MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2012

DH Ranch
Carbon County, Montana

Prepared for:

2701 Prospect Ave
Helena, MT 59620-1001

Prepared by:

PO Box 1133
Bozeman, MT 59771-1133

December 2012

MONTANA DEPARTMENT OF TRANSPORTATION

WETLAND MITIGATION MONITORING REPORT:

YEAR 2012

DH Ranch
Edger, Carbon County, Montana

MDT Project Number NH-STPP 5(39)

Control Number 5987

Prepared for:

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

Prepared by:

Confluence Consulting, Inc.
P.O. Box 1133
Bozeman, MT 59771

December 2012

CCI Project No: MDT.004

CONFLUENCE

TABLE OF CONTENTS

TABLES

CHARTS

FIGURES

APPENDICES

Cover: View of a constructed wetland depression showing *Schoenoplectus* and emerging *Populus* saplings.

1. INTRODUCTION

The 2012 Wetland Mitigation Monitoring Report presents the results of the sixth year of monitoring at the DH Ranch wetland mitigation site. This mitigation site was constructed during the spring of 2007 in the east portion of the Upper Yellowstone River watershed (Watershed 13). The Montana Department of Transportation (MDT) has acquired approximately 17.4 acres of potential wetland credits from this site through a wetland credit purchase. 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 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 existed along irrigation ditches that traversed the site prior to construction of the mitigation project.

The project is located at an elevation of approximately 3,430 feet above mean sea level in Carbon County, Montana, 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, Montana, 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 Monitoring Activity Locations and Mapped Site Features, respectively. The MDT Mitigation Site Monitoring Form, US Army Corps of Engineers (USACE) Routine Wetland Determination Data Forms (Environmental Laboratory 1987), and the 2008 MDT Montana Wetland Assessment Form (MWAM) (Berglund and McEldowney 2008) are included in Appendix B. Representative photographs are included in Appendix C and the Project Plan Sheet is included in Appendix D.

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

The approved performance standards for the DH Ranch Wetland Mitigation Site are:

1. **Wetland Characteristics**: Sites will develop hydrophytic vegetation, wetland hydrology, and hydric soils as outlined in the

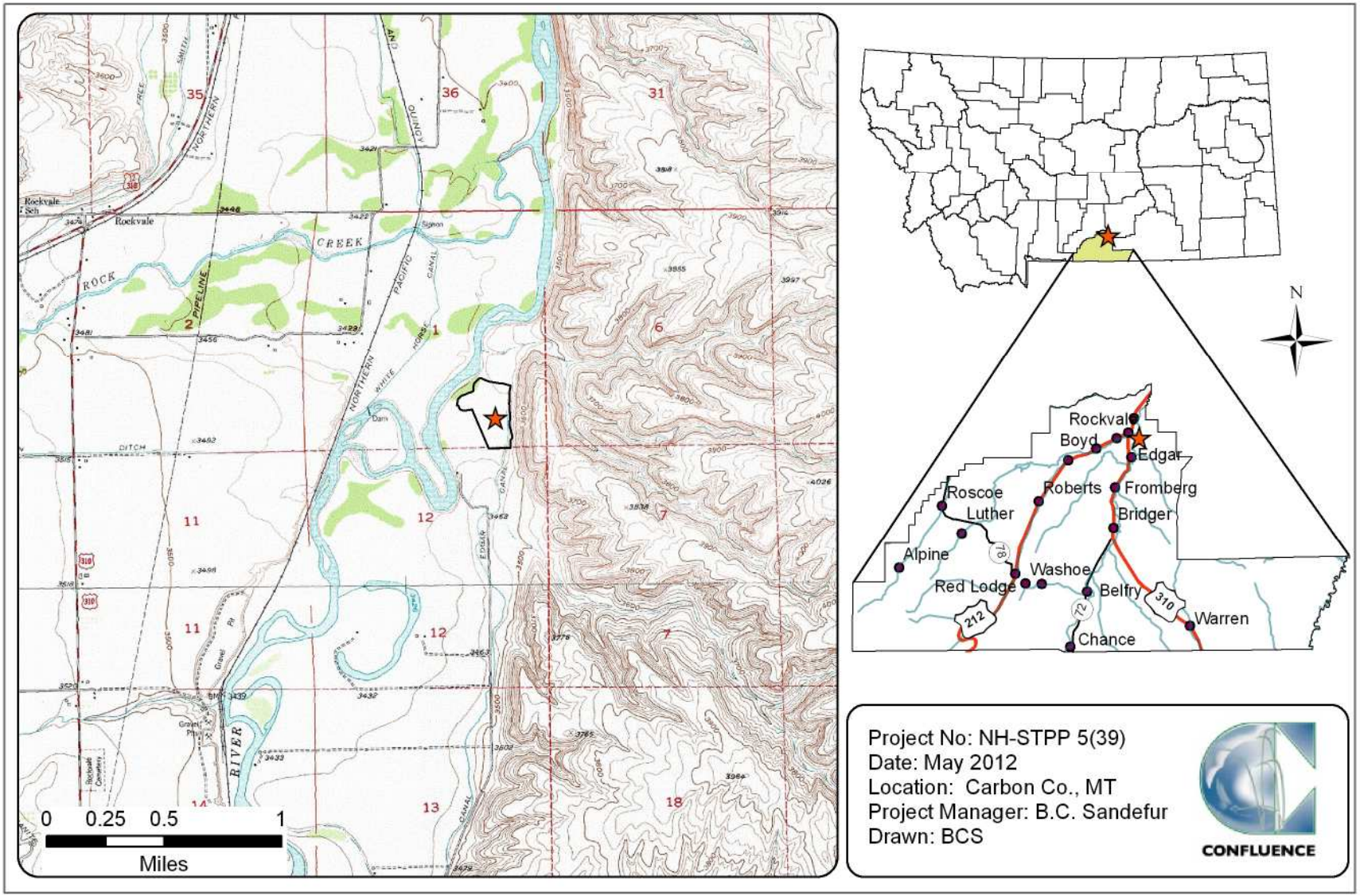


Figure 1. Project Location for DH Ranch Wetland Mitigation Site.

1987 USACE Wetland Delineation Manual (Environmental Laboratory 1987) for the Determination of Wetlands

2. **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.

3. **Hydrology:** Soil saturation will be present for at least 12.5 percent of the growing season (18 days).

4. **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.

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

2. METHODS

The site was monitored on August 17, 2012. Information contained on the Monitoring Form and Wetland Determination Data Forms was entered electronically in the field on a palmtop computer during the field investigation (Appendix B). Monitoring activity locations were located using a global positioning system (GPS) (Figure 2, Appendix A). Information collected included a wetland delineation, wetland/ aquatic/open water habitat boundary mapping, vegetation community mapping, vegetation transect monitoring, woody species survival monitoring, soils, hydrology, 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 during the growing season” (usually 14 days or 12.5 percent or more of 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). The growing season recorded for the meteorological station at Joliet, Montana (244506), extends from May 5 through September 29, approximately 146 days. 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. Joliet is approximately five miles west of Edgar.

Hydrological indicators as outlined on the Wetland Determination Data Form were documented at four 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 criteria addressing inundation/saturation requirements. 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 Determination 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 the 2012 aerial photograph. The percent cover of dominant species within a community type was estimated and recorded using the following cover classes: 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). Community types were named based on the predominant vegetation species that characterized each mapped polygon (Figure 3, Appendix A).

Temporal changes in vegetation were evaluated through annual assessments of a static belt transect. The transect location is shown on Figure 2 (Appendix A). Vegetation composition was assessed and recorded on one vegetation belt transect approximately 10 feet wide running east to west in the southern portion of the site. Between 2007 and 2009, the transect was reported as 645 feet. Since 2010, repeated measurements have confirmed the transect length to be 590 feet suggesting either error in measurement or incorrect communication of the transect endpoints. 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 for the community polygon data (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 were color-coded. The locations are denoted with the symbol "**x**", "▲", or "■" representing 0 to 0.1 acre, 0.1 to 1.0 acre, or 1.0 acre to 5 acres in extent, respectively. Cover classes listed on Figure 3 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 was assessed annually.

2.3. Soil

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

2.4. Wetland Delineation

Waters of the US including jurisdictional wetlands and special aquatic sites were delineated throughout the project area in accordance with criteria established in the 1987 Wetland Manual. 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 name and indicator status of plant species was derived from the Draft 2012 National Wetland Plant List (NWPL) (Lichvar and Kartesz. 2009). Previous years' reports used the 1988 National List of Plant Species that Occur in Wetlands: Northwest Region 4 (Reed 1988). The 2012 NWPL scientific plant names were used in this report. Many common names used in the 2012 NWPL appear incomplete or erroneous. When used in this report, 2012 NWPL common names that appear to be incomplete or erroneous are provided with parenthetical clarification. For example, the common given name for the plant *Agrostis exarata* in the 2012 NWPL is "spiked bent". As this is likely an error, this species' common name would be reported here as "spiked bent (grass)".

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. 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 Determination Data Form (Appendix B).

The wetland boundary was determined in the field based on changes in plant communities and/or hydrology, and changes in soil characteristics. Topographic relief boundaries within the project area were also examined and cross referenced with soil and vegetation communities as supportive information for 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 the 2012 aerial photography. Wetland acreages were estimated using geographic information system (GIS) methods.

2.5. Wildlife

Observations of use of mammal, reptile, amphibian, and bird use 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 2012 list was compiled for this report.

2.6. Functional Assessment

Pre-construction and 2007 conditions were assessed using the 1999 MWAM (Berglund 1999). Wetland functions for 2008 through 2012 were assessed using the 2008 MWAM. Field data for the functional assessment were collected during the site visit. A Wetland 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 and upland conditions, trends, current land uses surrounding the site, and the 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 2012 monitoring season. Points were collected using WAAS-enabled differential correction satellites, typically improving resolution to sub-meter accuracy. The collected data were then transferred to a personal computer, imported into GIS, and presented in Montana State Plane Single Zone NAD 83 meters. Site features and survey points that were located with GPS included fence boundaries, photograph points, transect endpoints, and wetland data points.

2.9. Maintenance Needs

Channels, engineered structures, fencing, and other features were examined during the site visit for obvious signs of breaching, damage, or other problems. This was a cursory examination rather than an engineering-level structural inspection. Results of this examination were recorded on the Mitigation Monitoring Form (Appendix B).

3. RESULTS

3.1. Hydrology

The mean annual precipitation recorded at the Joliet station, Montana (244506), was 15.15 inches for the period of record from September 1951 to December 2011 (WRCC 2012). Total precipitation in 2010 and 2011 was 13.25 inches and 19.02 inches, respectively. Monthly precipitation from January to August totaled 10.95 inches (long-term average), 10.13 inches (2010), 16.49 inches (2011), and

5.48 inches (2012). These data indicate that total precipitation between January and August in 2012 was approximately 50% of the historic average.

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. The outfall structure located in the northeast corner of the site discharges to a forested riparian area along the Clarks Fork of the Yellowstone River. Surface water was present at various levels within all of the wetland cells during the field investigation (Figure 3, Appendix A). Water depths ranged from 0.0 to 3.0 feet, with an average depth of 1.0 foot. The approximate depth at the emergent vegetation and open water boundary was 0.5 feet. Wetland areas that were not inundated were generally saturated within 12 inches (1.0 foot) of the ground surface (see discussion below). Approximately 45 percent of the assessment area was inundated at the time of the field survey.

Four data points DH-1, DH-2, DH-3, and DH-4 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 indicators of wetland hydrology at DH-1 were 2 inches of surface water, saturation within 12 inches of the ground surface, drainage patterns in the wetland, and oxidized rhizospheres along living roots. Data point DH-3 was inundated to a depth of one inch, saturated within 12 inches, and met the FAC-neutral test. There were no hydrologic indicators observed at data points DH-2 and DH-4.

3.2. Vegetation

A comprehensive list of 109 vegetation species identified on the site from 2007 to 2012 is presented in Table 1 and under the community types on the Mitigation Monitoring Form (Appendix B). Figure 3 (Appendix A) illustrates the vegetation community polygons and wetland/upland areas. Invasive plants species such as cheatgrass (*Bromus tectorum)* dominated a majority of the mitigation area prior to construction. Nine dominant community types, six wetland and three upland, were identified at the site in 2012. The community types and composition are detailed below. Dominant species are listed in descending order of abundance for each vegetation community type.

Wetland community Type 1 – *Schoenoplectus acutus/Typha latifolia* was identified in three small areas located near the east and west boundaries and in the central section of the site. The community encompassed 0.9 acres of the mitigation site. Dominant species included hard-stem club rush (*Schoenoplectus acutus*), broad-leaf cattail (*Typha latifolia*), creeping meadow-foxtail (*Alopecurus arundinaceus*), common spikerush (*Eleocharis palustris*), and three-square (club rush, S*choenoplextus pungens*).

Wetland community Type 2 – *Typha latifolia/Schoenoplectus* spp was found in larger, isolated wetlands across the site. It was interspersed among other

communities throughout the site, including wetland Types 1 and 11. The 9.63 acre community was dominated by broad leaf cattail, hard-stem club rush, common spikerush, creeping meadow-foxtail, and rough barnyard grass (*Echinochloa muricata*).

Upland community Type 4 – *Hordeum jubatum/Festuca pratensis* was found primarily in 2.71 acres of the northwest and southeast perimeters of the site. Dominant species were foxtail barley and meadow fescue. Western-wheatgrass (*Pascopyrum smithii*, called *Agropyron s*. on 1988 list), yellow sweet-clover (*Melilotus officinalis*), and Japanese brome (*Bromus arvensis*) were secondary species in the community.

Wetland community Type 5 – Aquatic macrophytes/algae replaced the open water community in 2010. This aquatic bed community is generally defined as a wetland class dominated by plants "that grow principally on or below the surface of the water for most of the growing season in almost all years (Cowardin et al. 1979)." The Montana Natural Heritage Program (MTNHP) website further defines the Palustrine Aquatic Bed Class (PAB) as having aquatic plants at greater than 30 percent cover and water depths greater than 0.5 meters (and less than 2 meters) (MTNHP 2011). This 2.73-acre community contained 21 to 50 percent green algae, 11 to 20 percent wigeonweed (*Ruppia* sp.), and less than 5 percent of common duckweed (*Lemna minor*), and rough barnyard grass.

Wetland Type 6 - *Salix amygdaloides* (peach-leaf willow) dominated the woody overstory in an isolated 0.23 acre strip of trees and shrubs located in the northwest quarter of the site. Hard-stem bulrush, creeping meadow-foxtail, and common spikerush were also identified within this community.

Wetland community Type 11 – *Alopecurus arundinaceus* was found in 6.33 acres of the west and southwest portions of the mitigation area. Creeping meadow-foxtail, arctic rush (*Juncus arcticus*, called *J. balticus* on 1988 list), common spikerush, and fox-tail barley dominated the herbaceous species.

Upland community Type 12 – *Hordeum jubatum/Bromus inermis* was identified on a 0.6 acre berm located between two wetland areas near the southwest boundary. Dominant species in the community were fox-tail barley and smooth brome. Japanese brome, creeping wild rye (*Elymus repens*, called *Agropyron r.* on 1988 list), yellow sweet-clover, and meadow fescue occurred less frequently cover within the community.

Upland community Type 14 – *Bromus arvensis/Ericameria nauseosa* (called *Chrysothamnus nauseousus* on 1988 list) was identified in a 4.91 acre area on the north project boundary. Japanese brome, rubber rabbitbrush (*Ericameria nauseosa*), coaltown (silver) sagebrush (*Artemisia cana*), curly-cup gumweed (*Grindelia squarrosa*), pale madwort (*Alyssum alyssoides*), and Western-wheatgrass contributed to the total vegetation cover.

Wetland community Type 15 – *Populus deltoides/Alopecurus arundinaceus* was located on 0.18 acres of the north margin of the largest open water depression. Eastern cottonwood dominated the woody overstory and creeping meadow-foxtail, common spike-rush, arctic rush, and hard-stem club-rush dominated the herbaceous understory.

Wetland community Types 1 and 2 are cattail (*Typha*) and club rush (*Schoenoplectus*, called bulrush species on 1988 list) communities that were associated with the open water areas in 2010 and 2011. Community Types 1 and 2 persisted in 2012 although the vegetation in some areas of the communities transitioned to wetland community Type 11 - *Alopecurus*. Fox-tail barley (*Hordeum jubatum*) dominated upland community Types 4 and 12 with lesser percent cover of meadow fescue (*Festuca pratensis)* and smooth brome (*Bromus inermis*), respectively. Creeping meadow-foxtail (*Alopecurus arundinaceus*) persisted in wetland community Types 11 and 15. The open water community was reclassified as an aquatic bed wetland, wetland community Type 5, in 2010 based on the dominance of aquatic macrophytes and algae.

Table 1. Vegetation species identified from 2007 to 2012 at the DH Ranch Wetland Mitigation Site.

Scientific Names	Common Names	GP Indicator Status[1]
Achillea millefolium	Common Yarrow	FACU
Agropyron cristatum	Crested Wheatgrass	UPL
Algae, green	Algae, Green	NL
Alopecurus arundinaceus	Creeping Meadow-Foxtail	FACW
Alyssum alyssoides	Pale Madwort	UPL
Ambrosia psilostachya	Perennial Ragweed	FACU
Ambrosia sp.	Ragweed	NL
Ambrosia trifida	Great Ragweed	NL
Argentina anserina	Common Silverweed	FACW
Artemisia cana	Coaltown Sagebrush	FACU
Asclepias sp.	Milkweed	NL
Asclepias speciosa	Showy Milkweed	FAC
Asparagus officinalis	Asparagus	FACU
Aster sp.	Aster	NL
Atriplex canescens	Four-Wing Saltbush	UPL
Bassia scoparia	Mexican-Fireweed	FACU
Bromus arvensis	Japanese Brome	FACU
Bromus inermis	Smooth Brome	FAC
Bromus tectorum	Cheatgrass	UPL
Capsella bursa-pastoris	Shepherd's-Purse	FACU
Carduus nutans	Nodding Plumeless Thistle	FACU

[1]Lichvar and Kartesz 2009
New species identified in 2012 are shown in **bold** type.

Table 1. (Continued). Vegetation species identified from 2007 to 2012 at the DH Ranch Wetland Mitigation Site.

Scientific Names	Common Names	GP Indicator Status[1]
Carex nebrascensis	**Nebraska Sedge**	**OBL**
Carex sp.	Sedge	NL
Carex stricta	Uptight Sedge	OBL
Carex utriculata	Northwest Territory Sedge	OBL
Chenopodium album	Lamb's-Quarters	FACU
Cirsium arvense	Canadian Thistle	FACU
Convolvulus arvensis	Field Bindweed	UPL
Cynoglossum officinale	Gypsy-Flower	FACU
Deschampsia cespitosa	Tufted Hairgrass	FACW
Distichlis spicata	Coastal Salt Grass	FACW
Echinochloa muricata	Rough Barnyard Grass	FACW
Echium vulgare	**Common Vipersbugloss**	**UPL**
Elaeagnus angustifolia	Russian-Olive	FACU
Eleocharis palustris	Common Spike-Rush	OBL
Elymus repens	Creeping Wild Rye	FACU
Elymus trachycaulus	Slender Wild Rye	FACU
Epilobium ciliatum	**Fringed Willowherb**	**FACW**
Epilobium sp.	Willowherb	NL
Ericameria nauseosa	Rubber Rabbitbrush	NL
Festuca arundinacea	Tall fescue	FACU
Festuca pratensis	Meadow Fescue	FACU
Grindelia squarrosa	Curly-Cup Gumweed	FACU
Halogeton glomeratus	**Saltlover**	**UPL**
Hordeum jubatum	Fox-Tail Barley	FACW
Juncus arcticus	Arctic Rush	FACW
Juncus bufonius	Toad Rush	OBL
Juncus effusus	Lamp Rush	OBL
Juncus nevadensis	Sierran Rush	FACW
Juncus torreyi	**Torrey's Rush**	**FACW**
Lactuca serriola	Prickly Lettuce	FAC
Lemna minor	Common Duckweed	OBL
Lepidium perfoliatum	Clasping Pepperwort	FAC
Medicago sativa	Alfalfa	UPL
Melilotus officinalis	Yellow Sweet-Clover	FACU
Melilotus sp.	Sweetclover	NL
Mentha arvensis	American Wild Mint	FACW
Nepeta cataria	Catnip	FACU
Panicum virgatum	Wand Panic Grass	FAC
Pascopyrum smithii	Western-Wheat Grass	FACU
Persicaria amphibia	Water Smartweed	OBL
Persicaria sp.	**Smartweed**	**NL**
Phalaris arundinacea	Reed Canary Grass	FACW
Phleum pratense	Common Timothy	FACU

[1]Lichvar and Kartesz 2009
New species identified in 2012 are shown in **bold** type.

Table 1. (Continued). Vegetation species identified from 2007 to 2012 at the DH Ranch Wetland Mitigation Site.

Scientific Names	Common Names	GP Indicator Status[1]
Plantago major	Great Plantain	FAC
Poa pratensis	Kentucky Blue Grass	FACU
Polygonum sp.	Knotweed	NL
Populus deltoides	Eastern Cottonwood	FAC
Rhus aromatica	Smooth Sumac	UPL
Ribes lacustre	**Bristly Black Gooseberry**	**FACW**
Ribes sp.	Currant	NL
Rosa multiflora	Rambler Rose	FACU
Rosa woodsii	Woods' Rose	FACU
Rumex crispus	Curly Dock	FAC
Ruppia sp.	Widgeonweed	NL
Salix amygdaloides	Peach-Leaf Willow	FACW
Salix exigua	Narrow-Leaf Willow	FACW
Salix sp.	Willow	NL
Sarcobatus vermiculatus	Greasewood	FAC
Schoenoplectus acutus	Hard-Stem Club-Rush	OBL
Schoenoplectus maritimus	Saltmarsh Club-Rush	OBL
Schoenoplectus pungens	Three-Square	OBL
Schoenoplectus tabernaemontani	Soft-Stem Club-Rush	OBL
Scirpus cyperinus	Cottongrass Bulrush	OBL
Scirpus microcarpus	Red-Tinge Bulrush	OBL
Scirpus pallidus	Pale Bulrush	OBL
Shepherdia argentea	Silver Buffalo-Berry	FACU
Shepherdia canadensis	Canada Buffalo-Berry	FACU
Sisymbrium altissimum	Tall Hedge-Mustard	FACU
Solanum dulcamara	Climbing Nightshade	FACU
Solanum sp.	Nightshade	NL
Sonchus arvensis	Field Sow-Thistle	FAC
Spartina pectinata	Freshwater Cord Grass	FACW
Sporobolus airoides	Alkali-Sacaton	FAC
Symphoricarpos albus	Common Snowberry	FACU
Taraxacum officinale	Common Dandelion	FACU
Thlaspi arvense	Field Penny-Cress	FACU
Tragopogon dubius	Yellow Salsify	UPL
Trifolium hybridum	Alsike Clover	FACU
Trifolium pratense	Red Clover	FACU
Trifolium repens	White Clover	FACU
Typha angustifolia	Narrow-Leaf Cat-Tail	OBL
Typha latifolia	Broad-Leaf Cat-Tail	OBL
Verbascum thapsus	Great Mullein	FACU
Verbena bracteata	Carpet Vervain	FACU
Verbena hastata	Simpler's-Joy	FACW
Veronica sp.	Speedwell	NL
Vicia sativa	Common Vetch	FACU

[1]Lichvar and Kartesz 2009
New species identified in 2012 are shown in **bold** type.

Data collected along the transect are summarized in Table 2 and graphed on Charts 1 and 2. The transect location is illustrated on Figure 2 (Appendix A) and the data are presented on the Monitoring Form (Appendix B). Transect endpoints photographed from 2009 to 2012 are shown in Appendix C.

Table 2. Transect 1 data summary from 2007 to 2012 at the DH Ranch Wetland Wetland Mitigation Site.

Monitoring Year	2007	2008	2009	2010	2011	2012
Transect Length (feet)	**645**	**645**	**645**	**590**	**590**	**590**
Vegetation Community Transitions along Transect	9	12	10	10	7	7
Vegetation Communities along Transect	3	5	4	5	5	5
Hydrophytic Vegetation Communities along Transect	2	4	3	4	3	3
Total Vegetative Species	39	47	34	34	33	33
Total Hydrophytic Species	50	15	18	18	16	14
Total Upland Species	19	32	16	16	17	19
Estimated % Total Vegetative Cover	50	66	78	80	80	85
% Transect Length Comprising Hydrophytic Vegetation Communities	88.4	90	91	92.4	92.4	92.4
% Transect Length Comprising Upland Vegetation Communities	11.6	10	9	7.6	7.6	7.6
% Transect Length Comprising Unvegetated Open Water	0	0	0	0	0	0
% Transect Length Comprising Bare Substrate	0	0	0	0	0	0

The transect traversed the site from east to west along the southern portion of the project area. Transect 1 intersected wetland community Types 1, 2, and 11 and upland community Types 4 and 12 (Appendix B). Hydrophytic species were present along 92.4 percent of the transect interval, the same percent as in 2011. The transect was inundated in several locations in 2012. The most notable change from 2011 to 2012 was a slight expansion of wetland community Type 2 – *Schoenoplectus/Typha* into wetland community Type 11 – *Alopecurus*. Type 2 community has been expanding since 2009. This shift potentially reflects a long-term shift to a wetter moisture regime dominated by irrigation return flow based on the indicator status of the dominant plants within this community.

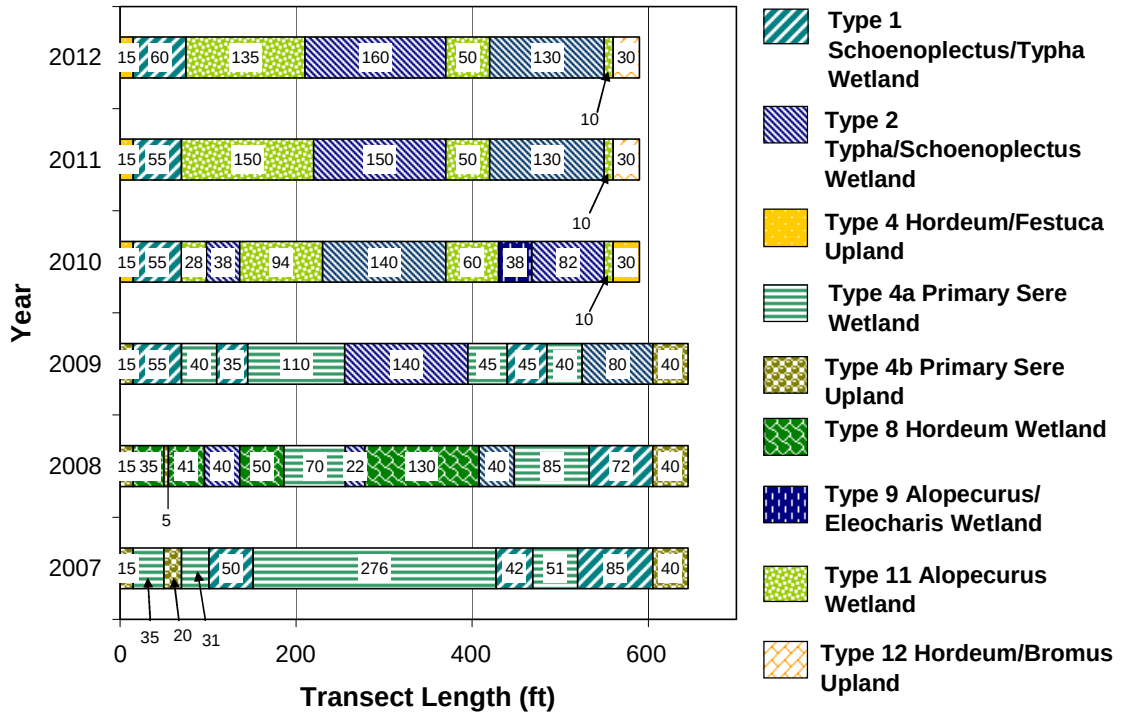


Chart 1. Transect map showing vegetation communities from transect beginning (0 feet) to end (590 feet from 2010 to 2012, 645 feet from 2007 to 2009).

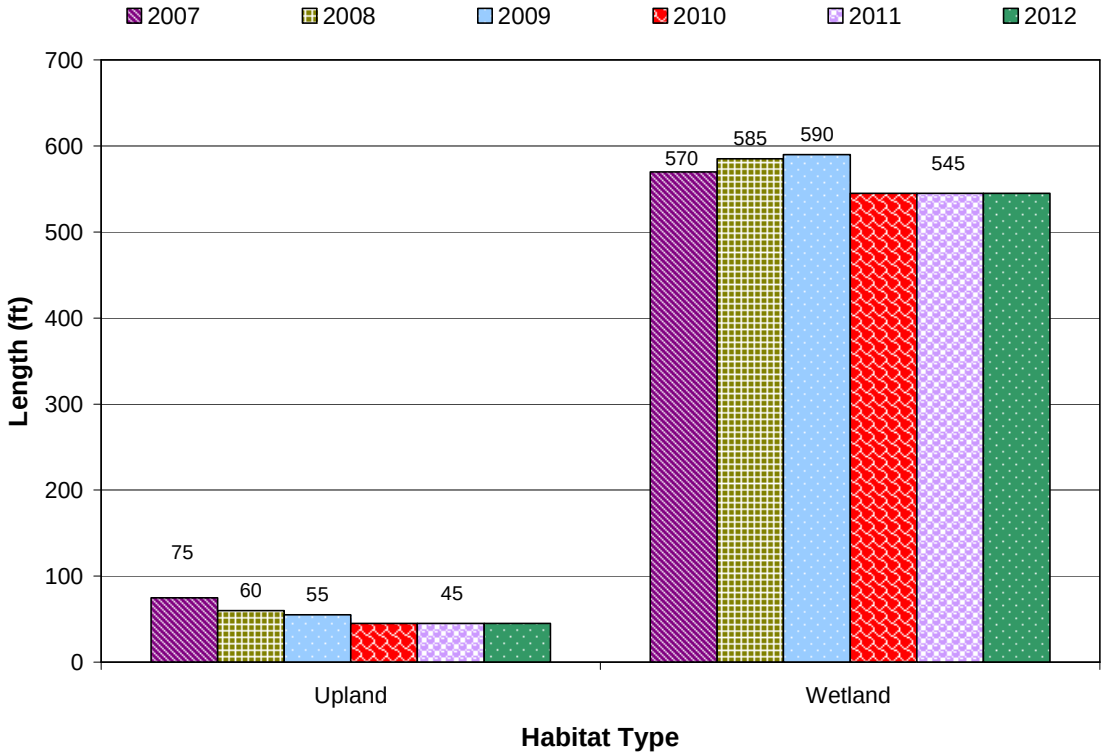


Chart 2. Length of upland/wetland communities within Transect 1 from 2007 to 2012.

The location of infestations of Canadian thistle (*Cirsium arvense*), field bindweed (*Convolvulus arvensis*), houndstongue (*Cynoglossum officinale*), and salt cedar (*Tamarix* spp.), all Priority 2B weeds, were mapped on Figure 3 (Appendix A). Infestations of Canadian thistle were identified at 13 locations across the site, ranging in size from less than 0.1 acre to 1 acre. The weed cover within the infestations ranged from 1.0 percent to 100.0 percent. Field bindweed was identified in 4 separate infestations across the project site. The size of the infestations ranged from less than 0.1 acre to between 0.1 and 1.0 acre. The cover class was trace to low. Two infestations of houndstongue were observed on the west boundary. The size was less than 0.1 acre and the cover class ranged from less than 1.0 percent to 25.0 percent. A single stem of salt cedar was found along the northeast edge of the project area. Removal of the salt cedar was attempted unsuccessfully.

Species planted within the DH Ranch wetland mitigation site included silver buffaloberry (*Shepherdia argentea*), four winged saltbush (*Atriplex canescens*), and skunk bush sumac (*Rhus trilobata*). These plantings may not have been well-suited to the permanent/perennial moisture regime found across most of the mitigation site. Ten live stems of silver buffaloberry were identified along the vegetation transect within wetland community 2 – *Typha/Schoenoplectus* in 2012 out of the 315 containerized woody plants installed in 2007. No other planted species were observed in 2012. Volunteer cottonwood and willow species were observed along the inlet channel and within wetland community Type 6 – *Salix*.

3.3. Soil

The predominant soil complex mapped across the site was Heldt silty clay loam, and is found on 0 to 8 percent slopes. These soils are formed in alluvial parent material and are found on alluvial fans and stream terraces. The soil is moderately well drained, non-hydric, and taxonomically classified as a fine, smectic, mesic Ustertic Haplocambid. The test pit soils did not confirm the mapped unit.

Four test pits DH-1, DH-2, DH-3, and DH-4 were used to define the wetland boundary and to characterize site soils. Test pit locations are shown on Figure 2 (Appendix A). Test pits DH-1 and DH-3 were located in areas that met the three wetland criteria. Test pit DH-2 was located in an area that met the hydric soil criteria although it lacked vegetative and hydrologic characteristics for wetland classification. Test pit DH-4 was located in upland and did not exhibit hydric soils. The soil profile at DH-1 and DH-2 revealed gray (10YR 5/1) silty clay with 5 percent dark yellowish brown (10YR 4/6) redoximorphic concentrations. The soil at DH-3 exhibited a dark gray (10YR 4/1) silty clay with yellowish brown (10YR 5/6) redox concentrations. The soil profile at DH-4 exhibited a very dark gray (10YR 3/1) A-horizon over a very dark grayish brown (10YR 3/2) B-horizon and did not qualify as hydric. Low-chroma colors in the horizons immediately below the A-horizon were positive hydric indicators for three of the four wetland determination test pits.

3.4. Wetland Delineation

Table 3 summarizes the wetland acreages delineated from 2007 to 2012. The wetland boundaries are shown on Figure 3 (Appendix A). Four data points were used to characterize the vegetation, soil, and hydrology of site wetlands (Figure 2, Appendix A; Wetland Determination Data Forms, Appendix B). Two data points, DH-1 and DH-3, were located within areas that met the three wetland criteria. The August 2012 delineation identified 20.00 acres of emergent, scrub-shrub, and aquatic bed wetlands. The 2010 open water community was reclassified as an aquatic bed wetland class in 2011 and 2012.

Table 3. Total wetland acreage delineated from 2007 to 2012 at the DH Ranch Wetland Mitigation Site.

Wetland Type	2005 baseline (ac)	2007 (ac)	2008 (ac)	2009 (ac)	2010 (ac)	2011 (ac)	2012 (ac)
Open Water	0.00	5.39	6.05	3.18	3.07	0.00	0.00
Wetland	0.57	11.31	11.39	15.25	16.90	20.00*	20.00**
Total Wetland Habitat	**0.57**	**16.70**	**17.44**	**18.43**	**19.97**	**20.00**	**20.00**

*3.07 acres of Aquatic Bed habitat identified in 2011.

**2.73 acres of Aquatic Bed habitat identified in 2012.

3.5. Wildlife

Table 4 lists the wildlife species identified from 2007 to 2012 at the DH Ranch mitigation site. Eleven bird species were observed in 2012. Whitetail deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), black-tailed prairie dogs (*Cynomys ludovicianus*), coyote (*Canis latrans*), muskrat (*Ondatra zibethicus*) and black bear (*Ursus americanus*) scat, and raccoon (*Procyon lotor*) tracks were also observed in 2012.

Table 4. Wildlife species observed at the DH Ranch Wetland Mitigation Site from 2007 to 2012.

COMMON NAME	SCIENTIFIC NAME
AMPHIBIANS	
Northern Leopard Frog	*Rana pipiens*
Unidentified Toad	
Woodhouse's Toad	*Bufo woodhousii*
BIRDS	
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***
Chukar	***Alectoris chukar***

Species identified in 2012 are bolded.

Table 4 (continued). Wildlife species observed at the DH Ranch Wetland Mitigation Site from 2007 to 2012.

COMMON NAME	SCIENTIFIC NAME
BIRDS	
Cliff Swallow	***Petrochelidon pyrrhonota***
Common Nighthawk	*Chordeiles minor*
Common Yellowthroat	***Geothlypis trichas***
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*
Northern Flicker	***Colaptes auratus***
Osprey	*Pandion haliaetus*
Peregrine Falcon	*Falco peregrinus*
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***
MAMMALS	
Black Bear	***Ursus americanus***
Black-tailed Prairie Dog	***Cynomys ludovicianus***
Coyote	***Canis latrans***
Moose	*Alces americanus*
Mountain Cottontail	*Sylvilagus nuttallii*
Mule Deer	***Odocoileus hemionus***
Muskrat	***Ondatra zibethicus***
Raccoon	***Procyon lotor***
Striped Skunk	*Mephitis mephitis*
White-tailed Deer	***Odocoileus virginianus***
REPTILES	
Plains Gartersnake	*Thamnophis radix*
Rattlesnake	*Crotalus sp.*

Species identified in 2012 are bolded.

3.6. Functional Assessment

Pre-construction (2005) and post-construction (2007) wetland conditions were assessed using the 1999 MWAM. Wetland functions were assessed from 2008 through 2012 using the 2008 MWAM. The scores from the 2005 baseline and 2007 through 2012 functional assessments are summarized for general comparison in Table 5. The 2012 wetland assessment form is included in Appendix B.

The mitigation site was evaluated as a single, 20-acre AA, consistent with previous years. The AA received a Category II rating with 71 percent of the total points possible in 2011 and 2012, an increase of 5 percent from 2010. The wetland received excellent marks for general wildlife habitat and production export/food chain support, and high marks for short and long term surface water storage, sediment/nutrient/toxicant removal, and sediment/shoreline stabilization. Numerous bird species including golden eagle (S3 species) and peregrine falcon (S3 species), black-tailed prairie dogs (S3 species), northern leopard frogs, deer, coyote, black bear, and moose frequent the site. The AA produced 128 functional units, a gain of 126.4 units over the 2005 baseline.

3.7. Photo Documentation

Representative photographs taken from photo points, transect endpoints, and data points are provided in Appendix C. Photo points PP1 through PP5 and the transect end points photographed from 2009 to 2012 are shown on pages C-1 to C-24 and C-25, respectively, in Appendix C. The data points are included on page C-26 of Appendix C.

Table 5. Summary of 2005 (baseline) through 2012 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]	2011[2]	2012[2]
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)	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)	Mod (0.6)	Mod (0.6)
General Wildlife Habitat	Mod (0.5)	High (0.9)	High (0.9)	High (0.9)	High (0.9)	Exc. (1.0)	Exc. (1.0)
General Fish/Aquatic Habitat	NA	NA	NA	NA	NA	NA	NA
Flood Attenuation	NA	NA	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)	High (1.0)	High (1.0)
Sediment/Nutrient/Toxicant Removal	NA	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	High (0.9)	Low (0.3)	Low (0.3)	Mod (0.7)	High (1.0)	High (1.0)	High (1.0)
Production Export/Food Chain Support	Mod (0.5)	High (0.9)	High (1.0)	High (1.0)	Exc(1.0)	Exc. (1.0)	Exc. (1.0)
Groundwater Discharge/Recharge	NA	Low (0.1)	Low (0.1)	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)	Mod (0.6)	Mod (0.6)
Recreation/Education Potential (bonus points)	Low (0.1)	Low (0.1)	Low (0.05)	Low (0.05)	Low (0.05)	Mod (0.1)	Mod (0.1)
Actual Points / Possible Points	**2.8 / 8**	**4.4 / 10**	**5.15 / 9**	**5.95 / 9**	**5.95 / 9**	**6.4 / 9**	**6.4 / 9**
% of Possible Score Achieved	**35**	**44**	**57**	**66**	**66**	**71**	**71**
Overall Category	**III**	**II**	**II**	**II**	**II**	**II**	**II**
Total Acreage of Assessed Aquatic Habitat within AA Boundaries	**0.570**	**16.70**	**17.44**	**18.43**	**19.97**	**20.00**	**20.00**
Functional Units (acreage x actual points)	**1.6**	**73.5**	**89.8**	**109.7**	**122.5**	**128.0**	**128.0**
Net Acreage Gain	NA	**16.13**	**16.87**	**17.86**	**19.40**	**19.43**	**19.43**
Net Functional Unit Gain	NA	**71.90**	**88.22**	**108.06**	**120.86**	**126.40**	**126.40**

[1] 1999 MDT Montana Wetland Assessment Method (Berglund)

[2] 2008 MDT Montana Wetland Assessment Method (Berglund and McEldowney)

3.8. Maintenance Needs

The location of infestations of Canadian thistle (*Cirsium arvense*), field bindweed (*Convolvulus arvensis*), houndstongue (*Cynoglossum officinale*), and salt cedar (*Tamarix* spp.), all Priority 2B weeds, are presented on Figure 3 (Appendix A). Infestations of Canadian thistle were identified at 13 locations across the site. Field bindweed was identified in 4 separate infestations. Two infestations of houndstongue were observed on the west boundary and a single stem of salt cedar was found along the northeast edge of the project area. Removal of the salt cedar was attempted unsuccessfully. The MDT has an ongoing weed control program including an annual assessment of weed management needs. This site was not sprayed in 2011.

The irrigation ditch that delivers water to the site from the Edgar Canal was in good condition in 2012. The split channel that diverts water along the east and west sides of the wetland appeared to be functioning effectively and were spreading irrigation return flows across the site. No repairs were necessary.

3.9. Current Credit Summary

The wetland mitigation design for DH Ranch indicated that a maximum of 21.1 acres of wetland, 1.7 acres of shrub-dominated riparian islands, and 0.8 acre of upland buffer could be created on site. Table 6 compares the 2012 status of the created wetland areas to the success criteria established in 2007. Table 7 summarizes the estimated credit acres for 2012. Full credit at a 1:1 ratio was earned for 17.27 acres of created emergent wetland delineated in 2012. Although the community Type 5 – Aquatic Macrophytes has satisfied all wetland criteria since 2010, only 1.73 acres of the 2.73 acres identified in 2012 were assigned credit value due to the success criteria statement regarding open water (aquatic bed) wetlands encompassing 10 percent or less of the total wetland area. The total credit acres accrued in 2012 were 20.20. Note that the 2010 and 2011 open water credits were over calculated and the correct 2010 and 2011 totals are shown in Table 7. The 2010 and 2011 monitoring report mistakenly gave full credit for open water (aquatic bed) wetlands, but should have been a maximum of 10 percent of the wetland area. The acreages for the proposed riparian islands and upland buffer were taken from the Aquatic Design and Construction Services (ADC) Mitigation Design Report (ADC 2006). The mitigation design report included a credit category for the shrub-dominated riparian islands located on the water diversion berms. Some of the riparian islands were classified as wetland in 2010 through 2012. The acreage was included in the emergent wetland creation category as a result of the failure of the establishment of woody species by 2012. The USACE will determine the final credits that can be applied to the mitigation site.

A majority of the performance standards have been achieved for the wetlands delineated in 2012. The cover of creeping meadow-foxtail exceeds 25 percent in wetland communities Types 11 and 15, which exceeds the 10 percent maximum for aggressive non-preferred species within these wetland areas. However, this

species did not exceed 10 percent cover within the mitigation site boundaries. The upland buffer is primarily characterized by upland community Type 4, which was dominated by foxtail barley and meadow fescue, and upland Type 14, which was dominated by Japanese brome and rubber rabbit bush. No success criteria were provided for the upland buffer. There was no change in the allocated credits for the upland buffer in 2012.

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

Success Criteria	2012 Status
Wetland Characteristics:	
Site will develop hydrophytic vegetation, wetland hydrology, and hydric soils as outlined in the COE 1987 wetlands delineation manual.	*Criteria achieved.* Approximately 20.0 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 contributed between 21 and greater than 50 percent cover to wetland communities 11 and 15. 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).	*Criteria achieved.* The hydrology criteria was met in the areas delineated as wetlands in 2012.
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 partially achieved.* Aquatic bed areas comprise more than 10 percent of the total wetland area, but remain 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.* Few of the woody plants installed as part of mitigation construction in 2007 were observed in 2012. There has been some natural recruitment of *Salix* and *Populus* spp.

Table 7. Mitigation credit summary from 2010 to 2012 for the DH Ranch Wetland Mitigation Site.

Credit Category	Proposed Credit Acres	2010 Delineated Acres	2011 Delineated Acres	2012 Delineated Acres	Credit Ratio	2010 Credit Acres	2011 Credit Acres	2012 Credit Acres
Emergent wetland creation	21.1[1]	16.90	16.93	17.27	1:1	16.90	16.93	17.27
Open water (Aquatic Bed)	Up to 10% of wetland area	3.07	3.07	2.73	Up to 10% of wetland area	1.69	1.69	1.73
Shrub-dominated riparian islands (i.e. berms)	1.65	1.65	1.65	1.65	4:1	0.41	0.41	0.41
Upland buffer	0.80	0.80	0.80	0.80	4:1	0.20	0.20	0.20
TOTAL		**22.42**	**22.45**	**22.45**		**19.20**	**19.23**	**19.61**

[1]Included open water creation

4. REFERENCES

Aquatic Design and Construction Services (ADC). 2006 DH Ranch Wetland Mitigation Project Final Design Report. January 26, 2006. Submitted to Montana Department of Transportation, Helena, Montana

Berglund, J. 1999. *MDT Montana Wetland Assessment Method*. Prepared for Montana Department of Transportation and Morrison-Maierle, Inc. Prepared by Western EcoTech. Helena, Montana. 18pp.

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

Cowardin, L.M., V. Carter, F.C. Golet, E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington D.C. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page.Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. U.S. Army Corps of Engineers. Washington, DC.

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

Lichvar, Robert W. and Kartesz, John T. 2009. North American Digital Flora: National Wetland Plant List, version 2.4.0 (https://wetland_plants.usace.army.mil). U.S. Army Corps of Engineers, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH, and BONAP, Chapel Hill, NC. *Downloaded from National Wetland Plant List website 5/9/12. Effective June 1, 2012.*

Reed, P.B. 1988. *National list of plant species that occur in wetlands: Great Plains (Region 4)*. Biological Report 88(26.9), May 1988. U.S. Fish and Wildlife Service, Washington, DC.

US Army Corps of Engineers. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* (*Version 2.0*), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-3. Vicksburg, MS: US Army Engineer Research and Development Center.

Websites:

United States Department of Agriculture-Natural Resource Conservation Service. Web Soil Survey for Carbon County, Montana. 2010. Accessed in June 2011 at: http://websoilsurvey.nrcs.usda.gov/app/

Western Regional Climate Center. United States Historical Climatology Network. Reno, Nevada. 2011. Accessed June 2011 at: http://www.wrcc.dri.edu/CLIMATEDATA.html

Appendix A

Project Area Maps – Figures 2 and 3

MDT Wetland Mitigation Monitoring
DH Ranch
Carbon County, Montana

Figure 2: 2012 Monitoring Activity Locations

Legend

- Vegetation Transect
- Monitoring Limits
- Data Point
- Photo Point

Base Photography Date: June 26, 2012

PP1
PP2
PP3
PP4
PP5
T-1 start
T-1 end
DH-1
DH-2
DH-3
DH-4

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 THAN THE ORIGINAL. ANY OTHER USE IS AT THE USER'S SOLE RISK.

LOCATION: Carbon Co., MT

PROJECT NO: NH-STPP 5(39)

FILE: DHRanch/Monitor2012.mxd

Project Name
DH Ranch Mitigation Site

Drawing Title
2012 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
BCS	BV	JJ

SCALE: Noted

Drawn: August 29, 2012

PROJ MGR: B Sandefur

CONFLUENCE
consulting incorporated

Figure 2

Figure 3: 2012 Mapped Site Features

Acreages

Project Area	27.78 acres
Wetland Area	20.00 acres
Uplands	7.78 acres

N

0 50 100 200

Feet

Legend

- Monitoring Limits
- Wetland Limits
- Vegetation Communities

Base Photography Date: June 26, 2012

Vegetation Community Types

1. Schoenoplectus acutus/Typha latifolia
2. Typha latifolia/Schoenoplectus spp.
4. Hordeum jubatum/Festuca pratensis
5. Aquatic Macrophytes/Algae
6. Salix amygdaloides
11. Alopecurus arundinaceus
12. Hordeum jubatum/Bromus inermis
14. Bromus arvensis/Ericameria nauseosa
15. Populus deltoides/Alopecurus arundinaceus

Noxious Weeds

Cynoglossum officinale
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)
- H = High (25-100% cover)

LOCATION: Carbon Co., MT

PROJECT NO: NH-STPP 5(39)

FILE: DHRanch/Veg2012.mxd

Project Name: DH Ranch Mitigation Site

Drawing Title: 2012 Mapped Site Features

DRAWN	CHECKED	APPROVED
BCS	BV	JJ

SCALE: Noted

Drawn: August 29, 2012

PROJ MGR: B Sandefur

CONFLUENCE consulting Incorporated

Figure 3

REV -

Appendix B

2012 MDT Wetland Mitigation Site Monitoring Form
2012 USACE Wetland Determination Data Forms
2012 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 8/17/2012 7:00:00 AM

Person(s) conducting the assessment: E. Nyquist

Weather: Sunny, clear, 70 degrees 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: 6 #Visits in Year: 1

Size of Evaluation Area: 27.78 (acres)

Land use surrounding wetland:

Native, agriculture/ranchland, Clark Fork of the Yellowstone River

HYDROLOGY

Surface Water Source: Edgar Canal irrigation return

Inundation: ☑ Average Depth: 1 **(ft)** Range of Depths: 0-3.0 **(ft)**

Percent of assessment area under inundation: 45 %

Depth at emergent vegetation-open water boundary: 0.5 **(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**:**

Drainage patterns in wetlands, oxidized rhizospheres along living roots, and FAC-neutral test.

Groundwater Monitoring Wells

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

Well ID	**Water Surface Depth (ft)**

No wells.

Additional Activities Checklist:

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

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

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

Hydrology Notes:

Surface water recharge through irrigation diversion observed. No monitoring wells on site.

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:** Schoenoplectus acutus / Typha latifolia **Acres:** 0.9

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	2	Eleocharis palustris	2
Juncus effusus	0	Persicaria sp.	0
Populus deltoides	0	Schoenoplectus acutus	5
Schoenoplectus maritimus	1	Schoenoplectus pungens	2
Typha latifolia	2		

Comments:

Community # 2 **Community Type:** Typha latifolia / Schoenoplectus spp. **Acres:** 9.63

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	2	Carex nebrascensis	1
Carex utriculata	1	Echinochloa muricata	2
Eleocharis palustris	2	Epilobium ciliatum	1
Juncus torreyi	0	Lemna minor	1
Open Water	2	Persicaria sp.	1
Schoenoplectus acutus	3	Schoenoplectus maritimus	1
Schoenoplectus pungens	1	Scirpus microcarpus	0
Shepherdia argentea	0	Typha latifolia	4

Comments:

Community # 4 **Community Type:** Hordeum jubatum / Festuca pratensis **Acres:** 2.71

Species	Cover class	Species	Cover class
Achillea millefolium	0	Alyssum alyssoides	1
Bassia scoparia	1	Bromus arvensis	2
Chenopodium album	1	Cirsium arvense	1
Cynoglossum officinale	0	Festuca pratensis	3
Grindelia squarrosa	1	Hordeum jubatum	3
Lactuca serriola	0	Lepidium perfoliatum	1
Melilotus officinalis	2	Pascopyrum smithii	2
Phleum pratense	1	Sarcobatus vermiculatus	1
Sporobolus airoides	0	Verbascum thapsus	0

Comments:

Community # 5 **Community Type:** Aquatic macrophytes / Algae, green **Acres:** 2.73

Species	Cover class	Species	Cover class
Algae, green	4	Echinochloa muricata	0
Lemna minor	1	Open Water	4
Ruppia sp.	3		

Comments:

Community # 6 **Community Type:** Salix amygdaloides / **Acres:** 0.23

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	2	Eleocharis palustris	2
Lemna minor	1	Persicaria sp.	0
Ribes lacustre	1	Salix amygdaloides	5
Schoenoplectus acutus	3	Solanum dulcamara	1

Comments:

Community # 11 **Community Type:** Alopecurus arundinaceus / **Acres:** 6.33

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	4	Alyssum alyssoides	1
Asclepias speciosa	1	Bassia scoparia	0
Bromus arvensis	1	Carduus nutans	0
Carex nebrascensis	0	Chenopodium album	0
Distichlis spicata	0	Echinochloa muricata	1
Elaeagnus angustifolia	0	Eleocharis palustris	2
Epilobium ciliatum	1	Hordeum jubatum	2
Juncus arcticus	2	Lactuca serriola	0
Melilotus officinalis	0	Nepeta cataria	1
Persicaria sp.	1	Poa pratensis	1
Populus deltoides	0	Schoenoplectus acutus	0
Schoenoplectus maritimus	1	Sporobolus airoides	1
Typha latifolia	1		

Comments:

Community # 12 Community Type: Hordeum jubatum / Bromus inermis **Acres:** 0.16

Species	Cover class	Species	Cover class
Ambrosia psilostachya	1	Asclepias speciosa	1
Bromus arvensis	2	Bromus inermis	3
Carduus nutans	0	Chenopodium album	1
Cirsium arvense	1	Convolvulus arvensis	1
Cynoglossum officinale	0	Elaeagnus angustifolia	0
Elymus repens	2	Festuca pratensis	2
Hordeum jubatum	4	Lactuca serriola	1
Lepidium perfoliatum	1	Medicago sativa	1
Melilotus officinalis	2	Pascopyrum smithii	1
Thlaspi arvense	1		

Comments:

Community # 14 Community Type: Bromus arvensis / Chrysothamnus nauseousus **Acres:** 4.91

Species	Cover class	Species	Cover class
Agropyron cristatum	1	Alyssum alyssoides	2
Artemisia cana	2	Bassia scoparia	1
Bromus arvensis	4	Chenopodium album	1
Chrysothamnus nauseousu	3	Cirsium arvense	1
Cynoglossum officinale	0	Echium vulgare	0
Grindelia squarrosa	2	Halogeton glomeratus	1
Lactuca serriola	1	Pascopyrum smithii	2
Sarcobatus vermiculatus	1	Sisymbrium altissimum	0
Sonchus arvensis	0	Symphoricarpos albus	0
Tragopogon dubius	1	Verbena hastata	1

Comments:

Community # 15 Community Type: Populus deltoides / Alopecurus arundinaceus **Acres:** 0.18

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	4	Echinochloa muricata	1
Eleocharis palustris	2	Juncus arcticus	2
Populus deltoides	5	Schoenoplectus acutus	2
Schoenoplectus tabernaem	1	Scirpus microcarpus	1

Comments:

Total Vegetation Community Acreage **27.78**

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

VEGETATION TRANSECTS

Site: DH Ranch Date: 8/17/2012 7:00:00 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
Achillea millefolium	0	Alyssum alyssoides	0
Bromus arvensis	0	Festuca pratensis	1
Grindelia squarrosa	2	Hordeum jubatum	3
Lactuca serriola	0	Lepidium perfoliatum	0
Melilotus officinalis	1		

Ending Station 75 **Community Type:** Schoenoplectus acutus / Typha latifolia

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	2	Eleocharis palustris	1
Populus deltoides	0	Schoenoplectus acutus	5
Schoenoplectus maritimus	1	Schoenoplectus pungens	1
Typha latifolia	3		

Ending Station 210 **Community Type:** Alopecurus arundinaceus /

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	4	Carex nebrascensis	1
Eleocharis palustris	1	Epilobium ciliatum	1
Hordeum jubatum	1	Persicaria sp.	0
Poa pratensis	0	Schoenoplectus maritimus	2
Schoenoplectus pungens	1	Typha latifolia	4

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

Species	Cover class	Species	Cover class
Carex utriculata	1	Eleocharis palustris	1
Persicaria sp.	1	Schoenoplectus acutus	4
Schoenoplectus maritimus	2	Schoenoplectus pungens	1
Typha latifolia	5		

Ending Station 420 **Community Type:** Alopecurus arundinaceus /

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	4	Hordeum jubatum	1
Poa pratensis	0	Typha latifolia	3

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

Species	Cover class	Species	Cover class
Eleocharis palustris	3	Juncus torreyi	0
Persicaria sp.	0	Schoenoplectus acutus	3
Scirpus microcarpus	2	Shepherdia argentea	0
Typha latifolia	5		

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

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	4	Eleocharis palustris	3
Typha latifolia	0		

Ending Station 590 **Community Type:** Hordeum jubatum / Bromus inermis

Species	Cover class	Species	Cover class
Ambrosia psilostachya	1	Bromus inermis	4
Chenopodium album	1	Cirsium arvense	3
Convolvulus arvensis	0	Cynoglossum officinale	1
Elaeagnus angustifolia	1	Elymus repens	2
Festuca pratensis	1	Hordeum jubatum	2
Lactuca serriola	1	Lepidium perfoliatum	1
Melilotus officinalis	1	Pascopyrum smithii	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	10	Live stems of buffaloberry observed along T-1 in veg con 2.

Comments

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
Canada Goose	4	FO	MA, OW, WM
Chukar			SS, UP
Cliff Swallow	4	FO	OW, WM
Common Yellowthroat	1	F, L	SS, WM
Eastern Kingbird	3	F, L	OW, SS
Grasshopper Sparrow	1	F, L	SS, UP
Gray Catbird	1	L	FO, OW, SS
Northern Flicker	1	FO	FO, SS
Red-winged Blackbird	3	F, FO, L	OW, SS, WM
Sandhill Crane	2	FO	WM
Yellow Warbler	1	F, FO	SS, WM, US

Bird Comments

Landowner released chukar into mitigation site. Heard chukar in upland.

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	Yes	No	
Black-tailed Prairie Dog	40	No	No	Yes	
Coyote	1	Yes	Yes	No	
Mule Deer	2	No	No	No	
Muskrat	1	Yes	No	Yes	
Raccoon		Yes	No	No	
White-tailed Deer	6	No	No	No	

Wildlife Comments:

Chukar heard in adjacent upland. Landowner released game birds (chukar) onto site. Bear scat observed.

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
DH1	45.512432	-108.827141	188	PP1
DH10	45.50914	-108.824699	239	PP3
DH11	45.50914	-108.824699	272	PP3
DH12	45.50914	-108.824699	304	PP3
DH13	45.50914	-108.824699	334	PP3
DH14	45.509148	-108.824715	260	T1, Start
DH15	45.509933	-108.827164	42	PP4
DH16	45.509933	-108.827164	85	PP4
DH17	45.509933	-108.827164	104	PP4
DH18	45.509933	-108.827164	142	PP4
DH19	45.509933	-108.827164	165	PP4
DH2	45.512432	-108.827141	207	PP1
DH20	45.50933	-108.827164	337	PP4
DH21	45.509933	-108.827164	354	PP4
DH22	45.511211	-108.827553	36	PP5
DH23	45.511211	-108.827553	66	PP5
DH24	45.511211	-108.827553	97	PP5
DH25	45.511211	-108.827553	153	PP5
DH26	45.511211	-108.827553	182	PP5
DH27	45.511211	-108.827553	221	PP5
DH28	45.509003	-108.826904	80	T1, End
DH29	45.510714	-108.825125	250	DH-1
DH3	45.512432	-108.827141	221	PP1
DH30	45.510742	-108.825107	240	DH-2

DH31	45.509324	-108.825106	240	DH-3
DH32	45.509986	-108.82728	40	DH-4
DH4	45.512432	-108.827141	256	PP1
DH5	45.511333	-108.826966	179	PP2
DH6	45.511333	-108.826966	203	PP2
DH7	45.511333	-108.826963	238	PP2
DH8	45.511333	-108.826966	264	PP2
DH9	45.50914	-108.824699	212	PP3

Comments:

DH Ranch

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?

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? Yes

If yes, are the structures in need of repair? No

If yes, describe the problems below.

No maintenance required on irrigation structures.

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

Project/Site: DH Ranch | City/County: Carbon | Sampling Date: 8/17/2012

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

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

Landform (hillslope, terrace, etc.): Lowland | Local relief (concave, convex, none): concave | Slope (%): 1

Subregion (LRR): LRR G | Lat: 45.510714 | Long: -108.825125 | Datum: WGS 84

Soil Map Unit Name: Heldy silty clay loam, saline

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:
point taken in wet meadow along east boundary

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. Typha latifolia	20	☑	OBL
2. Schoenoplectus pungens	15	☑	OBL
3. Epilobium ciliatum	10	☑	FACW
4. Carex nebrascensis	10	☑	OBL
5. Juncus torreyi	5	☐	FACW
6. Schoenoplectus maritimus	5	☐	OBL
7. Echinochloa muricata	5	☐	FACW
8. Alopecurus arundinaceus	5	☐	FACW
9. Lemna minor	5	☐	OBL
10.	0	☐	
11.	0	☐	
	80 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (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
0-3	10YR 5/1	100					Silty Clay	
3-24	10YR 5/1	95	10YR 4/6	5	C	M	Silty Clay	

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

Hydric Soil Indicators:

- ☐ 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 Haplocambid

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): 2

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

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

Wetland Hydrology Present? Yes ☑ No ☐

Remarks: Landowner currently irrigating wetland site.

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

Project/Site: DH Ranch | City/County: Carbon | Sampling Date: 8/17/2012

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

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

Landform (hillslope, terrace, etc.): Lowland | Local relief (concave, convex, none): concave | Slope (%): 1

Subregion (LRR): LRR G | Lat: 45.510742 | Long: -108.825107 | Datum: WGS 84

Soil Map Unit Name: Heldy silty clay loam, saline

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:
point taken adjacent to wet meadow along east boundary

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. Halogeton glomeratus	55	☑	UPL
2. Hordeum jubatum	10	☐	FACW
3. Deschampsia caespitosa	5	☐	FACW
4.	0	☐	
5.	0	☐	
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	70 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 50

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 0 (B)

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

Dominance Test is >50% ☐

Hydrophytic Vegetation Present? Yes ☐ No ☑

Remarks:
Halogeton and bare ground dominate.

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
0-4	10YR 5/1	100					Silty Clay	
4-18	10YR 4/1	90	10YR 5/6	10	C	M		

[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 Haplocambid

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:

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

Project/Site: DH Ranch | City/County: Carbon | Sampling Date: 8/17/2012

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

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

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

Subregion (LRR): LRR G | Lat: 45.509324 | Long: -108.825106 | Datum: WGS 84

Soil Map Unit Name: Heldy silty clay loam, saline

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:
point taken in wet meadow along southeast boundary

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. Alopecurus arundinaceus	60	☑	FACW
2. Schoenoplectus maritimus	10	☐	OBL
3. Typha latifolia	10	☐	OBL
4. Epilobium ciliatum	5	☐	FACW
5. Rumex crispus	5	☐	FAC
6. Schoenoplectus acutus	5	☐	OBL
7. Eleocharis palustris	5	☐	OBL
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (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
0-3	10YR 2/1	100					Clay	
3-24	10YR 5/1	85	10YR 4/6	15	C	M		

[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 Haplocambid

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): 1

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

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

Wetland Hydrology Present? Yes ☑ No ☐

Remarks: Landowner currently irrigating site.

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

Project/Site: DH Ranch | City/County: Carbon | Sampling Date: 8/17/2012

Applicant/Owner: MDT | State: MT | Sampling Point: DH-4

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

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

Subregion (LRR): LRR G | Lat: 45.509986 | Long: -108.82728 | Datum: WGS 84

Soil Map Unit Name: Heldy silty clay loam, saline

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:
point taken in upland area between wetland cells

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. Elymus repens	40	☑	FACU
2. Pascopyrum smithii	25	☑	FACU
3. Bromus inermis	15	☐	UPL
4. Cirsium arvense	10	☐	FACU
5.	0	☐	
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	90 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 15

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 0 (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-4

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
0-3	10YR 3/1	100					Sandy Clay Loam	
3-20	10YR 3/2	100					Sandy 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 Haplocambid

Confirm Mapped Type?: ☐

Hydric Soil Present? Yes ☐ No ☑

Remarks:
No hydic soil indicators observed.

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 hydrology indicators observed

MDT Montana Wetland Assessment Form (revised March 2008)

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

3. Evaluation Date 8/17/2012 **4. Evaluators** Eric Nyquist **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 10070006 **Watershed/County** Upper Yellowstone Watershed/Carbon County

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 20

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 20

☐ **Mitigation Wetlands: pre-construction**

How assessed: Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Depressional	Aquatic Bed	Excavated	Permanent/Perennial	14
Depressional	Emergent Wetland	Impounded	Permanent/Perennial	78
Depressional	Scrub-Shrub Wetland	Impounded	Seasonal/Intermittant	8

11. Estimated Relative Abundance Common

12. General Condition of AA

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

Conditions within AA	*Predominant conditions adjacent to (within 500 feet of) AA*		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is <=15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is <=30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >=30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is <=15%.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is <=30%.	moderate	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, no disturbance since construction. Site is managed in predominantly natural state.

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

Canada thistle, field bindweed, tamarisk

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 with native vegetation. The primary source of water is irrigation return flow that is directed to 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: Few scattered cottonwoods and peachleaf willow stand. Aquatic bed, emergent, and scrub/shrub veg classes.

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 database, no documented or suspected use by T&E species.

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 Black-tailed prairie dogs (S3), Golden Eagle (S3)

Incidental habitat (list species) ◯ D ◉ S Peregrine Falcon (S3)

No usable habitat ☐ S

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

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

Sources for documented use MTNHP, Black-tailed prairie dog colony in north upland areas on site. Golden eagle observed in 2011.

14C. General Wildlife Habitat Rating:

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

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

- [x] observations of abundant wildlife #s or high species diversity (during any period)
- [x] 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 Numerous bird species, northern leopard frogs, black-tailed prairie dogs, and whitetail deer observed on site.

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 [x] **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**

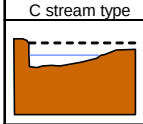
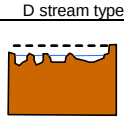
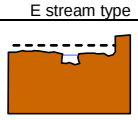
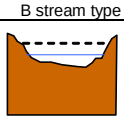
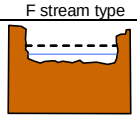
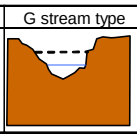
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

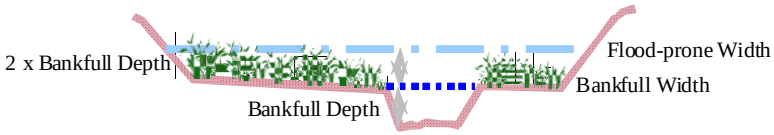
iii. Final Score and Rating: 0 NA **Comments:**

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

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



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: Multiple impoundments with total estimated water storage greater than 20 acre feet.

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: AA is well-vegetated with restricted outlet.

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: Cottonwoods, bulrush, sedges, rushes, and cattails common components around aquatic beds/open water.

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	.9	.6M	.7H	.4	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8	.5M	.6M	.3	.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: Wetland complex has a restricted outlet.

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, so groundwater recharge is unlikely.

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: Scattered cottonwoods, scrub/shrub, emergent marsh, and aquatic macrophyte communities present.

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:

AA in private ownership without general public access, permission required.

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	.6	1	12	☐
C. General Wildlife Habitat	E	1	1	20	☐
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	☑
G. Sediment/Nutrient/Toxicant Removal	H	1	1	20	☑
H. Sediment/Shoreline Stabilization	H	1	1	20	☑
I. Production Export/Food Chain Support	E	1	1	20	☑
J. Groundwater Discharge/Recharge	L	.1	1	2	☐
K. Uniqueness	M	.6	1	12	☐
L. Recreation/Education Potential (bonus points)	M	.1	NA	2	☐
Totals:		6.4	9	128	
Percent of Possible Score			**71.11** %		

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

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 1*
Bearing: 188 Degrees
Location: North Side
Taken in 2010

Photo Point 1 – *Photo 1*
Bearing: 188 Degrees
Location: North Side
Taken in 2011

Photo Point 1 – *Photo 1*
Bearing: 188 Degrees
Location: North Side
Taken in 2012

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 2*
Bearing: 207 Degrees
Location: North Side
Taken in 2011

Photo Point 1 – *Photo 2*
Bearing: 207 Degrees
Location: North Side
Taken in 2012

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 3*
Bearing: 221 Degrees
Location: North end
Taken in 2011

Photo Point 1 – *Photo 3*
Bearing: 221 Degrees
Location: North end
Taken in 2012

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 1 – *Photo 4*
Bearing: 256 Degrees
Location: North Side
Taken in 2011

Photo Point 1 – *Photo 4*
Bearing: 256 Degrees
Location: North Side
Taken in 2012

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

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

Photo Point 2 – *Photo 1* **Location:** NE Corner
Bearing: 179 Degrees **Taken in 2011**

Photo Point 2 – *Photo 1* **Location:** NE Corner
Bearing: 179 Degrees **Taken in 2012**

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 2*
Bearing: 203 Degrees
Location: NE Corner
Taken in 2011

Photo Point 2 – *Photo 2*
Bearing: 203 Degrees
Location: NE Corner
Taken in 2012

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 3*
Bearing: 238 Degrees
Location: NE Corner
Taken in 2011

Photo Point 2 – *Photo 3*
Bearing: 238 Degrees
Location: NE Corner
Taken in 2012

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 2 – *Photo 4*
Bearing: 264 Degrees
Location: NE Corner
Taken in 2011

Photo Point 2 – *Photo 4*
Bearing: 264 Degrees
Location: NE Corner
Taken in 2012

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 1*
Bearing: 212 Degrees
Location: SW Corner
Taken in 2011

Photo Point 3 – *Photo 1*
Bearing: 212 Degrees
Location: SW Corner
Taken in 2012

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

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

Photo Point 3 – *Photo 2*
Bearing: 239 Degrees
Location: SW Corner
Taken in 2011

Photo Point 3 – *Photo 2*
Bearing: 239 Degrees
Location: SW Corner
Taken in 2012

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

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

Photo Point 3 – *Photo 3*
Bearing: 272 Degrees
Location: SW Corner
Taken in 2011

Photo Point 3 – *Photo 3*
Bearing: 272 Degrees
Location: SW Corner
Taken in 2012

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

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

Photo Point 3 – *Photo 4*
Bearing: 304 Degrees
Location: SW Corner
Taken in 2011

Photo Point 3 – *Photo 4*
Bearing: 304 Degrees
Location: SW Corner
Taken in 2012

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

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

Photo Point 3 – *Photo 5*
Bearing: 334 Degrees
Location: SW Corner
Taken in 2011

Photo Point 3 – *Photo 5*
Bearing: 334 Degrees
Location: SW Corner
Taken in 2012

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

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

Photo Point 4 – *Photo 1*
Bearing: 42 Degrees
Location: West Side
Taken in 2011

Photo Point 4 – *Photo 1*
Bearing: 42 Degrees
Location: West Side
Taken in 2012

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 2* **Location:** West Side
Bearing: 142 Degrees **Taken in 2011**

Photo Point 4 – *Photo 2* **Location:** West Side
Bearing: 142 Degrees **Taken in 2012**

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

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

Photo Point 4 – *Photo 3*
Bearing: 104 Degrees
Location: West Side
Taken in 2011

Photo Point 4 – *Photo 3*
Bearing: 104 Degrees
Location: West Side
Taken in 2012

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

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

Photo Point 4 – *Photo 4*
Bearing: 142 Degrees
Location: West Side
Taken in 2011

Photo Point 4 – *Photo 4*
Bearing: 142 Degrees
Location: West Side
Taken in 2012

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

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

Photo Point 4 – *Photo 5*
Bearing: 165 Degrees
Location: West Side
Taken in 2011

Photo Point 4 – *Photo 5*
Bearing: 165 Degrees
Location: West Side
Taken in 2012

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 6* **Location:** West Side
Bearing: 337 Degrees **Taken in 2011**

Photo Point 4 – *Photo 6* **Location:** West Side
Bearing: 337 Degrees **Taken in 2012**

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

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

Photo Point 4 – *Photo 7*
Bearing: 354 Degrees
Location: West Side
Taken in 2011

Photo Point 4 – *Photo 7*
Bearing: 354 Degrees
Location: West Side
Taken in 2012

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

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

Photo Point 5 – *Photo 1*
Bearing: 36 Degrees
Location: Central
Taken in 2011

Photo Point 5 – *Photo 1*
Bearing: 36 Degrees
Location: Central
Taken in 2012

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

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

Photo Point 5 – *Photo 3* **Location:** Central
Bearing: 97 Degrees **Taken in 2011**

Photo Point 5 – *Photo 3* **Location:** Central
Bearing: 97 Degrees **Taken in 2012**

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 4*
Bearing: 153 Degrees
Location: Central
Taken in 2011

Photo Point 5 – *Photo 4*
Bearing: 153 Degrees
Location: Central
Taken in 2012

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 5*
Bearing: 182 Degrees
Location: Central
Taken in 2011

Photo Point 5 – *Photo 5*
Bearing: 182 Degrees
Location: Central
Taken in 2012

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

Photo Point 5 – *Photo 6*
Bearing: 221 Degrees
Location: Central
Taken in 2010

Photo Point 5 – *Photo 6*
Bearing: 221 Degrees
Location: Central
Taken in 2011

Photo Point 5 – *Photo 6*
Bearing: 221 Degrees
Location: Central
Taken in 2012

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 1*
Bearing: 260 Degrees
Location: T-1 Start
Taken in 2011

Transect 1 – *Photo 1*
Bearing: 260 Degrees
Location: T-1 Start
Taken in 2012

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

Transect 1 – *Photo 2*
Bearing: 80 Degrees
Location: T-1 End
Taken in 2011

Transect 1 – *Photo 2*
Bearing: 80 Degrees
Location: T-1 End
Taken in 2012

Data Point DH-1 **Location:** Community 2
Bearing: 250 Degrees **Taken in 2012**

Data Point DH-2 **Location:** Community 14
Bearing: 240 Degrees **Taken in 2012**

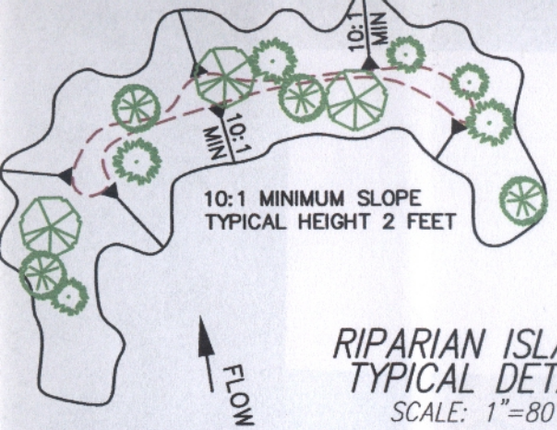
Data Point DH-3 **Location:** Community 11
Bearing: 240 Degrees **Taken in 2012**

Data Point DH-4 **Location:** Community 4
Bearing: 40 Degrees **Taken in 2012**

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

ADC SERVICES INC. water resource consulting

Phone 406.222.7600 – Fax 406.222.7677