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# MONTANA DEPARTMENT OF TRANSPORTATION

## WETLAND MITIGATION MONITORING REPORT: YEAR 2016

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### REDSTONE – EAST AND WEST SHERIDAN COUNTY, MONTANA



*Prepared for:*



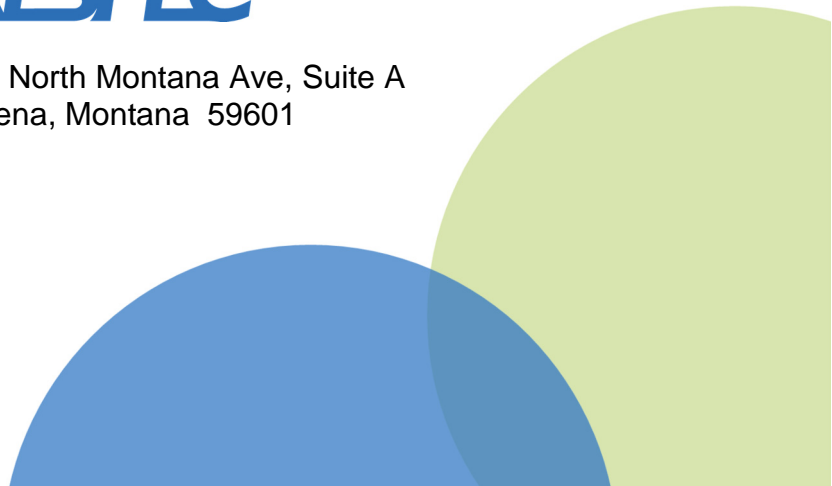
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December 2016



# MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2016

## REDSTONE – EAST AND WEST SHERIDAN COUNTY, MONTANA INITIAL CONSTRUCTION: 2010

MDT Project Number STPP 22-1 (5)14  
Control Number 2024

USACE: NWO-2001-90723-MTH

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December 2016

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Cover: View from west fence corner looking east.



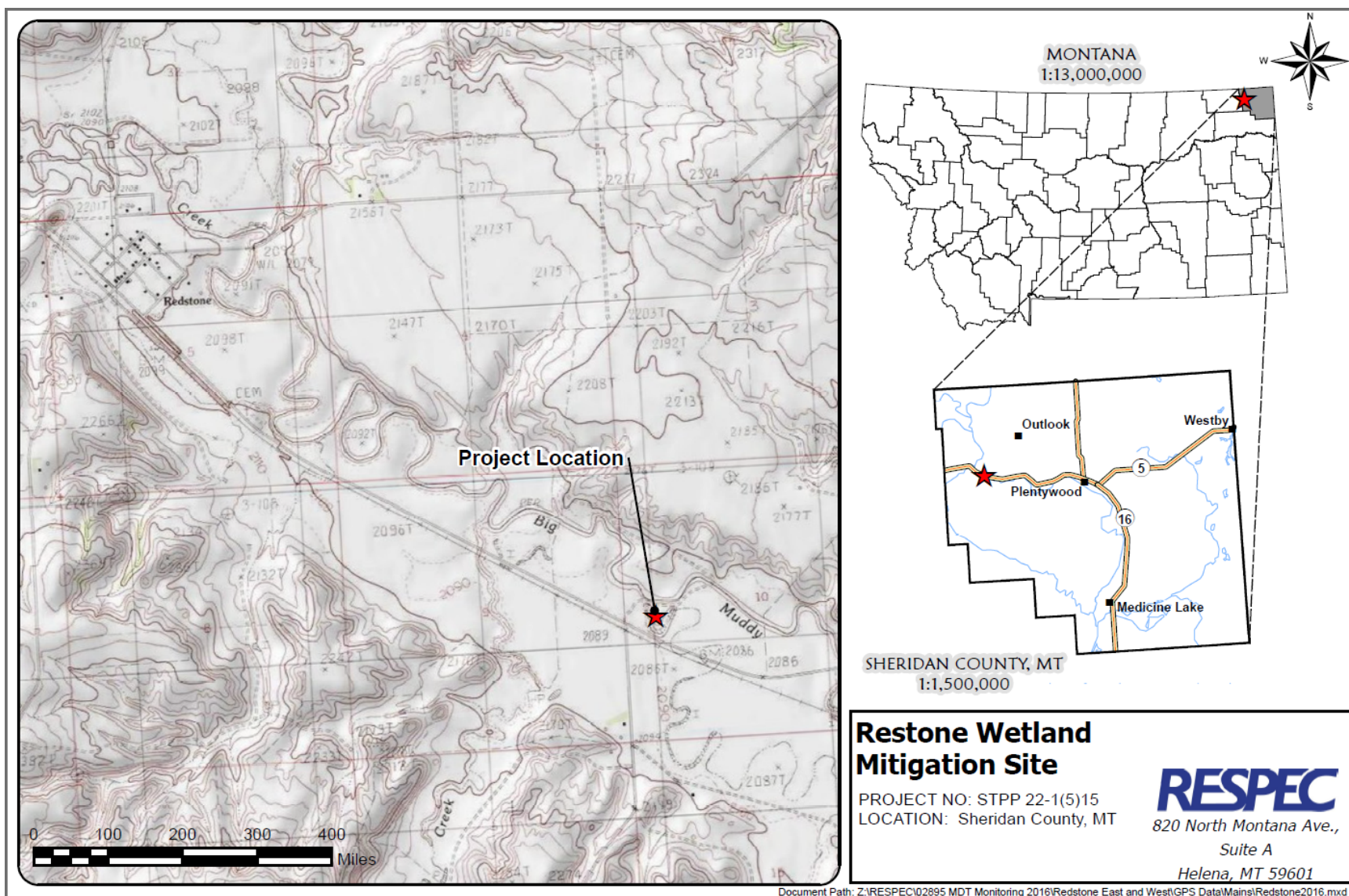
## 1.0 INTRODUCTION

The 2016 Redstone – East and West (E&W) wetland monitoring report documents the fourth year of postconstruction monitoring results collected at the Redstone – E&W wetland mitigation site. This site was developed to mitigate for impacts associated with the Redstone – E&W highway reconstruction project located in Sections 2, 4 and 7, Township 35 North, Range 51 East, in Daniels County; Section 1, Township 35 North, Range 51 East; Section 31, Township 36 North, Range 52 East; and Sections 5 and 9, Township 35 North, Range 52 East, in Sheridan County, Montana. According to the US Army Corps of Engineers (USACE) permit (NWO-2001-90723-MTH) and the February 4, 2010, approved wetland mitigation and monitoring proposal prepared by the Montana Department of Transportation (MDT), this highway project resulted in approximately 0.17 acre of permitted wetland fill with a replacement ratio of 2:1, which required 0.34 acre of compensatory wetland mitigation under the authority of Section 404 of the Clean Water Act.

The Redstone – E&W wetland mitigation project is located 2.2 miles southeast of Redstone, Montana, directly along US Highway 5 in the southwest corner of Section 10 and the southeast corner of Section 9, Township 35 North, Range 52 East, Sheridan County, Montana, as shown in Figure 1-1. The site is situated within Watershed #12 – the Lower Missouri River Basin. The wetlands for this project were constructed in 2012 concurrent with the road project impacts by excavating out the point bar of an isolated oxbow along Big Muddy Creek.

MDT staff completed the initial baseline delineation and Montana wetland assessment of the site in June 2002. The project site was agricultural land and had been historically farmed for grass and alfalfa production. A perennial stream (Big Muddy Creek) borders the project on the north and is hydraulically connected to the site via groundwater. The mitigation goal was to create and preserve 0.34 acre of new palustrine emergent/depressional wetland habitat in an existing upland area adjacent to Big Muddy Creek. Aside from creating 0.34 wetland acre, this on-site, permittee-responsible wetland mitigation site does not have any defined performance standards or success criteria. MDT will hold the site in “Fee Title” as part of a long-term management plan and will use MDT personnel and/or contractors to inspect and perform maintenance activities to ensure that this aquatic resource is properly established and protected.

Figures A-2 and A-3 in Appendix A show the 2016 monitoring activity locations and mapped site features, respectively. The MDT Wetland Mitigation Site Monitoring form, 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 presented in Appendix D.



**Figure 1-1.** Project Location of the Redstone – East and West Site.

## 2.0 METHODS

A monitoring site visit was performed on June 28, 2016. Monitoring activity locations were mapped using a global positioning system (GPS) and are illustrated in Figure A-2 (Appendix A). Information for the Wetland Mitigation Site Monitoring form and Wetland Determination Data forms was recorded in the field during the site investigation (Appendix B). Data-collection activities included completing a wetland delineation; wetland/open-water/aquatic habitat boundary mapping; vegetation community mapping; soils, hydrology, and bird- and wildlife-use documentation; photographic documentation; functional assessments; 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 that had been 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 form (Appendix B). Hydrologic assessments allow evaluation of mitigation criteria that address inundation and saturation requirements.

Technical criteria for wetland hydrology guidelines have been established as “permanent or periodic inundation, or soil saturation within 12 inches of the ground surface for a significant period (usually 14 days or 12.5 percent or more during the growing season)” [USACE, 2010]. Systems with continuous inundation or saturation for greater than 12.5 percent of the growing season are considered wetlands. The growing season is defined for purposes of this report as the number of days where a 50 percent probability exists that the minimum daily temperature is greater than or equal to 28.5 degrees Fahrenheit [Environmental Laboratory, 1987]. The Western Regional Climate Center (WRCC) identifies the average growing season recorded at the Redstone, Montana, weather station (246927) as 137 days [2015]. Areas that are defined as wetlands would require 17 days of inundation or saturation within 12 inches of the ground surface to meet the hydrology criteria.

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

### 2.2 VEGETATION

The boundaries of dominant-species-based vegetation communities were determined in the field during the active growing season and subsequently delineated on the 2016 aerial photographs. Community types were named based on the predominant vegetation species that characterized each mapped polygon (Figure A-3, Appendix A). 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).

No vegetation transect has been established at this site because of the perennially inundated conditions of the mitigation area and the deep-water nature of the area directly adjacent to the mitigation footprint.

The *Montana Noxious Weed List* (July 2015) was prepared by the Montana Department of Agriculture [2015] and 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). The locations are denoted with the symbol “x”, “▲”, or “■,” which represent 0–0.1 acre, 0.1–1 acre, or greater than 1 acre in extent, respectively. Cover classes are represented by a T, L, M, or H for less than 1 percent, 1–5 percent, 6–25 percent, and 26–100 percent, respectively.

## 2.3 SOIL

Soil information was obtained from the *Web Soil Survey for Sheridan County* [US Department of Agriculture (USDA), 2013] and in situ soil descriptions. Soil cores were excavated by using a 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 (Version 2.0)* (2010 Regional Supplement) [USACE, 2010]. A description of the soil profile, including hydric 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 jurisdictional wetlands and special aquatic sites, were delineated throughout the project area in accordance with criteria established in the 1987 Wetland Manual and the 2010 Regional Supplement. The technical criteria for hydrophytic vegetation, hydric soil, and wetland hydrology that were described in the 2010 Regional Supplement 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]. The 2016 NWPL scientific and common plant names were used in this report. 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 on the Wetland Determination Data form (Appendix B).

The wetland boundary was determined in the field based on changes in plant communities and/or hydrology, as well as 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 a special aquatic site, an atypical situation, or a problem area. The wetland boundaries were surveyed using a resource-grade GPS unit and imported into GIS format. The reported wetland areas have been calculated using GIS spatial quantification methodology.

## 2.5 WILDLIFE

Observations of use by mammal, reptile, amphibian, and bird species were recorded on the Wetland Mitigation Site Monitoring form during the site visit. Indirect-use indicators, including tracks, scat, burrows, eggshells, skins, feathers, and bones, were 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 for the entire site is maintained and reported each year.

## 2.6 FUNCTIONAL ASSESSMENT

The 2008 MDT MWAM was used to evaluate functions and values on the site during the 2016 site visit. 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. An MWAM form was completed for one assessment area (AA) and included both the existing and created wetlands (Appendix B).

## 2.7 PHOTOGRAPHIC DOCUMENTATION

Monitoring at photo points provides supplemental information that documents conditions of the site's wetlands, uplands, and vegetation transects; site trends; and current land uses that surround the project. Photographs were taken at four photo points that were established in 2013 during the initial 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 ( $\pm 1$  meter) Trimble R1 GNSS GPS receiver and companion Android tablet during the 2016 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, and wetland data points.

## 2.9 MAINTENANCE NEEDS

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



## 3.0 RESULTS

### 3.1 HYDROLOGY

Climate data from the meteorological station at Redstone, Montana (246927), recorded an average annual precipitation rate of 12.61 inches from December 1951 to December 2010. Precipitation data after 2011 was not available from this site. An additional meteorological station, which is located approximately 15.6 miles east of the site in Plentywood, Montana (246586), [WRCC, 2016] recorded an average annual precipitation rate of 13.27 inches from January 1947 to September 2016. The historic precipitation average from January to August 31 was 10.50 inches. The precipitation totals for this same period was 10.09 inches (2012), 11.23 inches (2013), 17.68 inches (2014), 9.18 inches (2015), and 12.63 (2016). These data indicate that the region around the Redstone – E&W site has received near-average precipitation before and during the 2012 and 2013 growing seasons, above-average precipitation in 2014 and 2016, and below-average precipitation in 2015. Note that the area received substantially more rain in July 2016 (4.15 inches) than the long-term average (2.14 inches). This precipitation occurred after the annual site monitoring was completed in June.

The wetland mitigation area is contiguous with a greater-than-2-acre open-water, isolated oxbow of Big Muddy Creek. Water levels within the oxbow are related to water elevations within the creek and fluctuate with seasonal stream flow. Approximately 75 percent of the site was inundated to an average depth of 2.5 feet during the 2013, 2014, and 2015 investigations. Inundation during the 2016 investigation had dropped dramatically at the site as a result of below-average surface-water levels within nearby Big Muddy Creek that provides hydrology within the old oxbow and wetland site. Below-average precipitation and snow pack during the winter of 2015/2016 resulted in below-average water levels region-wide. Surface-water depths ranged from 0.0 to 4.0 feet. The depth at the emergent vegetation/open-water boundary was approximately 1 foot. Wetland areas in 2016 that were inundated in previous years' monitoring exhibited hydrologic characteristics such as saturation to the ground surface, algal mats, and meeting the FAC-Neutral test.

Two data points (DP-01W and DP-01U) were sampled to determine the wetland and upland boundaries. DP-01W is located at the edge of open water of the oxbow and exhibited saturation to the ground surface, algal mats, and saturation visible on aerial imagery. No hydrologic indicators were noted at DP-01U, which is located at a slightly higher elevation than the adjacent wetland data point (DP-01W).

### 3.2 VEGETATION

Monitoring year 2016 marked the fourth year of postconstruction monitoring at the Redstone – E&W site. A total of 47 plant species were observed site-wide from 2013 through 2016; these species are listed in Table 3-1. Vegetation communities were mapped and named based on the dominant species within a community and the results of the wetland delineation data. The communities and associated species are listed on the Wetland Mitigation Site Monitoring form (Appendix B) and are mapped on Figure A-3 (Appendix A).

**Table 3-1. Vegetation Species Observed From 2013 Through 2016 at the Redstone – East and West Site (Page 1 of 2)**

Scientific Names	Common Names	GP Indicator Status <sup>(a)</sup>
<i>Achillea millefolium</i>	Common Yarrow	FACU
<i>Agropyron cristatum</i>	Crested Wheatgrass	NL
Algae, green	Algae, green	NL
<i>Anemone canadensis</i>	Round-Leaf Thimbleweed	FACW
<i>Artemisia cana</i>	Coaltown Sagebrush	FACU
<i>Artemisia frigida</i>	Fringed Sage	NL
<i>Artemisia tridentata</i>	Big Sagebrush	NL
<i>Bassia scoparia</i>	Mexican-Fireweed	FACU
<i>Bromus inermis</i>	Smooth Brome	UPL
<i>Bromus tectorum</i>	Cheatgrass	NL
<i>Chenopodium album</i>	Lamb's-Quarters	FACU
<i>Chenopodium glaucum</i>	Oak-Leaf Goosefoot	FAC
<i>Cicuta douglasii</i>	Western Water-Hemlock	OBL
<i>Cirsium arvense</i>	Canada Thistle	FACU
<i>Convolvulus arvensis</i>	Field Bindweed	NL
<i>Descurainia sophia</i>	Herb Sophia	NL
<i>Eleocharis palustris</i>	Common Spike-Rush	OBL
<i>Elymus repens</i>	Creeping Wild Rye	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>Lactuca serriola</i>	Prickly Lettuce	FAC
<i>Maianthemum stellatum</i>	Starry False Solomon's-Seal	FACU
<i>Marrubium vulgare</i>	White Horehound	FACU
<i>Medicago sativa</i>	Alfalfa	UPL
<i>Melilotus officinalis</i>	Yellow Sweet-Clover	FACU
<i>Melilotus</i> sp.	Sweet-Clover	NL
<i>Mentha arvensis</i>	American Wild Mint	FACW
<i>Pascopyrum smithii</i>	Western-Wheat Grass	FACU
<i>Poa palustris</i>	Fowl Blue Grass	FACW
<i>Ratibida columnifera</i>	Prairie Coneflower	NL
<i>Rosa woodsii</i>	Woods' Rose	FACU
<i>Rumex crispus</i>	Curly Dock	FAC
<i>Ruppia maritima</i>	Beaked Ditch-Grass	OBL
<i>Schoenoplectus acutus</i>	Hard-Stem Club-Rush	OBL
<i>Schoenoplectus heterochaetus</i>	Pale Great 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>Setaria viridis</i>	Green Bristle Grass	NL
<i>Sonchus arvensis</i>	Field Sow-Thistle	FAC
<i>Spartina pectinata</i>	Freshwater Cord Grass	FACW
<i>Symphoricarpos albus</i>	Common Snowberry	UPL



**Table 3-1. Vegetation Species Observed From 2013 Through 2016 at the Redstone – East and West Site (Page 2 of 2)**

Scientific Names	Common Names	GP Indicator Status <sup>(a)</sup>
<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

(a) 2016 NWPL [Lichvar et al., 2016].

Four vegetation communities were identified in 2016 including one upland type and three wetland types.

- Upland Type 1 – *Bromus inermis*/*Symphoricarpos albus*
- Wetland Type 2 – *Schoenoplectus* spp.
- Wetland Type 3 – Aquatic Macrophytes/Open Water
- Wetland Type 4 – *Eleocharis palustris*/Mudflat.

The plant communities largely remained the same from 2013 through 2016 with the addition of wetland Type 4 in 2016. The communities are discussed below.

Upland community Type 1 – *Bromus inermis*/*Symphoricarpos albus* was identified on the 0.30-acre upland that surrounds the preexisting and created wetlands. Areas of this community that were disturbed during construction were reseeded. A total of 28 species were identified in this community and primarily consisted of common pasture and roadside species. Smooth brome (*Bromus inermis*), common snowberry (*Symphoricarpos albus*), crested wheatgrass (*Agropyron cristatum*), creeping wild rye (*Elymus repens*), Mexican-fireweed (*Bassia scoparia*), lamb's-quarters (*Chenopodium album*), prickly lettuce (*Lactuca serriola*), curly-cup gumweed (*Grindelia squarrosa*), fox-tail barley (*Hordeum jubatum*), alfalfa (*Medicago sativa*), yellow sweet-clover (*Melilotus officinalis*) and field sow-thistle (*Sonchus arvensis*) were common components of this upland community.

Wetland community Type 2 – *Schoenoplectus* spp. characterized 0.13 acre within the shallower water depths that surround community Type 3. This community was dominated by hard-stem club-rush (*Schoenoplectus acutus*) with less cover of saltmarsh club-rush (*Schoenoplectus maritimus*) and three-square club-rush (*Schoenoplectus pungens*). Freshwater cord grass (*Spartina pectinata*), fox-tail barley, American germander (*Teucrium canadense*), and curly dock (*Rumex crispus*) were identified within the margins of inundation. This community will likely expand into the recently constructed wetland area.

Wetland community Type 3 – Aquatic macrophytes/Open Water was identified across 0.43 acre within the 1.26-acre monitoring area. The community was characterized by 100 percent inundation and included green algae, beaked ditch-grass (*Ruppia maritima*), additional unidentified aquatic macrophytes, and saltmarsh club-rush along the transition to community Type 2. Submerged vegetation and algae extended into the open water. This area was inundated during the 2013, 2014, and 2015 site visits, which indicates the likelihood of perennial inundation.

Wetland community Type 4 – *Eleocharis palustris*/Mud Flat was identified across 0.40 acre within the 1.26-acre monitoring area. This community was previously mapped as community Type 3, but because of below-average groundwater levels in the area during the 2016 site visit, roughly half of the open-water area from previous years was identified as sparsely vegetated mudflat in 2016 (see photographs in Appendix C). Vegetative cover in Type 4 was estimated to be less than 10 percent across the site. Species that were identified within this type include common spike-rush, fox-tail barley, curly dock, and saltmarsh club-rush.

No woody vegetation was installed at this site, and no indications were found of natural shrub or tree recruitment. Revegetation efforts primarily entailed seeding after construction. Two infestations of Canada thistle (*Cirsium arvense*), which is a Priority 2B noxious weed, were observed along the south edge of the site in community Type 1. The largest infestation covered less than 0.1 acre with a moderate cover class around 10 percent; the smaller infestation was less than 0.1 acre with less than 0.1 percent cover. Less than 0.1 acre of field bindweed (*Convolvulus arvensis*) with 1–5 percent cover was also observed in 2016. The infestation was located at the southeast boundary of the mitigation site. MDT has an ongoing weed-control program for their mitigation sites that includes an annual assessment of weeds at each site and periodic weed-control efforts.

### 3.3 SOIL

The entire project site was mapped in the *Web Soil Survey for Sheridan County* [USDA, 2013] as Haverlon silt loam. The Haverlon loam series is a moderately well-drained loam that is taxonomically classified as a frigid Typic Ustifluvents. The Haverlon series is found on floodplains of major streams and tributaries. This soil map unit is included on the *Montana Hydric Soils List* [NRCS, 2014].

Soil test pits were excavated at two locations, both within the originally mapped Haverlon soil series (DP-01W and DP-01U; Figure A-2, Appendix A). DP-01W was located within wetland community Type 2 at the edge of open water. DP-01U was located within upland community Type 1. The soil profile at DP-01W revealed a dark gray (10YR 4/1) silty clay with 40 percent strong brown (7.5YR 4/6) redox concentrations along pore linings. This soil met the criteria for depleted matrix (F3), hydrogen sulfide (A4), and classification as a hydric soil. The soil profile at DP-01U consisted of a dark, grayish-brown (2.5Y 4/2) silty clay. The soils observed at data point DP-01U had no hydric soil indicators.

### 3.4 WETLAND DELINEATION

Two wetland determination data points were evaluated to assess and confirm the 2016 wetland boundary at the Redstone – E&W site. Approximately 0.69 acre of wetlands existed within this mitigation site before construction. The 2016 wetland delineation identified a total of 0.96 acre of wetland and aquatic habitat within the site. A total of 0.27 acre of created wetland were identified from 2013 through 2016, as shown in Table 3-2. Additional wetland development at this site is unlikely because the current wetland boundary is defined by a distinct topographic break between the excavated basin and adjacent uplands.

**Table 3-2. Total Wetland Acres Delineated From 2013 Through 2016 at the Redstone – East and West Site**

<b>Wetland and Aquatic Habitat</b>	<b>2013 (acres)</b>	<b>2014 (acres)</b>	<b>2015 (acres)</b>	<b>2016 (acres)</b>
Created Wetland	0.27	0.27	0.27	0.27
Preexisting Wetland	0.69	0.69	0.69	0.69
Upland	0.30	0.30	0.30	0.30
<b>Total Area</b>	1.26	1.26	1.26	1.26

### 3.5 WILDLIFE

A comprehensive list of birds and other wildlife species that were observed directly or indirectly from 2013 through 2016 is presented in Table 3-3 and the Wetland Mitigation Site Monitoring form (Appendix B). Eight bird species were identified around the site, including killdeer (*Charadrius vociferous*), blue-winged teal (*Anas discors*), tree swallow (*Tachycineta bicolor*), mourning dove (*Zenaida macroura*), ring-necked pheasant (*Phasianus colchicus*), Brewer's blackbird (*Euphagus cyanocephalus*), western meadowlark (*Sturnella neglecta*), and red-winged blackbird (*Agelaius phoeniceus*). Two bluebird boxes were originally installed at this site, but only one remains standing. The remaining nesting structure was in good condition in 2016 and was being used by tree swallows. Many painted turtles and several deer tracks were observed at the wetland site in 2016.

### 3.6 FUNCTIONAL ASSESSMENT

The total wetland area (0.96 acre) that were identified within the Redstone – E&W site was evaluated as a single AA. The 2008 MWAM [Berglund and McEldowney, 2008] was used to evaluate the functions and values and to calculate the functional units of the site (Table 3-4; Appendix B).

The Redstone – E&W wetlands were rated as a Category II wetland with 64.6 percent of the total possible score and 6.8 functional units in 2016. The percent possible score increased from 2013 to 2015 as a result of increases in the general wildlife rating from 0.5 to 0.9 and the uniqueness rating from 0.2 to 0.4. Additionally, the S1 species *Schoenoplectus heterochaetus* was first identified on the site in 2014, which boosted the Montana Natural Heritage Program (MTNHP) rating from low (0.1) to high (1.0) and improved the overall category from III to II. An improvement in the disturbance rating yielded a higher score in the uniqueness function. The site received high ratings for short- and long-term surface-water storage, sediment/shoreline stabilization, and groundwater discharge/recharge and moderate ratings for flood attenuation, sediment/nutrient/toxicant removal, and production export/food chain support.

### 3.7 PHOTOGRAPHIC DOCUMENTATION

Photographs that were taken at photo points 1–4 (PP-1 through PP-4) and the wetland determination data points (Figure A-2, Appendix A) are shown in Appendix C.

**Table 3-3. Wildlife Species Observed Within the Redstone – East and West Site From 2013 Through 2016**

Common Name	Scientific Name
<i>Amphibian</i>	
Northern Leopard Frog	<i>Rana pipiens</i>
Frog sp.	<i>Rana</i> sp.
<i>Bird</i>	
Bank Swallow	<i>Riparia riparia</i>
Barn Swallow	<i>Hirundo rustica</i>
<b>Blue-winged Teal</b>	<b><i>Anas discors</i></b>
<b>Brewer's Blackbird</b>	<b><i>Euphagus cyanocephalus</i></b>
Brown-headed Cowbird	<i>Molothrus ater</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Eastern Kingbird	<i>Tyrannus tyrannus</i>
Gadwall	<i>Anas strepera</i>
<b>Killdeer</b>	<b><i>Charadrius vociferus</i></b>
Mallard	<i>Anas platyrhynchos</i>
Marbled Godwit	<i>Limosa fedoa</i>
<b>Mourning Dove</b>	<b><i>Zenaida macroura</i></b>
Northern Shoveler	<i>Anas clypeata</i>
Pied-billed Grebe	<i>Podilymbus podiceps</i>
<b>Red-winged Blackbird</b>	<b><i>Agelaius phoeniceus</i></b>
<b>Ring-necked Pheasant</b>	<b><i>Phasianus colchicus</i></b>
Spotted Sandpiper	<i>Actitis macularius</i>
Swainson's Hawk	<i>Buteo swainsoni</i>
<b>Tree Swallow</b>	<b><i>Tachycineta bicolor</i></b>
Swallow sp.	
Turkey Vulture	<i>Cathartes aura</i>
Vesper Sparrow	<i>Pooecetes gramineus</i>
<i>Mammal</i>	
Coyote	<i>Canis latrans</i>
Muskrat	<i>Ondatra zibethicus</i>
<b>White-tailed Deer</b>	<b><i>Odocoileus virginianus</i></b>
<i>Reptile</i>	
<b>Painted Turtle</b>	<b><i>Chrysemys picta</i></b>
Plains Gartersnake	<i>Thamnophis radix</i>
<i>Fish</i>	
Fish sp.	
Common Carp	<i>Cyprinus carpio</i>
Northern Pike	<i>Esox lucius</i>

Species that were observed in 2016 are **bolded**.

**Table 3-4. Functions and Values of the Redstone – East and West Site From 2013 Through 2016**

<b>Function and Value Parameters From the 2008 Montana Wetland Assessment Method</b>	<b>2013 AA Created &amp; Existing</b>	<b>2014 AA Created &amp; Existing</b>	<b>2015 AA Created &amp; Existing</b>	<b>2016 AA Created &amp; Existing</b>
Listed/Proposed Threatened and Endangered Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)
Montana Natural Heritage Program (MTNHP) Species Habitat	Low (0.1)	High (1.0)	High (1.0)	High (1.0)
General Wildlife Habitat	Mod (0.5)	Mod (0.7)	High (0.9)	High (0.9)
General Fish/Aquatic Habitat	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)
Flood Attenuation	Mod (0.6)	Mod (0.6)	Mod (0.6)	Mod (0.6)
Short- and Long-Term Surface-Water Storage	High (0.8)	High (0.8)	High (0.8)	High (0.8)
Sediment/Nutrient/Toxicant Removal	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)
Sediment/Shoreline Stabilization	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Production Export/Food Chain Support	Mod (0.6)	Mod (0.4)	Mod (0.4)	Mod (0.4)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Low (0.3)	Low (0.4)	Low (0.4)
Recreation/Education Potential (bonus points)	N/A	N/A	N/A	N/A
<b>Actual Points/Possible Points</b>	<b>5.8/11</b>	<b>6.8/11</b>	<b>7.1/11</b>	<b>7.1/11</b>
<b>% of Possible Score Achieved</b>	<b>52.7%</b>	<b>61.8%</b>	<b>64.6%</b>	<b>64.6%</b>
<b>Overall Category</b>	<b>III</b>	<b>II</b>	<b>II</b>	<b>II</b>
<b>Total Acreage of Assessed Wetlands Within Site Boundaries</b>	<b>0.96</b>	<b>0.96</b>	<b>0.96</b>	<b>0.96</b>
<b>Functional Units (acreage × actual points)</b>	<b>5.57</b>	<b>6.53</b>	<b>6.82</b>	<b>6.82</b>

### 3.8 MAINTENANCE NEEDS

No man-made diversion structures were installed at the site. Two bluebird boxes were installed at the site, but only one was observed and in use during the 2016 visit. One bluebird box should be reinstalled at PP-3. Two infestations of Canada thistle (*Cirsium arvense*), which is a Priority 2B noxious weed, were observed along the south edge of the site. The largest infestation covered less than 0.1 acre with a moderate cover class of 10 percent; while the smaller infestation was less than 0.1 acre with less than 0.1 percent cover. Less than 0.1 acre of field bindweed (*Convolvulus arvensis*) with 1–5 percent cover was observed in 2016. The infestation was located at the southeast boundary of the mitigation site. MDT will use the annual monitoring results to determine appropriate weed-control efforts. The fence that was installed around the perimeter of the site was in good working order when inspected during the 2016 field survey.

### 3.9 CURRENT CREDIT SUMMARY

The proposed mitigation acreages and credit ratios were discussed in the Redstone – East & West Wetland Mitigation Site Plan [MDT, 2010]. The USACE permit authorized a 2:1 ratio for mitigating unavoidable impacts associated with the construction of the Redstone – E&W highway reconstruction project. The approved mitigation plan proposed the concurrent creation of 0.34 acre of new, created wetland area.

Table 3-5 summarizes the calculated credit acreages based on the results of the 2016 mitigation monitoring efforts. The wetland acreage at the Redstone – E&W site totaled 0.96 acre including approximately 0.69 acre of preexisting wetlands and 0.27 acre of new, created wetland area. Using the mitigation ratios provided by the USACE Montana Regulatory Program [USACE, 2005] for creation (2:1), preservation (4:1), and upland buffer (5:1), a total of 0.37 credit acre has been estimated for the site in 2016. The overall credit acres for the site have remained static since monitoring began in 2013. No performance standards or success criteria to evaluate achieving wetland mitigation were presented within the approved on-site wetland mitigation plan. Therefore, all of the areas that exhibit wetland and aquatic conditions have received full credit.

**Table 3-5. Summary of Wetland Credits From 2013 Through 2016 at the Redstone – East and West Site**

Compensatory Mitigation Type	USACE Mitigation Credit Ratio	Proposed Mitigation Acres	2013 Delineated Acres	2013 Credit Acres	2014 Delineated Acres	2014 Credit Acres	2015 Delineated Acres	2015 Credit Acres	2016 Delineated Acres	2016 Credit Acres
Creation (Establishment)	2:1	0.34	0.27	0.14	0.27	0.14	0.27	0.14	0.27	0.14
Preservation (Protection)	4:1	(a)	0.69	0.17	0.69	0.17	0.69	0.17	0.69	0.17
Upland Buffer	5:1	(a)	0.30	0.06	0.30	0.06	0.30	0.06	0.30	0.06
<b>Total</b>		<b>0.34</b>	<b>1.26</b>	<b>0.37</b>	<b>1.26</b>	<b>0.37</b>	<b>1.26</b>	<b>0.37</b>	<b>1.26</b>	<b>0.37</b>

(a) The approved mitigation plan does not include acreage for these mitigation types.



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## APPENDIX A

# PROJECT AREA MAPS

---

MDT Wetland Mitigation Monitoring  
Redstone – East & West  
Sheridan County, Montana



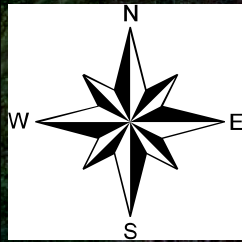
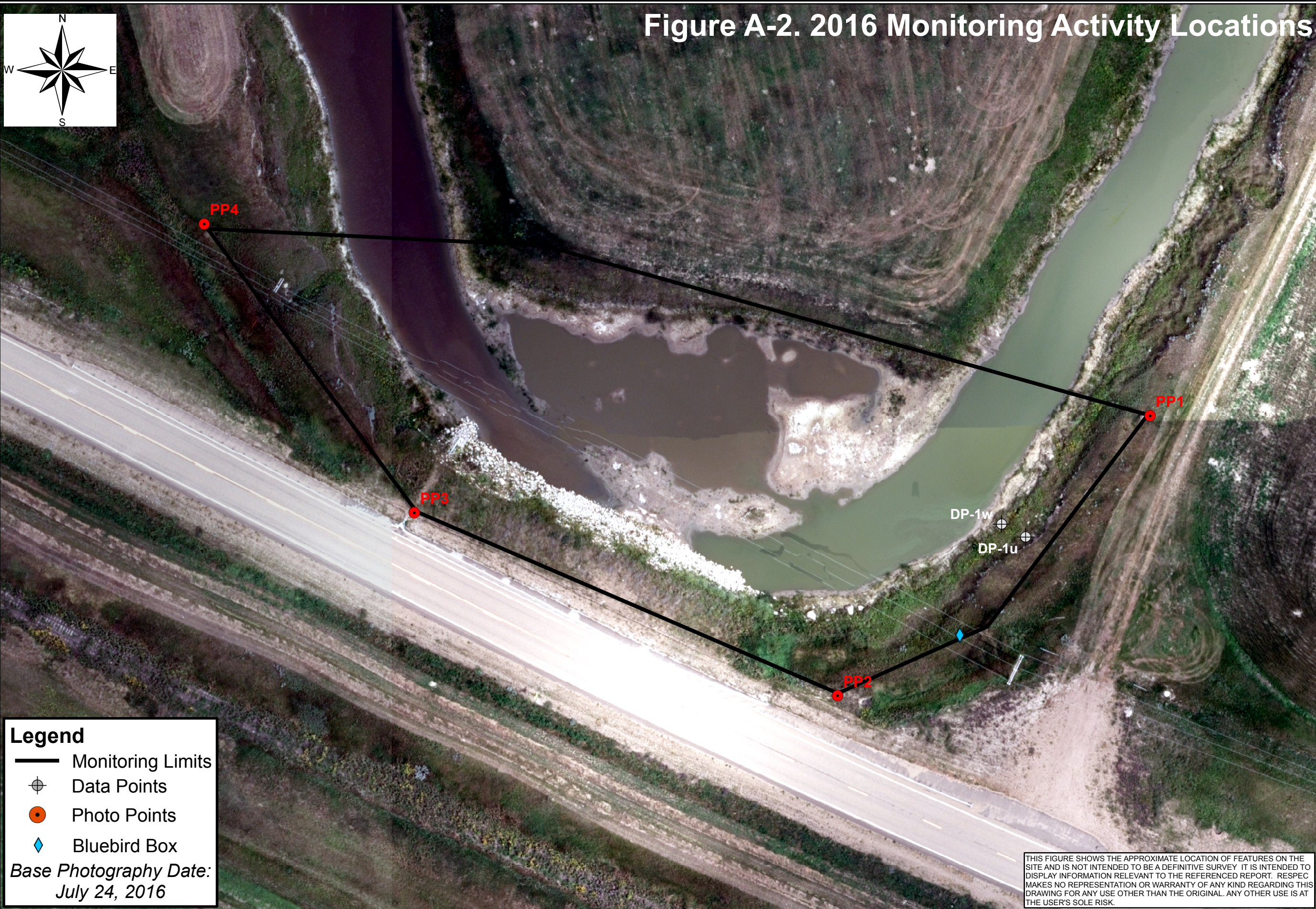


Figure A-2. 2016 Monitoring Activity Locations



**Legend**

- Monitoring Limits
- Data Points
- Photo Points
- Bluebird Box

Base Photography Date:  
July 24, 2016

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.

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

**Redstone E & W Wetland Mitigation Site**  
**2016 Monitoring Activity Locations**

0 20 40 80 120 160 200 Feet

Project: STPP 22-1(5)15
Location: Sheridan Co., Montana
Date: September 2016
Project Manager: M. Traxler
Drawn By: J. Rosenbaum



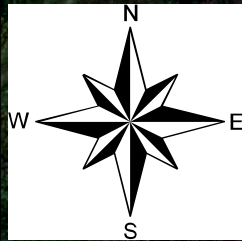


Figure A-3. 2016 Mapped Site Features

Noxious Weeds  
*Cirsium arvense*  
*Convolvulus arvensis*

Infestation Size  
X = <0.1 acre  
▲ = 0.1 to 1 acre  
■ = >1.0 acre

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

**Legend**

Monitoring Limits ———

Wetland Limits ———

Vegetation Communities ———

Base Photography Date:  
July 24, 2016

ACREAGES	
Project Area	1.26 acres
Total Wetlands	0.96 acres
Existing Wetlands	0.69 acres
Net Wetlands	0.27 acres
Upland	0.30 acres

Vegetation Community Types	
①	Bromus inermis/Symphoricarpus albus
②	Schoenoplectus spp.
③	Aquatic Macrophytes/Open Water
④	Eleocharis palustris/Mud Flat

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.

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

Redstone E & W Wetland Mitigation Site  
2016 Mapped Site Features



Project:	STPP 22-1(5)15
Location:	Sheridan Co., Montana
Date:	September 2016
Project Manager:	M. Traxler
Drawn By:	J. Rosenbaum



## APPENDIX B

# MONITORING FORMS

---

MDT Wetland Mitigation Monitoring  
Redstone – East & West  
Sheridan County, Montana

## RESPEC/MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **Redstone**

Project Number: \_\_\_\_\_

Assessment Date: **June 28, 2016**

Person(s) conducting the assessment: **M. and T.**

**Traxler**

Location: **~2.3 miles SE of Redstone**

MDT District: **Glendive**

Milepost: **~24.6 on Highway 5**

Legal Description: T **35N** R **52E**

Section **10**

Weather Conditions: **sunny, 75 degrees**

Time of Day: **10:30 AM**

Initial Evaluation Date: **August 8, 2013**

Monitoring Year: **4** # Visits in Year: **1**

Size of evaluation area: **1.26 acres**

Land use surrounding wetland: **Agriculture, rural**

**residential**

### HYDROLOGY

Surface Water Source: **Big Muddy Creek, precipitation**

Inundation: **Present**

Average Depth: **2.0 feet**

Range of Depths: **0-3 feet**

Percent of assessment area under inundation: **25%**

Depth at emergent vegetation-open water boundary: **0.5 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.):

**Saturation, H2S, geomorphic position, algal mat, FAC-neutral test.**

Groundwater Monitoring Wells: **Absent**

Record depth of water below ground surface (in feet):

Well Number	Depth	Well Number	Depth	Well Number	Depth

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:

**Water levels in 2016 significantly lower in Big Muddy Creek oxbow than in previous years.**

**Substantial mud flat in areas usually flooded.**

## VEGETATION COMMUNITIES

Community Number: **1** Community Title (main spp): **Bromus inermis / Symphoricarpos albus**

Dominant Species	% Cover	Dominant Species	% Cover
Bromus inermis	5 = > 50%	Medicago sativa	1 = 1-5%
Symphoricarpos albus	3 = 11-20%	Pascopyrum smithii	1 = 1-5%
Agropyron cristatum	2 = 6-10%	Sonchus arvensis	1 = 1-5%
Melilotus officinalis	2 = 6-10%	Bassia scoparia	1 = 1-5%
Elymus repens	1 = 1-5%	Bromus tectorum	1 = 1-5%
Lactuca serriola	1 = 1-5%	Cirsium arvense	1 = 1-5%

Comments / Problems: **Upland community type.**

Community Number: **2** Community Title (main spp): **Schoenoplectus spp. /**

Dominant Species	% Cover	Dominant Species	% Cover
Schoenoplectus acutus	4 = 21-50%	Teucrium canadense	1 = 1-5%
Sonchus arvensis	2 = 6-10%	Schoenoplectus pungens	1 = 1-5%
Eleocharis palustris	2 = 6-10%	Open Water	+ = < 1%
Rumex crispus	2 = 6-10%	Schoenoplectus maritimus	+ = < 1%
Chenopodium glaucum	1 = 1-5%		
Hordeum jubatum	1 = 1-5%		

Comments / Problems: **Schoenoplectus heterochaetus not observed in 2016.**

Community Number: **3** Community Title (main spp): **Aquatic macrophytes / Open Water**

Dominant Species	% Cover	Dominant Species	% Cover
Open Water	4 = 21-50%		
Aquatic macrophytes	4 = 21-50%		
Algae, green	2 = 6-10%		
Ruppia maritima	2 = 6-10%		
Schoenoplectus maritimus	+ = < 1%		

Comments / Problems: **Wetland community type.**

Community Number: **4** Community Title (main spp): **Eleocharis palustris / Mud Flat**

Dominant Species	% Cover	Dominant Species	% Cover
Mud Flat	5 = > 50%		
Eleocharis palustris	1 = 1-5%		
Rumex crispus	1 = 1-5%		
Hordeum jubatum	1 = 1-5%		
Schoenoplectus maritimus	1 = 1-5%		

Comments / Problems: \_\_\_\_\_



### PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number Observed	Mortality Causes

Comments / Problems: No planted woody vegetation.

## WILDLIFE

### Birds

Were man-made nesting structures installed? Yes

If yes, type of structure: Box How many? 2

Are the nesting structures being used? Yes

Do the nesting structures need repairs? One is missing

### Mammals and Herptiles

Mammal and Herptile Species	Number Observed	Indirect Indication of Use			
		Tracks	Scat	Burrows	Other
Painted Turtle	20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Deer sp.		<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"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

#### Additional Activities Checklist:

NA Macroinvertebrate Sampling (if required)

**Comments / Problems:** Bluebird box is being used by a tree swallow pair. One nest box is missing / has fallen down.

## 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.

[illegible]

**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? Yes

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? NA

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

If no, describe the problems below.

Comments / Problems: \_\_\_\_\_

## BIRD SURVEY – FIELD DATA SHEET

Site: **Redstone** Date: **6/28/16**  
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: Most of the blue-winged teal were young of the year.**

# WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Redstone City/County: Sheridan County Sampling Date: 28-Jun-16  
 Applicant/Owner: MDT State: MT Sampling Point: DP-01u  
 Investigator(s): Mark Traxler Section, Township, Range: S 10 T 35N R 52E  
 Landform (hillslope, terrace, etc.): Shoulder slope Local relief (concave, convex, none): flat Slope: 3.0% 1.7 °  
 Subregion (LRR): LRR F Lat.: 48.800402 Long.: -104.904422 Datum: WGS84  
 Soil Map Unit Name: Haverlon silt loam NWI classification: None

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: Formerly SP-02u.	

## VEGETATION - Use scientific names of plants

Dominant Species? FWS Region: GP

Tree Stratum (Plot size: _____)	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	<b>= Total Cover</b>		
Sapling/Shrub Stratum (Plot size: _____)				
1. _____	0	<input type="checkbox"/>	_____	<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: _____ OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>20</u> x 3 = <u>60</u> FACU species <u>10</u> x 4 = <u>40</u> UPL species <u>50</u> x 5 = <u>250</u> <b>Column Totals:</b> <u>80</u> (A) <u>350</u> (B) Prevalence Index = B/A = <u>4.375</u>
2. _____	0	<input type="checkbox"/>	_____	
3. _____	0	<input type="checkbox"/>	_____	
4. _____	0	<input type="checkbox"/>	_____	
5. _____	0	<input type="checkbox"/>	_____	
	0	<b>= Total Cover</b>		
Herb Stratum (Plot size: 5' radius _____)				
1. Bromus inermis	50	<input checked="" type="checkbox"/>	62.5% UPL	<b>Hydrophytic Vegetation Indicators:</b> <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 <sup>1</sup> <input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.
2. Elymus repens	10	<input type="checkbox"/>	12.5% FACU	
3. Sonchus arvensis	20	<input checked="" type="checkbox"/>	25.0% FAC	
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%	
	80	<b>= Total Cover</b>		
Woody Vine Stratum (Plot size: _____)				
1. _____	0	<input type="checkbox"/>	_____	<b>Hydrophytic Vegetation Present?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>
2. _____	0	<input type="checkbox"/>	_____	
	0	<b>= Total Cover</b>		
% Bare Ground in Herb Stratum <u>20</u>				
Remarks:				

# Soil

Sampling Point: DP-01u

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 <sup>1</sup>	Loc <sup>2</sup>		
0-16	2.5Y	4/2	100					Silty Clay

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 <sup>3</sup> :	
<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)	<b>(LRR H outside of MLRA 72 and 73)</b>	
<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)	<sup>3</sup> 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)	<b>(MLRA 72 and 73 of LRR H)</b>		

<b>Restrictive Layer (if present):</b> Type: _____ Depth (inches): _____	<b>Hydric Soil Present?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>
Remarks: No hydric soil indicators observed during field survey.	

# Hydrology

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
<b>Primary Indicators (minimum of one required; check all that apply)</b> <div> <input type="checkbox"/> Surface Water (A1)    <input 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)    <b>(where not tilled)</b>  <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)         </div>		<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) <b>(where tilled)</b> <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)	
<b>Field Observations:</b> 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?    Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ (includes capillary fringe)		<b>Wetland Hydrology Present?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>	
Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available: _____			
Remarks: Data point occurs on upland slope above the wetland. No hydrology indicators observed.			



# WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Redstone City/County: Sheridan County Sampling Date: 28-Jun-16  
 Applicant/Owner: MDT State: MT Sampling Point: DP-01W  
 Investigator(s): Mark Traxler Section, Township, Range: S 10 T 35N R 52E  
 Landform (hillslope, terrace, etc.): Shoreline Local relief (concave, convex, none): concave Slope: 0.0% 0.0 °  
 Subregion (LRR): LRR F Lat.: 48.800425 Long.: -104.904469 Datum: WGS84  
 Soil Map Unit Name: Haverlon silt loam NWI classification: None

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"/>	
<b>Remarks:</b> Formerly SP-01W. Water levels in the Big Muddy oxbow much lower than previous years. Data point is along vegetated margin of open water at toe of slope.	

## VEGETATION - Use scientific names of plants

Dominant Species? FWS Region: GP

Tree Stratum (Plot size: _____)	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>2</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>100.0%</u> (A/B)
4. _____	0	<input type="checkbox"/>	_____	
	0	<b>= Total Cover</b>		
<b>Sapling/Shrub Stratum</b> (Plot size: _____)				<b>Prevalence Index worksheet:</b>
1. _____	0	<input type="checkbox"/>	_____	Total % Cover of: _____ Multiply by: _____
2. _____	0	<input type="checkbox"/>	_____	OBL species <u>65</u> x 1 = <u>65</u>
3. _____	0	<input type="checkbox"/>	_____	FACW species <u>5</u> x 2 = <u>10</u>
4. _____	0	<input type="checkbox"/>	_____	FAC species <u>25</u> x 3 = <u>75</u>
5. _____	0	<input type="checkbox"/>	_____	FACU species <u>0</u> x 4 = <u>0</u>
	0	<b>= Total Cover</b>		UPL species <u>0</u> x 5 = <u>0</u>
<b>Herb Stratum</b> (Plot size: _____)				Column Totals: <u>95</u> (A) <u>150</u> (B)
1. <u>Chenopodium glaucum</u>	20	<input checked="" type="checkbox"/> 21.1%	FAC	Prevalence Index = B/A = <u>1.579</u>
2. <u>Hordeum jubatum</u>	5	<input type="checkbox"/> 5.3%	FACW	
3. <u>Schoenoplectus pungens</u>	60	<input checked="" type="checkbox"/> 63.2%	OBL	
4. <u>Schoenoplectus acutus</u>	5	<input type="checkbox"/> 5.3%	OBL	
5. <u>Sonchus arvensis</u>	5	<input type="checkbox"/> 5.3%	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%		
	95	<b>= Total Cover</b>		
<b>Woody Vine Stratum</b> (Plot size: _____)				
1. _____	0	<input type="checkbox"/>	_____	
2. _____	0	<input type="checkbox"/>	_____	
	0	<b>= Total Cover</b>		
<b>% Bare Ground in Herb Stratum</b> <u>5</u>				

**Hydrophytic Vegetation Indicators:**

☐ 1 - Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is > 50%

☒ 3 - Prevalence Index is ≤ 3.0<sup>1</sup>

☐ 4 - Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

# Soil

Sampling Point: DP-01W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)										
Depth (inches)	Matrix		%	Redox Features			Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
	Color (moist)			Color (moist)		%				
0-16	10YR	4/1	70	7.5YR	5/6	30	C	PL	Silty Clay	

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 <sup>3</sup> :	
<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)	<b>(LRR H outside of MLRA 72 and 73)</b>	
<input type="checkbox"/> 1 cm Muck (A9) (LRR F,G,H)	<input checked="" 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)	<sup>3</sup> 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)	<b>(MLRA 72 and 73 of LRR H)</b>		

Restrictive Layer (if present):	Hydric Soil Present?
Type: _____	Yes <input checked="" type="radio"/> No <input type="radio"/>
Depth (inches): _____	
Remarks: _____	

# 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 checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	
<input checked="" 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)	<b>(where tilled)</b>	
<input checked="" type="checkbox"/> Drift deposits (B3)	<b>(where not tilled)</b>	<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 checked="" type="checkbox"/> FAC-neutral Test (D5)	
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Frost Heave Hummocks (D7) (LRR F)	
<b>Field Observations:</b> Surface Water Present? Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): _____ Water Table Present? Yes <input checked="" type="radio"/> No <input type="radio"/> Depth (inches): 14 Saturation Present? (includes capillary fringe) Yes <input checked="" type="radio"/> No <input type="radio"/> Depth (inches): 0		<b>Wetland Hydrology Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>	
Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available: _____			
Remarks: _____			

# MDT MONTANA WETLAND ASSESSMENT FORM (revised March 2008)

1. Project Name: Redstone 2. MDT Project #: STPP 22-1(5)14 3. Control #: 2024  
 3. Evaluation Date: 6/28/2016 4. Evaluator(s): M&T Traxler 5. Wetland/Site #(s): Created and Existing  
 6. Wetland Location(s): Township 35 N, Range 52 E, Section 10; Township     N, Range     E, Section    

Approximate Stationing or Roadposts:           

Watershed: 12 - Lower Missouri County:     Sheridan

7. Evaluating Agency: RESPEC for MDT

8. Wetland Size (acre):            (visually estimated)  
0.96 (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) 0.96 (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	Aquatic Bed	Excavated	Permanent / Perennial	80
Depressional	Emergent Wetland	Excavated	Permanent / Perennial	20

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.): AA experiences low disturbance from adjacent MT Highway 5 and surrounding cultivated agriculture.

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 contiguous with isolated oxbow of Big Muddy Creek. Surrounding land uses include cultivated agriculture, Big Muddy Creek corridor, MT Highway 5.

## 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	mod	NA	NA
1 class, but not a monoculture	---	←NO	---
1 class, monoculture (1 species comprises ≥90% of total cover)	---	NA	NA

Comments: AA includes aquatic bed and emergent wetlands.

Wetland/Site #(s): Created and Existing**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 T&E list for Sheridan Co., MT**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 Schoenoplectus heterochaetus (S1)  
 Secondary habitat (**list species**) ☐ D ☐ S \_\_\_\_\_  
 Incidental habitat (**list species**) ☐ D ☒ S Ferruginous Hawk (S3B)  
 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	1H	---	---	---	---	---	---
S2 and S3 Species Functional Point/Rating	---	---	---	---	---	---	---

**Sources for documented use** (e.g. observations, records): MTNHP, Schoenoplectus heterochaetus identified on site in previous year.**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 type="checkbox"/> Even				<input checked="" 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)	---	---	---	---	---	---	---	---	---	---	---	---	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:** Numerous waterfowl, shorebirds, and turtles observed within ox bow during 2016 survey.

Wetland/Site #(s): Created and Existing**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 checked="" type="checkbox"/> Permanent / Perennial						<input type="checkbox"/> Seasonal / Intermittent						<input type="checkbox"/> Temporary / Ephemeral					
Aquatic Hiding / Resting / Escape Cover	<input type="checkbox"/> Optimal		<input checked="" 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	---	---	---	.4M	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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 = .3 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** a 0.1 =     or ☒ NO

**iii. Final Score and Rating:** .3L **Comments:** Common carp and Northern pike frye observed in previous years. Fish use reduced by constructed dike with culverts separating ox-bow from main channel of Big Muddy Creek.

**14E. FLOOD ATTENUATION** ☐ NA (proceed to 14F)

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

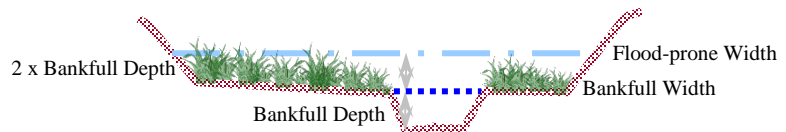
If wetlands in AA are not flooded from in-channel or overbank flow, check the NA box and proceed to 14F.

**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.

$$150 / 65 = 2.30769$$

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 checked="" type="checkbox"/> Slightly Entrenched C, D, E stream types			<input 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 checked="" type="checkbox"/> <25%	<input type="checkbox"/> 75%	<input type="checkbox"/> 25-75%	<input type="checkbox"/> <25%	<input type="checkbox"/> 75%	<input type="checkbox"/> 25-75%	<input type="checkbox"/> <25%
AA contains <b>no outlet or restricted outlet</b>	---	---	.6M	---	---	---	---	---	---
AA contains <b>unrestricted outlet</b>	---	---	---	---	---	---	---	---	---

**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 subject to flooding from Big Muddy Creek outside of assessment area.

Wetland/Site #(s): Created and Existing**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 checked="" 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 type="checkbox"/> S/I	<input type="checkbox"/> T/E	<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
Wetlands in AA flood or pond ≥ 5 out of 10 years	---	---	---	.8H	---	---	---	---	---
Wetlands in AA flood or pond < 5 out of 10 years	---	---	---	---	---	---	---	---	---

Comments: Average water depth within AA (0.96-ac) approx 4 ft.

**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 type="checkbox"/> ≥ 70%		<input checked="" type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
Evidence of Flooding / Ponding in AA	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<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
AA contains <b>no</b> or restricted outlet	---	---	.7M	---	---	---	---	---
AA contains <b>unrestricted</b> outlet	---	---	---	---	---	---	---	---

Comments: Surface water into and out of AA restricted by culverts.

**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: Open water likely subject to periodic wave action from high wind.

**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 (14Cii)		
	<input type="checkbox"/> E/H	<input checked="" type="checkbox"/> M	<input type="checkbox"/> L
<input type="checkbox"/> E/H	---	---	---
<input type="checkbox"/> M	---	---	---
<input checked="" type="checkbox"/> L	---	M	---
<input type="checkbox"/> NA	---	---	---

- 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	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	.4M	---	---
S/I	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
T/E/A	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Wetland/Site #(s): Created and Existing**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  $\geq 50$ -foot wide vegetated upland buffer around  $\geq 75\%$  of the AA's perimeter? ☐ YES, add 0.1 to score in ii = \_\_\_\_ ☒ NOiv. **Final Score and Rating:** .4M **Comments:** AA bordered by Hwy 5 to south and farm access road east, decreasing average vegetated width to 40 feet.**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 <b>FROM GROUNDWATER DISCHARGE</b> or <b>WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM</b>			
	<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:** AA maintained by surface water associated with Big Muddy Creek. Substrate silt loam and assumed permeable.**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)	---	---
Private ownership with general public access (no permission required)	---	---
Private or public ownership without general public access, or requiring permission for public access	---	---

**Comments:** Site very small.**15. GENERAL SITE NOTES:** \_\_\_\_

Wetland/Site #(s): Created and Existing

Function & Value Variables	Rating – Actual Functional Points	Possible Functional Points	Functional Units: Actual Points x Estimated AA Acreage	Indicate the Four Most Prominent Functions with an Asterisk
A. Listed / Proposed T&E Species Habitat	low 0.00	1.00	0	
B. MT Natural Heritage Program Species Habitat	high 1.00	1.00	0.96	
C. General Wildlife Habitat	high 0.90	1.00	0.864	
D. General Fish Habitat	low 0.30	1.00	0.288	
E. Flood Attenuation	mod 0.60	1.00	0.576	
F. Short and Long Term Surface Water Storage	high 0.80	1.00	0.768	*
G. Sediment / Nutrient / Toxicant Removal	mod 0.70	1.00	0.672	*
H. Sediment / Shoreline Stabilization	high 1.00	1.00	0.96	
I. Production Export / Food Chain Support	mod 0.40	1.00	0.384	*
J. Groundwater Discharge / Recharge	high 1.00	1.00	0.96	*
K. Uniqueness	mod 0.40	1.00	0.384	
L. Recreation / Education Potential (bonus point)	NA		0	
<b>Total Points</b>	<b>7.1</b>	<b>11</b>	<b>6.816 Total Functional Units</b>	
<b>Percent of Possible Score 65%</b> (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

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MDT Wetland Mitigation Monitoring  
Redstone – East & West  
Sheridan County, Montana



**Photo Point 1 – Panorama; Location: East Fence Corner; Bearing 240 degrees; Year 2013**



**Photo Point 1 – Panorama; Location: East Fence Corner; Bearing 240 degrees; Year 2014**



**Photo Point 1 – Panorama; Location: East Fence Corner; Bearing 240 degrees; Year 2015**



**Photo Point 1 – Panorama; Location: East Fence Corner; Bearing 240 degrees; Year 2016**





**Photo Point 2 – Panorama; Location: SE Fence Post; Bearing 0 degrees; Year 2013**



**Photo Point 2 – Panorama; Location: SE Fence Post; Bearing 0 degrees; Year 2014**



**Photo Point 2 – Panorama; Location: SE Fence Post; Bearing 0 degrees; Year 2015**



**Photo Point 2 – Panorama; Location: SE Fence Post; Bearing 0 degrees; Year 2016**





**Photo Point 3 – Panorama; Location: SW Fence Post; Bearing 75 degrees; Year 2013**



**Photo Point 3 – Panorama; Location: SW Fence Post; Bearing 75 degrees; Year 2014**



**Photo Point 3 – Panorama; Location: SW Fence Post; Bearing 75 degrees; Year 2015**



**Photo Point 3 – Panorama; Location: SW Fence Post; Bearing 75 degrees; Year 2016**





**Photo Point 4 – Panorama; Location: West Fence Corner; Bearing 140 degrees; Year 2013**



**Photo Point 4 – Panorama; Location: West Fence Corner; Bearing 140 degrees; Year 2014**



**Photo Point 4 – Panorama; Location: West Fence Corner; Bearing 140 degrees; Year 2015**



**Photo Point 4 – Panorama; Location: West Fence Corner; Bearing 140 degrees; Year 2016**





**Data Point: DP-01u  
Bearing 200 degrees**

**Location: Veg Community 2  
Year 2016**

**Tree Swallow Pair – Documented Using Artificial Bird  
Box.**



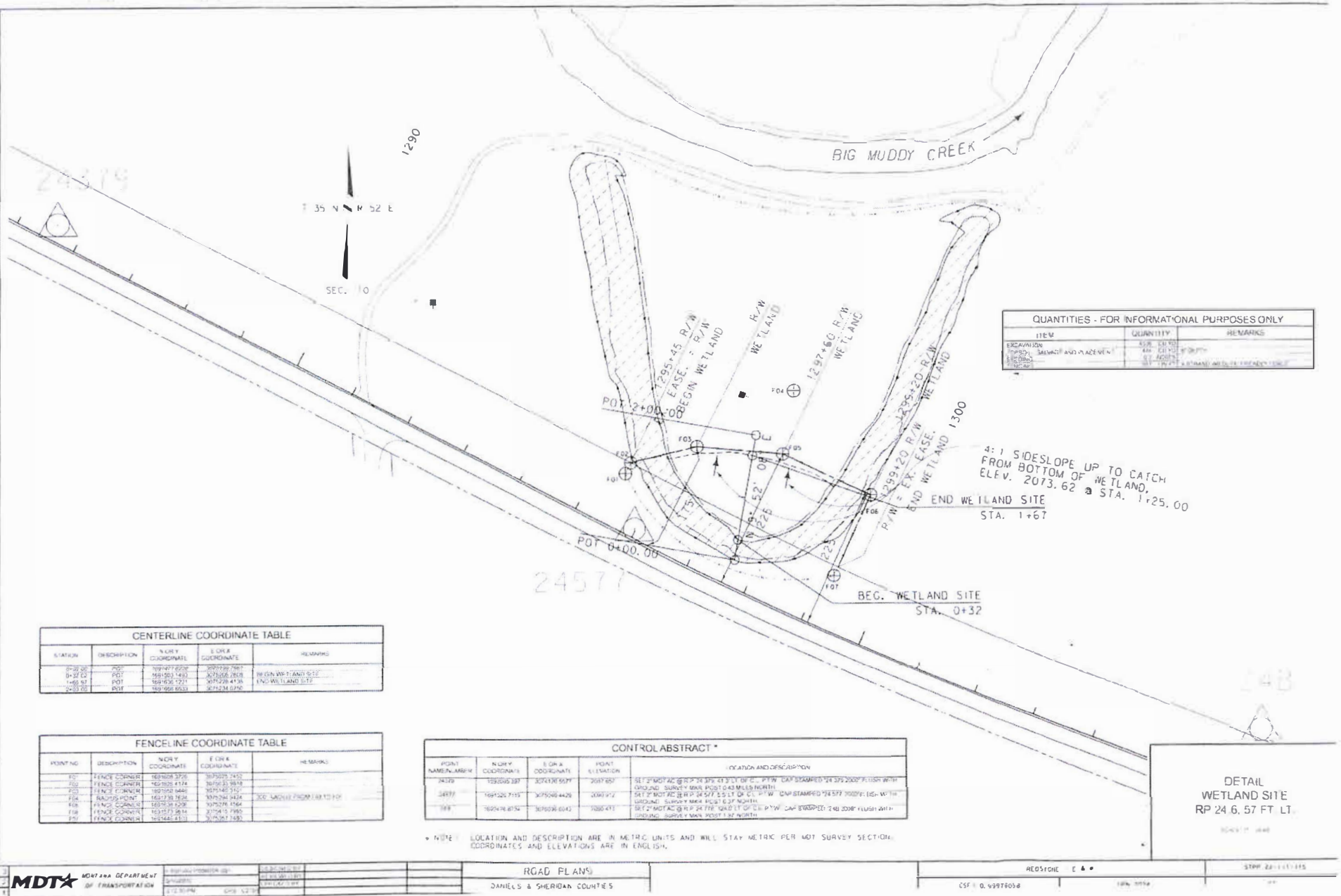
**Killdeer and Painted Turtles Common Onsite in 2016.**

## APPENDIX D

# PROJECT PLAN SHEETS

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MDT Wetland Mitigation Monitoring  
Redstone – East & West  
Sheridan County, Montana



QUANTITIES - FOR INFORMATIONAL PURPOSES ONLY		
ITEM	QUANTITY	REMARKS
EXCAVATION	1.18 CU YD	
PROJ. SAWCUT AND PLACEMENT	48.1 CU YD	
SEEDING	67 ACRES	
STAKE	129 ACRES	6 STRAINS AND 125 P-DRIVEN 100'

CENTERLINE COORDINATE TABLE				
STATION	DESCRIPTION	N OR Y COORDINATE	E OR E COORDINATE	REMARKS
0+00.00	POT	10977.6232	30712.7907	
0+22.62	POT	10978.1481	30708.2618	W/IN WETLAND SITE
1+00.57	POT	10978.7231	30728.4738	END WETLAND SITE
2+00.00	POT	10978.6531	30723.6780	

FENCELINE COORDINATE TABLE				
POINTING	DESCRIPTION	N OR Y COORDINATE	E OR E COORDINATE	REMARKS
P01	FENCE CORNER	10978.3728	30702.1432	
P02	FENCE CORNER	10978.4134	30703.3818	
P03	FENCE CORNER	10978.6448	30704.3127	
P04	RAILROAD POINT	10978.7834	30704.3434	SEE MAP FOR 100' TO 100'
P05	FENCE CORNER	10978.8238	30704.3464	
P06	FENCE CORNER	10978.8834	30704.3464	
P07	FENCE CORNER	10978.9131	30704.3434	

CONTROL ABSTRACT *				
POINT NAME/NUMBER	N OR Y COORDINATE	E OR E COORDINATE	POINT ELEVATION	LOCATION AND DESCRIPTION
1429	10978.6237	30703.3818	2087.857	1/2" MON. AC. 100' x 100' 1/2" OF E. - P.W. CAP STAMPED '24 3/4 2000' FLUSH WITH GROUND. SURVEY MARK POST 0.43 MILES NORTH.
1477	10978.7131	30704.4426	2087.472	1/2" MON. AC. 100' x 100' 1/2" OF E. - P.W. CAP STAMPED '24 3/4 2000' FLUSH WITH GROUND. SURVEY MARK POST 0.37 MILES NORTH.
1488	10978.8734	30704.6042	2086.471	1/2" MON. AC. 100' x 100' 1/2" OF E. - P.W. CAP STAMPED '24 3/4 2000' FLUSH WITH GROUND. SURVEY MARK POST 1.87 MILES NORTH.

\* NOTE: LOCATION AND DESCRIPTION ARE IN METRIC UNITS AND WILL STAY METRIC PER DOT SURVEY SECTION. COORDINATES AND ELEVATIONS ARE IN ENGLISH.

DETAIL  
WETLAND SITE  
RP 24 6, 57 FT. LT.  
SHEET 17 OF 18