MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2016

REDSTONE – EAST AND WEST
SHERIDAN COUNTY, MONTANA



Prepared for:

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December 2016

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REDSTONE – EAST AND WEST SHERIDAN COUNTY, MONTANA

INITIAL CONSTRUCTION: 2010

MDT Project Number STPP 22-1 (5)14
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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.

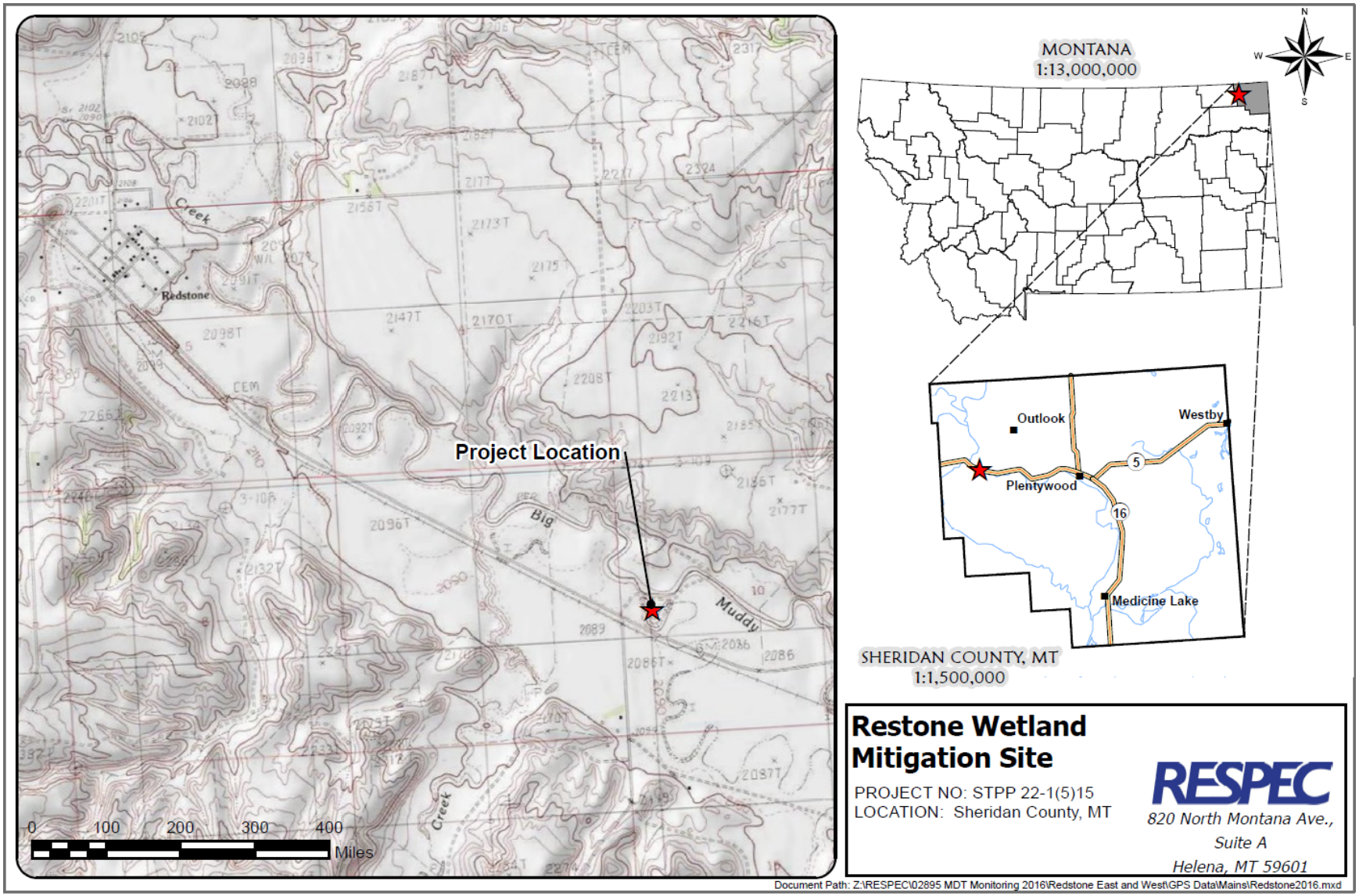


Figure 1-1. Project Location of the Redstone – East and West Site.

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 (± 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[a]
Achillea millefolium	Common Yarrow	FACU
Agropyron cristatum	Crested Wheatgrass	NL
Algae, green	Algae, green	NL
Anemone canadensis	Round-Leaf Thimbleweed	FACW
Artemisia cana	Coaltown Sagebrush	FACU
Artemisia frigida	Fringed Sage	NL
Artemisia tridentata	Big Sagebrush	NL
Bassia scoparia	Mexican-Fireweed	FACU
Bromus inermis	Smooth Brome	UPL
Bromus tectorum	Cheatgrass	NL
Chenopodium album	Lamb's-Quarters	FACU
Chenopodium glaucum	Oak-Leaf Goosefoot	FAC
Cicuta douglasii	Western Water-Hemlock	OBL
Cirsium arvense	Canada Thistle	FACU
Convolvulus arvensis	Field Bindweed	NL
Descurainia sophia	Herb Sophia	NL
Eleocharis palustris	Common Spike-Rush	OBL
Elymus repens	Creeping Wild Rye	FACU
Grindelia squarrosa	Curly-Cup Gumweed	UPL
Helianthus annuus	Common Sunflower	FACU
Hordeum jubatum	Fox-Tail Barley	FACW
Lactuca serriola	Prickly Lettuce	FAC
Maianthemum stellatum	Starry False Solomon's-Seal	FACU
Marrubium vulgare	White Horehound	FACU
Medicago sativa	Alfalfa	UPL
Melilotus officinalis	Yellow Sweet-Clover	FACU
Melilotus sp.	Sweet-Clover	NL
Mentha arvensis	American Wild Mint	FACW
Pascopyrum smithii	Western-Wheat Grass	FACU
Poa palustris	Fowl Blue Grass	FACW
Ratibida columnifera	Prairie Coneflower	NL
Rosa woodsii	Woods' Rose	FACU
Rumex crispus	Curly Dock	FAC
Ruppia maritima	Beaked Ditch-Grass	OBL
Schoenoplectus acutus	Hard-Stem Club-Rush	OBL
Schoenoplectus heterochaetus	Pale Great Club-Rush	OBL
Schoenoplectus maritimus	Saltmarsh Club-Rush	OBL
Schoenoplectus pungens	Three-Square	OBL
Scutellaria galericulata	Hooded Skullcap	OBL
Setaria viridis	Green Bristle Grass	NL
Sonchus arvensis	Field Sow-Thistle	FAC
Spartina pectinata	Freshwater Cord Grass	FACW
Symphoricarpos albus	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[(a)]
Teucrium canadense	American Germander	FACW
Thlaspi arvense	Field Pennycress	FACU
Tragopogon dubius	Meadow Goat's-beard	NL
Typha latifolia	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

Wetland and Aquatic Habitat	2013 (acres)	2014 (acres)	2015 (acres)	2016 (acres)
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
Total Area	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 phoenicueus*). 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
Amphibian	
Northern Leopard Frog	*Rana pipiens*
Frog sp.	*Rana* sp.
Bird	
Bank Swallow	*Riparia riparia*
Barn Swallow	*Hirundo rustica*
Blue-winged Teal	***Anas discors***
Brewer's Blackbird	***Euphagus cyanocephalus***
Brown-headed Cowbird	*Molothrus ater*
Cliff Swallow	*Petrochelidon pyrrhonota*
Eastern Kingbird	*Tyrannus tyrannus*
Gadwall	*Anas strepera*
Killdeer	***Charadrius vociferus***
Mallard	*Anas platyrhynchos*
Marbled Godwit	*Limosa fedoa*
Mourning Dove	***Zenaida macroura***
Northern Shoveler	*Anas clypeata*
Pied-billed Grebe	*Podilymbus podiceps*
Red-winged Blackbird	***Agelaius phoeniceus***
Ring-necked Pheasant	***Phasianus colchicus***
Spotted Sandpiper	*Actitis macularius*
Swainson's Hawk	*Buteo swainsoni*
Tree Swallow	***Tachycineta bicolor***
Swallow sp.	
Turkey Vulture	*Cathartes aura*
Vesper Sparrow	*Pooecetes gramineus*
Mammal	
Coyote	*Canis latrans*
Muskrat	*Ondatra zibethicus*
White-tailed Deer	***Odocoileus virginianus***
Reptile	
Painted Turtle	***Chrysemys picta***
Plains Gartersnake	*Thamnophis radix*
Fish	
Fish sp.	
Common Carp	*Cyprinus carpio*
Northern Pike	*Esox lucius*

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

Function and Value Parameters From the 2008 Montana Wetland Assessment Method	2013 AA Created & Existing	2014 AA Created & Existing	2015 AA Created & Existing	2016 AA Created & Existing
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
Actual Points/Possible Points	**5.8/11**	**6.8/11**	**7.1/11**	**7.1/11**
% of Possible Score Achieved	**52.7%**	**61.8%**	**64.6%**	**64.6%**
Overall Category	**III**	**II**	**II**	**II**
Total Acreage of Assessed Wetlands Within Site Boundaries	**0.96**	**0.96**	**0.96**	**0.96**
Functional Units (acreage × actual points)	**5.57**	**6.53**	**6.82**	**6.82**

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
Total		**0.34**	**1.26**	**0.37**	**1.26**	**0.37**	**1.26**	**0.37**	**1.26**	**0.37**

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

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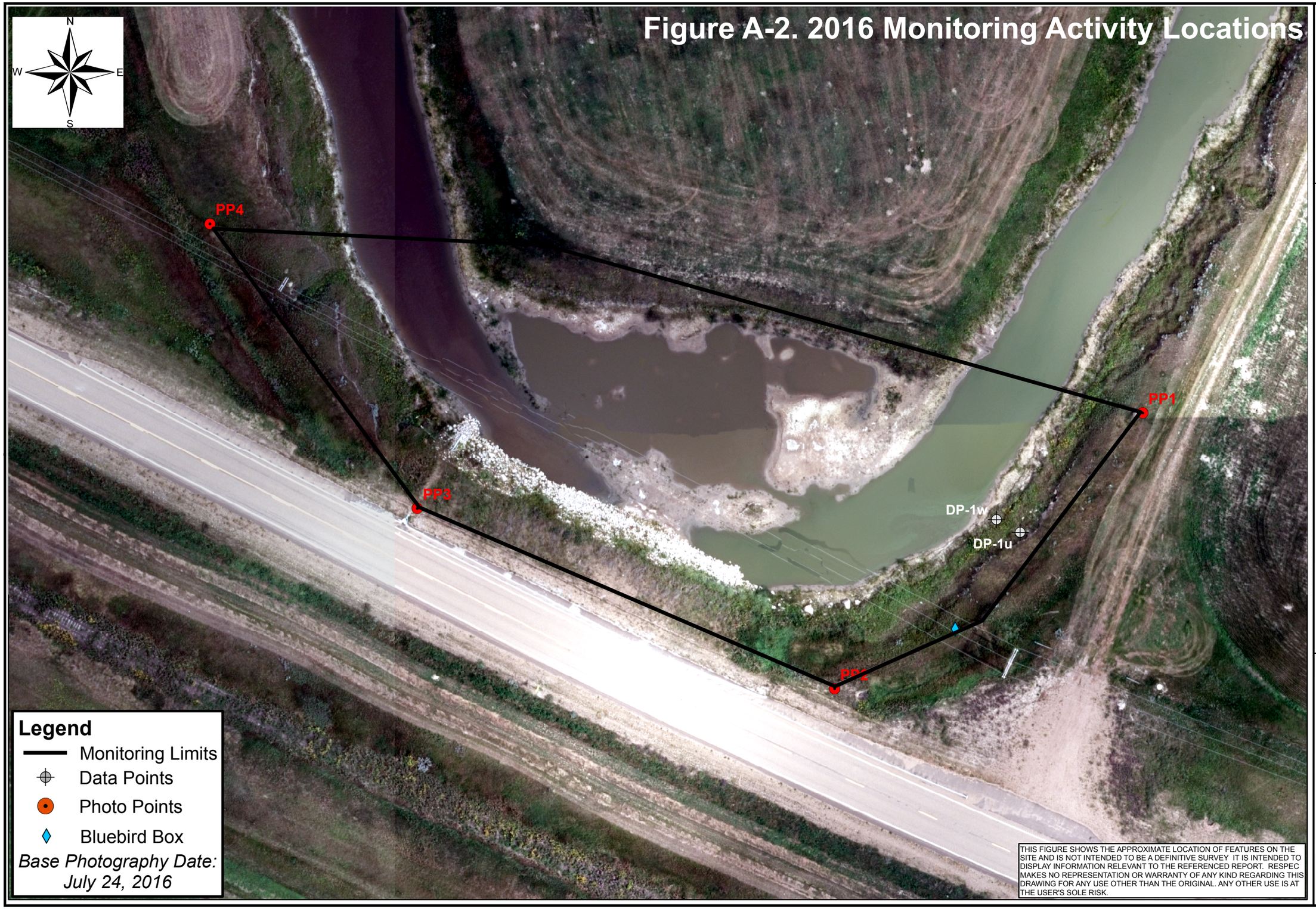
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APPENDIX A
PROJECT AREA MAPS

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

Figure A-2. 2016 Monitoring Activity Locations



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

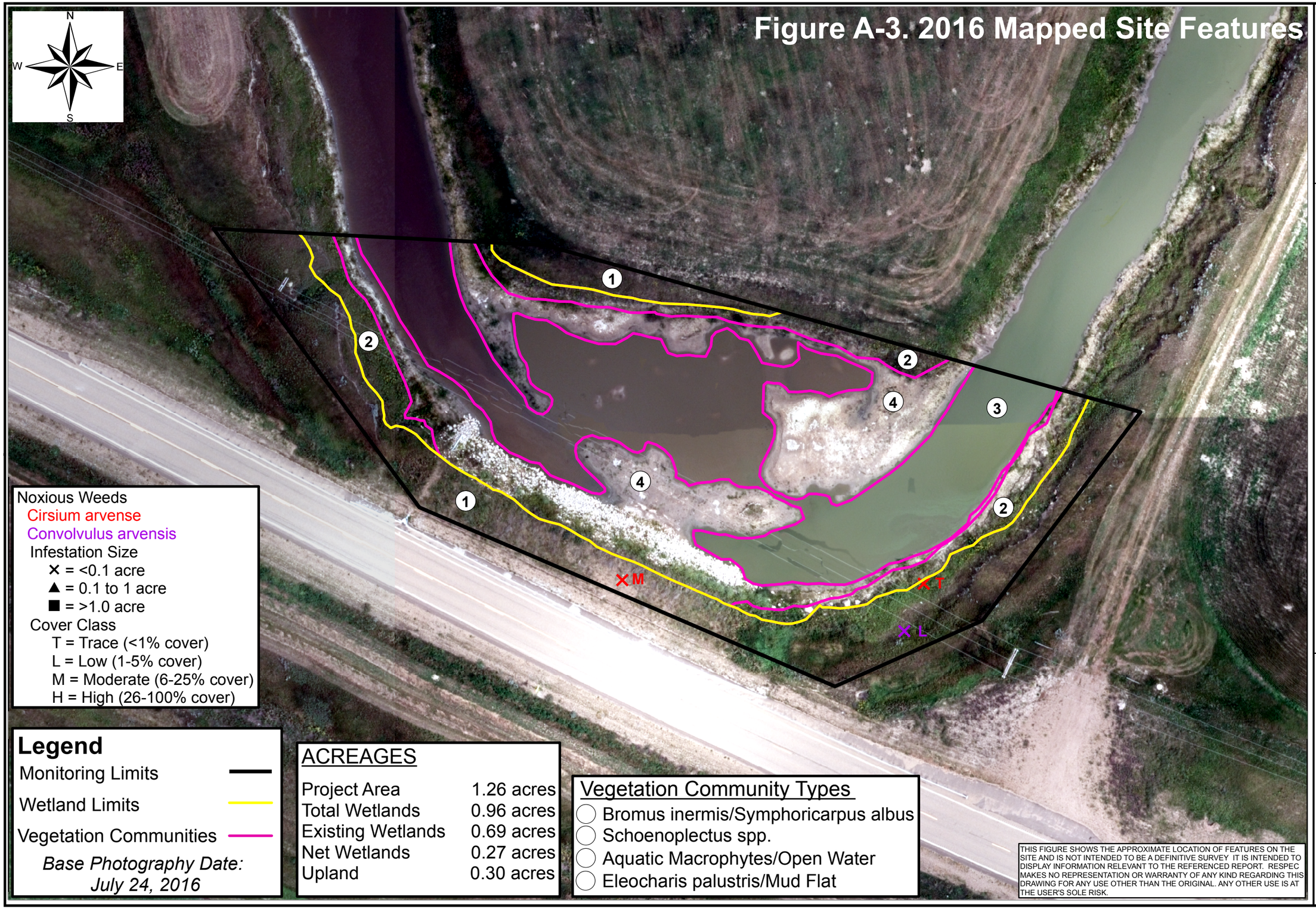
Redstone E & W Wetland Mitigation Site
2016 Monitoring Activity Locations

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

File: Z:\RESPEC\02895 MDT Monitoring 2016\Redstone East and West\GPS Data\Mains\Monitor2016.mxd

Figure A-3. 2016 Mapped Site Features



Noxious Weeds
Cirsium arvense
Convolvulus arvensis
Infestation Size
✕ = <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

- Bromus inermis/Symphoricarpus albus
- Schoenoplectus spp.
- Aquatic Macrophytes/Open Water
- 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

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

File: Z:\RESPEC\02895 MDT Monitoring 2016\Redstone East and West\GPS Data\Mains\Veg2016.mxd

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. Substanial 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	☐	☐	☐	
Deer sp.		☒	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	

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.

Location	Photograph Frame #	Photograph Description & Lat/Long	Compass Reading (°)
PP-1		Photo Point 1 (Pano): 48.800556 / -104.904221	240
PP-2		Photo Point 2 (Pano): 48.800175 / -104.904907	0
PP-3		Photo Point 3 (Pano): 48.800591 / -104.905739	75
PP-4		Photo Point 4: 48.800911 / -104.90612	140
DP-1W		Wetland soil pit: 48.800425 / -104.904469	
DP-1U		Upland soil pit: 48.800402 / -104.904422	

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 _____

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Killdeer	10	F BD	MF				
Brewer's Blackbird	5	L FO	UP				
Red-winged Blackbird	2	L FO	UP				
Tree Swallow	2	BP N	UP				
Blue-winged Teal	15	F L	OW				
Mourning Dove	1	L	UP				
Ring-necked Pheasant	1	F	UP				
Western Meadowlark	1	L	UP				

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 ○ No ◉

Hydric Soil Present? Yes ○ No ◉

Wetland Hydrology Present? Yes ○ No ◉

Is the Sampled Area within a Wetland? Yes ○ No ◉

Remarks:
Formerly SP-02u.

VEGETATION - Use scientific names of plants

FWS Region: GP

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size:)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
5.	0	☐		
	0	= Total Cover		
Herb Stratum (Plot size: 5' radius)				
1. Bromus inermis	50	☑	62.5%	UPL
2. Elymus repens	10	☐	12.5%	FACU
3. Sonchus arvensis	20	☑	25.0%	FAC
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	80	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐		
2.	0	☐		
	0	= Total Cover		

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	20	x 3 =	60	
FACU species	10	x 4 =	40	
UPL species	50	x 5 =	250	
Column Totals:	80	(A)	350	(B)

Prevalence Index = B/A = 4.375

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrophytic Vegetation**
- ☐ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0[1]**
- ☐ **4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation[1] (Explain)**

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

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks:

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
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.)

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

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No hydric soil indicators observed during field survey.

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches): _____

Water Table Present? Yes ○ No ◉ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches): _____

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, 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 ◉ No ○

Hydric Soil Present? Yes ◉ No ○

Wetland Hydrology Present? Yes ◉ No ○

Is the Sampled Area within a Wetland? Yes ◉ No ○

Remarks:
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

FWS Region: GP

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size:)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
5.	0	☐		
	0	= Total Cover		
Herb Stratum (Plot size:)				
1. Chenopodium glaucum	20	☑	21.1%	FAC
2. Hordeum jubatum	5	☐	5.3%	FACW
3. Schoenoplectus pungens	60	☑	63.2%	OBL
4. Schoenoplectus acutus	5	☐	5.3%	OBL
5. Sonchus arvensis	5	☐	5.3%	FAC
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	95	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐		
2.	0	☐		
	0	= Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	65	x 1 =	65
FACW species	5	x 2 =	10
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	95 (A)		150 (B)

Prevalence Index = B/A = 1.579

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrophytic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☑ **3 - Prevalence Index is ≤3.0[1]**
- ☐ **4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation[1] (Explain)**

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

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

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 Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
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.)

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

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Hydrology

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):	
Water Table Present?	Yes ◉	No ○	Depth (inches):	14
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches):	0

Wetland Hydrology Present? Yes ◉ No ○

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

Purpose of Evaluation:

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

8. Wetland Size (acre): _____ (visually estimated)
0.96 (measured, e.g. GPS)

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 occupied buildings; and noxious weed or ANVS cover is ≤15%.	---	low disturbance	---
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	---	---	---
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.	---	---	---

Comments (types of disturbance, intensity, season, etc.)**:** AA experiences low disturbance from adjancent MT Highway 5 and surrounding cultived 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	NA
2 (or 1 if forested) classes	mod	NA	NA	NA
1 class, but not a monoculture	---	←NO	YES→	---
1 class, monoculture (1 species comprises ≥90% of total cover)	---	NA	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)	☐ **High**								☒ **Moderate**								☐ **Low**			
Class Cover Distribution (all vegetated classes)	☐ **Even**				☐ **Uneven**				☐ **Even**				☒ **Uneven**				☐ **Even**			
Duration of Surface Water in ≥ 10% of AA	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**
☒ **Low Disturbance** at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	E	---	---	---	---	---	---	---
☐ **Moderate Disturbance** at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
☐ **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)**			
	☒ **Exceptional**	☐ **High**	☐ **Moderate**	☐ **Low**
☐ **Substantial**	---	---	---	---
☒ **Moderate**	.9H	---	---	---
☐ **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	☒ **Permanent / Perennial**						☐ **Seasonal / Intermittent**						☐ **Temporary / Ephemeral**					
Aquatic Hiding / Resting / Escape Cover	☐ **Optimal**		☒ **Adequate**		☐ **Poor**		☐ **Optimal**		☐ **Adequate**		☐ **Poor**		☐ **Optimal**		☐ **Adequate**		☐ **Poor**	
Thermal Cover: optimal / suboptimal	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**
FWP Tier I fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
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 ☐ **N0**

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area; specify in comments) for native fish or introduced game fish? ☐ **YES**, add to score in **i** or **iia** 0.1 = __ or ☒ **N0**

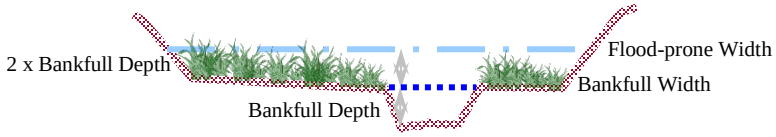
iii. Final Score and Rating: .3L **Comments:** Common carp and Northern pike frye observed in previous years. Fish use reduced by constructed dike with culverts seperating ox-bow from main channel of Big Muddy Creek.

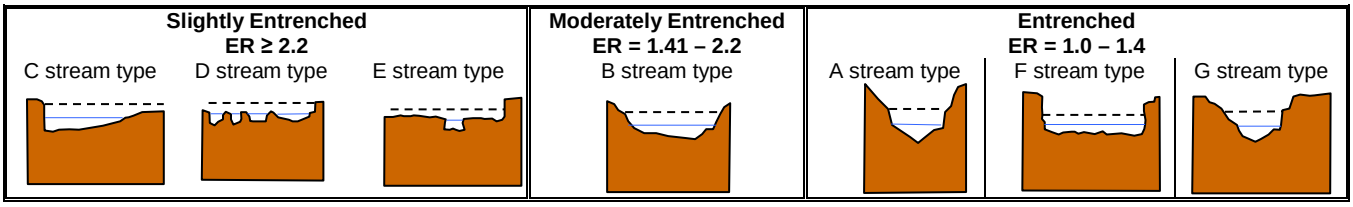
14E. FLOOD ATTENUATION ☐ **NA** (proceed to 14F)

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





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)	☒ Slightly Entrenched C, D, E stream types			☐ Moderately Entrenched B stream type			☐ Entrenched A, F, G stream types		
Percent of Flooded Wetland Classified as Forested and/or Scrub/Shrub	☐ 75%	☐ 25-75%	☒ <25%	☐ 75%	☐ 25-75%	☐ <25%	☐ 75%	☐ 25-75%	☐ <25%
AA contains **no outlet or restricted outlet**	---	---	.6M	---	---	---	---	---	---
AA contains **unrestricted outlet**	---	---	---	---	---	---	---	---	---

ii. Are ≥10 acres of wetland in the AA subject to flooding AND are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA? ☐ YES ☒ NO **Comments:** AA 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	☐ **>5 acre feet**			☒ **1.1 to 5 acre feet**			☐ **≤1 acre foot**		
Duration of Surface Water at Wetlands within the AA	☐ **P/P**	☐ **S/I**	☐ **T/E**	☒ **P/P**	☐ **S/I**	☐ **T/E**	☐ **P/P**	☐ **S/I**	☐ **T/E**
Wetlands in AA flood or pond **≥ 5 out of 10 years**	---	---	---	.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	☐ **≥ 70%**		☒ **< 70%**		☐ **≥ 70%**		☐ **< 70%**	
Evidence of Flooding / Ponding in AA	☐ **Yes**	☐ **No**	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	---	---	.7M	---	---	---	---	---
AA contains **unrestricted 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**		
	☒ **Permanent / Perennial**	☐ **Seasonal / Intermittent**	☐ **Temporary / Ephemeral**
☒ **≥ 65%**	1H	---	---
☐ **35-64%**	---	---	---
☐ **< 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 (14Diii)	**General Wildlife Habitat Rating (14Ciii)**		
	☐ **E/H**	☒ **M**	☐ **L**
☐ **E/H**	---	---	---
☐ **M**	---	---	---
☒ **L**	---	M	---
☐ **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	☐ **Vegetated Component >5 acres**						☐ **Vegetated Component 1-5 acres**						☒ **Vegetated Component <1 acre**					
B	☐ **High**		☐ **Moderate**		☐ **Low**		☐ **High**		☐ **Moderate**		☐ **Low**		☐ **High**		☒ **Moderate**		☐ **Low**	
C	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
P/P	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	.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 ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, AND that is not subjected to periodic mechanical mowing or clearing (unless for weed control).
Is there an average ≥ 50-foot wide vegetated upland buffer around ≥ 75% of the AA's perimeter? ☐ **YES**, add 0.1 to score in **ii** = ___ ☒ **NO**

iv. 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 ***FROM GROUNDWATER DISCHARGE*** or ***WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM***			
	☒ **P/P**	☐ **S/I**	☐ **T**	☐ **None**
☒ **Groundwater Discharge or Recharge**	1H	---	---	---
☐ **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)	☐ Rare	☐ Common	☐ Abundant	☐ Rare	☐ Common	☐ Abundant	☐ Rare	☒ Common	☐ Abundant
☒ **Low Disturbance** at AA (#12i)	---	---	---	---	---	---	---	.4M	---
☐ **Moderate Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---
☐ **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	
Total Points	**7.1**	**11**	**6.816 Total Functional Units**	
Percent of Possible Score 65% (round to nearest whole number)				

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

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

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

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

OVERALL ANALYSIS AREA (AA) RATING: Check the appropriate category based on the criteria outlined above.

☐ **I** ☒ **II** ☐ **III** ☐ **IV**

APPENDIX C
PROJECT AREA PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
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 Location: Veg Community 2
Bearing 200 degrees Year 2016



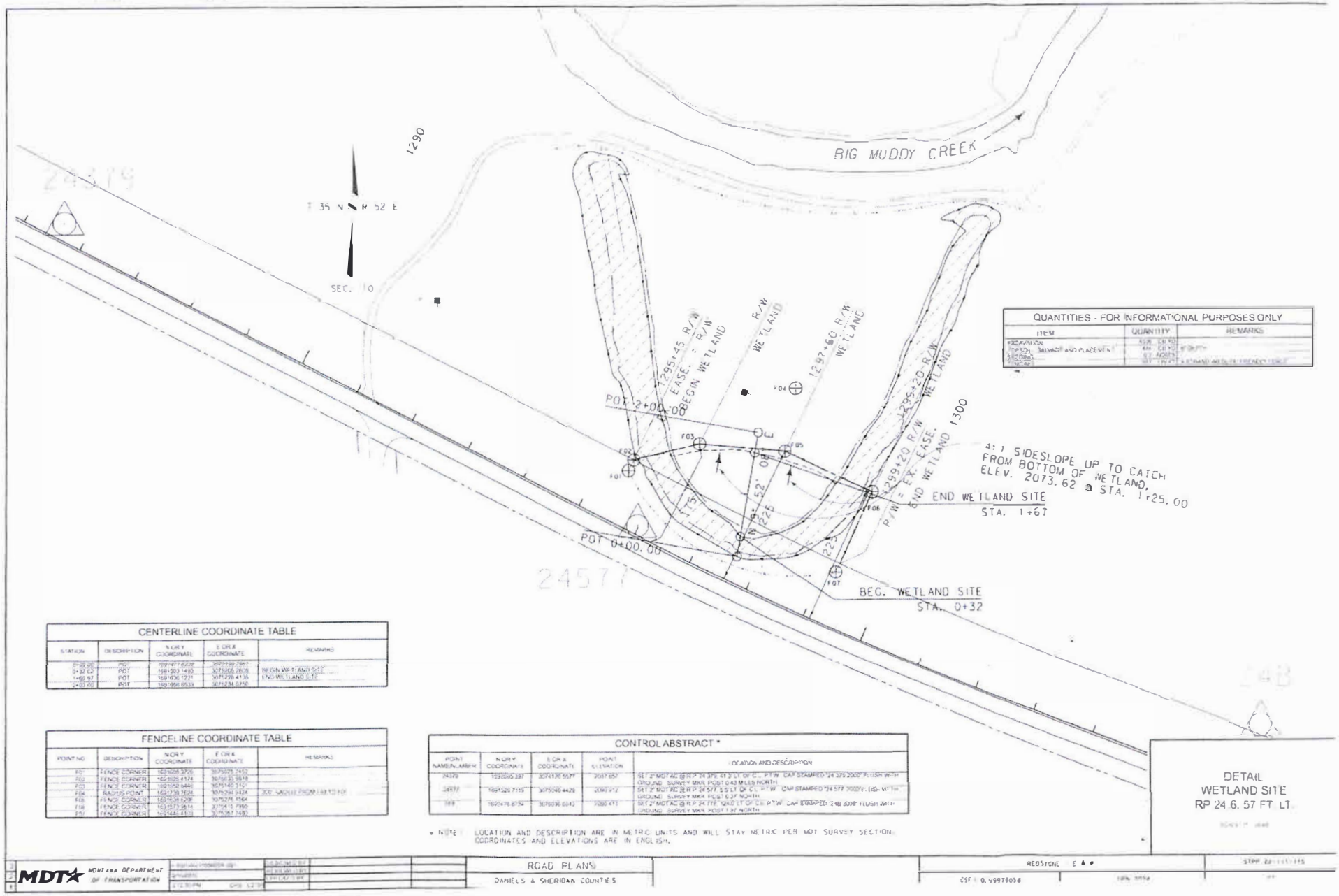
Tree Swallow Pair – Documented Using Artificial Bird Box.



Killdeer and Painted Turtles Common Onsite in 2016.

APPENDIX D
PROJECT PLAN SHEETS

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



QUANTITIES - FOR INFORMATIONAL PURPOSES ONLY

ITEM	QUANTITY	REMARKS
EXCAVATION		
TOPSOIL SALVAGE AND PLACEMENT		
SEEDING		
MULCH		

CENTERLINE COORDINATE TABLE

STATION	DESCRIPTION	N ORD. COORDINATE	E ORD. COORDINATE	REMARKS
0+32.00	POT	1691477.6206	3075229.7961	
0+32.02	POT	1691503.1493	3075206.2808	BEGIN WETLAND SITE
1+60.97	POT	1691636.1721	3075278.4136	END WETLAND SITE
2+03.00	POT	1691666.6533	3075234.0750	

FENCELINE COORDINATE TABLE

POINT NO	DESCRIPTION	N ORD. COORDINATE	E ORD. COORDINATE	REMARKS
F01	FENCE CORNER	1691606.3726	3075225.2452	
F02	FENCE CORNER	1691625.4174	3075233.9618	
F03	FENCE CORNER	1691652.9481	3075140.3157	
F04	ANGLE POINT	1691738.1836	3075234.1424	300' RADIUS FROM 1+67.57 FOT
F05	FENCE CORNER	1691736.6208	3075278.1564	
F06	FENCE CORNER	1691573.3614	3075415.7980	
F07	FENCE CORNER	1691446.4110	3075367.7480	

CONTROL ABSTRACT *

POINT NAME/NUMBER	N ORD. COORDINATE	E ORD. COORDINATE	POINT ELEVATION	LOCATION AND DESCRIPTION
24579	1692095.287	3074330.6627	2087.657	SET 2" MDT AC @ R.P. 24.579, 41.3 LT. OF CL. P.T.W. CAP STAMPED "24 579 2000' FLUSH WITH GROUND. SURVEY MKR. POST 0.43 MILES NORTH
24577	1691320.7115	3075080.4429	2089.912	SET 2" MDT AC @ R.P. 24.577, 2.5 LT OF CL. P.T.W. CAP STAMPED "24 577 2000'FLUSH WITH GROUND. SURVEY MKR. POST 0.37 NORTH
248	1692478.8754	3075036.6042	2080.473	SET 2" MDT AC @ R.P. 24.778, 124.0 LT OF CL. P.T.W. CAP STAMPED "248 2000' FLUSH WITH GROUND. SURVEY MKR. POST 1.37 NORTH

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

CSF # 0.4997805d

STPP 22-(11)115