MONTANA DEPARTMENT OF TRANSPORTATION STATEWIDE WETLAND MITIGATION SITE MONITORING PROJECT

EXECUTIVE SUMMARY - 2009 MONITORING RESULTS

Prepared for:

MDT

ENVIRONMENTAL SERVICES
2701 PROSPECT AVENUE
HELENA, MONTANA 59620

Prepared by:

PBSJ

POST, BUCKLEY, SCHUH, & JERNIGAN
820 NORTH MONTANA AVE, STE A
HELENA, MONTANA 59601

December 2009

TABLE OF CONTENTS

TABLES

TABLES, continued

APPENDICES

ABBREVIATIONS AND ACRONYMS

AA	Assessment Area
ADC	Aquatic Design and Construction
BHGA	Big Hole Grazing Association
BLM	Bureau of Land Management
CSKT	Confederated Salish & Kootenai Tribes
COE	U.S. Army Corps of Engineers
DEQ	Montana Department of Environmental Quality
DU	Ducks Unlimited
EPA	U.S. Environmental Protection Agency
FFIP	Future Fisheries Improvement Program
LWC	Land and Water Consulting, Inc.
MDT	Montana Department of Transportation
MFWP	Montana Fish, Wildlife and Parks
MTNHP	Montana Natural Heritage Program
MOA	Memorandum of Agreement
OW	Open Water
PBS&J	Post, Buckley, Schuh, and Jernigan
T&E	Threatened and Endangered
USFWS	U.S. Fish and Wildlife Service
WPA	Waterfowl Production Area

1.0 INTRODUCTION

This document summarizes the results of the 2009 monitoring efforts at 17 wetland mitigation sites located throughout Montana that were constructed by or for the Montana Department of Transportation (MDT). Full monitoring reports for each of these sites were prepared and presented to MDT in December 2009. The following mitigation sites were monitored during 2009:

Alkali Lake
Big Hole Grazing
Camp Creek
Cloud Ranch
DH Ranch
Jack Creek Ranch
Little Muddy Creek
Lonepine
Meriwether-East
Perry Ranch
Ringling-Galt
Rock Creek Ranch
Selkirk Ranch
Sportsman's Campground
U.S. Highway 93 Onsite
Wagner Marsh
West Fork Charley Creek

Monitoring activities were conducted by Post, Buckley, Schuh, and Jernigan (PBS&J) wetland scientists between April and October 2009 in accordance with standard MDT wetland mitigation site monitoring protocols. Activities and information conducted/collected included: wetland delineation; wetland/open water aquatic habitat boundary mapping; vegetation community mapping; vegetation transects; soils data; hydrology data; seasonal bird and general wildlife use; photograph points; macroinvertebrate sampling; functional assessment; and (non-engineering) examination of constructed features. Monitoring methods are discussed at length in the individual site monitoring reports and are generally not discussed in detail in this summary.

As in all past formal monitoring years since 2001, wetland delineation was conducted within the monitoring areas according to the 1987 Corps of Engineers (COE) Wetland Delineation Manual. In July 2008, consultation with the U.S. Army Corps of Engineers confirmed that, where the 1987 manual was used to establish baseline wetland conditions at MDT wetland mitigation sites, it should continue to be applied at such sites for the duration of the monitoring period. This approach applied to all 2008 and 2009 monitoring sites. Consequently, application of the new *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* and *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region* were not required or undertaken at MDT monitoring sites in 2008 or 2009.

Through 2007, wetland functional assessments were conducted at all monitoring sites using the 1999 MDT Montana Wetland Assessment Method. In 2008, use of the 1999 method was discontinued at most sites, as the 2008 MDT Montana Wetland Assessment Method became available and was applied. Use of the 1999 method was continued at sites in 2008 and 2009 for which baseline conditions were established using the 1999 method and functional assessment using that version of the method was integrated into credit calculation. These sites included Camp Creek, Selkirk Ranch, and all five U.S. Highway 93 onsite mitigation areas.

Table 1 in **Appendix A** provides, for each monitored mitigation site: the site name, MDT District, year constructed, major Montana watershed basin, pre-project wetland acreage and functional assessment category, target wetland credit, 2009 wetland acreage and functional assessment category, enhancement credit ratios, upland credit ratios, total wetland acreage gain / credit and functional unit gain as of 2009, and comments.

For reference, **Table 1** includes the following sites that were monitored only one year for "final" documentation purposes in 2001: Lawrence Park, Big Sandy, Crackerbox Creek, Vida, Lavina, Ryegate, Vince Ames, and Wyola-Sunlight Ranch. This table also includes the Plentywood-North mitigation site, which was only monitored in 2001, as MDT determined that the site would be monitored in-house in subsequent years due to its small size and remote location. **Table 1** also includes the Jack Johnson and Rey Creek sites, which were finalized in 2003; the Fourchette, Brown's Gulch, and Circle sites, which were finalized in 2004; the Creston, Big Spring Creek, and Stillwater sites which were finalized in 2005; the Beaverhead Ranch, Musgrave Lake, and Wigeon Reservoir sites finalized in 2006; the Batavia, Kleinschmidt Creek, Lame Deer-East, and Ridgeway Complex sites finalized in 2007, and the Hoskins Landing site finalized in 2008.

The Cow Coulee site is also included in **Table 1**, although it has not been finalized nor was it monitored in 2006-2009 due to water delivery problems. Similarly, the South Fork Smith site is also included in **Table 1**, although monitoring was suspended at this site following 2006. The Norem Ranch, Peterson Ranch, Roundup, and Woodson Creek sites are also included in the table, although monitoring was temporarily suspended at these sites following 2008 while site-specific wetland development or performance standard issues were addressed.

Monitoring summaries for each of the mitigation sites monitored in 2009 are presented in alphabetical order below in **Section 2.0**. Each discussion includes site history and objectives; delineation, crediting, and functional assessment results; and maintenance and other recommendations, where applicable. Supporting materials such as site maps, figures, data forms, photographs, and other information are provided in each of the individual monitoring reports, and are not included in this summary.

2.0 INDIVIDUAL MITIGATION SITE DISCUSSIONS

2.1 Alkali Lake (Great Falls District, Year 4)

MDT, in cooperation with the Bureau of Indian Affairs (BIA) and the Blackfeet Nation's Environmental Office and Fish & Wildlife Department, designed and constructed a wetland restoration project within a historic lakebed (Southeast Alkali Lake) on the Blackfeet Indian Reservation in Pondera County, Montana. The Alkali Lake restoration project was originally proposed in 1996 by the Blackfeet Nation Fish & Wildlife program and the U.S. Fish and Wildlife Service (USFWS) as a means to re-establish shorebird and wetland habitat to the southeastern arm of Alkali Lake.

The Alkali Lake Wetland Mitigation project is comprised of an approximate 175.8-acre historic lakebed and was constructed and flooded in late summer/early fall 2005. Hydrology was restored to the lakebed by constructing a pipeline from the Birch Creek Main Canal to Blacktail Creek; water then flows from a diversion in Blacktail Creek into the Badger Fisher Main Canal, K Canal, and 19K Canal where another pipeline was built to deliver water to the Alkali Lake site. Project goals are to restore/re-establish approximately 74.42 acres of historic wetlands (an estimated 20-30 acres of which were dominated by remnant hydrophytic vegetation, but lacked wetland hydrology); restore/re-establish approximately 101.4 acres of historic open water/lakebed (some or much of which could also conceivably result in wetland restoration); and provide fencing and an upland buffer. The project credit ratios were approved by the Corps of Engineers and the Blackfeet Tribe.

In 2009, approximately 96 acres of emergent wetlands were delineated at the mitigation site. These acres satisfied soils, hydrology, and vegetation performance standards. All together, about 182 acres of aquatic habitat were mapped in 2009. The upland buffer also satisfied applicable performance standards. To date the site has achieved the required wetland, upland, and open water goals as determined by the Tribe and COE. The 2009 credits at the site, applying Tribal and COE credit ratios, are presented in **Table 2**. The key to developing wetland habitat will come from managing the water levels that create the Transitional Open Water zone.

Table 2: ***2009 Tribal and Corps of Engineers credits at the Alkali Lake Wetland Mitigation Site.***

Proposed Feature	2009 Delineated Acres	Tribal Credit Ratio and 2009 Calculated Credit	Tribal Credit Target	Corps Credit Ratio and 2009 Calculated Credit[a]	Corps Credit Target
Primary emergent wetland restoration	96.42	1:2.5 credit ratio 38.57 credit acres	29.77 credit acres	1:1 credit ratio 96.42 credit acres	74.42 credit acres
Shallow open water restoration	85.59	1:2.5 credit ratio 34.24 credit acres	40.56 credit acres	1:1 credit ratio (to a max. matching wetland acres) 85.59 credit acres	74.42 credit acres
100-ft-wide upland buffer	45.12	1:4 credit ratio 11.28 credit acres	11.28 credit acres	1:4 credit ratio (on max. 50-ft width) 5.64 credit acres	1:4 credit ratio (on max. 50-ft width) 5.64 credit acres
TOTALS	182.01 (aquatic only)	**84.08 credit acres**	81.61 credit acres	**187.65 credit acres[a]**	154.48 credit acres

[a] Maximum credits as of 2009. Final credits are subject to compliance with the performance standards at the end of the monitoring period.

In 2009, the Alkali Lake Wetland Mitigation Site continued to rate as a Category II wetland (**Table 3**). The amount of wetland increased this year, but total aquatic habitat decreased slightly resulting in a slightly lower functional unit score. The site continued to rate as exceptional or high for General Wildlife Habitat and Short and Long Term Surface Water Storage (**Table 3**).

Table 3: ***Summary of 2009 wetland function/value ratings and functional points at the Alkali Lake Wetland Mitigation Site.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2009
Listed/Proposed T&E Species Habitat	Mod (0.8)
MTNHP Species Habitat	Mod (0.5)
General Wildlife Habitat	Exc (1.0)
General Fish/Aquatic Habitat	N/A
Flood Attenuation	N/A
Short and Long Term Surface Water Storage	High (0.9)
Sediment/Nutrient/Toxicant Removal	Mod (0.7)
Sediment/Shoreline Stabilization	Low (0.2)
Production Export/Food Chain Support	High (0.8)
Groundwater Discharge/Recharge	Low (0.1)
Uniqueness	Mod (0.5)
Recreation/Education Potential	Low (0.1)
Actual Points / Possible Points	**5.6 / 9.0**
% of Possible Score Achieved	**62%**
Overall Category	**II**
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries (ac)	**182.01**
Functional Units (acreage x actual points) (fu)	**1019.25**

The excavated inlet channel was in good condition during all site visits. Fencing, control structures, and the western berm were also in good condition. How water is managed at Alkali Lake is dependent upon availability and the goals set for wetland and wildlife management. Some wetland habitats and wildlife species at the site require opposing amounts and periods of flooding. In 2006 and 2008 the abundance of irrigation water promoted use of the site by waterfowl and shorebirds throughout the entire growing season. In 2007 and 2009, the site was inundated and water was allowed to recede from late spring to early fall. This promoted development of wetland areas and potential breeding habitat for the Piping Plover; water levels were sufficient to maintain foraging habitat for a large variety of shorebirds and waterfowl.

A herd of ten horses were found grazing within the site in August. Although they were later removed, it was evident on October 30th that cows had entered the site through two open gates and had grazed in the site. Grazing by cows and livestock has the potential to change the development of wetland within the site by removing vegetation, compacting soils, and dispersing noxious and exotic plants.

2.2 Big Hole Grazing Association (Butte District, Year 2)

The Big Hole Grazing Association (BHGA) wetland mitigation project was constructed in the fall of 2007 by MDT. The purpose of the project is to restore approximately 45 acres of wetland habitat within a 96-acre easement area owned by the BHGA. The project would provide a wetland mitigation reserve in Watershed #6 - Upper Missouri River Basin. MDT has not yet identified any construction projects in this watershed that would be applied against the Big Hole Grazing Association reserve. This project is located approximately 7 miles southwest of Wisdom and approximately 4 miles west of Secondary Route 278. Specifically, the project is located in

the NW ¼ of Section 2, Township 4 South and Range 16 West in Beaverhead County. The site was monitored for the second time in 2009.

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

In an attempt to restore natural hydrology to the site and thus restore wetlands within the easement area, the primary drainage ditch, which flowed northwest to southeast through the easement area, was completely filled and reclaimed. A secondary ditch which runs north to south across the western portion of the site was breached in three locations in an attempt to prevent drainage of the site and re-hydrate former wetlands by raising groundwater levels across the site. Prior to project implementation, MDT documented approximately 31 acres of emergent and scrub/shrub wetland across the entire 96-acre easement area, noting that some wetland areas were likely much larger prior to construction of drainage ditches across the site in the 1960's. According to project files, the goal is to generate 45.8 acres of Corp of Engineers approved credit through the restoration of 42.3 acres of wetland credited at 1:1 and preservation of 14.0 acres credited at a 4:1 ratio (3.5 acres of credit).

Wetland delineation during the August 2008 monitoring documented 49.81 acres of wetland, which increased to 56.76 acres in 2009 for a net gain of 25.76 acres since project inception . The largest difference between the 2001 delineation and 2009 delineation is in the east/northeast corner, where the 2009 delineation revealed 13.45 acres of developing EM/SS wetland in an area previously determined by MDT to be upland. It is probable that restoration of groundwater to this part of the project in the fall of 2007 was already having a positive affect on plant composition and saturated soil conditions in August 2009.

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

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

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

MDT project files indicate that prior to project implementation, wetlands occurring along the Rock Creek corridor and in the northwest corner (fen area) rated as Category II wetlands while

all other wetland on the site rated as Category III using the MDT 1999 MDT Montana Wetland Assessment Method.

In 2009, two functional assessments were completed for wetlands at the Big Hole Grazing Association mitigation site. Wetlands associated with the Rock Creek drainage (Assessment 1) were assessed on one form while all other wetlands were rated together (Assessment 2). In summary, all wetlands within project boundaries rated as Category II, with high ratings for short and long term surface water storage, sediment/nutrient/toxicant removal, and groundwater discharge/recharge (**Table 4**). Wetlands along Rock Creek also received high ratings for fish and wildlife habitat, flood attenuation, short and long term surface water storage, sediment/ shoreline protection, and production export / food chain support. The larger wetland area received a high rating for uniqueness because of the fen qualities exhibited in the northwest portion of the easement area.

Table 4: ***Summary of 2009 wetland function/value ratings and functional points at the Big Hole Grazing Association Wetland Mitigation Site.***

Function and Value Parameters from the 2008 MDT Montana Wetland Assessment Method	2009 Assessment 1 Rock Creek Wetlands	2009 Assessment 2
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Low (0.2)	Low (0.2)
General Wildlife Habitat	High (0.9)	Mod (0.7)
General Fish/Aquatic Habitat	High (0.8)	NA
Flood Attenuation	High (0.8)	NA
Short and Long Term Surface Water Storage	High (0.8)	High (1.0)
Sediment/Nutrient/Toxicant Removal	High (0.9)	High (1.0)
Sediment/Shoreline Stabilization	High (1.0)	NA
Production Export/Food Chain Support	High (1.0)	Mod (0.6)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Mod (0.4)	High (0.9)
Recreation/Education Potential	Low(0.05)	Low(0.05)
Actual Points / Possible Points	**7.85 / 11**	**5.45 / 8**
% of Possible Score Achieved	**71%**	**687%**
Overall Category	**II**	**II**
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries (ac)	**10**	**39.81**
Functional Units (acreage x actual points)	**78.50**	**217**

There were a total of 961 plantings counted during the 2008 monitoring. Approximately 79% (756 stems) survived through the first growing season. In 2009, the second year of monitoring, survival dropped considerably to 35% (339 stems). Of the three species planted, alder is faring the best, at 55% survival, while red-osier dogwood survival is about 30% and birch less than 2%. Mortality of birch and dogwood plantings was likely due to wetter than expected conditions and competition from forbs and grasses. It may be possible too, that these species are just not suited for the environment within which they were planted.

From a vegetative standpoint, disturbed areas where the ditch was filled were reseeded following construction and appeared to be progressing satisfactorily. Woody planting survival declined

significantly in 2009 and may need to be supplemented in future years if desired by MDT. No additional seeding is recommended at this time. Two small infestation of Canada thistle located close together were identified. Spraying or pulling may prevent spread to other parts of the site.

2.3 Camp Creek (Missoula District, Year 8)

The Camp Creek Mitigation Site was developed to mitigate wetland impacts associated with the MDT proposed Sula-North and South project. Camp Creek is located in Ravalli County, MT in the Lower Clark Fork Watershed (Watershed #3). The mitigation site is located approximately three miles south of Sula, Montana, and occurs on an MDT-owned parcel, as well as a privately-held parcel (Grasser). Elevations of the site range from 4,600 feet at the north boundary to 4,730 feet at the south boundary.

The project is located within the Sula Basin and along the historic Camp Creek floodplain. Camp Creek flows across the valley bottom, until eventually draining into East Fork of the Bitterroot River. Seasonal flooding and perennial creek flow provide the primary hydrology source within the new channel/floodplain margins. Local groundwater systems serve as a secondary hydrology source, flowing through the deep alluvial substrate contained within the Sula Basin. Several smaller creeks drain into Camp Creek, including Andrews, Praine, Waugh and Dick creeks.

Construction at the Camp Creek mitigation site was completed during the spring of 2002. The overall goals of this project were restoration of Camp Creek channel bottom, associated wetland functional restoration/enhancement and creation, and enhancement of heavily grazed and cleared riparian vegetation. Details for each of the three main goals are listed below:

Functional Restoration

- Return Camp Creek to its historic channel and establish a new channel.
- Restore hydrology and vegetation, recreating high value wetland habitat along the Camp Creek riparian corridor.
- Fill existing drainage ditches.

Enhancements

- Riparian shrub and tree plantings throughout the created floodplain margins.
- Planting upland species in drier areas (i.e., created upland slopes).

Creation

- Creation of emergent/scrub shrub wetlands along the floodplain margins of the new channel.

The site was intended to mitigate for specific wetland functions impacted by MDT roadway projects, including: stormwater retention, roadway runoff filtration, sediment and nutrient retention, water quality, groundwater recharge, and wildlife habitat. Per COE recommendations, a shallow flood channel connecting Camp Creek and the large emergent complex on the MDT parcel was excavated during fall 2005 between the creek and existing swales to enhance the connectivity of these two systems during high water events.

During 2009, total wetland acres slightly decreased (by 0.11 acre) on the MDT parcel due to separate mapping of a small weedy upland area within a larger wetland. Functional assessment results are presented in **Table 5**; approximately 147.88 functional units (score x wetland acreage) have been gained thus far at the Camp Creek mitigation site, despite the decrease in wetland acres between pre-project and post-project assessments on the MDT parcel. Approximately 110.50 functional units have been gained at the MDT parcel, and 37.38 have been gained on the Grasser parcel.

The credit allocation method for this site was worked out between MDT and COE in early 2006, and is functional unit-based, whereby wetland acreage for each AA is multiplied by the total score for that AA to arrive at an overall functional unit score. This is done both pre-project and post-project. The difference between these two numbers (the functional unit "gain") is then divided by the post-project score to arrive at an approximate credit acreage for that AA. Credit acreages from each AA are summed to arrive at a total for the site. This approach is illustrated below in **Table 6**. Using this approach, a current maximum of approximately 15.60 credit acres is assignable to the Camp Creek site as of 2009.

Table 6: ***2009 functional unit-based credit for the Camp Creek Wetland Mitigation Project.***

Property	2009 Wetland & Channel Acreage	2009 Score	2009 Functional Units	Baseline Functional Units	Functional Unit "Gain"	"Gain" Divided by Current Score (potential credit acres)
MDT	33.28	10	332.80	222.30	110.50	11.05
Grasser	8.13	8.2	66.66	29.28	37.38	4.55
Total	**41.41**	**--**	**399.46**	**251.58**	**147.88**	**15.60**

Planted woody specis survival rates within the upland areas were similar to those observed during 2004 to 2008 monitoring. In 2003, a majority of the survival rates ranged from 70% to 100%. Survival data recorded in 2004-2009 showed most upland species had a survival rate below 50%. These included such species as woods rose, ponderosa pine, snowberry, shrubby potentilla and red-osier dogwood. Almost all the Douglas-fir observed had died after initial planting.

In 2009, the wetter species planted along the streambank and floodplain margins had a survival rate ranging from 60% to 90%. These included alder, aspen, cottonwood and willows. The willow sprigs planted during the 2002 efforts are spreading out along the banks, continuing to increase in size and density each growing season. Several other wetter planted shrubs had increased in overall stature and exhibited vigorous growth.

The flood channel created by MDT to inundate the large emergent complex on the MDT parcel was examined during 2009 monitoring, and is in need of minor repair at the diversion feature. Scouring was observed directly downstream of the rock diversion. Continued scour during next season's runoff may affect the structural integrity of the diversion structure and ultimately reduce the functionality of the excavated channel.

Several Category 1 noxious weeds are present on both MDT and Grasser parcels including Canada thistle, oxeye daisy, spotted knapweed and yellow toadflax. Weed control and re-

Table 5: ***Summary of 2001 (baseline) and 2009 wetland function/value ratings and functional points at Camp Creek Wetland Mitigation Site.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2001[1] Type I, MDT Property	2001[1] Type III, MDT Property	2001[1] Type I, Grasser Property	2001[1] Type II, Grasser Property	2001[1] Type III, Grasser Property	2009[1] Grasser Property	2009[1] MDT Property
Listed/Proposed T&E Species Habitat	Mod (0.8)	Mod (0.8)	Mod (0.8)	Mod (0.8)	Mod (0.8)	Mod (0.8)	Mod (0.8)
MTNHP Species Habitat	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)	High (0.8)	High (0.8)
General Wildlife Habitat	Low (0.3)	Mod (0.5)	Low (0.3)	Mod (0.5)	Mod (0.5)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	Low (0.1)	Mod (0.5)	Low (0.1)	Low (0.1)	Mod (0.5)	High (0.9)	High (0.9)
Flood Attenuation	Mod (0.6)	Mod (0.4)	Mod (0.6)	Mod (0.5)	Mod (0.4)	Mod (0.4)	Mod (0.6)
Short and Long Term Surface Water Storage	Low (0.3)	High (0.8)	Low (0.3)	Low (0.3)	High (0.8)	Mod (0.6)	High (1.0)
Sediment/Nutrient/Toxicant Removal	Mod (0.7)	Mod (0.6)	Mod (0.7)	Mod (0.7)	Mod (0.6)	Mod (0.6)	High (0.9)
Sediment/Shoreline Stabilization	Low (0.2)	Low (0.3)	Low (0.2)	Mod (0.6)	Low (0.3)	High (1.0)	High (1.0)
Production Export/Food Chain Support	Mod (0.7)	High (0.9)	Mod (0.7)	Mod (0.7)	High (0.9)	High (0.9)	High (0.9)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Low (0.1)	Low (0.2)	Low (0.1)	Low (0.3)	Low (0.2)	Low (0.2)	Mod (0.4)
Recreation/Education Potential	Low (0.2)	Low (0.1)	Low (0.2)	Low (0.3)	Low (0.1)	Low (0.3)	High (1.0)
Actual Points / Possible Points	**5.1 / 12**	**6.2 / 12**	**5.1 / 12**	**5.9 / 12**	**6.2 / 12**	**8.20 / 12**	**10.0 / 12**
% of Possible Score Achieved	**42%**	**52%**	**42%**	**49%**	**52%**	**68%**	**83%**
Overall Category	**III**	**III**	**III**	**III**	**III**	**II**	**I**
Total Acreage of Assessed Wetlands and Open Water within Easement	**42.3**	**1.06[2]**	**3.51[2]**	**0.50[2]**	**1.36[2]**	**8.13**	**33.28**
Functional Units (fu) (acreage x actual points)	**215.73**	**6.57**	**17.90**	**2.95**	**8.43**	**66.66**	**332.80**
Functional Unit Gain to Date by Ownership	NA	NA	NA	NA	NA	**37.38[3]**	**110.50[3]**
Total Functional Unit Gain	NA	NA	NA	NA	NA	**147.88**	

[1] Assessed using the 1999 MDT Montana Wetland Assessment Method (MWAM).

[2] Baseline acreages adjusted per subsequent study.

[3] Baseline Functional Units used to determine the 2009 Functional Unit Gain included the combined totals for the 2001 MDT (222.30 fu) and Grasser (29.28 fu) properties.

vegetation of disturbed sites is needed to prevent further weed spread, reduce the risk of new weeds invading, reduce wind and water erosion and reduce sediment input to surface waters. Survival of plantings will continue to be monitored, and supplemental planting may need to be implemented if success of current plantings is low.

The Grasser parcel supports the majority of the noxious weed species with extensive distribution along the floodplain corridor. A weed management plan for this site should be developed and implemented to control the spread of noxious weeds. Areas of invading spotted knapweed, Canada thistle and yellow toadflax located along floodplain margins should be controlled and reseeded or planted with appropriate wetland species to help control further spread of invasive species. No weed control activity was observed on the Grasser parcel.

Survival of plantings will continue to be monitored, and supplemental planting may be needed if success of current plantings is low. Planted upland areas within the MDT parcel which were observed to have low survival rates should be replanted with appropriate native plant stock.

2.4 Cloud Ranch (Billings District, Year 6)

The Cloud Ranch stream and wetland restoration project was constructed in the spring of 2003 to mitigate wetland impacts associated with proposed MDT roadway improvement projects in the Upper Yellowstone watershed (Watershed #13). The site is located in Sweetgrass County approximately 12 miles northwest of Big Timber, MT. Elevations within the assessment area range from approximately 4,840 to 4,900 feet above mean sea level. The surrounding land uses include pastures and residential areas.

The project is intended to develop approximately 5.5 acres of wetland credit within a 15.5 acre conservation easement on private land. The project goals are to restore a degraded reach of Big Timber creek by narrowing the channel and revegetating the over bank areas with riparian trees, shrubs, wetland grasses and forbs. Restoration and creation activities for the off-channel wetland sites include pond and embankment removal, with subsequent grading adjacent to restored or existing wetlands which were formerly inundated with water. All disturbed areas were revegetated with native wetland species.

The 2003 baseline wetland delineation conducted by Aquatic Design and Construction Inc. (ADC) identified 1.00 acre of wetlands within the project area. Approximately 0.28 acre was later determined to be outside of the project area, reducing pre-existing wetland acreage to 0.72 acre. The COE approved allocation of 1:1 credit ratio for creation and restoration, as well as 4:1 ratio for the maintenance of a buffer zone around the wetland and riparian areas. More specifically, the wetland credit breakdown approved by the COE is as follows: 0.61 acre for off-channel wetland creation, 1.41 acres for off-channel wetland restoration, 2.0 acres for riparian wetland restoration along Big Timber Creek, 0.58 acre for emergent wetland restoration along Big Timber Creek, and a 0.89 acre upland buffer (4:1 ratio) for a total of 5.5 acres of wetland credit.

Table 7 outlines the target wetland credits and ratios from the COE and the net acres delineated during the 2009 wetland monitoring. In 2009, the net off-channel wetland/open water acreage is

Table 7. 2009 *credit acreages and ratios for the Cloud Ranch Wetland Mitigation Site.*

Wetland Mitigation	Current Net Acres	Ratio	2009 Credit Acres	Target Credit Acres	Comments
Off-channel Creation and restoration wetlands and open water	2.2	1:1	2.2	2.02	
Big Timber Creek Riparian wetland restoration	1.7	1:1	1.7	2.00	Riparian wetland community represented by Type 2.
Emergent wetland restoration	0.15	1:1	0.15	0.58	Riparian wetland community Type 2 has an emergent component at two small locations within mapped CT2. This acreage was calculated separately.
Upland and Wetland Buffer	3.56	4:1	0.89	0.89	Livestock grazing is prohibited on wetland sites.
GRAND TOTAL	**7.61**		**4.94**	**5.49**	**90% of goal**

2.2 acres (2.78 acres total wetland +0.14 acre open water – 0.72 acre of pre-existing wetlands = 2.2 acres). The Big Timber Creek wetland acreage is 1.85 acre; an increase of 0.43 acre compared to 2008 due to the population of young cottonwood and willow seedlings along the creek. Riparian wetlands comprise 1.7 acres along Big Timber Creek with 0.15 acre of emergent wetlands. The Big Timber Creek channel itself is not included in acreage totals.

As of 2009, the mitigation efforts have resulted in a total of 3.91 wetland credit acres, 0.14 shallow open water credit acres, and 0.89 credit acre of wetland/upland buffer. The grand total for the Cloud Ranch to date is 4.94 credit acres or 90 percent of the 5.49-acre goal.

As of 2009, the site remains approximately 0.55 acre short of its credit goal. The stream migration in 2006 created a new channel by cutting through a small point bar wetland. Areas adjacent to this channel are developing into wetlands with the establishment of cottonwood and willow seedlings. Banks and high terraces along Big Timber Creek will likely take more time to establish wetland vegetation. In 2009, the open water was reduced due to the vegetation encroachment. Community Type 7 near the southern monitoring limits of the off-channel area could potentially add wetland acreage in this area if the inundation continues. It should also be noted that restored Big Timber Creek itself (approximately 2.23 acres) is not included in aquatic acreage totals as it was not included in the original credit scheme; however, perhaps a portion of this would be considered creditable by the COE.

Functional assessment results for 2004 and 2009 are summarized in **Table 8**. Pre-construction functional assessments were completed for the wetlands by ADC (2003) but have thus far not been received for use in monitoring reports. The creek corridor wetlands currently rated as a Category II community, while the off-channel wetlands were assigned a Category III rating (**Table 8**). The ratings have been fairly consistent over the monitoring period; although the 2007 Threatened and Endangered Species function decreased because the Bald Eagle was de-listed.

The site supports two State of Montana-listed noxious weeds, Canada thistle and houndstongue. Canada thistle was observed along portions of Big Timber Creek and within the off-channel

Table 8: ***Summary of 2004 and 2009 wetland function/value ratings and functional points at the Cloud Ranch Wetland Mitigation Project.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2004 Post-Construction Off-Channel Wetlands	2004 Post-Construction Big Timber Creek	2009 Off-Channel Wetlands	2009 Big Timber Creek
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Low (0.1)	Mod (0.6)	Low (0.1)	Mod (0.5)
General Wildlife Habitat	Mod (0.7)	High (0.9)	Mod (0.7)	High (0.9)
General Fish/Aquatic Habitat	NA	Mod (0.7)	NA	Mod (0.6)
Flood Attenuation	Mod (0.5)	Mod (0.4)	Mod (0.5)	High (0.9)
Short and Long Term Surface Water Storage	Mod (0.6)	Mod (0.6)	Mod (0.6)	Mod (0.6)
Sediment/Nutrient/Toxicant Removal	High (1.0)	Mod (0.6)	High (1.0)	High (0.9)
Sediment/Shoreline Stabilization	High (1.0)	Mod (0.7)	High (1.0)	Mod (0.7)
Production Export/Food Chain Support	Mod (0.7)	Mod (0.7)	High (0.8)	High (0.6)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Mod (0.4)	Mod (0.4)	Mod (0.4)	Mod (0.4)
Recreation/Education Potential	Mod (0.7)	Mod (0.7)	Mod (0.1)	Mod (0.1)
Actual Points / Possible Points	**7 / 11**	**7.6 / 12**	**6.2 / 10**	**7.2 / 11**
% of Possible Score Achieved	**64%**	**63%**	**62%**	**66%**
Overall Category	**III**	**II**	**III**	**II**
Total Acreage of Assessed Wetlands and Open Water within Easement (ac)	**2.19**	**2.65**	**2.92**	**4.08**
Baseline Acreage of Assessed Wetlands and Open Water within Easement (ac)	**0.72**	**2.17** (ow)	**0.72**	**2.23** (ow)
Functional Units (acreage x actual points) (**fu)**	**15.33**	**20.14**	**18.10**	**29.37**
Net Acreage Gain (ac)	**1.47** (1.2 wetland, 0.27 ow)	**0.48** (wetland)	**2.20** (2.06 wetland, 0.14 ow)	**1.85** (wetland)
Net Functional Unit Gain[1]	Presently unavailable	Presently unavailable	**2.77**	**9.23**
Total Functional Unit Gain[1]	Presently unavailable		**12.0**	

[1] Baseline functional assessment information was unavailable as of the writing of this report.

wetland assessment area. Some infestations of Canada thistle appeared to have been sprayed in 2008 and post-monitoring in 2009 in the upland and wetlands adjacent to the Big Timber Creek channel. Continued chemical or biological control measures are recommended for Canada thistle. Houndstongue was noted along the upper reach of Big Timber Creek uplands as a few scattered individual plants.

The water level control structures within the off-channel wetlands were functioning and in good working order at the time of the July monitoring. Big Timber Creek channel migration resulted in minor bank loss in 2009. Gravel bars and new deposition areas will continue to be monitored to track riparian wetland gains or losses, development of the cottonwood communities and/or negative or undesirable changes in vegetation. The project designer commented in 2006 that the upper end of the lowest reach is likely to continue shifting before it stabilizes and some minor intervention in this area may eventually be warranted. Intervention does not appear warranted at this time as the stream appears to be adjusting naturally. However, if ultimately considered necessary by the designer, landowner, and MDT, any such intervention should be completed within the monitoring period.

2.5 DH Ranch (Billings District, Year 3)

This mitigation site was constructed during the spring of 2007 in the eastern portion of the Upper Yellowstone River watershed (Watershed #13). Approximately 17.4 acres of wetland credit at this site is to be provided to MDT through a credit purchase agreement. It is anticipated that this site will compensate for wetland impacts resulting from MDT highway and bridge reconstruction projects in the watershed. The DH Ranch mitigation site was constructed on private property. The goal of the project is to create wetland hydrology at the site, and thereby ultimately provide up to 23 acres of palustrine emergent and scrub-shrub wetland within the confines of the site. Prior to construction, approximately 0.38 acre of palustrine emergent and scrub-shrub wetland had been incidentally created along irrigation ditches traversing the site.

The project is a wetland creation project and includes a series of wetland cells supplied primarily by irrigation return flow, with some minimal contributions from precipitation. Monitoring occurs on the site in mid-summer when all wetland data are collected. Wetland crediting ratios for the site are 1:1 for wetland creation areas and 4:1 for riparian buffers, and are subject to various performance standards.

The COE will determine which crediting ratios are applicable to the site. However, using the credit ratios listed, **Table 9** summarizes compensatory mitigation credits developed to date at DH Ranch. As no success criteria pertain to the upland buffer, credits for the upland buffer were assigned in 2009 despite its dominance by clasping pepperweed and that most of the planted shrubs have died. The wetland mitigation design report also includes a credit category for shrubby riparian islands located on the water diversion berms. These berms are generally vegetated by weedy species, such as cheatgrass, Canada thistle, and yellow sweetclover, and do not yet exhibit a woody component. Some natural recruitment of cottonwoods is occurring on their southern sides, at the base of the berms and will continue to be monitored. No credits were calculated for these berms in 2009.

Table 9: ***2009 mitigation credit summary for the DH Ranch Wetland Mitigation Site.***

Credit Category	Acre	Assumed Credit Ratio[a]	Credit [a]
Emergent wetland creation	15.25	1:1	15.25[c]
Open water	3.18	Up to 10% of wetland area	1.53
Shrubby riparian islands[b] (i.e. berms)	1.65	1:1	0.00[c]
Upland buffer[b]	0.80	4:1	0.20
TOTAL	**20.88**		**16.98**

[a] The Corps of Engineers is the regulatory authority and will determine the actual mitigation ratios.
[b] The shrubby riparian islands and upland/riparian buffer acreage was derived from the design report.
[c] Not all ultimate success criteria have been met. Credits for these areas may be negotiated between MDT and the COE.

Based on the above information and assumed credit ratios for wetlands, open water, and the upland buffer, approximately 16.98 acres of credit, or 98% of the 17.4-acre MDT credit purchase goal, are currently available at the DH Ranch mitigation site (**Table 9**). The credit total for 2009 represents an increase of 4.23 credits over 2008 credit totals. Credits for wetland creation and upland buffer areas may be negotiated between the COE and MDT at their discretion.

Functional assessment results are summarized in **Table 10**. For comparative purposes, the functional assessment results for baseline conditions prepared by Oasis Environmental in 2005 are also included in **Table 10**. The created wetlands at DH Ranch were ranked as Category II wetlands in 2007, 2008, and 2009 as compared to a Category III in 2005. Functions that increased substantially over 2005 baseline conditions include MTNHP species habitat, general wildlife habitat, short and long term surface water storage, sediment/nutrient/ toxicant removal, and production export. Pre-project, the site provided about 1.596 functional units within the monitoring area, and in 2009 provides about 110 functional units, for a conservative gain of roughly 108 functional units.

In order to maximize wetland establishment on the site, it may be worthwhile to adjust the distribution of water so that the areas in the southwestern portion of the site, between a berm and an inundated area, are wet for prolonged time periods during the growing season. In 2009 these areas continue to be dominated by a variety of weedy species and had not been planted with riparian shrubs prior to the mid-season visit. However, cottonwood seedlings have become established and are expected to continue to grow. If these berm areas are to be counted for credit in future years, it may be necessary to plant the upper portions of the berms with shrubby riparian species.

Several infestations of Canada thistle, field bindweed, and musk thistle were identified. The most problematic of these three weeds is Canada thistle. The extent of its infestations has increased since 2008. Cheatgrass, clasping pepperweed, and field bindweed are prevalent in the disturbed–upland community type. Control of all these weeds is recommended. The occurrence of Garrison creeping foxtail has increased at the site since 2008, though it is still below the level that would affect crediting. It is mentioned simply to make readers aware that this species may prove to be problematic in the future.

Table 10: ***Summary of baseline and 2009 wetland function/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[1]	2009[2]
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Low (0.1)	High (1.0)
General Wildlife Habitat	Mod (0.5)	High (0.9)
General Fish/Aquatic Habitat	NA	NA
Flood Attenuation	NA	NA
Short and Long Term Surface Water Storage	Low (0.3)	High (1.0)
Sediment/Nutrient/Toxicant Removal	NA	Mod (0.7)
Sediment/Shoreline Stabilization	High (0.9)	Mod (0.7)
Production Export/Food Chain Support	Mod (0.5)	High (1.0)
Groundwater Discharge/Recharge	NA	Low (0.1)
Uniqueness	Mod (0.4)	Mod (0.5)
Recreation/Education Potential	Low (0.1)	Low (0.05)
Actual Points / Possible Points	**2.8 / 8**	**5.95/9**
% of Possible Score Achieved	**35**	**66**
Overall Category	**III**	**II**
Total Acreage of Assessed Aquatic Habitat within AA Boundaries	**0.570**	**18.43**
Functional Units (acreage x actual points)	**1.596**	**109.66**
Net Acreage Gain	NA	**17.86**
Net Functional Unit Gain	NA	**108.06**

[1] Assessed using the 1999 MDT Montana Wetland Assessment Method (MWAM).
[2] Assessed using the 2008 MDT MWAM.

A lateral ditch conveys water from east to west across the southern end of the site. According to the landowner, the ditch itself and the openings off of this lateral ditch were cleaned out by Oasis at the beginning of the growing season. During the mid-season visit, it was noted that several of the ditch openings had silted in just enough to prevent water from flowing northward onto the site. Overall the consequences of this were minimal, however, it is suggested that these ditch openings be inspected periodically throughout each growing season, and cleaned out as needed. An alternative solution is to engineer a design that prevents these ditch openings from clogging.

2.6 Jack Creek Ranch (Butte District, Year 6)

The Jack Creek Ranch stream and wetland restoration project was completed by Jack Creek Ranch, LLC and ADC in the summer and fall of 2003 to provide MDT with a wetland / stream mitigation reserve in the Upper Missouri Watershed (Watershed #6). The highway projects were constructed within the vicinity of Ennis, MT and the Madison River drainage within the MDT Butte District. The site is located in Madison County approximately 2.5 miles northeast of the town of Ennis. Elevations within the mitigation area range from approximately 4,889 to 4,892 feet above sea level. The surrounding land uses include livestock pastures and hay production.

The project was intended to develop approximately 50 acres of wetlands within the 86-acre pasture owned by the Jack Creek Ranch, LLC. The overall goal for restoration consists of two main areas: restoring wetland hydrology to the Horseshoe pasture and restoring a reach of McKee Spring Creek to a naturally functioning stream channel. The objectives are consistent

with historical conditions prior to the drainage of the Horseshoe pasture and the creation of in-stream reservoirs within the McKee Creek channel. During the 1940's, ditches were excavated in the Horseshoe pasture as a recommendation from the Soil Conservation Service (SCS) to lower groundwater. Field notes from SCS personnel describe the site as "very wet, hummocky with standing water, sedges and water loving plants." The final drainage system was a horseshoe shaped ditch that averaged 20 feet wide, 6 to 8 feet deep and nearly 1 mile long. In addition to draining wetland areas within the ranch, significant impacts occurred to McKee Spring Creek, such as widening as a result of prolonged cattle grazing and the mechanical excavation of ponds within the creek channel.

In the summer of 2003, the drainage systems along the perimeter of the Horseshoe pasture were filled. Selected areas within the Horseshoe field were graded to increase habitat diversity. Disturbed areas were seeded with a wetland seed mix and planted with containerized wetland species. Woody species were planted to restore a scrub-shrub wetland within portions of the pasture. Also, in the summer of 2003, a new channel was constructed for middle reach of the McKee Spring Creek and the over-widened areas (in-stream reservoirs) were filled. In the spring of 2003, a new channel was constructed for the lower reach of the McKee creek. The lower McKee Spring Creek construction began by shifting the confluence of McKee creek and Jack Creek west or downstream of the original confluence. Approximately 880 feet of new channel was created between the new confluence and the old confluence. From the original confluence upstream to the first of the middle creek ponds, the new channel was built within the old channel. New channel banks were created by stacking wetland sod mats until a specified finished bank height was achieved. This method allowed for the creation of a narrowed channel and a wide floodplain covering the full width of the old over-widened channel. Disturbed areas were revegetated with containerized wetland plants and wetland seed. Trees and shrubs were also planted along portions of the channel to restore a scrub shrub wetland community along the new stream corridor.

In 2008, per MDT's request, the monitoring area limits from 2004 to 2007 were extended to include the lower restored reach of McKee Spring Creek; The MDT and the designers had determined that this area was part of the credit purchase and was eligible for credit. In 2009, the gross wetland boundary included 64.21 acres with the addition of the lower reach of McKee Spring Creek. MDT anticipates grossing at least 50 acres of wetland at this site. The mitigation efforts have thus far resulted in 64.21 gross wetland acres or 128 percent of the goal (the 50 acre goal included the pre-existing wetlands and open water). Subtracting the original, pre-project wetland / open water acreage of 11.40, the current net gain acreage of aquatic habitat totals 52.81 acres.

Functional assessment results are summarized in **Table 11**. Pre-construction functional assessments were completed for the wetlands as well as the lower and middle reaches of McKee Spring Creek by ADC. The results of that assessment are included in **Table 11.** The monitoring area has gained over 476 functional units since construction. The site remains a Category II wetland and scores over 507 functional units.

Only two Wood Duck nest boxes remain attached to the trees; the northern one is hanging askew. The site has two State of Montana Noxious Weeds, Canada thistle and Hound's-tongue.

Table 11: ***Summary of 2002 and 2009 wetland function/value ratings and functional points at the Jack Creek Ranch Wetland Mitigation Project.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	Pre-construction 2002[1]	Post-construction 2009[2]
Listed/Proposed T&E Species Habitat	Low (0)	Low (0.0)
MTNHP Species Habitat	Mod (0.6)	Mod (0.5)
General Wildlife Habitat	Low (0.3)	Exc (1.0)
General Fish Habitat	Mod (0.6)	Mod (0.7)
Flood Attenuation	NA	Mod (0.5)
Short and Long Term Surface Water Storage	NA	High (0.9)
Sediment/Nutrient/Toxicant Retention and Removal	NA	High (0.9)
Sediment/Shoreline Stabilization	NA	High (1.0)
Production Export/Food Chain Support	Low (0.3)	High (0.9)
Groundwater Discharge/Recharge	Low (0.1)	High (1.0)
Uniqueness	Low (0.1)	Mod (0.4)
Recreation/Education Potential	Low (0.1)	Mod (0.1)
Actual Points / Possible Points	**2.7 / 9**	**7.9 / 11**
% of Possible Score Achieved	**30%**	**72%**
Overall Category	**III**	**II**
Total Acreage of Assessed Wetland / Open Water Areas within Easement	**11.40**	**64.21**
Functional Units (acreage x actual points)	**30.78**	**507.26**
Net Acreage Gain in Mitigation Area	NA	**52.81**
Approximate Functional Unit Gain in Mitigation Area	---	**476.48**

[1] The 2002 baseline assessment used the 1999 MWAM and included an additional 12.2 acres of wetlands and open water along McKee Spring Creek beyond the current assessment area (AA). The original acreage of wetlands and open water in this area (23.6 acres) and corresponding functional units were therefore approximated downward in order to match the baseline AA with the current AA.

[2] In 2008 the assessment area was expanded to include the horseshoe wetland and the lower and middle reaches of McKee Spring Creek.

Live Hound's-tongue plants were noted during the July 2009 monitoring visit within the McKee Spring Creek floodplain. Weed control efforts have been effective in reducing Canada thistle and Hound's-tongue. However, Canada thistle still continues to pose the greatest problem in the transition and upland areas**.** Spot spraying is recommended in 2009 for Canada thistle and Hound's-tongue.

2.7 Little Muddy Creek (Great Falls District, Year 6)

The Little Muddy Creek wetland project is located in the Missouri-Sun-Smith River watershed (Watershed #7) on private land approximately 1 mile west of Interstate 15 between the towns of Cascade and Ulm in Cascade County. It was constructed in 2004 by Ducks Unlimited and the property owners. The purpose of the project is to create wetland habitat for migratory birds and to serve as a wetland mitigation bank for MDT. The MDT is willing to acquire approximately all available wetland credit from Ducks Unlimited created by this project. It was anticipated by MDT that approximately 13.57 acres of compensatory wetland mitigation credit may be needed to offset impacts associated with ten different projects within the Missouri-Sun-Smith River

watershed (#7). An additional 50 acres of reserve credit was also being sought by MDT. Thus, MDT originally sought a total 63.57 acres of compensatory wetland mitigation credit.

Little Muddy Creek is an intermittent stream that flows directly into the Missouri River. In 2004, an 88 foot-wide diversion dam was built across the entire Little Muddy Creek channel. The central 30 feet of the dam is elevated three feet above the existing channel bottom and the ends of the dam rise up to meet the adjacent stream banks. Water is impounded in the channel of Little Muddy Creek for a distance upstream of 2,700 feet. An inlet channel of approximately 400 feet was excavated from the point of diversion to an inlet water control structure with a headgate, at which point water flows through another excavated channel to the off-channel impoundment. The off-channel impoundment is surrounded by an 11,500-foot long berm.

At the full pool elevation, the off-channel impoundment is anticipated to have a surface area of about 216 acres, a depth of five feet, and a maximum water storage volume of 387 acre-feet. To create this wetland, a maximum of 35 cubic feet per second (cfs) of water can be diverted during spring flows. When Little Muddy Creek is flowing, a minimum of 1 cfs must remain in the channel below the point of diversion. Upon filling the site, all streamflow continues downstream. No diversion of water is allowed after June 1st of each year. Further, no diversion is allowed when the combined flow of the Missouri River near Ulm and the Sun River near Vaughn totals less than 7,880 cfs.

Prior to project implementation, no wetland habitat existed within the main project site. Target wetland communities to be produced at the site include open water/aquatic bed and shallow marsh/wet meadow.

As of 2009, the Little Muddy site has developed approximately 162.82 acres of Class II wetland and 26.99 acres of transitional open water.

Approximately 0.80 acre, 9.97 acres, and 2.80 acres of the originally-anticipated 13.57-acre impacts were projected at Class II, III, and IV wetlands, respectively. The COE approved application of these projected impact acres to the Little Muddy site as previously "owed" mitigation, with the exception of the Bowman's Corner project, which comprised 10.7 of the 13.57 projected impact acres. Consequently, 2.87 acres of "owed" mitigation was approved for application against the Little Muddy site, with any additional projects (including Bowman's Corner) to be applied against the 50-acre "reserve". Final application of projected or incurred wetland impacts against this mitigation site are subject to ongoing discussions and specific agreements between the COE and MDT. As of 2009, the site appears to be developing the anticipated target credits.

As in 2006-2008, the Little Muddy Creek Wetland Mitigation Site continued to rate as a Category II wetland because it rates as exceptional for wildlife habitat (**Table 12**). The site rated high for Short and Long Term Surface Water Storage; Sediment/Nutrient/Toxicant Removal; and Production Export/Food Chain Support (**Table 12**).

The berm, excavated channels, and inlet/outlet structures were in good condition during the mid-season visit of 2009. During the initial filling of the site, water was released in phases in order to

Table 12: ***Summary of 2009 wetland function/value ratings and functional points at the Little Muddy Creek Wetland Mitigation Site.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2009
Listed/Proposed T&E Species Habitat	Low (0.0)
MTNHP Species Habitat	Mod (0.6)
General Wildlife Habitat	Exc (1.0)
General Fish/Aquatic Habitat	Low (0.2)
Flood Attenuation	Mod (0.6)
Short and Long Term Surface Water Storage	High (1.0)
Sediment/Nutrient/Toxicant Removal	High (1.0)
Sediment/Shoreline Stabilization	Low (0.3)
Production Export/Food Chain Support	High (0.9)
Groundwater Discharge/Recharge	Low (0.1)
Uniqueness	Mod (0.4)
Recreation/Education Potential	Mod (0.1)
Actual Points/Possible Points	**6.2 / 11**
% of Possible Score Achieved	**56%**
Overall Category	**II**
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries (ac)	**189.81**
Functional Units (acreage x actual points)	**1176.82**

prevent erosion of the berm. Vegetation on the berm has grown dense and tall. In 2006 it was suggested that extremely wide and deep cracks on the berm near PP-5 should be monitored. However, these cracks were much shallower in 2007 and 2008, indicating they are ephemeral and a result of how the soil responds to precipitation events.

In 2008 the landowner expressed concern over six locations of eroding bank in the northeast corner of the project. The erosion is a result of wind action on a nearly full pool of water. The site was examined at various times during the spring and summer by PBS&J, MDT, and Ducks Unlimited. Ducks Unlimited will be working to reduce the erosion in the fall of 2009.

Within the monitoring limits, Canada thistle occupied 0.65 acre in 2009. This was much less than the 1.62 acres it occupied in 2008. However, Canada thistle is present over a greater area than the 0.65 acres implies. The densest patches of Canada thistle were delineated and considered upland. Canada thistle within the project area has not been controlled. Although inundation will help decrease populations, seed will continue to colonize suitable habitat within the project area.

2.8 Lonepine (Missoula District, Year 2)

The Lonepine mitigation site was constructed between the summer of 2007 and early summer of 2008 on MDT property in Sanders County, Montana, simultaneously with re-construction of the Lower Dry Fork Reservoir dam. The goals are to develop approximately 23.85 acres of COE-approved wetland credit and 11.86 acres of Confederated Saish & Kootenai Tribes (CSKT)-approved wetland credit at this 80-acre site. The project is primarily intended to mitigate for wetland impacts associated with the proposed MDT Lonepine North & East highway

reconstruction project, with any leftover wetland credits to be held in reserve for application against future MDT highway projects in the area.

The site occurs at an elevation of approximately 2,840 feet above mean sea level and is located near the west edge of the Flathead Indian Reservation, approximately 1.5 miles west of Lonepine and immediately south of the Lower Dry Fork Reservoir dam. The primary target wetland class to be provided at the mitigation site is emergent, with aquatic bed and scrub-shrub (including non-wetland riparian) classes to be provided at a lesser extent. Primary target wetland functions include wildlife habitat; sediment / nutrient / toxicant removal; surface water storage; and production export / food chain support. The project includes a series of five wetland cells supplied primarily by Lower Dry Fork Reservoir via the Camas C Canal with some minimal contributions from precipitation. Objectives include the following:

- Maximize emergent wetland development, associated wildlife habitat, nutrient / toxicant removal functions, surface water storage functions, and production export / food chain support on the site by constructing several large interconnected cells that flood to a maximum depth of approximately 1 foot.
- Restore sinuosity and connectivity to ditched and straightened segments of Dry Fork Creek, including reactivation of a cutoff meander loop.
- Provide a riparian scrub-shrub component by revegetating restored Dry Fork Creek channel margins, and inter-cell watercourses, with riparian shrub species.
- Enhance and protect uplands and existing wetlands along Dry Fork Creek by removing grazing from the site, planting upland shrubs, prohibiting development, and fencing.
- Minimize operational maintenance and promote a self-sustaining system by placing permanent spillways at all cell outlets to control water elevations.

Approximately 7.13 acres of essentially pre-existing wetland were delineated on the site in 2009, with an additional 21.74 acres of transitional, inundated communities / areas that developed wetland characteristics between the 2008 and 2009 monitoring. These transitional areas were inundated for the first time in June 2008, and have since developed into emergent wetlands. Similarly, vegetation along the new Dry Fork Creek channel segments is developing and banks are stable.

As construction was essentially completed in June 2008, and monitoring commenced in July 2008, the site had very little chance to develop during the first monitoring season. As of 2009, the wetland cells had developed into emergent wetlands and are expected to continue developing with adequate hydrology. The CSKT and Corps will ultimately determine / authorize credit at the site. However, as shown in **Table 13**, up to 11.93 CSKT and 23.83 Corps interim credit-acres have developed on the site in the absence of full ultimate performance standard application. **Table 13** also presents the Year 2 status of designed features in terms of their progress in achieving the final performance standards. Planted shrub survival was far below the target along the new Dry Fork channel at the dam face, and within intercell swales, and as such these areas were conservatively not included at this time in interim credit totals.

The functional assessment results for baseline (2003) and 2009 conditions are summarized in **Table 14**. The site was separated into two assessment areas (AAs): Dry Fork Creek and inter-

Table 13: ***2009 Tribal (CSKT) and Corps of Engineers (COE) maximum interim credits at the Lonepine Wetland Mitigation Site.***

Proposed Feature	2009 Delineated Acres	CSKT Credit Ratio 2009 Interim Calculated Credit	CSKT Credit Target	COE Credit Ratio 2009 Interim Calculated Credit[a]	COE Credit Target	2009 Performance Standard Comments
1) Wetland cells, wetland excavation, and designed intercell swales that have developed into wetlands	21.58	1:3.04 credit ratio 7.1 credit ac	7.02 credit ac	1:1 credit ratio (OW limited to 10% of wetlands) 21.58 credit ac	21.35 credit ac	Wetland Hydrology: Satisfied Hydric Soil: Satisfied Noxious Weed Cover: Satisfied Hydrophytic Veg Cover in Gypsum-Treated Areas: Satisfied Hydrophytic Veg Cover in Untreated Areas: Progress on target Cattail Cover: Satisfied
2) New Dry Fork channel & wetland fringe along dam face	0.16	1:1.54 credit ratio 0.10 credit ac (not included in totals)	0.19 credit ac	1:1 credit ratio 0.16 credit ac (not included in totals)	0.3 credit ac	Bank Stability: Satisfied Noxious Weed Cover: Satisfied Cutting Survival: Progress on target Shrub Survival: Below target
3) New Dry Fork Creek channel in pre-existing Wetland 1	0.04	1:1.54 credit ratio 0.03 credit ac	0.03 credit ac	1:1.5 credit ratio 0.03 credit ac	0.03 credit ac	Bank Stability: Satisfied
4) Dry Fork Creek meander re-activation	0.26	1:1.54 credit ratio 0.17 credit ac	0.17 credit ac	1:1.5 credit ratio 0.17 credit ac	0.17 credit ac	Bank Stability: Satisfied Noxious Weed Cover: Satisfied Cutting Survival: Progress on target
5) Protection / grazing removal at pre-existing wetlands	7.13	1:1.54 credit ratio 4.63 credit ac	4.31 credit ac	1:5 credit ratio 1.43 credit ac	1.33 credit ac	Fencing and Grazing Exclusion: Satisfied
6) Riparian intercell swales	0.24	1:3.04 credit ratio 0.08 credit ac (not included in totals)	0.14 credit ac	1:4 credit ratio 0.06 credit ac (not included in totals)	0.11 credit ac	Noxious Weed Cover: Satisfied Shrub Survival: Below target
7) Upland buffer	4.45	0 credit ac (no planting)	0.00 credit ac	1:4 credit ratio (on max. 50-ft width) 0.56 credit ac	1:4 credit ratio on max. 50-ft width (2.23 ac) 0.56 credit ac	Fencing: Satisfied Noxious Weed Cover: Satisfied Vegetation Cover: Satisfied
TOTAL		**11.93 ac[a]**	11.86 ac	**23.83 ac[a]**	23.85 ac	

[a] Maximum credits as of 2009. Features 2 and 6 not included in 2009 credit totals. Credits are subject to performance standard compliance following the monitoring period.

Table 14: ***Summary of pre-project and 2009 wetland function/value ratings and functional points at the Lonepine Wetland Mitigation Site.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	Pre-Project Dry Fork Ck 2003[1]	Pre-Project Isolated Wetland Patches 2003[1]	Post-Project Dry Fork Ck 2009[2]	Post-Project Cells 1-5 2009[2]
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.0)	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Low (0.1)	Low (0.1)	Mod (0.6)	Mod (0.6)
General Wildlife Habitat	Low (0.3)	Low (0.1)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	Mod (0.4)	NA	Mod (0.4)	NA
Flood Attenuation	Mod (0.5)	NA	Mod (0.6)	NA
Short and Long Term Surface Water Storage	Mod (0.6)	Low (0.3)	Mod (0.6)	High (0.9)
Sediment/Nutrient/Toxicant Removal	Mod (0.7)	NA	Mod (0.7)	Mod 0.7
Sediment/Shoreline Stabilization	Mod (0.6)	NA	Mod (0.6)	Mod (0.6)
Production Export/ Food Chain Support	High (0.8)	Low (0.1)	High (0.8)	Mod (0.7)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	Mod (0.7)	Mod (0.4)
Uniqueness	Low (0.2)	Low (0.2)	Mod (0.4)	Mod (0.4)
Recreation/Education Potential	Low (0.1)	Low (0.1)	Mod (0.1)	High (0.15)
Actual Points / Possible Points	**5.0 / 12**	**1.9 / 8**	**6.2 / 11**	**5.15 / 9**
% of Possible Score Achieved	**47%**	**24%**	**56%**	**57%**
Overall Category	**III**	**IV**	**III**	**III**
Acreage of Assessed Aquatic Habitats within Easement (ac)	**6.87**[3]	**0.31**[3]	**7.64**	**21.23**
Functional Units (acreage x actual points) (fu)	**34.35**	**0.59**	**47.37**	**109.33**
Net Acreage Gain (ac)	NA		**21.69**	
Net Functional Unit Gain (fu)	NA		**121.76**	

[1] Assessed using the 1999 MDT Montana Wetland Assessment Method (MWAM).
[2] Assessed using the 2008 MDT MWAM.
[3] Outside of the recently expanded Lower Dry Fork Dam footprint.

connected Cells 1-5. Both AAs currently rate as Category III sites, and although differing functional assessment methods were applied pre- and post-project, the site as a whole has gained aquatic habitat acreage and 122 functional units. Prominent functions include general wildlife habitat, surface water storage, sediment/nutrient/toxicant removal, and production export / food chain support.

The original vegetation plan for this site called for 580 woody plantings (shrubs) and 500 willow sprigs (cuttings). A total of 285 woody plantings were identified onsite during the 2009, mainly willow along Dry Fork Creek. During the 2008 monitoring, it was observed that root systems were exposed on many of the planted containerized shrubs, apparently due to soil displacement during watering, and likely resulted in the morality of many plants. Subsequent to monitoring, approximately 270 dead willow cuttings were replaced along Dry Fork Creek in November 2008. During the 2009 monitoring, woody plantings were only observed along the reconstructed banks of Dry Fork Creek.

Several problems with inlet/outlet structures were identified in June 2008, and were for the most part repaired prior to site monitoring in July 2008. The exception to this was the Cell 5 outlet, which has since been repaired. Fencing was completed during the July 2008 limiting the access of livestock to the site. A fifth smooth wire was added to the existing four-strand fence in order to more effectively discourage use of the site by neighboring domestic goats. No livestock were present during the 2009 monitoring.

Erosion along the eastern edges of many of the wetland cells was observed and is relatively minor at this stage of the project, except for Cell 2 that had more extensive erosion. These areas need to be monitored in the future, specifically where the berms are relatively narrow between wetland cells. Until vegetation establishes along these edges, this may be a continuing issue. MDT is investigating the possibility salvaging bulrushes from an adjacent wetland near the site and planting the bulrush along the eroding edges of the wetland cells to speed up vegetative growth, damper wave action, and reduce erosion.

Noxious weeds are present on the site. Canada thistle occurs mainly in small, scattered patches across the site and should be controlled. Whitetop is present in a large patch in the southwest corner of the site and should also be controlled. Kochia is another weedy species occurring on the site, especially on the disturbed upland portions, but is not on the noxious weed list.

2.9 Meriwether-East (Great Falls District, Year 4)

The Meriwether-East Wetland Mitigation Site was constructed during 2005 to partially mitigate for wetland impacts associated with MDT project NH 1-3(36)234F (Meriwether-East). The Meriwether-East wetland mitigation project was constructed on-site along Highway 2 in Glacier County. It consists of two areas: Site 1 was built near milepost 236 and was designed to encompass approximately 2.67 acres (ac) and Site 2 was built near milepost 239 and designed to encompass approximately 6.62 acres. Combined, the on-site mitigation project was designed to create 9.29 acres of new wetland in an area that had no prior wetlands. Wetland hydrology was designed to be supplied from the neighboring wetlands, interception of the water table, and ponding of direct precipitation. It was anticipated that vegetation would be comprised of emergent wetland species.

At Site 1, no wetland or other aquatic habitat has yet developed. The goal at Site 2 has been achieved as 6.62 acres of wetland were present in 2009. Proper hydrology and a seed source from adjacent natural wetlands has been the key to driving the development and maintenance of this wetland habitat.

Site 2 continued to rate as a Category III wetland (**Table 15**). Notable functions and values included General Wildlife Habitat, Flood Attenuation, Short and Long Term Water Storage, Sediment / Nutrient / Toxicant Removal, Production / Export Food Chain Support, and Groundwater Discharge/Recharge. The functional assessment score increased by over three points from that in 2007 (and was the same score as that achieved in 2008). This is a result of changes in the MWAM and better conditions for developing wetland habitat. Environmental conditions were much improved because Site 2 received more precipitation in spring and summer temperatures were lower.

Table 15: ***Summary of 2009 wetland function/value ratings and functional points at Site 2 of the Meriwether-East Wetland Mitigation Site.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2009 Site 2
Listed/Proposed T&E Species Habitat	Low (0.0)
MTNHP Species Habitat	Low (0.0)
General Wildlife Habitat	Mod (0.7)
General Fish/Aquatic Habitat	NA
Flood Attenuation	High (0.9)
Short and Long Term Surface Water Storage	High (0.9)
Sediment/Nutrient/Toxicant Removal	High (1.0)
Sediment/Shoreline Stabilization	NA
Production Export/Food Chain Support	High (0.8)
Groundwater Discharge/Recharge	Mod (0.7)
Uniqueness	Mod (0.4)
Recreation/Education Potential	NA
Actual Points / Possible Points	5.4 / 9.0
% of Possible Score Achieved	60%
Overall Category	III
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries (ac)	**6.62**
Functional Units (acreage x actual points)	**35.7**

The dikes were surveyed for erosion problems in 2009. The dikes were covered evenly with erosion control fabric and no erosion problems were found. Plants have incrementally been colonizing the erosion control fabric. The two small sub-populations of Canada thistle should be sprayed with the appropriate herbicide before they flower in 2010.

2.10 Perry Ranch (Great Falls District, Year 8)

The Perry Ranch wetland mitigation site was constructed during early summer 2001 to mitigate wetland impacts associated with the Browning-Meriwether and Browning East & West MDT projects. These two projects resulted in a combined projected wetland loss of approximately 14.7 acres. Constructed in the Marias Watershed (Watershed #8), the mitigation site is located approximately 13 miles west of Browning, MT and 4 miles north of U.S. Highway 2 in Glacier County. The entire site occurs within the confines of the tribally-owned Perry Ranch on the Blackfeet Indian Reservation.

The intent of the project was to create, via dike placement and shallow excavation, two wetland impoundments within historic oxbows located in the Cut Bank Creek floodplain. The inner oxbow impoundment, located adjacent to Cut Bank Creek, was designed to provide approximately 6.1 wetland acres with a maximum water depth of 2.6 feet. The outer oxbow impoundment, located immediately north of the inner oxbow and west of the creek, was designed to provide approximately 21.5 wetland acres with a maximum water depth of three feet. Approximately 2.3 acres of wetland occurred at the inner oxbow prior to construction, while approximately 1.1 acres occurred at the outer oxbow. The 27.6-acre target mitigation figure is inclusive of these 3.4 acres of existing wetlands.

Wetland hydrology at the inner oxbow is to be provided via overbank flood flows, alluvial flow, and precipitation; flood flows and precipitation will source the outer oxbow. It is anticipated that, over time, vegetation at the inner oxbow will be comprised of scrub-shrub and emergent communities with occasional cottonwoods scattered throughout. The outer oxbow will likely be dominated by emergent communities. No specific performance criteria were required to be met at this site in order to document its success.

No specific performance criteria were required to be met at this site in order to document its success. In general, the site appears to be developing as designed, subject to the limitations of dry and wet years. Approximately 3.4 acres of wetland occurred at the site prior to construction. The 27.6-acre mitigation goal is inclusive of these 3.4 acres of pre-existing wetlands. Consequently, the net goal for this project is to create 24.2 acres. As of 2009 the site has netted about 17.9 wetland acres, or 74% of the 24.2-acre project target.

However, the site contains a substantive preserved upland buffer between grazed uplands and created wetlands and between grazed uplands and Cut Bank Creek within its approximate 18,450 total feet of perimeter fencing (based on MDT plan quantities). Assigning an average 50 foot-wide buffer width over this fencing length equates to approximately 21.18 acres. Applying a 5:1 ratio to this buffer area would then equate to approximately 4.24 acres of upland buffer credit at this site. Subject to Corps approval, adding this 4.24 acres of potential credit to the net 17.9 acres of creation would equate to 22.14 credit acres, bringing the total to within 91% of the target. Additionally, if enhancement credit (based on functional assessment improvement) was applied to the pre-existing 3.4 acres of wetlands at a 3:1 ratio, this could yield an additional 1.13 acres of credit, bringing the total to 23.27 acres of credit, or 96% of the target. The Inner and Outer Oxbows have achieved a net gain of about 19 and 51 functional units, respectively (**Table 16**). This potential credit addition approach would also be subject to Corps approval.

As wetlands have developed within the oxbows and northern excavated area, so have their associated functions and values (**Table 16**). In 2009, the Inner Oxbow continued to rate as Category II site; although, functional units decreased due to acreage decline. Both scrub-shrub (willow) and emergent wetland habitats continue to develop within the Inner Oxbow; in addition, the unconsolidated bottom has transitioned to emergent wetland. In 2009, the Outer Oxbow rated as a Category III wetland, providing emergent wetland habitat. The Northern Excavated Area continued to rate as a Category III wetland, also providing emergent wetland habitat.

Several dike problems were noted during the 2002 summer visit, repaired during 2003, and have been stable into 2009. The Blackfeet Tribe and MDT have developed a weed plan for the Perry Ranch site. Bio-control was established for leafy spurge and Canada thistle and has been monitored through aerial photograph assessments and at three established Weed Photo Points.

Table 16: ***Summary of baseline and 2009 wetland function/value ratings and functional points at the Perry Ranch Wetland Mitigation Project.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	Pre-Construction (1997 method)		Post-construction (2008 method)		
	Inner Oxbow	**Outer Oxbow**	**2009 Inner Oxbow**	**2009 Outer Oxbow**	**2009 Northern Excavated Area**
Listed/Proposed TE Species Habitat	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)
MTNHP Species Habitat	None (0.0)	None (0.0)	High (1.0)	High (0.8)	Mod (0.8)
General Wildlife Habitat	Mod (0.4)	Low (0.1)	Mod (0.7)	High (0.9)	Mod (0.4)
General Fish/Aquatic Habitat	NA	NA	NA	NA	NA
Flood Attenuation	Mod (0.5)	Low (0.2)	High (0.9)	Mod (0.6)	Mod (0.6)
Short and Long Term Surface Water Storage	--	--	High (0.9)	High (0.9)	High (0.9)
Sediment/Nutrient/Toxicant Removal	Mod (0.5)	Mod (0.5)	High (1.0)	High (1.0)	Mod (0.7)
Sediment/Shoreline Stabilization	NA	NA	NA	NA	NA
Production Export/Food Chain Support	Mod (0.7)	Mod (0.6)	Mod (0.4)	Mod (0.5)	Mod (0.5)
Groundwater Discharge/Recharge	High (1.0)	Low (0.1)	Mod (0.7)	Mod (0.7)	Mod (0.7)
Uniqueness	Low (0.3)	Low (0.2)	Mod (0.4)	Mod (0.4)	Mod (0.4)
Recreation/Education Potential	Low (0.1)	Low (0.1)	Low (0.05)	Low (0.05)	Low (0.05)
Actual Points / Possible Points	**4.4 / 10**	**2.7 /10**	6.15 / 9	5.75 / 9	5.15 / 9
% of Possible Score Achieved	**44%**	**27%**	68%	64%	57%
Overall Category	**III**	**IV**	II	III	III
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries (ac)	**2.30**	**1.10**	**4.87**	**9.45**	**6.96**
Functional Units (acreage x actual points)	**10.12**	**2.97**	**29.95**	**54.34**	**35.84**
Net Acreage Gain (ac)	**NA**	**NA**	4.87 – 2.30 = **2.57**	9.45 – 1.10 = 8.35	6.96 - 0.00 = **6.96**
Net Functional Unit Gain (fu)	**NA**	**NA**	29.95-10.12 = **19.83**	54.34 – 2.97 = **51.37**	35.84 – 0.00 = **35.84**
Total Functional Unit Gain	**107.04**				

2.11 Ringling-Galt (Butte District, Year 5)

The Ringling-Galt wetland mitigation project was constructed in 2000 to provide partial mitigation for projected wetland impacts resulting from MDT's Ringling – North highway reconstruction project. Constructed in Watershed #7 (Missouri-Sun-Smith) and the MDT Butte District, the 20-acre mitigation site is located approximately 7 miles north of Ringling in Meagher County. The site occurs on private land (Galt Ranch) located northeast of US Hwy 89, in the Agate Creek drainage.

Design features included minor excavation and placement of a dike across Agate Creek to retain surface water drainage. A primary water control structure was built near the north end of the dike, with an emergency spillway constructed around the north end of the dike. Wetland hydrology is to be primarily provided by surface water from Agate Creek, and supplemented by precipitation. Following construction, the dike and other disturbed areas were seeded with a graminoid seed mix.

No wetland habitat occurred at the site prior to project implementation. Target wetland communities to be produced at the site included open water/aquatic bed and shallow marsh/wet meadow. Target wetland functions to be provided at the site included habitat diversity, flood control & storage, general wildlife habitat, sediment filtration, and nutrient cycling. In May 2000, the COE determined that this site could not be used as permanent mitigation for the Ringling – North project due to the lack of a perpetual conservation easement. Periodic monitoring of the site proceeded in order to document the establishment of wetland habitat to be used as mitigation should the landowner have agreed to a perpetual conservation easement at some point.

The site was formally monitored in 2001, 2003, 2004, 2006, and 2009 but was not monitored in 2002, 2005, 2007 or 2008 due to extreme drought conditions and lack of surface water. To date, the site has yet to create any wetland habitat and therefore no credit, COE approved or otherwise, for wetland creation can be attributed to this project. In August 2009, the site supported 2.24 acres of non-wetland aquatic habitat (open water) and up to 3.00 acres earlier in the spring/summer. As no wetland habitat occurs within the monitoring area, a functional assessment was not completed for this site.

Given the lack of wetland development since the project was constructed in 2000, and the lack of a perpetual conservation easement at the site, MDT has decided to terminate monitoring at this site.

The dike, water control structure, and emergency spillway were generally in good condition during the mid-season visit. Cattle are using the standpipe near the top of the dike as a scratching post; however, it does not appear as though the pipe has sustained any damage from such use.

In general, it appears that the water available to the site is insufficient during some years to support the proposed wetland creation. This is likely due to persistent drought conditions in the area. However, according to NRCS personnel familiar with the drainage, Agate Creek flows enough water during years of normal or above normal precipitation, to flood the basin behind the dike. At this time, no corrective actions are recommended, as lack of wetland development to date has apparently resulted from sub-normal precipitation and runoff.

2.12 Rock Creek Ranch (Glendive District, Year 5)

The Rock Creek Ranch is located in Valley County, approximately three miles east of Hinsdale along the north side of U.S. Highway 2. The ranch is situated east of Rock Creek and north of the Milk River in Watershed 11. The MDT sought to purchase up to 50 wetland credit acres in Watershed 11 (Milk River) to offset current and potential future wetland impacts resulting from proposed highway construction projects within the watershed. Potential highway impacts have not been quantified or characterized at this time.

Constructed in fall 2004, the Rock Creek Ranch wetland mitigation project seeks to create / restore (re-establish) up to 75 acres of primarily emergent and, as a minor component, scrub/shrub wetlands, within an approximate 116.75-acre perpetual conservation easement in the

southeast corner of the ranch property. The first 50 acres of successfully established credits would be allocated to MDT, and MDT would have the option of purchasing additional wetland credits developing within the easement. Approximately 1.08 acres of wetlands occurred in the project area prior to construction. This does not include pre-existing wetlands in an excavated east-west trench within the easement just north of U.S. Highway 2, which were not part of the Rock Creek Ranch project, but were previously constructed by MDT to mitigate wetland impacts associated with the Hinsdale East and West project.

The proposed wetlands are designed to collect water from irrigation and natural seasonal flow down Long Coulee, as well as irrigation return flow and precipitation. As the low point on the ranch, all irrigation return water flows through the wetland mitigation area with the exception of water flowing in the U.S. Highway 2 roadside ditch. Water is retained on the site by two low dikes in the southeast property corner

Credit ratios and approximate associated credit acreages agreed to by the COE are listed below. While up to 76 acres of credit may eventually develop, the short term current MDT credit goal at the site is 50 acres.

Wetland Creation / Re-Establishment (1:1 ratio):	75 acres created / re-established 75 acres wetland mitigation credit
Upland Buffer (3,100 x 50 feet along south and southwest wetland borders; 1:4 ratio):	3.6 acres of buffer established 0.9 acre wetland mitigation credit
Wetland Enhancement (1,000 x 15 feet, 1:3 ratio):	0.34 acre enhanced 0.11 acre wetland mitigation credit
Total Projected Wetland Mitigation Credit:	76.01 acres

Approximately 86.4 acres of wetlands were delineated on the mitigation site in 2009. Approximately 1.08 acres of wetlands occurred on the site prior to project implementation. Consequently, the net aquatic habitat created / restored to date is 86.4 – 1.08 = 85.32 acres. This is credited at a 1:1 ratio. Additionally, the pre-existing 1.08 acres were enhanced at a credit ratio of 1:3, resulting in 0.36 acre of credit. Finally, approximately 3.6 acres of upland buffer were included in the easement at a credit ratio of 1:4, resulting in 0.9 acre of credit.

As of 2009, the maximum assignable credit at the Rock Creek Ranch mitigation site is 85.32 + 0.36 + 0.9 = 86.58 acres, or 173% of the initial 50-acre goal. Additional wetland communities are likely to form and stabilize with consistent inundation from year to year.

Cottonwood (40 cubic-inch) and three willow species (30 cubic-inch and one-gallon) were planted at the site in 2007. Estimated percent survival in 2008 was <1%, and was 0% in 2009. Plantings were installed in spring 2007 during what would normally have been peak inundation. However, peak inundation was achieved later in 2007 due to plentiful early summer precipitation. Mortality was likely due to longer and deeper inundation conditions than were anticipated during early 2007, coupled with substantive wildlife browse, and drawdown during July 2007; the effects of which were brought to bear in 2008 and 2009. Vexar plant protection

netting was missing in most cases; likely removed by deer. Due to the precipitation-dependent variable inundation regime (as learned over the past 5 years), the flatness of the site (resulting in substantive inundation extent variability from small changes in precipitation), and extensive deer use (and browse) of the area, shrub establishment is unlikely to succeed at this site over the short term. This is also exemplified by the lack of persistent shrub volunteers both onsite and at adjacent wetlands (with the exception of the excavated highway ditch, which has a constant water source). No performance standards were associated with planted species survival.

Functional assessment results are summarized in **Table 17**. For comparative purposes, the functional assessment results for baseline conditions are also included in **Table 17**. The site currently rates as a Category II wetland, a substantial improvement over baseline Category IV ratings. More significantly, the site has gained almost 473 functional units over baseline conditions. Prominent functions include general wildlife habitat, surface water storage, sediment/nutrient/toxicant removal, documented MTNHP species habitat (northern leopard frog, scarlet ammannia), and production export.

All dikes were in good condition during the spring, mid-season, and fall visits with no indications of seepage observed during 2009. Three small patches of Canada thistle, a State-listed noxious weed, were observed and should be treated to prevent further spread.

2.13 Selkirk Ranch (Billings District, Year 3)

The Selkirk wetland mitigation site is located in Wheatland County, Montana, near the community of Two Dot, northeast quarter of Section 9, Township 8 North, Range 12 East. Elevation is approximately 4,640 feet above sea level.

The Selkirk mitigation site was constructed by a private party on private land during the winter of 2006/2007, with the intent of providing MDT wetland mitigation credits (via a credit purchase agreement) prior to Highway 12 road construction in Wheatland County (Watershed #10). The wetland site is intended to provide 60.4 acres of mitigation credit (after subtracting 0.4 acre of wetland fill) and a total of 71.5 wetland acres comprised of herbaceous wet meadow wetland (60.1 acres), scrub/shrub wetland (10.0 acres) and open water (1.4 acres). Upland buffer (2.9 acres) along portions of the wetland circumference, when added to the wetland acreage, comprise a 74.4-acre wetland reserve easement.

Four different crediting areas were developed, each with their own specific performance standards and mitigation ratios. Credit ratios vary from 1:1 to 5:1 for the four types of mitigation: rehabilitation, 1.5:1; re-establishment and creation, 1:1; enhancement, 3:1; and, upland buffer, 5:1. Final ratios will be determined by the COE and will be based on the achievement of performance standards. It should be noted that the current performance standards are under revision, pending Corps review and approval, and the revised standards will be applied during 2010 monitoring.

Table 17: ***Summary of 2003 and 2009 wetland function/value ratings and functional points at the Rock Creek Ranch Wetland Mitigation Project.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	Wetland Numbers		
	Pre-Project Wetland Ditches (2003)	Pre-Project Isolated Wetland Patches (2003)	Post-Project 2009
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.0)	Low (0.1)
MTNHP Species Habitat	Low (0.1)	Low (0.1)	High (1.0)
General Wildlife Habitat	Low (0.3)	Low (0.1)	High (0.9)
General Fish/Aquatic Habitat	NA	NA	NA
Flood Attenuation	Low (0.2)	NA	NA
Short and Long Term Surface Water Storage	Low (0.3)	Low (0.3)	High (0.9)
Sediment/Nutrient/Toxicant Removal	Low (0.3)	Mod (0.5)	High (1.0)
Sediment/Shoreline Stabilization	Low (0.2)	NA	NA
Production Export/ Food Chain Support	Low (0.3)	Low (0.2)	High (1.0)
Groundwater Discharge/Recharge	Low (0.1)	Low (0.1)	Low (0.1)
Uniqueness	Low (0.1)	Low (0.1)	Mod (0.4)
Recreation/Education Potential	Low (0.1)	Low (0.1)	Mod (0.1)
Actual Points / Possible Points	**2.3 / 11**	**1.5 / 9**	**5.5 / 8**
% of Possible Score Achieved	**21**	**17**	**69**
Overall Category	**IV**	**IV**	**II**
Total Acreage of Assessed Wetlands within Easement (ac)	**0.77**	**0.31**	**86.4**
Functional Units (acreage x actual points) (fu)	**1.77**	**0.47**	**475.2**
Net Acreage Gain (ac)	NA	NA	**85.32**
Net Functional Unit Gain (fu)	NA	NA	**472.96**

In 2009, the wetland delineation boundary includes 69.5 wetland acres; shallow surface water is <20 inches deep and is vegetated with aquatics and emergent vegetation (edges). In 2009, acreage of the shallow surface water features is included in the total wetland acreage. Only 0.31 acre of upland persists within the wetland boundary. Approximate wetland acreages within the various mitigation credit zones have been estimated using digitized site plans and the 2009 wetland delineation boundary. Mitigation credit zones include 1.0 acre in the enhancement credit zone, 36.51 acres in the re-establishment/creation credit zone, 31.99 acres in the rehabilitation credit zone, and 4.59 acres of upland around portions of the wetland circumference. In general, most of the wetland performance criteria have been met for each mitigation credit area, with two major exceptions:

1) creeping foxtail comprises > 10% aerial coverage within the re-establishment /creation and rehabilitation credit areas.
2) The S/S aerial coverage within each planting zone must equal or exceed 30% to be considered a S/S community and target stem density must be at a density of 500 stems/acre. Stems must survive two years before they are included in the stem count. Approximately 150 leaf-bearing planted woody stems were counted site wide during the monitoring visit; percent cover cannot be viably assessed at this time. A mitigation credit acreage summary is included in **Table 18**.

Functional assessment results are presented in **Table 19**. For comparative purposes, the functional assessment results for baseline conditions prepared by Oasis Environmental in 2006 are also included in **Table 19**. All mitigation credit areas, excluding upland buffer, were classified as Category II wetlands in 2009 (**Table 19**).

No weed spraying occurred within the wetland in 2009. In previous years, the property owner has sprayed creeping foxtail within the southern portion of the wetland and adjacent to the small ponds on the east side. Weeds along the berms and drier areas have also been sprayed.

2.14 Sportsman's Campground (Butte District, Year 2)

The Sportsman's Campground wetland mitigation project was constructed in 2007 by MDT. The purpose of the project is to create approximately 15.6 acres of palustrine emergent, scrub/shrub, and aquatic bed wetland habitat to serve as compensatory wetland mitigation for MDT's Sportsman's Campground East and Dickie Bridge – Wise River reconstruction projects. Wetland impacts associated with these two projects total 14.36 acres, with an additional impact of 0.18 acre expected to existing wetlands at the mitigation site during construction of the mitigation project.

This project is located on public land (MDT-owned) adjacent to Montana State Highway 43 (P-46), approximately 13 miles west of Wise River, Montana. The 27.2-acre project site was utilized by MDT for gravel mining, equipment storage, and gravel stockpiling prior to being converted to a wetland mitigation site in 2007. Gravel was mined from the site for use in the Sportsman's Campground East highway reconstruction project, leaving a pit approximately 19.2 acres in size. The mitigation area is hydrologically connected via groundwater to the nearby Big Hole River (located immediately south of Highway 43). Additional seasonal groundwater

Table 18: ***2009 developing wetland and upland mitigation acreage for the Selkirk Wetland Mitigation Reserve***.

Credit Zone	Credit Category	Developed Acreage		Credit Ratio[a]	Interim Maximum Credit Acreage[a,b]	# of Performance Standards Met as of 2009
		Maximum Target	2009			
1	Re-establishment / Creation	38.6	36.51	1:1	36.51	5/7
2	Rehabilitation	31.9	31.99	1.5:1	21.32	6/8
3	Enhancement	1.0	1.0	3:1	0.33	8/8
Total Wetland Acreage		**71.5**	**69.5**	**--**	**58.16**	
4	Upland Buffer[c]	2.9	4.59 [d]	5:1	0.92	
TOTAL ACREAGE[c]		**74.4**	**74.4**	**--**	**59.1**	

[a] The Corps of Engineers is the regulatory authority and will determine the actual mitigation ratios and interim and/or final credits as they pertain to the success criteria.

[b] Not all conditions in the success criteria have been fulfilled, therefore final credits have not been calculated. Crediting is at discretion of COE and MDT.

[c] As a result of map fit issues, the total project acreage was less than 74.4 acres. With improved clarity of the 2009 aerial photo, project boundary acreage has been adjusted to more accurately fit the aerial photo. Subsequently, upland buffer area (that area between the wetland and project boundary lines) has been adjusted to compensate for these adjustments.

[d] Acreage does not include upland community inside the wetland boundary (2009: 0.31 acre)

recharge occurs at the site as a result of snowmelt from the nearby Pintlar Mountain Range to the north.

The gravel pit was excavated to varying depths so as to provide a range of inundation within developing wetlands including areas of permanent, semi-permanent, and seasonal inundation. Four small islands were also included as part of the design. Prior to project implementation,wetland habitat existed in two areas within the project site, both as a result of past gravel mining in this area. A 1.62 acre open water pond with an emergent / scrub-shrub fringe occurs in the north central portion of the project, while a 0.35 acre emergent marsh wetland occurs immediately south of the pond area. Target wetland communities to be produced across the site included open water/aquatic bed, scrub/shrub, and shallow marsh/wet meadow.

As of 2009, the Sportsman's Campground site has developed 7.39 acres of Class II wetland, 2.46 acres of transitional area (transitioning to wetland), and 3.70 acres of transitional open water for a total of 13.55 acres of aquatic habitat. When added to the 0.66 acre of pre-existing wetland and 1.31 acres of pre-existing open water, there is a total of 15.52 acres of aquatic habitat within monitoring limits.

Table 19: ***Summary of 2006 [1] and 2009 wetland function/value ratings and functional points at the Selkirk Wetland Mitigation Reserve.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	Re-Establishment & Creation[2]	Rehabilitation		Enhancement	
	2009	2006	2009	2006	2009
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)
MNHP Species Habitat	Mod (0.7)	Low (0.0)	Mod (0.7)	Low (0.0)	Low (0.0)
General Wildlife Habitat	Exc. (1.0)	Low (0.3)	Exc. (1.0)	Mod (0.5)	High (0.9)
General Fish/Aquatic Habitat	NA	NA	NA	NA	NA
Flood Attenuation	Mod. (0.6)	NA	Mod (0.6)	NA	Low (0.2)
Short and Long Term Surface Water Storage	High (1.0)	Low (0.3)	High (1.0)	Low (0.2)	Mod (0.4)
Sediment, Nutrient, Toxicant Removal	High (1.0)	Mod (0.6)	High (1.0)	High (0.9)	High (1.0)
Sediment/Shoreline Stabilization	High (1.0)	NA	High (1.0)	NA	High (1.0)
Production Export/Food Chain Support	High (0.8)	Mod (0.7)	High (0.8)	Mod (0.6)	High (0.8)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Mod (0.4)	Low (0.1)	Mod (0.4)	Low (0.3)	Mod (0.4)
Recreation/Education Potential	High (1.0)	Low (0.1)	High (1.0)	Low (0.1)	High (1.0)
Actual Points/Possible Points	**8.5 / 11**	3.1 / 9	**8.5 / 11**	3.6 / 9	**6.7 / 11**
% of Possible Score Achieved	**77%**	34%	**77%**	43%	**61%**
Overall Category	**II**	III	**II**	III	**II**
Total Acreage of Assessed Aquatic Habitat within AA Boundaries	**36.51**	**31.9**	**31.9**	**1.0**	**1.00**
Functional Units (acreage x actual points)	**310.3**	**98.9**	**271.2**	**3.6**	**6.7**
Net Acreage Gain	**36.51**	NA	NA	NA	**0**
Net Functional Unit Gain	**310.3**	NA	**172.3**	NA	**3.1**

[1] Baseline data provided by Oasis (2006a).
[2] Area an upland prior to construction; no functional assessment conducted for this area in 2006.

After year 2 of monitoring, the mitigation site is 2.05 acres of created aquatic habitat short of the anticipated goal of 15.6 acres and 0.81 acre short of the amount necessary to cover the 14.36 acres of impact. However, an additional approximate 1.5 acres of aquatic habitat is possible at the site should the area currently identified as cobble/gravel (1.06 acres) and the fringe areas around the four ponds eventually develop into wetland. As recommended in this report, MDT may need to spread a layer of topsoil across the area of cobble/gravel before a vegetative component is recognized in this area. The area is seasonally inundated and would likely develop wetland characteristics given a substrate suitable for plant establishment. Over time, a broader wetland fringe around the perimeter of the four constructed ponds will likely develop, providing for an additional 0.5 – 1.0 acres of wetland within project boundaries. With an additional 1.5 acres of aquatic habitat possible, the mitigation site has the potential to support 15.00 acres of created aquatic habitat which is less than originally anticipated, but enough to cover the 14.36 acres of highway construction related impacts at a ratio of 1:1.

MDT project files indicate that wetlands occurring within proposed disturbance boundaries prior to construction rated as Category IV using the MDT 1999 MDT Montana Wetland Assessment Method. Assessment forms for this evaluation are not available. In 2009, the Sportsman's Campground Wetland Mitigation Site rated as a Category II wetland because it achieved a high wildlife habitat rating (**Table 20**). The site also rated high for short and long term surface water storage, production export/food chain support, and groundwater discharge/recharge (**Table 20**).

One small infestation of spotted knapweed was identified. Results of wetland seeding were mixed in 2008, with some areas developing well while others did not. Transitional areas and mudflat areas showed significant vegetative growth in 2009 and no additional seeding is recommended at this time. Areas identified as cobble/gravel (CG) will likely need to be covered with topsoil before desired vegetation becomes established in these areas. A minimum of 4 inches of topsoil in these areas is recommended.

2.15 US Highway 93 Onsite (Missoula District, Years 1, 2, and 3)

The US Highway 93 Onsite Wetland Mitigation Sites were developed to mitigate wetland impacts associated with eight MDT segments of the US 93 Evaro to Polson highway reconstruction project along US Highway 93. The 2009 monitoring effort documented the third year of monitoring at two of the five US Highway 93 sites monitored in 2009: Bouchard and Jocko Spring Creek property. The Peterson property was monitored for a second year in 2009. Two new mitigation sites, Mission Creek and Mud Creek, were monitored for the first time in 2009.

The US Highway 93 Onsite Wetland Mitigation Sites are all located in Lake County in Watershed # 3 (Lower Clark Fork). The five mitigation sites are located north of Arlee, Montana between Mileposts 20 and 50. The Bouchard and Jocko Spring Creek sites are located between Mileposts 20 and 25, along a segment identified as Project 4 - White Coyote Road-South of Ravalli. The Mission Creek site is located south of St. Ignatius near Milepost 32, along the segment identified as Project 6 – Medicine Tree (Old US 93)-vicinity Red Horn Road. The Peterson site is located north of St. Ignatius near Milepost 35, also along the segment identified

Table 20: ***Summary of 2009 wetland function/value ratings and functional points at the Sportsman's Campground Wetland Mitigation Site.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2009
Listed/Proposed T&E Species Habitat	Low (0.00)
MTNHP Species Habitat	Low (0.10)
General Wildlife Habitat	High (0.90)
General Fish/Aquatic Habitat	NA
Flood Attenuation	NA
Short and Long Term Surface Water Storage	High (0.90)
Sediment/Nutrient/Toxicant Removal	Mod (0.70)
Sediment/Shoreline Stabilization	Low (0.30)
Production Export/Food Chain Support	High (0.80)
Groundwater Discharge/Recharge	High (1.00)
Uniqueness	Mod (0.40)
Recreation/Education Potential	High (0.20)
Actual Points / Possible Points	**5.3 / 9**
% of Possible Score Achieved	**59%**
Overall Category	**II**
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries	**15.52**
Functional Units (acreage x actual points)	**82.25**

as Project 6. The Mud Creek Site is located south of Pablo near Milepost 50, along a segment indentified as Project 7 – Spring Creek Road to Minesinger Trail.

2.15.1 Bouchard Property – Year 3

The Bouchard Property mitigation site is a 40-acre parcel adjacent to US 93 at approximately Milepost 20.5. The Bouchard Property is located in Township 17N, Range 20W, Section 26. The site occurs east of US Highway 93, between the highway and Spring Creek. Spring Creek runs along the east side of the parcel boundary and historically provided a major source of surface water to the Bouchard property. The parcel previously included an abandoned home site, fish rearing ponds, and a system of drainage ditches and berms used to control water flow on the property. The site is near the headwaters of Jocko Spring Creek and has a high water table that inundates a large portion of the site. Proposed mitigation actions included the following:

- Plug drainage ditches and remove berms adjacent to the existing fish ponds;
- Excavate topography in the southeast corner of the property to lower elevation to that of adjacent wetlands; and
- Create forested, scrub-shrub and emergent wetland vegetation types with installation of native plant species in the excavated cells.

The target wetland community types include forested and scrub-shrub, dominated by a smaller cover area of quaking aspen / red osier dogwood habitat, and larger coverage of Bebbs willow and bog birch / beaked sedge communities. Initial construction was completed in summer 2006, and revegetation with herbaceous plants and shrubs was completed in August-October 2006.

As of 2009, approximately 28.53 aquatic habitat acres (28.14 acres of wetlands, 0.39 acre of shallow open water) occur on the mitigation site. Pre-project wetland delineation documented 19.03 acres of wetlands / open water. The initially-calculated net increase in aquatic habitat acres to date is approximately 28.53 – 19.03 = 9.50 acres. **Table 21** lists the current credits based on COE and CSKT credit ratios, including this year's calculated ratio for the rehabilitation areas at the Bouchard Property site. The Bouchard Property wetland mitigation site is progressing toward reaching the expected credits. The site currently provides slightly less than the expected creation credit acres, but is exceeding expectations in the remaining categories as a whole, and is predicted to continue gaining in functional points and credit acreage as the wetlands continue to develop.

Table 21. ***Current credits at the Bouchard Property Mitigation Site*.**

Targeted Mitigation Type	Current Wetlands (Acre)	Credit Ratio		Current Credit (Acre)		Expected Credit (Acre)	
		COE	CSKT	COE	CSKT	COE	CSKT
Creation	4.79	1:1	3.36:1	4.79	1.43	5.16	1.54
Re-establishment / primary restoration	4.71[1]	1:1	1.86:1	4.71	2.53	2.94	1.58
Rehabilitation / secondary restoration	19.03	2.86:1	1.86:1	6.65	10.23	4.05	10.23
Total	**28.53**			**16.15**	**14.19**	**12.15**	**13.35**

[1] Includes wetlands delineated outside of targeted creation, re-establishment, and rehabilitation areas and assumed to have been re-established by project implementation.

Functional assessment results are presented in **Table 22**. For comparative purposes, the functional assessment results for baseline conditions are also included.

Overall survival ratings are considered moderate to high based on visual assessment. Plant growth was vigorous and looked healthy with few discolored leaves. Browse protection was intact during the monitoring. Browse control was removed from plantings following the annual monitoring to allow plants to thrive without constricted netting. Planted species have reached a large enough size that they can withstand some browse from local wildlife.

Several Category 1 noxious weeds were present: Canada thistle, hound's-tongue, oxeye daisy, St. John's wort, and spotted knapweed. Noxious weeds should be controlled in accordance with the *Noxious Weed Management Guidelines, Species and Control Methods for US 93 Evaro to Polson Wetland Mitigation Sites* contained in the mitigation plan.

2.15.2 Jocko Spring Creek – Year 3

The 6.5-acre Jocko Spring Creek mitigation site is located along the south side of the Montana Rail Link (MRL) grade just north of the Jocko Spring Creek highway crossing. The site occurs at approximately Milepost 23 in Township 17N, Range 20W, Section 16. Jocko Spring Creek flows under the highway and the MRL bridge in a newly constructed channel, and then flows northwest parallel to the railroad grade before it connects to the existing channel alignment on the northwest end of the project area. The mitigation site encompasses the new channel and its

Table 22: ***Summary of baseline and 2009 wetland function/value ratings and functional points at the Bouchard Wetland Mitigation Project.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	Baseline (AA-1)[1]	2009 (AA-1)[2]
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)
MTNHP Species Habitat	Low (0.1)	Low (0.1)
General Wildlife Habitat	High (0.8)	High (0.9)
General Fish/Aquatic Habitat	NA	NA
Flood Attenuation	NA	NA
Short and Long Term Surface Water Storage	High (0.8)	High (0.9)
Sediment/Nutrient/Toxicant Removal	NA	High (1.0)
Sediment/Shoreline Stabilization	NA	NA
Production Export/Food Chain Support	High (0.9)	High (0.9)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Mod (0.6)	Mod (0.6)
Recreation/Education Potential	Low (0.1)	Mod (0.5)
Actual Points / Possible Points	**4.6 / 8**	**6.2 / 9**
% of Possible Score Achieved	**56%**	**69%**
Overall Category	**III**	**II**
Total Acreage of Assessed Wetlands and Open Water within Easement (ac)	**19.03**	**28.53**
Total Functional Units (acreage x actual points) (fu)	**87.54**	**176.89**
Net Acreage Gain (ac)	**NA**	**9.5**
Net Functional Unit Gain (fu)	**NA**	**89.35**

[1] The baseline assessment was performed by Herrera Environmental Consultants using the 1999 MDT Montana Wetland Assessment Method (MWAM).

[2] The post-project functional assessment was performed by PBS&J during 2009 using the 1999 MDT MWAM because the mitigation crediting systems require direct comparisons of pre- and post-project functions.

floodplain. Existing flows from Jocko Spring Creek provide water for the wetland mitigation site. Objectives included the following:

- Relocating Jocko Spring Creek from between the railroad and highway to a newly constructed channel west of the railroad;
- Constructing a new culvert under the railroad and in-line with the new highway bridge;
- Applying soft bioengineering treatments and installing near-bank plant material along in the new channel;
- Filling the abandoned Jocko Spring Creek channel with cobbles and gravel, topping with salvaged wetland soil, and planting;
- Creating scrub-shrub and emergent vegetation types with native wetland shrub and grass-like plantings and broadcast seeding of a wetland mix;
- Salvaging sod from the excavated channel placing along stream banks;
- Excluding grazing from the property; and
- Eliminating the existing vehicle pullout along the US Hwy. 93.

The target wetland community is a palustrine scrub-shrub system supporting Bebb's willow with inclusions of emergent habitat. Initial construction of the new channel and floodplain was completed in March 2006 with prevegetated coir mats installed during April 2006. Revegetation efforts, including shrub and herbaceous plantings, were completed during August to October 2006.

As of 2009, approximately 1.81 acres of wetland and 0.27 acres of open water / channel occur on the mitigation site, for a total of 2.08 acres of aquatic habitat. Subtracting the original 2.0 acres of pre-project wetlands from this total yields a current net of approximately 0.08 wetland/open water acres. **Table 23** lists the current credits based on COE and CSKT credit ratios, including this year's calculated ratio for the rehabilitation areas at the Jocko Spring Creek site. The Jocko Spring Creek wetland mitigation site is progressing toward reaching the expected credits. Current credit acres are below expected credit acres, but with further development of targeted wetland creation between the highway and the railroad grade, the site could reach the mitigation goals. Functional assessment scores are predicted to increase as vegetation matures.

Table 23: ***Current credits at the Jocko Spring Creek Mitigation Site.***

Targeted Mitigation Type[1]	Current Wetland (Acre)[1]	Credit Ratio		Current Credit (Acre)		Expected Credit (Acre)	
		COE	CSKT	COE	CSKT	COE	CSKT
Creation	0.66	1:1	3.36:1	0.66	0.19	2.17	1.17
Rehabilitation / primary restoration	0.82	1:1	1.86:1	0.82	0.44	0.59[2]	0.32
Enhancement / secondary restoration	0.05	7.69:1	--	0.01	0.0	0.01	0.0
Assumed pre-existing wetland (based on the site plan) occurring outside of Mitigation Type boundaries	0.55	--	--	--	--	--	--
TOTAL	**2.08**			**1.49**	**0.63**	**2.77[2]**	**1.49**

[1] Target mitigation type zone boundaries were derived from the site plan.
[2] Corrected from values presented in the 2007 monitoring report. The revised figures are based on the site plan.

Functional assessment results are presented in **Table 24**. For comparative purposes, the functional assessment results for baseline conditions are also included. The Jocko Spring Creek is currently rated as a Category II site. Functional points and ratings improved significantly for several assessed parameters over baseline conditions.

The observed plantings along all transects looked healthy and exhibited vigorous growth for the season. Few dead species were recorded. Plantings were protected with browse control nets that offered protection from local wildlife. Plantings along the wetland fringes were flourishing and received more than adequate hydrology to sustain continued growth.

Category 1 noxious weeds Canada thistle and hounds tongue were present at moderate cover values. Noxious weeds should be controlled in accordance with the *Noxious Weed Management Guidelines, Species and Control Methods for US 93 Evaro to Polson Wetland Mitigation Sites* contained in the mitigation plan.

Table 24: ***Summary of baseline and 2009 wetland function/value ratings and functional points at the Jocko Spring Creek Wetland Mitigation Project.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	Baseline (AA-1)[1]	2009 (AA-1)[2]
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)
MTNHP Species Habitat	Mod (0.6)	Mod (0.6)
General Wildlife Habitat	Mod (0.5)	Mod (0.7)
General Fish/Aquatic Habitat	High (0.9)	High (0.9)
Flood Attenuation	Low (0.2)	Low (0.1)
Short and Long Term Surface Water Storage	High (0.8)	High (0.8)
Sediment/Nutrient/Toxicant Removal	Mod (0.6)	High (0.9)
Sediment/Shoreline Stabilization	Mod (0.7)	High (1.0)
Production Export/Food Chain Support	Mod (0.7)	High (0.9)
Groundwater Discharge/Recharge	High (1)	High (1.0)
Uniqueness	Mod (0.4)	Mod (0.5)
Recreation/Education Potential	High (1.0)	High (1.0)
Actual Points / Possible Points	**7.7 / 12**	**8.7 / 12**
% of Possible Score Achieved	**64%**	**73%**
Overall Category	**III**	**II**
Total Acreage of Assessed Wetlands and Open Water within Easement (ac)	**2.0**	**2.08**
Total Functional Units (acreage x actual points) (fu)	**15.40**	**18.1**
Net Acreage Gain (ac)	**NA**	**0.08**
Net Functional Unit Gain (fu)	**NA**	**2.7**

[1] The baseline assessment was performed by Herrera Environmental Consultants using the 1999 MDT Montana Wetland Assessment Method (MWAM).
[2] Performed by PBS&J during 2009 using the 1999 MDT MWAM because the mitigation crediting systems require direct comparisons of pre- and post-project functions.

2.15.3 Mission Creek – Year 1

The 0.22-acre Mission Creek mitigation site occurs in the Project 6 segment just south of St. Ignatius adjacent to the highway. The site is located between Milepost 32 and 33 in Township 18N, Range 20W, Section 14. The Mission Creek site consists of Mission Creek and adjacent floodplains along the drainage. Site hydrology is provided by perennial Mission Creek.

The "wetland mitigation" proposal for this site involved several items included under the general category of floodplain "system" re-establishment (as opposed to wetland re-establishment exclusively), and included removing the culvert and roadway fill, restoring the stream channel, and expanding the floodplain underneath the new bridge. The intent was to line the stream channel with stream aggregates and install class 1 riprap and boulder clusters along the channel under the bridge and a combination of class 1 riprap, boulder clusters, and embedded brush layers in the portions of the stream channel extending upstream and downstream from the drip line of the bridge; reestablish a small floodplain underneath the bridge; plant native vegetation along the floodplain both upstream and downstream of the bridge, extending the vegetation approximately 6.6 feet under the bridge with compacted subgrade above the ordinary high water mark to allow wildlife passage; place gravels below the ordinary high water mark to line the newly opened channel; install 50 individual brush pieces along the stream channel at about the ordinary high water mark from approximately 6.6 feet underneath the bridge extending both

upstream and downstream on both sides of the channel; and remove fill on the southwest side of the new bridge abutment and revegetate the area.

Restoration of the channel and floodplain was completed in summer 2007. Revegetation efforts, including riparian tree, shrub and herbaceous plantings, were completed during summer of 2008.

As of 2009, the total wetland habitat at the site equates to approximately 0.02 acre, and the non-wetland floodplain re-establishment / enhancement areas totaled 0.2 acre, for a total of approximately 0.22 acre of wetland and non-wetland floodplain "re-establishment" within the Mission Creek floodplain in accordance with the site plan.

To determine the current crediting acres for the Mission Creek site, the total wetland and non-wetland floodplain "re-establishment" acreage was subjected to agreed-upon credit ratios for both the CSKT and Corps crediting systems. The Mission Creek mitigation types consist of re-establishment (Corps) / primary restoration (CSKT).

Table 25 lists the current credits based on COE and CSKT credit ratios for the re-establishment areas at the Mission Creek site. The Mission Creek wetland mitigation site has reached the expected credits for the proposed Corps credits. The current credits are slightly below the expected CSKT credits by 0.04 acre.

Table 25: ***Current credits at the Mission Creek Mitigation Site.***

Targeted Mitigation Type[1]	Current (Acre)[1]	Credit Ratio		Current Credit (Acre)		Expected Credit (Acre)	
		COE	CSKT	COE	CSKT	COE	CSKT
Rehabilitation / primary restoration areas (wetland and non-wetland per site plan)	0.22	1:1	1.86:1	0.22	0.11	0.22[1]	0.15
TOTAL	**0.22**			**0.22**	**0.11**	**0.22**	**0.15**

[1] Target mitigation type zone boundaries were derived from the site plan.

Functional assessment results are presented in **Table 26**. For comparative purposes, the functional assessment results for baseline conditions are also included. The Mission Creek site is currently rated as a Category I site, as it was during the baseline assessment. The AA encompasses portions of the up- and down-stream areas of existing forested, scrub-shrub and emergent wetlands located on either side of restoration zones. These areas were included in the pre-project evaluation and also included in the 2009 evaluation for consistency with pre- and post-project comparison.

The observed plantings along all transects looked healthy and exhibited vigorous growth for the season. Few dead species were recorded. Plantings along the wetland fringes were flourishing and received more than adequate hydrology to sustain continued growth.

Category 1 noxious weeds Canada thistle and hounds tongue were present at moderate cover values. Noxious weeds should be controlled in accordance with the *Noxious Weed Management Guidelines, Species and Control Methods for US 93 Evaro to Polson Wetland Mitigation Sites* contained in the mitigation plan.

Table 26: ***Summary of baseline and 2009 wetland function/value ratings and functional points at the Mission Creek Wetland Mitigation Project.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	Baseline (AA-1)[1]	2009 (AA-1)[2]
Listed/Proposed T&E Species Habitat	High (1.0)	High (1.0)
MTNHP Species Habitat	Mod (0.7)	Mod (0.7)
General Wildlife Habitat	High (0.9)	High (0.9)
General Fish/Aquatic Habitat	High (0.9)	High (0.9)
Flood Attenuation	Mod (0.7)	Mod (0.7)
Short and Long Term Surface Water Storage	High (0.8)	High (0.8)
Sediment/Nutrient/Toxicant Removal	High (0.9)	High (0.9)
Sediment/Shoreline Stabilization	High (1.0)	High (1.0)
Production Export/Food Chain Support	High (1.0)	High (1.0)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Mod (0.5)	Mod (0.5)
Recreation/Education Potential	High (1.0)	High (1.0)
Actual Points / Possible Points	**10.4 / 12**	**10.4 / 12**
% of Possible Score Achieved	**87%**	**87%**
Overall Category	**I**	**I**
Total Acreage of Assessed Wetlands and Open Water within Easement (ac)	**Unknown**	**0.77[3]**
Total Functional Units (acreage x actual points) (fu)	**Unknown**	**8.0**
Net Acreage Gain (ac)	**NA**	**Unknown**
Net Functional Unit Gain (fu)	**NA**	**Unknown**

[1] The baseline assessment was performed by Herrera Environmental Consultants using the 1999 MDT Montana Wetland Assessment Method (MWAM).
[2] Performed by PBS&J during 2009 using the 1999 MDT MWAM because the mitigation crediting systems require direct comparisons of pre- and post-project functions. [3]Includes 0.02 acre of wetland and approximately 0.75 acre of Mission Creek within monitoring limits.

2.15.4 Mud Creek – Year 1

The 2.54-acre Mud Creek mitigation site occurs in the Project 7 segment just south of Pablo. The site is located near Milepost 50 in Township 21N, Range 20W, Section 13. The mitigation site consists of Mud Creek and adjacent wetlands dominated by emergent vegetation and remnant stands of hawthorn shrubs. Site hydrology is sourced by perennial Mud Creek that flows from the east under the newly constructed bridges along Highway 93 and through the southeast corner of the site.

Mitigation objectives for both wetland rehabilitation and creation include the following:

- Fencing the mitigation site to prevent cattle grazing;
- Controlling invasive weedy species such as reed canarygrass;
- Performing wetland mitigation planting to increase diversity of wetland plants;
- Constructing and realigning the Mud Creek channel to provide higher surface water elevation allowing for recharge of adjacent wetlands; and
- Grading and revegetating the abandoned portion of Mud Creek located within the proposed US Highway 93 median.

The target wetland community is a palustrine forested and scrub-shrub system supporting black cottonwood, thin-leaf alder, and Bebb's willow with inclusions of emergent wetland habitat. Initial construction of the new channel and floodplain was completed in summer 2007 with the installation of prevegetated coir mats along the channel. Revegetation efforts, including tree, shrub and herbaceous plantings, were completed during late summer 2008.

As of 2009, approximately 2.02 acres of wetland occur on the mitigation site. The channel was included in the wetland totals. Additional acreage may form with additional time and continued increase in hydrology levels. **Table 27** lists the current credits based on COE and CSKT credit ratios, including this year's calculated ratio for the rehabilitation areas at the Mud Creek site. Current credits are well below the expected credits, due to apparent discrepancy in the original acreage calculation in the mitigation plan. The mitigation plan proposed a total of 6.81 acres of Corps credit, but in actuality, following construction, the total area of the site is 2.54 acres, including 0.52 acres of uplands. Construction plans were followed as specified in the plan and existing conditions at the site are similar to the proposed design plan. This discrepancy of 4.8 acres of wetlands leaves the site well below expected credits. The site is predicted to continue gaining functional points as the wetlands continue to develop.

Table 27: ***Current credits at the Mud Creek Mitigation Site.***

Targeted Mitigation Type	Current Wetland (Acre)	Credit Ratio		Current Credit (Acre)		Expected Credit (Acre)	
		COE	CSKT	COE	CSKT	COE	CSKT
Creation	1.49	1:1	3.36:1	1.49	0.44	6.18	3.22
Rehabilitation / secondary restoration	0.53	4.35:1	1.86:1	0.12	0.28	0.63	0.33
TOTAL	**2.02**	**--**	**--**	**1.61**	**0.72**	**6.81**	**3.55**

The Mud Creek site currently rates as a Category III site. Based on functional assessment results, approximately15.76 functional units occur at the Mud Creek mitigation site (**Table 28**). Baseline functional assessment results are also provided for comparative purposes (**Table 28**).

Overall, planted woody species survival ratings are considered moderate to high based on visual assessment. Plant growth was vigorous and looked healthy with few discolored leaves.

Three Category 1 noxious weeds were present at low to high cover values and should be treated: Canada thistle, oxeye daisy, and hounds. A Category 2 noxious weed, yellowflag iris, was also present within the mitigation site. Noxious weeds should be controlled in accordance with the *Noxious Weed Management Guidelines, Species and Control Methods for US 93 Evaro to Polson Wetland Mitigation Sites* contained in the mitigation plan.

Table 28: ***Summary of baseline and 2009 wetland function/value ratings and functional points at the Mud Creek Wetland Mitigation Project.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	Baseline (AA-1)[1]	2009 (AA-1)[2]
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)
MTNHP Species Habitat	Low (0.1)	Low (0.1)
General Wildlife Habitat	Mod (0.5)	Mod (0.7)
General Fish/Aquatic Habitat	Low (0.3)	Mod (0.7)
Flood Attenuation	Low (0.4)	Mod (0.4)
Short and Long Term Surface Water Storage	High (0.8)	High (0.8)
Sediment/Nutrient/Toxicant Removal	Mod (0.6)	High (0.9)
Sediment/Shoreline Stabilization	Mod (0.7)	High (1.0)
Production Export/Food Chain Support	High (0.9)	High (0.9)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Mod(0.4)	Mod (0.5)
Recreation/Education Potential	Low (0.1)	Mod (0.5)
Actual Points / Possible Points	**6.1 / 12**	**7.8 / 12**
% of Possible Score Achieved	**50%**	**65%**
Overall Category	**III**	**III**
Total Acreage of Assessed Wetlands and Open Water within Easement (ac)	Unknown	**2.02**
Total Functional Units (acreage x actual points) (fu)	Unknown	**15.76**
Net Acreage Gain (ac)	NA	Unknown
Net Functional Unit Gain (fu)	NA	Unknown

[1] The baseline assessment was performed by Herrera Environmental Consultants using the 1999 MDT Montana Wetland Assessment Method.
[2] Performed by PBS&J during 2009 using the1999 MDT MWAM because the mitigation crediting systems required a direct comparisons of pre- and post-project functions.

2.15.5 Peterson Property – Year 2

The 30-acre Peterson mitigation site occurs approximately 3 miles north of St. Ignatius and west of the highway. The site is south of Milepost 36 in Township 16N, Range 20W, Section 2. The Peterson site consists of a wetland draw dominated by herbaceous vegetation. Site hydrology is sourced by an unnamed perennial tributary to Post Creek. Objectives included the following:

- Constructing impoundments using twelve log crib structures and earthen berms;
- Excavating an oxbow basin along the outer fringe of existing wetland boundaries; and
- Planting shrubs and herbaceous plugs within the oxbow basin, wetland fringe, and log crib structures.

The targeted wetland community type at this site is a scrub-shrub / emergent vegetation type, supporting thinleaf alder / red osier dogwood and Nebraska sedge / Baltic rush habitat type. Revegetation work at this site was completed in October 2006.

As of 2009, approximately 3.71 acres of wetland occur on the mitigation site. The channel was included in the wetland totals. Additional acreage may form with additional time and continued increase in hydrology levels. **Table 29** lists the current credits based on COE and CSKT credit ratios, including this year's calculated ratio for the rehabilitation areas at the Peterson site.

Table 29: ***Current credits at the Peterson Property Mitigation Site.***

Targeted Mitigation Type	Current Wetland (Acre)	Credit Ratio		Current Credit (Acre)		Expected Credit (Acre)	
		COE	CSKT	COE	CSKT	COE	CSKT
Creation	2.46[1]	1:1	3.36:1	2.46	0.73	2.14	0.64
Rehabilitation / secondary restoration	1.25	3.57:1	1.86:1	0.35	0.67	0.25	0.67
TOTAL	**3.71**	**--**	**--**	**2.81**	**1.40**	**2.39**	**1.31**

[1] Includes wetlands delineated outside of targeted creation and rehabilitation areas and assumed to have been created by project implementation.

Current credits have exceeded the expected credits, assuming that wetlands delineated outside of the targeted creation and rehabilitation areas were created by project implementation. The site is predicted to continue gaining functional points as the wetlands continue to develop.

Functional assessment results are presented in **Table 30**. For comparative purposes, the functional assessment results for baseline conditions are also included. The Peterson site currently rates as a Category III site.

Table 30: ***Summary of baseline and 2009 wetland function/value ratings and functional points at the Peterson Wetland Mitigation Project.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	Baseline (AA-1)[1]	2009 (AA-1)[2]
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)
MTNHP Species Habitat	Low (0.1)	Low (0.1)
General Wildlife Habitat	Low (0.5)	Mod (0.7)
General Fish/Aquatic Habitat	Low (0.1)	NA
Flood Attenuation	Low (0.2)	Mod (0.4)
Short and Long Term Surface Water Storage	Mod (0.4)	High (0.8)
Sediment/Nutrient/Toxicant Removal	High (0.9)	High (0.9)
Sediment/Shoreline Stabilization	High (0.7)	High (1.0)
Production Export/Food Chain Support	High (0.8)	High (0.8)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Low (0.3)
Recreation/Education Potential	Low (0.1)	Mod (0.5)
Actual Points / Possible Points	**5.3 / 12**	**6.8 / 11**
% of Possible Score Achieved	**44%**	**61%**
Overall Category	**III**	**III**
Total Acreage of Assessed Wetlands and Open Water within Easement (ac)	1.26	**3.71**
Total Functional Units (acreage x actual points) (fu)	6.68	**25.23**
Net Acreage Gain (ac)	NA	**2.45**
Net Functional Unit Gain (fu)	NA	**18.43**

[1] The baseline assessment was performed by Herrera Environmental Consultants using the 1999 MDT Montana Wetland Assessment Method.

[2] Performed by PBS&J during 2009 using the1999 MDT MWAM because the mitigation crediting systems required a direct comparisons of pre- and post-project functions.

Overall, survival ratings of planted woody speciesare considered moderate to high based on visual assessment. Plant growth was vigorous and looked healthy with few discolored leaves. Browse protection was intact and properly functioning.

Four Category 1 noxious weeds were present at low to high cover values and should be treated: Canada thistle, oxeye daisy, sulfur cinquefoil, and whitetop. A Category 3 noxious weed, yellowflag iris, was also present within the mitigation site. Noxious weeds should be controlled in accordance with the *Noxious Weed Management Guidelines, Species and Control Methods for US 93 Evaro to Polson Wetland Mitigation Sites* contained in the mitigation plan.

Log crib structures were assessed for general functionality and were generally considered to be operational, with shallow inundation observed behind the impoundments. However, undercutting and substantive leakage between logs was observed at many of the structures. Subsequent to monitoring, MDT installed additional straw bales and rock at the structures to facilitate sediment entrapment, vegetation establishment, sealing.

2.16 Wagner Marsh (Billings District, Year 5)

The Wagner Marsh site occurs at an elevation of approximately 3,240 feet above mean sea level and is located on the west edge of Billings, just north and east of the intersection of Danford Road and 56th Street. This mitigation site was constructed during the spring of 2005 in the eastern portion of the UpperYellowstone River Watershed (Watershed #13). Wagner Marsh was constructed on MDT property originally purchased in 1954 and used as a borrow area (gravel mining) for construction of the Interstate 90 (I-90) corridor. For this reason the Wagner Marsh is also known as the 'Wagner Pit'. The goal of the project is to create wetland hydrology at the site, and thereby ultimately provide approximately 21.59 acres of palustrine emergent and scrub-shrub wetland within the confines of the 39 acre site. Prior to construction approximately 2.12 acres of palustrine emergent and scrub-shrub wetland and 1.75 acres of open water had been incidentally created by MDT via pit excavation. It is anticipated that this site will compensate for wetland impacts resulting from MDT highway and bridge reconstruction projects in the watershed.

The project incorporates the two incidentally created wetland/open water areas totaling 3.87 acres and seven wetland creation areas (i.e., wetland cells) totaling approximately 17.72 acres for a total projected aquatic habitat size of 21.59 acres. Wetland hydrology is supplied primarily through interception of the groundwater table, with some minimal contributions from precipitation. No surface outlet exists at the site. To ensure sufficient water for the wetland creation areas into the future, MDT previously secured groundwater rights. The establishment of an upland buffer is also a part of this project and will be tied into the crediting for the project.

Based on documentation provided by MDT, approximately 2.12 acres of wetland and 1.75 acres of open water (3.87 acres total of aquatic habitat) were incidentally created on the site via pit excavation prior to formal mitigation project implementation in 2005. MDT is receiving credit for these wetlands as they were originally created in association with the 2000-2001 Shiloh Road interchange project and protected from disturbance by MDT. As of 2009, a total of approximately 16.58 acres of open water and wetland habitat (including the original 3.87 acres)

occur within the monitoring area. This is an increase of approximately 0.39 acres from 2008 totals (16.19 acres).

Of the 16.58-acre 2009 total, approximately 8.26 acres are currently open water habitat and the remaining 8.32 acres are vegetated wetland areas. Much of the 'disturbed-moist' vegetation type of previous monitoring years was classified as emergent wetlands or open water in 2008 and 2009. A 50 foot wetland buffer around wetlands on the site comprises approximately 5.19 acres.

The Corps of Engineers will determine which crediting ratios are applicable to the site. However, using the credit ratios listed, **Table 31** summarizes compensatory mitigation credits developed to date at the Wagner Marsh. Using these assumed credit ratios for wetlands, open water, and upland buffer, approximately 11.28 acres of credit are currently available, an increase of 1.12 credits. If the water levels remain relatively constant, there is considerable potential for the extent of the emergent wetlands to increase, especially in the eastern half of the site.

Table 31: ***2009 mitigation credit summary for the Wagner Marsh Wetland Mitigation Site.***

Credit Category	Acre	Assumed Credit Ratio[1]	Credit [1]
Total Scrub/Shrub and Emergent Wetland	8.32	1:1	8.32
Total Open water	8.26	20% of wetland acreage[2]	1.66
50-foot wide upland buffer	5.19	4:1	1.30
TOTAL	**21.77**		**11.28**

[1] The Corps of Engineers is the regulatory authority and will determine the actual mitigation ratios.
[2] According to July 23, 3004 correspondence from the Corps to MDT, "credit for open water will be limited to no more than 20% of the amount of actual wetland that develops at the site. For example, if 20 acres of wetland develops, up to 4 acres of additional acres of open water credit could be used as wetland mitigation credit."

A total of 550 woody plantings were installed as part of the overall revegetation plan for the site. In 2009 435, or 79 percent, of the plantings were monitored. As of August 13, 2009, the overall survival rate is estimated at 37 percent. This is down from the 92 percent survival rate reported in 2005, the 64 percent survival rate in 2006, the 57 percent survival rate in 2007, and the 45 percent survival in 2008. Of the seven different shrub species planted, the juniper plantings continue to do well and have the highest survival rate (98 percent). Shrub planting mortality at the site is thought to be primarily due to a lack of available water during the summer months; however, in some areas the higher water levels observed in 2009 had actually inundated several plantings and may have caused some mortality at those locations.

The created wetlands at Wagner Marsh were ranked as Category II wetlands in 2006, 2007, 2008, and 2009, as compared to Category IV in 2001(**Table 32**). Functions that increased substantially over 2001 baseline conditions include MTNHP species habitat, general wildlife habitat, short and long term surface water storage, production export, and uniqueness. The pre-project site provided about 16.6 functional units within the monitoring area, and the post-project site currently provides about 111 functional units, for a conservative gain of 94 functional units.

Table 32: ***Summary of 2001 (baseline) and 2009 wetland function/value ratings and functional points at the Wagner Marsh Wetland Mitigation Site.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2001 Baseline Assessment	2009
Listed/Proposed T&E Species Habitat	Low (0.5)	Low (0.0)
MTNHP Species Habitat	Low (0.2)	Mod (0.7)
General Wildlife Habitat	Low (0.3)	High (0.9)
General Fish/Aquatic Habitat	N/A	N/A
Flood Attenuation	N/A	N/A
Short and Long Term Surface Water Storage	Mod (0.6)	High (1.0)
Sediment/Nutrient/Toxicant Removal	Mod (0.7)	Mod (0.7)
Sediment/Shoreline Stabilization	N/A	Mod (1.0)
Production Export/Food Chain Support	Mod (0.6)	High (0.8)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Mod (0.5)
Recreation/Education Potential	Low (0.2)	Mod (0.1)
Actual Points / Possible Points	**4.3 / 9**	6.7/9
% of Possible Score Achieved	**48%**	74%
Overall Category	**IV**	II
Total Acreage of Assessed Aquatic Habitat within AA Boundaries	**3.87**	**16.58**
Functional Units (acreage x actual points)	**16.64**	**111.1**
Net Acreage Gain	NA	**12.71**
Net Functional Unit Gain	NA	**94.46**

A few salt cedar saplings were observed, but were too large to easily remove during monitoring in 2009. The presence of salt cedar on the site should continue to be monitored and individuals removed when encountered, but overall the threat of salt cedar invasion appears to be low. In 2006 it was noted that spotted knapweed was well established on the berm on the east side of the site, and in upland communities and that Canada thistle was prevalent in the cattail area in the northwestern portion of the site. During mid-season visits in 2007 and again in 2008 it was noted that a comprehensive weed spraying program had been implemented at the site. This effort was especially noticeable in 2009 by the relatively low cover of these species now found on the site. Continued, occasional spraying in subsequent years is still needed to prevent future weed issues. A single purple loosestrife plant was observed onsite during the mid-season visit. Within one week MDT had removed this individual from the site. Future infestations of this aquatic noxious weed will be identified and eradicated immediately.

It appears that the supplemental water being pumped into Wagner Marsh from the gravel mine west of 56th St. site is helping to maintain a more consistent water regime throughout the growing season. During the mid-season visit water levels were the highest observed to date. In fact, they were close to topping the emergency outfall located in the middle of the east side. MDT was alerted and the water levels were immediately dropped. Since that time MDT has discussed this issue with the WJH Bird Sanctuary and the gravel mine operators to prevent the water levels from attaining that height.

2.17 West Fork Charley Creek (Glendive District, Year 3)

The project site is located on the Fort Peck Indian Reservation in Valley County, approximately five miles northwest of Frazer, north of U.S. Highway 2. The project occurs in the Lower Missouri River Watershed (Watershed #12), in Township 27N, Range 43E, Section 1. The mitigation site was constructed to compensate for 1.6 acres of unavoidable wetland impacts associated with the MDT Frazer East and West project on U.S. Highway 2 (constructed in 1999), with any remaining credits to be used to offset unavoidable wetland impacts resulting from other MDT highway projects in the watershed as approved by the COE.

Constructed during summer of 2006, the intent of the West Fork Charley Creek project is to provide approximately 5 acres of palustrine, semi-permanent, emergent wetland within an approximate 28.7-acre perpetual conservation easement. This was to be accomplished by flooding a primarily upland area via dike placement across ephemeral West Fork Charley Creek and retaining runoff. Additional project components include upland and wetland seeding, fencing, and implementation of a grazing management plan. Approximately 0.03 acre of emergent wetlands occurred in the project area along the fringes of the creek prior to construction. No COE or Fort Peck Assiniboine and Sioux Tribes performance standards were required.

Approximately 1.73 acres of vegetated wetlands and 5.19 acres of open water were delineated on the mitigation site in 2009, for a total of 6.92 acres of aquatic habitat. Approximately 0.03 acre of wetlands occurred on the site prior to project implementation. Consequently, the net aquatic habitat created / restored to date is 6.92 – 0.03 = 6.89 acres, which is the maximum assignable credit at this site in 2009. No performance standards for the site were found in the project files; however, the goal of the project was to provide approximately 5 acres of palustrine, semi-permanent, emergent wetland. Additional flooded uplands and shallow open water areas are likely to convert to emergent wetland over time, given consistent inundation.

Functional assessment results are summarized in **Table 33**. Functional assessment results for baseline conditions are also provided in **Table 33** for comparison. The site currently rates as a Category III wetland and has gained over 38 functional units. Prominent functions include general wildlife habitat, surface water storage, sediment/nutrient/toxicant removal, documented MTNHP species habitat (northern leopard frog), and production export.

All dikes were in good condition during the mid-season visit. The designed water gap (for cattle watering) appeared to be functioning as designed, although the gates to the site were open, allowing cattle access. Trampling was evident in essentially all wetlands fringing the reservoir.

Table 33: ***Summary of baseline and 2009 wetland function/value ratings and functional points at the WF Charley Creek Mitigation Project.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2005 (Baseline)	2009
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.1)
MTNHP Species Habitat	Low (0.0)	Mod (0.7)
General Wildlife Habitat	Low (0.2)	Mod (0.7)
General Fish/Aquatic Habitat	NA	NA
Flood Attenuation	Low (0.1)	Mod (0.6)
Short and Long Term Surface Water Storage	Low (0.3)	Mod (0.6)
Sediment/Nutrient/Toxicant Removal	Mod (0.6)	Mod (0.7)
Sediment/Shoreline Stabilization	Low (0.2)	Low (0.3)
Production Export/ Food Chain Support	Low (0.3)	High (0.8)
Groundwater Discharge/Recharge	NA	Mod (0.7)
Uniqueness	Low (0.3)	Low (0.3)
Recreation/Education Potential	Low (0.1)	Low (0.05)
Actual Points / Possible Points	**2.1 / 10**	5.55 / 10
% of Possible Score Achieved	**21**	56
Overall Category	**IV**	III
Total Acreage of Assessed Aquatic Habitat within Easement (ac)	**0.03**	**6.92**
Functional Units (acreage x actual points) (fu)	**0.06**	**38.4**
Net Acreage Gain (ac)	**NA**	**6.89**
Net Functional Unit Gain (fu)	**NA**	**38.34**

.

Appendix A

TABLE 1: SUMMARY INFORMATION FOR MDT WETLAND MITIGATION SITES

MDT Wetland Mitigation Monitoring
2009 Executive Summary

.

Table 1: ***Summary of MDT Wetland Mitigation Sites monitored during 2001 to 2009.***

Site	Year Built	Major Montana Watershed Basin	Pre-Project Wetland Acreage and MDT Category	Target Wetland Credit	2009 Wetland/Open Water Acreage and MDT Category	Enhancement Credit (ratio)	Upland Credit (ratio)	Total Acreage Gain / Credit and Functional Unit Gain as of 2009	Comments
MISSOULA DISTRICT									
Batavia	1998	4 – Flathead	137 ac Category II 1069 fu	28.72 ac (see comments)	146.73 ac Category II 1408 fu	See comments	NA	Applying ratios, site has achieved 24.42 ac. of credit. Gain of 340 fu	2007 was seventh and final year of monitoring. Site at 85% of goal. Full delineation conducted in 2007. See report for project goals and ratios.
Camp Creek	2002	3 – Lower Clark Fork	48.73 ac Category III 251.58 fu	11.4 ac minimum (see comments)	39.26 ac wetland 2.15 ac channel Category I & II 399.46 fu	None specified	None specified	Gain of 147.88 fu FU-based credit approach = 15.6 ac credit	2009 is eighth monitoring year. Intended to mitigate for Sula N&S (11.4 acres) and possibly other projects. Goals: overall goals of this project were restoration of Camp Creek channel bottom, associated wetland functional restoration/enhancement and creation, and enhancement of heavily grazed and cleared riparian vegetation. Corps agreed to functional unit-based crediting approach in 2006. This currently yields up to 15.6 acres of credit to date.
Creston	1998	4 – Flathead	2 ac Category and fu unknown	6 ac (4 created, 2 enhanced)	5.4 ac Category II 36.72 fu	2 acre; no ratio specified.	NA	3.4 ac created 2.0 ac enhanced 5.4 ac total credit fu gain at pre-existing 2 ac unknown; 23.12 fu gain at created wetlands	2005 final year of monitoring. Similar results as 2001 - 2004. No baseline delineation or functional assessment available. No performance criteria for enhancement. If functional enhancement achieved, then currently at 90% of goal.
Hoskins Landing	2002	3 – Lower Clark Fork	5.85 ac (total) Category II (0.06 ac) Category III (4.12 ac) Category IV (1.69 ac) 29.33 fu	8.1 ac (restore & create) 5.2 acre (upland enhance)	13.91 ac Category III (13.45 ac) Category IV (0.46 ac) 103.6 fu	None specified	None specified	Approx. 8.1 ac 72.38 fu	2008 was seventh and final monitoring year. See report text for explanation of credits. Planting at adjacent uplands was accomplished in 2003 and 2004. Virtually at wetland acreage goal. Weed control is ongoing by Tribes.
Kleinschmidt Creek	2001	2 – Upper Clark Fork	13.78 ac wetlands 7.59 ac open water Category III 111.3 fu	12 ac	22.71 ac wetland 2.41 ac open water Category II & III 209 fu	1:2 on 8.05 = 4.02 1:3 on 3.43 = 1.14 Total Acres = 5.16	1:4 on 7.99 = 1.99 ac. 4.70 ac of up buffer reverted to wetland	17.90 max. total credit **Recommend 12 ac credit** 97.72 fu	2007 was sixth and final monitoring year. No credit for low intensity enhancement due to accidental grazing impacts; recommend eventual re-planting in this zone. Recommend certification of 12 credits (see 2007 report text).
Lawrence Park	1998	4 – Flathead	0 ac	Up to 2 ac	1.04 ac (2001) Category II 6.63 fu	NA	NA	1.04 ac (2001) 6.6 fu	Monitoring completed in 2001. Wetland creation ability limited by size of mitigation site. Currently at 52% of "maximum" goal.
Lonepine	2007/ 2008	3 – Lower Clark Fork	7.18 ac Category III and IV 34.94 fu	23.85 ac COE 11.86 ac CSKT	28.87 ac wetland 156.7 fu	See report	1:4 on 2.23 ac = 0.56 ac (COE) 0 credit CSKT	23.83 ac COE credit 11.93 ac CSKT credit 121.76 fu	2009 is second monitoring year. Credit is considered interim pending satisfaction of ultimate (end of monitoring period) performance standards. See report for credit breakdown.
Peterson Ranch	2002	2 – Upper Clark Fork	22.6 ac Category III 67.8 fu	17.5 ac (created)	21.54 ac wetland 1.08 ac open water Category II and III 142.83 fu	None specified	None specified	0.02 ac created 75.03 fu	**Not Monitored in 2009.** 2008 was seventh monitoring year. Was at 1% of project goal. Grazing control recommended. Water rights may be problematic and may prevent site from functioning as designed.
US 93 Bouchard	2006	3 – Lower Clark Fork	19.03 ac Category III 87.54 fu	12.15 ac COE 13.35 ac CSKT	28.14 ac wetland 0.39 ac ow Category II 176.89 fu	Varies according to current FA score	None specified	16.15 ac COE credit 14.19 ac CSKT credit 89.35 fu	2009 is third monitoring year. Credit is considered interim pending satisfaction of ultimate (end of monitoring period) performance standards. See report for credit breakdown.
US 93 Jocko River Bridge	2006	3 – Lower Clark Fork	Unknown	0.33 ac COE 0.54 ac CSKT	0.19 ac wetland Category III 0.99 fu	Varies according to current FA score	None specified	0.0 ac COE credit 0.1 ac CSKT credit fu gain unknown	**Not Monitored in 2009.** 2008 was second monitoring year. Substantial grazing impacts to planted shrubs. Credit is considered interim pending satisfaction of ultimate (end of monitoring period) performance standards. See report for credit breakdown.
US 93 Jocko Spring Creek	2006	3 – Lower Clark Fork	2.0 ac wetland/ow Category III 15.4 fu	2.77 ac COE 1.49 ac CSKT	1.81 ac wetland 0.27 ac ow Category II 18.1 fu	Varies according to current FA score	None specified	1.49 ac COE credit 0.63 ac CSKT credit 2.7 fu	2009 is third monitoring year. Credit is considered interim pending satisfaction of ultimate (end of monitoring period) performance standards. See report for credit breakdown.

.

Table 1 (continued): ***Summary of MDT Wetland Mitigation Sites monitored during 2001 to 2009.***

Site	Year Built	Major Montana Watershed Basin	Pre-Project Wetland Acreage and MDT Category	Target Wetland Credit	2009 Wetland / Open Water Acreage and MDT Category	Enhancement Credit (ratio)	Upland Credit (ratio)	Total Acreage Gain / Credit and Functional Unit Gain as of 2009	Comments
MISSOULA DISTRICT Cont.									
US 93 Mission Creek	2007-2008	3 – Lower Clark Fork	Unknown	0.22 ac COE 0.15 ac CSKT	0.02 ac wetland 0.75 ac stream channel	NA	NA	0.22 ac COE credit 0.11 ac CSKT credit	2009 is first monitoring year. Credit is considered interim pending satisfaction of ultimate (end of monitoring period) performance standards. See report for credit breakdown.
US 93 Mud Creek	2007-2008	3 – Lower Clark Fork	Unknown	6.81 ac COE 3.55 ac CSKT	2.02 ac wetland	Varies according to current FA score	None specified	1.61 ac COE credit 0.72 ac CSKT credit	2009 is first monitoring year. Total site area is smaller than expected credit acreage, indicating possible error in original expected credit calculations. Credit is considered interim pending satisfaction of ultimate (end of monitoring period) performance standards. See report for credit breakdown.
US 93 Peterson	2006	3 – Lower Clark Fork	1.26 ac Category III 6.68 fu	2.39 ac COE 1.31 ac CSKT	3.71 ac wetland Category III 25.23 fu	Varies according to current FA score	None specified	2.81 ac COE credit 1.40 ac CSKT credit 18.43 fu gain	2009 is second monitoring year. Credit is considered interim pending satisfaction of ultimate (end of monitoring period) performance standards. See report for credit breakdown.
BUTTE DISTRICT									
Beaverhead Ranch	1997	6 – Upper Missouri	5.2 ac Category and fu unknown	52 ac	97.9 ac Category II 841.94 fu	NA	NA	92.7 ac 797.22 fu	Monitoring completed in 2006. Excellent site with heavy wildlife use. Project at 178% of goal. MDT opted not to purchase additional credits outside the current easement (below the dike). Total credit "gain" includes 6.5 acres of open water.
Big Hole Grazing Association	2007	6 – Upper Missouri	31 ac Category II and III fu unknown	45.8 ac	56.76 ac Category II 295.5 fu	NA	NA	3.5 ac preservation +42.76 ac restoration 46.26 ac credit fu gain unknown	2009 is second monitoring year. 14 ac preservation @ 4:1 = 3.5 ac, 42.76 ac restoration @1:1 = 42.76 ac. Project at 101% of goal.
Brown's Gulch	2000	2 – Upper Clark Fork	0 ac	0.24 ac	0.17 ac Category IV 0.48 fu	NA	NA	0.17 ac 0.48 fu	Monitoring completed in 2004. Achieved 71% of project goal.
Cow Coulee	1997	7 – Missouri-Sun-Smith	0.07 ac Category and fu unknown	4.5 ac	2.94 ac Category III 15.88 fu	NA	NA	2.87 ac 15.5 fu	Monitoring suspended after 2004 season due to water delivery problems. Monitoring to be re-instated when delivery issues are addressed.
Jack Creek Ranch	2003	6 – Upper Missouri	11.4 ac Category III 30.78 fu	50 ac	61.7 ac wetland 2.51 ac open water Category II 507.26 fu	None specified	None specified	64.21 ac restored 476.48 fu	2009 is sixth monitoring year. The 50-acre goal includes pre-existing wetlands and open water; currently at 128% of goal. Monitoring area increased in 2008 to include lower McKee Spring Creek restoration, which was determined in 2008 by MDT to be included in the credit purchase agreement.
Rey Creek	1999	6 – Upper Missouri	0 ac	1.2 ac	0.52 ac Category III 3.38 fu	NA	NA	0.52 ac 3.38 fu	Monitoring completed in 2003. Project at 45% of "maximum" project goal of 1.2 acres. However, project exceeds specific 0.27-acre replacement goal associated with Highway 10 bridge and culvert project. Therefore, the project resulted in an "excess" of 0.25 acre of mitigation credit.
Ringling Galt	2000	7 – Missouri-Sun-Smith	0 ac	20 ac	2.24 acres open water	NA	NA	0 ac	2009 is final monitoring year. Site monitored in 2001, 2003, 2004, 2006, and 2009; not monitored in 2007 or 2008. No wetlands have developed to date. Site contains no conservation easement.
South Fork Smith	2001	7 – Missouri-Sun-Smith	8.32 ac wetland 0.57 ac open water Category III 43.61 fu	Not specified	8.79 ac wetland 0.57 ac open water Category III 56.16 fu	NA	NA	0.47 ac created wetland 12.55 fu	Monitoring suspended after 2006 (fifth monitoring year). Site contains no conservation easement, and grazing impacts are extensive. No specific project acreage target was established.
Sportsman's Campground	2007	6 – Upper Missouri	0.66 ac wetland 1.31 ac open water Category IV fu unknown	15.6 ac	8.05 ac wetland 5.01 open water 2.46 ac trans/mudflat Category II 82.25 fu	NA	NA	13.55 ac net aq habitat fu gain unknown	2009 is second monitoring year. Site nearing 87% of overall net acreage goal.
Woodson Creek	2006	7 – Missouri-Sun-Smith	57.48 ac wetland Category III/IV 141.8 fu	50 ac	59.02 ac wetland 2.73 ac open water Category II/III 418.49 fu	NA	NA	59.51ac restoration 0.38 ac creation 59.89 ac total credit 277.39 fu	**Not Monitored in 2009.** 2008 was second monitoring year. Complex ultimate performance standards (see individual report). Current credit is considered "interim" pending satisfaction of all ultimate performance standards, which are currently being re-negotiated with the Corps.

.

Table 1 (continued): ***Summary of MDT Wetland Mitigation Sites monitored during 2001 to 2009.***

Site	Year Built	Major Montana Watershed Basin	Pre-Project Wetland Acreage and MDT Category	Target Wetland Credit	2009 Wetland / Open Water Acreage and MDT Category	Enhancement Credit (ratio)	Upland Credit (ratio)	Total Acreage Gain / Credit and Functional Unit Gain as of 2009	Comments
GREAT FALLS DISTRICT									
Alkali Lake	2005	8 - Marias	0 ac	COE: 154.48 ac Tribe: 81.61 ac	96.42 ac wetland 85.59 ac open water Category II 1019.25 fu	NA	COE: 1:4 ratio on 22.56 ac = 5.64 ac Tribe: 1:4 ratio on 45.12 ac = 11.28 ac	182.01 ac aquatic hab. 187.65 ac COE credit 84.08 ac Tribal credit 1019.25 fu	2009 is fourth monitoring year. Ratios applied to credit, therefore impacts can be debited at 1:1.
Big Sandy	1991	11 - Milk	0 ac	9.44 ac	13.79 ac (2001) Category II 106.9 fu	NA	NA	13.79 ac (2001) Category II 106.9 fu	Monitoring completed in 2001. Very good site; excellent hydrology despite drought conditions. Project goals exceeded. Currently at 146% of project goal.
Jack Johnson	1994	8 - Marias	2.5 ac Category and fu unknown	25 to 29 ac	22.63 ac Category II (16.99 ac) Category III (5.05 ac), Category IV (0.59 ac) 122 fu	NA	NA	22.63 ac 107 fu	Monitoring completed in 2003. 2.5-ac pre-existing wetlands not subtracted from total as this area was likely "enhanced", per agency agreements. No baseline functional assessment performed. Project goal not clear (25 to 29 acres). Currently at 78% to 91% of project goal.
Little Muddy Creek	2004	7 – Missouri-Sun-Smith	0 ac	63.57 ac	162.82 ac wetland 26.99 ac open water Category II 1176.82 fu	NA	NA	162.82 ac wetland 26.99 ac open water 1176.82 fu	2009 is sixth monitoring year. Essentially exceeding original 63.57-ac credit goal again in 2009. Wetlands are likely to continue development.
Meriwether-East Onsite	2005	8 - Marias	0 ac	9.29 ac	6.62 ac wetland Category III 35.7 fu	NA	NA	6.62 ac wetland Category III 35.7 fu	2009 is fourth monitoring year. No wetland development to date at Site 1. Currently at 71% of combined Site 1/Site 2 goal.
Musgrave Lake	2000-2001	11 - Milk	RS1: 4.59 ac Category III 9.2 fu RS2: 0 ac ES1: 4.8 ac Category III 19.6 fu	27.2 ac minimum; 28.95 ac maximum (see comments)	RS1: 13.29 ac Category II 93.03 fu RS2: 10.21 ac Category II 73.51 fu ES1: 5.77 ac Category II 45.01 fu ES2: 3.8 ac Category II Ref Area: 5.29 ac	NA	1:4 ratio on 3 ac = 0.75 ac	24.63 ac restored 3.2 ac rehab. 1.49 ac preserved 0.75 ac buffer 30.07 ac total credit 182.69 fu (minimum – does not include ES-2)	2006 was final monitoring year. 2006 approved ratios: Restoration Site 1, Restoration Site 2, and any additional or restored wetlands: 1:1 ratio Rehabilitation of pre-existing wetlands at Enhancement Site 1: 1:1.5 ratio Preservation of original Enhancement Site 2 and Wetland Reference Area: 1:6 ratio Upland buffer: 1:4 ratio Previous column applies these ratios to 2006 acreages to arrive at 2006 credits. Landowner committed to providing a minimum of 27.2 acres wetland credit. Project at 111% of goal.
Perry Ranch	2001	8 - Marias	3.4 ac Category III (2.3 ac) and IV (1.1 ac), 13.09 fu	27.6 ac total - 3.4 ac existing = 24.2 ac	21.3 ac wetland Category II and III 120.13 fu	Potential 1:3 on 3.4 ac = 1.13 ac	Potential 1:5 on 21.18 ac = 4.24 ac	18 ac created 5.37 potential enhanced and buffer credit 107.04 fu	2009 is eighth monitoring year. Currently at about 74% of project goal; potentially up to 96% of target if enhancement and buffer credit approved by Corps.

.

Table 1 (continued): ***Summary of MDT Wetland Mitigation Sites monitored during 2001 to 2009.***

Site	Year Built	Major Montana Watershed Basin	Pre-Project Wetland Acreage and MDT Category	Target Wetland Credit	2009 Wetland / Open Water Acreage and MDT Category	Enhancement Credit (ratio)	Upland Credit (ratio)	Total Acreage Gain / Credit and Functional Unit Gain as of 2009	Comments
GLENDIVE DISTRICT									
American Colloid	2001	16 – Little Missouri	0 ac	4.4 ac	4.08 ac Category III 13.4 fu	NA	NA	4.08 ac 13.4 fu	2007 was sixth monitoring year. Site was primarily open water in 2005 and 2006, with minor (0.06 acre) wetlands in 2006 and 2007. Functional units slightly decreased. Counting presumed open water, currently at 93% of project goal. Dike breach temporarily drained site sometime during 2007. Monitoring suspended until breach is repaired.
Circle	1999	12 – Lower Missouri	2.98 ac Category and fu unknown	1.7 ac	7.6 ac Category II 65.4 fu	NA	NA	4.62 ac 39.73 fu	Monitoring completed in 2004. Project goals satisfied. Achieved 155% of project goal.
Crackerbox Creek	1997	15 – Lower Yellowstone	0 ac	1.2 ac	1.6 ac (2001) Category III 7.2 fu	NA	NA	1.6 ac (2001) 7.2 fu	Monitoring completed in 2001. Project goals satisfied. Currently at 133% of project goal.
Fourchette Creek Reserve	1992-1995	9 – Middle Missouri	0 ac	10-22 ac	7.87 ac Category II, III, IV 34.17 fu	NA	NA	7.87 ac 34.17 fu	Monitoring completed in 2004. Consists of 5 reservoirs. Puffin reservoir excavated too deep and supports minimal wetland. Grazing is impacting most sites. Extensive northern leopard frog use at Penguin and Flashlight reservoirs. Achieved 79% of minimum 10-acre project goal.
Lame Deer	2001	14 – Middle Yellowstone	0 ac	0.9 ac (school) 1.5 ac (creek) 2.4 ac total	0.91 ac (school) 1.18 ac (creek) 2.09 ac total Category II & III 15.72 fu	NA	NA	2.09 ac 15.72 fu	2007 was sixth and final monitoring year. Site consists of school site and two Alderson Creek sites. Currently at approximately 87% of adjusted project goal. Project goal adjusted based on as-built verses design features and MDT-specified monitoring area limits.
Plentywood-North	2000	12 – Lower Missouri	0 ac	2.7 ac	0.32 ac (2001) Category III 1.1 fu	NA	NA	0.32 ac (2001) 1.1 fu	Numerical values shown are from 2001. Not monitored in 2002, 2003, or 2004 – removed from monitoring contract.
Ridgeway	2000-2001	16 – Little Missouri	0	50 total ac	47.17 ac wetland 10.31 ac open water 57.48 ac total Category II 425.87 fu	NA	NA	57.48 ac Category II 425.87 fu	2007 was seventh and final monitoring year. One of the 16 ponds in this complex (W-9) was intensively sampled / monitored in 2001-2007, although all ponds were delineated and functionally assessed in 2007. Counting shallow open water development, the project is at approximately 115% of project goal. Total includes 10.31 acres of shallow open water.
Rock Creek Ranch	2004	11 - Milk	1.08 ac Category IV 2.24 fu	50 ac	86.4 ac wetland Category II 475.2 fu	1:3 on 1.08 ac = 0.36 ac	1:4 on 3.6 ac = 0.9 ac	85.32 ac creation 0.36 ac enhancement 0.9 ac buffer 86.58ac total credit 472.96 fu	2009 is fifth monitoring year. Site is currently at 173% of 50-acre goal.
Vida	1995	12 – Lower Missouri	0.2 ac	3.9 ac	0.11 ac (2001) Category III 0.32 fu	NA	NA	0 ac (wetlands lost to dike construction) (2001)	Monitoring completed in 2001. Water delivery to the site has been cut off by upstream users.
Wigeon Reservoir	1997	16 – Little Missouri	0 ac	2.2 ac	2.07 ac wetland 6.64 ac open water 8.71 ac total Category II 61.84 fu	NA	NA	8.71 ac 61.84 fu	2006 was sixth and final monitoring year. Project goal exceeded by 6.51 acres. Drought impacted this site in 2004 and 2005, which decreased size. Includes 6.64 acres of open water.
W.F. Charley Creek	2006	12 – Lower Missouri	0.03 ac Category IV 0.06 fu	5.0 ac	1.73 ac wetlands 5.19 ac open water 6.92 ac total Category III 38.4 fu	NA	NA	1.7 ac wetlands 5.19 ac open water 6.89 ac total 38.34 fu	2009 is third formal monitoring year. Counting all aquatic habitat, site is at 138% of goal. Vegetated wetlands will likely continue to develop. Cattle are accessing site.

Table 1 (continued): ***Summary of MDT Wetland Mitigation Sites monitored during 2001 to 2009.***

Site	Year Built	Major Montana Watershed Basin	Pre-Project Wetland Acreage and MDT Category	Target Wetland Credit	2009 Wetland / Open Water Acreage and MDT Category	Enhancement Credit (ratio)	Upland Credit (ratio)	Total Acreage Gain / Credit and Functional Unit Gain as of 2009	Comments
BILLINGS DISTRICT									
Big Spring Creek	1998 - 1999	9 – Middle Missouri	7.86 ac wetland, 1.3 ac stream Category III 29.1 fu	7.21 ac total, create 1.5 ac wtlnd creation, enh exist. wtlnd and strm	11.97 ac wetland, 2.41 ac stream Category II and III 103.03 fu	NA	NA	Gained 4.11 ac wetland, 1.11 ac stream, and 73.98 fu Minimum 7.21 acres credit	2005 was final monitoring year. Site gained additional 1.53 wetland acres and 12.83 functional units in 2005. Maximum Corps-allowable credit at this site is 7.21 ac (no performance standards, etc.), based subjectively on overall site improvement. About 4.11 wetland and 1.11 stream acres have been created (5.22 ac of aquatic habitat) and the site has been enhanced. How this equates to allowable credit is undetermined, but at least 7.21 acres of credit was assumed at this site. Fish habitat greatly enhanced.
Cloud Ranch	2003	13 – Upper Yellowstone	0.72 ac Category and fu unknown	5.5 ac total	Off-chan: 2.92 ac Crk frng net: 1.85 ac Approx crk OW: 2.17 ac Category II and III 47.47 fu	NA	1:4 on 3.56 ac = 0.89 ac	4.05 ac restoration 0.89 ac buffer 4.94 ac total 12.0 fu gain since 2004	2009 is sixth monitoring year. Site currently at 90% of goal. Actual acreage of restored Big Timber Creek is not included in acreage totals. Goals (total 5.5 ac): Off-Channel Wetland Creation: 0.61 ac @ 1:1 = 0.61 ac Off-Channel Wetland Restoration: 1.41 ac @ 1:1 = 1.41 ac Riparian Wetland Restoration – Big Timber Creek: 2.0 ac @ 1:1 = 2.0 ac Emergent Wetland Restoration – Big Timber Creek: 0.58 ac @ 1:1 = 0.58 ac Buffer: 3.56 ac @ 1:4 = 0.89 ac
DH Ranch	2007	13 – Upper Yellowstone	0.57 ac Category III 1.6 fu	17.4 ac	15.25 ac wetland 3.18 ac open water Category II 109.66 fu	NA	1:4 on 0.8 ac =0.2 ac	15.25 ac wetland 1.53 ac ow (10% of wet.) 0.2 upland buffer 16.98 ac credit 108.06 fu	2009 is third monitoring year. Open water credit limited to 10% of wetland acreage. Site at 98% of goal.
Lavina	1987	10 - Musselshell	0.45 ac Category and fu unknown	1 ac total	1.75 ac (2001) Category III 12.3 fu	NA	NA	1.3 ac (2001) 9.1 fu	Monitoring completed in 2001. Site functioning well. Intended to be combined with Ryegate mitigation site to mitigate for 1.3 acres of highway impact. Currently at 130% of project goal.
Norem Ranch	2002	13 – Upper Yellowstone	6.93 ac Category III 33.6 fu	14.71 ac total	11.64 ac wetland 1.58 ac open water 13.22 total Category II 72.43	1:3 on 6.98 ac =2.32 ac	1:4 on 6 ac = 1.5 ac	2.32 ac enhancement 4.66 ac creation 1.58 ac open water creation 1.5 ac buffer 10.06 ac total 39.12 fu	**Not Monitored in 2009.** 2008 was fifth monitoring year. Site was at 68% of goal. Goals (total 14.71 ac): Enhancement: 6.98 ac @ 1:3 = 2.32 ac Wetland Creation: 9.46 ac @ 1:1 = 9.46 ac Open Water Creation: 1.58 ac @ 1:1 = 1.58 ac Buffer: 6 ac @ 1:4 = 1.5 ac
Roundup	2000	10 - Musselshell	0 ac	24 ac	12.03 ac wetland 8.85 ac open water 20.88 ac developing Category II 123.19 fu	NA	NA	20.88 ac total 123.19 fu	**Not Monitored in 2009.** 2008 was eighth monitoring year. Site was at 87% of goal. Kochia and goosefoot dominance and other weedy species proliferation somewhat problematic.
Ryegate	1987	10 - Musselshell	0.3 ac	1 ac	2.22 ac (2001) Category II 16.9 fu	NA	NA	2.22 ac (2001) 16.9 fu	Monitoring completed in 2001 Site functioning well. Intended to be combined with Lavina mitigation site to mitigate for 1.3 acres of highway impact. Currently at 220% of project goal.
Stillwater River	1999	13 – Upper Yellowstone	3.77 ac Category III 15 fu	10.69 ac total	4.16 ac wetland 5.56 ac open water 9.72 ac Category I 101.88 fu	1:1 on 3.77 ac = 3.77 ac	NA	5.95 ac creation 3.77 ac enhancement 9.72 ac total credit 86.88 fu	2005 was final monitoring year. Results similar to 2002 - 2005. 10.69-ac goal included existing wetlands. Currently at 91% of goal.
Selkirk Ranch	2006/ 2007	10 - Musselshell	32.9 ac Category III 102.5 fu	60.4 ac	69.5 ac wetland 588.2 fu	1:3	1:5	36.51 ac re-establishment 21.32 ac rehabilitation 0.33 ac enhancement 0.92 ac credit (buffer) 59.1 ac total credit 485.7 fu	2009 is third monitoring year. Complex ultimate performance standards (see individual report). Current credit is considered “interim” pending satisfaction of all ultimate performance standards. Performance standards currently under revision pendng Corps approval.
Vince Ames	1992 - 1994	13 – Upper Yellowstone	2.39 ac Category III Category IV fu unknown	9.8 ac	15.24 ac (2001) Category III 117.3	NA	NA	12.85 ac (2001) 98.94 fu	Monitoring completed in 2001. Consists of 4 ponds. Acreage and functional goals met. Currently at 131% of project goal.

Table 1 (continued): Summary of MDT Wetland Mitigation Sites monitored during 2001 to 2009.

Site	Year Built	Major Montana Watershed Basin	Pre-Project Wetland Acreage and MDT Category	Target Wetland Credit	2009 Wetland / Open Water Acreage and MDT Category	Enhancement Credit (ratio)	Upland Credit (ratio)	Total Acreage Gain / Credit and Functional Unit Gain as of 2009	Comments
BILLINGS DISTRICT cont.									
Wagner Marsh	2005	13 – Upper Yellowstone	2.12 ac wetland 1.75 ac open water 3.87 ac total Category IV 16.64 fu	21.59 ac total	8.32 ac wetland 8.26 ac open water 16.58 ac total Category II 111 fu	NA	1:4 on 5.19 ac = 1.3 ac	8.32 ac (total wetland) 1.66 ac (open water) +1.3 ac (buffer) 11.28 ac credit 94.46 fu	2009 is fifth monitoring year. Open water credit limited to 20% of wetland credit. Much of the open water habitat observed in 2009 is expected to become vegetated with emergent hydrophytic species over time.
Wyola-Sunlight Ranch	1996	13 – Upper Yellowstone	1 ac (visual est.) Category II fu unknown	2.2 ac	0.85 ac (2001) Category II 7.3 fu	NA	NA	Unknown (2001)	Monitoring completed in 2001. Pre-project wetland acreage was estimated by MDT; no delineation map available. Site has experienced functional gain, but application of this to crediting is unknown at this time. From an acreage standpoint, currently at 39% of project goal.