MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2009

Big Hole Grazing Association
Beaverhead County, Montana



Prepared for:

MONTANA DEPARTMENT OF TRANSPORTATION
2701 Prospect Ave
Helena, MT 59620-1001

Prepared by:

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820 North Montana Avenue, Suite A
Helena, MT 59601

December 2009

PBS&J Project No: 0B4308802.03.02

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TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 METHODS 3

Monitoring Dates and Activities 3

2.1 Hydrology 3

2.2 Vegetation 3

2.3 Soils 4

2.4 Wetland Delineation 4

2.5 Mammals, Reptiles, and Amphibians 4

2.6 Birds 4

2.7 Macroinvertebrates 5

2.8 Functional Assessment 5

2.9 Photographs 5

2.10 GPS Data 5

2.11 Maintenance Needs 5

3.0 RESULTS 5

Hydrology 5

3.1 Vegetation 6

3.2 Soils 9

3.3 Wetland Delineation 10

3.4 Wildlife 10

3.5 Macroinvertebrates 11

3.6 Functional Assessment 11

3.7 Photographs 12

3.8 Maintenance Needs/Recommendations 12

3.9 Current Credit Summary 13

4.0 REFERENCES 14

TABLES

Table 1 *Vegetation species observed from 2008 to 2009 at the Big Hole Grazing Association Wetland Mitigation Site.*

Table 2 *Data summary from 2008 to 2009 for Transect 1.*

Table 3 *Acreages for each wetland community from 2008 to 2009 at the Big Hole Grazing Association Wetland Mitigation Site.*

Table 4 *Fish and wildlife species observed within the Big Hole Grazing Association Wetland Mitigation Site in 2008 and 2009.*

Table 5 *Summary of 2009 wetland function/value ratings and functional points at the Big Hole Grazing Association Wetland Mitigation Site.*

FIGURES

Figure 1 *Project Site Location Map*

Figure 2 *2009 Monitoring Activity Locations*

Figure 3 *2009 Mapped Site Features*

CHARTS

Chart 1 *Transect map showing vegetation types of Transect 1 from start (0 feet) to end (1247 feet) in 2008 and 2009.*

Chart 2 *Length of* vegetation communities within Transect 1 during 2008 and

APPENDICES

Appendix A *Figures 2 & 3*
2009.

Appendix B *2009 Wetland Mitigation Site Monitoring Form*
2009 Bird Survey Form
2009 COE Wetland Delineation Forms
2009 MDT Functional Assessment Forms

Appendix C *2009 Representative Photographs*

Appendix D *Project Plan Sheet*

Appendix E *Bird Survey Protocol*
GPS Protocol

1.0 INTRODUCTION

The Big Hole Grazing Association (BHGA) wetland mitigation project was constructed in the fall of 2007 by the Montana Department of Transportation (MDT). The purpose of the project is to restore approximately 45 acres of wetland habitat within a 96-acre easement area owned by the BHGA. The project would provide a wetland mitigation reserve in Watershed #6 - Upper Missouri River Basin. MDT has not yet identified any construction projects in this watershed that would be applied against the Big Hole Grazing Association reserve.

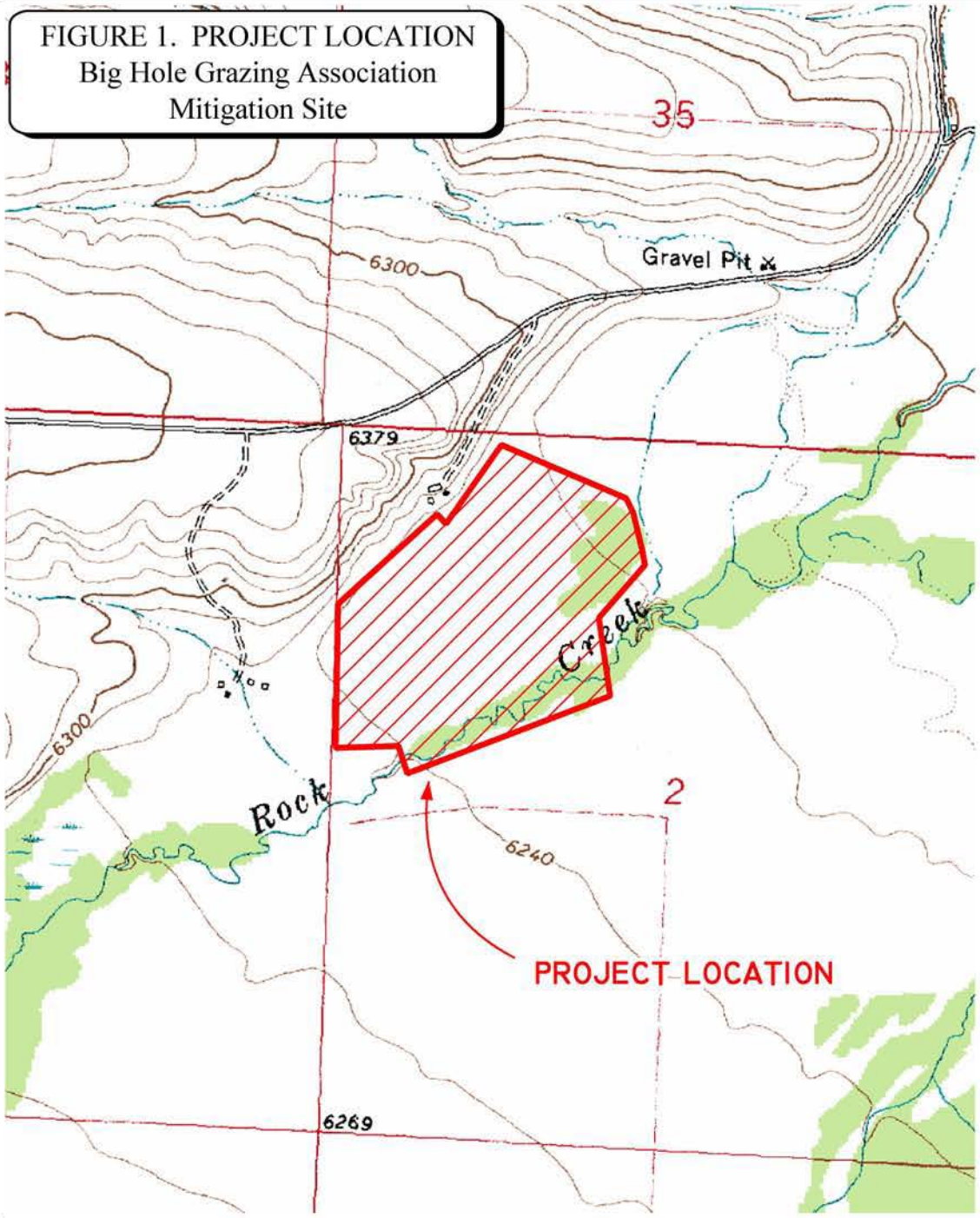
This report documents the second year of monitoring at the Big Hole Grazing Association Wetland Mitigation site. This project is located approximately seven miles southwest of the town of Wisdom and approximately four miles west of Secondary Route 278 (**Figure 1**). Specifically, the project is located in the NW ¼ of Section 2, Township 4 South and Range 16 West in Beaverhead County.

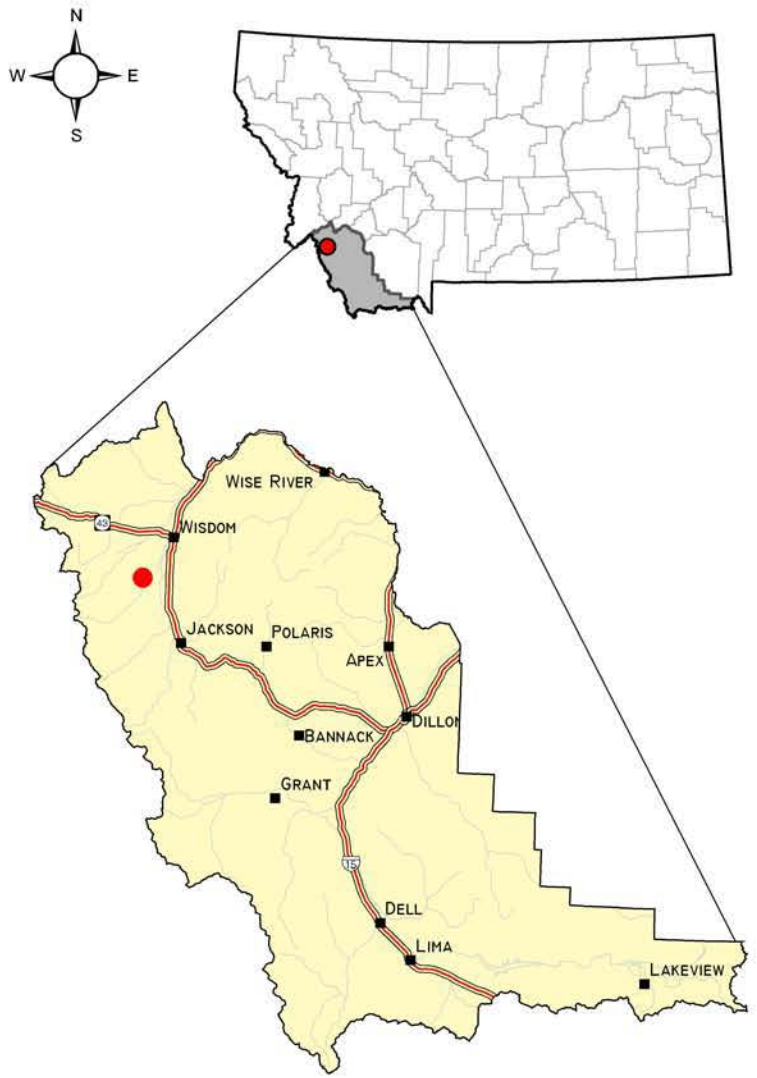
Prior to project initiation, the BHGA utilized the project area for grazing and haying operations. Drainage ditches had been utilized for decades to drain the project area, which has a naturally high groundwater table and receives spring flows from the hillside to the north of the site. In addition to the springs and groundwater, Rock Creek, a perennial tributary to the Big Hole River, flows through the southern portion of the easement area.

In an attempt to restore natural hydrology to the site and thus restore wetlands within the easement area, the primary drainage ditch, which flowed northwest to southeast through the easement area, was completely filled and reclaimed. A secondary ditch which runs north to south across the western portion of the site was breached in three locations in an attempt to prevent drainage of the site and re-hydrate former wetlands by raising groundwater levels across the site. A project plan sheet is provided in **Appendix D**.

Prior to project implementation, MDT documented approximately 31 acres of degraded and relic emergent and scrub/shrub wetland across the entire 96-acre easement area, noting that some wetland areas were likely much larger prior to construction of drainage ditches across the site in the 1960's. The intent of the project was to restore natural hydrology to the site in an attempt to restore wetlands within the easement area. According to project files, the goal is to generate 45.8 acres of Corp of Engineers approved credit through the restoration of 42.3 acres of wetland credited at 1:1 and preservation of 14.0 acres credited at a 4:1 ratio (3.5 acres of credit).

FIGURE 1. PROJECT LOCATION
Big Hole Grazing Association
Mitigation Site





0 800 1,600 FEET

1:16,000

PROJECT #: 0B4308801
DATE: NOVEMBER 2008
LOCATION: BIG HOLE
PROJECT MGR: J. BERGLUND
DRAWN BY: MSA

PBS&J
801 N. LAST CHANCE GULCH
SUITE 101
HELENA, MT 59601-3360

2.0 METHODS

2.1 Monitoring Dates and Activities

Monitoring in 2009 occurred on August 12th. All information contained on the Wetland Mitigation Site Monitoring Form was collected during this site visit (**Appendix B**). Activities conducted and information collected included: wetland delineation; vegetation community mapping; vegetation transect monitoring; soils data collection; hydrology data collection; mapping of man-made bird nest boxes; bird and wildlife use documentation; and photo documentation.

2.2 Hydrology

Hydrologic indicators were evaluated during the site visit on August 12th. Wetland hydrology indicators were recorded using procedures outlined in the COE 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Hydrology data were recorded on COE Routine Wetland Delineation Data Forms and on the Wetland Mitigation Site Monitoring Form (**Appendix B**).

There are eight groundwater monitoring wells at the site that, up until 2009, were routinely monitored by the U.S. Geological Service (USGS). The USGS discontinued monitoring of the wells in 2009 at the request of MDT and the monitoring wells were not measured by PBS&J during the site visit. Soil pits excavated for wetland delineation purposes were used to evaluate the presence of groundwater if occurring within 12 inches from the ground surface. Data were recorded on the COE Routine Wetland Delineation Data Form (**Appendix B**)

2.3 Vegetation

General dominant species-based vegetation community types were delineated in the field during the mid-summer field visit. Standardized community mapping was not employed as many of these systems are geared towards climax vegetation. Estimated percent cover of the dominant species in each community type was recorded on the Wetland Mitigation Site Monitoring Form (**Appendix B**). Plants observed were identified using Flora of the Pacific Northwest (Hitchcock and Conquist 1975) and Plants of Montana (Dorn 1984). Nomenclature follows that of Dorn (1984).

Annual changes in vegetation, especially the establishment and increase of hydrophytic plants, will be evaluated through the use of belt transects. A single 10-foot wide vegetation belt transect was established at the site and monitored for the second time in 2009. The transect start and end points were marked in the field and recorded with a global positioning system (GPS) unit in 2008. Percent cover was estimated for each successive vegetative species encountered within the "belt" using the following values: + (<1%); 1 (1-5%); 2 (6-10%); 3 (11-20%); 4 (21-50%); and 5 (>50%). Photographs were taken at the start and end of the transect during the mid-season visit.

Woody species were planted in clumps across the site in May 2008. The location of each clump was recorded in the field with GPS in 2008 and examined for plant survival for the second time in 2009.

2.4 Soils

Soil information was obtained from the Web Soil Survey (NRCS 2008). Soils were evaluated during the mid-season visit according to procedures outlined in the COE 1987 Wetland Delineation Manual. In the field, surface soils were evaluated for signs of wetland formation during the mid-season visit. If wetland indicators for hydrology or plants were found then a soil pit was excavated to look for evidence of hydric soil formation. Soil data were then recorded on the COE Routine Wetland Delineation Form (**Appendix B**).

2.5 Wetland Delineation

Wetland delineation was conducted during the mid-season visit in accordance with the 1987 COE Wetland Delineation Manual. In July 2008, consultation with the COE (Steinle pers. comm.) confirmed that, where the 1987 manual was used to establish baseline wetland conditions at MDT wetland mitigation sites, it should continue to be applied at such sites for the duration of the monitoring period. Consequently, application of the new *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (COE 2008) was not required or undertaken at this site in 2008 or 2009.

The monitoring area was investigated for the presence of wetland hydrology, hydrophytic vegetation, and hydric soils. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1988). The information was recorded on a COE Routine Wetland Delineation Data Form (**Appendix B**).

2.6 Mammals, Reptiles, and Amphibians

Mammal, reptile, and amphibian species observations and other positive indicators of use, such as vocalizations, were recorded on the wetland monitoring form during the site visit. Indirect use indicators, including tracks, scat, burrow, eggshells, skins, and bones, were also recorded. These signs were recorded as the observer traversed the site while conducting 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 was compiled (**Appendix B**).

2.7 Birds

Bird observations were recorded during the site visit. No formal census plots, spot mapping, point counts, or strip transects were conducted. Bird observations were recorded incidental to other monitoring activity observations, using the bird survey protocol as a general guideline (**Appendix E**). Observations were categorized by species, activity code, and general habitat association on the Bird Survey Field Data Sheet (**Appendix B**). Shortly after monitoring was completed in 2008, MDT installed blue bird and wood duck nesting boxes across the site. Each

of these boxes was examined for use in 2009. A comprehensive bird list was compiled using these observations.

2.8 Macroinvertebrates

Due to the lack of standing water, no aquatic macroinvertebrate sample was collected at this site.

2.9 Functional Assessment

In 2001, a functional assessment for each delineated wetland was conducted using the 1999 MDT Montana Wetland Assessment Method (MWAM) (Berglund 1999). In 2009 the 2008 MDT Montana Wetland Assessment Method (Berglund and McEldowney 2008) was applied. Field data necessary for this assessment were collected during the mid-season site visit. For each wetland or group of wetlands a Functional Assessment Form was completed (**Appendix B**).

2.10 Photographs

Photographs were taken in 2009 to show the current land use surrounding the site, the upland buffer, the monitored area, and the vegetation transect. Seven photograph points were established and their location recorded with a resource grade GPS unit in 2008. A description and compass direction for each photograph was recorded onto the Wetland Mitigation Site Monitoring Form (**Appendix B**).

2.11 GPS Data

During the 2009 monitoring season, survey points were collected with a resource grade GPS unit at each of the bird boxes installed by MDT in 2008. Rather than using the GPS unit to survey all wetland boundaries within project limits, minor changes in wetland boundaries were hand drawn onto aerial photography in 2009 (**Appendix E**).

2.12 Maintenance Needs

The Big Hole Grazing Association mitigation site is a groundwater driven project that does not include any manmade diversions, water level control structures, or other structures that might need periodic maintenance.

3.0 RESULTS

3.1 Hydrology

Eight groundwater monitoring wells were installed across the site in 2001 and were monitored annually by the USGS through 2008. The primary goal of the project was to raise groundwater levels across the easement area by plugging the two main drainage ditches across the site. As indicated in the 2008 monitoring report, groundwater levels following construction in 2007 were noticeably higher during monitoring in 2008.

For the second time in 2009, water levels were documented (visual observation) above the ground surface at wells 6, 7, and 8. Although monitoring of the wells was discontinued in 2009, saturation levels and evidence of shallow standing surface water in several wet meadow locations indicate that groundwater levels were comparable in 2009 to those documented in 2008.

From January to September of 2009, the Wisdom weather station (#249067) reported 10.25 inches (in) of precipitation compared to the long term average of 9.53 inches over the same 9-month time period (Western Regional Climate Center (WRCC) 2009). It was assumed that precipitation levels measured at the Wisdom Weather Station would serve as an indicator of precipitation received at the mitigation site.

3.2 Vegetation

The relatively flat 96-acre easement area has a variety of wetland and upland vegetation communities. Plant species observed during the first two years of monitoring have been compiled in a list (**Table 1**). Mapped vegetation community types were based on topography, hydrology, and plant composition. A total of one upland community and five wetland communities were identified in 2009 (**Figure 3** in **Appendix A**). Transitional wetland identified in 2008 was reclassified as a combination of wetland communities 3 and 5 in 2009. For purposes of describing vegetation types, the site can be divided into four basic areas: the northwest corner, the northeast corner, the south side, and the central portion. The northwest corner contains a 7-acre sedge-dominated (Vegetation Type 3) fen that is in reasonably good health and was likely never adversely impacted by previous ditching on the site (**Monitoring Forms** in **Appendix B**).

The east/northeast side of the easement area was once likely dominated by willow communities but was converted to upland and wet meadow through years of being drained and grazed. This area has numerous hummocks and with the restoration of hydrology to the site is already showing signs of converting back to its previous state. Willow shoots are common on the numerous hummocks, while sedge and other OBL and FACW species are replacing more facultative grasses and forbs (Vegetation Type 6) (**Monitoring Forms** in **Appendix B**).

Rock Creek and its associated willow-dominated (Vegetation Type 4) floodplain run west to east across the southern portion of the easement area (**Monitoring Forms** in **Appendix B**). Willow communities are in relatively good health and were never adversely affected by drainage of the easement area because these wetland areas are tied hydraulically to Rock Creek.

The large central portion of the easement area is a mix of Vegetation Type 1 (mixed grass upland) and Type 5 (wet meadow) (**Monitoring Forms** in **Appendix B**). This area has been most affected by past management activities on the property, as wetland was converted to upland for agricultural purposes.

Table 1: ***Vegetation species observed from 2008 to 2009 at the Big Hole Grazing Association Wetland Mitigation Site.***

Scientific Name	Region 9 (Northwest) Wetland Indicator	Scientific Name	Region 9 (Northwest) Wetland Indicator
Achillea millefolium	FACU	*Hordeum jubatum*	FAC+
Agropyron trachycaulum	FAC	*Juncus balticus*	OBL
Agrostis alba	FACW	*Juncus longistylis*	FACW
Alnus incana	FACW	*Kochia scoparia*	FAC
Alopecurus pratensis	FACW	*Lemna minor*	OBL
Aster hesperius	OBL	*Mentha arvense*	FAC
Beckmannia syzigachne	OBL	*Mimulus guttatus*	OBL
Betula pumila	OBL	*Myosotis scorpioides*	FACW
Bromus inermis	---	*Phleum pratense*	FACU
Calamagrostis canadensis	FACW+	*Poa juncifolia*	FACU+
Carex aquatilis	OBL	*Poa pratensis*	FACU+
Carex nebrascensis	OBL	*Polygonum amphibium*	OBL
Carex praegracilis	FACW	*Potamogeton sp.*	OBL
Carex utriculata	OBL	*Potentilla glandulosa*	FAC-
Centaurea maculosa	---	*Potentilla gracilis*	FAC
Cirsium arvense	FACU+	*Rosa woodsii*	FACU
Cornus stolonifera	FACW	*Rumex crispus*	FACW
Deschampsia cespitosa	FACW	*Salix bebbiana*	FACW
Eleocharis palustris	OBL	*Salix exigua*	OBL
Eleocharis pauciflora	OBL	*Salix lemmonii*	FACW+
Epilobium ciliatum	FACW-	*Scirpus acutus*	OBL
Equisetum arvense	FAC	*Senecio sphaerocephalus*	FACW
Festuca octoflora	---	*Sisyrinchium angustifolium*	FACW-
Geum Aleppicum	FACW-	*Spiranthes romanzoffiana*	OBL
Glyceria elata	FACW+	*Taraxacum officinale*	---
Glycyrrhiza lepidota	FAC+	*Thlaspi arvense*	---
Gnaphalium palustre	FAC+	*Trifolium pratense*	FACU
Hippuris vulgaris	OBL	*Triglochin palustre*	OBL
Hordeum brachyantherum	FACW-	*Typha latifolia*	OBL

Vegetation Type 3/5 occurs along the large drainage ditch that used to drain the project area but was filled as part of the restoration effort. Wetland vegetation is beginning to establish in this area as a result of seeding and planting of woody vegetation (**Monitoring Forms** in **Appendix B**). This area was identified as transitional wetland in 2008, but due to extensive wetland vegetation establishment in 2009, was reclassified.

Plant composition along a single vegetation transect was quantified during the monitoring effort in 2009. Transect results are detailed in the Monitoring Form (**Appendix B**) and are summarized in **Table 2** and **Charts 1** and **2**. The transect runs south to north through the central portion of the mitigation area; it starts at monitoring well #3 and ends at monitoring well #6 (**Figure 2** in **Appendix A**). This transect includes areas of mixed grass upland, wet meadow, and developing emergent marsh where the drainage ditch was filled.

Table 2: ***Data summary from 2008 to 2009 for Transect 1.***

Monitoring Year	2008	2009
Transect Length (feet)	1247	1247
# Vegetation Community Transitions along Transect	7	7
# Vegetation Communities along Transect	3	3
# Hydrophytic Vegetation Communities along Transect	2	2
Total Vegetative Species	22	22
Total Hydrophytic Species	13	14
Total Upland Species	9	8
Estimated % Total Vegetative Cover	75	80
% Transect Length Comprised of Hydrophytic Vegetation Communities	45	55
% Transect Length Comprised of Upland Vegetation Communities	55	45
% Transect Length Comprised of Unvegetated Open Water	0	0
% Transect Length Comprised of Bare Substrate	0	0

Chart 1: ***Transect map showing vegetation types of Transect 1 from start (0 feet) to end (1247 feet) in 2008 and 2009.***

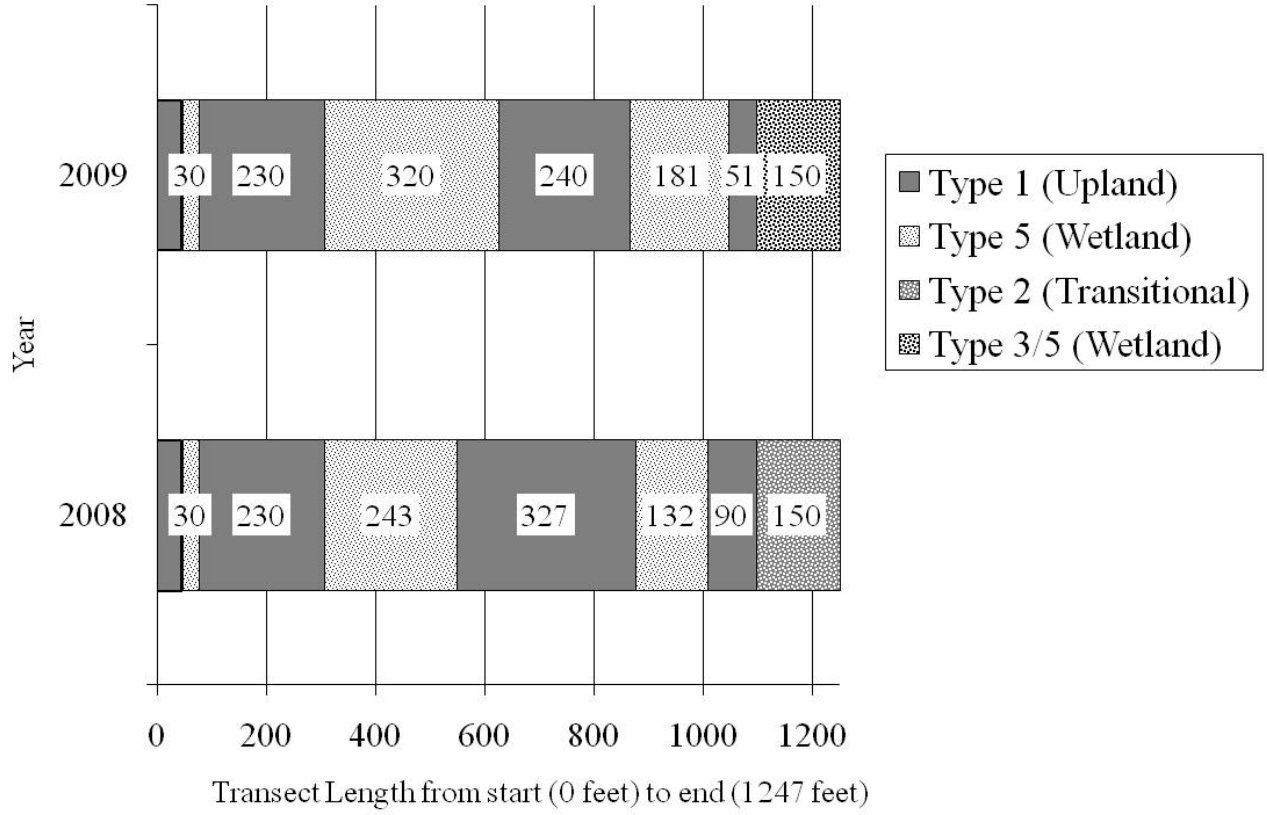
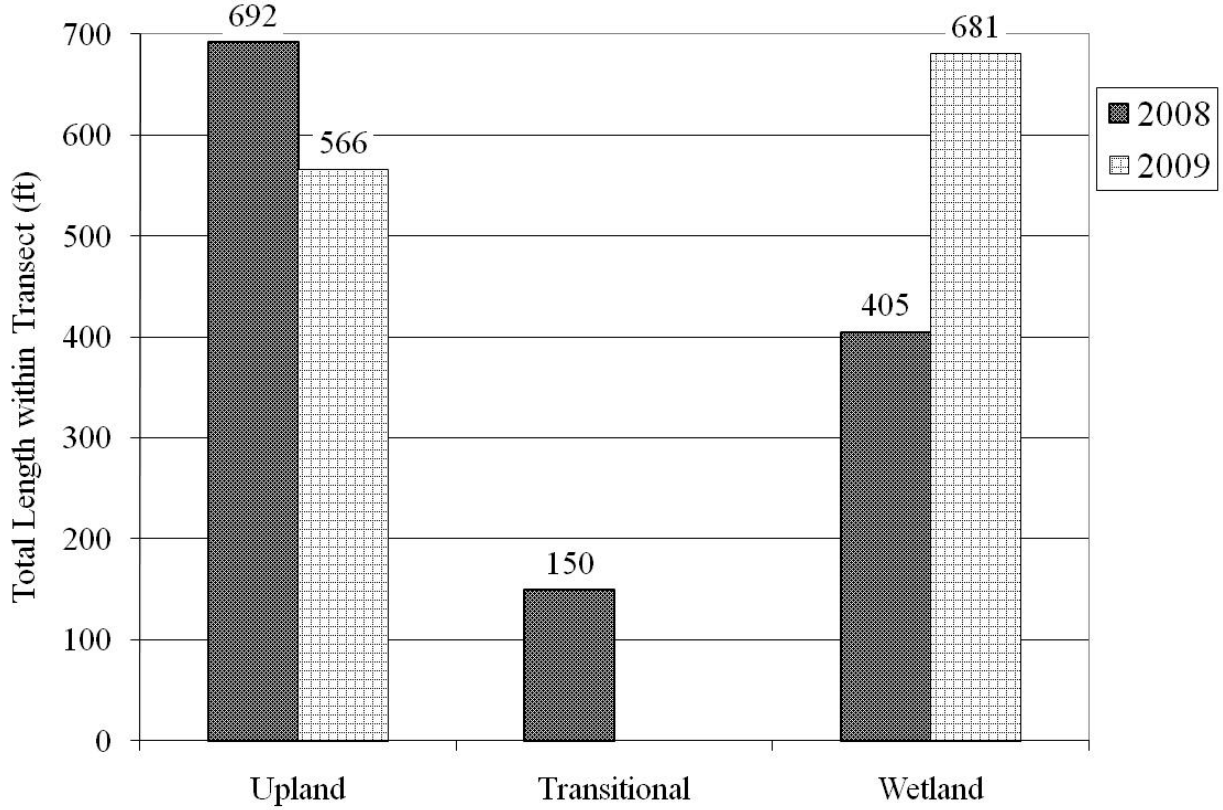


Chart 2: ***Length of vegetation communities within Transect 1 during 2008 and 2009.***



In May 2008, woody vegetation was planted in 45 clumps along the filled-in drainage ditch and along the secondary drainage ditch that was plugged in three locations (**Figure 2** in **Appendix A**). Three plant species were planted: birch (*Betula pumila*), alder (*Alnus incana*), and dogwood (*Cornus stolonifera*). There were a total of 961 plantings counted during the 2008 monitoring. Approximately 79% (756 stems) survived through the first growing season. In 2009, the second year of monitoring, survival dropped considerably to 35% (339 stems). Of the three species planted, alder is faring the best, at 55% survival, while red-osier dogwood survival is about 30% and birch less than 2%. Mortality of birch and dogwood plantings was likely due to wetter than expected conditions and competition from forbs and grasses. It may also be possible that these species are not suited for the environment within which they were planted.

Cirsium arvense was the only State noxious weed found in 2009; it occurred in two primary locations near each other (**Figure 3** in **Appendix A**). The infestation is small, but appeared to have expanded slightly from 2008.

3.3 Soils

According to soil survey, the easement area has two primary soil types: *Mooseflat Loam 0-4% slope* along the Rock Creek corridor and Foxgulch-Copperbasin-Wisdom complex 0-2% slope for the remaining study area (NRCS 2008). The drainage class for both soil types is conducive to wetland development.

Soils were investigated across much of the site in 2009. Typical soil profiles throughout the site consisted of sandy loam and clay loam with matrix colors ranging from 10YR 2/1 with no mottles to 10YR 4/2 with distinct 10YR 6/8 mottles (**COE Forms** in **Appendix B**). Within wetland areas, soils were generally saturated within the upper 12 inches of the profile and to near the surface in many cases.

3.4 Wetland Delineation

According to project documents, the site was delineated by MDT in June of 2001. At that time, approximately 31 acres of drained and degraded wetland habitat was delineated within project boundaries. Wetland delineation during the August 2008 monitoring documented 49.81 acres of wetland, which increased to 56.76 acres in 2009 for a net gain of 25.76 acres since project inception (**Figure 3** in **Appendix A**). The largest difference between the 2001 delineation and 2009 delineation is in the east/northeast corner, where the 2009 delineation revealed 13.45 acres of developing EM/SS wetland in an area previously determined by MDT to be upland. It is probable that restoration of groundwater to this part of the project in the fall of 2007 was already having a positive effect on plant composition and saturated soil conditions in August 2009.

Delineated wetland boundaries, uplands, and transitional areas were mapped (**Figure 3** in **Appendix A**). As mentioned, hydrophytic vegetation was quick to establish in the northeast corner of the site and also began to appear within the central portion of the site in previously identified upland areas. Herbaceous plant establishment in the filled drain ditch expanded significantly in 2009, as disturbed areas transition to wetland (Wetland Type 3/5 on **Figure 3** in **Appendix A**).

Acreages were calculated for delineated wetlands within the monitoring limits (**Table 3**). In addition to the 56.76 acres of wetland within monitoring limits, there is an additional approximately 38.1 acres of upland habitat.

Table 3: ***Acreages for each wetland community from 2008 to 2009 at the Big Hole Grazing Association Wetland Mitigation Site.***

WETLAND COMMUNITY	ACREAGE	
	2008	**2009**
Type 3 – *Carex* Wetland	7.19	7.19
Type 4 – *Salix* Wetland	13.28	13.28
Type 5 – Wet Meadow Wetland	15.89	21.20
Type 3/5 – Developing Emergent / Wet Meadow Wetland	0.00	1.64
Type 6 – Emergent / Scrub-shrub Wetland	13.45	13.45
Total Wetland Habitat	**49.81**	**56.76**

3.5 Wildlife

Direct observations of all wildlife species and signs indicating their presence were compiled in **Table 4** and in **Appendix B**. Three moose were seen on the site during the field survey and according to the land owner, a cow and calf are observed regularly. Relatively few bird species were noted – however, conditions were less than optimal (temperatures in the 80's) during the

August monitoring. Of note was the observation of a northern harrier family group. The land owner documented a harrier nest on the property earlier in the summer. Animals not observed but likely to occur onsite include various small mammals, reptiles, amphibians, and various song birds.

Table 4: ***Fish and wildlife species observed within the Big Hole Grazing Association Wetland Mitigation Site in 2008 and 2009.***

FISH, AMPHIBIAN, and REPTILE Trout (unidentified species in Rock Creek)	
BIRD Bank Swallow (*Riparia riparia*) Cliff Swallow (*Petrochelidon pyrrhonota*) **Common Raven (*Corvus corax*)** **Common Snipe (*Gallinago gallinago*)** Great Horned Owl (*Bubo virginianus*) Great Blue Heron (*Ardea herodias*) Killdeer (*Charadrius vociferous*) **Black-billed Magpie (*Pica pica*)** **Mallard (*Anas platyrhynchos*)**	 **Northern Harrier (*Circus cyaneus*)** **Red-winged Blackbird (*Agelaius phoeniceus*)** **Rock Dove (*Columba livia*)** **Sandhill Crane (*Grus Canadensis*)** Spotted Sandpiper (*Actitis macularia*) **Tree Swallow (*Tachycineta bicolor*)** Wilson's Phalarope (*Phalaropus tricolor*) **Song Sparrow (*Melospiza melodia*)**
MAMMAL Deer (*Odocoileus* sp.) **Moose (*Alces alces*)**	 American Badger (*Taxidea taxus*)

Bolded species were observed during the 2009 monitoring year while other species were observed in previous monitoring years.

3.6 Macroinvertebrates

Aquatic macroinvertebrates were not sampled at this site in 2009 because the site did not contain large areas of surface water.

3.7 Functional Assessment

MDT project files indicate that prior to project implementation, wetlands occurring along the Rock Creek corridor and in the northwest corner (fen area) rated as Category II wetlands while all other wetland on the site rated as Category III using the MDT 1999 MDT Montana Wetland Assessment Method. The 2009 conditions were assessed using the 2008 Montana Wetlands Assessment Method (**Functional Assessment Forms** in **Appendix B**).

In 2009, two functional assessments were completed for wetlands at the Big Hole Grazing Association mitigation site. Wetlands associated with the Rock Creek drainage (Assessment 1) were assessed on one form while all other wetlands were rated together (Assessment 2). In summary, all wetlands within project boundaries rated as Category II, with high ratings for short and long term surface water storage, sediment/nutrient/toxicant removal, and groundwater discharge/recharge (**Table 5**). Wetlands along Rock Creek also received high ratings for fish and wildlife habitat, flood attenuation, short and long term surface water storage, sediment/

shoreline protection, and production export / food chain support. The larger wetland area received a high rating for uniqueness because of the fen qualities exhibited in the northwest portion of the easement area.

Table 5: ***Summary of 2009 wetland function/value ratings and functional points at the Big Hole Grazing Association Wetland Mitigation Site.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2009 Assessment 1 (Rock Creek Wetlands)	2009 Assessment 2 (Remaining Wetlands)
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Low (0.2)	Low (0.2)
General Wildlife Habitat	High (0.9)	Mod (0.7)
General Fish/Aquatic Habitat	High (0.8)	NA
Flood Attenuation	High (0.8)	NA
Short and Long Term Surface Water Storage	High (0.8)	High (1.0)
Sediment/Nutrient/Toxicant Removal	High (0.9)	High (1.0)
Sediment/Shoreline Stabilization	High (1.0)	NA
Production Export/Food Chain Support	High (1.0)	Mod (0.6)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Mod (0.4)	High (0.9)
Recreation/Education Potential	Low(0.05)	Low(0.05)
Actual Points / Possible Points	**7.85 / 11**	**5.45 / 8**
% of Possible Score Achieved	**71%**	**68%**
Overall Category	**II**	**II**
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries (ac)	**10**	**39.81**
Functional Units (acreage x actual points)	**78.50**	**217**

3.8 Photographs

Representative photos were taken from photo-points (**Photos 1-21**), transect ends (**Photos 22-23**), and of the general project area (**Photo 24**) (**Appendix C**). The 2009 aerial photograph taken on July 1st was used as a base for **Figures 2** and **3** (**Appendix A**).

3.9 Maintenance Needs / Recommendations

As a majority of the mitigation site relies entirely on groundwater to support wetlands, there are no man-made water level control features to monitor. The project area has a wooden fence around the perimeter that was in good condition in 2009. All man-made bird nesting structures installed in 2008 by MDT were in good condition.

From a vegetative standpoint, disturbed areas where the ditch was filled were reseeded following construction and appeared to be progressing satisfactorily. Woody planting survival declined significantly in 2009 and may need to be supplemented in future years if desired by MDT. No additional seeding is recommended at this time. Two small infestation of Canada thistle located close together were identified (**Figure 3** in **Appendix A**). Spraying or pulling may prevent spread to other parts of the site.

3.10 Current Credit Summary

Correspondence in the MDT project file indicates that the overall goal was to achieve 45.8 acres of Corps-approved mitigation credit within the 96 acre easement area. Credit was to be obtained for 42.3 acres of wetland restoration at a ratio of 1:1, and 3.5 acres of credit was to be obtained for preservation of 14.0 acres at a ratio of 4:1. The 14.0 acres of preservation applies to the Rock Creek corridor and the fen area in the northwest corner of the site – neither of which was impacted by the filling of the ditches. These areas did however benefit from the removal of cattle grazing from the site.

Assuming that restoration credit is granted for all wetlands on the site other than the 14 acres dedicated as "preservation", the maximum 2009 credit breakdown is as follows:

14 acres preservation at 4:1 ratio:	3.5 acres credit
42.76 acres restoration at 1:1 ratio:	42.76 acres credit
Total 2009 credit:	**46.26 acres credit**

Years 1 and 2 of monitoring have shown a positive trend toward hydrologic restoration within a large portion of the site as indicated by the fact that 56.76 acres of wetland were delineated on the site compared to 31 acres pre-project. Over time, it is anticipated that additional wetland will develop, especially towards the center of the project area, where upland grass communities may convert to wet meadow and emergent marsh. After year two of monitoring, the site has already exceeded the intended goal of 45.8 acres of credit. Additional acreage is possible and will be documented during future monitoring efforts.

4.0 REFERENCES

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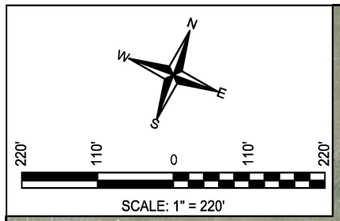
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Appendix A

FIGURES 2 & 3

MDT Wetland Mitigation Monitoring
Big Hole Grazing Association
Beaverhead County, Montana

Figure 2. Monitoring Activity Locations 2009



Legend

- Monitoring Area Limits
- Vegetation Transect
- Photo Point
- Monitoring Well
- Woody Planting
- Soil Sample Location
- Wood Duck Box
- Bluebird Box

Base Photograph: July 1, 2009

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. PBS&J 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.

MDT BIG HOLE GRAZING WETLAND MITIGATION

MONITORING ACTIVITY LOCATIONS 2009

DRAWN: JR | PROJ MGR: J. BERGLUND | CHECKED: MT | APPVD: JB | PLOTTED: Oct/16/2009

PROJ NO: 0B43088802 03.02 | LOCATION: WISDOM, MT | SCALE: NOTED | FILE NAME: BASE 2009.dwg

801 N. Last Chance Gulch
Suite 100
Helena, MT 59601

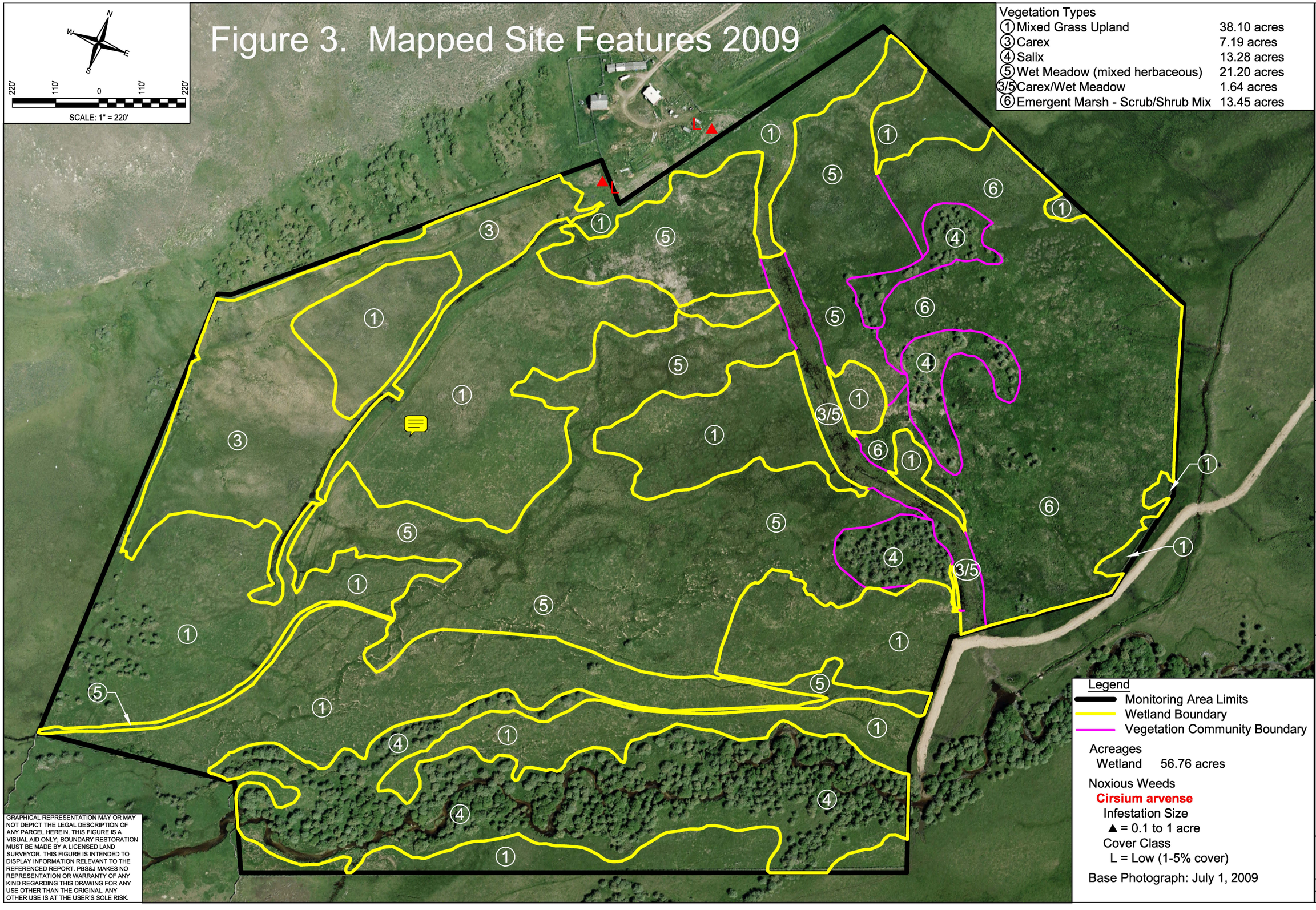
PBSJ

FIGURE 2

REV -

DATE 10/07/2009

Figure 3. Mapped Site Features 2009



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. PBS&J 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.

MDT BIG HOLE GRAZING WETLAND MITIGATION

MAPPED SITE FEATURES 2009

DRAWN: JR
PROJ MGR: J. BERGLUND
APPVD: JB
CHECKED: MT
PLOTTED: Oct/27/2009

PROJ NO: 0B4308802 03.02
LOCATION: WISDOM,MT
SCALE: NOTED
FILE NAME: BASE 2009.dwg

PBSJ
801 N. Last Chance Gulch
Suite 100
Helena, MT 59601

FIGURE
3

REV -

DATE 10/07/2009

Appendix B

2009 WETLAND MITIGATION SITE MONITORING FORM
2009 BIRD SURVEY FORM
2009 COE WETLAND DELINEATION FORMS
2009 MDT FUNCTIONAL ASSESSMENT FORMS

MDT Wetland Mitigation Monitoring
Big Hole Grazing Association
Beaverhead County, Montana

PBS&J / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **Bighole Grazing Association** Project Number: **0B4308802**
Assessment Date: **August 12, 2009** Person(s) conducting the assessment: **Traxler**
Location: **10 miles southwest of Wisdom** MDT District: **Butte** Milepost: ____
Legal Description: T **4S** R **16W** Section **2**
Weather Conditions: **partly cloudy, warm** Time of Day: **7:30am - 1:00pm**
Initial Evaluation Date: **August 6, 2008** Monitoring Year: **2** # Visits in Year: **1**
Size of evaluation area: **95 acres** Land use surrounding wetland: **Rangeland; hayland**

HYDROLOGY

Surface Water Source: **Rock Creek, precipitation, springs, groundwater**
Inundation: **Present** Average Depth: ___ Range of Depths: **0-36"**
Percent of assessment area under inundation: **67%**
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.):
Ditches and drainage patterns.

Groundwater Monitoring Wells: **Present**
Record depth of water below ground surface (in feet): not recorded in 2009

Well Number	Depth	Well Number	Depth	Well Number	Depth
1		5			
2		6			
3		7			
4		8			

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:
USGS discontinued monitoring groundwater levels at the 8 well sites in 2009. Well readings were not taken by PBS&J during the August monitoring. As was the case in 2008, surface water was noted at well numbers 6 & 7. Based on visual observations of surface water and overall ground saturation across the site, it is thought that groundwater levels were at least equal to or higher than the first year of monitoring (2008).

VEGETATION COMMUNITIES

Community Number: **1** Community Title (main spp): **Mixed Grass Upland**

Dominant Species	% Cover	Dominant Species	% Cover
Achellea millefolium	1 = 1-5%	Poa juncifolia	1 = 1-5%
Agropyron trachycaulum	2 = 6-10%	Poa pratensis	2 = 6-10%
Agrostis alba	2 = 6-10%	Taraxacum officinale	1 = 1-5%
Bromus inermis	1 = 1-5%		
Festuca octoflora	4 = 21-50%		
Phleum pratense	3 = 11-20%		

Comments / Problems: _____

Community Number: **2** Community Title (main spp): **Transitional**

Dominant Species	% Cover	Dominant Species	% Cover
Agrostis alba	2 = 6-10%	Juncus balticus	2 = 6-10%
Beckmannia syzigachne	1 = 1-5%	Polygonum amphibium	1 = 1-5%
Carex nebrascensis	1 = 1-5%	Potamogeton sp.	2 = 6-10%
Eleocharis palustris	2 = 6-10%	Rumex crispus	1 = 1-5%
Hordeum brachyantherum	2 = 6-10%	Mimulus guttatus	2 = 6-10%
Hordeum jubatum	2 = 6-10%	Deschampsia cespitosa	2 = 6-10%

Comments / Problems: **Area where main drain ditch was filled in. Not present in 2009. This area developed significant wetland characteristics in 2009 and was classified as Community number 3/5.**

Community Number: **3** Community Title (main spp): **Carex**

Dominant Species	% Cover	Dominant Species	% Cover
Carex aquatilis	4 = 21-50%		
Carex nebrascensis	4 = 21-50%		
Carex utriculata	4 = 21-50%		

Comments / Problems: **Sedge dominated fen area in NW corner of site.**

Community Number: **4** Community Title (main spp): **Salix**

Dominant Species	% Cover	Dominant Species	% Cover
Salix exigua	3 = 11-20%	Agrostis alba	1 = 1-5%
Salix lemmonii	3 = 11-20%	Juncus balticus	1 = 1-5%
Salix bebbiana	3 = 11-20%	Calamagrostis canadensis	1 = 1-5%
Alnus incana	2 = 6-10%		
Betula pumila	1 = 1-5%		
Cornus stolonifera	1 = 1-5%		

Comments / Problems: **Dominated by willow with scattered birch, dogwood, and alder in overstory and various wetland grasses in understory.**

VEGETATION COMMUNITIES (continued)

Community Number: **5** Community Title (main spp): **Wet Meadow (mixed herbaceous)**

Dominant Species	% Cover	Dominant Species	% Cover
Agrostis alba	2 = 6-10%	Deschampsia cespitosa	2 = 6-10%
Eleocharis palustris	1 = 1-5%	Mimulus guttatus	1 = 1-5%
Hordeum brachyantherum	2 = 6-10%	Senecio sphaerocephalus	1 = 1-5%
Hordeum jubatum	2 = 6-10%	Glyceria elata	2 = 6-10%
Juncus balticus	3 = 11-20%	Beckmannia syzigachne	2 = 6-10%
Alopecurus pratensis	3 = 11-20%		

Comments / Problems: **Largest wetland community type within monitoring limits.**

Community Number: **6** Community Title (main spp): **EM/SS Mix**

Dominant Species	% Cover	Dominant Species	% Cover
Agrostis alba	2 = 6-10%	Salix bebbiana	2 = 6-10%
Juncus balticus	3 = 11-20%	Salix lemmonii	2 = 6-10%
Carex nebrascensis	2 = 6-10%		
Carex utriculata	2 = 6-10%		
Carex praegracilis	1 = 1-5%		
Salix exigua	2 = 6-10%		

Comments / Problems: **Along eastern edge of site - shrub component is beginning to be restored after having grazing removed.**

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

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: _____

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

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: _____

COMPREHENSIVE VEGETATION LIST

Plant Species	Vegetation Community Number (s)	Plant Species	Vegetation Community Number (s)
Achillea millefolium	1,2	*Juncus balticus*	1,2,4,5,6
Agropyron trachycaulum	1	*Juncus longistylus*	1,2,5
Agrostis alba	1,2,4,5,6	*Kochia scoparia*	1
Alnus incana	4	*Lemna minor*	3,5,6
Glycyrrhiza lepidota	1,5	*Mentha arvense*	5
Alopecurus pratensis	1,2,5	*Mimulus guttatus*	5,6
Aster hesperius	3,5,6	*Myosotis scorpioides*	2,5,6
Beckmannia syzigachne	2,5	*Phleum pratense*	1
Betula pumila	4,6	*Poa Juncifolia*	1
Bromus inermis	1	*Poa pratensis*	1
Calamagrostis canadensis	3,4,5,6	*Polygonum amphibium*	2,6
Calamagrostis scopulorum	5,6	*Potamogeton sp.*	3,5,6
Carex aquatilis	3	*Potentilla glandulosa*	1
Carex nebrascensis	3,6	*Potentilla gracilis*	1,2,5
Carex praegracilis	3,6	*Rosa woodsii*	1,4
Carex utriculata	3,6	*Rumex crispus*	2,5,6
Centaurea maculosa	1	*Salix bebbiana*	4,6
Cirsium arvense	1,2,5	*Salix exigua*	4,6
Cornus stolonifera	4	*Salix lemmonii*	4,6
Deschampsia cespitosa		*Scirpus acutus*	3,6
Eleocharis palustris	2,4,5,6	*Senecio sphaerocephalus*	5,6
Eleocharis pauciflora	5,6	*Sisyrinchium angustifolium*	5
Epilobium ciliatum	2,5,6	*Taraxacum officinale*	1
Equisetum arvense	1,2,5	*Thlaspi arvense*	1
Festuca octoflora	1	*Trifolium pratense*	1
Geum Aleppicum	2,5,6	*Triglochin palustre*	3,5,6
Glyceria elata		*Typha latifolia*	3,6
Gnaphalium palustre	2,5		
Hippuris vulgaris	2,6		
Hordeum brachyantherum	2,5,6		
Hordeum jubatum	1,2,5		

Comments / Problems: _____

PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number Observed	Mortality Causes
Thin-leaf Alder	470	261	Doing ok
Water Birch	245	4	nearly 100% mortality
Red-oiser Dogwood	246	73	30% survival.

Comments / Problems: Greater than 50% of the alder survived through year 2 but the dogwood and birch have not fared well. Some planting locations appeared to be too wet and the birch and dogwood were also outcompeted by herbaceous forbs and grasses. Birch and dogwood are not common in the project area and may not be suited for that particular environment.

WILDLIFE

Birds

Were man-made nesting structures installed? **Yes**
If yes, type of structure: **blue bird and wood duck boxes** How many? **14 total**
Are the nesting structures being used? **Yes**
Do the nesting structures need repairs? **No**

Mammals and Herptiles

Mammal and Herptile Species	Number Observed	Indirect Indication of Use			
		Tracks	Scat	Burrows	Other
deer	0	☒	☒	☐	
moose	3	☒	☒	☐	
badger	0	☐	☐	☒	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	

Additional Activities Checklist:
NA Macroinvertebrate Sampling (if required)

Comments / Problems: Blue bird and wood duck boxes installed late summer 2008 - most were unused in 2009, except two blue bird boxes that according to the landowner were used by tree swallows. Boxes were all in good condition. A cow and calf moose were seen onsite along with a single cow moose. Landowner documented a northern harrier nest in the northwest portion of the mitigation site - adults and young were seen foraging within project boundaries during the monitoring.

PHOTOGRAPHS

Using a camera with a 50mm lens and color film 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	Compass Reading (°)
PP1		View looking north	345
PP1		View looking west	270
PP1		View looking east	80
PP2		View looking northwest	300
PP2		View looking west	260
PP2		View looking east	80
PP3		View looking southeast	165
PP3		View looking west	270
PP3		View looking northwest	320
PP4		View looking southeast	165
PP4		View looking southeast	100
PP4		View looking southwest	210
PP5		View looking east	90
PP5		View looking southwest	245
PP5		View looking northwest	310
PP6		View looking southeast	110
PP6		View looking south	180
PP6		View looking northwest	320
PP7		View looking southwest	200
PP7		View looking west	270
PP7		View looking south	180
Transect 1		View from start of Transect looking north	5
Transect 1		View from end of Transect looking south	185
North End		View of woody plantings	

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:

- ☒ Jurisdictional 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.

Comments / Problems: _____

WETLAND DELINEATION

(attach COE delineation forms)

At each site conduct these checklist items:

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

Yes Survey wetland – upland boundary with a resource grade GPS survey.

Comments / Problems: _____

FUNCTIONAL ASSESSMENT

(Complete and attach full MDT Montana Wetland Assessment Method field forms.)
(Also attach any completed abbreviated field forms, if used)

Comments / Problems: _____

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 working properly and in good working order? **NA**
If no, describe the problems below.

Comments / Problems: Nesting structures installed after monitoring in 2008 (MDT communication).

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Big Hole Grazing Association** Date: **August 12, 2009** Examiner: **PBS&J - Traxler**
Transect Number: **1** Approximate Transect Length: **1247 feet** Compass Direction from Start: **5˚** Note: **Page 1**

Vegetation Type: **Type 1 Upland**	
Length of transect in this type: 45 feet	
Plant Species	**Cover**
Agrostis alba	2 = 6-10%
Festuca octoflora	3 = 11-20%
Poa pratensis	3 = 11-20%
Phleum pratense	3 = 11-20%
Taraxacum officinale	1 = 1-5%
Total Vegetative Cover:	90%

Vegetation Type: **Type 5 Wet Meadow**	
Length of transect in this type: 30 feet	
Plant Species	**Cover**
Agrostis alba	2 = 6-10%
Hordeum brachyantherum	2 = 6-10%
Glyceria elata	2 = 6-10%
Alopecurus pratensis	4 = 21-50%
Calamagrostis canadensis	1 = 1-5%
Senecio sphaerocephalus	1 = 1-5%
Myosotis scorpioides	2 = 6-10%
Total Vegetative Cover:	80%

Vegetation Type: **Type 1 Upland**	
Length of transect in this type: 230 feet	
Plant Species	**Cover**
Poa juncifolia	2 = 6-10%
Agropyron trachycaulum	1 = 1-5%
Hordeum jubatum	2 = 6-10%
Achillea millefolium	1 = 1-5%
Phleum pratense	3 = 11-20%
Alopecurus pratensis	1 = 1-5%
Total Vegetative Cover:	75%

Vegetation Type: **Type 5 Wet Meadow**	
Length of transect in this type: 320 feet	
Plant Species	**Cover**
Agrostis alba	3 = 11-20%
Alopecurus pratensis	1 = 1-5%
Glyceria elata	2 = 6-10%
Senecio sphaerocephalus	1 = 1-5%
Hordeum brachyantherum	2 = 6-10%
Juncus balticus	3 = 11-20%
Carex aqautilis	2 = 6-10%
Total Vegetative Cover:	75%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Big Hole Grazing Association** Date: **August 12, 2009** Examiner: **PBS&J - Traxler**
Transect Number: **1** Approximate Transect Length: **1247 feet** Compass Direction from Start: **5˚** Note: **Page 2**

Vegetation Type: **Type 1 Upland**	
Length of transect in this type: 240 feet	
Plant Species	**Cover**
Agropyron trachycaulum	2 = 6-10%
Phleum pratense	3 = 11-20%
Taraxacum officinale	2 = 6-10%
Potentilla gracilis	2 = 6-10%
Agrostis alba	3 = 11-20%
Juncus balticus	2 = 6-10%
Alopecurus pratensis	2 = 6-10%
Total Vegetative Cover:	75%

Vegetation Type: **Type 5 Wet Meadow**	
Length of transect in this type: 181 feet	
Plant Species	**Cover**
Agrostis alba	2 = 6-10%
Glyceria elata	3 = 11-20%
Alopecurus pratensis	3 = 11-20%
Hordeum brachyantherum	2 = 6-10%
Epilobium ciliatum	1 = 1-5%
Deschampsia cespitosa	1 = 1-5%
Beckmannia syzigachne	2 = 6-10%
Senecio sphaerocephalus	2 = 6-10%
Total Vegetative Cover:	75%

Vegetation Type: **Type 1 Upland**	
Length of transect in this type: 51 feet	
Plant Species	**Cover**
Agrostis alba	3 = 11-20%
Poa juncifolia	3 = 11-20%
Agropyron trachycaulum	1 = 1-5%
Phleum pratense	2 = 6-10%
Taraxacum officinale	1 = 1-5%
Hordeum jubatum	2 = 6-10%
Total Vegetative Cover:	80%

Vegetation Type: **Type 3/5 Wetland**	
Length of transect in this type: 150 feet	
Plant Species	**Cover**
Agrostis alba	1 = 1-5%
Epilobium ciliatum	1 = 1-5%
Rumex crispus	+ = < 1%
Deschampsia cespitosa	2 = 6-10%
Carex nebrascensis	1 = 1-5%
Beckmannia syzigachne	2 = 6-10%
Total Vegetative Cover:	75%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Cover Estimate		**Indicator Class**	**Source**
+ = < 1%	3 = 11-10%	+ = Obligate	P = Planted
1 = 1-5%	4 = 21-50%	- = Facultative/Wet	V = Volunteer
2 = 6-10%	5 = > 50%	0 = Facultative	

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): **70%**

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

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

Comments: _____

BIRD SURVEY – FIELD DATA SHEET

Site: **Big Hole Grazing Association** Date: **8/12/09**
Survey Time: **7:30 am** to **1:00 pm**

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Mallard	5	L	MA				
Northern Harrier	4	F N	MA UP				
Common Snipe	3	F L	MA				
Sandhill Crane	4	FO					
Song Sparrow	2	F	UP SS				
Tree Swallow	12	F	WM UP				
Red-winged Blackbird	6	F N	MA SS				
Magpie	1	L	SS				
Raven	1	FO					
Rock Dove	3	FO					

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: **Partly Sunny and warm**

Notes: **Land Owner documented Northern Harrier nest in NW portion of mitigation site.**

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Big Hole Grazing Association	**Project No:**	**Date:** 12-Aug-2009
Applicant/Owner:	Montana Department of Transportation		**County:** Beaverhead
Investigators:	PBSJ - Traxler		**State:** Montana
			Plot ID: 1

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** EM/SS
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		Rock Creek drainage

VEGETATION **(USFWS Region No. 9)**

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Salix bebbiana	Shrub	FACW	*Agrostis alba*	Herb	FACW
Willow,Bebb			Redtop		
Salix exigua	Shrub	OBL	*Juncus balticus*	Herb	OBL
Willow,Sandbar			Rush,Baltic		
Salix lemmonii	Shrub	FACW+	*Carex aquatilis*	Herb	OBL
Willow,Lemmon's			Sedge,Water		
Alnus incana	Shrub	FACW	*Calamagrostis canadensis*	Herb	FACW+
Alder,Speckled			Reedgrass,Blue-Joint		
Betula pumila	Shrub	OBL	*Hippuris vulgaris*	Herb	OBL
Birch,Bog			Mare's-Tail,Common		
Cornus stolonifera	Shrub	FACW			
Dogwood,Red-Osier					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 11/11 = 100.00%

FAC Neutral: 11/11 = 100.00%

Numeric Index: 17/11 = 1.55

Remarks:
Rock Creek floodplain has significant SS component with emergent marsh understory.

HYDROLOGY

NO **Recorded Data(Describe in Remarks):**
- N/A **Stream, Lake or Tide Gauge**
- N/A **Aerial Photographs**
- N/A **Other**

YES **No Recorded Data**

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	= 6 *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO **Inundated**
- YES **Saturated in Upper 12 Inches**
- NO **Water Marks**
- YES **Drift Lines**
- YES **Sediment Deposits**
- YES **Drainage Patterns in Wetlands**

Secondary Indicators
- NO **Oxidized Root Channels in Upper 12 Inches**
- NO **Water-Stained Leaves**
- NO **Local Soil Survey Data**
- YES **FAC-Neutral Test**
- NO **Other(Explain in Remarks)**

Remarks:
Plot taken 5 feet from channel. Channel water depth varies from 1-36 inches. Conditions unchanged from 2008.

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Big Hole Grazing Association	**Project No:**	**Date:** 12-Aug-2009
Applicant/Owner:	Montana Department of Transportation		**County:** Beaverhead
Investigators:	PBSJ - Traxler		**State:** Montana
			Plot ID: 1

SOILS

Map Unit Name (Series and Phase): Mooseflat loam, 0-4% slope
Map Symbol: 40B **Drainage Class:** Very Poorly drained **Mapped Hydric Inclusion?**
Taxonomy (Subgroup): **Field Observations Confirm Mapped Type?** (Yes) No
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
4	A	10YR3/2	N/A	N/A	N/A	Loam, organics
14	B	10YR4/2	10YR5/8	Common	Distinct	Sandy loam, small cobbles

Hydric Soil Indicators:

NO **Histosol**	NO **Concretions**
NO **Histic Epipedon**	NO **High Organic Content in Surface Layer in Sandy Soils**
YES **Sulfidic Odor**	NO **Organic Streaking in Sandy Soils**
NO **Aquic Moisture Regime**	NO **Listed on Local Hydric Soils List**
NO **Reducing Conditions**	NO **Listed on National Hydric Soils List**
YES **Gleyed or Low Chroma Colors**	NO **Other (Explain in Remarks)**

Remarks:
Soil profile influenced by periodic flooding and deposits of sand and gravel over time.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes)	No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes)	No	
Hydric Soils Present?	(Yes)	No	

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Big Hole Grazing Association	**Project No:**	**Date:** 12-Aug-2009
Applicant/Owner:	Montana Department of Transportation		**County:** Beaverhead
Investigators:	PBS&J - Traxler		**State:** Montana
			Plot ID: 2

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** Wet Meadow
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		Wet meadow towards center of site

VEGETATION **(USFWS Region No. 9)**

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Agrostis alba	Herb	FACW	*Juncus balticus*	Herb	OBL
Redtop			Rush,Baltic		
Alopecurus pratensis	Herb	FACW	*Juncus longistylis*	Herb	FACW
Foxtail,Meadow			Rush,Long-Style		
Carex nebrascensis	Herb	OBL	*Senecio sphaerocephalus*	Herb	FACW
Sedge,Nebraska			Groundsel,Ball-Head		
Hordeum brachyantherum	Herb	FACW			
Barley,Meadow					

Percent of Dominant Species that are OBL, FACW or FAC: **FAC Neutral:** 7/7 = 100.00%
(excluding FAC-) 7/7 = 100.00% **Numeric Index:** 12/7 = 1.71

Remarks:
Flat wet meadow wetland towards center of site.

HYDROLOGY

NO **Recorded Data(Describe in Remarks):**
- N/A **Stream, Lake or Tide Gauge**
- N/A **Aerial Photographs**
- N/A **Other**

YES **No Recorded Data**

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	= 0 *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO **Inundated**
- YES **Saturated in Upper 12 Inches**
- NO **Water Marks**
- NO **Drift Lines**
- NO **Sediment Deposits**
- NO **Drainage Patterns in Wetlands**

Secondary Indicators
- NO **Oxidized Root Channels in Upper 12 Inches**
- NO **Water-Stained Leaves**
- NO **Local Soil Survey Data**
- YES **FAC-Neutral Test**
- NO **Other(Explain in Remarks)**

Remarks:
high groudwater table. Water levels increased across site with plugging of drainage ditches. Ground saturated to surface in 2009.

WetForm[tm]

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Big Hole Grazing Association	**Project No:**	**Date:** 12-Aug-2009
Applicant/Owner:	Montana Department of Transportation		**County:** Beaverhead
Investigators:	PBS&J - Traxler		**State:** Montana
			Plot ID: 2

SOILS

Map Unit Name (Series and Phase): Foxgulch-copperbasin-Wisdom complex
Map Symbol: 15A **Drainage Class:** Somewhat poorly drained **Mapped Hydric Inclusion?**
Taxonomy (Subgroup): **Field Observations Confirm Mapped Type?** (Yes) No
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
6	A	10YR3/2	N/A	N/A	N/A	Loam, Roots
12	B	10YR3/1	10YR6/8	Common	Distinct	Clay loam

Hydric Soil Indicators:

NO **Histosol**	NO **Concretions**
NO **Histic Epipedon**	NO **High Organic Content in Surface Layer in Sandy Soils**
NO **Sulfidic Odor**	NO **Organic Streaking in Sandy Soils**
NO **Aquic Moisture Regime**	NO **Listed on Local Hydric Soils List**
NO **Reducing Conditions**	NO **Listed on National Hydric Soils List**
YES **Gleyed or Low Chroma Colors**	NO **Other (Explain in Remarks)**

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Big Hole Grazing Association	**Project No:**	**Date:** 12-Aug-2009
Applicant/Owner:	Montana Department of Transportation		**County:** Beaverhead
Investigators:	PBS&J - Traxler		**State:** Montana
			Plot ID: 3

Do Normal Circumstances exist on the site?	(Yes) No	**Community ID:** EM
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	**Transect ID:**
Is the area a potential Problem Area?	Yes (No)	**Field Location:**
(If needed, explain on the reverse side)		East side of mitigation area

VEGETATION **(USFWS Region No. 9)**

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Carex aquatilis	Herb	OBL	*Juncus balticus*	Herb	OBL
Sedge,Water			Rush,Baltic		
Carex nebrascensis	Herb	OBL	*Geum aleppicum*	Herb	FACW-
Sedge,Nebraska			Avens,Yellow		
Carex rostrata	Herb	OBL	*Salix bebbiana*	Shrub	FACW
Sedge,Beaked			Willow,Bebb		
Agrostis alba	Herb	FACW	*Salix exigua*	Shrub	OBL
Redtop			Willow,Sandbar		

Percent of Dominant Species that are OBL, FACW or FAC:	**FAC Neutral:** 8/8 = 100.00%
(excluding FAC-) 8/8 = 100.00%	**Numeric Index:** 11/8 = 1.38

Remarks:
Site is converting from heavily grazed emergent marsh to EM/SS. Significant hummocks throughout.

HYDROLOGY

NO **Recorded Data(Describe in Remarks):**
- N/A **Stream, Lake or Tide Gauge**
- N/A **Aerial Photographs**
- N/A **Other**

YES **No Recorded Data**

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	= 0 *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO **Inundated**
- YES **Saturated in Upper 12 Inches**
- NO **Water Marks**
- NO **Drift Lines**
- NO **Sediment Deposits**
- NO **Drainage Patterns in Wetlands**

Secondary Indicators
- NO **Oxidized Root Channels in Upper 12 Inches**
- NO **Water-Stained Leaves**
- NO **Local Soil Survey Data**
- YES **FAC-Neutral Test**
- NO **Other(Explain in Remarks)**

Remarks:
High groundwater table. Similar conditions to 2008.

WetForm[tm]

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Big Hole Grazing Association	**Project No:**	**Date:** 12-Aug-2009
Applicant/Owner:	Montana Department of Transportation		**County:** Beaverhead
Investigators:	PBS&J - Traxler		**State:** Montana
			Plot ID: 3

SOILS

Map Unit Name (Series and Phase): Foxgulch-copperbasin-Wisdom complex
Map Symbol: 15A **Drainage Class:** Somewhat poorly drained **Mapped Hydric Inclusion?**
Taxonomy (Subgroup): **Field Observations Confirm Mapped Type?** Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
14	A/B	10YR2/1	N/A	N/A	N/A	Clay loam

Hydric Soil Indicators:

NO Histosol	NO Concretions
NO Histic Epipedon	NO High Organic Content in Surface Layer in Sandy Soils
NO Sulfidic Odor	NO Organic Streaking in Sandy Soils
NO Aquic Moisture Regime	NO Listed on Local Hydric Soils List
NO Reducing Conditions	NO Listed on National Hydric Soils List
YES Gleyed or Low Chroma Colors	NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes)	No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes)	No	
Hydric Soils Present?	(Yes)	No	

Remarks:

WetForm[tm]

MDT MONTANA WETLAND ASSESSMENT FORM (revised March 2008)

1. Project Name: Big Hole Grazing Association **2. MDT Project #:** STPX 1(45) **3. Control #:** CN4668

3. Evaluation Date: 8/12/09 **4. Evaluator(s):** PBS&J - Traxler **5. Wetland/Site #(s):** Rock Creek corridor

6. Wetland Location(s): Township 4 S, Range 16 W, Section 2; Township ___N, Range ___E, Section _____

Approximate Stationing or Roadposts: _____

Watershed: 6 - Upper Missouri **County:** Beaverhead _ _ _____

7. Evaluating Agency: MDT

Purpose of Evaluation:

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

8. Wetland Size (acre): 8.0 (visually estimated)
_____ (measured, e.g. GPS)

9. Assessment Area (AA) Size (acre): 10.0 (visually estimated)
(see manual for determining AA) _____ (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	Rock Bottom		Permanent / Perennial	10
Riverine	Emergent Wetland		Seasonal / Intermittent	20
Riverine	Scrub-Shrub Wetland		Seasonal / Intermittent	70

Comments: _____

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

12. GENERAL CONDITION OF AA

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

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

ii. Prominent noxious, aquatic nuisance, and other exotic vegetation species: _____

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: AA includes the Rock Creek channel and adjacent SS and EM wetland. Surrounding land outside project area is grazed and hayed.

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: Two vegetated classes in creek corridor.

Wetland/Site #(s): Rock Creek Corridor

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): .

14B. HABITAT FOR PLANTS OR ANIMALS RATED S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM
Do not include species listed in 14A above.

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

Primary or critical habitat (**list species**) ☐ D ☐ S _____
Secondary habitat (**list species**) ☐ D ☐ S _____
Incidental habitat (**list species**) ☒ D ☐ S grayling, westslope cutthroat
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	---	---	---	---	.2L	---	---
S2 and S3 Species Functional Point/Rating	---	---	---	---	---	---	---

Sources for documented use (e.g. observations, records): MFWP - MFISH

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: various bird species, small and large mammals, herps.

Wetland/Site #(s): Rock Creek Corridor

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	---	---	.8H	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier II or **Native Game** fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier III or **Introduced Game** fish	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Non-Game Tier IV or **No** fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Sources used for identifying fish spp. potentially found in AA: 2008 MFISH on FWP website. Westslope cutthroat, grayling, brook trout, brown trout, rainbow trout, whitefish.

ii. Modified Rating: NOTE: Modified score cannot exceed 1.0 or be less than 0.1.

a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity, ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* ☐ **YES**, reduce score in **i** by 0.1 = __ or ☒ **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: .8H **Comments:** _____

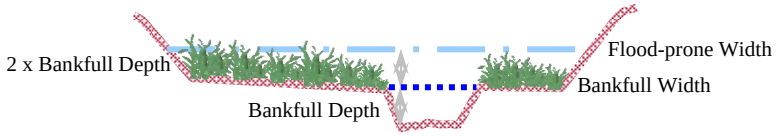
14E. FLOOD ATTENUATION ☐ **NA** (proceed to 14F)

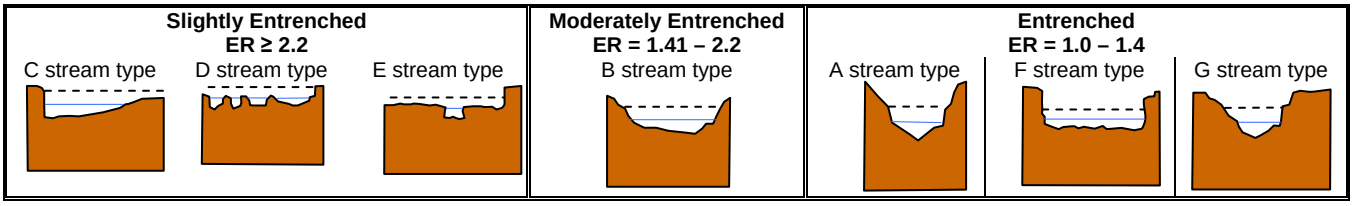
Applies only to wetlands that are subject to flooding via in-channel or overbank flow.
If wetlands in AA are not flooded from in-channel or overbank flow, check the NA box and proceed to 14F.

Entrenchment Ratio (ER) Estimation (see manual for additional guidance). Entrenchment ratio = (flood-prone width) / (bankfull width).
Flood-prone width = estimated horizontal projection of where 2 X maximum bankfull depth elevation intersects the floodplain on each side of the stream.

30 / 10 = 3

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**	---	---	---	---	---	---	---	---	---
AA contains **unrestricted outlet**	---	.8H	---	---	---	---	---	---	---

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:** no structures

Wetland/Site #(s): Rock Creek Corridor

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: _____

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**	---	---	---	---	---	---	---	---
AA contains **unrestricted outlet**	.9H	---	---	---	---	---	---	---

Comments: _____

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: _____

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**	H	H	---
☐ **M**	---	---	---
☐ **L**	---	---	---
☐ **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	1H	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S/I	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
T/E/A	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Wetland/Site #(s): Rock Creek Corridor

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: 1H **Comments:** _____

14J. GROUNDWATER DISCHARGE / RECHARGE
Check the appropriate indicators in i and ii below.

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

ii. Recharge Indicators
- ☐ Permeable substrate present without underlying impeding layer.
- ☐ Wetland contains inlet but no outlet.
- ☐ Stream is a known 'losing' stream. Discharge volume decreases.
- ☐ Other: _____

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

Criteria	Duration of Saturation at AA Wetlands ***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: _____

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	---	.05L

Comments: _____

15. GENERAL SITE NOTES: fishing and hunting by permission.

Wetland/Site #(s): Rock Creek Corridor

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	low 0.20	1.00	2	
C. General Wildlife Habitat	high 0.90	1.00	9	
D. General Fish Habitat	high 0.80	1.00	8	
E. Flood Attenuation	high 0.80	1.00	8	
F. Short and Long Term Surface Water Storage	high 0.80	1.00	8	
G. Sediment / Nutrient / Toxicant Removal	high 0.90	1.00	9	
H. Sediment / Shoreline Stabilization	high 1.00	1.00	10	
I. Production Export / Food Chain Support	high 1.00	1.00	10	
J. Groundwater Discharge / Recharge	high 1.00	1.00	10	
K. Uniqueness	mod 0.40	1.00	4	
L. Recreation / Education Potential (bonus point)	low 0.05		0.5	
Total Points	**7.85**	**11**	**78.5 Total Functional Units**	
Percent of Possible Score 71% (round to nearest whole number)				

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

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

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

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

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

☐ **I** ☒ **II** ☐ **III** ☐ **IV**

MDT MONTANA WETLAND ASSESSMENT FORM (revised March 2008)

1. Project Name: Big Hole Grazing Association **2. MDT Project #:** STPX 1(45) **3. Control #:** CN4668

3. Evaluation Date: 8/12/09 **4. Evaluator(s):** PBS&J - Traxler **5. Wetland/Site #(s):** All wetlands outside Rock Creek corridor

6. Wetland Location(s): Township 4 S, Range 16 W, Section 2; Township ___N, Range ___E, Section _____

Approximate Stationing or Roadposts: _____

Watershed: 6 - Upper Missouri **County:** Beaverhead _ _ _____

7. Evaluating Agency: 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)
42 (measured, e.g. GPS)

9. Assessment Area (AA) Size (acre): _____ (visually estimated)
(see manual for determining AA) 39.81 (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
Slope	Emergent Wetland		Permanent / Perennial	20
Slope	Scrub-Shrub Wetland		Seasonal / Intermittent	10
Slope	Emergent Wetland		Seasonal / Intermittent	70

Comments: Springs from north and high groundwater table supply hydrology to the site

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.)**:** _____

ii. Prominent noxious, aquatic nuisance, and other exotic vegetation species: _____

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: AA is large wet meadow, emergent marsh and shrub/scrub wetland that has been restored by plugging man-made drain ditches. AA is not grazed or hayed. Surrounding land is moderately grazed and managed for agriculture.

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: _____

Wetland/Site #(s): all wetlands outside Rock Creek corridor

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): _____

14B. HABITAT FOR PLANTS OR ANIMALS RATED S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM
Do not include species listed in 14A above.

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

Primary or critical habitat (**list species**) ☐ D ☐ S _____
Secondary habitat (**list species**) ☐ D ☐ S _____
Incidental habitat (**list species**) ☒ D ☒ S bald eagle, gray wolf
No usable habitat ☐ S

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

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
S1 Species Functional Point/Rating	---	---	---	---	---	---	---
S2 and S3 Species Functional Point/Rating	---	---	---	---	.2L	.1L	---

Sources for documented use (e.g. observations, records): Gray wolf documented onsite by landowner according to MDT.

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)	---	---	---	---	---	---	---	---	---	---	---	---	---	H	---	---	---	---	---	---
☐ **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**	---	.7M	---	---
☐ **Minimal**	---	---	---	---

Comments: various bird species, mammals, herps. Large area with significant wildllife habitat.

Wetland/Site #(s): al wetlands outside Rock Creek corridor

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	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

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

ii. Modified Rating: NOTE: Modified score cannot exceed 1.0 or be less than 0.1.

a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity, ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* ☐ **YES**, reduce score in **i** by 0.1 = __ or ☐ **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: _ **Comments:** _____

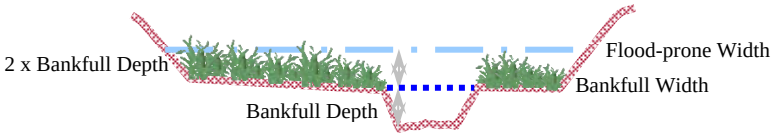
14E. FLOOD ATTENUATION ☒ **NA** (proceed to 14F)

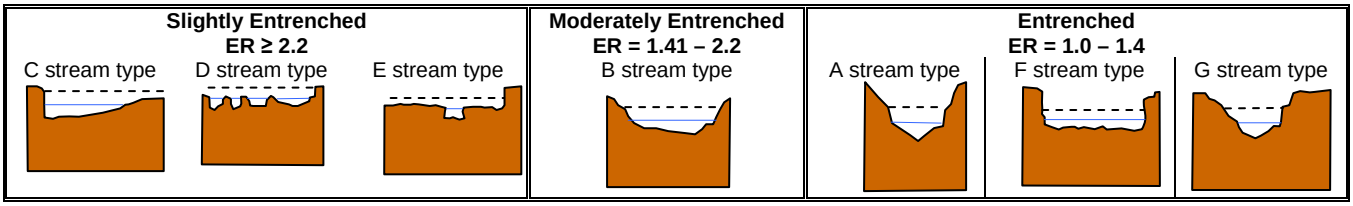
Applies only to wetlands that are subject to flooding via in-channel or overbank flow.
If wetlands in AA are not flooded from in-channel or overbank flow, check the NA box and proceed to 14F.

Entrenchment Ratio (ER) Estimation (see manual for additional guidance). Entrenchment ratio = (flood-prone width) / (bankfull width).
Flood-prone width = estimated horizontal projection of where 2 X maximum bankfull depth elevation intersects the floodplain on each side of the stream.

_____ / _____ = _____

flood prone width / bankfull width = entrenchment ratio





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**	---	---	---	---	---	---	---	---	---
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:** _____

Wetland/Site #(s): all wetlands outside Rock Creek corridor

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**	1H	---	---	---	---	---	---	---	---
Wetlands in AA flood or pond **< 5 out of 10 years**	---	---	---	---	---	---	---	---	---

Comments: _____

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**	1H	---	---	---	---	---	---	---
AA contains **unrestricted outlet**	---	---	---	---	---	---	---	---

Comments: _____

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%**	---	---	---
☐ **35-64%**	---	---	---
☐ **< 35%**	---	---	---

Comments: _____

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**	---	---	---
☒ **NA**	---	M	---

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

A	☒ **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	---	---	---	.5M	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S/I	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
T/E/A	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Wetland/Site #(s): all wetlands outside Rock Creek corridor

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT (continued)

iii. Modified Rating: Note: Modified score cannot exceed 1.0 or be less than 0.1.

Vegetated Upland Buffer: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, AND that is not subjected to periodic mechanical mowing or clearing (unless for weed control).
Is there an average ≥ 50-foot wide vegetated upland buffer around ≥ 75% of the AA's perimeter? ☒ **YES**, add 0.1 to score in **ii** = 0.6 ☐ **NO**

iv. Final Score and Rating: .6M **Comments:** _____

14J. GROUNDWATER DISCHARGE / RECHARGE
Check the appropriate indicators in i and ii below.

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

ii. Recharge Indicators
- ☐ Permeable substrate present without underlying impeding layer.
- ☐ Wetland contains inlet but no outlet.
- ☐ Stream is a known 'losing' stream. Discharge volume decreases.
- ☐ Other: _____

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

Criteria	Duration of Saturation at AA Wetlands ***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: _____

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)	---	.9H	---	---	---	---	---	---	---
☐ **Moderate Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---
☐ **High Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---

Comments: Fen present.

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	---	.05L

Comments: _____

15. GENERAL SITE NOTES: _____

Wetland/Site #(s): all wetlands outside Rock Creek corridor

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	low 0.20	1.00	7.96	
C. General Wildlife Habitat	mod 0.70	1.00	27.87	
D. General Fish Habitat	NA	NA		
E. Flood Attenuation	NA	NA		
F. Short and Long Term Surface Water Storage	high 1.00	1.00	39.81	
G. Sediment / Nutrient / Toxicant Removal	high 1.00	1.00	39.81	
H. Sediment / Shoreline Stabilization	NA	NA		
I. Production Export / Food Chain Support	mod 0.60	1.00	23.89	
J. Groundwater Discharge / Recharge	high 1.00	1.00	39.81	
K. Uniqueness	high 0.90	1.00	35.83	
L. Recreation / Education Potential (bonus point)	low 0.05		1.99	
Total Points	**5.45**	**8**	**217 Total Functional Units**	
Percent of Possible Score 68% (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

2009 REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Big Hole Grazing Association
Beaverhead County, Montana

2009 BIG HOLE GRAZING ASSOCIATION WETLAND MITIGATION SITE



Photo 1: PP1 – View facing north.



Photo 2: PP1 – View facing west.



Photo 3: PP1 – View facing east.



Photo 4: PP2 – View facing northwest.



Photo 5: PP2 – View facing west.



Photo 6: PP2 – View facing east.



Photo 7: PP3 – View facing southeast.



Photo 8: PP3 – View facing west.



Photo 9: PP3 – View facing northwest.



Photo 10: PP4 – View facing southeast.



Photo 11: PP4 – View facing southeast.



Photo 12: PP4 – View facing southwest.



Photo 13: PP5 - View facing east.



Photo 14: PP5 - View facing southwest.



Photo 15: PP5 - View facing northwest.



Photo 16: PP6 - View facing southeast.



Photo 17: PP6 - View facing south.



Photo 18: PP6 - View facing northwest.



Photo 19: PP7 - View facing southwest.



Photo 20: PP7 - View facing west.



Photo 21: PP7 - View facing south.



Photo 22: Transect Start.



Photo 23: Transect End.



Photo 24: Moose in the site.

Appendix D

PROJECT PLAN SHEET

MDT Wetland Mitigation Monitoring
Big Hole Grazing Association
Beaverhead County, Montana

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	STPX 1(45)	4

DETAIL

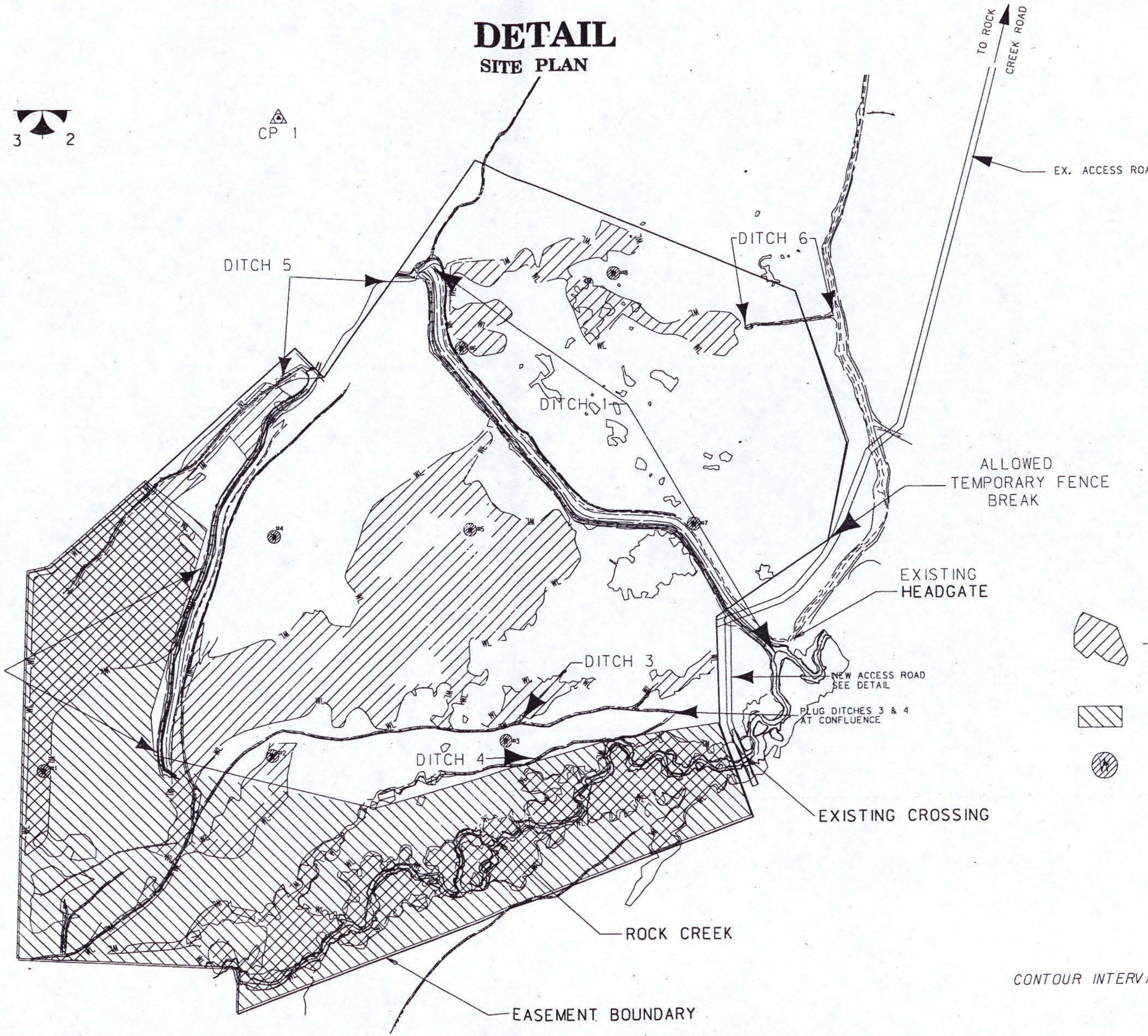
SITE PLAN

3 2

T. 4 S. R. 16 W.

SEC. 2

NO SCALE



LENGTH OF DITCH TO BE FILLED

DITCH #1 = 520m±
DITCH #3 = 3m±
DITCH #4 = 3m±
DITCH #5 = 172m±
DITCH #6 = 82m±

- DELINEATED WETLANDS DO NOT DISTURB

- DO NOT DISTURB

- MONITORING WELL

CONTOUR INTERVAL = 0.2m

MONTANA DEPARTMENT OF TRANSPORTATION

MONTANA CADD

n\4668rdpln999.dgn DESIGNED BY
2007 REVIEWED BY
30 PM CHECKED BY
CPS - U0277

Appendix E

BIRD SURVEY PROTOCOL
GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Big Hole Grazing Association
Beaverhead County, Montana

BIRD SURVEY PROTOCOL

This protocol was developed by the Montana Department of Transportation (MDT) to monitor bird use within their Wetland Mitigation Sites. Though each wetland mitigation site is vastly different, the bird survey data collection methods were standardized to order to increase repeatability. The protocol uses an "area search within a restricted time frame" to collect data on bird species, density, behavior, and habitat-type use.

Survey Area

Sites that can be entirely walked: Sites where the entire perimeter or area can be walked include, but are not limited to: small ponds, enhanced historic river channels, and wet meadows. If the wetland is not uncomfortably inundated, walk several meandering transects to sufficiently cover the wetland. Meandering transects can be used, even if a small portion of the area is inaccessible (e.g. cannot cross due to inundation). Use binoculars to identify the bird species, to count the number of individuals, and to identify their behavior and habitat type. Data can be recorded directly onto the bird survey form or into a field notebook. The number of meandering transects and their direction (or location) should be recorded in the field notebook and/or drawn onto the aerial photograph or topographic map. Meandering transects are not formal and should not be staked. Each site should be walked and surveyed to the fullest extent within the set time limit.

Sites than cannot be entirely walked: Sites where the entire perimeter or area cannot be walked include, but are not limited to: very large sites (i.e. perimeter of 2-3 miles), and large-bodied waters (i.e. reservoirs), where deep water habitat (> 6 feet) is close to shore. For large-bodied waters where only one area was graded to create or enhance the development of wetland, bird surveys should be walked along meandering transects within or around the graded area (see above.). For sites that cannot be walked, bird surveys should be conducted from many lookout posts, established at key vantage points. The general location of lookout posts should be recorded in the field notebook or drawn onto the aerial photograph or topographic map. Lookout post locations do not need to be staked. Both binoculars and spotting scopes may be used in order to accurately identify and count the birds. Depending upon the size of the open water, more time may be spent viewing the mitigation area from lookout posts than is spent traveling between posts.

Survey Time

Ideally, bird surveys should be conducted in the morning hours when bird activity is often greatest (i.e. sunrise to no later than 11:00 am). Surveys can be completed before 11am if all transects have been walked or all lookout posts have been viewed with no new bird activity observed. For some sites bird surveys may need to be performed in the late afternoon or evening due to traveling constraints or weather. The overall limiting time factor will be the number of budgeted hours for the project.

Data Recording

Bird Species List: Record each bird species observed onto the Bird Survey-Field Data Sheet (or field notebook). Record the bird's common name using the appropriate 4-letter code. The 4-letter code uses the first two letters of the first two word's of the bird's common name or if one name, the first four letters. For example, Mourning Dove is coded as MODO while Mallard is coded as MALL. If an unknown individual is observed, use the 4-letter protocol, but define your

abbreviation at the bottom of the field data sheet. For example, unknown shorebird is UNSB; unknown brown bird is UNBR; unknown warbler is UNWA; and unknown waterfowl is UNWF. For a flyover of a flock of unknown species, use a term that describes the birds' general characteristics and include the approximate flock size in parenthesis; do not fill in the habitat column. For example, a flock of black, medium-sized birds could be coded as UNBB / FO (25).

Bird Density: For each observation record the actual or estimated number of individuals observed per species and per behavior. Totals can be tallied in the office and entered onto the Bird Survey-Field Data Sheet.

Bird Behavior: Bird behavior must be identified by what is known. When a species is observed, the behavior that is immediately exhibited is recorded. Only behaviors that have discreet descriptive terms should be used. The following terms are recommended: breeding pair (BP); foraging (F); flyover (FO); loafing (L), which is defined as sleeping, roosting, or floating with head tucked under wing; and nesting (N). If other behaviors that have a specific descriptive word are observed then it can be used and should later be added to the protocol. Descriptive words or phrases such as "migrating" or "living on site" are unknown behaviors.

Bird Species Habitat Use: When a species is observed, the habitat is also recorded. The following broad habitat categories are used:

- aquatic bed (AB), defined as rooted-floating, floating-leaved, or submergent vegetation.
- marsh (MA), defined as emergent (e.g. cattail, bulrush) vegetation with surface water.
- wet meadow (WM), defined as grasses, sedges, or rushes with little to no surface water.
- scrub-shrub (SS), defined as shrub covered wetland.
- forested (FO), defined as tree covered wetland.
- open water (OW), defined as unvegetated surface water.
- upland (UP), defined as the upland buffer.

Other categories can be used and defined on the data sheet and should later be added to the protocol.

Other Fields

Bird Visit: Each bird survey (i.e. spring, fall, and mid-season) should be completed on separate Bird Survey-Field Data Sheets.

Time: Record the start time and end time on the Bird Survey-Field Data Sheet.

Date: Record the date of the bird survey.

Weather: Record the weather conditions (i.e. temperature, wind, condition).

Notes: Note if a particular individual bird is using a constructed nest box and note the condition of constructed nest box(es). Also record any comments about the site, wildlife, wetland conditions, etc.

GPS MAPPING AND AERIAL PHOTO REFERENCING PROCEDURE

From 2001 through 2006, PBS&J mapped the vegetation community boundaries, photograph points, and other sampling locations in the field using the resource-grade Trimble GEO III GPS (Global Positioning System) unit. The data were collected with a minimum of three positions per feature using Course/Acquisition code. The collected data were then transferred to a personal computer (PC) and differentially corrected to the nearest operating Community Base Station. The corrected data were then exported to ACAD drawings in Montana State Plain Coordinates NAD 83 international feet. The Trimble GEO III GPS unit was also used for some sites in 2007.

The collected and processed Trimble Geo III GPS positions had a 68% accuracy of 7 feet except in isolated areas where accuracy fell to 12 feet. This is within the 1 to 5 meter range listed as the expected accuracy of the mapping grade Trimble GPS.

In 2007 and 2008 sites were mapped using the resource-grade Magellan MobileMapper Office GPS unit. The Magellan GPS unit has a comparable accuracy level to the Trimble Geo III unit.

Each year, MDT photographs each mitigation site from the air. These aerial photographs are not geo-referenced, but serve as a visual aid to map wetland development and vegetation communities, and to show approximate locations for various monitoring activities (i.e. photograph points, transects, or macroinvertebrate sampling). Reference points that are observable on the aerial photo (i.e. road, stream channel, or fence) were also marked with the GPS unit in order to better position the aerial photograph. This positioning did not remove any of the distortion inherent to all photos. All mapped features and community boundaries were reviewed by the wetland biologist, to increase the figure's accuracy.

Any relationship of features located to easement or property lines are not to be construed from these figures. These relationships can only be determined with a survey by a licensed surveyor.