MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2010

DH Ranch
Carbon County, Montana



Prepared for:

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and

December 2010

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Edger, Carbon County, Montana

MDT Project Number NH-STPP 5(39)

Control Number 5987

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CONFLUENCE

TABLE OF CONTENTS

1. INTRODUCTION 1

2. METHODS 3

2.1. Hydrology 3
2.2. Vegetation 4
2.3. Soil 4
2.4. Wetland Delineation 4
2.5. Wildlife 5
2.6. Functional Assessment 5
2.7. Photo Documentation 5
2.8. GPS Data 6
2.9. Maintenance Needs 6

3. RESULTS 6

3.1. Hydrology 6
3.2. Vegetation 7
3.3. Soil 14
3.4. Wetland Delineation 14
3.5. Wildlife 15
3.6. Functional Assessment 15
3.7. Photo Documentation 15
3.8. Maintenance Needs 17
3.9. Current Credit Summary 17

4. REFERENCES 20

TABLES

Table 1. Vegetation species identified from 2007 to 2010 at the DH Ranch Wetland Mitigation Site. 10
Table 2. Transect 1 data summary from 2007 to 2010. 12
Table 3. Total aquatic habitat delineated from 2007 to 2010. 15
Table 4. Wildlife species observed from at the DH Ranch mitigation site from 2007 to 2010. 16
Table 5. Summary of 2005 (baseline) through 2010 wetland functions, value ratings, and functional points at the DH Ranch Wetland Mitigation Site. 17
Table 6. Success criteria for the DH Ranch Wetland Mitigation Site. 18
Table 7. Mitigation credit summary in 2010 for the DH Ranch Wetland Mitigation Site. 19

CHARTS

Chart 1. Transect map showing vegetation communities from transect start (0 feet) to end (590 feet in 2010, 645 feet in 2007 to 2009). 13
Chart 2. Length of transect communities within Transect 1 from 2007 to 2010. 13

FIGURES

Figure 1. Project Location for DH Ranch Mitigation Site. 2
Figure 2 – Appendix A
Figure 3 – Appendix A

APPENDICES

Appendix A: Figures 2 and 3
Appendix B: 2010 MDT Wetland Mitigation Site Monitoring Form
2010 USACE Wetland Determination Data Form
2010 MDT Montana Wetland Assessment Form
Appendix C: Project Area Photographs
Appendix D: Project Plan Sheet

Cover: (Photo description) View of open water area vegetated with *Scirpus* spp. and *Typha latifolia* on the west side of mitigation area.

1. INTRODUCTION

The Wetland Mitigation 2010 Monitoring Report presents the results of the fourth year of wetland monitoring at the DH Ranch wetland mitigation project. This mitigation site was constructed during the spring of 2007 in the east portion of the Upper Yellowstone River watershed (Watershed 13). Through a wetland credit purchase, MDT has acquired approximately 17.4 acres of potential wetland credits from this site. The site was constructed to provide compensatory mitigation for wetland impacts resulting from MDT highway and bridge reconstruction projects within this watershed.

The DH Ranch mitigation site was constructed on private property owned by Mr. George Duke. The goal of the project was to provide sufficient wetland hydrology to support the creation of a maximum of 23 acres of palustrine emergent and scrub-shrub wetland within the confines of the site. Approximately 0.38 acres of palustrine emergent and scrub-shrub wetland had been incidentally created along irrigation ditches traversing the site prior to construction.

The site is located at an elevation of approximately 3,430 feet above mean sea level (amsl) in Carbon County, Montana, roughly three miles northeast of Edgar on the eastern floodplain of the Clarks Fork of the Yellowstone River (Figure 1). The site is shown on the Silesia, MT U. S. Geological Survey 7.5 minute topographic quadrangle in the southeast quarter of Section 1, Township 4 South, Range 23 East. The approximate universal transverse Mercator (UTM) coordinates for the central portion of the site are in Zone 12 at 5,041,967 Northing and 669,792 Easting.

Figures 2 and 3 in Appendix A show the site monitoring activity locations and mapped site features, respectively. The MDT Mitigation Monitoring Form, US Army Corps of Engineers (USACE) Routine Wetland Determination Data Forms (Environmental Laboratory 1987), and the MDT Montana Wetland Assessment Forms are included in Appendix B. Representative photographs are included in Appendix C and the Project Plan Sheet is included in Appendix D.

The wetland creation project entailed constructing a series of wetland cells with the water supplied by irrigation return flow and minor contributions from precipitation. Wetland crediting ratios for the site were 1:1 for wetland creation areas and 4:1 for riparian buffers. The site encompasses 27.78 acres that is surrounded by jackleg and barbwire fences.

The approved performance standards are listed below (PBS&J 2009).

1. **Wetland Characteristics**: Sites will develop hydrophytic vegetation, wetland hydrology, and hydric soils as outlined in the 1987 USACE Wetland Delineation Manual (Environmental Laboratory 1987) for the Determination of Wetlands.

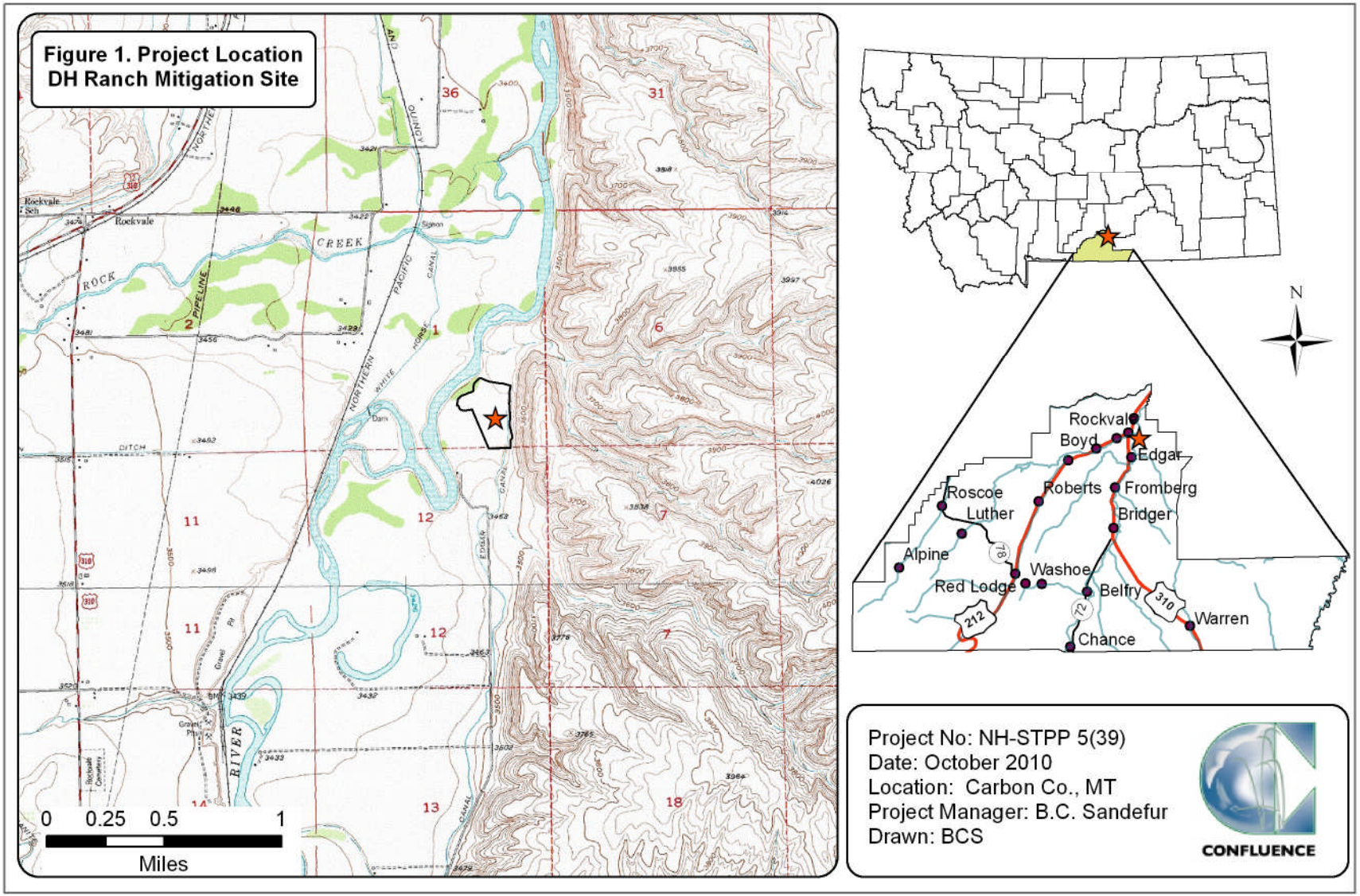


Figure 1. Project Location for DH Ranch Mitigation Site.

1. **Herbaceous Plants:** Ocular coverage of desirable herbaceous wetland plant species will be at least 80 percent. Except for desirable native emergent wetland species, no species may comprise more than 25 percent of a vegetated layer in a wetland community. Aggressive non-preferred species (such as reed canary grass) may comprise a maximum of 10 percent of any given wetland area.

2. **Hydrology:** Soil saturation will be present for at least 12.5 percent of the growing season (18 days). The requirement for monitoring wells was removed in December 2007.

3. **Open Water:** At the conclusion of the monitoring period, open water (aquatic bed) wetlands will encompass less than 10 percent of the total wetland area and will remain saturated for more than 12.5 percent of the growing season.

4. **Woody Plants:** Woody planting zones (berms) will have a minimum of 1,000 stems per acre.

2. METHODS

The site was monitored on August 11, 2010. Information contained on the Monitoring Form and Wetland Data Form was entered electronically in the field on a personal digital assistant (PDA) palmtop computer during the field investigation (Appendix B). Monitoring activity locations were located using the global positioning system (GPS) (Figure 2, Appendix A). Information collected included wetland delineation, wetland/open water/aquatic habitat boundary mapping, vegetation community mapping, vegetation transect monitoring, woody species survival monitoring, soil data collection, hydrology data collection, bird and wildlife use documentation, photographs, functional assessment, and a non-engineering examination of the infrastructure established within the mitigation project area.

2.1. Hydrology

Technical criteria for wetland hydrology guidelines have been established as "permanent or periodic inundation, or soil saturation within 12 inches of the ground surface for a significant period (usually 14 days or more or 12.5 percent) during the growing season" (Environmental Laboratory 1987). The growing season is defined for purposes of this report as the number of days where there is a 50 percent probability that the minimum daily temperature is greater than or equal to 28 degrees Fahrenheit (Environmental Laboratory 1987).

Hydrological indicators as outlined on the Wetland Data Form were documented at three points established within the project area. Hydrologic indicators were evaluated according to features observed during the site visit. The data were recorded on electronic field data sheets (Appendix B). Hydrologic assessments

allowed evaluation of mitigation goals addressing inundation/saturation requirements.

The requirement to establish monitoring wells was removed in December 2007 (PBS&J 2009). Soil pits excavated during the wetland delineation were used to evaluate groundwater levels within 18 inches of the ground surface. The data were recorded electronically on the wetland data form (Appendix B).

2.2. Vegetation

The boundaries of general dominant species-based vegetation communities were determined in the field during the active growing season and subsequently delineated on aerial photographs. The percent cover of dominant species within a community type was estimated and recorded using the following values: 0 (less than 1 percent), 1 (1 to 5 percent), 2 (6 to 10 percent), 3 (11 to 20 percent), 4 (21 to 50 percent), and 5 (greater than 50 percent) (Appendix B).

Temporal changes in vegetation were evaluated through annual assessments of a static belt transect. Transect locations are shown on Figure 2 (Appendix A). Vegetation composition was assessed and recorded on one vegetation belt transect approximately 10 feet wide and 645 feet long running west to east in the southern portion of the site. The transect location was recorded with a GPS unit. Spatial changes in the dominant vegetation communities were recorded along the stationed transect. The percent cover of each vegetation species within the transect interval was estimated using the same cover ranges listed in the above paragraph (Appendix B). Photographs were taken at the endpoints of the transect during the monitoring event (Appendix C).

The location of noxious weeds was noted in the field and mapped on the aerial photo (Figure 3, Appendix A). The noxious weed species identified are color-coded. The locations are denoted with the symbol "+", "▲", or "■" representing 0 to 0.1 acre, 0.1 to 1.0 acre, or greater than 1.0 acre in extent, respectively. Cover classes listed on Figure 3 (Appendix A) are represented by T, L, M, or H, corresponding to less than 1 percent, 1 to 5 percent, 2 to 25 percent, and 25 to 100 percent, respectively

Containerized woody species were planted at the mitigation site. Survival of individual plants has been assessed annually.

2.3. Soil

Soil information was obtained from the *Soil Survey for Carbon County* and *in situ* soil descriptions (USDA 2010). Soil cores were excavated using a hand auger and evaluated according to procedures outlined in the 1987 Wetland Manual. A description of the soils is included on the Wetland Data Form for each profile (Appendix B).

2.4. Wetland Delineation

Waters of the US including jurisdictional wetlands and special aquatic sites were delineated throughout the project area in accordance with criteria established in

the 1987 Wetland Manual. In order to delineate a representative area as wetland, the technical criteria for hydrophytic vegetation, hydric soil, and wetland hydrology, as described in the 1987 Manual, must be satisfied. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1988). A Routine Level-2 On-site Determination Method (Environmental Laboratory 1987) was used to delineate wetland areas within the project boundaries. The information was recorded electronically on the Wetland Data Form (Appendix B).

Consultation with the USACE determined that the 1987 Wetland Manual should continue to be used at this site where baseline wetland conditions had been established prior to 2008. The use of the 2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (USACE 2010) was not required.

The wetland boundary was determined in the field based on changes in plant communities and/or hydrology, and changes in soil characteristics. Topographic relief boundaries within the project area were also examined and cross referenced with soil and vegetation communities as supportive information for this delineation. Vegetation composition, soil characteristics, and hydrology were assessed at likely wetland and adjacent upland locations. If all three parameters met the criteria, the area was designated as wetland and mapped by vegetation community type. If any one of the parameters did not exhibit positive wetland indicators, the area was determined to be upland unless the site was a special aquatic site, an atypical situation, or a problem area. The wetland boundary was identified on aerial photography. Wetland areas reported were estimated using geographic information system (GIS) methodology.

2.5. Wildlife

Observations and other positive indicators of use of mammal, reptile, amphibian, and bird species were recorded on the Mitigation Monitoring Form during the site visit. Indirect use indicators, including tracks, scat, burrow, eggshells, skins, and bones, were also recorded (Appendix B). Direct sampling methods, such as snap traps, live traps, and pitfall traps, were not used. A list of wildlife species observed from 2007 to 2010 list was compiled.

2.6. Functional Assessment

Pre-construction and 2007 conditions were assessed using the 1999 MDT Montana Wetland Assessment Method (MWAM) (Berglund 1999). Wetland functions for 2008 through 2010 were assessed using the 2008 MDT assessment method (Berglund & McEldowney 2008). Field data for the assessment were collected during the site visit. A Functional Assessment Form was completed for each wetland or group of wetlands [Assessment Areas (AA)] (Appendix B).

2.7. Photo Documentation

Monitoring at photo points provides supplemental information documenting wetland conditions, trends, current land use surrounding the site, upland buffers, monitored area, and vegetation transects. Photographs were taken at

established photo points throughout the mitigation site during the site visit (Appendix C). Photo point locations were recorded with a resource grade GPS unit (Figure 2, Appendix A).

2.8. GPS Data

Site features and survey points were collected with a resource grade Thales Pro Mark III GPS unit during the 2010 monitoring season. Points were collected using WAAS-enabled differential corrected satellites, typically improving resolution to sub-meter accuracy. The collected data were transferred to a personal computer, exported into GIS, and drawn in Montana State Plane Single Zone NAD 83 meters. In addition to GPS, some site features within the site were hand-mapped onto an aerial photograph and then digitized. Site features and survey points that were mapped included fence boundaries, photograph points, transect beginnings and endings, wetland boundaries, and vegetation community boundaries.

2.9. Maintenance Needs

Channels, engineered structures, fencing, and other features were examined during the site visit for obvious signs of breaching, damage, or other problems. This was a cursory examination rather than an engineering-level structural inspection.

3. RESULTS

3.1. Hydrology

The growing season recorded for the meteorological station at Joliet, Montana (Station Number 244506), extends from May 5 through September 29, approximately 146 days (USDA 2002). Areas defined as wetlands would require 18 days of inundation or saturation within 12 inches of the ground surface to meet the wetland hydrology criteria.

Average total annual precipitation recorded at the Joliet station was 14.96 inches for the period of record from September 1951 to December 2009 (WRCC 2010). The majority of precipitation occurs in April, May, and June. Annual precipitation rates recorded from 2005 to 2009 are 15.12, 13.24, 14.54, 13.07, and 11.58 inches, respectively (WRCC 2010). Monthly precipitation from January to June 2010 totaled 7.68 inches a slight decrease in the precipitation rate of 7.83 inches recorded from January to June in 2009.

Irrigation return flow from the Edgar Canal operated by the Orchard Canal Company is the primary source of water at the DH Ranch mitigation site. The irrigation flow enters the mitigation site from the south. There is an outfall structure located in the northeast corner of the site that discharges to a forested riparian area along the Clarks Fork of the Yellowstone River. Inundation was present to various extents at all wetland cells within the monitoring area during the field investigation (Figure 3, Appendix A). Water depths ranged from zero to approximately three feet, with an average of around one foot. The depth at the emergent vegetation and open water boundary was 1.5 feet. Wetland areas that

were not inundated were saturated within 12 inches of the ground surface (see discussion below).

Three data points DH-1, DH-2, and DH-3 were used to define the wetland and upland boundaries. The data points are shown on Figure 2 (Appendix A). Data points DH-1 and DH-3 were located in areas that met the three wetland criteria. The primary indicator of wetland hydrology at DH-1 was saturation at 12 inches below the ground surface (bgs). Positive results for the FAC-Neutral test provided one secondary indicator of wetland hydrology. The test pit at DH-3 revealed saturation at 7 inches bgs and free water in the pit at 12 inches bgs. The FAC-neutral test provided a secondary indicator of wetland hydrology at both data points. There were no hydrological indicators observed at data point DH-2 located along the southern periphery of the site at the wetland boundary.

3.2. Vegetation

A comprehensive list of 84 vegetation species identified on the site from 2007 to 2010 is presented in Table 1 and by community type on the Monitoring Form (Appendix B). Figure 3 (Appendix A) defines the community polygons and wetland and upland areas. Construction of the site was completed in July 2007. Invasive plants species such as cheatgrass (*Bromus tectorum)* dominated a majority of the mitigation area prior to construction.

Eleven dominant community types, eight wetland and three upland, were identified at the site in 2010 and include Type 1 – *Scirpus acutus/Typha latifolia* Wetland, Type 2 – *Typha latifolia/Scirpus* spp., Wetland, Type 3 – *Scirpus maritimus* Wetland, Type 4 – *Hordeum jubatum/Festuca pratensis* Upland, Type 6 – *Salix amygdaloides* –Wetland, Type 8 – *Hordeum jubatum/Scirpus maritimus* Wetland, Type 9 – *Alopecurus arundinaceus/Eleocharis palustris* Wetland, Type 11 –*Alopecurus arundinaceus* Wetland, Type 12 – *Hordeum jubatum/Bromus inermis* Upland, Type 13 – *Alopecurus arundinaceus*/*Hordeum jubatum* Wetland, and Type 14 – *Bromus japonicas/Chrysothamnus nauseousus* Upland. Open water areas were identified by the number 5 on Figure 3 (Appendix A). The most extensive open water area is located in the north half of the site.

The 2010 vegetation communities generally corresponded to the communities identified in 2009. The term “Mixed Graminoids” used in 2009 was replaced with the dominant species names in 2010. Alkali sacaton (*Sporobolus airoides*) did not dominate any of the communities in 2010 although it was present at 1 to 5 percent cover in Type 3 and at less than 1 percent cover in Types 8 and 11. Alkali sacaton dominated 2009 Type 7 at 21 to 50 percent cover. The Montana Natural Heritage Program (MTNHP) classifies the *Alkali Sacaton Southern Plains Grassland* community type as “S2 - at risk” based on very limited and/or declining numbers, range, and/or habitat, making it vulnerable to extirpation in the state (PBS&J 2009). The decline noted for this species at the DH Ranch is likely due to natural succession following increased inundation and saturation levels.

The bulrush and cattail community types, Types 1, 2, 3, and 8 occurred as isolated stands throughout the site in the permanently inundated areas where surface water depths ranged from 0 to 3 feet. Foxtail barley (*Hordeum jubatum*) continued to dominate in community Types 4, 8, and 12 although there was enough species diversity to preclude the classification as a monoculture. The community types are detailed below. Dominant species are listed in descending order of abundance.

Wetland Type 1 – *Scirpus acutus/Typha latifolia* was identified in two small areas located near the east boundary and in the north section of the site. Dominant species included hard-stem bulrush (*Scirpus acutus*) and broad-leaf cattail (*Typha latifolia*) with 1 to 5 percent cover of creeping spikerush (*Eleocharis palustris*) and saltmarsh bulrush (*Scirpus maritimus*).

Type 2 was found in larger, isolated wetlands across the site. The community was dominated by broad-leaf cattail, three-square bulrush (*Scirpus pungens*), hard-stem bulrush, creeping spikerush, and rough barnyard grass (*Echinochloa muricata*).

Wetland Type 3 dominated by saltmarsh bulrush was identified in a large inundated wetland in the northwest corner of the site and in the center of the site. Seashore saltgrass (*Distichilis spicata*), foxtail barley, alkali sacaton, and creeping spikerush each contributed between one and five percent cover.

Upland community Type 4 – *Hordeum jubatum/Festuca pratensis* was found in the outer perimeter of the site on drier yet moist ground. Dominant species were foxtail barley, meadow fescue (*Festuca pratensis*), white goosefoot (*Chenopodium album*), prickly lettuce (*Lactuca serriola*), curly dock (*Rumex crispus*), Japanese brome (*Bromus japonicas)*, Canada thistle (*Cirsium arvense*), Russian olive (*Elaeagnus angustifolia*), common timothy (*Phleum pratense*), and common mullein (*Verbascum thapsus*).

The open water areas were identified as number 5 on Figure 2 (Appendix A). These shallow water areas in general contained less than one percent cover of creeping spikerush and hard-stem bulrush.

Wetland Type 6 *Salix amygdaloides* (peach-leaf willow) dominated the woody overstory in an isolated strip of trees and shrubs located in the northwest quarter of the site. Eastern cottonwood (*Populus deltoides*) was also present in the overstory and foxtail barley, creeping foxtail (*Alopecurus arundinaceus*), creeping spikerush, and Canada thistle dominated the herbaceous understory.

Foxtail barley and hard-stem bulrush dominated wetland Type 8, identified in several areas across the site. The herbaceous cover included broad-leaf cattail, meadow fescue, kochia (*Kochia scoparia*), red clover (*Trifolium repens*) and alkali sacaton.

Wetland community Type 9 – *Alopecurus arundinaceus/Eleocharis palustris* was identified near the east and south boundaries. Foxtail barley, hard-stem bulrush, three-square bulrush, broad-leaf cattail, and tufted hairgrass (*Deschampsia cespitosa*) dominated the understory. A limited number of Eastern cottonwood trees were identified within the community.

Wetland community Type 11 – *Alopecurus arundinaceus* was found in the northwest and southwest portions of the mitigation area. Creeping foxtail, rough barnyard grass, foxtail barley, Canada thistle, creeping spikerush, and water smartweed (*Polygonum amphibium*) dominated the herbaceous species.

Upland community Type 12 – *Hordeum jubatum/Bromus inermis* was identified on a small berm located between two wetland areas near the south boundary. Dominant species in the community were foxtail barley, smooth brome, prickly lettuce, and common vetch (*Vicia sativa*). Canada thistle was present at one to five percent cover.

Wetland community Type 13 – *Alopecurus arundinaceus*/*Hordeum jubatum* located at the south boundary was dominated by creeping foxtail and foxtail barley. Canada thistle was present at one to five percent cover.

Upland community Type 14 – *Bromus japonicas/Chrysothamnus nauseousus* was identified in an area on the north project boundary. Japanese brome, rubber rabbit bush (*Chrysothamnus nauseousus*), Western wheatgrass (*Agropyron smithii*), silver sagebrush (*Artemisia cana*), pale madwort (*Alyssum alyssoides*), and four-winged saltbush (*Atriplex canescens*) contributed to the total vegetation cover. Canada thistle was identified at one to five percent cover in this community.

Table 1. Vegetation species identified from 2007 to 2010 at the DH Ranch Wetland Mitigation Site.

Achillea millefolium	yarrow,common	FACU
Agropyron repens	quackgrass	FACU
Agropyron smithii	**wheatgrass,Western**	FACU
Alopecurus arundinaceus	foxtail,creeping	NI
Alyssum alyssoides	**pale madwort**	NL
Ambrosia spp.		NL
Ambrosia trifida	ragweed,great	FAC
Artemisia cana	sagebrush,silver	FAC
Asclepias fascicularis	milkweed,narrow-leaf	FAC-
Asclepias speciosa	**milkweed,showy**	FAC+
Asclepias spp.		NL
Asparagus officinalis	asparagus-fern,garden	FACU
Aster spp.		NL
Atriplex canescens	saltbush,four-wing	UPL
Bromus inermis	smooth brome	NL
Bromus japonicus	**brome,Japanese**	FACU
Bromus tectorum	cheatgrass	NL
Capsella bursa-pastoris	purse,common shepherd's	FAC-
Carex spp.		NL
Carex stricta	**sedge,uptight**	NL
Carex vulpinoidea	**sedge,fox**	OBL
Chenopodium album	goosefoot,white	FAC
Chrysothamnus nauseousus	rubber rabbitbrush	NL
Cirsium arvense	thistle,creeping	FACU+
Convolvulus arvensis	field bindweed	NL
Cynoglossum officinale	gypsy-flower	NL
Deschampsia cespitosa	**hairgrass,tufted**	FACW
Distichlis spicata	saltgrass,seashore	FAC+
Echinochloa muricata	grass,rough barnyard	FACW
Elaeagnus angustifolia	olive,Russian	FAC
Eleocharis palustris	spikerush,creeping	OBL
Elymus trachycaulus	slender wheatgrass	NL
Festuca arundinacea	**fescue,Kentucky**	FACU-
Festuca pratensis	fescue,meadow	FACU+
Grindelia squarrosa	gumweed,curly-cup	FACU
Hordeum jubatum	barley,fox-tail	FAC+
Juncus balticus	rush,Baltic	OBL
Juncus bufonius	rush,toad	FACW+
Juncus effusus	rush,soft	FACW+
Juncus nevadensis	rush,sierra	FACW
Kochia scoparia	summer-cypress,Mexican	FAC
Lactuca serriola	lettuce,prickly	FAC-
Lepidium perfoliatum	pepper-grass,clasping	FACU+

[1]Region 9 Northwest (Reed 1988).
New species identified in 2010 are show in **bold** type.

Table 1 (Continued). Vegetation species identified from 2007 to 2010 at the DH Ranch Wetland Mitigation Site.

Medicago sativa	alfalfa	NL
Melilotus alba	**sweetclover,white**	FACU
Melilotus spp.		NL
Mentha arvensis	**mint,field**	FAC
Panicum virgatum	switchgrass	FAC+
Phalaris arundinacea	grass,reed canary	FACW
Phleum pratense	**timothy**	FACU
Plantago major	plantain,common	FAC+
Poa pratensis	bluegrass,Kentucky	FACU+
Polygonum amphibium	water smartweed	NL
Populus deltoides	cotton-wood,Eastern	FAC
Potentilla anserina	silverweed	OBL
Rhus trilobata	sumac,smooth	NI
Rosa woodsii	rose,woods	FACU
Rumex crispus	dock,curly	FACW
Salix amygdaloides	willow,peach-leaf	FACW
Salix exigua	willow,sandbar	OBL
Salix spp.		NL
Sarcobatus vermiculatus	greasewood,black	FACU+
Scirpus acutus	bulrush,hard-stem	OBL
Scirpus cyperinus	**wool-grass**	NI
Scirpus maritimus	bulrush,saltmarsh	OBL
Scirpus microcarpus	bulrush,small-fruit	OBL
Scirpus pallidus	bulrush,cloaked	OBL
Scirpus pungens	bulrush,three-square	OBL
Shepherdia canadensis	**buffalo-berry,Canada**	NI
Sisymbrium altissimum	mustard,tall tumble	FACU-
Solanum spp.		NL
Spartina pectinata	cordgrass,prairie	OBL
Sporobolus airoides	sacaton,alkali	FAC-
Symphoricarpos albus	snowberry	FACU
Taraxacum officinale	dandelion,common	FACU
Thlaspi arvense	penny-cress,field	NI
Tragopogon dubius	yellow salsify	NL
Trifolium hybridum	clover,alsike	FACU+
Trifolium pratense	clover,red	FACU
Trifolium repens	clover,white	FACU+
Typha angustifolia	cattail,narrow-leaf	OBL
Typha latifolia	cattail,broad-leaf	OBL
Verbascum thapsus	common mullein	NL
Verbena bracteata	vervain,prostrate	FACU+
Veronica spp.		NL
Vicia sativa	**vetch,common**	UPL

[1]Region 9 Northwest (Reed 1988).
New species identified in 2010 are show in **bold** type.

Data collected on a 645-foot long transect is summarized in Table 2 and graphed on Charts 1 and 2. The location of the transect is illustrated on Figure 2 (Appendix A) and the data is presented on the Monitoring Form (Appendix B). Transect endpoints photographed in 2009 and 2010 are shown on pages C-9 and C-10 of Appendix C.

Table 2. Transect 1 data summary from 2007 to 2010.

# Vegetation Community Transitions along Transect	9	12	10	10
# Vegetation Communities along Transect	3	5	4	5
# Hydrophytic Vegetation Communities along Transect	2	4	3	4
Total Vegetative Species	39	47	34	34
Total Hydrophytic Species	20	15	18	18
Total Upland Species	19	32	16	16
Estimated % Total Vegetative Cover	50	66	78	80
% Transect Length Comprising Hydrophytic Vegetation Communities	88.4	90	91	92.4
% Transect Length Comprising Upland Vegetation Communities	11.6	10	9	7.6
% Transect Length Comprising Unvegetated Open Water	0	0	0	0
% Transect Length Comprising Bare Substrate	0	0	0	0

The transect length measured in 2010 was 590 feet versus 645 feet in 2007 through 2009. The 2009 Type 4a Primary Sere Wetland was renamed Type 11 – *Alopecurus* Wetland in 2010. The species composition on the Type 11 transect intervals shifted from a dominance of foxtail barley and rough barnyard grass in 2009 to a dominance of creeping foxtail in 2010. Tufted hair grass, hard-stem bulrush, three-square bulrush, foxtail barley, Kentucky bluegrass, kochia, curly dock, soft rush (*Juncus effuses*), and upright sedge (*Carex stricta)* were also indentified within the Type 11 transect intervals.

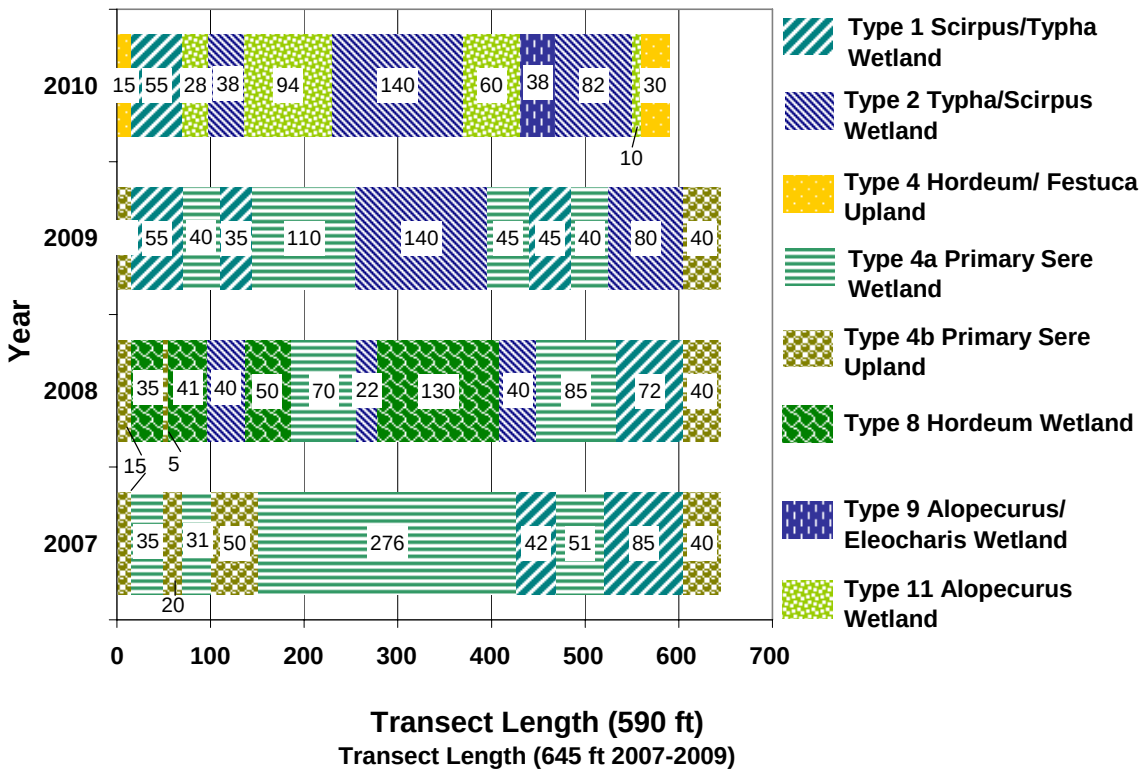


Chart 1. Transect map showing vegetation communities from transect start (0 feet) to end (590 feet in 2010, 645 feet in 2007 to 2009).

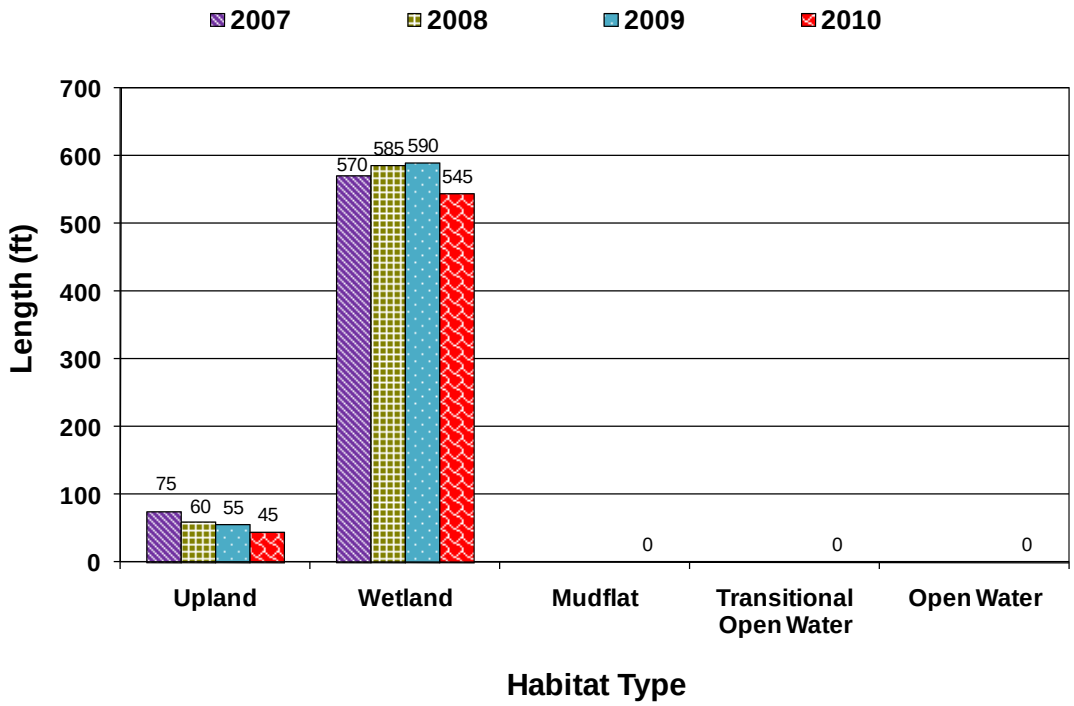


Chart 2. Length of transect communities within Transect 1 from 2007 to 2010.

Canada thistle, a Priority 2B weed, persisted in the upland areas at the north and south site boundaries (Figure 3, Appendix A). Ten infestations of Canada thistle ranging in size from less than 0.1 acre to between 0.1 and 1.0 acre were identified during 2010 monitoring. The weed cover within the infestations ranged from less than 1 percent to 1 to 5 percent. Canada thistle was also identified at less than 5 percent cover within community Types 4, 6, 11, 12, 13, and 14.

Field bindweed (*Convolvulus arvensis*), a Priority 2B weed, was identified in three separate infestations located near the north project boundary. The size of the infestations ranged from less than 0.1 acre to between 0.1 and 1.0 acre. The cover class was low to moderate. A single stem of salt cedar (*Tamarix* spp.) was found along the northeast corner of the project area and an unsuccessful attempt was made to remove this sapling during the site investigation. Saltcedar is considered a Priority 2B weed.

The number of woody plants observed onsite decreased from 315 (the total number planted) in 2007 to 103 in 2008. One smooth sumac (*Rhus trilobata*) plant was identified in 2009. No planted woodies were directly noted in 2010, however there appeared to be several volunteer shrub seedlings/saplings in communities 5, 6, and 2 in the northern portion of the site.

3.3. Soil

Mitigation site construction completed in 2007 disturbed the original site soils. The predominant map unit is the Heldt silty clay loam found on 0 to 6 percent slopes. The moderately well drained, non-hydric soil is taxonomically classified as a fine, smectitic, mesic Usteric Haplocambids. The test pit soils did not confirm the mapped unit.

Three data points DH-1, DH-2, and DH-3 were used to define the wetland boundary and characterize the soils. The data points are shown on Figure 2 (Appendix A). Data points DH-1 and DH-3 were located in areas that met the three wetland criteria. The soil profile at DH-1 revealed a clay loam (10 YR 4/2) with redoximorphic features (10 YR 2/1) in the matrix, providing a positive indication of hydric soil. The soil at DH-3 was a clay loam with a low chroma (10 YR 3/1) and redox concentrations (10 YR 4/3) in the matrix. The soil at upland pit DH-2 was a clay loam (10 YR 5/3) without redox features.

3.4. Wetland Delineation

Table 3 summarizes the wetland and open water acreages delineated in 2010. The wetland boundaries are shown on Figure 3 (Appendix A). Compared with 2009, an increase of water being contributed to the site from the irrigation return was observed during the 2010 site visit and may be attributed to an increase in wetland acreage. Created palustrine emergent wetlands (marsh) encompass 16.9 acres, an increase of 1.65 acres of wetland since 2009. The area of open water decreased 0.11 acres from 3.18 acres in 2009 to 3.07 acres in 2010 and is likely the result of emergent vegetation establishing within the shallow water areas. The acreage of aquatic habitat increased overall 1.54 acres in 2010, primarily in areas along the primary sere wetlands/uplands boundary of 2009.

Table 3. Total aquatic habitat delineated from 2007 to 2010.

2005 (baseline)	0.00	0.57	0.57
2007	5.39	11.31	16.70
2008	6.05	11.39	17.44
2009	3.18	15.25	18.43
2010	3.07	16.90	19.97

3.5. Wildlife

Table 4 lists the wildlife species indentified from 2007 to 2010 at the mitigation site. Twenty-two bird species have been observed since 2007. Twelve bird species were observed in 2010 (listed in bold type in Table 4). A black bear (*Ursus americanus)* was seen on the site by the landowner one week before the 2010 monitoring event. Whitetail deer (*Odocoileus* virginianus), an unidentified toad, and the skin of a rattlesnake (*Crotalus* viridis) were also identified in 2010.

3.6. Functional Assessment

Pre-construction and 2007 wetland conditions were assessed using the 1999 MDT Montana Wetland Assessment Method (Berglund 1999). Functions were assessed from 2008 through 2010 using the 2008 method (Berglund and McEldowney 2008). The 2005 baseline and 2007 through 2010 functional assessments are summarized for general comparison in Table 5. The 2010 functional assessment form is presented in Appendix B.

The mitigation site was evaluated as a single AA, consistent with previous years. The AA received a Category II rating with high marks for general wildlife habitat, short and long term surface water storage, and sediment/shoreline stabilization. The AA received an excellent rating for production export/food chain support. The rating was higher in 2010 for sediment/shoreline stabilization based on the increased cover of wetland shoreline species with stability ratings greater than or equal to 6, such as creeping spikerush and three-square bulrush (Berglund and McEldowney 2008).

3.7. Photo Documentation

Representative photographs taken from photo points and transect endpoints are provided in Appendix C. Photo points PP1 through PP5 are shown on pages C-1 through C-9 of Appendix C. Transect endpoints photographed in 2009 and 2010 are shown on pages C-9 and C-10 of Appendix C.

Table 4. Wildlife species observed from at the DH Ranch mitigation site from 2007 to 2010.

AMPHIBIAN	
Northern Leopard Frog	*Rana pipiens*
Woodhouse's Toad	*Bufo woodhousii*
unidentified toad	
BIRD	
American Goldfinch	*Spinus tristus*
American Robin	*Turdus migratorius*
American White Pelican	*Pelecanus erythrorhynchos*
Bald Eagle	*Haliaeetus leucocephalus*
Barn Swallow	*Hirundo rustica*
Blue-winged Teal	*Anas discors*
Canada Goose	*Branta canadensis*
Common Nighthawk	***Chordeiles minor***
Eastern Kingbird	*Tyrannus tyrannus*
Golden Eagle	*Aquila chrysaetos*
Grasshopper Sparrow	*Ammodramus savannarum*
Gray Catbird	***Dumetella carolinensis***
Greater Yellowlegs	*Tringa melanoleuca*
Killdeer	*Charadrius vociferus*
Lesser Yellowlegs	*Tringa flavipes*
Mallard	*Anas platyrhynchos*
Mourning Dove	*Zenaida macroura*
Osprey	***Pandion haliaetus***
Red-winged Blackbird	*Agelaius phoeniceus*
Ring-necked Pheasant	*Phasianus colchicus*
Rock Pigeon	***Columba livia***
Sandhill Crane	*Grus canadensis*
Solitary Sandpiper	*Tringa solitaria*
Song Sparrow	***Melospiza melodia***
Spotted Sandpiper	*Actitis macularius*
Western Kingbird	***Tyrannus verticalis***
Wild Turkey	*Meleagris gallopavo*
Willow Flycatcher	***Empidonax traillii***
Wilson's Snipe	*Gallinago delicata*
Yellow Warbler	***Dendroica petechia***
MAMMAL	
Black Bear	***Ursus americanus***
Black-tailed Prairie Dog	*Cynomys ludovicianus*
Moose	*Alces americanus*
Mountain Cottontail	*Sylvilagus nuttallii*
Raccoon	*Procyon lotor*
Striped Skunk	*Mephitis mephitis*
White-tailed Deer	***Odocoileus virginianus***
REPTILE	
Plains Gartersnake	*Thamnophis radix*
Rattlesnake	***Crotalus sp.***

Species first identified in 2010 are listed in **bold** type.

Table 5. Summary of 2005 (baseline) through 2010 wetland functions, value ratings, and functional points at the DH Ranch Wetland Mitigation Site.

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2005 Baseline	2007[1]	2008[2]	2009[2]	2010[2]
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Low (0.1)	Low (0.1)	Mod (0.6)	High (1.0)	Mod (0.7)
General Wildlife Habitat	Mod (0.5)	High (0.9)	High (0.9)	High (0.9)	High (0.9)
General Fish/Aquatic Habitat	NA	NA	NA	NA	NA
Flood Attenuation	NA	NA	NA	NA	NA
Short and Long Term Surface Water Storage	Low (0.3)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Sediment/Nutrient/Toxicant Removal	NA	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)
Sediment/Shoreline Stabilization	High (0.9)	Low (0.3)	Low (0.3)	Mod (0.7)	High (1.0)
Production Export/Food Chain Support	Mod (0.5)	High (0.9)	High (1.0)	High (1.0)	Exc(1.0)
Groundwater Discharge/Recharge	NA	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)
Uniqueness	Mod (0.4)	Low (0.3)	Mod (0.5)	Mod (0.5)	Mod (0.5)
Recreation/Education Potential (bonus points*)	Low (0.1)	Low (0.1)	Low (0.05)	Low (0.05)	Low (0.05)
Actual Points / Possible Points	**2.8 / 8**	**4.4 / 10**	**5.15 / 9**	**5.95 / 9**	**5.95 / 9**
% of Possible Score Achieved	**35**	**44**	**57**	**66**	**66**
Overall Category	**III**	**II**	**II**	**II**	**II**
Total Acreage of Assessed Aquatic Habitat within AA Boundaries	**0.570**	**16.70**	**17.44**	**18.43**	**19.97**
Functional Units (acreage x actual points)	**1.6**	**73.5**	**89.8**	**109.7**	**122.5**
Net Acreage Gain**	NA	**16.13**	**16.87**	**17.86**	**20.58**
Net Functional Unit Gain	NA	**71.90**	**88.22**	**108.06**	**120.90**

[1]Berglund 1999

[2]Berglund and McEldowney 2008

3.8. Maintenance Needs

Canada thistle, a Priority 2B weed, persisted in the upland areas at the north and south site boundaries (Figure 3, Appendix A). Field bindweed (*Convolvulus arvensis*), a Priority 2B weed, was identified in three separate infestations located near the north project boundary. A failed attempt was made to remove the single stem of salt cedar (*Tamarix* spp.) found at the northeast boundary. Salt cedar is considered a Priority 2B weed. The extent of noxious weeds, particularly Canada thistle, warrants the use of chemical controls to manage the encroachment of the weeds into unifested areas. The weed cover, predominantly Canada thistle, was estimated at eight percent total cover across the vegetated areas of the DH Ranch wetland mitigation area.

3.9. Current Credit Summary

The wetland mitigation design for DH Ranch stipulated the creation of a maximum of 21.1 acres of wetland, 1.65 acres of shrub-dominated riparian islands, and 0.8 acre of riparian buffer (PBS&J 2009). Table 6 compares the 2010 status of the created wetland areas to the success criteria. Table 7 summarizes the estimated credit acres for 2010. Full credit at a 1:1 ratio was given for the 16.9 acres of created emergent wetland and 3.07 acres of open water delineated in 2010. A majority of the performance standards have been achieved for the wetlands delineated in 2010 except for the dominance of creeping foxtail and foxtail barley in wetland communities 11 and 13 and the lack of woody species on the riparian islands. The USACE will determine the final

credits that can be applied to the mitigation site. Created palustrine, emergent wetlands encompassed 16.9 acres, an increase of 1.65 acres of wetland since 2009. The area of open water decreased 0.11 acres from 3.18 acres in 2009 to 3.07 acres in 2010. The acreage of aquatic habitat increased overall 1.54 acres in 2010.

The acreages for the riparian islands and upland buffer were taken originally from the Aquatic Design and Construction Services (ADC) Mitigation Design Report (ADC 2006). The mitigation design report (ADC 2006) included a credit category for the shrub-dominated riparian islands located on the water diversion berms. The riparian islands were classified as wetland in 2010. The upland buffer is primarily characterized by Type 4, which was dominated by foxtail barley and meadow fescue. No success criteria were applied to the upland buffer. Approximately 0.2 acres has been credited to the upland buffer in 2010.

Table 6. Success criteria for the DH Ranch Wetland Mitigation Site.

Wetland Characteristics:	
Site will develop hydrophytic vegetation, wetland hydrology, and hydric soils as outlined in the COE 1987 wetlands delineation manual.	*Criteria achieved.* Approximately 16.9 acres of wetlands delineated within the project area met the three criteria to date.
Herbaceous Plants:	
Ocular coverage of desirable herbaceous wetland plant species will be at least 80 percent. Except for desirable native emergent wetland species, no species may comprise more than 25 percent of a vegetated layer in a wetland community. Aggressive non-preferred species (such as reed canarygrass) may comprise a maximum of 10 percent of any given wetland area.	*Criteria partially achieved.* A majority of the site achieved the 80 percent cover target. None of the delineated emergent wetland communities contain a non-native species exceeding 25 percent composition of a given vegetation layer. Creeping foxtail contribute up to 21 and 50 percent cover of wetland communities 9, 11 and 13. The sitewide weed cover is approximately 10 percent.
Hydrology:	
Soil saturation will be present for at least 12.5 percent of the growing season (18 days). The requirement for monitoring wells was removed in December 2007.	*Criteria achieved.* The hydrology criteria was met in the areas delineated as wetlands in 2010.
Open Water:	
At the conclusion of the monitoring period, open water (aquatic bed) wetlands will encompass < 10 percent of the total wetland area and will remain saturated for more than 12.5 percent of the growing season.	*Criteria achieved.* Open water areas encompassed less than 10 percent of the total wetland area and remained saturated for more than 12.5 percent of the growing season.
Woody Plants:	
Woody planting zones (berms) will have a minimum of 1,000 stems/acre	*Criteria not achieved to date.* None of the woody plants installed as part of mitigation construction in 2007 were observed in 2010. There has been some natural recruitment of *Salix* and *Populus* spp.

Table 7. Mitigation credit summary in 2010 for the DH Ranch Wetland Mitigation Site.

Emergent wetland creation	21.1[1]	16.90	1:1	16.90
Open water	--	3.07	1:1	3.07
Shrub-dominated riparian islands[1] (i.e. berms)	1.65	1.65	4:1	0.41
Upland buffer[1]	0.80	0.80	4:1	0.20
TOTAL		**22.42**		**20.58**

[1]Included open water creation.

4. REFERENCES

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Appendix A

Figures 2 and 3

MDT Wetland Mitigation Monitoring
DH Ranch
Carbon County, Montana

Figure 2: 2010 Monitoring Activity Locations

Legend

- Vegetation Transect
- Monitoring Limits
- DataPoints
- PhotoPoints

Base Photography Date: July 17, 2010

PP1
PP2
PP3
PP4
PP5
T-1 start
T-1 end
DH-1
DH-2
DH-3

N

0 125 250 500

Feet

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

LOCATION: Carbon Co., MT

PROJECT NO: NH-STPP 5(39)

FILE: DHRanch/Monitor2010.mxd

Project Name: MDT DH Ranch Mitigation Site

Drawing Title: 2010 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
BCS	BV	JL

SCALE: Noted

Drawn: November 16, 2010

PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 2

REV -

Figure 3: 2010 Mapped Site Features

Acreages

Project Area	27.78 acres
Gross Wetlands	19.97 acres
Open Water (5)	3.07 acres
Net Wetlands	16.9 acres
Uplands	7.81 acres

N

0 50 100 200

Feet

Legend

- Monitoring Limits
- Wetland Limits
- Vegetation Communities

Base Photography Date: July 17, 2010

Noxious Weeds

- Cirsium arvense
- Convolvulus arvensis
- Tamarisk

Infestation SIze

- X = <0.1 acre
- ▲ = 0.1 to 1 acre
- ■ = 1 to 5 acre

Cover Class

- T = Trace (<1% cover)
- L = Low (1-5% cover)
- M = Moderate (5-25% cover)

Vegetation Community Types

1 Scirpus acutus/Typha latifolia
2 Typha latifolia/Scirpus spp.
3 Scirpus maritimus
4 Hordeum jubatum/Festuca pratensis
6 Salix amygdaloides
8 Hordeum jubatum/Scirpus maritimus
9 Alopecurus arundinaceus/Eleocharis palustris
11 Alopecurus arundinaceus
12 Hordeum jubatum/Bromus inermis
13 Alopecurus arundinaceus/Hordeum jubatum
14 Bromus japonicus/Chrysothamnus nauseousus

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

LOCATION: Carbon Co., MT
PROJECT NO: NH-STPP 5(39)
FILE: DHRanch/Veg2010.mxd

Project Name: MDT DH Ranch Mitigation Site
Drawing Title: 2010 Mapped Site Features

DRAWN BCS | CHECKED BV | APPROVED JL
SCALE: Noted
Drawn: November 16, 2010
PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 3

REV -

Appendix B

2010 MDT Wetland Mitigation Site Monitoring Form
2010 USACE Wetland Determination Data Form
2010 MDT Montana Wetland Assessment Form

MDT Wetland Mitigation Monitoring
DH Ranch
Carbon County, Montana

MDT WETLAND MITIGATION SITE MONITORING FORM

Project Site: DH Ranch Assessment Date/Time 8/11/2010 8:57:32 AM

Person(s) conducting the assessment: B. Sandefur

Weather: Clear, sunny, warm Location: Edgar, MT

MDT District: Billings Milepost: NA

Legal Description: T 4S R 23E Section(s) 1

Initial Evaluation Date: 9/7/2007 Monitoring Year: 4 #Visits in Year: 1

Size of Evaluation Area: 27.78 (acres)

Land use surrounding wetland:

Ranchland

HYDROLOGY

Surface Water Source: Edgar Canal irrigation return

Inundation: ☑ Average Depth: 1 **(ft)** Range of Depths: 0-3 **(ft)**

Percent of assessment area under inundation: 70 %

Depth at emergent vegetation-open water boundary: 1.5 **(ft)**

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

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

Groundwater Monitoring Wells

Record depth of water surface below ground

Additional Activities Checklist:

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

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

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

Hydrology Notes:

VEGETATION COMMUNITIES

Site DH Ranch

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

* Indicates accepted spp name not on '88 list.

Community # 1 **Community Type:** Scirpus acutus / Typha latifolia

Species	Cover class	Species	Cover class
Echinochloa muricata	0	Eleocharis palustris	1
Hordeum jubatum	0	Juncus effusus	0
Scirpus acutus	4	Scirpus maritimus	1
Typha latifolia	4		

Comments:

Community # 2 **Community Type:** Typha latifolia / Scirpus spp.

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	0	Echinochloa muricata	1
Eleocharis palustris	1	Scirpus acutus	2
Scirpus pungens	2	Shepherdia canadensis	1
Typha latifolia	5		

Comments:

Community # 3 **Community Type:** Scirpus maritimus /

Species	Cover class	Species	Cover class
Distichlis spicata	1	Eleocharis palustris	1
Hordeum jubatum	1	Scirpus maritimus	5
Sporobolus airoides	1		

Comments:

Community # 4 **Community Type:** Hordeum jubatum / Festuca pratensis

Species	Cover class	Species	Cover class
Artemisia cana	0	Bromus japonicus	1
Chenopodium album	1	Cirsium arvense	1
Cynoglossum officinale	0	Elaeagnus angustifolia	1
Festuca pratensis	3	Hordeum jubatum	4
Lactuca serriola	1	Phleum pratense	1
Rumex crispus	1	Verbascum thapsus	1

Comments:

Community # 5 Community Type: Open Water /

Species	Cover class	Species	Cover class
Eleocharis palustris	0	Open Water	5
Scirpus acutus	0		

Comments:

Community # 6 Community Type: Salix amygdaloides /

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	1	Cirsium arvense	1
Eleocharis palustris	1	Hordeum jubatum	2
Populus deltoides	1	Salix amygdaloides	5

Comments:

Community # 8 Community Type: Hordeum jubatum / Scirpus maritimus

Species	Cover class	Species	Cover class
Festuca pratensis	1	Hordeum jubatum	5
Kochia scoparia	1	Scirpus maritimus	3
Sporobolus airoides	0	Trifolium repens	1
Typha latifolia	2		

Comments:

Community # 9 Community Type: Alopecurus arundinaceus / Eleocharis palustris

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	4	Deschampsia cespitosa	1
Eleocharis palustris	4	Hordeum jubatum	3
Populus deltoides	0	Scirpus maritimus	3
Scirpus pungens	2	Typha latifolia	2

Comments:

Community # 11 Community Type: Alopecurus arundinaceus /

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	5	Cirsium arvense	1
Echinochloa muricata	2	Eleocharis palustris	1
Hordeum jubatum	2	Polygonum amphibium	1
Sporobolus airoides	0		

Comments:

Community # 12 Community Type: Hordeum jubatum / Bromus inermis

Species	Cover class	Species	Cover class
Bromus inermis	3	Chenopodium leptophyllum	1
Cirsium arvense	1	Hordeum jubatum	4
Lactuca serriola	2	Melilotus alba	1
Sisymbrium altissimum	1	Vicia sativa	2

Comments:

Community # 13 Community Type: Alopecurus arundinaceus / Hordeum jubatum

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	4	Cirsium arvense	1
Hordeum jubatum	3	Populus deltoides	0
Rumex crispus	1	Vicia sativa	1

Comments:

Community # 14 Community Type: Bromus japonicus / Chrysothamnus nauseousus

Species	Cover class	Species	Cover class
Agropyron smithii	2	Alyssum alyssoides	2
Artemisia cana	2	Atriplex canescens	2
Bromus japonicus	4	Chenopodium album	1
Chrysothamnus nauseousu	3	Cirsium arvense	1
Lactuca serriola	1	Verbena bracteata	1

Comments:

VEGETATION TRANSECTS

Site: DH Ranch Date: 11/2010 8:57:32 AM

Transect Number: 1 **Compass Direction from Start:** 260

Interval Data:

Ending Station 15 **Community Type:** Hordeum jubatum / Festuca pratensis

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	0	Alyssum alyssoides	2
Bromus japonicus	1	Hordeum jubatum	2
Kochia scoparia	1	Lactuca serriola	2
Lepidium perfoliatum	4	Vicia sativa	0

Ending Station 70 **Community Type:** Scirpus acutus / Typha latifolia

Species	Cover class	Species	Cover class
Eleocharis palustris	2	Hordeum jubatum	1
Populus deltoides	0	Scirpus acutus	5
Scirpus maritimus	2	Scirpus pungens	1
Typha latifolia	2		

Ending Station 98 **Community Type:** Alopecurus arundinaceus /

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	4	Deschampsia cespitosa	3
Hordeum jubatum	1	Kochia scoparia	1
Poa pratensis	1	Rumex crispus	1
Scirpus acutus	2	Scirpus pungens	1
Trifolium repens			

Ending Station 136 **Community Type:** Typha latifolia / Scirpus spp.

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	2	Deschampsia cespitosa	1
Eleocharis palustris	2	Hordeum jubatum	1
Kochia scoparia	1	Mentha arvensis	1
Scirpus acutus	3	Typha latifolia	4

Ending Station 230 **Community Type:** Alopecurus arundinaceus /

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	5	Carex vulpinoidea	1
Hordeum jubatum	1	Kochia scoparia	1
Poa pratensis	1	Scirpus acutus	3
Typha latifolia	2		

Ending Station 370 **Community Type:** Typha latifolia / Scirpus spp.

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	3	Eleocharis palustris	1
Scirpus acutus	2	Scirpus pungens	1
Shepherdia canadensis	0	Typha latifolia	5

Ending Station 430 **Community Type:** Alopecurus arundinaceus /

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	5	Carex stricta	1
Juncus bufonius	1	Juncus effusus	1
Rumex crispus	1	Typha latifolia	2

Ending Station 468 **Community Type:** Alopecurus arundinaceus / Eleocharis palustris

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	5	Eleocharis palustris	2
Scirpus cyperinus	1		

Ending Station 550 **Community Type:** Typha latifolia / Scirpus spp.

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	3	Eleocharis palustris	1
Scirpus acutus	2	Typha latifolia	5

Ending Station 560 **Community Type:** Alopecurus arundinaceus /

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	5	Eleocharis palustris	1
Rumex crispus	1		

Ending Station 590 **Community Type:** Hordeum jubatum / Festuca pratensis

Species	Cover class	Species	Cover class
Agropyron repens	3	Artemisia cana	2
Asclepias speciosa	1	Bromus inermis	2
Chenopodium album	2	Cirsium arvense	5
Elaeagnus angustifolia	1	Festuca pratensis	2
Rumex crispus	1	Trifolium repens	1
Verbascum thapsus	1		

Transect Notes:

PLANTED WOODY VEGETATION SURVIVAL

DH Ranch

Planting Type	#Planted	#Alive	Notes
Atriplex canescens	40	0	
Rhus trilobata	103	0	
Shepherdia argentea	172	0	

Comments

Only one Rhus trilobata observed in 2009; none observed in 2010.

DH Ranch

WILDLIFE

Birds

Were man-made nesting structures installed? No

If yes, type of structure: _____

How many? _____

Are the nesting structures being used? No

Do the nesting structures need repairs? No

Nesting Structure Comments:

Species	#Observed	Behavior	Habitat
American Goldfinch	3		SS
Common Nighthawk	1	FO	FO, SS
Eastern Kingbird	1	FO	
Golden Eagle	1	FO	OW
Gray Catbird	2	L	
Osprey	1	FO	OW
Red-winged Blackbird	1	L	MA
Rock Pigeon	2	L	
Song Sparrow	7	L	MA, SS
Western Kingbird	1	L	
Willow Flycatcher	3		SS
Yellow Warbler	2	L	MA, OW, SS

Bird Comments

BEHAVIOR CODES

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

HABITAT CODES

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

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

Mammals and Herptiles

Species	# Observed	Tracks	Scat	Burrows	Comments
Black bear		No	No	No	
Black-tailed Prairie Dog		No	No	Yes	Prairie dog town located in northern project area
Rattlesnake		No	No	No	skin shed in adjacent uplands
unidentified toad		No	No	No	
White-tailed Deer		Yes	Yes	No	

Wildlife Comments:

Landowner observed a black bear one week prior to field work.

DH Ranch

PHOTOGRAPHS

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

Photograph Checklist:

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

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

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

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

Photo #	Latitude	Longitude	Bearing	Description
5841			212	PP3
5843			239	PP3
5844			272	PP3
5845			304	PP3
5848			334	PP3
5849			260	Veg Tran 1, start
5849	45.50919	-108.824707	260	Veg tran 1, start
5851			80	Veg Tran 1, end
5855			42	PP4
5857			75	PP4
5858			104	PP4
5859			142	PP4
5861			165	PP4
5868			337	PP4
5869			354	PP4
5870			36	PP5
5871			66	PP5
5872			97	PP5
5873			153	PP5
5877			221	PP5
5878			182	PP5
5879			188	PP1
5880			207	PP1
5881			221	PP1
5882			256	PP1

5883	179	PP2
5884	203	PP2
5885	238	PP2
5886	264	PP2

Comments:

ADDITIONAL ITEMS CHECKLIST

Hydrology

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

Photos

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

Vegetation

☐ Map vegetation community boundaries

☐ Complete Vegetation Transects

Soils

☐ Assess soils

Wetland Delineations

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

Wetland Delineation Comments

Functional Assessments

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

Functional Assessment Comments:

Maintenance

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

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? No

If no, describe the problems below.

No maintenance to man made structures identified during site visit. Weed control maintenance should be conducted.

WETLAND DETERMINATION DATA FORM – Routine Weltand Delineation, 1987 COE Protocol

Project/Site: DH Ranch | City/County: Carbon | Sampling Date: 8/11/2010

Applicant/Owner: MDT | State: MT | Sampling Point: DH-1

Investigator(s): B. Sandefur | Section, Township, Range: S 1 T 4S R 23E

Landform (hillslope, terrace, etc.): Flat | Local relief (concave, convex, none): flat | Slope (%):

Subregion (LRR): LRR G | Lat: 45.50858 | Long: -108.825956666667 | Datum:

Soil Map Unit Name: Heldt

Do Normal Circumstances Exist on this site? Yes ☑

Is the site significantly disturbed (Atypical Situation)? Yes ☐

Is the area a potential Problem Area? Yes ☐

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑	No ☐	**Is the Sampled Area within a Wetland?** Yes ☑ No ☐
Hydric Soil Present?	Yes ☑	No ☐	
Wetland Hydrology Present?	Yes ☑	No ☐	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	0
2.	0	☐	0
3.	0	☐	0
4.	0	☐	0
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	0
2.	0	☐	0
3.	0	☐	0
4.	0	☐	0
5.	0	☐	0
	0 = Total Cover		
Herb Stratum (Plot size: 5ft)			
1. Phalaris arundinacea	25	☑	FACW+
2. Alopecurus arundinaceus	45	☑	NI
3. Hordeum jubatum	25	☑	FACW
4. Cirsium arvense	10	☐	FACU
5. Bromus japonicus	5	☐	FACU
6.	0	☐	0
7.	0	☐	0
8.	0	☐	0
9.	0	☐	0
10.	0	☐	0
11.	0	☐	0
	110 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	0
2.	0	☐	0
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.66 (A/B)

Dominance Test is >50% ☑

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: DH-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/2	95	10YR 2/1	3		M	Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☑ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Soils List
- ☐ Listed on National Soils List
- ☐ Other (explain in remarks)

Taxonomy Subgroup: Ustertic Haplocambids

Confirm Mapped Type?: ☐

Hydric Soil Present? Yes ☑ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators

- ☐ Innundated
- ☑ Saturated in upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage patterns in wetlands

Secondary Indicators (2 or more required)

- ☐ Oxidized Rhizospheres along Living Roots
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☑ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 12

Wetland Hydrology Present? Yes ☑ No ☐

Remarks:

WETLAND DETERMINATION DATA FORM – Routine Weltand Delineation, 1987 COE Protocol

Project/Site: DH Ranch | City/County: Carbon | Sampling Date: 8/11/2010

Applicant/Owner: MDT | State: MT | Sampling Point: DH-2

Investigator(s): B. Sandefur | Section, Township, Range: S 1 T 4S R 23E

Landform (hillslope, terrace, etc.): Flat | Local relief (concave, convex, none): flat | Slope (%): 0

Subregion (LRR): LRR G | Lat: 45.508515 | Long: -108.82641 | Datum:

Soil Map Unit Name: Heldt

Do Normal Circumstances Exist on this site? Yes ☑

Is the site significantly disturbed (Atypical Situation)? Yes ☐

Is the area a potential Problem Area? Yes ☐

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☑	**Is the Sampled Area within a Wetland?** Yes ☐ No ☑
Hydric Soil Present?	Yes ☐	No ☑	
Wetland Hydrology Present?	Yes ☐	No ☑	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	0
2.	0	☐	0
3.	0	☐	0
4.	0	☐	0
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	0
2.	0	☐	0
3.	0	☐	0
4.	0	☐	0
5.	0	☐	0
	0 = Total Cover		
Herb Stratum (Plot size: 5ft)			
1. Bromus inermis	25	☑	NL
2. Festuca arundinacea	65	☑	NI
3. Cirsium arvense	10	☐	FACU
4. Carduus nutans	5	☐	NL
5. Lactuca serriola	5	☐	FACU
6. Hordeum jubatum	5	☐	FACW
7.	0	☐	0
8.	0	☐	0
9.	0	☐	0
10.	0	☐	0
11.	0	☐	0
	115 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	0
2.	0	☐	0
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Dominance Test is >50% ☐

Hydrophytic Vegetation Present? Yes ☐ No ☑

Remarks:

SOIL

Sampling Point: DH-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 4/2	100					Clay Loam	very friable
5-12	10YR 5/3	100					Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Soils List
- ☐ Listed on National Soils List
- ☐ Other (explain in remarks)

Taxonomy Subgroup: Ustertic Haplocambids

Confirm Mapped Type?: ☐

Hydric Soil Present? Yes ☐ No ☑

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators

- ☐ Innundated
- ☐ Saturated in upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage patterns in wetlands

Secondary Indicators (2 or more required)

- ☐ Oxidized Rhizospheres along Living Roots
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Field Observations:

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

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

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

Wetland Hydrology Present? Yes ☐ No ☑

Remarks: No indicators, approx 25ft from secondary surface irrigation canal

WETLAND DETERMINATION DATA FORM – Routine Weltand Delineation, 1987 COE Protocol

Project/Site: DH Ranch | City/County: Carbon | Sampling Date: 8/11/2010

Applicant/Owner: MDT | State: MT | Sampling Point: DH-3

Investigator(s): B. Sandefur | Section, Township, Range: S 1 T 4S R 23E

Landform (hillslope, terrace, etc.): Flat | Local relief (concave, convex, none): flat | Slope (%): 0

Subregion (LRR): LRR G | Lat: 45.509485 | Long: -108.826705 | Datum:

Soil Map Unit Name: Heldt

Do Normal Circumstances Exist on this site? Yes ☑

Is the site significantly disturbed (Atypical Situation)? Yes ☐

Is the area a potential Problem Area? Yes ☐

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑	No ☐	**Is the Sampled Area within a Wetland?** Yes ☑ No ☐
Hydric Soil Present?	Yes ☑	No ☐	
Wetland Hydrology Present?	Yes ☑	No ☐	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	0
2.	0	☐	0
3.	0	☐	0
4.	0	☐	0
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	0
2.	0	☐	0
3.	0	☐	0
4.	0	☐	0
5.	0	☐	0
	0 = Total Cover		
Herb Stratum (Plot size: 5ft)			
1. Echinochloa muricata	35	☑	OBL
2. Alopecurus arundinaceus	15	☑	NI
3. Hordeum jubatum	35	☑	FACW
4. Lactuca serriola	5	☐	FACU
5. Bromus japonicus	10	☐	FACU
6. Chenopodium album	5	☐	FAC
7. Sisymbrium altissimum	5	☐	UPL
8. Carduus nutans	5	☐	0
9.	0	☐	0
10.	0	☐	0
11.	0	☐	0
	115 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	0
2.	0	☐	0
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.66 (A/B)

Dominance Test is >50% ☑

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: DH-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2	100					Clay Loam	
4-13	10YR 3/1	95	10YR 4/3	5	C	M	Clay Loam	

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

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☑ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Soils List
- ☐ Listed on National Soils List
- ☐ Other (explain in remarks)

Taxonomy Subgroup: Ustertic Haplocambids

Confirm Mapped Type?: ☐

Hydric Soil Present? Yes ☑ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators

- ☐ Innundated
- ☑ Saturated in upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage patterns in wetlands

Secondary Indicators (2 or more required)

- ☐ Oxidized Rhizospheres along Living Roots
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☑ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Field Observations:

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

Water Table Present? Yes ☑ No ☐ Depth (inches): 12

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 7

Wetland Hydrology Present? Yes ☑ No ☐

Remarks:

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name DH Ranch Wetland **2. MDT project#** NH-STPP 5(39) **Control#**

3. Evaluation Date 8/11/2010 **4. Evaluators** B. Sandefur **5. Wetland/Site# (s)** DH Ranch

6. Wetland Location(s): **T** 4S **R** 23E **Sec1** 1 **T** **R** **Sec2**

Approx Stationing or Mileposts NA

Watershed 13-Upper Yellowstone **County** Carbon Co. MT

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 20.58

Purpose of Evaluation

- ☐ **Wetlands potentially affected by MDT project**
- ☐ **Mitigation Wetlands: pre-construction**
- ☑ **Mitigation Wetlands: post construction**
- ☐ **Other**

How assessed: Measured e.g. by GPS

9. Assesssment area (AA) size (acres) 20.58

How assessed: Measured e.g. by GPS

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Depressional	Unconsolidated Bottom	Excavated	Permanent/Perennial	40
Depressional	Emergent Wetland	Excavated	Permanent/Perennial	55
Depressional	Scrub-Shrub Wetland	Impounded	Seasonal/Intermittant	5

11. Estimated Relative Abundance Abundant

12. General Condition of AA

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

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

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

Wetland mitigation site constructed in 2007.

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

Tamarisk, Cirsium arvense, convolvulus arvensis

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

AA is a marsh on a terrace of the Clark's Fork of the Yellowstone River. Surrounding land to the west, north and south sides are grazed and/or hayed. To the east is a ranch road and a steep hillside comprised of native vegetation. Primary source of water is irrigation return flow that is directed onto the south end of the site.

13. Structural Diversity: (based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes], see #10 above)

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management preventing (passive) existence of additional vegetated classes?		Modified Rating
>=3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	<NO	YES>	L
1 class, monoculture (1 species comprises>=90% of total cover)	L	NA	NA	NA

Comments: Emergent with an increasing amount of scrub-shrub, few scattered cottonwoods.

SECTION PERTAINING to FUNCTIONS_VALUES ASSESSMENT

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

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

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

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

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

Sources for documented use USFWS

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

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

Primary or critical habitat (list species)	○ D ○ S	
Secondary habitat (list Species)	◉ D ○ S	Sandhill Crane (S2), black-tailed prairie dogs (S3)
Incidental habitat (list species)	○ D ○ S	Bald Eagle (S3), Peregrine Falcon
No usable habitat	☐ S	

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

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

Sources for documented use N. leopard frog and sandhill cran observed onsite

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (check substantial, moderate, or low based on supporting evidence):

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

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

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

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

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

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

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

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

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

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

Comments

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

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

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

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

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

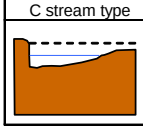
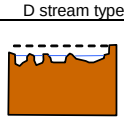
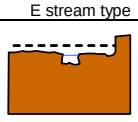
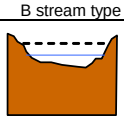
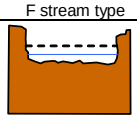
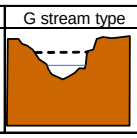
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

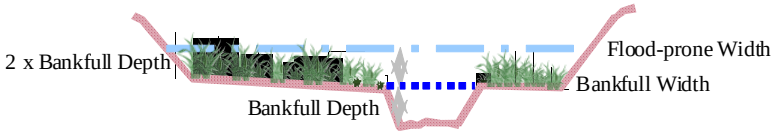
iii. Final Score and Rating: _____ **Comments:**

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

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

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)				Moderately entrenched – B stream type					
% of flooded wetland classified as forested and/or scrub/shrub				75%	25-75%	<25%			
AA contains **no outlet or restricted outlet**									
AA contains **unrestricted outlet**									

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



Floodrpone width _____ **/** **Bankfull width** _____ **=** **Entrenchment ratio** _____

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

Comments:

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

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

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

Comments:

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

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

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

Comments:

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

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

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

Comments:

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [check])

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

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

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

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

a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** ○ **N** ◉ *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:* **Modified Rating** 1 E

Comments:

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

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

ii. Recharge Indicators

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

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

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

Comments: Site is supported by irrigation return flow. There is no evidence of a groundwater discharge component. The soils are clayey s

14K. Uniqueness:

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

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

Comments:

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

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

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

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

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

Comments:

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): DH Ranch

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	0	1	0	☐
B. MT Natural Heritage Program Species Habitat	M	.7	1	14.406	☑
C. General Wildlife Habitat	H	.9	1	18.522	☑
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	NA	0	0	0	☐
F. Short and Long Term Surface Water Storage	H	1	1	20.58	☐
G. Sediment/Nutrient/Toxicant Removal	M	.7	1	14.406	☐
H. Sediment/Shoreline Stabilization	H	1	1	20.58	☑
I. Production Export/Food Chain Support	E	1	1	20.58	☑
J. Groundwater Discharge/Recharge	L	.1	1	2.058	☐
K. Uniqueness	M	.5	1	10.29	☐
L. Recreation/Education Potential (bonus points)	L	.05	NA	1.029	☐
Totals:		5.95	9	122.451	
Percent of Possible Score			**66.11** %		

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

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

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

☐

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

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

I	II	III	IV

Appendix C

Project Area Photographs

MDT Wetland Mitigation Monitoring
DH Ranch
Carbon County, Montana



Photo Point 1 – *Photo 1*
Bearing: 188 Degrees
Location: North Side
Taken in 2009





Photo Point 1 – *Photo 2*
Bearing: 207 Degrees
Location: North Side
Taken in 2009



Photo Point 1 – *Photo 2*
Bearing: 207 Degrees
Location: North Side
Taken in 2010



Photo Point 1 – *Photo 3*
Bearing: 221 Degrees
Location: North end
Taken in 2009



Photo Point 1 – *Photo 3*
Bearing: 221 Degrees
Location: North end
Taken in 2010



Photo Point 1 – *Photo 4*
Bearing: 256 Degrees
Location: North Side
Taken in 2009



Photo Point 1 – *Photo 4*
Bearing: 256 Degrees
Location: North Side
Taken in 2010



Photo Point 2 – *Photo 1*
Bearing: 179 Degrees
Location: NE Corner
Taken in 2009



Photo Point 2 – *Photo 1*
Bearing: 179 Degrees
Location: NE Corner
Taken in 2010



Photo Point 2 – *Photo 2*
Bearing: 203 Degrees
Location: NE Corner
Taken in 2009



Photo Point 2 – *Photo 2*
Bearing: 203 Degrees
Location: NE Corner
Taken in 2010



Photo Point 2 – *Photo 3*
Bearing: 238 Degrees
Location: NE Corner
Taken in 2009



Photo Point 2 – *Photo 3*
Bearing: 238 Degrees
Location: NE Corner
Taken in 2010



Photo Point 2 – *Photo 4*
Bearing: 264 Degrees
Location: NE Corner
Taken in 2009



Photo Point 2 – *Photo 4*
Bearing: 264 Degrees
Location: NE Corner
Taken in 2010



Photo Point 3 – *Photo 1*
Bearing: 212 Degrees
Location: SW Corner
Taken in 2009



Photo Point 3 – *Photo 1*
Bearing: 212 Degrees
Location: SW Corner
Taken in 2010



Photo Point 3 – *Photo 2* **Location:** SW Corner
Bearing: 239 Degrees **Taken in 2009**



Photo Point 3 – *Photo 2* **Location:** SW Corner
Bearing: 239 Degrees **Taken in 2010**



Photo Point 3 – *Photo 3* **Location:** SW Corner
Bearing: 272 Degrees **Taken in 2009**



Photo Point 3 – *Photo 3* **Location:** SW Corner
Bearing: 272 Degrees **Taken in 2010**



Photo Point 3 – *Photo 4* **Location:** SW Corner
Bearing: 304 Degrees **Taken in 2009**



Photo Point 3 – *Photo 4* **Location:** SW Corner
Bearing: 304 Degrees **Taken in 2010**



Photo Point 3 – *Photo 5* **Location:** SW Corner
Bearing: 334 Degrees **Taken in 2009**



Photo Point 3 – *Photo 5* **Location:** SW Corner
Bearing: 334 Degrees **Taken in 2010**



Photo Point 4 – *Photo 1* **Location:** West Side
Bearing: 42 Degrees **Taken in 2009**



Photo Point 4 – *Photo 1* **Location:** West Side
Bearing: 42 Degrees **Taken in 2010**



Photo Point 4 – *Photo 2* **Location:** West Side
Bearing: 142 Degrees **Taken in 2009**



Photo Point 4 – *Photo 2* **Location:** West Side
Bearing: 142 Degrees **Taken in 2010**



Photo Point 4 – *Photo 3* **Location:** West Side
Bearing: 104 Degrees **Taken in 2009**



Photo Point 4 – *Photo 3* **Location:** West Side
Bearing: 104 Degrees **Taken in 2010**



Photo Point 4 – *Photo 4* **Location:** West Side
Bearing: 142 Degrees **Taken in 2009**



Photo Point 4 – *Photo 4* **Location:** West Side
Bearing: 142 Degrees **Taken in 2010**



Photo Point 4 – *Photo 5* **Location:** West Side
Bearing: 165 Degrees **Taken in 2009**



Photo Point 4 – *Photo 5* **Location:** West Side
Bearing: 165 Degrees **Taken in 2010**



Photo Point 4 – *Photo 6* **Location:** West Side
Bearing: 337 Degrees **Taken in 2009**



Photo Point 4 – *Photo 6* **Location:** West Side
Bearing: 337 Degrees **Taken in 2010**



Photo Point 4 – *Photo 7* **Location:** West Side
Bearing: 354 Degrees **Taken in 2009**



Photo Point 4 – *Photo 7* **Location:** West Side
Bearing: 354 Degrees **Taken in 2010**



Photo Point 5 – *Photo 1* **Location:** Central
Bearing: 36 Degrees **Taken in 2009**



Photo Point 5 – *Photo 1* **Location:** Central
Bearing: 36 Degrees **Taken in 2010**



Photo Point 5 – *Photo 2*
Bearing: 66 Degrees
Location: Central
Taken in 2009



Photo Point 5 – *Photo 2*
Bearing: 66 Degrees
Location: Central
Taken in 2010



Photo Point 5 – *Photo 3*
Bearing: 97 Degrees
Location: Central
Taken in 2009



Photo Point 5 – *Photo 3*
Bearing: 97 Degrees
Location: West Side
Taken in 2010



Photo Point 5 – *Photo 4*
Bearing: 153 Degrees
Location: Central
Taken in 2009



Photo Point 5 – *Photo 4*
Bearing: 153 Degrees
Location: Central
Taken in 2010



Photo Point 5 – *Photo 5*
Bearing: 182 Degrees
Location: Central
Taken in 2009



Photo Point 5 – *Photo 5*
Bearing: 182 Degrees
Location: Central
Taken in 2010



Photo Point 5 – *Photo 6*
Bearing: 221 Degrees
Location: Central
Taken in 2009



Photo Point 5 – *Photo 3*
Bearing: 221 Degrees
Location: West Side
Taken in 2010



Transect 1 – *Photo 1*
Bearing: 260 Degrees
Location: T-1 Start
Taken in 2009



Transect 1 – *Photo 1*
Bearing: 260 Degrees
Location: T-1 Start
Taken in 2010



Transect 1 – *Photo 2*
Bearing: 80 Degrees
Location: T-1 End
Taken in 2009

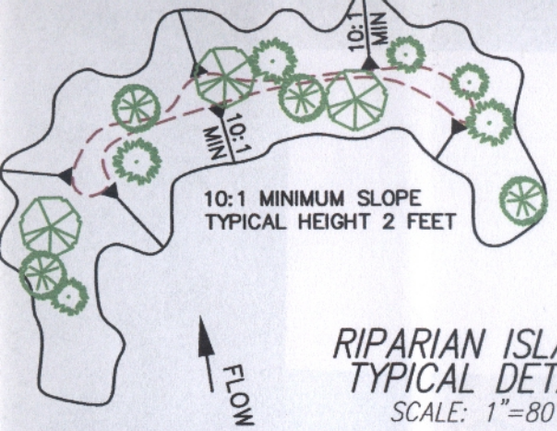


Transect 1 – *Photo 2*
Bearing: 80 Degrees
Location: T-1 End
Taken in 2010

Appendix D

Project Plan Sheet

MDT Wetland Mitigation Monitoring
DH Ranch
Carbon County, Montana



RIPARIAN ISLAND TYPICAL DETAIL

SCALE: 1"=80'

REVEGETATION ZONES (23.45 ac.)

WETLAND PEM	15.90 ac.
WETLAND PEM DEPRESSION	*2.25 ac.
WETLAND SALINE PEM	6.75 ac.
RIPARIAN ISLAND SCRUB-SHRUB	*1.65 ac.
RIPARIAN BUFFER SCRUB-SHRUB SALINE	0.80 ac.

* SUB AREAS OF WETLAND PEM

RANCH ACCESS ROAD IMPROVED TO ACT AS LOW HEAD IMPOUNDMENT AND CONTINUED RANCH ACCESS

PROJECT BOUNDARY

BUFFER SWALE NARROWS BECOMES OVERFLOW DRAINAGE DITCH

INTERCEPTOR DITCH

INTERCEPTOR DITCH

NORTH

0 50 150 300

REVEGETATION PLAN

SCALE: 1"=150'

NOTES:

1> AERIAL PHOTO BACKGROUND – MDT Flight on 6/17/2005

2> FINISHED DESIGN CONTOUR INTERVAL = 1 foot

REVEGETATION PLAN & PROPOSED GRADING

DRAWING NO. FIGURE 5

REVISION 1

DH RANCH & Montana Department of Transportation

WETLAND MITIGATION PROJECT

Sec 1 TAN R23E CARBON COUNTY, MT

DHDESIGN.dwg

SCALE: AS NOTED

PROJECT NO. 251A

DRAWN bz

CHECK --

DATE 10/05/05

REV NO.	REVISION DESCRIPTION	BY	REVISION DATE

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