MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2015

Redstone – East & West
Sheridan County, Montana



Prepared for:

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October 2015

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WETLAND MITIGATION MONITORING REPORT:

YEAR 2015

Redstone East and West

Sheridan County, Montana

Constructed: 2010

MDT Project Number STPP 22-1 (5)14
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TABLE OF CONTENTS

1. INTRODUCTION....1
2. METHODS....3
2.1. Hydrology....3
2.2. Vegetation....3
2.3. Soil....4
2.4. Wetland Delineation....4
2.5. Wildlife....4
2.6. Functional Assessment....5
2.7. Photo Documentation....5
2.8. GPS Data....5
2.9. Maintenance Needs....5
3. RESULTS....5
3.1. Hydrology....5
3.2. Vegetation....6
3.3. Soil....9
3.4. Wetland Delineation....9
3.5. Wildlife....9
3.6. Functional Assessment....11
3.7. Photo Documentation....11
3.8. Maintenance Needs....12
3.9. Current Credit Summary....12
4. REFERENCES....13

TABLES

Table 1. Vegetation species observed in 2013 to 2015 at the Redstone-E&W Wetland Mitigation Site. 8
Table 2. Total wetland acres delineated in 2013 to 2015 at the Redstone-E&W Wetland Mitigation Site. 9
Table 3. Wildlife species observed within the Redstone-E&W Wetland Mitigation Site in 2013 to 2015. 10
Table 4. Functions and Values of the Redstone-E&W Wetland Mitigation Site in 2013 to 2015. 11
Table 5. Summary of wetland credits in 2013 to 2015 at the Redstone-E&W Wetland Mitigation Site. 12

FIGURES

Figure 1. Project location of Redstone-E&W Wetland Mitigation Site. 2
Figure 2. 2015 Monitoring Activity Locations……..... Appendix A
Figure 3. 2015 Mapped Site Features…… Appendix A

APPENDICES

Appendix A Project Area Maps – Figures 2 and 3
Appendix B 2015 MDT Wetland Mitigation Site Monitoring Form
2015 USACE Wetland Determination Data Forms
2015 MDT Montana Wetland Assessment Method Form
Appendix C Project Site Photographs
Appendix D Project Plan Sheet

Cover: Photo is looking east from photo point 4, across the inundated Redstone wetland mitigation site.

1. INTRODUCTION

The 2015 Redstone-East and West (E&W) wetland monitoring report documents the third year post-construction 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; and 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 Montana Department of Transportation (MDT), this highway project resulted in approximately 0.17 acres of permitted wetland fill with a replacement ratio of 2:1, requiring 0.34 acres of compensatory wetland mitigation under authority of Section 404 of the Clean Water Act.

The Redstone-E&W wetland mitigation project is located 2.2 miles southeast of Redstone, 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 (Figure 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 a point of an isolated oxbow along Big Muddy Creek.

The 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 known as 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 acres of new palustrine emergent/depressional wetland habitat in an existing upland area adjacent to Big Muddy Creek. Aside from the creation of 0.34 wetland acres, this onsite, permittee-responsible, wetland mitigation site does not have any defined performance standards or success criteria. The 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 this aquatic resource is properly established and protected.

Figures 2 and 3 in Appendix A show the 2015 Monitoring Activity Locations and Mapped Site Features, respectively. The MDT Mitigation Monitoring Form, USACE Wetland Determination Data Forms for the Great Plains Region (USACE 2010), and the 2008 MDT Montana Wetland Assessment Forms (MWAM) (Berglund and McEldowney 2008) are included in Appendix B. Project site photographs are included in Appendix C and the MDT Preliminary Design – Plan is presented in Appendix D.

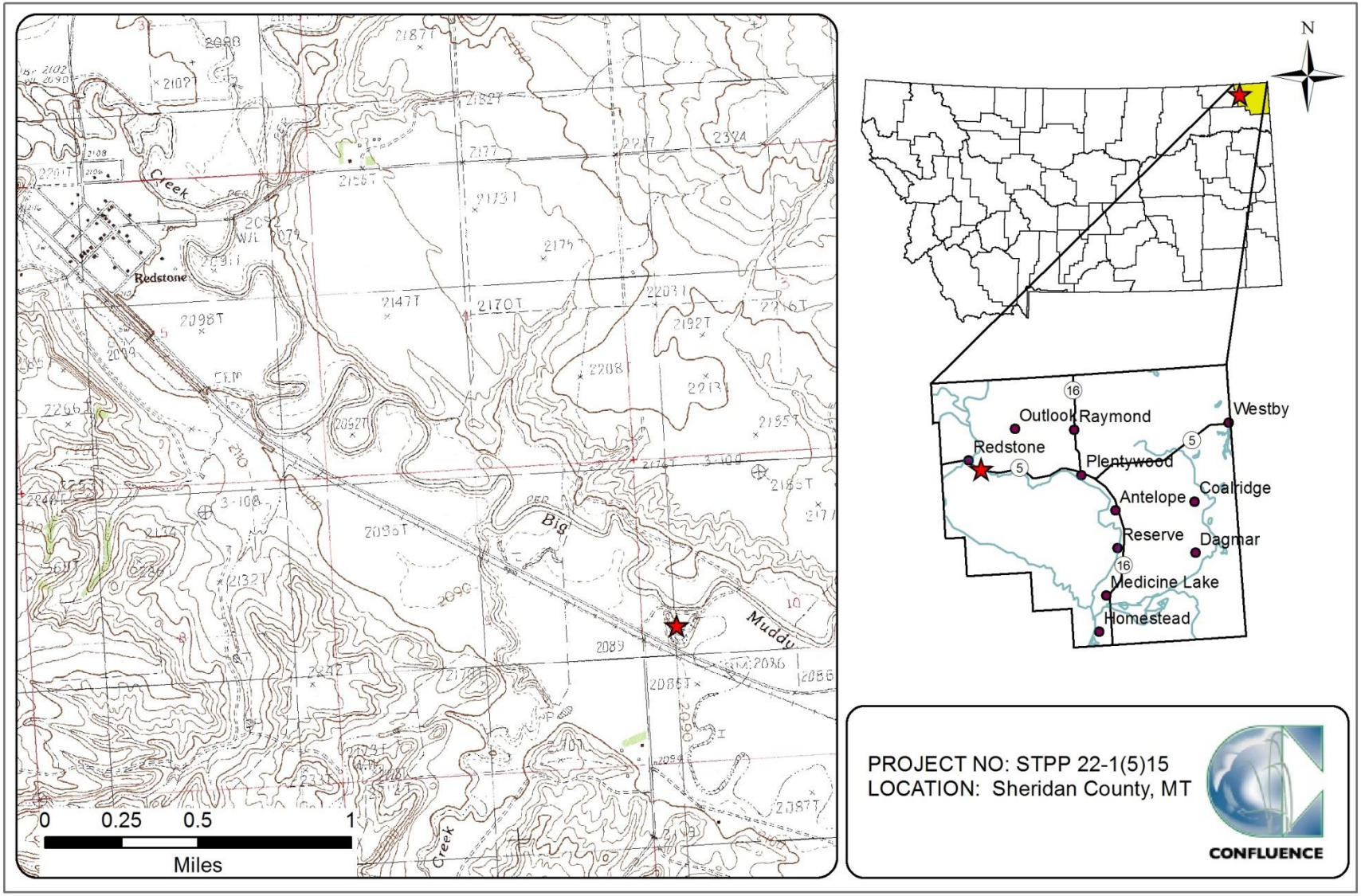


Figure 1. Project location of Redstone-E&W Wetland Mitigation Site.

2. METHODS

A monitoring site visit was performed on June 29, 2015. Information for the Mitigation Monitoring form and Wetland Determination Data Form was entered in the field on an electronic tablet during the field investigation (Appendix B). Monitoring activity sites were located with a global positioning system (GPS) as shown on Figure 2 (Appendix A). Information included completion of a wetland delineation, vegetation community mapping, soil and hydrology data collection, bird and wildlife use, photo documentation, and a non-engineering examination of any 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 two data points established within the project area. The hydrologic indicators were evaluated according to features observed during the site visit (Appendix B). Hydrologic assessments allow evaluation of mitigation goals addressing inundation/saturation requirements.

Technical criteria for wetland hydrology guidelines have been established as "permanent or periodic inundation, or soil saturation within 12 inches of the ground surface for a significant period (12.5 percent of the growing season) during the growing season" (USACE 2010). Systems with continuous inundation or saturation for greater than 12.5 percent of the growing season are considered jurisdictional wetlands. The growing season is approximated for purposes of this report as the number of days where there is a 50 percent probability that the minimum daily temperature is greater than or equal to 28.5 degrees Fahrenheit (USACE 2010). The Western Regional Climate Center (WRCC) identifies the average growing season recorded at the Redstone, Montana, weather station (246927) as 137 days. Areas 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 excavated during the wetland delineation were used to evaluate groundwater levels within 18 inches of the ground surface. The data were recorded on the Wetland Determination Data Form (Appendix B).

2.2. Vegetation

The boundaries of the dominant-species based vegetation communities were determined in the field during the active growing season and subsequently delineated on the 2015 aerial photograph. Percent cover of the dominant species within a community type was estimated and recorded using the following values: 0 (less than 1 percent), 1 (1 to 5 percent), 2 (6 to10 percent), 3 (11 to 20 percent), 4 (21 to 50 percent), and 5 (greater than 50 percent) (Appendix B). Community types were named based on the predominant vegetation species that characterized each mapped polygon (Figure 3, Appendix A).

No vegetation transect has been established at this site due to 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), prepared by the Montana Department of Agriculture, was used to classify weeds identified within the site. The location of noxious weeds was noted in the field and mapped on the aerial photo (Figure 3, Appendix A). The noxious weed species identified are color-coded. The locations are denoted with the symbol "**x**", "▲", or "■" representing 0 to 0.1 acre, .1 to 1 acre, or greater than 1 acre in extent, respectively. Cover classes are represented on Figure 3 by T, L, M, or H, symbols for less than 1 percent, 1 to 5 percent, 6 to 25 percent, and 26 to 100 percent, respectively.

2.3. Soil

Soil information was obtained from the *Soil Survey for Sheridan County Area* (USDA 2013) and *in situ* soil descriptions. Soil cores were excavated using a hand auger and evaluated according to procedures outlined in the 1987 Manual and 2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (USACE 2010). A description of the soil profile, including hydric soil indicators when present, was recorded on the Wetland Determination Data Form for each profile (Appendix B).

2.4. Wetland Delineation

Waters of the US including special aquatic sites and jurisdictional wetlands were delineated throughout the project area in accordance with criteria established in the 1987 Manual and the 2010 Great Plains Regional Supplement. The technical criteria for hydrophytic vegetation, hydric soil, and wetland hydrology must be satisfied to delineate a representative area as jurisdictional. The name and indicator status of plant species were derived from the 2014 National Wetland Plant List (NWPL) (Lichvar *et al*., 2014). The Routine Level-2 On-site Determination Method (Environmental Laboratory 1987) was used to delineate jurisdictional areas as documented on the Wetland Determination Data Form (Appendix B).

The wetland boundary was determined in the field based on changes in plant communities and/or hydrology, and changes in soil characteristics. Topographic relief boundaries within the project area were also examined and cross-referenced with soil and vegetation communities as supportive information for the delineation. Vegetation composition, soil characteristics, and hydrology were assessed at likely wetland and adjacent upland locations. If all three parameters met the criteria, the area was designated as wetland and mapped by vegetation community type. If any one of the parameters did not exhibit positive wetland indicators, the area was determined to be upland unless the site was classified as an atypical situation, potential problem area for vegetation, soil or hydrology, or special aquatic site, i.e., mudflat. The GPS-surveyed wetland boundary is shown on the 2015 aerial imagery (Figure 3, Appendix A). Wetland acreages were estimated using Geographic Information System (GIS) methods.

2.5. Wildlife

Observations and other positive indicators of use of mammal, reptile, amphibian, and bird species were recorded on the Mitigation Monitoring Form during the site

visit. Indirect use indicators, including tracks, scat, burrows, eggshells, skins, and bones, were also recorded. These signs were recorded while traversing the site for other required activities. Direct sampling methods, such as snap traps, live traps, and pitfall traps, were not used. A comprehensive wildlife species list of animals observed from 2013 to 2015 was compiled for this report.

2.6. Functional Assessment

The 2008 MDT MWAM (Berglund and McEldowney 2008) was used to evaluate functions and values on the site in 2015. This method provides an objective means of assigning wetlands an overall rating and provides regulators a means of assessing mitigation success based on wetland functions. Functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society and relate to ecological significance without regard to subjective human values (Berglund and McEldowney 2008). Field data for this assessment were collected during the site visit. A Wetland Assessment Form was completed for one assessment area (AA) and included both the existing and created wetlands (Appendix B).

2.7. Photo Documentation

Monitoring at photo points provides supplemental information documenting conditions of the site wetlands, uplands, and vegetation transects; site trends; and current land uses surrounding the project. Photographs were taken at four photo points established in 2013 during the initial site visit (Appendix C). Photo point locations were recorded with a resource grade GPS unit (Figure 2, Appendix A).

2.8. GPS Data

Site features and survey points were collected with a resource grade Thales Pro Mark III GPS unit during the 2015 monitoring season. Points were collected using WAAS-enabled differential correction satellites, typically improving resolution to sub-meter accuracy. The collected data were then transferred to a personal computer, imported into GIS, and presented in Montana State Plane Single Zone NAD 83 meters. Site features and survey points that were located with GPS included fence boundaries, photograph points, transect endpoints, wetland/upland boundaries, and wetland data points.

2.9. Maintenance Needs

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

3. RESULTS

3.1. Hydrology

Climate data from the meteorological station at 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, located approximately 15.6 miles east of the site in Plentywood, Montana (246586), recorded an average annual precipitation rate of 13.28 inches from January 1947 to September 2015. The historic precipitation average from January to August 31 was 10.48 inches. The precipitation totals for this same period was 10.09 inches (2012), 11.23 inches (2013), 17.68 inches (2014), and 9.18 inches (2015). These data indicate the region around the Redstone-E&W wetland mitigation site has received near-average precipitation prior to and during the 2012 and 2013 growing seasons, above average precipitation in 2014 and below average precipitation in 2015.

The wetland mitigation area is contiguous with a greater than two-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. The entire constructed wetland was inundated during the field survey in 2015. Surface water depths ranged from 0.0 to 6.0 feet. The depth at the emergent vegetation/open water boundary was approximately one foot. Areas defined as wetlands that were not inundated exhibited saturation to the ground surface, inundation on aerial imagery, algal mats, H_2S odor, and FAC-Neutral test.

Two data points, SP-01w and SP-02u, were sampled to determine the wetland and upland boundaries. Data point SP-01w was located at the edge of open water of the oxbow and exhibited saturation to the ground surface, algal mats, H_2S odor, and saturation visible on aerial imagery. No hydrologic indicators were noted at data point SP-02u, which was located at a slightly higher elevation than the adjacent wetland data point SP-01w.

3.2. Vegetation

Monitoring year 2015 marked the third year of post-construction monitoring at the Redstone-E&W wetland mitigation site. Forty-seven plant species were observed site wide in 2013 to 2015 (Table 1). Vegetation plant communities were mapped and named based on the dominant species within a community and the results of the wetland delineation data. The communities and associated species are listed on the Monitoring Form in Appendix B and are mapped on Figure 3 in Appendix A.

Three vegetation communities were identified in 2015 including one upland type and two wetland types. The plant communities remained the same from 2013 to 2015. The communities were upland Type 1 – *Bromus inermis/Symphoricarpos albus*, wetland Type 2 – *Schoenoplectus* spp., and wetland Type 3 – Aquatic Macrophytes/Open Water. The communities are discussed below.

Upland community Type 1 – *Bromus inermis/Symphoricarpos albus* was identified on the 0.3-acre upland surrounding the pre-existing and created wetlands. Areas of this community disturbed during construction were reseeded. Twenty-eight 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 wildrye (*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 acres within the shallower water depths surrounding community Type 3. This community was dominated by hard-stem club-rush (*Schoenoplectus acutus*) with less cover of saltmarsh club-rush (*Schoenoplectus maritimus*), three-square club-rush (*Schoenoplectus pungens*), and great pale club-rush (*Schoenoplectus heterochaetus*). 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 0.83 acres 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 extend into the open water. This area was inundated during 2013, 2014, and 2015 site visits, indicating the likelihood of perennial inundation.

No woody vegetation was installed at this site and there were no indications of natural shrub or tree recruitment. Revegetation efforts primarily entailed seeding after construction. Two infestations of Canadian thistle (*Cirsium arvense*), a Priority 2B noxious weed, were observed along the south edge of the site in community Type 1. The largest infestation covered between 0.1 acres and 1 acre with a moderate cover class of 6 to 25 percent, while the smaller infestation was less than 0.1 acres with less than 0.1 percent cover. Less than 0.1 acres of field bindweed (*Convolvulus arvensis*) with 1 to 5 percent cover was also observed in 2015. The infestation was located at the southeast boundary of the mitigation site. The 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.

Table 1. Vegetation species observed in 2013 to 2015 at the Redstone-E&W Wetland Mitigation Site.

Scientific Names	Common Names	GP Indicator Status[1]
Achillea millefolium	**Common Yarrow**	**FACU**
Agropyron cristatum	Crested Wheatgrass	NL
Algae, green	Algae, green	NL
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	Canadian 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.	Sweetclover	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
Teucrium canadense	**American Germander**	**FACW**
Thlaspi arvense	Field Pennycress	FACU
Tragopogon dubius	Meadow Goat's-beard	NL
Typha latifolia	Broad-Leaf Cat-Tail	OBL

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

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

3.3. Soil

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

Soil test pits were excavated at two locations, both within the originally mapped Haverlon soil series (SP-01w and SP-02u, Figure 2, Appendix A). Data point SP-01w was located within wetland Community 2, at the edge of open water. Data point SP-02u was located within upland Community 1. The soil profile at SP-01w revealed a dark gray (10YR 4/1) silty clay with forty 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. Soil profile SP-02u consisted of a dark grayish brown (2.5Y 4/2) silty clay. The soils observed at data point SP-02u had no hydric soil indicators.

3.4. Wetland Delineation

Two wetland determination data points were evaluated to assess and confirm the 2015 wetland boundary at the Redstone-E&W mitigation site. Approximately 0.69 acres of wetlands existed within this mitigation site prior to construction. The 2015 wetland delineation identified a total of 0.96 acres of wetland and aquatic habitat within the site. A total of 0.27 acres of created wetland were identified in 2013, 2014, and 2015 (Table 2). Additional wetland development at this site is unlikely as the current wetland boundary is defined by a distinct topographic break between the excavated basin and adjacent uplands.

Table 2. Total wetland acres delineated in 2013 to 2015 at the Redstone-E&W Wetland Mitigation Site.

Wetland and Aquatic Habitat	2013 (acres)	2014 (acres)	2015 (acres)
Created Wetland	0.27	0.27	0.27
Pre-Existing Wetland	0.69	0.69	0.69
Upland	0.30	0.30	0.30
Total Area	1.26	1.26	1.26

3.5. Wildlife

A comprehensive list of birds and other wildlife species observed directly or indirectly in 2013 to 2015 is presented in Table 3 (Monitoring Form, Appendix B). Three bird species were identified around the site including killdeer (*Charadrius vociferous*), swallow sp., and red-winged blackbirds (*Agelaius phoenicueus*). One bluebird box has been installed at this site. This nesting structure was in good condition in 2015 and was being used by a swallow. One frog sp. (*Rana* sp.) was observed at the wetland. Several small fish were observed along the fringe of the *Schoenoplectus* spp. community. One coyote (*Canis latrans*) was observed on-site.

Table 3. Wildlife species observed within the Redstone-E&W Wetland Mitigation Site in 2013 to 2015.

COMMON NAME	SCIENTIFIC NAME
AMPHIBIANS	
Northern Leopard Frog	*Rana pipiens*
Frog sp.	***Rana* sp.**
BIRDS	
Bank Swallow	*Riparia riparia*
Barn Swallow	*Hirundo rustica*
Blue-winged Teal	*Anas discors*
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***
Spotted Sandpiper	*Actitis macularius*
Swainson's Hawk	*Buteo swainsoni*
Tree Swallow	*Tachycineta bicolor*
Swallow sp.	
Turkey Vulture	*Cathartes aura*
Vesper Sparrow	*Pooecetes gramineus*
Western Meadowlark	*Sturnella neglecta*
MAMMALS	
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 observed in 2015 are **bolded.**

3.6. Functional Assessment

The boundary between the existing and created wetlands was indistinguishable and inundated with contiguous surface water. As such, the total wetland area (0.96 acres) identified within the Redstone-E&W wetland mitigation site was evaluated as a single assessment area (AA). The 2008 MWAM (Berglund and McEldowney) was used to evaluate the functions and values and to calculate the functional units of the site.

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 2015. 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 identified on the site in 2014 and 2015, boosting the MTNHP rating from low (0.1) to high (1.0) and improving 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.

Table 4. Functions and Values of the Redstone-E&W Wetland Mitigation Site in 2013 to 2015.

Function and Value Parameters from the 2008 Montana Wetland Assessment Method	2013 AA Created & Existing	2014 AA Created & Existing	2015 AA Created & Existing
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Low (0.1)	High (1.0)	High (1.0)
General Wildlife Habitat	Mod (0.5)	Mod (0.7)	High (0.9)
General Fish/Aquatic Habitat	Low (0.3)	Low (0.3)	Low (0.3)
Flood Attenuation	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)
Sediment/Nutrient/Toxicant Removal	Mod (0.7)	Mod (0.7)	Mod (0.7)
Sediment/Shoreline Stabilization	High (1.0)	High (1.0)	High (1.0)
Production Export/Food Chain Support	Mod (0.6)	Mod (0.4)	Mod (0.4)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Low (0.3)	Low (0.4)
Recreation/Education Potential (bonus points[3])	NA	NA	NA
Actual Points/Possible Points	**5.8 / 11**	**6.8 / 11**	**7.1 / 11**
% of Possible Score Achieved	**52.7%**	**61.8%**	**64.6%**
Overall Category	**III**	**II**	**II**
Total Acreage of Assessed Wetlands within Site Boundaries	**0.96**	**0.96**	**0.96**
Functional Units (acreage x actual points)	**5.57**	**6.53**	**6.82**

3.7. Photo Documentation

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

3.8. Maintenance Needs

There are no man-made diversion structures installed at the site. Two bluebird boxes were installed at the site, but only one was observed and in use during the 2015 visit. One bluebird box should be reinstalled at PP-3. Two infestations of Canadian thistle (*Cirsium arvense*), a Priority 2B noxious weed, were observed along the south edge of the site. The largest infestation covered between 0.1 acres and 1 acre with a moderate cover class of 6 to 25 percent, while the smaller infestation was less than 0.1 acres with less than 0.1 percent cover. Less than 0.1 acres of field bindweed (*Convolvulus arvensis*) with 1 to 5 percent cover was observed in 2015. The infestation was located at the southeast boundary of the mitigation site. The MDT will use the annual monitoring results to determine appropriate weed control efforts. The fence installed around the perimeter of the site was in good working order when inspected during the 2015 field survey.

3.9. Current Credit Summary

The proposed mitigation acreages and credit ratios were discussed in the February 2010 Wetland Mitigation Site Monitoring Plan. 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 acres of new, created wetland area.

Table 5 summarizes the calculated credit acreages based on the results of the 2015 mitigation monitoring efforts. The wetland acreage at the Redstone E&W site totaled 0.96 acres including approximately 0.69 acres of pre-existing wetlands and 0.27 acres of new, created wetland area. Using the mitigation ratios provided by the USACE Montana Regulatory Program for creation (2:1), preservation (4:1), and upland buffer (5:1), a total of 0.37 credit acres has been estimated for the Redstone site in 2015. No performance standards or success criteria to evaluate the achievement of wetland mitigation were presented within the approved on-site wetland mitigation plan. Therefore, all areas exhibiting wetland and aquatic conditions have received full credit.

Table 5. Summary of wetland credits in 2013 to 2015 at the Redstone-E&W Wetland Mitigation 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
Creation (Establishment)	2:1	0.34	0.27	0.14	0.27	0.14	0.27	0.14
Preservation (Protection)	4:1	*	0.69	0.17	0.69	0.17	0.69	0.17
Upland Buffer	5:1	*	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**

*Approved mitigation plan does not include acreage for these mitigation types.

4. REFERENCES

Berglund, J. and R. McEldowney. 2008. *MDT Montana Wetland Assessment Method.* Prepared for Montana Department of Transportation, Helena, Montana. Post, Buckley, Schuh, & Jernigan, Helena, Montana. 42pp.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. U.S. Army Corps of Engineers. Washington, DC.

Lichvar, R.W., M. Butterwick, N.C. and W.N. Kirchner. 2014. *The National Wetland Plant List. 2014 Update of Wetland Ratings.* Phytoneuron 2014-41:1-42.

Reed, P.B. 1988. *National list of plant species that occur in wetlands: North Plains (Region 4)*. Biological Report 88(26.4), May 1988. U.S. Fish and Wildlife Service, Washington, DC.

U.S. Army Corps of Engineers. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-1.Vicksburg, MS: U.S. Army Engineer Research and Development Center.

Websites:

Montana Department of Agriculture. 2015. *Montana Noxious Weed List*. Accessed October 2015 at: http://agr.mt.gov/agr/Programs/Weeds/PDF/2015WeedList.pdf.

United States Department of Agriculture-Natural Resource Conservation Service. Web Soil Survey for Sheridan County, Montana. 2013. Accessed September 2013 at: http://websoilsurvey.nrcs.usda.gov/app/

Western Regional Climate Center. United States Historical Climatology Network. Reno, Nevada. 2015. Accessed September 2015 at: http://www.wrcc.dri.edu/CLIMATEDATA.html

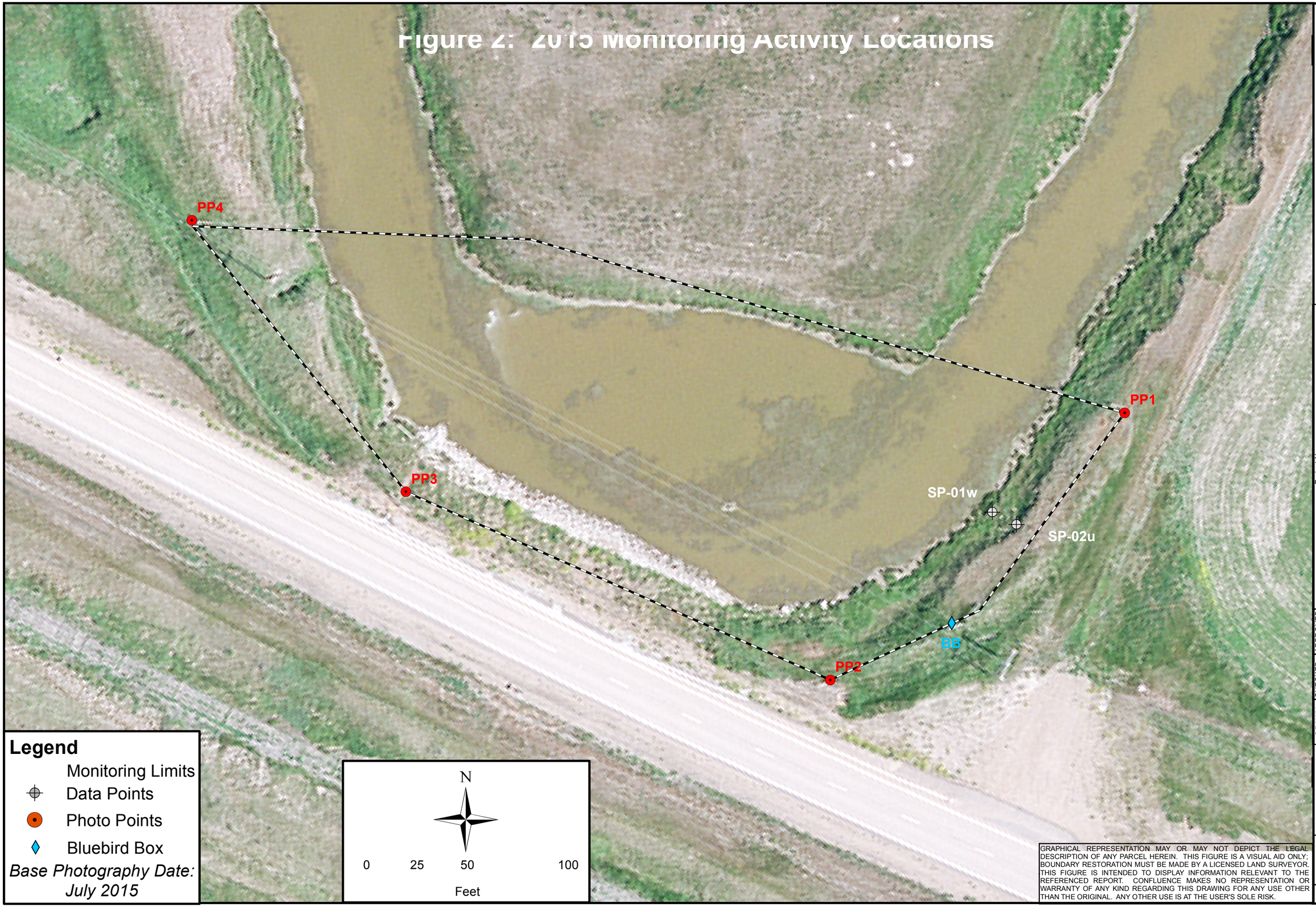
Appendix A

PROJECT AREA MAPS

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

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

Figure 2: 2015 Monitoring Activity Locations



Legend

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

Base Photography Date: July 2015

N

0 25 50 100

Feet

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

LOCATION: Sheridan Co., MT

PROJ NO: STPP 14-6(9)259

FILE: Redstone/Monitor2015.mxd

Project Name: Redstone Wetland Mitigation Site

Drawing Title: 2015 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
JJ	JJ	JJ

SCALE: Noted

Drawn: August 30, 2015

PROJ MGR: J Johnson

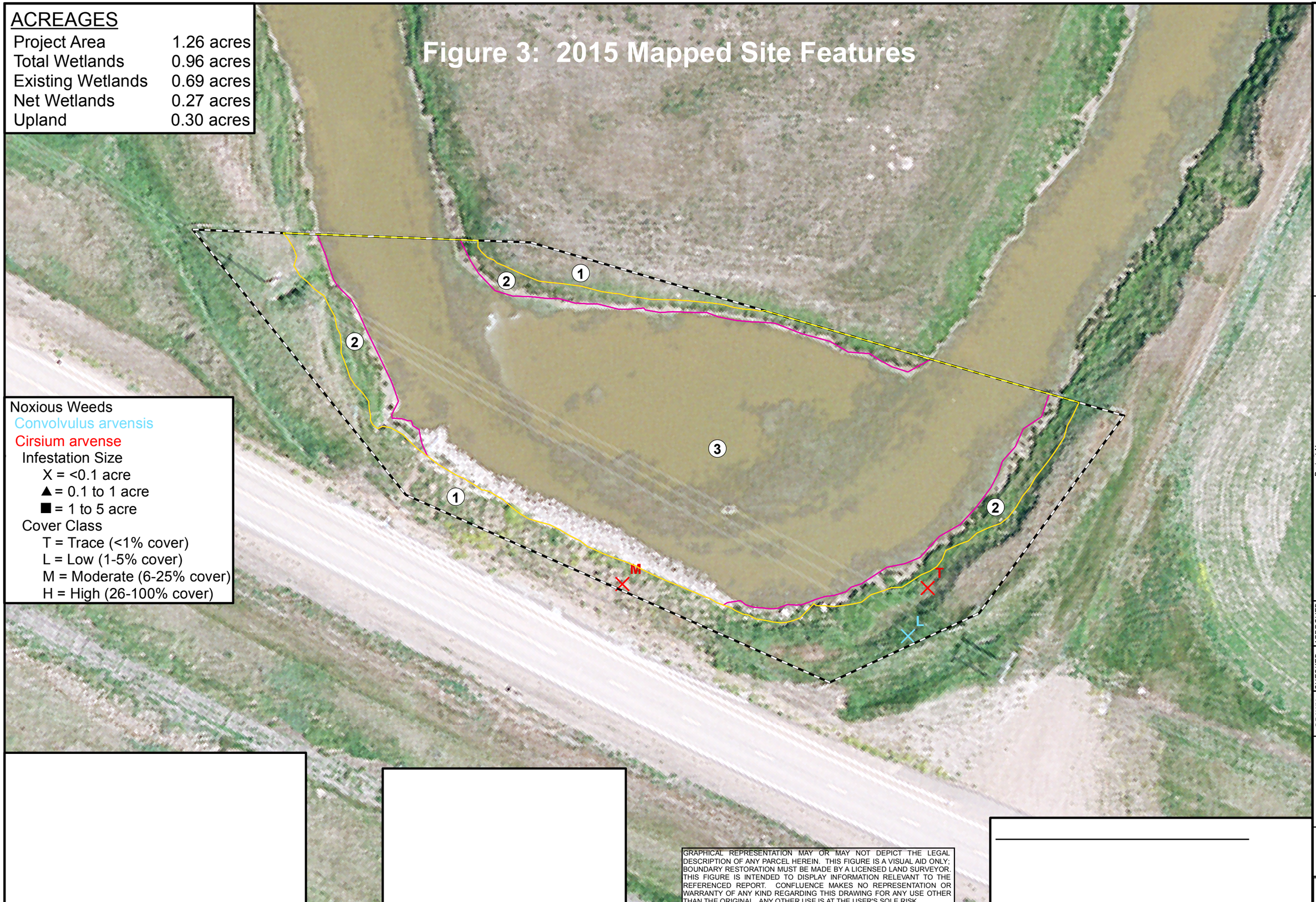
CONFLUENCE consulting incorporated

Figure 2

Figure 3: 2015 Mapped Site Features

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

Noxious Weeds
- Convolvulus arvensis
- Cirsium arvense
  - Infestation Size
    - X = <0.1 acre
    - ▲ = 0.1 to 1 acre
    - ■ = 1 to 5 acre
  - Cover Class
    - T = Trace (<1% cover)
    - L = Low (1-5% cover)
    - M = Moderate (6-25% cover)
    - H = High (26-100% cover)



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

LOCATION: Sheridan Co., MT

PROJ NO: STPP 14-6(9)259

FILE: Redston/Veg2015.mxd

Project Name: Redstone Wetland Mitigation Site

Drawing Title: 2015 Mapped Site Features

DRAWN	CHECKED	APPROVED
JJ	JJ	JJ

SCALE: As Shown

Drawn: August 30, 2015

PROJ MGR: J Johnson

CONFLUENCE consulting incorporated

Figure 3

REV -

Appendix B

2015 MDT Wetland Mitigation Site Monitoring Form
2015 USACE Wetland Determination Data Forms
2015 MDT Montana Wetland Assessment Form

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

MDT WETLAND MITIGATION SITE MONITORING FORM

Project Site: Redstone Assessment Date/Time 6/29/2015

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

Weather: Hot and sunny, light breeze Location: ~2.3 miles SE of Redstone

MDT District: Glendive Milepost: ~24.6 on Hwy 5

Legal Description: T 35N R 52E Section(s) 10

Initial Evaluation Date: 8/8/2013 Monitoring Year: 3 #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: ☑ Average Depth: 2.5 **(ft)** Range of Depths: 0-6 **(ft)**

Percent of assessment area under inundation: 75 %

Depth at emergent vegetation-open water boundary: 1 **(ft)**

If assessment area is not inundated then are the soils saturated within 12 inches of surface: Yes

Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc**:**

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

Groundwater Monitoring Wells

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

Well ID	Water Surface Depth (ft)
No Wells	

Additional Activities Checklist:

☐ Map emergent vegetation-open water boundary on aerial photograph.

☐ Observe extent of surface water during each site visit and look for evidence of past surface water elevations (drift lines, erosion, vegetation staining, etc.)

☐ Use GPS to survey groundwater monitoring well locations, if present.

Hydrology Notes:

Entire constructed wetland inundated during field survey. This area appears to maintain perennial inundation.

VEGETATION COMMUNITIES

Site Redstone

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

Community # 1 **Community Type:** Bromus inermis / Symphoricarpos albus **Acres** 0.3

Species	Cover class	Species	Cover class
Achillea millefolium	0	Agropyron cristatum	2
Anemone canadensis	0	Artemisia cana	0
Artemisia frigida	0	Bassia scoparia	1
Bromus inermis	5	Bromus tectorum	1
Chenopodium album	0	Cirsium arvense	1
Convolvulus arvensis	0	Descurainia sophia	0
Elymus repens	1	Grindelia squarrosa	1
Helianthus annuus	0	Hordeum jubatum	1
Lactuca serriola	1	Maianthemum stellatum	0
Medicago sativa	1	Melilotus officinalis	2
Pascopyrum smithii	1	Ratibida columnifera	0
Rosa woodsii	0	Rumex crispus	0
Sonchus arvensis	1	Symphoricarpos albus	3
Thlaspi arvense	0	Tragopogon dubius	0

Comments:

Upland community type.

Community # 2 **Community Type:** Schoenoplectus spp. / **Acres** 0.13

Species	Cover class	Species	Cover class
Chenopodium glaucum	1	Eleocharis palustris	1
Hordeum jubatum	1	Marrubium vulgare	0
Mentha arvensis	0	Open Water	2
Poa palustris	0	Rumex crispus	1
Schoenoplectus acutus	4	Schoenoplectus heterochaetus	0
Schoenoplectus maritimus	0	Schoenoplectus pungens	1
Sonchus arvensis	2	Spartina pectinata	0
Teucrium canadense	1	Thlaspi arvense	0

Comments:

Wetland community type. Schoenoplectus maritimus decreased from a cover class of 4 in 2014 to a cover class of 0 in 2015 while Schoenoplectus acutus increased from a cover class of 2 in 2014 to a cover class of 4 in 2015. Schoenoplectus heterochaetus also decreased in cover from a cover class of 1 in 2014 to a cover class of 0 in 2015.

Community # 3 **Community Type:** Aquatic macrophytes / Open Water **Acres** 0.83

Species	Cover class	Species	Cover class
Algae, green	2	Aquatic macrophytes	4
Open Water	5	Ruppia maritima	2
Schoenoplectus maritimus	0		

Comments:

Wetland community type.

Total Vegetation Community Acreage **1.26**

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

VEGETATION TRANSECTS

Site: Redstone Date: 6/29/2015

PLANTED WOODY VEGETATION SURVIVAL

Redstone

Planting Type	#Planted	#Alive	Notes
No planted woody veg			

Comments

Redstone

WILDLIFE

Birds

Were man-made nesting structures installed? Yes

If yes, type of structure: Bluebird box

How many? 1

Are the nesting structures being used? Yes

Do the nesting structures need repairs? No

Nesting Structure Comments:

Two bluebird boxes were installed at the site, but only one was observed and in use during the 2015 visit. The nesting structure that was present on site was in good condition and being use by swallow sp. One bluebird box should be reinstalled at PP-3.

Species	#Observed	Behavior	Habitat
Killdeer	2		US, OW, UP, US,
Red-winged Blackbird	4		UP,
Swallow sp.	2		UP,

Bird Comments

BEHAVIOR CODES

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

HABITAT CODES

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

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

Mammals and Herptiles

Species	# Observed	Tracks	Scat	Burrows	Comments
Coyote	1	No	No	No	
Fish sp.	15	No	No	No	
Frog sp.	1	No	No	No	

Wildlife Comments:

Redstone

PHOTOGRAPHS

Take photographs of the following permanent reference points listed in the check list below. Record the direction of the photograph using a compass. When at the site for the first time, establish a permanent reference point by setting a ½ inch rebar or fencepost extending 2-3 feet above ground. Survey the location with a resource grade GPS and mark the location on the aerial photograph.

Photograph Checklist:

☑ One photograph for each of the four cardinal directions surrounding the wetland.

☑ At least one photograph showing upland use surrounding the wetland. If more than one upland exists then take additional photographs.

☑ At least one photograph showing the buffer surrounding the wetland.

☑ One photograph from each end of the vegetation transect, showing the transect.

Photo #	Latitude	Longitude	Bearing	Description
1114-1116	48.800556	-104.904221	240	PP-1
1121-1122	48.800175	-104.904907	0	PP-2
1126-1127	48.800591	-104.905739	75	PP-3
1129-1131	48.800911	-104.90612	140	PP-4
8386-8387	48.800425	-104.904469	340	SP-01w
8391-8392	48.800402	-104.904422	200	SP-02u

Comments:

Redstone

ADDITIONAL ITEMS CHECKLIST

Hydrology

☑ Map emergent vegetation/open water boundary on aerial photos.
☑ Observe extent of surface water. Look for evidence of past surface water elevations (e.g. drift lines, vegetation staining, erosion, etc).

Photos

☑ One photo from the wetland toward each of the four cardinal directions
☑ One photo showing upland use surrounding the wetland.
☑ One photo showing the buffer around the wetland
☑ One photo from each end of each vegetation transect, toward the transect

Vegetation

☑ Map vegetation community boundaries

☑ Complete Vegetation Transects

Soils

☑ Assess soils

Wetland Delineations

☐ Delineate wetlands according to applicable USACE protocol (1987 form or Supplement)
☐ Delineate wetland – upland boundary onto aerial photograph.

Wetland Delineation Comments

Functional Assessments

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

Functional Assessment Comments:

Maintenance

Were man-made nesting structure installed at this site? Yes

If yes, do they need to be repaired? No

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

Were man-made structures built or installed to impound water or control water flow

into or out of the wetland? No

If yes, are the structures in need of repair?

If yes, describe the problems below.

Two bluebird boxes were installed at the site, but only one was observed and in use during the 2015 visit. One bluebird box should be reinstalled at PP-3.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Redstone City/County: Sheridan Co. Sampling Date: 6/29/2015

Applicant/Owner: MDT State: MT Sampling Point: SP-01w

Investigator(s): R Quire, R McEldowney Section, Township, Range: 10 35N 52E

Landform (hillslope, terrace, etc.): Shoreline Local relief (concave, convex, none): concave Slope (%): 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 ☐	Is the Sampled Area within a Wetland? Yes ☑ No ☐
Wetland Hydrology Present?	Yes ☑	No ☐	

Remarks: Data point along vegetated margin of open water at toe of slope. Old oxbow feature. Depressional PEM.

VEGETATION - Use scientific names of plant

Tree Stratum Plot size (30 Foot Radius)

	Absolute % Cover:	Domiant Species?	Indicator Status

Sapling/Shrub Stratum Plot size (15 Foot Radius)

Herbaceous Stratum Plot size (5 Foot Radius)

Chenopodium glaucum	20	☐	FAC
Epilobium sp.	1	☐	NL
Hordeum jubatum	1	☐	FACW
Schoenoplectus acutus	2	☐	OBL
Schoenoplectus pungens	65	☑	OBL
Sonchus arvensis	15	☐	FAC
Teucrium canadense	2	☐	FACW

Woody Vine Stratum Plot size (30 Foot Radius)

Percent Bare Ground

Dominance Test worksheet

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

Total Number of Dominant Species Across All Strata: 1 (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	67	X 1	67
FACW species	3	X 2	6
FAC species	35	X 3	105
FACU species	0	X 4	0
UPL species	1	X 5	5
Column Totals	106 (A)		183 (B)

Prevalence Index = B/A = 1.73

Hydrophytic Vegetation Indicators

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

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

Hydrophytic Vegetation Present? Yes ☑ NO ☐

Remarks:

SOIL

Sampling Point: SP-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	60	7.5YR 4/6	40	C	PL	Silty Clay	

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

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

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

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☑ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

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

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Redstone City/County: Sheridan Co. Sampling Date: 6/29/2015

Applicant/Owner: MDT State: MT Sampling Point: SP-02u

Investigator(s): R Quire, R McEldowney Section, Township, Range: 10 35N 52E

Landform (hillslope, terrace, etc.): Shoulder slope Local relief (concave, convex, none): flat Slope (%): 3

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: Data point located on sideslope adjacent to wetland depression.

VEGETATION - Use scientific names of plant

Tree Stratum Plot size (30 Foot Radius)

	Absolute % Cover:	Domiant Species?	Indicator Status

Sapling/Shrub Stratum Plot size (15 Foot Radius)

Herbaceous Stratum Plot size (5 Foot Radius)

Bromus inermis	40	☑	UPL
Elymus repens	10	☐	FACU
Sonchus arvensis	20	☑	FAC

Woody Vine Stratum Plot size (30 Foot Radius)

Percent Bare Ground 30

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	40	X 5	200
Column Totals	70 (A)		300 (B)

Prevalence Index = B/A = 4.29

Hydrophytic Vegetation Indicators

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

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

Hydrophytic Vegetation Present? Yes ☐ NO ☑

Remarks:

SOIL

Sampling Point: SP-02u

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	

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

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

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

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☑

Remarks: No hydric soil indicators observed during field survey.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

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

Wetland Hydrology Present? Yes ☐ No ☑

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

Remarks: No evidence of wetland hydrology observed during field survey.

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name Redstone **2. MDT project#** STPP 22-1(5)14 **Control#** 2024

3. Evaluation Date 6/29/2015 **4. Evaluators** R Quire, R McEldowney **5. Wetland/Site# (s)** Created and Existing

6. Wetland Location(s): T 35N **R** 52E **Sec1** 10 **T** **R** **Sec2**

Approx Stationing or Mileposts 10060006

Watershed 10060006 **Watershed/County** Big Muddy Creek, Lower Missouri, Sheridan Co.

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 0.96

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 0.96

☐ **Mitigation Wetlands: pre-construction**

How assessed: Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Riverine	Aquatic Bed	Excavated	Permanent/Perennial	80
Depressional	Emergent Wetland	Excavated	Permanent/Perennial	20

11. Estimated Relative Abundance Common

12. General Condition of AA

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

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

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

AA experiences low disturbance from adjancent MT Highway 5 and surrounding cultived agriculture.

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

Cirsium arvense, Convolvulus arvensis

iii. Provide brief descriptive summary of AA and surrounding land use/habitat

AA contiguous with isolated oxbow of Big Muddy Creek. Surrounding landuses 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 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	<NO	YES>	L
1 class, monoculture (1 species comprises>=90% of total cover)	L	NA	NA	NA

Comments: AA includes aquatic bed and emergent wetlands.

SECTION PERTAINING to FUNCTIONS VALUES ASSESSMEN

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

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

Primary or critical habitat (list species)	○ D ○ S	
Secondary habitat (list Species)	○ D ○ S	
Incidental habitat (list species)	○ D ○ S	
No usable habitat	☑ S	

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

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

Sources for documented use: USFWS T&E list for Sheridan Co., MT

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

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

Primary or critical habitat (list species)	◉ D ○ S	Schoenoplectus heterochaetus (S1)
Secondary habitat (list Species)	◉ D ○ S	
Incidental habitat (list species)	○ D ◉ S	Ferruginous Hawk (S3B)
No usable habitat	☐ S	

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

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

Sources for documented use: MTNHP, 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): Moderate

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

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

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

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

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

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

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

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

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

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

Comments Numerous waterfowl observed within ox bow during 2013 survey.

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then check ☐ **NA** here and proceed to 14E.) Warm Water

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [check the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)
a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* **Y** ◉ **N** ○ *If yes, reduce score in* ***i*** *above by 0.1:* **Modified Rating** .3L

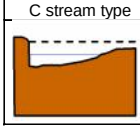
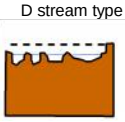
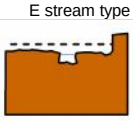
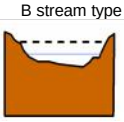
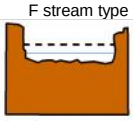
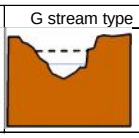
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ○ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating .3L

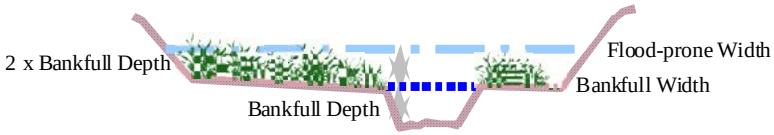
iii. Final Score and Rating: .3 L **Comments:** Common carp and Northern pike frye observed in previous years. Fish use reduced by constructed dike with culverts seperating ox-bow from main channel of Big Muddy Creek.

14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, click ☐ **NA** here and proceed to 14F.)

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

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% of flooded wetland classified as forested and/or scrub/shrub	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	.1L

Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						



Floodprone width 150 **/** **Bankfull width** 65 **=** **Entrenchment ratio** 2.30769230769231

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (check)? **Y** ○ **N** ◉

Comments: AA subject to flooding from Big Muddy Creek outside of assessment area.

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, click ☐ **NA** here and proceed to 14G.)

i. Rating (Working from top to bottom, use the matrix below to arrive at [check] the functional points and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			1.1 to 5 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ñ **5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

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

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, click ☐ **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating [H = high, M = moderate, or L = low])

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

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

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, click ☐ **NA** here and proceed to 14I.)

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

*% Cover of **wetland** streambank or shoreline by species with stability ratings of ≥6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
ñ **65%**	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

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 ratings [check])

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

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

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

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

a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** ○ **N** ◉ *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:* **Modified Rating** .4M

Comments: 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 & ii below)

i. Discharge Indicators

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

ii. Recharge Indicators

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

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

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

Comments: 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 arrive at [check] the functional points and rating)

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

Comments:

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

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

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

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

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

Comments:

Site very small.

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR 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	L	0	1	0	☐
B. MT Natural Heritage Program Species Habitat	H	1	1	0.96	☑
C. General Wildlife Habitat	H	.9	1	0.864	☑
D. General Fish Habitat	L	.3	1	0.288	☐
E. Flood Attenuation	M	.6	1	0.576	☐
F. Short and Long Term Surface Water Storage	H	.8	1	0.768	☐
G. Sediment/Nutrient/Toxicant Removal	M	.7	1	0.672	☐
H. Sediment/Shoreline Stabilization	H	1	1	0.96	☑
I. Production Export/Food Chain Support	M	.4	1	0.384	☐
J. Groundwater Discharge/Recharge	H	1	1	0.96	☑
K. Uniqueness	M	.4	1	0.384	☐
L. Recreation/Education Potential (bonus points)	NA	0	NA	0	☐
Totals:		7.1	11	6.816	
Percent of Possible Score			**64.55** %		

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

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

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

☐

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

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

I	II	III	IV

Appendix C

Project Area Photographs

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



Photo Point 1 – *Panorama* **Location:** East fence corner
Bearing: 240 Degrees **Taken in 2013**



Photo Point 1 – *Panorama* **Location:** East fence corner
Bearing: 240 Degrees **Taken in 2014**



Photo Point 1 – *Panorama* **Location:** East fence corner
Bearing: 240 Degrees **Taken in 2015**



Photo Point 2 – *Panorama* **Location:** Southeast fence post
Bearing: 0 Degrees **Taken in 2013**



Photo Point 2 – *Panorama* **Location:** Southeast fence post
Bearing: 0 Degrees **Taken in 2014**



Photo Point 2 – *Panorama* **Location:** Southeast fence post
Bearing: 0 Degrees **Taken in 2015**



Photo Point 3 – *Panorama* **Location:** Southwest fence post
Bearing: 75 Degrees **Taken in 2013**



Photo Point 3 – *Panorama* **Location:** Southwest fence post
Bearing: 75 Degrees **Taken in 2014**



Photo Point 3 – *Panorama* **Location:** Southwest fence post
Bearing: 75 Degrees **Taken in 2015**



Photo Point 4 – *Panorama* **Location:** West fence corner
Bearing: 140 Degrees **Taken in 2013**



Photo Point 4 – *Panorama* **Location:** West fence corner
Bearing: 140 Degrees **Taken in 2014**



Photo Point 4 – *Panorama* **Location:** West fence corner
Bearing: 140 Degrees **Taken in 2015**



Data Point – *SP-01w*
Bearing: 40 Degrees
Location: Veg community 2
Taken in 2015

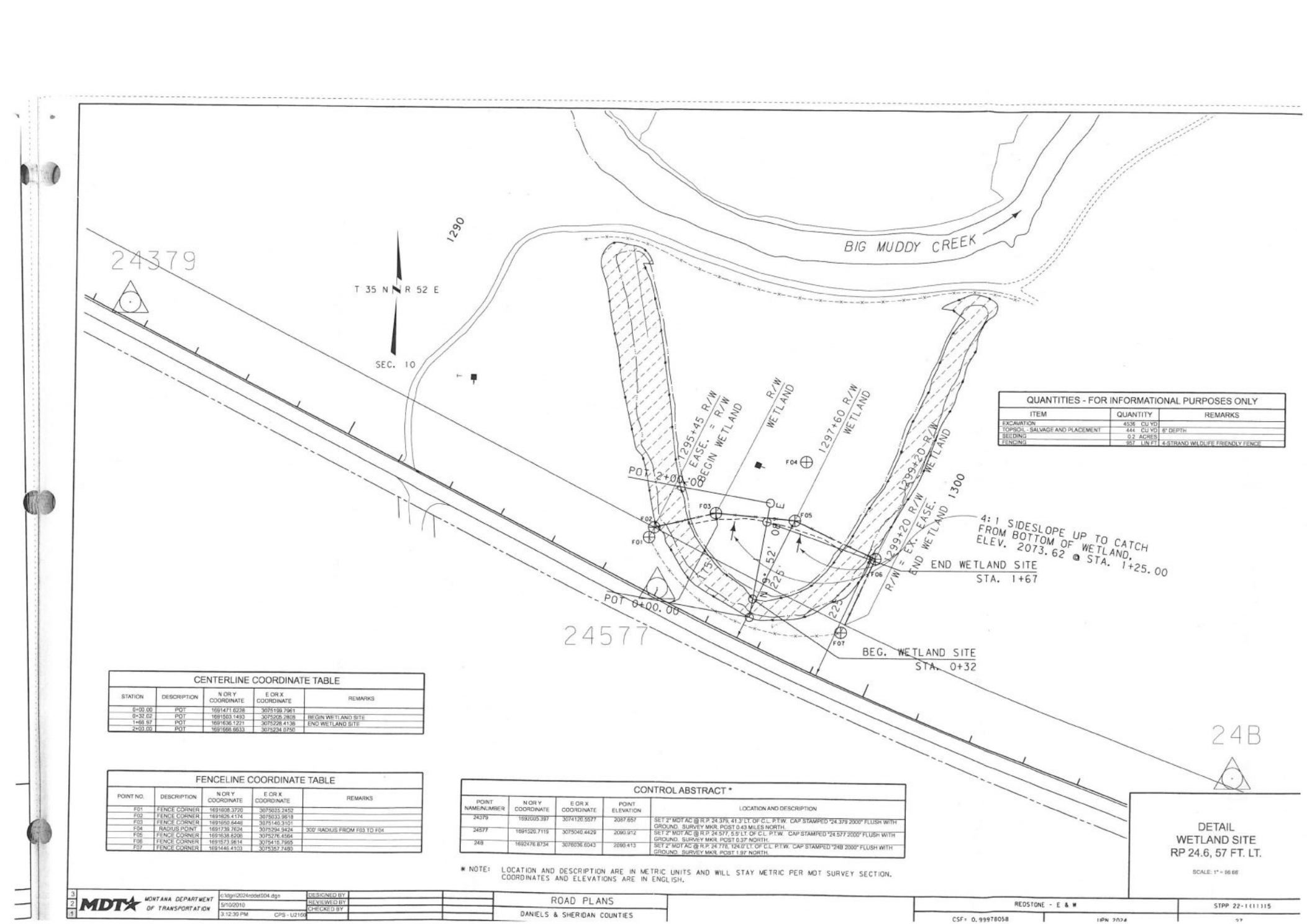


Data Point –*SP-02u*
Bearing: 220 Degrees
Location: Veg community 1
Taken in 2015

Appendix D

Project Plan Sheet

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



QUANTITIES - FOR INFORMATIONAL PURPOSES ONLY		
ITEM	QUANTITY	REMARKS
EXCAVATION	4536 CU YD	
TOPSOIL - SALVAGE AND PLACEMENT	444 CU YD	6" DEPTH
SEEDING	0.2 ACRES	
FENCING	957 LIN FT	4-STRAND WILDLIFE FRIENDLY FENCE

CENTERLINE COORDINATE TABLE				
STATION	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
0+00.00	POT	1691471.6238	3075199.7961	
0+32.02	POT	1691503.1493	3075205.2805	BEGIN WETLAND SITE
1+66.57	POT	1691636.1221	3075228.4138	END WETLAND SITE
2+00.00	POT	1691668.6633	3075234.0760	

FENCELINE COORDINATE TABLE				
POINT NO.	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
F01	FENCE CORNER	1691608.3720	3075025.2452	
F02	FENCE CORNER	1691626.4174	3075033.9618	
F03	FENCE CORNER	1691650.6446	3075140.3101	
F04	RADIUS POINT	1691739.7624	3075294.9424	300' RADIUS FROM F03 TO F04
F05	FENCE CORNER	1691638.8206	3075276.4564	
F06	FENCE CORNER	1691573.9614	3075415.7965	
F07	FENCE CORNER	1691446.4103	3075357.7480	

CONTROL ABSTRACT *				
POINT NAME/NUMBER	N OR Y COORDINATE	E OR X COORDINATE	POINT ELEVATION	LOCATION AND DESCRIPTION
24379	1692005.397	3074126.5577	2087.657	SET 2" MDT AC @ R.P. 24.379, 41.3' LT. OF C.L. P.T.W. CAP STAMPED "24.379 2000" FLUSH WITH GROUND. SURVEY MKR. POST 0.43 MILES NORTH.
24577	1691520.7119	3075046.4429	2090.912	SET 2" MDT AC @ R.P. 24.577, 5.9' LT. OF C.L. P.T.W. CAP STAMPED "24.577 2000" FLUSH WITH GROUND. SURVEY MKR. POST 0.37' NORTH.
248	1692476.8734	3076036.6043	2090.413	SET 2" MDT AC @ R.P. 24.778, 124.0' LT. OF C.L. P.T.W. CAP STAMPED "248 2000" FLUSH WITH GROUND. SURVEY MKR. POST 1.97' NORTH.

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

DETAIL
WETLAND SITE
RP 24.6, 57 FT. LT.
SCALE: 1" = 66.66

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\2024\rdet004.dgn	DESIGNED BY	ROAD PLANS	REDSTONE - E & W
2		5/10/2010	REVIEWED BY	DANIELS & SHERIDAN COUNTIES	CSF= 0.99978058
1		3:12:39 PM CPS - U2100	CHECKED BY		UPN 2024

STPP 22-1(11)15