Length Comprising Unvegetated Open Water	0.0	0.0	0	0	0	0
% Transect Length Comprising Mudflat	0.0	0.0	0	0	0	0

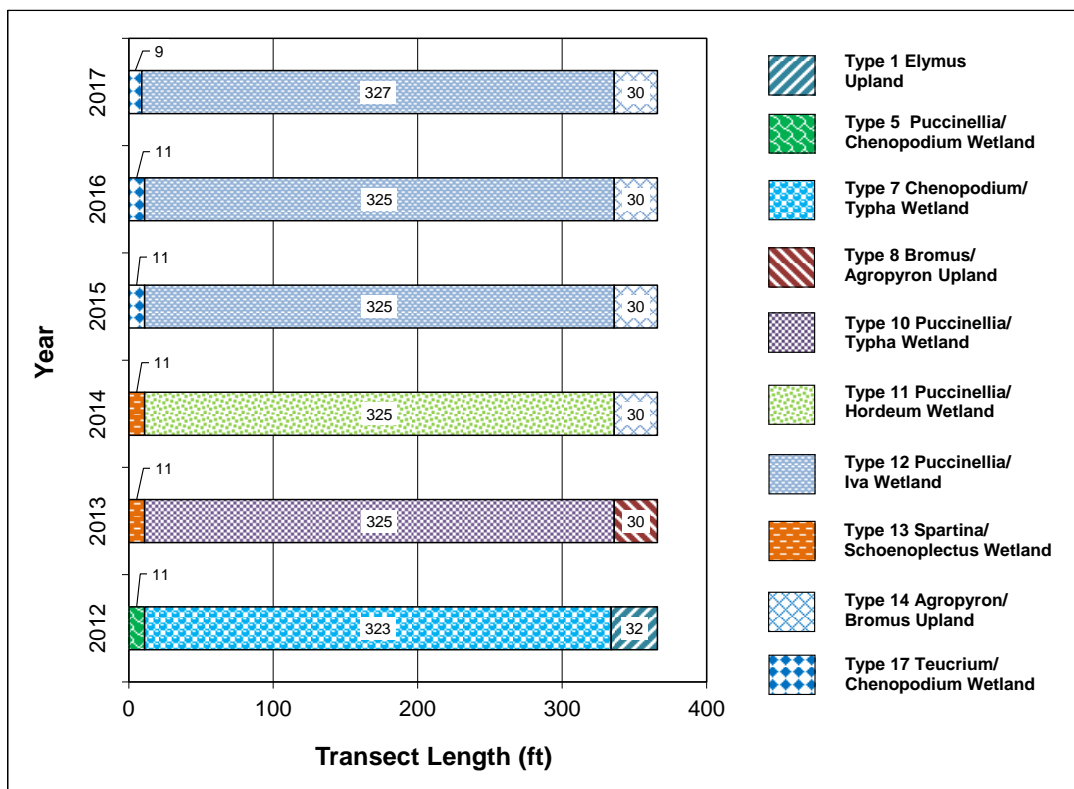


Chart 3-3. Transect Map Showing Community Types on T-2 (South Parcel) From 2012 Through 2017 From Start to Finish at the Big Muddy Site.

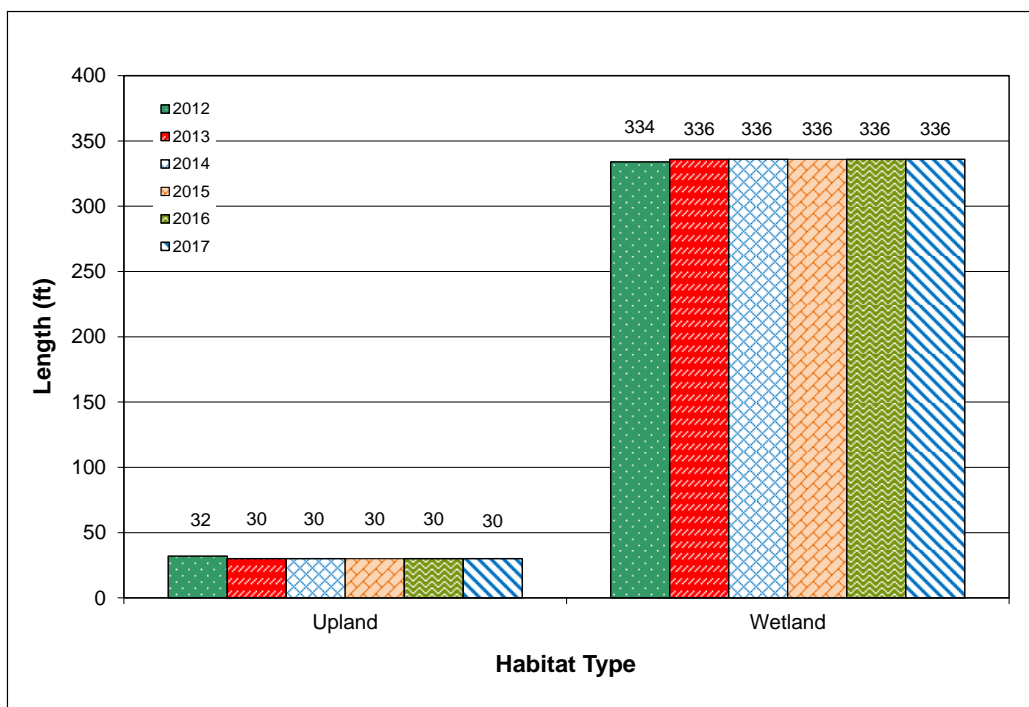


Chart 3-4. Length of Habitat Types Within T-2 (South Parcel) From 2012 Through 2017 at the Big Muddy Site.

Two infestations of Canada thistle (*Cirsium arvense*), which is a Priority 2B noxious weed, were observed at the northeast edge of the unnamed tributary on the north parcel. The infestations included trace and moderate cover classes. The Canada thistle and field bindweed infestations previously noted on the south parcel were not identified during the 2017 field survey. 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 site. A natural recruitment area that consists of Eastern cottonwood (*Populus deltoides*) and willow (*Salix* spp.) seedlings and saplings was identified within wetland Type 3 in the north parcel from 2013 through 2017. In 2017, the seedlings appeared to be healthy and showed little signs of herbivory, although growth has been slow.

3.3 SOIL

The project site was mapped in the *Web Soil Survey for Roosevelt County, Montana* [US Department of Agriculture, 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 preexisting wetland areas in the north parcel. This series is a moderately well-drained loam that is 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 that is 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. This series was mapped along the west boundary of the site that surrounds the unnamed tributary of Big Muddy Creek. The three soil map units are included on the *Montana Hydric Soils List* [US Department of Agriculture, 2014].

Soil test pits were excavated at four locations, all of which were within what was originally mapped as the Lohler silty clay soil series (DP-1W, DP-1U, DP-2U, and DP-2W; Figure A-2, Appendix A). The presence of the Lohler silty clay soil series was confirmed through observations at all four data points during the 2017 monitoring event. DP-1W and DP-2W are located in areas that met the wetland criteria. The upper horizon of the soil profile at DP-1W revealed 8 inches of dark (10YR 3/1) silty clay with 5 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 DP-2W revealed a dark grayish-brown (10YR 4/2) silty clay with 5 percent brown (7.5 YR 4/6) redox concentrations in the matrix. During previous surveys, this soil did not meet the criteria for any hydric soil indicators, likely because of its location in a recently constructed wetland where soils may have been too young to have formed hydric indicators [USACE, 2010]; however, in 2017 the percentage of redox concentrations had increased to 5 percent. This soil meets the National Technical Committee for Hydric Soils (NTCHS). The soil profile at DP-1U, which is located in the adjacent upland approximately 20 feet upslope of DP-1W, was a dark (10YR 3/1) silty clay loam. No hydric soil indicators were observed in this soil profile. The soil profile at DP-2U, which is located in the adjacent upland approximately 30 feet upslope of DP-2U, was a dark grayish-brown (10YR 4/2) silty clay. No hydric soil indicators were observed in this soil profile.

3.4 WETLAND DELINEATION

Two data points (DP-2U and DP-2W) located within the north parcel and two data points (DP-1W and DP-1U) in the south parcel were evaluated to confirm the wetland boundary determinations (Figure A-2, Appendix A; Wetland Determination Data forms, Appendix B). The 2017 wetland delineation identified a combined total of 14.12 acres of wetland/aquatic habitat at the north and south parcels, which is the same as 2016, and a decrease of 0.13 acre since 2014; this data is presented in Table 3-4. A total of 8.12 acres of wetland habitat was identified in the north parcel in 2017. The 6.0-acre extent of overall wetland and aquatic habitat in the south parcel remained constant from 2013 through 2017.

Table 3-4. Total Wetland Acres Delineated From 2011 Through 2017 at the Big Muddy Site

Wetland and Aquatic Habitat	2012 (acres)	2013 (acres)	2014 (acres)	2015 (acres)	2016 (acres)	2017 (acres)
Created Wetland – North Parcel	1.14	3.65	4.61	7.39	7.39	7.39
Preexisting Wetland – North Parcel	0.73	0.73	0.73	0.73	0.73	0.73
Open Water – North Parcel	5.05	3.87	2.91	0.00	0.00	0.00
Subtotal for North Parcel	6.92	8.25	8.25	8.12	8.12	8.12
Created Wetland – South Parcel	4.11	4.17	4.17	4.17	4.17	4.17
Preexisting Wetland – South Parcel	1.83	1.83	1.83	1.83	1.83	1.83
Open Water – South Parcel	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal for South Parcel	5.94	6.00	6.00	6.00	6.00	6.00
Total	12.87	14.25	14.25	14.12	14.12	14.12

3.5 WILDLIFE

A comprehensive list of birds and other wildlife species that were observed directly or indirectly from 2011 through 2017 is presented in Table 3-5 and the site Wetland Mitigation Site Monitoring form (Appendix B). Twelve bird species as well as rabbit scat, deer tracks, and two plains garter snakes (*Thamnophis radix*) were observed in 2017. Wildlife observations in 2017 are bolded in Table 3-5.

3.6 FUNCTIONAL ASSESSMENT

The 2008 MWAM was used in the *Big Muddy Creek Wetland Mitigation Plan* [Atkins and Post, Buckley, Schuh, & Jernigan, 2011] 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 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 2017. These values are provided in Table 3-6. Four AAs were assessed in 2017 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 site were not separated by parcel (north/south) in 2012. The MWAM forms for the Big Muddy area that were completed in 2017 are located in Appendix B.

Table 3-5. Wildlife Species Observed Within the Big Muddy Site From 2011 Through 2017 (Page 1 of 2)

Common Name	Scientific Name
<i>Amphibian</i>	
Boreal Chorus Frog	<i>Pseudacris maculata</i>
Northern Leopard Frog	<i>Rana pipiens</i>
Woodhouse's Toad	<i>Bufo woodhousii</i>
<i>Mammal</i>	
White-tailed Deer	<i>Odocoileus virginianus</i>
Deer sp.	Odocoileus sp.
Muskrat	<i>Ondatra zibethicus</i>
Rabbit sp.	unknown species
Raccoon	<i>Procyon lotor</i>
Red Fox	<i>Vulpes vulpes</i>
<i>Reptile</i>	
Plains Garter Snake	<i>Thamnophis radix</i>
Prairie Rattlesnake	<i>Crotalus viridis</i>
Unknown Snake	
<i>Bird</i>	
American Avocet	<i>Recurvirostra americana</i>
American Coot	<i>Fulica americana</i>
American Goldfinch	<i>Spinus tristis</i>
American Pigeon	<i>Anas americana</i>
Bank Swallow	<i>Riparia riparia</i>
Barn Swallow	<i>Hirundo rustica</i>
Blue-winged Teal	<i>Anas discors</i>
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>
Cinnamon Teal	<i>Anas cyanoptera</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Common Yellowthroat	<i>Geothlypis trichas</i>
Eastern Kingbird	<i>Tyrannus tyrannus</i>
Franklin's Gull	<i>Leucophaeus pipixcan</i>
Gadwall	<i>Anas strepera</i>
Killdeer	<i>Charadrius vociferus</i>
Loggerhead Shrike	<i>Lanius ludovicianus</i>
Mallard	<i>Anas platyrhynchos</i>
Mourning Dove	<i>Zenaida macroura</i>
Northern Pintail	<i>Anas acuta</i>
Northern Shoveler	<i>Anas clypeata</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Ring-necked Pheasant	<i>Phasianus colchicus</i>
Sparrow	<i>unknown species</i>
Spotted Sandpiper	<i>Actitis macularius</i>

Table 3-5. Wildlife Species Observed Within the Big Muddy Site From 2011 Through 2017 (Page 2 of 2)

Common Name	Scientific Name
<i>Bird</i>	
Swainson's Hawk	<i>Buteo swainsoni</i>
Tree Swallow	<i>Tachycineta bicolor</i>
Upland Sandpiper	<i>Bartramia longicauda</i>
Western Meadowlark	<i>Sturnella neglecta</i>
Western Sandpiper	<i>Calidris mauri</i>
Wilson's Phalarope	<i>Phalaropus tricolor</i>
Wilson's Snipe	<i>Gallinago delicata</i>
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>

Species that were identified in 2017 are **bolded**.

The north parcel Creation AA encompassed 7.39 acres and included the constructed wetland cells and excavated areas between the cells, which were characterized by wetland community Types 3 – *Schoenoplectus* spp., 9 – *Puccinellia nuttalliana*/*Iva axillaris*, 15 – Bare Ground/*Schoenoplectus* spp., and 18 – Open Water/*Schoenoplectus* spp. This AA was rated as a Category II wetland with 72 percent of the total possible points. Overall, the AA rates high for several wetland functions including production export/food chain support, short- and long-term surface-water storage, sediment/shoreline stabilization, and recreation/education potential. This AA achieved 53.21 total functional units in 2017.

The north parcel Preservation AA included 0.73 acre located within the floodway fringe of the existing tributary to Big Muddy Creek (wetland community Type 4 – *Spartina pectinate*/*Schoenoplectus* spp.). This AA was rated as a Category III wetland with 56 percent of the total possible points and 4.09 functional units in 2017. The AA received high ratings in 2017 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 57.30 functional units in 2017.

The south parcel Creation AA encompassed 4.17 acres within the footprint of the excavated wetland cell and was dominated by wetland community Type 12 – *Puccinellia nuttalliana*/*Iva axillaris*. The AA was rated as a Category III wetland with 61 percent of the total possible points and 25.44 functional units in 2017, the same as 2016. 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 south parcel Preservation AA identified in 2017 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 2017. The seasonal/intermittent nature of the wetland hydrology within this AA was the primary factor that limited 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 36.05 functional units in 2017.

Table 3-6. Functions and Values of the Big Muddy Site From 2011 Through 2012 and 2014 Through 2017 (Page 1 of 2)

Function and Value Parameters From the 2008 Montana Wetland Assessment Method	2011 (Creation) AA-1	2011 (Preservation) AA-2	2012 ^(a) (Creation) AA-1	2012 ^(a) (Preservation) AA-2	2014 Creation North Parcel	2014 Preservation North Parcel	2014 Creation South Parcel	2014 Preservation South Parcel	2015 Creation North Parcel	2015 Preservation North Parcel
Listed/Proposed Threatened and Endangered (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)	Low (0.0)	Low (0.0)
Montana Natural Heritage Program (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)	Mod (0.5)	Mod (0.5)
General Wildlife Habitat	Mod (0.5)	High (0.9)	Mod (0.7)	High (0.9)	High (0.9)	Mod (0.7)	Mod (0.7)	Mod (0.7)	High (0.9)	Mod (0.7)
General Fish/Aquatic Habitat	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flood Attenuation	Mod (0.5)	Mod (0.4)	Mod (0.5)	Mod (0.4)	Mod (0.5)	Mod (0.5)	Mod (0.5)	Mod (0.4)	Mod (0.5)	Mod (0.5)
Short- and Long-Term Surface-Water Storage	High (1.0)	Mod (0.4)	High (1.0)	High (0.8)	High (1.0)	Low (0.3)	High (0.9)	Low (0.3)	High (1.0)	Low (0.3)
Sediment/Nutrient/Toxicant Removal	Mod (0.7)	High (0.9)	High (1.0)	High (0.9)	High (1.0)	High (1.0)	High (1.0)	High (0.9)	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	Low (0.3)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (0.9)	High (0.9)	High (1.0)	High (1.0)	High (0.9)
Production Export/Food Chain Support	Mod (0.5)	High (0.9)	Mod (0.6)	High (1.0)	Mod (0.7)	Mod (0.4)	Mod (0.4)	Mod (0.7)	High (0.8)	Mod (0.4)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	Mod (0.7)	Mod (0.7)	Mod (0.7)	High (1.0)	Mod (0.7)
Uniqueness	Low (0.2)	Mod (0.4)	Low (0.2)	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 (0.15)	High (0.15)	High (0.15)	High (0.15)	High (0.2)	High (0.2)	High (0.2)	High (0.2)	High (0.2)	High (0.2)
Actual Points/Possible Points	5.35/10	6.55/10	6.65/10	7.05/10	7.1/10	5.6/10	6.1/10	5.8/10	7.2/10	5.6/10
% of Possible Score Achieved	53.5%	65.5%	66.5%	70.5%	71.0%	56.0%	61.0%	58.0%	72.0%	56.0%
Overall Category	III	II	II	II	II	III	III	III	II	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	7.39	0.73
Functional Units (acreage × actual points)	33.12	4.78	68.56	18.05	53.39	4.09	25.44	10.61	53.21	4.09

Table 3-6. Functions and Values of the Big Muddy Site From 2011 Through 2012 and 2014 Through 2017 (Page 2 of 2)

Function and Value Parameters From the 2008 Montana Wetland Assessment Method	2015 Creation South Parcel	2015 Preservation South Parcel	2016 Creation North Parcel	2016 Preservation North Parcel	2016 Creation South Parcel	2016 Preservation South Parcel	2017 Creation North Parcel	2017 Preservation North Parcel	2017 Creation South Parcel	2017 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)	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)	Mod (0.5)	Mod (0.5)
General Wildlife Habitat	Mod (0.7)	Mod (0.7)	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flood Attenuation	Mod (0.5)	Mod (0.4)	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 (0.9)	Low (0.3)	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 (0.9)	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 (0.9)	High (1.0)	High (0.9)	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 (0.4)	Mod (0.7)	High (0.8)	Mod (0.4)	Mod (0.4)	Mod (0.7)	Mod (0.8)	Mod (0.4)	Mod (0.4)	Mod (0.7)
Groundwater Discharge/Recharge	Mod (0.7)	Mod (0.7)	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)	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)	High (0.2)	High (0.2)
Actual Points/Possible Points	6.1/10	5.8/10	7.2/10	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	61.0%	58.0%	72.0%	56.0%	61.0%	58.0%	72.0%	56.0%	61.0%	58.0%
Overall Category	III	III	II	III	III	III	II	III	III	III
Total Acreage of Assessed Wetlands within Site Boundaries	4.17	1.83	7.39	0.73	4.17	1.83	7.39	0.73	4.17	1.83
Functional Units (acreage x actual points)	25.44	10.61	53.21	4.09	25.44	10.61	53.21	4.10	25.44	10.62

(a) 2012 AAs included wetland areas on both sides (north/south) of US Highway 2.

3.7 PHOTOGRAPHIC DOCUMENTATION

Photographs taken at photo points 1 through 7 (PP1 through PP7), transect endpoints, and wetland determination data points are shown in Appendix C.

3.8 MAINTENANCE NEEDS

No diversion structures or nesting structures are currently installed at the site. Two infestations of Canada thistle, which is a Priority 2B noxious weed, were observed at the edge of the unnamed tributary in the northeast quadrant of the north site (Figure A-3, Appendix A). Weed coverage at both portions of the mitigation site is less than 1 percent. MDT has an ongoing weed-control program for their mitigation sites that includes an annual assessment of weeds that were identified at each location and treatment to contain and control identified populations.

3.9 CURRENT CREDIT SUMMARY

Table 3-7 summarizes the originally proposed mitigation acreages, credit ratios, and scaled performance standards from the *Big Muddy Creek Wetland Mitigation Plan* [Atkins and Post, Buckley, Schuh, & Jernigan, 2011]. This table was modified in 2012 to include the additional acreages monitored within the south parcel. Table 3-8 presents a summary of the site's progress in relation to the established performance standards. Table 3-9 provides a breakdown of the credit acreages (based on the 2017 delineation) listed for each category scaled according to the credit criteria listed in Table 3-7. Each mitigation category has been divided into the respective parcels (north or south). The total credit acres accrued at the Big Muddy site in 2017 was 12.95 acres.

Table 3-7. Wetland Crediting and Performance Standard Summary for the Original Big Muddy Creek Site (Page 1 of 2)

	Compensatory Mitigation Type	USACE Mitigation Credit Ratio ^(a)	Proposed Acres	Preliminary Credit Estimate (acres)	Performance Standard 1	Performance Standard 2	Performance Standard 3	Scaled % Credit Criteria ^(b)
North Parcel	Creation: Establishment ^(c) (area between cells [1.76 acres] and passive creation in northern tip of site [1.03 acres])	1:1	1.03–2.79	1.03–2.79	Satisfy 1987 Wetland Manual and 2010 GP 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 north parcel)	1:1	6.53	6.53	Satisfy 1987 Wetland Manual and 2010 GP 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 (north parcel)	4:1	0.73	0.18	Satisfy 1987 Wetland Manual and 2010 GP Regional Supplement Wetland Hydrology Wetland Soils Hydrophytic Vegetation Criteria	N/A	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 (north parcel)	5:1	0.43	0.09	N/A	N/A	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%

Table 3-7. Wetland Crediting and Performance Standard Summary for the Original Big Muddy Creek Site (Page 2 of 2)

	Compensatory Mitigation Type	USACE Mitigation Credit Ratio ^(a)	Proposed Acres	Preliminary Credit Estimate (acres)	Performance Standard 1	Performance Standard 2	Performance Standard 3	Scaled % Credit Criteria ^(b)
South Parcel	Creation: Establishment (emergent marsh and open water in south parcel)^(d)	1:1	5.47	5.47	Satisfy 1987 Wetland Manual and 2010 GP 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 (south parcel)^(d)	4:1	1.83	0.46	Satisfy 1987 Wetland Manual and 2010 GP Regional Supplement Wetland Hydrology Wetland Soils Hydrophytic Vegetation Criteria	N/A	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 (south parcel)	5:1	NA	NA	N/A	N/A	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				13.76–15.52 acres				

(a) USACE, 2005.

(b) Percentages to be applied to credit estimate acres in Column 5.

(c) Incidentally created wetlands will be credited according to parameters listed under "Creation: Establishment."

(d) Areas added in 2012 have been included in preliminary wetland crediting and performance standard summary approved by the USACE for the Big Muddy wetland mitigation project.

Table 3-8. Summary of Performance Standards for Big Muddy Credit Areas

	Compensatory Mitigation Type	Performance Standard 1	Performance Standard 2	Performance Standard 3	Discussion
North Parcel	Creation: Establishment^(a) (area between cells [1.76 acres] and passive creation in northern tip of site [1.03 acres])	Satisfy 1987 Wetland Manual and 2010 GP 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 north parcel)	Satisfy 1987 Wetland Manual and 2010 GP 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 (north parcel)	Satisfy 1987 Wetland Manual and 2010 GP Regional Supplement Wetland Hydrology Wetland Soils Hydrophytic Vegetation Criteria	N/A	Noxious Weed Absolute Cover < 5%	Performance Standards 1 and 3 met. Full credit allocated.
	Upland Buffer (north parcel)	N/A	N/A	Noxious Weed Absolute Cover < 5%	Performance Standard 3 met. Full credit allocated.
South Parcel	*Creation: Establishment^(b) (emergent marsh and open water in south parcel)	Satisfy 1987 Wetland Manual and 2010 GP 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 (south parcel)	Satisfy 1987 Wetland Manual and 2010 GP Regional Supplement Wetland Hydrology Wetland Soils Hydrophytic Vegetation Criteria	N/A	Noxious Weed Absolute Cover < 5%	Performance Standards 1 and 3 met. Full credit allocated.
	Upland Buffer (south parcel)	N/A	N/A	Noxious Weed Absolute Cover < 5%	Performance Standard 3 met. Full credit allocated.

(a) Incidentally created wetlands will be credited according to parameters listed under "Creation: Establishment."

(b) Areas added in 2012 have been included in preliminary wetland crediting and performance standard summary approved by the USACE for the Big Muddy wetland mitigation project.

Table 3-9. Summary of Wetland Credits From 2011 Through 2017 at the Big Muddy Site (Page 1 of 2)

	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
North Parcel	Wetland Creation: Establishment (area between constructed cells in north parcel)	1:1	0.44	70%	0.31	0.00	0%	0.00	1.76	70%	1.23	1.76
	Wetland Creation: Establishment (wetland cells in north parcel)	1:1	5.75	70%	4.03	5.76	70%	4.03	5.76	70%	4.03	5.76
	Wetland Preservation (north parcel)	4:1	0.73	100%	0.18	0.73	100%	0.18	0.73	100%	0.18	0.73
	Upland Buffer (north parcel)	5:1	3.70	100%	0.74	3.69	100%	0.74	2.37	100%	0.47	2.37
	North Subtotal		10.62	–	5.26	10.18		4.95	10.62		5.92	10.62
South Parcel	Wetland Creation: Establishment (wetland cell in south parcel)	1:1	–			4.55	70%	3.19	4.17	70%	2.92	4.17
	Wetland Preservation (south parcel)	4:1	–			1.83	100%	0.46	1.83	100%	0.46	1.83
	Upland Buffer (south parcel)	5:1	–			1.31	100%	0.26	1.25	100%	0.25	1.25
	South Subtotal					7.69		3.90	7.25		3.63	7.25
	Total		10.62		5.26	17.87		8.86	17.87		9.55	17.87

Table 3-9. Summary of Wetland Credits From 2011 Through 2017 at the Big Muddy Site (Page 2 of 2)

	Compensatory Mitigation Type	Scaled % Credit Standards	2014 Credit Acres	2015 Delineated Acres	Scaled % Credit Standards	2015 Credit Acres	2016 Delineated Acres	Scaled % Credit Standards	2016 Credit Acres	2017 Delineated Acres	Scaled % Credit Standards	2017 Credit Acres
North Parcel	Wetland Creation: Establishment (area between constructed cells in north parcel)	100%	1.76	1.63	100%	1.63	1.63	100%	1.63	1.63	100%	1.63
	Wetland Creation: Establishment (wetland cells in north parcel)	70%	4.03	5.76	100%	5.76	5.76	100%	5.76	5.76	100%	5.76
	Wetland Preservation (north parcel)	100%	0.18	0.73	100%	0.18	0.73	100%	0.18	0.73	100%	0.18
	Upland Buffer (north parcel)	100%	0.47	2.50	100%	0.50	2.50	100%	0.50	2.50	100%	0.50
	North Subtotal		6.45	10.62		8.07	10.62		8.07	10.62		8.07
South Parcel	Wetland Creation: Establishment (wetland cell in south parcel)	100%	4.17	4.17	100%	4.17	4.17	100%	4.17	4.17	100%	4.17
	Wetland Preservation (south parcel)	100%	0.46	1.83	100%	0.46	1.83	100%	0.46	1.83	100%	0.46
	Upland Buffer (south parcel)	100%	0.25	1.25	100%	0.25	1.25	100%	0.25	1.25	100%	0.25
	South Subtotal		4.88	7.25		4.88	7.25		4.88	7.25		4.88
	Total		11.33	17.87		12.95	17.87		12.95	17.87		12.95

4.0 REFERENCES

Atkins and Post, Buckley, Schuh, & Jernigan, 2011. *Big Muddy Creek Wetland Mitigation Plan*, prepared by Atkins, Missoula, MT, and Post, Buckley, Schuh, & Jernigan, Helena, MT, for the Montana Department of Transportation, Helena, MT.

Berglund, J. and R. McEldowney, 2008. *MDT Montana Wetland Assessment Method*, PBS&J Project B43075.00, prepared by Post, Buckley, Schuh, & Jernigan, Helena, MT, for the Montana Department of Transportation, Helena, MT.

Environmental Laboratory, 1987. *Corps of Engineers Wetlands Delineation Manual*, Program Technical Report Y-87-1, prepared by Environmental Laboratory, Department of the Army, Waterways Experiment Station, Corps of Engineers, Vicksburg, MS, for the Department of the Army, US Army Corps of Engineers, Washington, DC.

Lichvar, R. W., D. L. Banks, W. N. Kirchner, and N. C. Melvin, 2016. "The National Wetland Plant List: 2016 Wetland Ratings," *Phytoneuron*, Vol. 2016-30, No. 1–17.

Montana Department of Agriculture, 2017. "Montana Noxious Weed List," *mt.gov*, retrieved November 7, 2017, from <http://agr.mt.gov/Portals/168/Documents/Weeds/2017%20Noxious%20Weed%20List.pdf>

Montana Department of Natural Resources and Conservation, 2017. "Drought Management," *mt.gov*, retrieved November 27, 2017, from <http://dnrc.mt.gov/divisions/water/drought-management>

Tillinger, T. N., 2010. Personal communication between the Montana Department of Transportation, Helena, MT, and T. N. Tillinger, US Army Corps of Engineers, Washington, DC, June 14.

US Army Corps of Engineers, 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0)*, ERDC/EL TR-10-3, prepared by the US Army Corps of Engineers, US Army Engineer Research and Development Center, Environmental Laboratory, Vicksburg, MS.

US Department of Agriculture, 2011. "Web Soil Survey for Roosevelt County, Montana," *usda.gov*, retrieved July 20, 2011, from <http://websoilsurvey.nrcs.usda.gov/app/>

US Department of Agriculture, 2014. "Montana Hydric Soils List," *usda.gov*, retrieved October 21, 2016, from <http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric>

Western Regional Climate Center, 2017. "Monthly Sum Precipitation at the Culbertson Coop, Montana (242122)" *dri.edu*, Western Regional Climate Center, United States Historical Climatology Network, Reno, NV, retrieved September 13, 2017, from <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?mt0802>

APPENDIX A

PROJECT AREA MAPS

MDT Wetland Mitigation Monitoring
Big Muddy Creek Mitigation Site
Roosevelt County, Montana

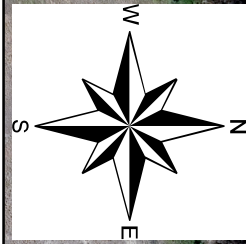
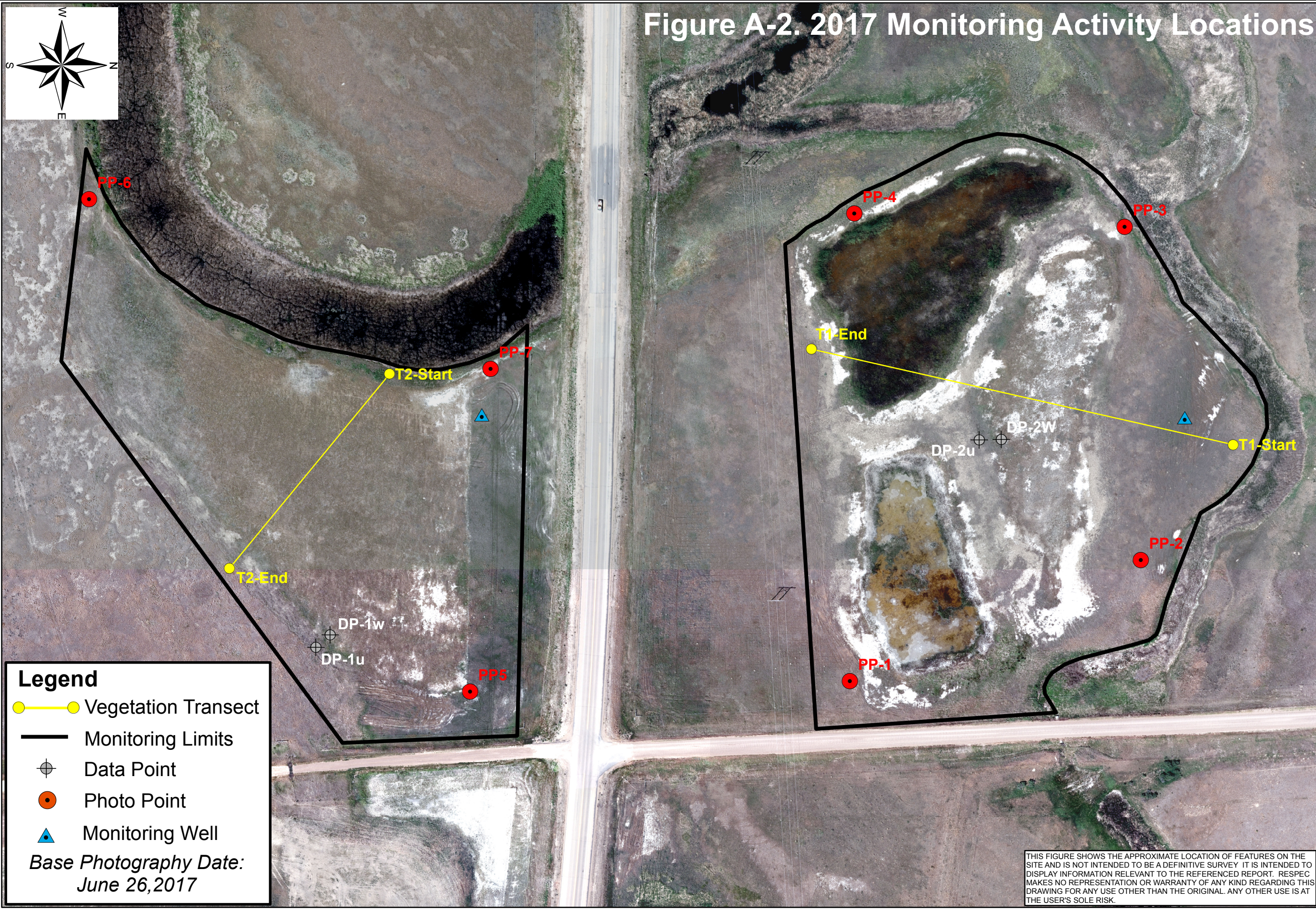


Figure A-2. 2017 Monitoring Activity Locations



Legend

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

Base Photography Date:
June 26, 2017

820 North Montana Ave.,
Suite A
Helena, MT 59601

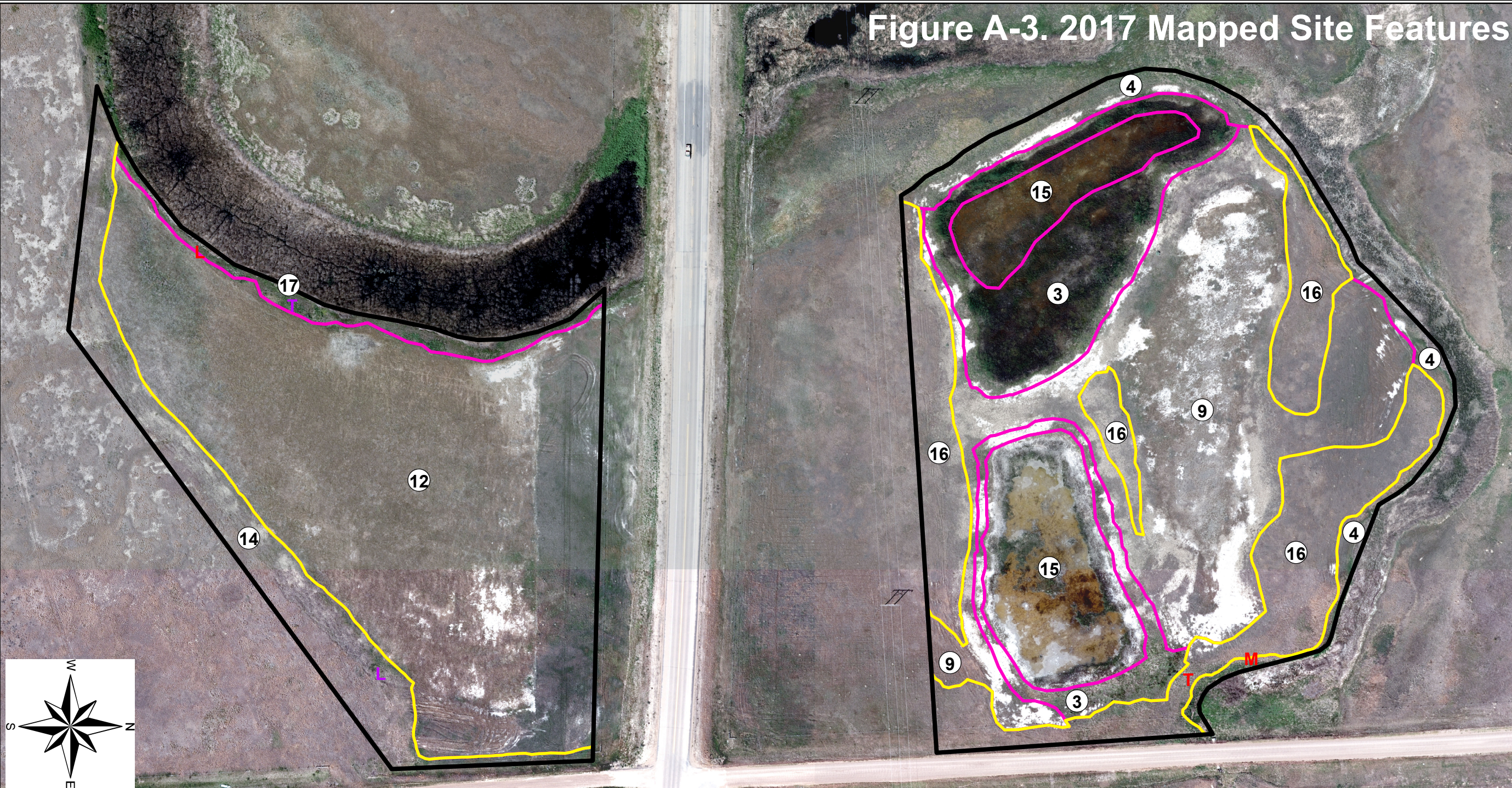
Big Muddy Creek Wetland Mitigation Site

2017 Monitoring Activity Locations

0 60 120 240 360 480 600 Feet

Project:	NH-1-(46)633
Location:	Roosevelt Co., Montana
Date:	December 2017
Project Manager:	M. Traxler
Drawn By:	J. Rosenbaum

Figure A-3. 2017 Mapped Site Features



THIS FIGURE SHOWS THE APPROXIMATE LOCATION OF FEATURES ON THE SITE AND IS NOT INTENDED TO BE A DEFINITIVE SURVEY. IT IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. RESPEC MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND REGARDING THIS DRAWING FOR ANY USE OTHER THAN THE ORIGINAL. ANY OTHER USE IS AT THE USER'S SOLE RISK.

Noxious Weeds

Cirsium arvense

Convolvulus arvensis

Cover Class

T = Trace (<1% cover)

L = Low (1-5% cover)

M = Moderate (6-25% cover)

H = High (26-100% cover)

Legend

Monitoring Limits

Wetland Limits

Vegetation Communities

Base Photography Date:

June 26, 2017

Acreages	
Total Project Area	17.87
Total Wetlands	14.13
Pre-existing Wetlands	2.56
Upland Buffer	3.76

Vegetation Community Types

③ Schoenoplectus spp.

④ Spartina pectinata/Schoenoplectus spp.

⑨ Puccinellia nuttalliana/Iva axillaris (N)

⑫ Puccinellia nuttalliana/Iva axillaris (S)

⑭ Agropyron cristatum/Bromus inermis

⑮ Bare Ground/Schoenoplectus merittimus

⑯ Bromus inermis/Pascopyrum smithii

⑰ Teucrium canadense/Chenopodium album

RESPEC

820 North Montana Ave.,
Suite A
Helena, MT 59601

Big Muddy Creek Wetland Mitigation Site

2017 Mapped Site Features

Project: NH-1-(46)633

Location: Roosevelt Co., Montana

Date: December 2017

Project Manager: M. Traxler

Drawn By: J. Rosenbaum

0 60 120 240 360 480 600

Feet

APPENDIX B

MONITORING FORMS

MDT Wetland Mitigation Monitoring
Big Muddy Creek Mitigation Site
Roosevelt County, Montana

RESPEC/MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **Big Muddy** Project Number: _____
Assessment Date: **July 12, 2017** Person(s) conducting the assessment: **M. Traxler**
Location: **4 miles west of Culbertson** MDT District: **Glendive**
Milepost: **~639.75 on Highway 2**
Legal Description: T **28N** R **55E** Section **21**
Weather Conditions: **mostly cloudy, 70 degrees** Time of Day: **9:30 AM**
Initial Evaluation Date: **August 20, 2011** Monitoring Year: **7** # 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 tributary to Big Muddy Creek, precipitation, groundwater**
Inundation: **Absent** Average Depth: **0 feet** Range of Depths: **0**
Percent of assessment area under inundation: **0%**
Depth at emergent vegetation-open water boundary: **NA feet**
If assessment area is not inundated then are the soils saturated within 12 inches of surface: **Yes**
Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc.):
Surface soil cracks, salt crust, geomorphic position, inundation and saturation visible on aerial, FAC-neutral test, water marks.

Groundwater Monitoring Wells: **Present**
Record depth of water below ground surface (in feet):

Well Number	Depth	Well Number	Depth	Well Number	Depth
Well 1					
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.

COMMENTS / PROBLEMS:

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. 2017 was the second consecutive year with no surface water present during monitoring visit due to extended extreme drought in area. Well 1 located in northern tract, Well 2 located in southern tract. Unable to open either well to measure water depth, as the wells appeared to be locked.

VEGETATION COMMUNITIES

Community Number: **3** Community Title (main spp): **Schoenoplectus spp. /**

Dominant Species	% Cover	Dominant Species	% Cover
Schoenoplectus maritimus	3 = 11-20%	Hordeum jubatum	1 = 1-5%
Distichlis spicata	2 = 6-10%	Juncus balticus	1 = 1-5%
Spartina pectinata	2 = 6-10%	Puccinellia nuttalliana	1 = 1-5%
Typha latifolia	2 = 6-10%	Eleocharis palustris	1 = 1-5%
Bare Ground	2 = 6-10%	Schoenoplectus acutus	1 = 1-5%
Alopecurus arundinaceus	1 = 1-5%	Schoenoplectus americanus	1 = 1-5%

Comments / Problems: _____

Community Number: **4** Community Title (main spp): **Spartina pectinata / Schoenoplectus spp.**

Dominant Species	% Cover	Dominant Species	% Cover
Schoenoplectus maritimus	4 = 21-50%	Elymus trachycaulus	1 = 1-5%
Spartina pectinata	4 = 21-50%	Schoenoplectus acutus	1 = 1-5%
Sonchus arvensis	3 = 11-20%	Typha latifolia	1 = 1-5%
Alopecurus arundinaceus	2 = 6-10%		
Hordeum jubatum	2 = 6-10%		
Puccinellia nuttalliana	1 = 1-5%		

Comments / Problems: _____

Community Number: **9** Community Title (main spp): **Puccinellia nuttalliana / Iva axillaris**

Dominant Species	% Cover	Dominant Species	% Cover
Puccinellia nuttalliana	5 = > 50%	Agropyron cristatum	1 = 1-5%
Distichlis spicata	4 = 21-50%	Bassia scoparia	1 = 1-5%
Iva axillaris	4 = 21-50%	Chenopodium album	1 = 1-5%
Pascopyrum smithii	3 = 11-20%	Schoenoplectus maritimus	1 = 1-5%
Grindelia squarrosa	2 = 6-10%	Spartina pectinata	1 = 1-5%
Bare Ground	2 = 6-10%	Bromus inermis	1 = 1-5%

Comments / Problems: **Community located in northern tract.**

Community Number: **12** Community Title (main spp): **Puccinellia nuttalliana / Iva axillaris**

Dominant Species	% Cover	Dominant Species	% Cover
Puccinellia nuttalliana	5 = > 50%	Bassia scoparia	1 = 1-5%
Hordeum jubatum	4 = 21-50%	Distichlis spicata	1 = 1-5%
Iva axillaris	4 = 21-50%	Spartina pectinata	1 = 1-5%
Chenopodium album	2 = 6-10%		
Bare Ground	1 = 1-5%		
Suaeda calceoliformis	1 = 1-5%		

Comments / Problems: **Community located in southern tract.**

VEGETATION COMMUNITIES (continued)

Community Number: **14** Community Title (main spp): **Agropyron cristatum / Bromus inermis**

Dominant Species	% Cover	Dominant Species	% Cover
Bromus inermis	5 = > 50%		
Agropyron cristatum	4 = 21-50%		
Iva axillaris	2 = 6-10%		
Hordeum jubatum	1 = 1-5%		
Grindelia squarrosa	1 = 1-5%		
Poa pratensis	1 = 1-5%		

Comments / Problems: _____

Community Number: **15** Community Title (main spp): **Bare Ground / Schoenoplectus maritimus**

Dominant Species	% Cover	Dominant Species	% Cover
Bare Ground	5 = > 50%		
Schoenoplectus maritimus	3 = 11-20%		
Puccinellia nuttalliana	2 = 6-10%		
Hordeum jubatum	1 = 1-5%		
Distichlis spicata	1 = 1-5%		
Suaeda calceoliformis	+ = < 1%		

Comments / Problems: _____

Community Number: **16** Community Title (main spp): **Bromus inermis / Pascopyrum smithii**

Dominant Species	% Cover	Dominant Species	% Cover
Bromus inermis	4 = 21-50%	Spartina pectinata	1 = 1-5%
Pascopyrum smithii	3 = 11-20%	Chenopodium sp.	1 = 1-5%
Grindelia squarrosa	2 = 6-10%	Distichlis spicata	1 = 1-5%
Iva axillaris	2 = 6-10%	Elymus trachycaulus	1 = 1-5%
Agropyron cristatum	2 = 6-10%	Hordeum jubatum	1 = 1-5%
Poa pratensis	1 = 1-5%	Puccinellia nuttalliana	1 = 1-5%

Comments / Problems: _____

Community Number: **17** Community Title (main spp): **Teucrium canadense / Chenopodium album**

Dominant Species	% Cover	Dominant Species	% Cover
Teucrium canadense	4 = 21-50%	Distichlis spicata	1 = 1-5%
Chenopodium album	3 = 11-20%	Iva axillaris	1 = 1-5%
Eleocharis palustris	2 = 6-10%	Lepidium densiflorum	1 = 1-5%
Lactuca tatarica	2 = 6-10%	Symphoricarpos albus	1 = 1-5%
Spartina pectinata	2 = 6-10%	Convolvulus arvensis	1 = 1-5%
Apocynum cannabinum	1 = 1-5%	Puccinellia nuttalliana	1 = 1-5%

Comments / Problems: _____

VEGETATION COMMUNITIES (continued)

Community Number: **18** Community Title (main spp): **Open Water / Schoenoplectus spp.**

Dominant Species	% Cover	Dominant Species	% Cover
Schoenoplectus maritimus	5 = > 50%		
Open Water	1 = 1-5%		
Aquatic macrophytes	3 = 11-20%		
Algae, green	2 = 6-10%		
Schoenoplectus acutus	1 = 1-5%		
Spartina pectinata	+ = < 1%		

Comments / Problems: **This vegetation type was very limited in 2016 and 2017 due to lack of surface water.**

Community Number: _____ Community Title (main spp): _____

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: _____

Community Number: _____ Community Title (main spp): _____

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: _____

Community Number: _____ Community Title (main spp): _____

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: _____

Additional Activities Checklist:

☐ Record and map vegetative communities on aerial photograph.

PLANTED WOODY VEGETATION SURVIVAL

[illegible]

Comments / Problems: No woody species were installed on this site. The wetlands were revegetated with seed and salvaged material. Numerous volunteer seedlings and saplings (less than 1-inch diameter) were observed within the eastern portion of the site in 2017, including cottonwoods, aspen, and willows.

B-7

Site: **Big Muddy** Date: **July 12, 2017** Examiner: **M. Traxler**
Transect Number: **1** Approximate Transect Length: **647 feet** Compass Direction from Start: **220°** Note: **North Side**

Compass Direction from Start: **220°** Note: **North Side**

Transect Interval Length: 69 feet (station 31-100)	
Vegetation Community Type: <i>Puccinellia nuttalliana</i> / <i>Iva axillaris</i>	
Plant Species	Cover
<i>Distichlis spicata</i>	5 = > 50%
<i>Puccinellia nuttalliana</i>	5 = > 50%
<i>Iva axillaris</i>	3 = 11-20%
<i>Suaeda calceoliformis</i>	2 = 6-10%
<i>Chenopodium</i> sp.	1 = 1-5%
<i>Hordeum jubatum</i>	1 = 1-5%
Total Vegetative Cover:	90%

Transect Interval Length: 265 feet (station 175-440)	
Vegetation Community Type: <i>Puccinellia nuttalliana</i> / <i>Iva axillaris</i>	
Plant Species	Cover
<i>Puccinellia nuttalliana</i>	4 = 21-50%
Bare Ground	3 = 11-20%
<i>Hordeum jubatum</i>	2 = 6-10%
<i>Distichlis spicata</i>	1 = 1-5%
<i>Grindelia squarrosa</i>	1 = 1-5%
<i>Chenopodium</i> sp.	1 = 1-5%
<i>Pascopyrum smithii</i>	1 = 1-5%
<i>Bassia scoparia</i>	1 = 1-5%
Total Vegetative Cover:	75%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Big Muddy** Date: **July 12, 2017** Examiner: **M. Traxler**

Transect Number: **1** Approximate Transect Length: **647 feet** Compass Direction from Start: **220°** Note: **North Side**

Transect Interval Length: 152 feet (station 440-592)	
Vegetation Community Type: Schoenoplectus spp. /	
Plant Species	Cover
Schoenoplectus acutus	4 = 21-50%
Schoenoplectus maritimus	4 = 21-50%
Spartina pectinata	2 = 6-10%
Bare Ground	2 = 6-10%
Alopecurus arundinaceus	1 = 1-5%
Eleocharis palustris	1 = 1-5%
Puccinellia nuttalliana	1 = 1-5%
Sonchus arvensis	1 = 1-5%
Hordeum jubatum	1 = 1-5%
Total Vegetative Cover:	75%

Transect Interval Length: 34 feet (station 592-626)	
Vegetation Community Type: Puccinellia nuttalliana / Iva axillaris	
Plant Species	Cover
Bare Ground	4 = 21-50%
Distichlis spicata	3 = 11-20%
Puccinellia nuttalliana	2 = 6-10%
Grindelia squarrosa	+ = < 1%
Hordeum jubatum	+ = < 1%
Total Vegetative Cover:	75%

Transect Interval Length: 21 feet (station 626-647)	
Vegetation Community Type: Bromus inermis / Pascopyrum smithii	
Plant Species	Cover
Bromus inermis	4 = 21-50%
Grindelia squarrosa	1 = 1-5%
Iva axillaris	1 = 1-5%
Agropyron cristatum	1 = 1-5%
Pascopyrum smithii	1 = 1-5%
Total Vegetative Cover:	90%

Transect Interval Length:	
Vegetation Community Type:	
Plant Species	Cover
Total Vegetative Cover:	%

B-9

Transect Number: **2** Approximate Transect Length: **366 feet** Compass Direction from Start: **130°** Note: **South Side**

Transect Number: 2 Approximate Transect Length: 366 feet

Compass Direction from Start: **130°** Note: **South Side**

Transect Interval Length: 30 feet (station 336-366)	
Vegetation Community Type: <i>Agropyron cristatum</i> / <i>Bromus inermis</i>	
Plant Species	Cover
<i>Bromus inermis</i>	5 = > 50%
<i>Agropyron cristatum</i>	2 = 6-10%
<i>Iva axillaris</i>	1 = 1-5%
<i>Vicia americana</i>	+ = < 1%
<i>Grindelia squarrosa</i>	+ = < 1%
<i>Symphoricarpos albus</i>	+ = < 1%
Total Vegetative Cover:	95%

Transect Interval Length:	
Vegetation Community Type:	
Plant Species	Cover
Total Vegetative Cover:	%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Cover Estimate

+ = < 1% 3 = 11-10%
1 = 1-5% 4 = 21-50%
2 = 6-10% 5 = > 50%

Indicator Class

+ = Obligate
- = Facultative/Wet
0 = Facultative

Source

P = Planted
V = Volunteer

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): ____%

Establish transects perpendicular to the shoreline (or saturated perimeter). The transect should begin in the upland area. Permanently mark this location with a standard metal fencepost. Extend the imaginary transect line towards the center of the wetland, ending at the 3 foot depth (in open water), or at the point where water depths or saturation are maximized. Mark this location with another metal fencepost.

Estimate cover within a 10 foot wide "belt" along the transect length. At a minimum, establish a transect at the windward and leeward sides of the wetland. Remember that the purpose of this sampling is to monitor, not inventory, representative portions of the wetland site.

Comments: _____

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.

Location	Photograph Frame #	Photograph Description & Lat/Long	Compass Reading (°)
PP-1		Photo Point 1, Photo 1: 48.165836 / -104.617004	N
PP-1		Photo Point 1, Photo 2: 48.165836 / -104.617004	NW
PP-1		Photo Point 1, Photo 3: 48.165836 / -104.617004	SW
PP-2		Photo Point 2, Photo 1: 48.167038 / -104.617645	N
PP-2		Photo Point 2, Photo 2: 48.167038 / -104.617645	E
PP-2		Photo Point 2, Photo 3: 48.167038 / -104.617645	S
PP-2		Photo Point 2, Photo 4: 48.167038 / -104.617645	W
PP-3		Photo Point 3, Photo 1: 48.16716 / -104.619606	E
PP-3		Photo Point 3, Photo 2: 48.16716 / -104.619606	S
PP-3		Photo Point 3, Photo 3: 48.16716 / -104.619606	W
PP-3		Photo Point 3, Photo 4: 48.16716 / -104.619606	N
PP-4		Photo Point 4, Photo 1: 48.166012 / -104.619835	N
PP-4		Photo Point 4, Photo 2: 48.166012 / -104.619835	NE
PP-4		Photo Point 4, Photo 3: 48.166012 / -104.619835	NW
PP-5		Photo Point 5 (Pano): 48.164421 / -104.616943	221
PP-6		Photo Point 6 (Pano): 48.162872 / -104.620232	0
PP-7		Photo Point 7 (Pano): 48.164448 / -104.618835	180
T-1 start		Transect 1 start: 48.167465 / -104.618301	220
T-1 end		Transect 1 end: 48.165768 / -104.619057	30
T-2 start		Transect 2 start: 48.164039 / -104.619043	130
T-2 end		Transect 2 end: 48.163334 / -104.618011	310
DP-1U		Upland soil pit #1: 48.163729 / -104.617384	
DP-1W		Wetland soil pit #1: 48.163785 / -104.61745	
DP-2U		Upland soil pit #2: 48.166432 / -104.618452	
DP-2W		Wetland soil pit #2: 48.166514 / -104.618436	

Comments / Problems: _____

GPS SURVEYING

Using a resource grade GPS survey the items on the checklist below. Collect at least 3 location points set at a 5 second recording rate. Record file numbers for site in designated GPS field notebook.

GPS Checklist:

- ☒ Upland/wetland boundary.
- ☒ 4-6 landmarks that are recognizable on the aerial photograph.
- ☒ Start and End points of vegetation transect(s).
- ☒ Photograph reference points.
- ☒ Groundwater monitoring well locations.
- ☐ Bird nest boxes.

Comments / Problems: _____

WETLAND DELINEATION

(attach COE delineation forms)

At each site conduct these checklist items:

- ☒ Delineate wetlands according to the 1987 Army COE manual and regional supplement.
- ☒ Delineate wetland – upland boundary onto aerial photograph.

Comments / Problems: _____

FUNCTIONAL ASSESSMENT

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

Comments / Problems: _____

MAINTENANCE

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

If yes, do they need to be repaired? NA

If yes, describe the problems below and indicate if any actions were taken to remedy the problems.

Were man-made structures built or installed to impound water or control water flow into or out of the wetland? No

If yes, are the structures working properly and in good working order? NA

If no, describe the problems below.

Comments / Problems: _____

WILDLIFE

Birds

Were man-made nesting structures installed? No

If yes, type of structure: _____ How many? _____

Are the nesting structures being used? NA

Do the nesting structures need repairs? _____

Mammals and Herptiles

Mammal and Herptile Species	Number Observed	Indirect Indication of Use			
		Tracks	Scat	Burrows	Other
Garter snake	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Deer sp.		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Rabbit sp.		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Additional Activities Checklist:

NA Macroinvertebrate Sampling (if required)

Comments / Problems: Site contained no standing water during 2017 site visit which might be limiting wildlife use - especially waterfowl species and mammals that would routinely come to the site to drink.

BIRD SURVEY – FIELD DATA SHEET

Site: **Big Muddy** Date: **7/12/17**
Survey Time: _____ to _____

[illegible]

BEHAVIOR CODES

BP = One of a breeding pair

BD = Breeding display

F = Foraging

FO = Flyover

L = Loafing

N = Nesting

HABITAT CODES

AB = Aquatic bed

FO = Forested

I = Island

MA = Marsh

MF = Mud Flat

OW = Open Water

SS = Scrub/Shrub

UP = Upland buffer

WM = Wet meadow

US = Unconsolidated shore

Weather: _____

Notes: Ducks could be heard on adjacent property but not seen due to height of vegetation.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Big Muddy City/County: Roosevelt Sampling Date: 12-Jul-17
 Applicant/Owner: MDT State: MT Sampling Point: DP-1U
 Investigator(s): M. Traxler Section, Township, Range: S 21 T 28N R 55E
 Landform (hillslope, terrace, etc.): Shoulder slope Local relief (concave, convex, none): flat Slope: 10.0% 5.7 °
 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 <input type="radio"/> No <input checked="" type="radio"/>	Is the Sampled Area within a Wetland? Yes <input type="radio"/> No <input checked="" type="radio"/>
Hydric Soil Present? Yes <input type="radio"/> No <input checked="" type="radio"/>	
Wetland Hydrology Present? Yes <input type="radio"/> No <input checked="" type="radio"/>	
Remarks: Data point in upland, vegetation community 14.	

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size: 30 Foot Radius)		Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status	FWS Region: -?- Dominance Test worksheet:	
1. _____	0	<input type="checkbox"/>			Number of Dominant Species That are OBL, FACW, or FAC: <u>0</u> (A)	
2. _____	0	<input type="checkbox"/>			Total Number of Dominant Species Across All Strata: <u>2</u> (B)	
3. _____	0	<input type="checkbox"/>			Percent of dominant Species That Are OBL, FACW, or FAC: <u>0.0%</u> (A/B)	
4. _____	0	<input type="checkbox"/>				
	0	= Total Cover				
Sapling/Shrub Stratum (Plot size: 15 Foot Radius)					Prevalence Index worksheet:	
1. _____	0	<input type="checkbox"/>			Total % Cover of: Multiply by:	
2. _____	0	<input type="checkbox"/>			OBL species <u>0</u> x 1 = <u>0</u>	
3. _____	0	<input type="checkbox"/>			FACW species <u>0</u> x 2 = <u>0</u>	
4. _____	0	<input type="checkbox"/>			FAC species <u>5</u> x 3 = <u>15</u>	
5. _____	0	<input type="checkbox"/>			FACU species <u>25</u> x 4 = <u>100</u>	
	0	= Total Cover			UPL species <u>42</u> x 5 = <u>210</u>	
Herb Stratum (Plot size: 5 Foot Radius)					Column Totals: <u>72</u> (A) <u>325</u> (B)	
1. <u>Agropyron cristatum</u>	10	<input type="checkbox"/>	13.9%	UPL	Prevalence Index = B/A = <u>4.514</u>	
2. <u>Bromus inermis</u>	30	<input checked="" type="checkbox"/>	41.7%	UPL		
3. <u>Iva axillaris</u>	5	<input type="checkbox"/>	6.9%	FAC		
4. <u>Lactuca tatarica</u>	1	<input type="checkbox"/>	1.4%	UPL		
5. <u>Pascopyrum smithii</u>	25	<input checked="" type="checkbox"/>	34.7%	FACU		
6. <u>Symphoricarpos albus</u>	1	<input type="checkbox"/>	1.4%	UPL		
7. _____		<input type="checkbox"/>	0.0%			
8. _____		<input type="checkbox"/>	0.0%			
9. _____	0	<input type="checkbox"/>	0.0%			
10. _____	0	<input type="checkbox"/>	0.0%			
	72	= Total Cover				
Woody Vine Stratum (Plot size: 30 Foot Radius)					Hydrophytic Vegetation Indicators:	
1. _____	0	<input type="checkbox"/>			<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation	
2. _____	0	<input type="checkbox"/>			<input type="checkbox"/> 2 - Dominance Test is > 50%	
	0	= Total Cover			<input type="checkbox"/> 3 - Prevalence Index is ≤ 3.0 ¹	
% Bare Ground in Herb Stratum <u>20</u>					<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
Remarks:					<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)	
Upland vegetation in this plot is dominated by smooth brome and western wheat grass.					¹ Indicators of hydric soil and wetland hydrology must be present.	
					Hydrophytic Vegetation Present? Yes <input type="radio"/> No <input checked="" type="radio"/>	

Soil

Sampling Point: DP-1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		%	Redox Features			Texture	Remarks
	Color (moist)			Color (moist)	%	Type ¹		
0-16	10YR	3/1	100				Silty Clay Loam	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix S4	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Coastal Prairie Redox (A16) (LRR F, G, H)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Dark Surface (S7) (LRR G)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> High Plains Depressions (F16)	
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	(LRR H outside of MLRA 72 and 73)	
<input type="checkbox"/> 1 cm Muck (A9) (LRR F,G,H)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Reduced Vertic (F18)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Sandy Muck Mineral (S1)	<input type="checkbox"/> Redox depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	<input type="checkbox"/> High Plains Depressions (F16)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.	
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	(MLRA 72 and 73 of LRR H)		

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input type="radio"/> No <input checked="" type="radio"/>
Remarks: No hydric soil indicators observed during field survey. Soil not moist to 16".	

Hydrology

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one required; check all that apply)			
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Dry Season Water Table (C2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	(where tilled)	
<input type="checkbox"/> Drift deposits (B3)	(where not tilled)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-neutral Test (D5)	
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Frost Heave Hummocks (D7) (LRR F)	
Field Observations: Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____		Wetland Hydrology Present? Yes <input type="radio"/> No <input checked="" type="radio"/>	
Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available: _____			
Remarks: No evidence of hydrologic indicators observed during field survey. Very dry.			

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Big Muddy City/County: Roosevelt Sampling Date: 12-Jul-17
 Applicant/Owner: MDT State: MT Sampling Point: DP-1W
 Investigator(s): M. Traxler Section, Township, Range: S 21 T 28N R 55E
 Landform (hillslope, terrace, etc.): Lowland Local relief (concave, convex, none): flat Slope: 0.0% 0.0 °
 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 <input checked="" type="radio"/> No <input type="radio"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="radio"/> No <input type="radio"/>
Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	
Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	
Remarks: Data point in excavated basin south of highway, on southeastern edge of wetland cell.	

VEGETATION - Use scientific names of plants

Dominant Species? FWS Region: GP

Tree Stratum (Plot size: 30 Foot Radius)	Absolute % Cover	Rel. Strat. Cover	Indicator Status	Dominance Test worksheet:
1. _____	0	<input type="checkbox"/>		Number of Dominant Species That are OBL, FACW, or FAC: <u>3</u> (A)
2. _____	0	<input type="checkbox"/>		Total Number of Dominant Species Across All Strata: <u>3</u> (B)
3. _____	0	<input type="checkbox"/>		Percent of dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)
4. _____	0	<input type="checkbox"/>		
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Foot Radius)				Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species <u>50</u> x 1 = <u>50</u> FACW species <u>25</u> x 2 = <u>50</u> FAC species <u>25</u> x 3 = <u>75</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>100</u> (A) <u>175</u> (B) Prevalence Index = B/A = <u>1.75</u>
1. _____	0	<input type="checkbox"/>		
2. _____	0	<input type="checkbox"/>		
3. _____	0	<input type="checkbox"/>		
4. _____	0	<input type="checkbox"/>		
5. _____	0	<input type="checkbox"/>		
	0	= Total Cover		
Herb Stratum (Plot size: 5 Foot Radius)				
1. <u>Hordeum jubatum</u>	25	<input checked="" type="checkbox"/> 25.0%	FACW	
2. <u>Iva axillaris</u>	25	<input checked="" type="checkbox"/> 25.0%	FAC	
3. <u>Puccinellia nuttalliana</u>	50	<input checked="" type="checkbox"/> 50.0%	OBL	
4. _____	0	<input type="checkbox"/> 0.0%		
5. _____	0	<input type="checkbox"/> 0.0%		
6. _____	0	<input type="checkbox"/> 0.0%		
7. _____	0	<input type="checkbox"/> 0.0%		
8. _____	0	<input type="checkbox"/> 0.0%		
9. _____	0	<input type="checkbox"/> 0.0%		
10. _____	0	<input type="checkbox"/> 0.0%		
	100	= Total Cover		
Woody Vine Stratum (Plot size: 30 Foot Radius)				
1. _____	0	<input type="checkbox"/>		
2. _____	0	<input type="checkbox"/>		
	0	= Total Cover		
% Bare Ground in Herb Stratum <u>5</u>				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is > 50% <input checked="" type="checkbox"/> 3 - Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present.
Remarks: Vegetation at data point unchanged from 2016.				Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/>

Soil

Sampling Point: DP-1W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)									
Depth (inches)	Matrix		%	Redox Features				Texture	Remarks
	Color (moist)			Color (moist)	%	Type ¹	Loc ²		
0-8	10YR	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

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Coastal Prairie Redox (A16) (LRR F, G, H)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Dark Surface (S7) (LRR G)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> High Plains Depressions (F16)	
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	(LRR H outside of MLRA 72 and 73)	
<input type="checkbox"/> 1 cm Muck (A9) (LRR F,G,H)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Reduced Vertic (F18)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Sandy Muck Mineral (S1)	<input type="checkbox"/> Redox depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	<input type="checkbox"/> High Plains Depressions (F16)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.	
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	(MLRA 72 and 73 of LRR H)		

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/>
Remarks: Soil moist to within 2" of surface.	

Hydrology

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> Salt Crust (B11) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Invertebrates (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Dry Season Water Table (C2) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift deposits (B3) (where not tilled) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Water-Stained Leaves (B9)		<input checked="" type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input checked="" type="checkbox"/> FAC-neutral Test (D5) <input type="checkbox"/> Frost Heave Hummocks (D7) (LRR F)	
Field Observations: Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____		Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	
Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available: _____			
Remarks: Soil moist to within 2" of surface, but no saturation or water in pit.			

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Big Muddy City/County: Roosevelt Sampling Date: 12-Jul-17
 Applicant/Owner: MDT State: MT Sampling Point: DP-2U
 Investigator(s): M. Traxler Section, Township, Range: S 21 T 28N R 55E
 Landform (hillslope, terrace, etc.): Lowland Local relief (concave, convex, none): flat Slope: 0.0% 0.0 °
 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 <input type="radio"/> No <input checked="" type="radio"/> Hydric Soil Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Wetland Hydrology Present? Yes <input type="radio"/> No <input checked="" type="radio"/>	Is the Sampled Area within a Wetland? Yes <input type="radio"/> No <input checked="" type="radio"/>
Remarks: Data point located in upland area between wetland depressions.	

VEGETATION - Use scientific names of plants

Dominant Species? FWS Region: GP

Tree Stratum (Plot size: 30 Foot Radius)	Absolute % Cover	Rel. Strat. Cover	Indicator Status	Dominance Test worksheet:
1. _____	0	<input type="checkbox"/>		Number of Dominant Species That are OBL, FACW, or FAC: <u>1</u> (A)
2. _____	0	<input type="checkbox"/>		Total Number of Dominant Species Across All Strata: <u>2</u> (B)
3. _____	0	<input type="checkbox"/>		Percent of dominant Species That Are OBL, FACW, or FAC: <u>50.0%</u> (A/B)
4. _____	0	<input type="checkbox"/>		
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Foot Radius)				Dominance Test worksheet:
1. _____	0	<input type="checkbox"/>		Total % Cover of: <u>0</u> Multiply by: <u>1</u> = <u>0</u> OBL species
2. _____	0	<input type="checkbox"/>		FACW species <u>30</u> x <u>2</u> = <u>60</u>
3. _____	0	<input type="checkbox"/>		FAC species <u>0</u> x <u>3</u> = <u>0</u>
4. _____	0	<input type="checkbox"/>		FACU species <u>17</u> x <u>4</u> = <u>68</u>
5. _____	0	<input type="checkbox"/>		UPL species <u>15</u> x <u>5</u> = <u>75</u>
	0	= Total Cover		Column Totals: <u>62</u> (A) <u>203</u> (B)
Herb Stratum (Plot size: 5 Foot Radius)				Prevalence Index worksheet:
1. Bromus inermis	5	<input type="checkbox"/>	8.1% UPL	Prevalence Index = B/A = <u>3.274</u>
2. Distichlis spicata	30	<input checked="" type="checkbox"/>	48.4% FACW	
3. Grindelia squarrosa	10	<input type="checkbox"/>	16.1% UPL	
4. Pascopyrum smithii	15	<input checked="" type="checkbox"/>	24.2% FACU	
5. Melilotus officinalis	2	<input type="checkbox"/>	3.2% FACU	
6. _____	0	<input type="checkbox"/>	0.0%	
7. _____	0	<input type="checkbox"/>	0.0%	
8. _____	0	<input type="checkbox"/>	0.0%	
9. _____	0	<input type="checkbox"/>	0.0%	
10. _____	0	<input type="checkbox"/>	0.0%	
	62	= Total Cover		
Woody Vine Stratum (Plot size: 30 Foot Radius)				
1. _____	0	<input type="checkbox"/>		
2. _____	0	<input type="checkbox"/>		
	0	= Total Cover		
% Bare Ground in Herb Stratum <u>40</u>				Hydrophytic Vegetation Indicators:
				<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is > 50% <input type="checkbox"/> 3 - Prevalence Index is ≤ 3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
Remarks: Dominance test is not greater than 50% and prevalence index is above 3.0.				Hydrophytic Vegetation Present? Yes <input type="radio"/> No <input checked="" type="radio"/>

Soil

Sampling Point: DP-2U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)									
Depth (inches)	Matrix		%	Redox Features			Texture	Remarks	
	Color (moist)			Color (moist)	%	Type ¹			Loc ²
0-16	10YR	4/2	100				Silty Clay	Soil moist at 12"	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Stratified Layers (A5) (LRR F) <input type="checkbox"/> 1 cm Muck (A9) (LRR F,G,H) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Muck Mineral (S1) <input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H) <input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	<input type="checkbox"/> Sandy Gleyed Matrix S4 <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Loamy Mucky Mineral (F1) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox depressions (F8) <input type="checkbox"/> High Plains Depressions (F16) <div style="text-align: center;">(MLRA 72 and 73 of LRR H)</div>
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Indicators for Problematic Hydric Soils³: <input type="checkbox"/> 1 cm Muck (A9) (LRR I, J) <input type="checkbox"/> Coastal Prairie Redox (A16) (LRR F, G, H) <input type="checkbox"/> Dark Surface (S7) (LRR G) <input type="checkbox"/> High Plains Depressions (F16) <div style="text-align: center;">(LRR H outside of MLRA 72 and 73)</div> <input type="checkbox"/> Reduced Vertic (F18) <input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
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Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input type="radio"/> No <input checked="" type="radio"/>
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Remarks:
No hydric soil indicators observed during field survey.

Hydrology

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one required; check all that apply)</u> <div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) </div> <div style="width: 50%;"> <input type="checkbox"/> Salt Crust (B11) <input type="checkbox"/> Aquatic Invertebrates (B13) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Dry Season Water Table (C2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <div style="text-align: center;">(where not tilled)</div> <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks) </div> </div>	<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <div style="text-align: center;">(where tilled)</div> <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> FAC-neutral Test (D5) <input type="checkbox"/> Frost Heave Hummocks (D7) (LRR F)
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Field Observations: Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____	Wetland Hydrology Present? Yes <input type="radio"/> No <input checked="" type="radio"/>
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Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available: _____

Remarks:
No primary or secondary hydrology indicators observed during field survey.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Big Muddy City/County: Roosevelt Sampling Date: 29-Jun-16
 Applicant/Owner: MDT State: MT Sampling Point: DP-2W
 Investigator(s): M. and T. Traxler Section, Township, Range: S 21 T 28N R 55E
 Landform (hillslope, terrace, etc.): Lowland Local relief (concave, convex, none): flat Slope: 0.0% 0.0 °
 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 <input checked="" type="radio"/> No <input type="radio"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="radio"/> No <input type="radio"/>
Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	
Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	
Remarks: Data point located on concave, depressional salt flat.	

VEGETATION - Use scientific names of plants

Dominant Species? FWS Region: GP

Tree Stratum (Plot size: 30 Foot Radius)	Absolute % Cover	Rel. Strat. Cover	Indicator Status	Dominance Test worksheet:
1. _____	0	<input type="checkbox"/>	_____	Number of Dominant Species That are OBL, FACW, or FAC: <u>3</u> (A)
2. _____	0	<input type="checkbox"/>	_____	Total Number of Dominant Species Across All Strata: <u>3</u> (B)
3. _____	0	<input type="checkbox"/>	_____	Percent of dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)
4. _____	0	<input type="checkbox"/>	_____	
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Foot Radius)				Prevalence Index worksheet:
1. _____	0	<input type="checkbox"/>	_____	
2. _____	0	<input type="checkbox"/>	_____	Total % Cover of: Multiply by:
3. _____	0	<input type="checkbox"/>	_____	OBL species <u>25</u> x 1 = <u>25</u>
4. _____	0	<input type="checkbox"/>	_____	FACW species <u>30</u> x 2 = <u>60</u>
5. _____	0	<input type="checkbox"/>	_____	FAC species <u>20</u> x 3 = <u>60</u>
	0	= Total Cover		FACU species <u>0</u> x 4 = <u>0</u>
	0			UPL species <u>0</u> x 5 = <u>0</u>
Herb Stratum (Plot size: 5 Foot Radius)				Column Totals: <u>75</u> (A) <u>145</u> (B)
1. Distichlis spicata	20	<input checked="" type="checkbox"/>	26.7% FACW	Prevalence Index = B/A = <u>1.933</u>
2. Puccinellia nuttalliana	25	<input checked="" type="checkbox"/>	33.3% OBL	
3. Suaeda calceoliformis	5	<input type="checkbox"/>	6.7% FACW	
4. Hordeum jubatum	5	<input type="checkbox"/>	6.7% FACW	
5. Sonchus arvensis	20	<input checked="" type="checkbox"/>	26.7% FAC	
6. _____	0	<input type="checkbox"/>	0.0%	
7. _____	0	<input type="checkbox"/>	0.0%	
8. _____	0	<input type="checkbox"/>	0.0%	
9. _____	0	<input type="checkbox"/>	0.0%	
10. _____	0	<input type="checkbox"/>	0.0%	
	75	= Total Cover		
Woody Vine Stratum (Plot size: 30 Foot Radius)				
1. _____	0	<input type="checkbox"/>	_____	
2. _____	0	<input type="checkbox"/>	_____	
	0	= Total Cover		
% Bare Ground in Herb Stratum <u>20</u>				
Remarks:				
100% of dominant species are OBL, FACW, or FAC. Prevalence index < 3.0.				

Hydrophytic Vegetation Indicators:

☒ 1 - Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is > 50%

☒ 3 - Prevalence Index is ≤ 3.0¹

☐ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation¹ (Explain)

¹ Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Soil

Sampling Point: DP-2W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)										
Depth (inches)	Matrix		%	Redox Features			Type ¹	Loc ²	Texture	Remarks
	Color (moist)			Color (moist)	%					
0-15	10YR	4/2	95	7.5YR	4/6	5	C	M	Silty Clay	Soil is as moist as DP-2U.

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Coastal Prairie Redox (A16) (LRR F, G, H)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Dark Surface (S7) (LRR G)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> High Plains Depressions (F16)	
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	(LRR H outside of MLRA 72 and 73)	
<input type="checkbox"/> 1 cm Muck (A9) (LRR F,G,H)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Reduced Vertic (F18)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Sandy Muck Mineral (S1)	<input type="checkbox"/> Redox depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	<input type="checkbox"/> High Plains Depressions (F16)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.	
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	(MLRA 72 and 73 of LRR H)		

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/>
Remarks: Soil meets NTCHS technical standard for hydric soil and had been inundated earlier in the spring.	

Hydrology

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> Salt Crust (B11) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Invertebrates (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Dry Season Water Table (C2) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift deposits (B3) (where not tilled) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Water-Stained Leaves (B9)		<input checked="" type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled) <input type="checkbox"/> Crayfish Burrows (C8) <input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input checked="" type="checkbox"/> FAC-neutral Test (D5) <input type="checkbox"/> Frost Heave Hummocks (D7) (LRR F)	
Field Observations: Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____		Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	
Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available: _____			
Remarks: Soil moist at 6".			

MDT MONTANA WETLAND ASSESSMENT FORM (revised March 2008)

1. **Project Name:** Big Muddy 2. **MDT Project #:** NH 1-10(626) 3. **Control #:** 4058-001
 3. **Evaluation Date:** July 12, 2017 4. **Evaluator(s):** Mark Traxler 5. **Wetland/Site #(s):** North Cell - Created
 6. **Wetland Location(s):** Township 28 N, Range 55 E, Section 21; Township N, Range E, Section
Approximate Stationing or Roadposts: ~639.75 on Hwy 2

Watershed: 12 - Lower Missouri **County:** Roosevelt

7. **Evaluating Agency:** Respec for MDT

8. **Wetland Size (acre):** (visually estimated)
7.39 (measured, e.g. GPS)

Purpose of Evaluation:

- ☐ Wetland potentially affected by MDT project
☐ Mitigation wetlands; pre-construction
☒ Mitigation wetlands; post-construction
☐ Other

9. **Assessment Area (AA) Size (acre):** (visually estimated)
 (see manual for determining AA) 7.39 (measured, e.g. GPS)

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA (See manual for definitions.)

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

Comments:

11. **ESTIMATED RELATIVE ABUNDANCE** (of similarly classified sites within the same Major Montana Watershed Basin; see manual.)
abundant

12. GENERAL CONDITION OF AA

i. **Disturbance:** Use matrix below to select the appropriate response; see manual for Montana listed noxious weed and aquatic nuisance vegetation species 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	---
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%.	---	---	---
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%.	---	---	---

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, and other exotic vegetation 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 have had only seasonal saturation the last two years allowing for some emergent vegetation to establish. 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 one is forested) classes	---	NA	NA	NA
2 (or 1 if forested) classes	---	NA	NA	NA
1 class, but not a monoculture	mod	←NO	YES→	---
1 class, monoculture (1 species comprises 90% of total cover)	---	NA	NA	NA

Comments: Vegetation is predominantly emergent. No woody overstory associated with creek.

Wetland/Site #(s): North Cell - Created

14A. HABITAT FOR FEDERALLY LISTED OR PROPOSED THREATENED OR ENDANGERED PLANTS OR ANIMALS**i. AA is Documented (D) or Suspected (S) to contain:** Check box based on definitions in manual.

- 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: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
Functional Point/Rating	---	---	---	---	---	---	0L

Sources for documented use (e.g. observations, records): USFWS database for Roosevelt County**14B. HABITAT FOR PLANTS OR ANIMALS RATED S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM**

Do not include species listed in 14A above.

i. AA is Documented (D) or Suspected (S) to contain: Check box based on definitions in manual.

- Primary or critical habitat (list species) ☐ D ☐ S _____
 Secondary habitat (list species) ☐ D ☒ S Blue Heron (S3), Loggerhead Shrike (S3B)
 Incidental habitat (list species) ☐ D ☒ S Greater Sage-Grouse (S2)
 No usable habitat ☐ S

ii. Rating: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
S1 Species Functional Point/Rating	---	---	---	---	---	---	---
S2 and S3 Species Functional Point/Rating	---	---	---	.5M	---	---	---

Sources for documented use (e.g. observations, records): Suspected species identified by MTNHP for Roosevelt County. Loggerhead Shrike observed onsite.**14C. GENERAL WILDLIFE HABITAT RATING****i. Evidence of Overall Wildlife Use in the AA:** Check substantial, moderate, or low based on supporting evidence.☐ **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
☐ interview with local biologist 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
☐ interview with local biologist with knowledge of 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
☐ interview with local biologist 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 manual for further definitions of these terms].

Structural Diversity (see #13)	<input type="checkbox"/> High								<input checked="" type="checkbox"/> Moderate								<input type="checkbox"/> Low			
Class Cover Distribution (all vegetated classes)	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input checked="" type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> 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
<input checked="" type="checkbox"/> Low Disturbance at AA (see #12i)	---	---	---	---	---	---	---	---	E	---	---	---	---	---	---	---	---	---	---	---
<input type="checkbox"/> Moderate Disturbance at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<input type="checkbox"/> High Disturbance at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

iii. Rating: Use the conclusions from i and ii above and the matrix below to select the functional point and rating.

Evidence of Wildlife Use (i)	Wildlife Habitat Features Rating (ii)			
	<input checked="" type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
<input type="checkbox"/> Substantial	---	---	---	---
<input checked="" type="checkbox"/> Moderate	.9H	---	---	---
<input type="checkbox"/> Minimal	---	---	---	---

Comments: Several bird species and animal tracks observed during site visits. No surface water in excavated cells in 2017 - limiting factor in providing habitat for waterfowl and other wildlife.

Wetland/Site #(s): North Cell - Created**14D. GENERAL FISH HABITAT** ☒ **NA** (proceed to 14E)

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 the NA box and proceed to 14E.

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].

Type of Fishery: ☐ Cold Water (CW) ☐ Warm Water (WW) Use the CW or WW guidelines in the manual to complete the matrix.

i. Habitat Quality and Known / Suspected Fish Species in AA: Use matrix to select the functional point and rating.

Duration of Surface Water in AA	<input type="checkbox"/> Permanent / Perennial						<input type="checkbox"/> Seasonal / Intermittent						<input type="checkbox"/> Temporary / Ephemeral					
Aquatic Hiding / Resting / Escape Cover	<input type="checkbox"/> Optimal		<input type="checkbox"/> Adequate		<input type="checkbox"/> Poor		<input type="checkbox"/> Optimal		<input type="checkbox"/> Adequate		<input type="checkbox"/> Poor		<input type="checkbox"/> Optimal		<input type="checkbox"/> Adequate		<input type="checkbox"/> 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	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier II or Native Game fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier III or Introduced Game fish	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Non-Game Tier IV or No fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Sources used for identifying fish spp. potentially found in AA: _____

ii. Modified Rating: NOTE: Modified score cannot exceed 1.0 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? ☐ YES, reduce score in i by 0.1 = ____ or ☒ **NO**

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area; specify in comments) for native fish or introduced game fish? ☐ YES, add to score in i or iia 0.1 = ____ or ☒ **NO**

iii. Final Score and Rating: Comments: Closed wetland cells with no direct surface water inlet or outlet.**14E. FLOOD ATTENUATION** ☐ **NA** (proceed to 14F)

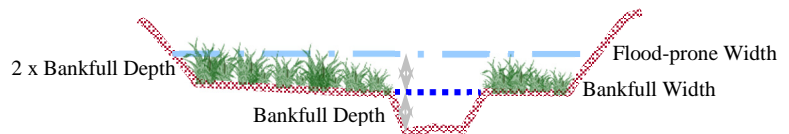
Applies only to wetlands that are subject to flooding via in-channel or overbank flow.

If wetlands in AA are not flooded from in-channel or overbank flow, check the NA box and proceed to 14F.

Entrenchment Ratio (ER) Estimation (see manual for additional guidance). Entrenchment ratio = (flood-prone width) / (bankfull width).

Flood-prone width = estimated horizontal projection of where 2 X maximum bankfull depth elevation intersects the floodplain on each side of the stream.

_____ / _____ = _____
flood prone width / bankfull width = entrenchment ratio



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

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	<input type="checkbox"/> Slightly Entrenched C, D, E stream types			<input checked="" type="checkbox"/> Moderately Entrenched B stream type			<input type="checkbox"/> Entrenched A, F, G stream types		
Percent of Flooded Wetland Classified as Forested and/or Scrub/Shrub	<input type="checkbox"/> 75%	<input type="checkbox"/> 25-75%	<input type="checkbox"/> <25%	<input type="checkbox"/> 75%	<input type="checkbox"/> 25-75%	<input checked="" type="checkbox"/> <25%	<input type="checkbox"/> 75%	<input type="checkbox"/> 25-75%	<input type="checkbox"/> <25%
AA contains no outlet or restricted outlet	---	---	---	---	---	.5M	---	---	---
AA contains unrestricted outlet	---	---	---	---	---	---	---	---	---

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? ☐ YES ☒ **NO** **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.

Wetland/Site #(s): North Cell - Created**14F. SHORT AND LONG TERM SURFACE WATER STORAGE** ☐ NA (proceed to 14G)

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, then check the NA box and proceed to 14G.

- i. **Rating:** Working from top to bottom, use the matrix below to select the functional point and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see manual 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	<input checked="" type="checkbox"/> >5 acre feet			<input type="checkbox"/> 1.1 to 5 acre feet			<input type="checkbox"/> ≤1 acre foot		
Duration of Surface Water at Wetlands within the AA	<input checked="" type="checkbox"/> P/P	<input type="checkbox"/> S/I	<input type="checkbox"/> T/E	<input type="checkbox"/> P/P	<input type="checkbox"/> S/I	<input type="checkbox"/> T/E	<input type="checkbox"/> P/P	<input type="checkbox"/> S/I	<input type="checkbox"/> T/E
Wetlands in AA flood or pond ≥ 5 out of 10 years	1H	---	---	---	---	---	---	---	---
Wetlands in AA flood or pond < 5 out of 10 years	---	---	---	---	---	---	---	---	---

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 ☐ NA (proceed to 14H)

Applies to wetland 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, check the NA box and proceed to 14H.

- i. **Rating:** Working from top to bottom, use the matrix below to select the functional point and rating.

Sediment, Nutrient, and Toxicant Input Levels within AA	AA receives or surrounding land use has potential to deliver 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 is on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% Cover of Wetland Vegetation in AA	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
Evidence of Flooding / Ponding in AA	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
AA contains no or restricted outlet	1H	---	---	---	---	---	---	---
AA contains unrestricted outlet	---	---	---	---	---	---	---	---

Comments: Vegetation cover along shoreline around constructed cells has developed to greater than 70%.

14H. SEDIMENT / SHORELINE STABILIZATION ☐ NA (proceed to 14I)

Applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action.
If 14H does not apply, check the NA box and proceed to 14I.

% Cover of Wetland Streambank or Shoreline by Species with Stability Ratings of 6 (see Appendix F).	Duration of Surface Water Adjacent to Rooted Vegetation		
	<input checked="" type="checkbox"/> Permanent / Perennial	<input type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
<input checked="" type="checkbox"/> ≥ 65%	1H	---	---
<input type="checkbox"/> 35-64%	---	---	---
<input type="checkbox"/> < 35%	---	---	---

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 rates (select).

General Fish Habitat Rating (14Di)	General Wildlife Habitat Rating (14Ci)		
	<input checked="" type="checkbox"/> E/H	<input type="checkbox"/> M	<input type="checkbox"/> L
<input type="checkbox"/> E/H	---	---	---
<input type="checkbox"/> M	---	---	---
<input type="checkbox"/> L	---	---	---
<input checked="" type="checkbox"/> NA	H	---	---

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

A	<input checked="" type="checkbox"/> Vegetated Component >5 acres						<input type="checkbox"/> Vegetated Component 1-5 acres						<input type="checkbox"/> Vegetated Component <1 acre					
B	<input checked="" type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S/I	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
T/E/A	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Wetland/Site #(s): North Cell - Created**14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT** (continued)**iii. Modified Rating:** Note: Modified score cannot exceed 1.0 or be less than 0.1.**Vegetated Upland Buffer:** 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).Is there an average 50-foot wide vegetated upland buffer around 75% of the AA's perimeter? ☒ **YES**, add 0.1 to score in ii = .8H ☐ **NO****iv. Final Score and 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 and 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 select the functional point and rating.

Criteria	Duration of Saturation at AA Wetlands <u>FROM GROUNDWATER DISCHARGE</u> or <u>WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM</u>			
	<input checked="" type="checkbox"/> P/P	<input type="checkbox"/> S/I	<input type="checkbox"/> T	<input type="checkbox"/> None
<input checked="" type="checkbox"/> Groundwater Discharge or Recharge	1H	---	---	---
<input type="checkbox"/> Insufficient Data/Information	---			

Comments: _____**14K. UNIQUENESS****i. Rating:** Working from top to bottom, use the matrix below to select the functional point 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)	<input type="checkbox"/> Rare	<input type="checkbox"/> Common	<input type="checkbox"/> Abundant	<input type="checkbox"/> Rare	<input type="checkbox"/> Common	<input type="checkbox"/> Abundant	<input type="checkbox"/> Rare	<input type="checkbox"/> Common	<input checked="" type="checkbox"/> Abundant
<input checked="" type="checkbox"/> Low Disturbance at AA (#12i)	---	---	---	---	---	---	---	---	.3L
<input type="checkbox"/> Moderate Disturbance at AA (#12i)	---	---	---	---	---	---	---	---	---
<input type="checkbox"/> High Disturbance at AA (#12i)	---	---	---	---	---	---	---	---	---

Comments: _____**14L. RECREATION / EDUCATION POTENTIAL**☐ NA (proceed to Overall Summary and Rating page)

Affords 'bonus' points if AA provides a recreational or educational opportunity.

i. Is the AA a known or potential recreational or educational site? ☒ **YES**, go to ii. ☐ **NO**, check the NA box.**ii. Check categories that apply to the AA:** ☒ Educational/Scientific Study ☒ Consumptive Recreational ☒ Non-consumptive recreational
☐ Other: _____**iii. Rating:** Use the matrix below to select the functional point and rating.

Known or Potential Recreational or Educational Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	---
Private ownership with general public access (no permission required)	---	---
Private or public ownership without general public access, or requiring permission for public access	---	---

Comments: MDT-owned site with known hunting.**15. GENERAL SITE NOTES:** _____

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	low 0.00	1.00	0	
B. MT Natural Heritage Program Species Habitat	mod 0.50	1.00	3.70	
C. General Wildlife Habitat	high 0.90	1.00	6.65	*
D. General Fish Habitat	NA	NA	0	
E. Flood Attenuation	mod 0.50	1.00	3.70	
F. Short and Long Term Surface Water Storage	high 1.00	1.00	7.39	*
G. Sediment / Nutrient / Toxicant Removal	high 1.00	1.00	7.39	
H. Sediment / Shoreline Stabilization	high 1.00	1.00	7.39	*
I. Production Export / Food Chain Support	high 0.80	1.00	5.91	
J. Groundwater Discharge / Recharge	high 1.00	1.00	7.39	*
K. Uniqueness	low 0.30	1.00	2.22	
L. Recreation / Education Potential (bonus point)	high 0.20		1.48	
Total Points	7.2	10	53.21 Total Functional Units	
Percent of Possible Score 72% (round to nearest whole number)				

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; if not 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 (AA) RATING: Check the appropriate category based on the criteria outlined above.
☐ I ☒ II ☐ III ☐ IV

MDT MONTANA WETLAND ASSESSMENT FORM (revised March 2008)

1. **Project Name:** Big Muddy 2. **MDT Project #:** NH 1-10(626) 3. **Control #:** 4058-001
 3. **Evaluation Date:** July 12, 2017 4. **Evaluator(s):** Mark Traxler 5. **Wetland/Site #(s):** North Cell - Preservation
 6. **Wetland Location(s):** Township 28 N, Range 55 E, Section 21; Township N, Range E, Section
Approximate Stationing or Roadposts: -639.75 on Hwy 2

Watershed: 12 - Lower Missouri **County:** Roosevelt

7. **Evaluating Agency:** RESPEC for MDT

8. **Wetland Size (acre):** (visually estimated)
0.73 (measured, e.g. GPS)

Purpose of Evaluation:

- ☐ Wetland potentially affected by MDT project
☐ Mitigation wetlands; pre-construction
☒ Mitigation wetlands; post-construction
☐ Other

9. **Assessment Area (AA) Size (acre):** (visually estimated)
 (see manual for determining AA) 0.73 (measured, e.g. GPS)

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA (See manual for definitions.)

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% OF AA
Riverine	Emergent Wetland		Seasonal / Intermittent	100

Comments:

11. **ESTIMATED RELATIVE ABUNDANCE** (of similarly classified sites within the same Major Montana Watershed Basin; see manual.)
common

12. GENERAL CONDITION OF AA

i. **Disturbance:** Use matrix below to select the appropriate response; see manual for Montana listed noxious weed and aquatic nuisance vegetation species 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 buildings; and noxious weed or ANVS cover is 15%.	---	low 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%.	---	---	---
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%.	---	---	---

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, and other exotic vegetation 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 one is forested) classes	---	NA	NA
2 (or 1 if forested) classes	---	NA	NA
1 class, but not a monoculture	mod	←NO	YES→
1 class, monoculture (1 species comprises 90% of total cover)	---	NA	NA

Comments: Emergent vegetation class but is comprised of various species so not considered a monoculture.

Wetland/Site #(s): North Cell - Preservation

14A. HABITAT FOR FEDERALLY LISTED OR PROPOSED THREATENED OR ENDANGERED PLANTS OR ANIMALS**i. AA is Documented (D) or Suspected (S) to contain:** Check box based on definitions in manual.

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: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
Functional Point/Rating	---	---	---	---	---	---	0L

Sources for documented use (e.g. observations, records): USFWS database for Roosevelt County**14B. HABITAT FOR PLANTS OR ANIMALS RATED S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM**

Do not include species listed in 14A above.

i. AA is Documented (D) or Suspected (S) to contain: Check box based on definitions in manual.

Primary or critical habitat (**list species**) ☐ D ☐ S _____
 Secondary habitat (**list species**) ☐ D ☒ S Blue Heron (S3), Loggerhead Shrike (S3B)
 Incidental habitat (**list species**) ☐ D ☒ S Greater Sage-Grouse (S2)
 No usable habitat ☐ S

ii. Rating: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
S1 Species	---	---	---	---	---	---	---
Functional Point/Rating	---	---	---	---	---	---	---
S2 and S3 Species	---	---	---	.5M	---	---	---
Functional Point/Rating	---	---	---	.5M	---	---	---

Sources for documented use (e.g. observations, records): MTNHP tracker for Roosevelt County. Loggerhead Shrike observed onsite.**14C. GENERAL WILDLIFE HABITAT RATING****i. Evidence of Overall Wildlife Use in the AA:** Check substantial, moderate, or low based on supporting evidence.☐ **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
- ☐ interview with local biologist 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
- ☐ interview with local biologist with knowledge of 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
- ☐ interview with local biologist 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 manual for further definitions of these terms].

Structural Diversity (see #13)	<input type="checkbox"/> High								<input checked="" type="checkbox"/> Moderate								<input type="checkbox"/> Low			
	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input checked="" type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> Even			
Class Cover Distribution (all vegetated classes)	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
Duration of Surface Water in ≥ 10% of AA																				
<input checked="" type="checkbox"/> Low Disturbance at AA (see #12i)	---	---	---	---	---	---	---	---	---	H	---	---	---	---	---	---	---	---	---	---
<input type="checkbox"/> Moderate Disturbance at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<input type="checkbox"/> High Disturbance at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

iii. Rating: Use the conclusions from i and ii above and the matrix below to select the functional point and rating.

Evidence of Wildlife Use (i)	Wildlife Habitat Features Rating (ii)			
	<input type="checkbox"/> Exceptional	<input checked="" type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
<input type="checkbox"/> Substantial	---	---	---	---
<input checked="" type="checkbox"/> Moderate	---	.7M	---	---
<input type="checkbox"/> Minimal	---	---	---	---

Comments: Seasonal waterfowl habitat, abundant amphibian breeding areas.

Wetland/Site #(s): North Cell - Preservation**14D. GENERAL FISH HABITAT** ☒ **NA** (proceed to 14E)

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 the NA box and proceed to 14E.

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].

Type of Fishery: ☐ Cold Water (CW) ☐ Warm Water (WW) Use the CW or WW guidelines in the manual to complete the matrix.

i. Habitat Quality and Known / Suspected Fish Species in AA: Use matrix to select the functional point and rating.

Duration of Surface Water in AA	<input type="checkbox"/> Permanent / Perennial						<input type="checkbox"/> Seasonal / Intermittent						<input type="checkbox"/> Temporary / Ephemeral					
Aquatic Hiding / Resting / Escape Cover	<input type="checkbox"/> Optimal		<input type="checkbox"/> Adequate		<input type="checkbox"/> Poor		<input type="checkbox"/> Optimal		<input type="checkbox"/> Adequate		<input type="checkbox"/> Poor		<input type="checkbox"/> Optimal		<input type="checkbox"/> Adequate		<input type="checkbox"/> 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	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier II or Native Game fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier III or Introduced Game fish	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Non-Game Tier IV or No fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Sources used for identifying fish spp. potentially found in AA: _____

ii. Modified Rating: NOTE: Modified score cannot exceed 1.0 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? ☐ **YES**, reduce score in i by 0.1 = ____ or ☒ **NO**

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area; specify in comments) for native fish or introduced game fish? ☐ **YES**, add to score in i or **ii** 0.1 = ____ or ☒ **NO**

iii. Final Score and Rating: _____ **Comments:** _____**14E. FLOOD ATTENUATION** ☐ **NA** (proceed to 14F)

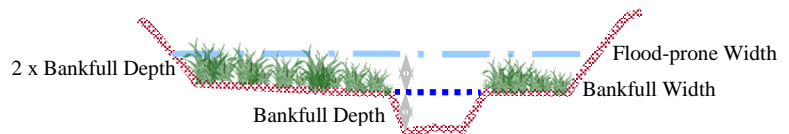
Applies only to wetlands that are subject to flooding via in-channel or overbank flow.

If wetlands in AA are not flooded from in-channel or overbank flow, check the NA box and proceed to 14F.

Entrenchment Ratio (ER) Estimation (see manual for additional guidance). Entrenchment ratio = (flood-prone width) / (bankfull width).

Flood-prone width = estimated horizontal projection of where 2 X maximum bankfull depth elevation intersects the floodplain on each side of the stream.

_____ / _____ = _____
flood prone width / bankfull width = entrenchment ratio



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

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	<input type="checkbox"/> Slightly Entrenched C, D, E stream types			<input checked="" type="checkbox"/> Moderately Entrenched B stream type			<input type="checkbox"/> Entrenched A, F, G stream types		
Percent of Flooded Wetland Classified as Forested and/or Scrub/Shrub	<input type="checkbox"/> 75%	<input type="checkbox"/> 25-75%	<input type="checkbox"/> <25%	<input type="checkbox"/> 75%	<input type="checkbox"/> 25-75%	<input checked="" type="checkbox"/> <25%	<input type="checkbox"/> 75%	<input type="checkbox"/> 25-75%	<input type="checkbox"/> <25%
AA contains no outlet or restricted outlet	---	---	---	---	---	.5M	---	---	---
AA contains unrestricted outlet	---	---	---	---	---	---	---	---	---

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? ☐ **YES** ☒ **NO** **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.

Wetland/Site #(s): North Cell - Preservation**14F. SHORT AND LONG TERM SURFACE WATER STORAGE** ☐ NA (proceed to 14G)

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, then check the NA box and proceed to 14G.

- i. **Rating:** Working from top to bottom, use the matrix below to select the functional point and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see manual 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	<input type="checkbox"/> >5 acre feet			<input type="checkbox"/> 1.1 to 5 acre feet			<input checked="" type="checkbox"/> ≤1 acre foot		
Duration of Surface Water at Wetlands within the AA	<input type="checkbox"/> P/P	<input type="checkbox"/> S/I	<input type="checkbox"/> T/E	<input type="checkbox"/> P/P	<input type="checkbox"/> S/I	<input type="checkbox"/> T/E	<input type="checkbox"/> P/P	<input checked="" type="checkbox"/> S/I	<input type="checkbox"/> T/E
Wetlands in AA flood or pond ≥ 5 out of 10 years	---	---	---	---	---	---	---	.3L	---
Wetlands in AA flood or pond < 5 out of 10 years	---	---	---	---	---	---	---	---	---

Comments: AA is 0.73 acres, without potential to support greater than 1 ft of surface water.

14G. SEDIMENT / NUTRIENT / TOXICANT / RETENTION AND REMOVAL ☐ NA (proceed to 14H)

Applies to wetland 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, check the NA box and proceed to 14H.

- i. **Rating:** Working from top to bottom, use the matrix below to select the functional point and rating.

Sediment, Nutrient, and Toxicant Input Levels within AA	AA receives or surrounding land use has potential to deliver 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 is on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% Cover of Wetland Vegetation in AA	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
Evidence of Flooding / Ponding in AA	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
AA contains no or restricted outlet	1H	---	---	---	---	---	---	---
AA contains unrestricted outlet	---	---	---	---	---	---	---	---

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 ☐ NA (proceed to 14I)

Applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action.
If 14H does not apply, check the NA box and proceed to 14I.

% Cover of Wetland Streambank or Shoreline by Species with Stability Ratings of 6 (see Appendix F).	Duration of Surface Water Adjacent to Rooted Vegetation		
	<input type="checkbox"/> Permanent / Perennial	<input checked="" type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
<input checked="" type="checkbox"/> ≥ 65%	---	.9H	---
<input type="checkbox"/> 35-64%	---	---	---
<input type="checkbox"/> < 35%	---	---	---

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 rates (select).

General Fish Habitat Rating (14Diii)	General Wildlife Habitat Rating (14Ciii)		
	<input type="checkbox"/> E/H	<input checked="" type="checkbox"/> M	<input type="checkbox"/> L
<input type="checkbox"/> E/H	---	---	---
<input type="checkbox"/> M	---	---	---
<input type="checkbox"/> L	---	---	---
<input checked="" type="checkbox"/> NA	---	M	---

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

A	<input type="checkbox"/> Vegetated Component >5 acres						<input type="checkbox"/> Vegetated Component 1-5 acres						<input checked="" type="checkbox"/> Vegetated Component <1 acre					
B	<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input checked="" type="checkbox"/> Moderate		<input type="checkbox"/> Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S/I	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	.3L	---	---
T/E/A	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Wetland/Site #(s): North Cell - Preservation**14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT** (continued)**iii. Modified Rating:** Note: Modified score cannot exceed 1.0 or be less than 0.1.**Vegetated Upland Buffer:** 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).Is there an average 50-foot wide vegetated upland buffer around 75% of the AA's perimeter? ☒ **YES**, add 0.1 to score in ii = 0.40 ☐ **NO****iv. Final Score and Rating:** .4M **Comments:** _____**14J. GROUNDWATER DISCHARGE / RECHARGE**

Check the appropriate indicators in i and 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 select the functional point and rating.

Criteria	Duration of Saturation at AA Wetlands <i>FROM GROUNDWATER DISCHARGE</i> or <i>WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM</i>			
	<input type="checkbox"/> P/P	<input checked="" type="checkbox"/> S/I	<input type="checkbox"/> T	<input type="checkbox"/> None
<input checked="" type="checkbox"/> Groundwater Discharge or Recharge	---	.7M	---	---
<input type="checkbox"/> Insufficient Data/Information	---			

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 select the functional point 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)	<input type="checkbox"/> Rare	<input type="checkbox"/> Common	<input type="checkbox"/> Abundant	<input type="checkbox"/> Rare	<input type="checkbox"/> Common	<input type="checkbox"/> Abundant	<input type="checkbox"/> Rare	<input checked="" type="checkbox"/> Common	<input type="checkbox"/> Abundant
<input checked="" type="checkbox"/> Low Disturbance at AA (#12i)	---	---	---	---	---	---	---	.4M	---
<input type="checkbox"/> Moderate Disturbance at AA (#12i)	---	---	---	---	---	---	---	---	---
<input type="checkbox"/> High Disturbance at AA (#12i)	---	---	---	---	---	---	---	---	---

Comments: _____**14L. RECREATION / EDUCATION POTENTIAL**☐ **NA** (proceed to Overall Summary and Rating page)

Affords 'bonus' points if AA provides a recreational or educational opportunity.

i. Is the AA a known or potential recreational or educational site? ☒ **YES**, go to ii. ☐ **NO**, check the NA box.**ii. Check categories that apply to the AA:** ☒ Educational/Scientific Study ☒ Consumptive Recreational ☒ Non-consumptive recreational
☐ Other: _____**iii. Rating:** Use the matrix below to select the functional point and rating.

Known or Potential Recreational or Educational Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	---
Private ownership with general public access (no permission required)	---	---
Private or public ownership without general public access, or requiring permission for public access	---	---

Comments: MDT-owned site, signs of hunting.**15. GENERAL SITE NOTES:** _____

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	low 0.00	1.00	0	
B. MT Natural Heritage Program Species Habitat	mod 0.50	1.00	0.37	
C. General Wildlife Habitat	mod 0.70	1.00	0.51	*
D. General Fish Habitat	NA	NA	0	
E. Flood Attenuation	mod 0.50	1.00	0.37	
F. Short and Long Term Surface Water Storage	low 0.30	1.00	0.22	*
G. Sediment / Nutrient / Toxicant Removal	high 1.00	1.00	0.73	*
H. Sediment / Shoreline Stabilization	high 0.90	1.00	0.66	
I. Production Export / Food Chain Support	mod 0.40	1.00	0.29	
J. Groundwater Discharge / Recharge	mod 0.70	1.00	0.51	*
K. Uniqueness	mod 0.40	1.00	0.29	
L. Recreation / Education Potential (bonus point)	high 0.20		0.15	
Total Points	5.6	10	4.10	Total Functional Units
Percent of Possible Score 56% (round to nearest whole number)				

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; if not 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 (AA) RATING: Check the appropriate category based on the criteria outlined above.

☐ I ☐ II ☒ III ☐ IV

MDT MONTANA WETLAND ASSESSMENT FORM (revised March 2008)

1. **Project Name:** Big Muddy 2. **MDT Project #:** NH 1-10(626) 3. **Control #:** 4058-001
 3. **Evaluation Date:** July 12, 2017 4. **Evaluator(s):** Mark Traxler 5. **Wetland/Site #(s):** South Cell - Created
 6. **Wetland Location(s):** Township 28 N, Range 55 E, Section 21; Township N, Range E, Section
Approximate Stationing or Roadposts: -639.75 on Hwy 2

Watershed: 12 - Lower Missouri **County:** Roosevelt

7. **Evaluating Agency:** RESPEC for MDT

8. **Wetland Size (acre):** (visually estimated)
4.17 (measured, e.g. GPS)

Purpose of Evaluation:

- ☐ Wetland potentially affected by MDT project
☐ Mitigation wetlands; pre-construction
☒ Mitigation wetlands; post-construction
☐ Other

9. **Assessment Area (AA) Size (acre):** (visually estimated)
 (see manual for determining AA) 4.17 (measured, e.g. GPS)

10. **CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA** (See manual for definitions.)

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% OF AA
Depressional	Emergent Wetland	Excavated	Seasonal / Intermittent	100

Comments:

11. **ESTIMATED RELATIVE ABUNDANCE** (of similarly classified sites within the same Major Montana Watershed Basin; see manual.)
abundant

12. **GENERAL CONDITION OF AA**

i. **Disturbance:** Use matrix below to select the appropriate response; see manual for Montana listed noxious weed and aquatic nuisance vegetation species 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	---
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%.	---	---	---
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%.	---	---	---

Comments (types of disturbance, intensity, season, etc.): Constructed wetland cell with continued vegetation development. AA adjacent to Hwy 2.

ii. **Prominent noxious, aquatic nuisance, and other exotic vegetation 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 one is forested) classes	---	NA	NA	NA
2 (or 1 if forested) classes	---	NA	NA	NA
1 class, but not a monoculture	mod	←NO	YES→	---
1 class, monoculture (1 species comprises 90% of total cover)	---	NA	NA	NA

Comments: Vegetation class only includes emergent wetland but is comprised of various species so not considered a monoculture.

Wetland/Site #(s): South Cell - Created**14A. HABITAT FOR FEDERALLY LISTED OR PROPOSED THREATENED OR ENDANGERED PLANTS OR ANIMALS****i. AA is Documented (D) or Suspected (S) to contain:** Check box based on definitions in manual.

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: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
Functional Point/Rating	---	---	---	---	---	---	0L

Sources for documented use (e.g. observations, records): USFWS database for Roosevelt County**14B. HABITAT FOR PLANTS OR ANIMALS RATED S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM**

Do not include species listed in 14A above.

i. AA is Documented (D) or Suspected (S) to contain: Check box based on definitions in manual.

Primary or critical habitat (**list species**) ☐ D ☐ S _____
 Secondary habitat (**list species**) ☐ D ☒ S Blue Heron (S3), Loggerhead Shrike (S3B)
 Incidental habitat (**list species**) ☐ D ☒ S Greater Sage-Grouse (S2)
 No usable habitat ☐ S

ii. Rating: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
S1 Species Functional Point/Rating	---	---	---	---	---	---	---
S2 and S3 Species Functional Point/Rating	---	---	---	.5M	---	---	---

Sources for documented use (e.g. observations, records): Suspected species identified by MTNHP for Roosevelt County. Loggerhead Shrike observed onsite.**14C. GENERAL WILDLIFE HABITAT RATING****i. Evidence of Overall Wildlife Use in the AA:** Check substantial, moderate, or low based on supporting evidence.☐ **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
- ☐ interview with local biologist 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
- ☐ interview with local biologist with knowledge of 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
- ☐ interview with local biologist 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 manual for further definitions of these terms].

Structural Diversity (see #13)	<input type="checkbox"/> High								<input checked="" type="checkbox"/> Moderate								<input type="checkbox"/> Low			
	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input checked="" type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> Even			
Class Cover Distribution (all vegetated classes)	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
<input checked="" type="checkbox"/> Low Disturbance at AA (see #12i)	---	---	---	---	---	---	---	---	---	H	---	---	---	---	---	---	---	---	---	---
<input type="checkbox"/> Moderate Disturbance at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<input type="checkbox"/> High Disturbance at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

iii. Rating: Use the conclusions from i and ii above and the matrix below to select the functional point and rating.

Evidence of Wildlife Use (i)	Wildlife Habitat Features Rating (ii)			
	<input type="checkbox"/> Exceptional	<input checked="" type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
<input type="checkbox"/> Substantial	---	---	---	---
<input checked="" type="checkbox"/> Moderate	---	.7M	---	---
<input type="checkbox"/> Minimal	---	---	---	---

Comments: Several bird species and signs of wildlife observed during site visits.

Wetland/Site #(s): South Cell - Created**14D. GENERAL FISH HABITAT** ☒ **NA** (proceed to 14E)

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 the NA box and proceed to 14E.

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].

Type of Fishery: ☐ Cold Water (CW) ☐ Warm Water (WW) Use the CW or WW guidelines in the manual to complete the matrix.

i. Habitat Quality and Known / Suspected Fish Species in AA: Use matrix to select the functional point and rating.

Duration of Surface Water in AA	<input type="checkbox"/> Permanent / Perennial						<input type="checkbox"/> Seasonal / Intermittent						<input type="checkbox"/> Temporary / Ephemeral					
Aquatic Hiding / Resting / Escape Cover	<input type="checkbox"/> Optimal		<input type="checkbox"/> Adequate		<input type="checkbox"/> Poor		<input type="checkbox"/> Optimal		<input type="checkbox"/> Adequate		<input type="checkbox"/> Poor		<input type="checkbox"/> Optimal		<input type="checkbox"/> Adequate		<input type="checkbox"/> 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	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier II or Native Game fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier III or Introduced Game fish	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Non-Game Tier IV or No fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Sources used for identifying fish spp. potentially found in AA: _____

ii. Modified Rating: NOTE: Modified score cannot exceed 1.0 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? ☐ YES, reduce score in i by 0.1 = ____ or ☒ **NO**

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area; specify in comments) for native fish or introduced game fish? ☐ YES, add to score in i or **ii** 0.1 = ____ or ☒ **NO**

iii. Final Score and Rating: Comments: Closed wetland cell with no direct surface water inlet or outlet.**14E. FLOOD ATTENUATION** ☐ **NA** (proceed to 14F)

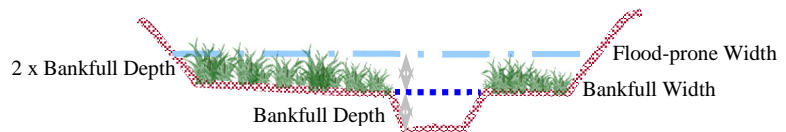
Applies only to wetlands that are subject to flooding via in-channel or overbank flow.

If wetlands in AA are not flooded from in-channel or overbank flow, check the NA box and proceed to 14F.

Entrenchment Ratio (ER) Estimation (see manual for additional guidance). Entrenchment ratio = (flood-prone width) / (bankfull width).

Flood-prone width = estimated horizontal projection of where 2 X maximum bankfull depth elevation intersects the floodplain on each side of the stream.

_____ / _____ = _____
flood prone width / bankfull width = entrenchment ratio



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

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	<input type="checkbox"/> Slightly Entrenched C, D, E stream types			<input checked="" type="checkbox"/> Moderately Entrenched B stream type			<input type="checkbox"/> Entrenched A, F, G stream types		
Percent of Flooded Wetland Classified as Forested and/or Scrub/Shrub	<input type="checkbox"/> 75%	<input type="checkbox"/> 25-75%	<input type="checkbox"/> <25%	<input type="checkbox"/> 75%	<input type="checkbox"/> 25-75%	<input checked="" type="checkbox"/> <25%	<input type="checkbox"/> 75%	<input type="checkbox"/> 25-75%	<input type="checkbox"/> <25%
AA contains no outlet or restricted outlet	---	---	---	---	---	.5M	---	---	---
AA contains unrestricted outlet	---	---	---	---	---	---	---	---	---

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? ☐ YES ☒ **NO** **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.

Wetland/Site #(s): South Cell - Created**14F. SHORT AND LONG TERM SURFACE WATER STORAGE** ☐ NA (proceed to 14G)

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, then check the NA box and proceed to 14G.

- i. **Rating:** Working from top to bottom, use the matrix below to select the functional point and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see manual 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	<input checked="" type="checkbox"/> >5 acre feet			<input type="checkbox"/> 1.1 to 5 acre feet			<input type="checkbox"/> ≤1 acre foot		
Duration of Surface Water at Wetlands within the AA	<input type="checkbox"/> P/P	<input checked="" type="checkbox"/> S/I	<input type="checkbox"/> T/E	<input type="checkbox"/> P/P	<input type="checkbox"/> S/I	<input type="checkbox"/> T/E	<input type="checkbox"/> P/P	<input type="checkbox"/> S/I	<input type="checkbox"/> T/E
Wetlands in AA flood or pond ≥ 5 out of 10 years	---	.9H	---	---	---	---	---	---	---
Wetlands in AA flood or pond < 5 out of 10 years	---	---	---	---	---	---	---	---	---

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 ☐ NA (proceed to 14H)

Applies to wetland 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, check the NA box and proceed to 14H.

- i. **Rating:** Working from top to bottom, use the matrix below to select the functional point and rating.

Sediment, Nutrient, and Toxicant Input Levels within AA	AA receives or surrounding land use has potential to deliver 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 is on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% Cover of Wetland Vegetation in AA	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
Evidence of Flooding / Ponding in AA	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
AA contains no or restricted outlet	1H	---	---	---	---	---	---	---
AA contains unrestricted outlet	---	---	---	---	---	---	---	---

Comments: Vegetation cover within constructed cell estimated to be >70%.

14H. SEDIMENT / SHORELINE STABILIZATION ☐ NA (proceed to 14I)

Applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action.
If 14H does not apply, check the NA box and proceed to 14I.

% Cover of Wetland Streambank or Shoreline by Species with Stability Ratings of 6 (see Appendix F).	Duration of Surface Water Adjacent to Rooted Vegetation		
	<input type="checkbox"/> Permanent / Perennial	<input checked="" type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
<input checked="" type="checkbox"/> ≥ 65%	---	.9H	---
<input type="checkbox"/> 35-64%	---	---	---
<input type="checkbox"/> < 35%	---	---	---

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 rates (select).

General Fish Habitat Rating (14Di)	General Wildlife Habitat Rating (14Ci)		
	<input type="checkbox"/> E/H	<input checked="" type="checkbox"/> M	<input type="checkbox"/> L
<input type="checkbox"/> E/H	---	---	---
<input type="checkbox"/> M	---	---	---
<input type="checkbox"/> L	---	---	---
<input checked="" type="checkbox"/> NA	---	M	---

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

A	<input type="checkbox"/> Vegetated Component >5 acres						<input checked="" type="checkbox"/> Vegetated Component 1-5 acres						<input type="checkbox"/> Vegetated Component <1 acre					
B	<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input checked="" type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S/I	---	---	---	---	---	---	---	---	---	.3L	---	---	---	---	---	---	---	---
T/E/A	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Wetland/Site #(s): South Cell - Created**14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT** (continued)**iii. Modified Rating:** Note: Modified score cannot exceed 1.0 or be less than 0.1.**Vegetated Upland Buffer:** 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).Is there an average 50-foot wide vegetated upland buffer around 75% of the AA's perimeter? ☒ **YES**, add 0.1 to score in ii = 0.40 ☐ **NO****iv. Final Score and Rating:** .4M **Comments:** Average 50-foot upland buffer surrounding mitigation site.**14J. GROUNDWATER DISCHARGE / RECHARGE**

Check the appropriate indicators in i and 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 select the functional point and rating.

Criteria	Duration of Saturation at AA Wetlands <i>FROM GROUNDWATER DISCHARGE</i> or <i>WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM</i>			
	<input type="checkbox"/> P/P	<input checked="" type="checkbox"/> S/I	<input type="checkbox"/> T	<input type="checkbox"/> None
<input checked="" type="checkbox"/> Groundwater Discharge or Recharge	---	.7M	---	---
<input type="checkbox"/> Insufficient Data/Information	---			

Comments: _____

14K. UNIQUENESS**i. Rating:** Working from top to bottom, use the matrix below to select the functional point 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)	<input type="checkbox"/> Rare	<input type="checkbox"/> Common	<input type="checkbox"/> Abundant	<input type="checkbox"/> Rare	<input type="checkbox"/> Common	<input type="checkbox"/> Abundant	<input type="checkbox"/> Rare	<input type="checkbox"/> Common	<input checked="" type="checkbox"/> Abundant
<input checked="" type="checkbox"/> Low Disturbance at AA (#12i)	---	---	---	---	---	---	---	---	.3L
<input type="checkbox"/> Moderate Disturbance at AA (#12i)	---	---	---	---	---	---	---	---	---
<input type="checkbox"/> High Disturbance at AA (#12i)	---	---	---	---	---	---	---	---	---

Comments: _____

14L. RECREATION / EDUCATION POTENTIAL☐ NA (proceed to Overall Summary and Rating page)

Affords 'bonus' points if AA provides a recreational or educational opportunity.

i. Is the AA a known or potential recreational or educational site? ☒ **YES**, go to ii. ☐ **NO**, check the NA box.**ii. Check categories that apply to the AA:** ☐ Educational/Scientific Study ☒ Consumptive Recreational ☒ Non-consumptive recreational
☐ Other: _____**iii. Rating:** Use the matrix below to select the functional point and rating.

Known or Potential Recreational or Educational Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	---
Private ownership with general public access (no permission required)	---	---
Private or public ownership without general public access, or requiring permission for public access	---	---

Comments: MDT-owned site with known hunting.**15. GENERAL SITE NOTES:** _____

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	low 0.00	1.00	0	
B. MT Natural Heritage Program Species Habitat	mod 0.50	1.00	2.09	
C. General Wildlife Habitat	mod 0.70	1.00	2.92	*
D. General Fish Habitat	NA	NA	0	
E. Flood Attenuation	mod 0.50	1.00	2.09	
F. Short and Long Term Surface Water Storage	high 0.90	1.00	3.75	*
G. Sediment / Nutrient / Toxicant Removal	high 1.00	1.00	4.17	
H. Sediment / Shoreline Stabilization	high 0.90	1.00	3.75	*
I. Production Export / Food Chain Support	mod 0.40	1.00	1.67	
J. Groundwater Discharge / Recharge	mod 0.70	1.00	2.92	*
K. Uniqueness	low 0.30	1.00	1.25	
L. Recreation / Education Potential (bonus point)	high 0.20		0.83	
Total Points	6.1	10	25.44	Total Functional Units
Percent of Possible Score 61% (round to nearest whole number)				

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; if not 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 (AA) RATING: Check the appropriate category based on the criteria outlined above.
☐ I ☐ II ☒ III ☐ IV

MDT MONTANA WETLAND ASSESSMENT FORM (revised March 2008)

1. **Project Name:** Big Muddy 2. **MDT Project #:** NH 1-10(626) 3. **Control #:** 4058-001
 3. **Evaluation Date:** July 12, 2017 4. **Evaluator(s):** Mark Traxler 5. **Wetland/Site #(s):** South Cell - Preservation
 6. **Wetland Location(s):** Township 28 N, Range 55 E, Section 21; Township N, Range E, Section
Approximate Stationing or Roadposts: ~639.75 on Hwy 2

Watershed: 12 - Lower Missouri **County:** Roosevelt

7. **Evaluating Agency:** RESPEC for MDT

8. **Wetland Size (acre):** (visually estimated)
1.83 (measured, e.g. GPS)

Purpose of Evaluation:

- ☐ Wetland potentially affected by MDT project
☐ Mitigation wetlands; pre-construction
☒ Mitigation wetlands; post-construction
☐ Other

9. **Assessment Area (AA) Size (acre):** (visually estimated)
 (see manual for determining AA) 1.83 (measured, e.g. GPS)

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA (See manual for definitions.)

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% OF AA
Riverine	Emergent Wetland		Seasonal / Intermittent	30
Depressional	Emergent Wetland		Seasonal / Intermittent	70

Comments:

11. **ESTIMATED RELATIVE ABUNDANCE** (of similarly classified sites within the same Major Montana Watershed Basin; see manual.)
common

12. GENERAL CONDITION OF AA

i. **Disturbance:** Use matrix below to select the appropriate response; see manual for Montana listed noxious weed and aquatic nuisance vegetation species 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 buildings; and noxious weed or ANVS cover is ≤15%.	---	low 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%.	---	---	---
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%.	---	---	---

Comments (types of disturbance, intensity, season, etc.): Grazing eliminated within AA. AA not disturbed during construction.

ii. **Prominent noxious, aquatic nuisance, and other exotic vegetation 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 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 one is forested) classes	---	NA	NA	NA
2 (or 1 if forested) classes	---	NA	NA	NA
1 class, but not a monoculture	mod	←NO	YES→	---
1 class, monoculture (1 species comprises ≥90% of total cover)	---	NA	NA	NA

Comments: Emergent vegetation class comprised of various obligate species including Typha and Schoenoplectus

Wetland/Site #(s): South Cell - Preservation**14A. HABITAT FOR FEDERALLY LISTED OR PROPOSED THREATENED OR ENDANGERED PLANTS OR ANIMALS****i. AA is Documented (D) or Suspected (S) to contain:** Check box based on definitions in manual.

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: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
Functional Point/Rating	---	---	---	---	---	---	0L

Sources for documented use (e.g. observations, records): USFWS database for Roosevelt County**14B. HABITAT FOR PLANTS OR ANIMALS RATED S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM**

Do not include species listed in 14A above.

i. AA is Documented (D) or Suspected (S) to contain: Check box based on definitions in manual.

Primary or critical habitat (**list species**) ☐ D ☐ S _____
 Secondary habitat (**list species**) ☐ D ☒ S Blue Heron (S3), Loggerhead Shrike (S3B)
 Incidental habitat (**list species**) ☐ D ☒ S Greater Sage-Grouse (S2)
 No usable habitat ☐ S

ii. Rating: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
S1 Species Functional Point/Rating	---	---	---	---	---	---	---
S2 and S3 Species Functional Point/Rating	---	---	---	.5M	---	---	---

Sources for documented use (e.g. observations, records): MTNHP tracker for Roosevelt County. Loggerhead Shrike observed onsite.**14C. GENERAL WILDLIFE HABITAT RATING****i. Evidence of Overall Wildlife Use in the AA:** Check substantial, moderate, or low based on supporting evidence.☐ **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
- ☐ interview with local biologist 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
- ☐ interview with local biologist with knowledge of 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
- ☐ interview with local biologist 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 manual for further definitions of these terms].

Structural Diversity (see #13)	<input type="checkbox"/> High								<input checked="" type="checkbox"/> Moderate								<input type="checkbox"/> Low			
Class Cover Distribution (all vegetated classes)	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input checked="" type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> 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
<input checked="" type="checkbox"/> Low Disturbance at AA (see #12i)	---	---	---	---	---	---	---	---	---	H	---	---	---	---	---	---	---	---	---	---
<input type="checkbox"/> Moderate Disturbance at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<input type="checkbox"/> High Disturbance at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

iii. Rating: Use the conclusions from i and ii above and the matrix below to select the functional point and rating.

Evidence of Wildlife Use (i)	Wildlife Habitat Features Rating (ii)			
	<input type="checkbox"/> Exceptional	<input checked="" type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
<input type="checkbox"/> Substantial	---	---	---	---
<input checked="" type="checkbox"/> Moderate	---	.7M	---	---
<input type="checkbox"/> Minimal	---	---	---	---

Comments: _____

Wetland/Site #(s): South Cell - Preservation**14D. GENERAL FISH HABITAT** ☒ **NA** (proceed to 14E)

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 the NA box and proceed to 14E.

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].

Type of Fishery: ☐ Cold Water (CW) ☐ Warm Water (WW) Use the CW or WW guidelines in the manual to complete the matrix.

i. Habitat Quality and Known / Suspected Fish Species in AA: Use matrix to select the functional point and rating.

Duration of Surface Water in AA	<input type="checkbox"/> Permanent / Perennial						<input type="checkbox"/> Seasonal / Intermittent						<input type="checkbox"/> Temporary / Ephemeral					
Aquatic Hiding / Resting / Escape Cover	<input type="checkbox"/> Optimal		<input type="checkbox"/> Adequate		<input type="checkbox"/> Poor		<input type="checkbox"/> Optimal		<input type="checkbox"/> Adequate		<input type="checkbox"/> Poor		<input type="checkbox"/> Optimal		<input type="checkbox"/> Adequate		<input type="checkbox"/> 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	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier II or Native Game fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier III or Introduced Game fish	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Non-Game Tier IV or No fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Sources used for identifying fish spp. potentially found in AA: _____

ii. Modified Rating: NOTE: Modified score cannot exceed 1.0 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? ☐ YES, reduce score in i by 0.1 = ____ or ☒ **NO**

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area; specify in comments) for native fish or introduced game fish? ☐ YES, add to score in i or **ii** 0.1 = ____ or ☒ **NO**

iii. Final Score and Rating: _ Comments: _____**14E. FLOOD ATTENUATION** ☐ **NA** (proceed to 14F)

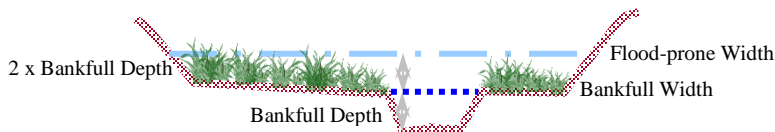
Applies only to wetlands that are subject to flooding via in-channel or overbank flow.

If wetlands in AA are not flooded from in-channel or overbank flow, check the NA box and proceed to 14F.

Entrenchment Ratio (ER) Estimation (see manual for additional guidance). Entrenchment ratio = (flood-prone width) / (bankfull width).

Flood-prone width = estimated horizontal projection of where 2 X maximum bankfull depth elevation intersects the floodplain on each side of the stream.

_____ / _____ = _____
flood prone width / bankfull width = entrenchment ratio



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

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	<input type="checkbox"/> Slightly Entrenched C, D, E stream types			<input checked="" type="checkbox"/> Moderately Entrenched B stream type			<input type="checkbox"/> Entrenched A, F, G stream types		
Percent of Flooded Wetland Classified as Forested and/or Scrub/Shrub	<input type="checkbox"/> 75%	<input type="checkbox"/> 25-75%	<input type="checkbox"/> <25%	<input type="checkbox"/> 75%	<input type="checkbox"/> 25-75%	<input checked="" type="checkbox"/> <25%	<input type="checkbox"/> 75%	<input type="checkbox"/> 25-75%	<input type="checkbox"/> <25%
AA contains no outlet or restricted outlet	---	---	---	---	---	---	---	---	---
AA contains unrestricted outlet	---	---	---	---	---	.4M	---	---	---

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? ☐ YES ☒ **NO** **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.

Wetland/Site #(s): South Cell - Preservation**14F. SHORT AND LONG TERM SURFACE WATER STORAGE** ☐ NA (proceed to 14G)

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, then check the NA box and proceed to 14G.

- i. **Rating:** Working from top to bottom, use the matrix below to select the functional point and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see manual 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	<input type="checkbox"/> >5 acre feet			<input type="checkbox"/> 1.1 to 5 acre feet			<input checked="" type="checkbox"/> ≤1 acre foot		
Duration of Surface Water at Wetlands within the AA	<input type="checkbox"/> P/P	<input type="checkbox"/> S/I	<input type="checkbox"/> T/E	<input type="checkbox"/> P/P	<input type="checkbox"/> S/I	<input type="checkbox"/> T/E	<input type="checkbox"/> P/P	<input checked="" type="checkbox"/> S/I	<input type="checkbox"/> T/E
Wetlands in AA flood or pond ≥ 5 out of 10 years	---	---	---	---	---	---	---	.3L	---
Wetlands in AA flood or pond < 5 out of 10 years	---	---	---	---	---	---	---	---	---

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 ☐ NA (proceed to 14H)

Applies to wetland 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, check the NA box and proceed to 14H.

- i. **Rating:** Working from top to bottom, use the matrix below to select the functional point and rating.

Sediment, Nutrient, and Toxicant Input Levels within AA	AA receives or surrounding land use has potential to deliver 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 is on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% Cover of Wetland Vegetation in AA	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
Evidence of Flooding / Ponding in AA	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
AA contains no or restricted outlet	---	---	---	---	---	---	---	---
AA contains unrestricted outlet	.9H	---	---	---	---	---	---	---

Comments: Cover greater than 70%, undisturbed during construction.

14H. SEDIMENT / SHORELINE STABILIZATION ☐ NA (proceed to 14I)

Applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action.
If 14H does not apply, check the NA box and proceed to 14I.

% Cover of Wetland Streambank or Shoreline by Species with Stability Ratings of ≥6 (see Appendix F).	Duration of Surface Water Adjacent to Rooted Vegetation		
	<input checked="" type="checkbox"/> Permanent / Perennial	<input type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
<input checked="" type="checkbox"/> ≥ 65%	1H	---	---
<input type="checkbox"/> 35-64%	---	---	---
<input type="checkbox"/> < 35%	---	---	---

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 rates (select).

General Fish Habitat Rating (14Diil)	General Wildlife Habitat Rating (14Ciil)		
	<input type="checkbox"/> E/H	<input checked="" type="checkbox"/> M	<input type="checkbox"/> L
<input type="checkbox"/> E/H	---	---	---
<input type="checkbox"/> M	---	---	---
<input type="checkbox"/> L	---	---	---
<input checked="" type="checkbox"/> NA	---	M	---

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

A	<input type="checkbox"/> Vegetated Component >5 acres						<input checked="" type="checkbox"/> Vegetated Component 1-5 acres						<input type="checkbox"/> Vegetated Component <1 acre					
B	<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input checked="" type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S/I	---	---	---	---	---	---	---	---	.6M	---	---	---	---	---	---	---	---	---
T/E/A	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Wetland/Site #(s): South Cell - Preservation**14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT** (continued)iii. **Modified Rating:** Note: Modified score cannot exceed 1.0 or be less than 0.1.**Vegetated Upland Buffer:** Area with $\geq 30\%$ plant cover, $\leq 15\%$ noxious weed or ANVS cover, AND that is not subjected to periodic mechanical mowing or clearing (unless for weed control).Is there an average ≥ 50 -foot wide vegetated upland buffer around $\geq 75\%$ of the AA's perimeter? ☒ **YES**, add 0.1 to score in ii = .7M ☐ **NO**iv. **Final Score and Rating:** .7M **Comments:****14J. GROUNDWATER DISCHARGE / RECHARGE**

Check the appropriate indicators in i and 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 select the functional point and rating.

Criteria	Duration of Saturation at AA Wetlands <i>FROM GROUNDWATER DISCHARGE</i> or <i>WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM</i>			
	<input type="checkbox"/> P/P	<input checked="" type="checkbox"/> S/I	<input type="checkbox"/> T	<input type="checkbox"/> None
<input checked="" type="checkbox"/> Groundwater Discharge or Recharge	---	.7M	---	---
<input type="checkbox"/> Insufficient Data/Information	---			

Comments: _____

14K. UNIQUENESSi. **Rating:** Working from top to bottom, use the matrix below to select the functional point 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)	<input type="checkbox"/> Rare	<input type="checkbox"/> Common	<input type="checkbox"/> Abundant	<input type="checkbox"/> Rare	<input type="checkbox"/> Common	<input type="checkbox"/> Abundant	<input type="checkbox"/> Rare	<input checked="" type="checkbox"/> Common	<input type="checkbox"/> Abundant
<input checked="" type="checkbox"/> Low Disturbance at AA (#12i)	---	---	---	---	---	---	---	.4M	---
<input type="checkbox"/> Moderate Disturbance at AA (#12i)	---	---	---	---	---	---	---	---	---
<input type="checkbox"/> High Disturbance at AA (#12i)	---	---	---	---	---	---	---	---	---

Comments: _____

14L. RECREATION / EDUCATION POTENTIAL☐ NA (proceed to Overall Summary and Rating page)

Affords 'bonus' points if AA provides a recreational or educational opportunity.

i. **Is the AA a known or potential recreational or educational site?** ☒ **YES**, go to ii. ☐ **NO**, check the NA box.ii. **Check categories that apply to the AA:** ☐ Educational/Scientific Study ☒ Consumptive Recreational ☒ Non-consumptive recreational
☐ Other: _____iii. **Rating:** Use the matrix below to select the functional point and rating.

Known or Potential Recreational or Educational Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	---
Private ownership with general public access (no permission required)	---	---
Private or public ownership without general public access, or requiring permission for public access	---	---

Comments: MDT-owned site with known hunting.**15. GENERAL SITE NOTES:** _____

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	low 0.00	1.00	0	
B. MT Natural Heritage Program Species Habitat	mod 0.50	1.00	0.92	
C. General Wildlife Habitat	mod 0.70	1.00	1.28	*
D. General Fish Habitat	NA	NA	0	
E. Flood Attenuation	mod 0.40	1.00	0.73	
F. Short and Long Term Surface Water Storage	low 0.30	1.00	0.55	
G. Sediment / Nutrient / Toxicant Removal	high 0.90	1.00	1.65	*
H. Sediment / Shoreline Stabilization	high 1.00	1.00	1.83	*
I. Production Export / Food Chain Support	mod 0.70	1.00	1.28	
J. Groundwater Discharge / Recharge	mod 0.70	1.00	1.28	*
K. Uniqueness	mod 0.40	1.00	0.73	
L. Recreation / Education Potential (bonus point)	high 0.20		0.37	
Total Points	5.8	10	10.62	Total Functional Units
Percent of Possible Score 58% (round to nearest whole number)				

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; if not 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 (AA) RATING: Check the appropriate category based on the criteria outlined above.

☐ I ☐ II ☒ III ☐ IV

APPENDIX C

PROJECT AREA PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Big Muddy Creek Mitigation Site
Roosevelt County, Montana

Big Muddy: Northern Property Photographs



Photo Point: 1
Bearing: North

Location: SE Property Corner
Year: 2011

Photo Point: 1
Bearing: North

Location: SE Property Corner
Year: 2013



Photo Point: 1
Bearing: North

Location: SE Property Corner
Year: 2014

Photo Point: 1
Bearing: North

Location: SE Property Corner
Year: 2015



Photo Point: 1
Bearing: North

Location: SE Property Corner
Year: 2016

Photo Point: 1
Bearing: North

Location: SE Property Corner
Year: 2017

Big Muddy: Northern Property Photographs



Photo Point: 1 Location: SE Property Corner
Bearing: Northwest Year: 2011

Photo Point: 1 Location: SE Property Corner
Bearing: Northwest Year: 2013



Photo Point: 1 Location: SE Property Corner
Bearing: Northwest Year: 2014

Photo Point: 1 Location: SE Property Corner
Bearing: Northwest Year: 2015



Photo Point: 1 Location: SE Property Corner
Bearing: Northwest Year: 2016

Photo Point: 1 Location: SE Property Corner
Bearing: Northwest Year: 2017

Big Muddy: Northern Property Photographs



Photo Point: 1 Location: SE Property Corner
Bearing: Southwest Year: 2011

Photo Point: 1 Location: SE Property Corner
Bearing: Southwest Year: 2013



Photo Point: 1 Location: SE Property Corner
Bearing: Southwest Year: 2014







Photo Point: 1 Location: SE Property Corner
Bearing: Southwest Year: 2015



Photo Point: 1 Location: SE Property Corner
Bearing: Southwest Year: 2016

Photo Point: 1 Location: SE Property Corner
Bearing: Southwest Year: 2017

Big Muddy: Northern Property Photographs

			
Photo Point: 2 Bearing: North	Location: NE Property Corner Year: 2011	Photo Point: 2 Bearing: North	Location: NE Property Corner Year: 2013
			
Photo Point: 2 Bearing: North	Location: NE Property Corner Year: 2014	Photo Point: 2 Bearing: North	Location: NE Property Corner Year: 2015
			
Photo Point: 2 Bearing: North	Location: NE Property Corner Year: 2016	Photo Point: 2 Bearing: North	Location: NE Property Corner Year: 2017

Big Muddy: Northern Property Photographs



Photo Point: 2
Bearing: East

Location: NE Property Corner
Year: 2011



Photo Point: 2
Bearing: East

Location: NE Property Corner
Year: 2013



Photo Point: 2
Bearing: East

Location: NE Property Corner
Year: 2014



Photo Point: 2
Bearing: East

Location: NE Property Corner
Year: 2015



Photo Point: 2
Bearing: East

Location: NE Property Corner
Year: 2016



Photo Point: 2
Bearing: East

Location: NE Property Corner
Year: 2017

Big Muddy: Northern Property Photographs



Photo Point: 2
Bearing: South

Location: NE Property Corner
Year: 2011

Photo Point: 2
Bearing: South

Location: NE Property Corner
Year: 2013



Photo Point: 2
Bearing: South

Location: NE Property Corner
Year: 2014

Photo Point: 2
Bearing: South

Location: NE Property Corner
Year: 2015




Photo Point: 2
Bearing: South

Location: NE Property Corner
Year: 2016







Photo Point: 2
Bearing: South

Location: NE Property Corner
Year: 2017







Big Muddy: Northern Property Photographs

			
Photo Point: 2 Bearing: West	Location: NE Property Corner Year: 2011	Photo Point: 2 Bearing: West	Location: NE Property Corner Year: 2013
			
Photo Point: 2 Bearing: West	Location: NE Property Corner Year: 2014	Photo Point: 2 Bearing: West	Location: NE Property Corner Year: 2015
			
Photo Point: 2 Bearing: West	Location: NE Property Corner Year: 2016	Photo Point: 2 Bearing: West	Location: NE Property Corner Year: 2017

Big Muddy: Northern Property Photographs

			
Photo Point: 3 Bearing: East	Location: NW Property Corner Year: 2011	Photo Point: 3 Bearing: East	Location: NW Property Corner Year: 2013
			
Photo Point: 3 Bearing: East	Location: NW Property Corner Year: 2014	Photo Point: 3 Bearing: East	Location: NW Property Corner Year: 2015
			
Photo Point: 3 Bearing: East	Location: NW Property Corner Year: 2016	Photo Point: 3 Bearing: East	Location: NW Property Corner Year: 2017







Big Muddy: Northern Property Photographs

			
Photo Point: 3 Bearing: South	Location: NW Property Corner Year: 2011	Photo Point: 3 Bearing: South	Location: NW Property Corner Year: 2013
			
Photo Point: 3 Bearing: South	Location: NW Property Corner Year: 2014	Photo Point: 3 Bearing: South	Location: NW Property Corner Year: 2015
			
Photo Point: 3 Bearing: South	Location: NW Property Corner Year: 2016	Photo Point: 3 Bearing: South	Location: NW Property Corner Year: 2017

Big Muddy: Northern Property Photographs

			
Photo Point: 3 Bearing: West	Location: NW Property Corner Year: 2011	Photo Point: 3 Bearing: West	Location: NW Property Corner Year: 2013
			
Photo Point: 3 Bearing: West	Location: NW Property Corner Year: 2014	Photo Point: 3 Bearing: West	Location: NW Property Corner Year: 2015
			
Photo Point: 3 Bearing: West	Location: NW Property Corner Year: 2016	Photo Point: 3 Bearing: West	Location: NW Property Corner Year: 2017

Big Muddy: Northern Property Photographs

			
Photo Point: 3 Bearing: North	Location: NW Property Corner Year: 2011	Photo Point: 3 Bearing: North	Location: NW Property Corner Year: 2013
			
Photo Point: 3 Bearing: North	Location: NW Property Corner Year: 2014	Photo Point: 3 Bearing: North	Location: NW Property Corner Year: 2015
			
Photo Point: 3 Bearing: North	Location: NW Property Corner Year: 2016	Photo Point: 3 Bearing: North	Location: NW Property Corner Year: 2017

Big Muddy: Northern Property Photographs



Photo Point: 4
Bearing: North

Location: SW Property Corner
Year: 2011



Photo Point: 4
Bearing: North

Location: SW Property Corner
Year: 2013



Photo Point: 4
Bearing: North

Location: SW Property Corner
Year: 2014



Photo Point: 4
Bearing: North

Location: SW Property Corner
Year: 2015



Photo Point: 4
Bearing: North


Location: SW Property Corner
Year: 2016



Photo Point: 4
Bearing: North

Location: SW Property Corner
Year: 2017

Big Muddy: Northern Property Photographs

	
<p>Photo Point: 4 Location: SW Property Corner Bearing: Northeast Year: 2011</p>	<p>Photo Point: 4 Location: SW Property Corner Bearing: Northeast Year: 2013</p>
	
<p>Photo Point: 4 Location: SW Property Corner Bearing: Northeast Year: 2014</p>	<p>Photo Point: 4 Location: SW Property Corner Bearing: Northeast Year: 2015</p>
	
<p>Photo Point: 4 Location: SW Property Corner Bearing: Northeast Year: 2016</p>	<p>Photo Point: 4 Location: SW Property Corner Bearing: Northeast Year: 2017</p>

Big Muddy: Northern Property Photographs

			
Photo Point: 4 Bearing: Northwest	Location: SW Property Corner Year: 2011	Photo Point: 4 Bearing: Northwest	Location: SW Property Corner Year: 2013
			
Photo Point: 4 Bearing: Northwest	Location: SW Property Corner Year: 2014	Photo Point: 4 Bearing: Northwest	Location: SW Property Corner Year: 2015
			
Photo Point: 4 Bearing: Northwest	Location: SW Property Corner Year: 2016	Photo Point: 4 Bearing: Northwest	Location: SW Property Corner Year: 2017

Big Muddy: Southern Property Photographs



Photo Point 5; Location: NE Property Corner; Bearing 221 degrees; Year 2014



Photo Point 5; Location: NE Property Corner; Bearing 221 degrees; Year 2015



Photo Point 5; Location: NE Property Corner; Bearing 221 degrees; Year 2016



Photo Point 5; Location: NE Property Corner; Bearing 221 degrees; Year 2017

Big Muddy: Southern Property Photographs



Photo Point 6; Location: SW Property Corner; Bearing 0 degrees; Year 2014



Photo Point 6; Location: SW Property Corner; Bearing 0 degrees; Year 2015



Photo Point 6; Location: SW Property Corner; Bearing 0 degrees; Year 2016



Photo Point 6; Location: SW Property Corner; Bearing 0 degrees; Year 2017

Big Muddy: Southern Property Photographs



Photo Point 7; Location: NW Property Corner; Bearing 180 degrees; Year 2014



Photo Point 7; Location: NW Property Corner; Bearing 180 degrees; Year 2015



Photo Point 7; Location: NW Property Corner; Bearing 180 degrees; Year 2016





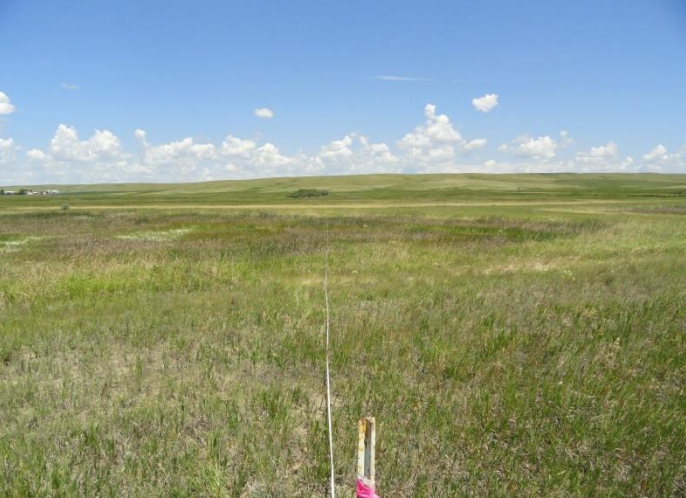



Photo Point 7; Location: NW Property Corner; Bearing 180 degrees; Year 2017

Big Muddy: Transect Photographs

			
Transect 1: Start Bearing: 220 degrees	Location: North Parcel Year: 2011	Transect 1: Start Bearing: 220 degrees	Location: North Parcel Year: 2013
			
Transect 1: Start Bearing: 220 degrees	Location: North Parcel Year: 2014	Transect 1: Start Bearing: 220 degrees	Location: North Parcel Year: 2015
			
Transect 1: Start Bearing: 220 degrees	Location: North Parcel Year: 2016	Transect 1: Start Bearing: 220 degrees	Location: North Parcel Year: 2017

Big Muddy: Transect Photographs

			
Transect 1: Finish Bearing: 40 degrees	Location: North Parcel Year: 2011	Transect 1: Finish Bearing: 40 degrees	Location: North Parcel Year: 2013
			
Transect 1: Finish Bearing: 40 degrees	Location: North Parcel Year: 2014	Transect 1: Finish Bearing: 40 degrees	Location: North Parcel Year: 2015
			
Transect 1: Finish Bearing: 40 degrees	Location: North Parcel Year: 2016	Transect 1: Finish Bearing: 40 degrees	Location: North Parcel Year: 2017

Big Muddy: Transect Photographs



Transect 2: Start Location: South Parcel
Bearing: 130 degrees Year: 2011



Transect 2: Start Location: South Parcel
Bearing: 130 degrees Year: 2013



Transect 2: Start Location: South Parcel
Bearing: 130 degrees Year: 2014



Transect 2: Start Location: South Parcel
Bearing: 130 degrees Year: 2015

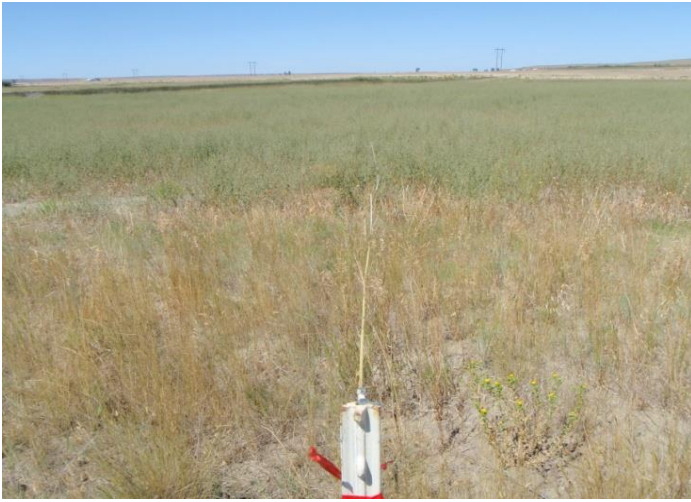


Transect 2: Start Location: South Parcel
Bearing: 130 degrees Year: 2016



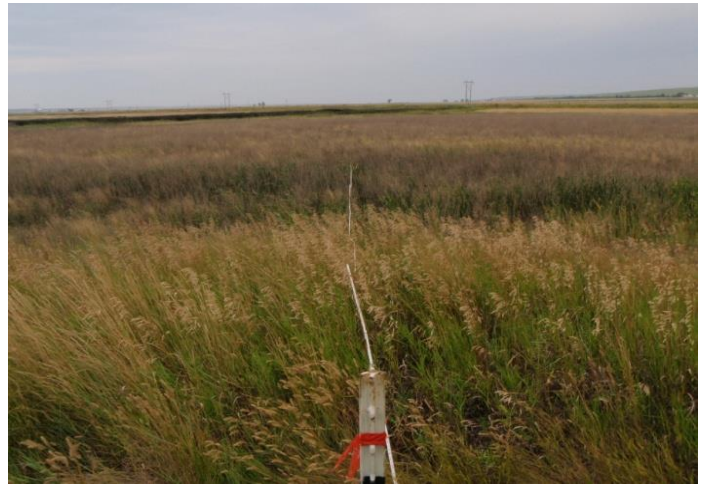
Transect 2: Start Location: South Parcel
Bearing: 130 degrees Year: 2017

Big Muddy: Transect Photographs



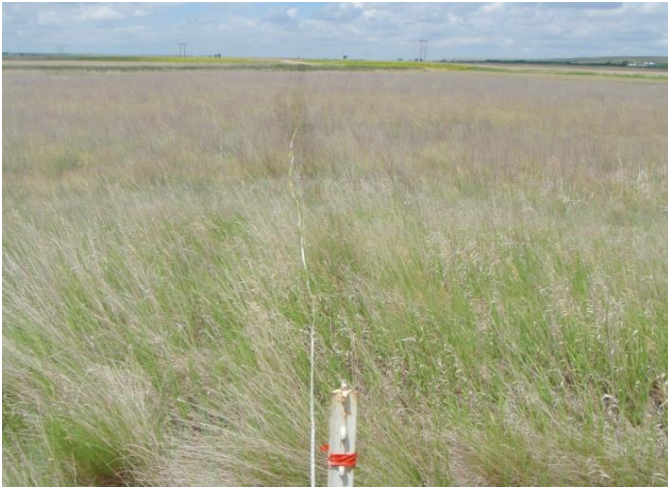
Transect 2: Finish
Bearing: 310 degrees

Location: South Parcel
Year: 2011



Transect 2: Finish
Bearing: 310 degrees

Location: South Parcel
Year: 2013



Transect 2: Finish
Bearing: 310 degrees

Location: South Parcel
Year: 2014



Transect 2: Finish
Bearing: 310 degrees

Location: South Parcel
Year: 2015



Transect 2: Finish
Bearing: 310 degrees

Location: South Parcel
Year: 2016



Transect 2: Finish
Bearing: 310 degrees

Location: South Parcel
Year: 2017

Big Muddy: Transect Photographs



Data Point: DP1W
Year: 2017

Location: South Parcel



Data Point: DP1U
Year: 2017

Location: South Parcel



Data Point: DP2W
Year: 2017

Location: North Parcel



Data Point: DP2U
Year: 2017

Location: North Parcel

APPENDIX D

PROJECT PLAN SHEETS

MDT Wetland Mitigation Monitoring
Big Muddy Creek Mitigation Site
Roosevelt County, Montana

