EXECUTIVE SUMMARY
2005 MONITORING RESULTS

Montana Department of Transportation Statewide Wetland Mitigation Site Monitoring Project

Prepared for:

Montana Department of Transportation

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ABBREVIATIONS AND ACRONYMS

AA	Assessment Area
ADC	Aquatic Design and Consturction
BLM	Bureau of Land Management
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
MDT	Montana Department of Transportation
MFWP	Montana Fish, Wildlife and Parks
MNHP	Montana Natural Heritage Program
MOA	Memorandum of Agreement
OW	Open water
PBS&J	Post, Buckley, Schuh, and Jernigan (formerly LWC)
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 2005 monitoring efforts at 23 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 2005. The following mitigation sites were monitored during 2005:

American Colloid
Batavia Waterfowl Production Area
Beaverhead Gateway Ranch
Big Spring Creek
Camp Creek
Cloud Ranch
Creston
Hoskins Landing
Jack Creek Ranch
Kleinschmidt Creek
Lame Deer-East
Little Muddy Creek
Musgrave Lake
Norem Ranch
Perry Ranch
Peterson Ranch
Ridgeway Complex
Rock Creek Ranch
Roundup
South Fork Smith River
Stillwater River
Wagner Marsh
Wigeon Reservoir

Monitoring activities were conducted by PBS&J/Land and Water Consulting (LWC) wetland scientists between April and October 2005 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 further in this summary.

Table 1 (**Appendix A**) provides, for each monitored mitigation site: site name, MDT District, year constructed, major Montana watershed basin, pre-project wetland acreage and functional assessment category, target wetland credit, 2005 wetland acreage and functional assessment category, enhancement credit ratios, upland credit ratios, total wetland acreage gain / credit and functional unit gain as of 2005, and comments.

Table 2 presents target verses actual credit acreage by watershed basin at MDT mitigation sites monitored in 2001, 2002, 2003, 2004, and 2005. **Chart 1** presents this information on a percentage basis. Statewide, the target credit acreage at monitored sites is approximately 594 acres. For purposes of **Table 2**, "target" acreage includes projected credit reserves as well as impact-specific compensatory targets. Consequently, the target may actually be substantially larger than the required mitigation needs in some watersheds. As of the 2005 monitoring season, approximately 429 acres of "wetland credit" have developed at these monitored sites. Thus, cumulatively, monitored mitigation projects are at approximately 72% of the credit target.

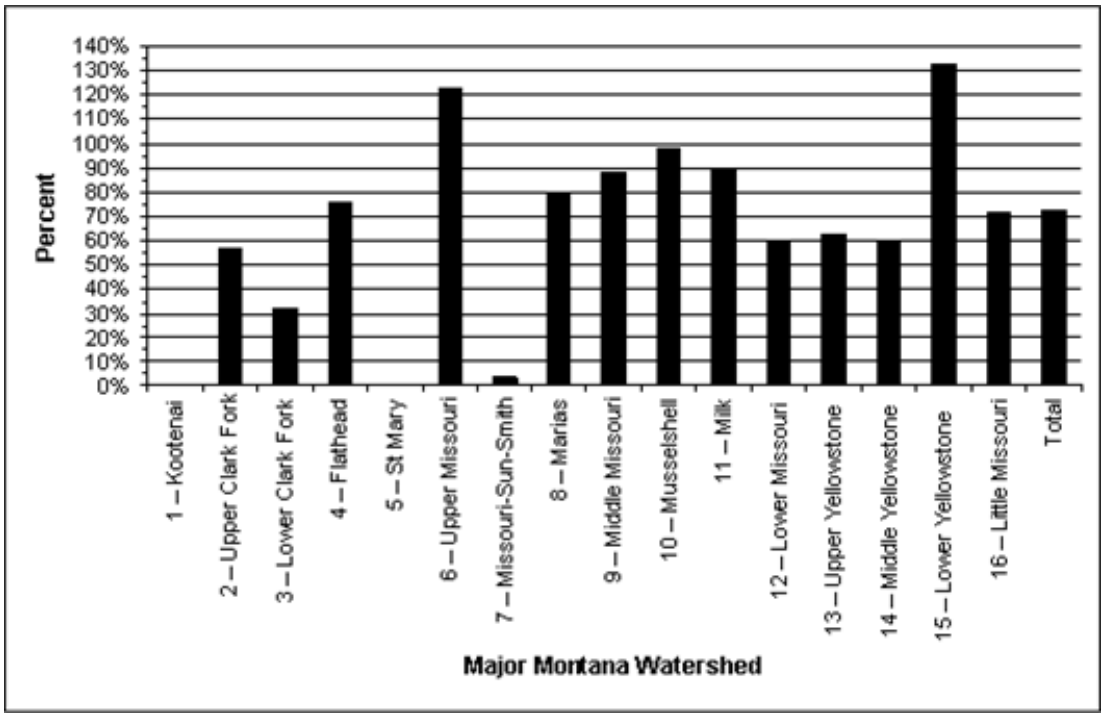
A summary of maintenance issues identified in 2005 is provided in **Appendix B**.

Table 2: *Target Verses Actual Credit Acreage by Watershed Basin at MDT Mitigation Sites Monitored in 2001-2005*

Major Montana Watershed Basin	Sites	Minimum Target Credit Acreage[a]	Credit Acreage as of 2005 Monitoring	Percent of Target Acreage Achieved as of 2005 Monitoring	Approximate Functional Units Gain as of 2005 Monitoring (acres x functional points)
1 – Kootenai	None	No monitoring sites in basin	No monitoring sites in basin	No monitoring sites in basin	No monitoring sites in basin
2 – Upper Clark Fork	Peterson Ranch Brown's Gulch Kleinschmidt Creek	33.26 acres	19.08 acres	57%	192.34 funct. units
3 – Lower Clark Fork	Camp Creek Hoskins Landing	19.5 acres	6.34 acres[b]	33%	205.85 funct. units
4 – Flathead	Batavia WPA Creston Lawrence Park	36.72 acres	27.92 acres[c]	76%	287.72 funct. units
5 – St Mary	None	No monitoring sites in basin	No monitoring sites in basin	No monitoring sites in basin	No monitoring sites in basin
6 – Upper Missouri	Beaverhead Jack Creek Ranch Rey Creek	103.2 acres	126.66 acres[d]	123%	1,077.04 funct. units
7 – Missouri-Sun-Smith	Cow Coulee Little Muddy Creek Ringling-Galt SF Smith River	88.07 acres[e]	2.87 acres[e]	3%	27.69 funct. units
8 – Marias	Jack Johnson Perry Ranch	49.2 acres	39.27 acres	80%	182.47 funct. units
9 – Middle Missouri	Fourchette Creek Big Spring Creek	17.21 acres[f]	15.08 acres[f]	88%	108.15 funct. units
10 – Musselshell	Lavina Ryegate Roundup	26 acres	25.59 acres	98%	184.9 funct. units
11 – Milk	Big Sandy Musgrave Lake Rock Creek Ranch	86.64 acres	77.07 acres	89%	485.66 funct. units
12 – Lower Missouri	Vida Circle Plentywood-N	8.3 acres	4.94 acres	60%	40.83 funct. units
13 – Upper Yellowstone	Cloud Ranch Norem Ranch Stillwater Vince Ames Wagner Marsh Wyola-Sunlight	64.49 acres	40.53 acres	63%	278.89 funct. units[g]
14 – Middle Yellowstone	Lame Deer-East	3.18 acres	1.89 acres	59%	12.99 funct. units
15 – Lower Yellowstone	Crackerbox Creek	1.2 acres	1.6 acres	133%	7.20 funct. units
16 – Little Missouri	American Colloid Ridgeway Wigeon Res.	56.6 acres	40.58 acres	72%	84.12 funct. units[h]
Totals	**39**	**593.57 acres**	**429.42 acres**	**72%**	**3,175.85 funct. units**
Averages per site	--	15.22 acres	11.01 acres	--	81.43 funct. units

[a] Includes proposed "reserves" as well as impact-specific targets.
[b] Does not include possible functional unit-based credits at Camp Creek mitigation site.
[c] Accounts for agency negotiation that resulted in 19.6 acres of additional enhancement credit at Batavia WPA.
[d] Wetland "credit" total no longer includes 20.3 acres at Beaverhead Ranch that MDT elected not to purchase from the landowner.
[e] Does not include wetland acreage for SF Smith site because no target was assigned. Does not include 194 acres of open water at Little Muddy Creek site in 2005 as wetland vegetation had not yet developed.
[f] Assumes 7.21 acres for both target and credit at Big Spring Creek.
[g] Does not include functional unit gain at Cloud Ranch as baseline was unavailable.
[h] Does not include functional units from 15 reservoirs at the Ridgeway mitigation project, for which functional assessments were not conducted.

Chart 1: ***Percent of MDT Wetland Mitigation Target Achieved in 2005 by Watershed.***



The current 164-acre discrepancy between target and credit figures is due to a few main factors. A primary consideration is that several large sites (Jack Creek Ranch [2003], Cloud Ranch [2003], Little Muddy Creek [2004], and Rock Creek Ranch [2004]) were recently constructed and are just beginning to develop wetland characteristics. The cumulative credit target for these sites is over 169 acres. Another main consideration is that one of the larger sites, Batavia (29 acre target), did not appear to receive adequate hydrology in 2001-2004 due to drought conditions and diversion problems and was not delineated/monitored in its entirety in 2001-2005.

For reference, **Tables 1** and **2** include 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. These tables also include the Plentywood-North mitigation site, which was only monitored in 2001. The MDT determined that the Plentywood-North mitigation site would be monitored in-house subsequent to 2001 due to its small size and remote location. **Tables 1** and **2** also include the Jack Johnson and Rey Creek sites, which were finalized in 2003, and the Fourchette, Brown's Gulch, and Circle sites, which were finalized in 2004. The Cow Coulee and Ringling-Galt sites are also included; neither of which have been finalized nor were monitored in 2005. Monitoring at these two sites was suspended during 2005 due to water delivery and/or retention problems.

Summaries of each of the mitigation sites monitored in 2005 are presented in alphabetical order in Section 2.0. Each discussion includes site history and objectives, delineation and functional assessment results, maintenance needs, and other recommendations, where applicable. Supporting materials such as site maps, figures, data forms, photographs, and other information can be found in each of the individual monitoring reports, and are not included in this summary.

2.0 INDIVIDUAL MITIGATION SITE DISCUSSIONS

2.1 American Colloid (Glendive District, Year 4)

The American Colloid wetland mitigation site was constructed in October 2001 in an ephemeral drainage to mitigate 4.4 acres of unavoidable wetland impacts associated with the following MDT projects: Alzada-West and Alzada-South, in the Little Missouri Watershed (watershed #16). The wetland site was constructed to encompass 5 acres and includes a 10-acre buffer zone; the entire 15 acres have been fenced. The wetland mitigation site is located in Carter County, MT, near the community of Alzada.

As of 2005, the inundation area totals 4.22 acres, an increase of approximately 0.4 acre since 2004. Only 0.03 acre technically qualifies as wetlands, with the remaining 4.19 classified as open water in 2005. The water surface area has increased since 2004, but the level may be stabilizing given the exposed portion of the stand pipe has remained at approximately 12 inches above the water surface for 2 years. Once the water level stabilizes, on-site sources of cattail and cordgrass will colonize readily. The American Colloid mitigation area is rated Category II site. Maximum functional units have increased more than 800% since 2002. No maintenance issues were noted; the outflow culverts were free of debris on the inlet end.

Functional assessment results are summarized in **Table 3** below. Ratings did not change between 2004 and 2005, but due to the increase in acreage, functional units increased 1.79 points in 2005. The functional units on the data sheet (19.74) represent the maximum units for the site calculated from the gross inundated acreage. Functional units based exclusively on the area of emergent vegetation (0.03 acre) would result in a minimal functional unit value of 0.14 units. The American Colloid mitigation wetland rated as a Category II wetland because it achieved a score of .9 for general wildlife habitat. Also, it should be noted that the site contains documented habitat for the northern leopard frog. Leopard frogs are considered a "species of special concern" by the Montana Natural Heritage Program (MNHP). Decreases in ratings for flood attenuation, short and long term surface water storage, sediment/shoreline stabilization, and production export/food chain support between 2002 and 2005 are all related to increases in the average pool elevation.

Table 3: ***Summary of 2005 Wetland Function/Value Ratings and Functional Points at the American Colloid Wetland Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Evaluation Year	
	2002	2005
Listed/Proposed T&E Species Habitat	Low (0)	Low (0)
MNHP Species Habitat	Mod (.6)	Mod (0.7)
General Wildlife Habitat	Mod (.4)	High (.9)
General Fish/Aquatic Habitat	NA	NA
Flood Attenuation	Mod (.4)	Low (.2)
Short and Long Term Surface Water Storage	High (.8)	Mod (.4)
Sediment, Nutrient, Toxicant Removal	Mod (.6)	Mod (.7)
Sediment/Shoreline Stabilization	Mod (.7)	Low (.3)

Table 3 (Continued): Summary of 2005 Wetland Function/Value Ratings and Functional Points at the American Colloid Wetland Mitigation Project

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Evaluation Year	
	2002	2005
Production Export/Food Chain Support	Mod (.6)	Mod (.4)
Groundwater Discharge/Recharge	NA	NA
Uniqueness	Low (.3)	Mod (.4)
Recreation/Education Potential	Mod (.5)	Mod (.7)
Actual Points/Possible Points	4.9/10	4.7/10
% of Possible Score Achieved	49%	47%
Overall Category	III	II
Total Acreage of Assessed Wetlands within Monitoring Area	0.69	4.2 (max)
Total Functional Units (acreage x actual points)	3.38	19.74 (max)
Net Acreage Gain ("new" wetlands)	0.69	4.2 (max)
Net Functional Unit Gain (new acreage x actual points)	3.38	19.74 (max)

2.2 Batavia Waterfowl Production Area (Missoula District, Year 5)

The Batavia Waterfowl Production Area (WPA) mitigation project is located in the Smith Valley, approximately five miles southwest of Kalispell, MT in Flathead County. The Batavia WPA mitigation project was developed to mitigate wetland impacts associated with MDT roadway projects that have been or will be constructed in the Flathead Watershed (watershed #4). Specifically, the mitigation pertains to impacts on the Missoula County Line North, Somers to Whitefish, Swan River Bridge, and future projects.

The entire WPA is influenced by a high groundwater table and by surface water diverted out of nearby Ashley Creek. Over time, the existing dike structure and water delivery system became degraded to a point where the dike was no longer holding water at the desired elevation. The intent of the project was to raise the water level approximately 2 feet to increase the area of inundation. This was to be achieved by reconstructing the degraded dike system. Construction was completed in January 1998 with the goal of creating and enhancing wetlands. In addition to reconstructing the dike, several defunct culverts were removed, three new control devices were installed, and open water was restored in the vicinity of several small islands, essentially enhancing the site by creating habitat diversity.

According to MDT project files, mitigation credits were determined by assigning credit ratios for creation and enhancement across the entire site. A total of 28.72 acres of credit was agreed upon by MDT, the U.S. Fish & Wildlife Service (USFWS), and U.S. Army Corps of Engineers (COE), with the potential for an additional 6.8 acres to be credited following post-project monitoring. Credits were broken down as follows:

Wetland Creation minus impacts from new dike: 18.2 acres credited at 2:1 = 9.10 acres
North Cell enhancement: 76.8 acres credited at 8:1 = 9.60 acres
South Cell enhancement: 60.0 acres credited at 6:1 = 10.0 acres
Total =28.72 acres

The WPA encompasses two primary hydrologic areas referred to as the North Cell (76.8 acres) and South Cell (60.3 acres). Due to the immense size of the WPA and the enormous effort required to monitor the entire site, three monitoring areas were selected by MDT to serve as representations of the larger site. The three monitoring areas are located: 1) at the southwest corner of the South Cell (Wetland D); 2) between the North Cell and South Cell on the western end (Wetlands B and C); and 3) on the northwest side of the North Cell (Wetland A). Borrow material was removed from each of these areas for construction of the new dike and wetland creation was expected at each location.

In March of 2005, Ducks Unlimited (DU) lowered the four borrow areas through excavation to ensure inundation and future wetland establishment in these areas. The excavated material was deposited in the adjacent upland areas and seeded. A site inspection of the project was conducted on May 18, 2005, with representatives from MDT, USFWS, COE, DU, and PBS&J in attendance. The site will continue to be monitored to document wetland establishment in these locations. Each of the four excavated areas was inundated with water during the mid-season visit, with water depths ranging between one and 24 inches. Of note in 2005, was a change in monitoring limits at Wetland "A" to include new excavation in this area.

The delineated areas in 2005 were similar to those observed in 2004, with the exception of those area affected by the excavation. In some instances, wetland was (at least temporarily) converted to open water as a result of the excavation.

The original goal of the project was to create approximately three acres of wetland in the borrow areas and 5.9 acres up to the designed full pool elevation in the north and south cells combined. It was also anticipated that an additional 13.6 acres of wetland would develop beyond the full pool elevation through capillary action in the soil. When added together, a gross total of 22.5 acres of creation was expected across the site. Subtract from this the 4.3 acres of impact from the new dike structure and the net wetland gain was to be 18.2 acres. An eventual delineation of the north and south cells is necessary in order to determine if the anticipated periphery wetlands have developed.

Approximately 19.6 acres of enhancement has occurred in the north and south cells through the creation of more open water habitat around the many small islands. The COE concurred with this determination in early 2004. Creating habitat diversity by adding open water areas has likely attracted more wildlife species and potentially encouraged the establishment different emergent and submergent plant communities. These areas would be even further enhanced with increased water levels across the site.

Current credit that has developed at the site consists of 1.25 acres wetland creation, plus 4.93 acres open water creation, plus 19.6 acres enhancement credit, equals 25.78 acres. Subtracting 4.3 acres from dike construction leaves 21.48 acres of net aquatic habitat credit. Any future monitoring will document if wetlands develop in the newly excavated open water areas.
The berm and associated water control structures were in good condition during the mid-season visit. Excavated soils were deposited in adjacent upland areas during the spring of 2005, and by

July some of these areas were infested with weedy species, primarily thistle and spotted knapweed. Weed control is recommended in these areas until desired species get established.

Functional assessment results are summarized in **Table 4** below. In order to compare pre and post project functional assessment, the entire site was considered including the active Ashley Creek channel. Although direct comparisons cannot be made between the two assessments because different versions of the assessment form were used, general comparisons can be made. A comparison of the two assessments shows similarities, although the most recent functional assessment produced higher ratings based on MNHP species habitat (Forster's [past USFWS observations] and black terns [2005 observations]), groundwater discharge/recharge, and recreation/education potential. The original functional assessment rated the wetland as a Category II with 65% of possible points, while the current assessment rated the wetland as a Category II with 80% of possible points. This assessment is unchanged from 2004.

In order for this site to reach its full potential, it is critical that the designed water elevation of 3,128.5 feet be attained, especially during the spring and early growing season. During years of average or above average runoff, enough water should be available to successfully recharge the site through diversion out of Ashley Creek. It appears as though the desired full pool elevation of 3,128.5 has never been met at this site because the diversion structure is limited to a full pool elevation of 3,126.6 (Urban pers. comm.). The water elevation was at 3,126.6 during the mid-season visit in 2005. Drought conditions in the Flathead Valley are also having an influence on water levels at Batavia.

Table 4: ***Summary of Baseline and 2005 Wetland Function/Value Ratings and Functional Points at the Batavia Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Evaluation Year	
	1996 Baseline Assessment[a]	2005 Assessment
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)
MNHP Species Habitat	Low (0.1)	High (1)
General Wildlife Habitat	High (1.0)	Exceptional (1.0)
General Fish/Aquatic Habitat	Mod (0.7)	Low (0.3)
Flood Attenuation	Mod (0.5)	Mod (0.6)
Short and Long Term Surface Water Storage	High (1.0)	High (1.0)
Sediment, Nutrient, Toxicant Removal	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	High (1.0)	High (0.9)
Production Export/Food Chain Support	High (0.9)	High (0.9)
Groundwater Discharge/Recharge	Low (0.1)	High (1.0)
Uniqueness	Mod (0.5)	Mod (0.6)
Recreation/Education Potential	Mod (0.7)	High (1.0)
Actual Points/Possible Points	7.8/12	9.6 / 12
% of Possible Score Achieved	65%	80 %
Overall Category	II	II

Table 4 (Continued): ***Summary of Baseline and 2005 Wetland Function/Value Ratings and Functional Points at the Batavia Mitigation Project***

Total Acreage of Assessed Wetlands within Easement (north and south cells)	137.00	138.25
Functional Units (acreage x actual points)	1069	1327
Net Acreage Gain (ac)	NA	1.25
Net Functional Unit Gain (fu)	NA	258
Total Functional Unit Gain (fu)	NA	258

[a]The baseline assessment was performed using the 1996 MDT assessment method, several parameters which were substantially revised during development of the 1999 MDT assessment method, which was applied during 2005 monitoring. Thus, direct comparison of pre- and post-project functions is not possible, although some general trends can be noted.

2.3 Beaverhead Gateway Ranch (Butte District, Year 5)

The Beaverhead Gateway Ranch Wetland Mitigation Site was developed to mitigate wetland impacts associated with MDT roadway projects in the Upper Missouri Watershed (watershed #6). Some of these projects were completed and some have yet to be constructed. The mitigation site is located 13 miles northeast of Dillon, MT and 14 miles southwest of Twin Bridges on Highway 41. Elevations range from approximately 4,825 to 4,830 feet above mean sea level. The western portion of the site is in Beaverhead County and the eastern portion is in Madison County.

The project is located adjacent to the Beaverhead River and Highway 41. Upwelling groundwater and springs with surface retention behind a constructed dike provides wetland hydrology. Precipitation and surface runoff provide minor contributions to wetland hydrology at this site. The site is in private ownership and occurs within a conservation easement. The wetland easement area is not fenced exclusively; however, portions of the easement are fenced for cattle management and the larger property containing the easement is fenced.
A pre-project construction wetland delineation documented 5.2 acres of wetlands at the site.

Construction was completed in 1997 with the goal of creating at least 52 acres of wetland. The site includes a dike constructed to retain stormwater and groundwater collected in two prior-existing drainage ditch systems. A control structure was completed in the northwest portion of the impoundment located where the two former drainage ditches converged. This control structure can be used to adjust impoundment water levels. The impoundment was designed to inundate approximately 26 acres with water depths of 0 to 3 feet.

The site was designed 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, waterfowl and wildlife habitats and riparian restoration. In addition to creating 52 acres of new wetland, a primary goal is to use an ephemeral creek channel entering the southeastern quadrant of the site to capture stormwater flows from nearby farmland and allow silts/suspended sediments to settle out within the wetland.

2005 monitoring results were identical to 2004 results. At this time approximately 106.5 acres of wetland and 6.5 acres of open water creation have been accomplished compared with a goal of 52 acres. This includes portions of the monitoring area both above (net of 86.2 wetland acres and 6.5 open water acres) and below (20.3 wetland acres) the dike. MDT has opted not to purchase the credits that have developed below the dike (Urban pers. comm.). Consequently, available credit at the site (above the dike) is currently 92.7 acres, well in excess of the 52-acre goal.

The functional assessment numbers for 2005 are similar to those from past years, although a slightly higher recreation/education score was afforded in 2004 and 2005 as the landowner clarified that permission has and can be granted for birding and scientific research (**Table 5**). The Beaverhead Gateway mitigation site is currently rated as a Category II (high value) site, primarily due to high wildlife habitat, threatened/endangered species habitat, MTNHP species habitat, surface water storage, sediment/nutrient removal, food chain support, and groundwater discharge ratings.

Weed control and revegetation of disturbed sites is still 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. Several noxious weeds are present including Canada thistle, hound's-tongue, and spotted knapweed. Spoil piles left from ditch excavation will continue to create a weed problem, a wind and water erosion hazard and a sedimentation source. This same issue applies to portions of the dike and other poorly vegetated sites. A possible remedy would entail chemically treating weeds and re-seeding the spoil piles with desirable grasses.

Dike erosion and sediment production from the poorly vegetated shoreline could be monitored more closely by installing permanent markers or by periodic surveys. The dike was examined by a DNRC dam inspector in 2005, and the erosion was considered to be a maintenance issue, but not a dam safety concern. The DNRC recommended periodically adding fill to the face of the dike where breaching is taking place and vertical slopes are developing. Fill was added to the face of the dike in 2004 to replace eroded material, but has not yet vegetated. Additional examples of potential solutions to erosion problems include shoreline reinforcement, off-shore wave protection, protected off-shore plantings, shoreline plantings, and placement of vegetated sod mats.

Table 5: ***Summary of 2005 Wetland Function/Value Ratings and Functional Points at the Beaverhead Gateway Ranch Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2005 Ratings and Scores
Listed/Proposed T&E Species Habitat	Mod (0.7)
MNHP Species Habitat	High (1.0)
General Wildlife Habitat	High (0.9)
General Fish/Aquatic Habitat	Mod (0.5)
Flood Attenuation	Mod (0.5)
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	High (1.0)
Uniqueness	Mod (0.5)
Recreation/Education Potential	Mod (0.5)
Actual Points/Possible Points	8.8 / 12.0
% of Possible Score Achieved	73%
Overall Category	II
Total Acreage of Assessed Wetlands and Other Aquatic Habitats	**118.2**
Functional Units (acreage x actual points)	**1040.16**
Net Acreage Gain	**113**
Net Functional Unit Gain	**994.4**

2.4 Big Spring Creek (Billings District, Year 5 - Final Year)

In 1996, the Montana Fish, Wildlife & Parks (FWP) approached MDT with a partnership proposal to restore approximately 0.5 mile of Big Spring Creek, at the FWP Brewery Flats Fishing Access site, one mile SE of Lewistown in Fergus County, MT. Big Spring Creek was straightened through the Brewery Flats area around 1907 by the Milwaukee Railroad to facilitate the construction of a freight yard to the west of the creek. The FWP proposed, through their Future Fisheries Improvement Program (FFIP), to restore that section of Big Spring Creek that traversed Brewery Flats to a more natural condition for the purpose of improving fisheries habitat. In addition to increasing total stream length from 2,300 feet to 4,000 feet, the design also included the establishment of a functional floodplain and associated wetland habitat.

In 1998, a Memorandum of Agreement (MOA) between MDT and FWP was signed, thus formalizing a cooperative agreement to restore Big Spring Creek. In return for a cash contribution to the project, MDT would receive 7.21 acres of COE-approved wetland mitigation credit to provide mitigation for projected wetland impacts resulting from MDT projects in the Middle Missouri watershed (watershed #9).

The proposed channel restoration was completed over two construction seasons (1998 and 1999), providing a newly created meandering channel with numerous pool, riffle, and run sections. The project incorporated the use of root wads, boulders, footer logs, sod mats, willow clumps and

cuttings, coir fabric and seeding of both upland and wetland areas. Sections of floodplain were lowered 1-2 feet to provide areas for wetland development.

Approximately 7.86 acres of shrub/scrub and emergent wetland occurred within the current monitoring area prior to project implementation. Hydrology for many of the existing wetlands was thought to be provided by leaking water pipes, with little or no connection to the incised Big Spring Creek channel. The proposed stream restoration was intended to create approximately 1.5 acres of additional wetland habitat, and restore and enhance existing wetlands by reconnecting them with Big Spring Creek.

Wetland communities targeted for creation at the site included shallow marsh/wet meadow and wet meadow/scrub-shrub. Wetland functions targeted at the site included habitat diversity, flood control & storage, threatened/endangered species habitat, general wildlife habitat, sediment filtration, shoreline stabilization, food chain support, nutrient cycling, and uniqueness.

As of 2005, approximately 11.97 wetland acres and 2.41 acres of non-wetland perennial stream channel occur within the monitoring area. Based on maps provided in the project Environmental Assessment (EA), approximately 7.86 wetland acres and 1.3 acres of non-wetland perennial stream channel occurred within the monitoring area prior to project implementation. Currently, the site has gained 4.11 wetland acres and 1.11 acres of non-wetland perennial stream channel, substantially improving fish habitat. It was originally anticipated that the area encompassed by the old stream channel would develop into upland riparian habitat following construction; however, this area continues to transition to emergent marsh and scrub/shrub wetland thus providing wetland mitigation acreage that was not originally anticipated.

The COE determined that the maximum allowable credit at the site is 7.21 acres. This conclusion was subjectively based on acreages of existing and developed wetlands, changes in functions and values, re-creation of a functioning floodplain, and modifications to supporting hydrology. No performance standards were required by the COE, although the site appears to have met project goals and perhaps exceeded those goals with the creation of two additional wetland acres in the area encompassed by the old stream channel. Considering that this area was not originally taken into consideration during the initial project crediting, additional credit may be available from the COE.

Although a thorough investigation of all stream banks was not completed, it does appear that the outside bend of the creek immediately south of the designated parking area is experiencing some minor lateral migration. The one Wood Duck box on the site was hanging upside down on the tree to which it is attached. This problem should be corrected to encourage use of the box by cavity nesting species.

Functional assessment results in 2005 were virtually unchanged from the 2001 - 2004 assessments, and are summarized in **Table 6**. For comparative purposes, the functional assessment results for baseline conditions prepared by Inter-Fluve are also included in the table below. However, the baseline assessment was performed using a modified 1997 MDT assessment method. Several parameters of this method were substantially revised during development of the 1999 MDT assessment method, which was applied during 2002 monitoring.

Table 6: ***Summary of 2005 Wetland Function/Value Ratings and Functional Points at the Big Spring Creek Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Evaluation Year and Wetland Sites			
	1998: Baseline Assessment [a]	**2005: Large wetland polygons bisected by creek near north, east, and south ends of site.**	**2005: Isolated wetland depressions west of creek.**	**2005: Narrow wetland fringe segments along creek.**
Listed/Proposed T&E Species Habitat	Low (0.2)	Low (0.3)	Low (0.0)	Low (0.3)
MNHP Species Habitat	Low (0.0)	Mod (0.6)	Low (0.1)	Low (0.1)
General Wildlife Habitat	Mod (0.5)	High (0.9)	Mod (0.5)	Mod (0.7)
General Fish/Aquatic Habitat	High (1.0)	High (0.9)	NA	Mod (0.7)
Flood Attenuation	Low (0.3)	High (0.7)	Low (0.2)	Low (0.2)
Short and Long Term Surface Water Storage	--	Mod (0.6)	Low (0.3)	Low (0.3)
Sediment, Nutrient, Toxicant Removal	Low (0.1)	High (1.0)	High (1.0)	Mod (0.6)
Sediment/Shoreline Stabilization	NA	Mod (0.7)	NA	Mod (0.7)
Production Export/Food Chain Support	Low (0.4)	High (0.9)	Low (0.3)	Mod (0.4)
Groundwater Discharge/Recharge	NA	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Low (0.3)	Low (0.3)	Low (0.3)
Recreation/Education Potential	High (1.0)	High (1.0)	Mod (0.5)	High (1.0)
Actual Points/Possible Points	3.7 / 10	8.9 / 12	4.2 / 10	5.3 / 12
% of Possible Score Achieved	37%	74%	42%	44%
Overall Category	III[b]	II	III	III
Total Acreage of Assessed Wetlands within AA Boundaries (note: non-wetland stream channel is not included in these totals) * Pre-project (baseline) wetland areas within the current monitoring area boundaries were measured via digital planimeter from delineation maps provided in project EA.	**7.86**	**11.21**	**0.70**	**0.06**
Functional Units (acreage x actual points)	**29.1**	**99.79**	**2.94**	**0.3**
Net Acreage Gain	Site currently supports 11.97 wetland acres and 2.4 non-wetland perennial stream channel acres. Baseline conditions within the current monitoring area boundaries included 7.86 wetland acres and 1.3 acres of non-wetland perennial stream channel. **Net gain is approximately 4.11 wetland acres and 1.1 acres of non-wetland perennial stream channel.**			
Net Functional Unit Gain[b]	Approximately **73.93** Functional Units[2]			

[a] The baseline assessment was performed by Inter-Fluve using a modified 1997 MDT assessment method. Several parameters were substantially revised and applied to the 1999 MDT assessment method, which was applied during 2005 monitoring. Thus, direct comparison of pre- and post-project functions are not possible, but general trends can be noted.

[b] The baseline assessment was performed using a modified 1997 MDT method, which resulted in an incorrect overall category designation (Category IV). This was corrected to a Category III.

Generally speaking, functions that increased substantially over baseline conditions include wildlife and fish habitat, flood attenuation, sediment/nutrient/toxicant removal, production export, and groundwater discharge. The pre-project site provided about 29 functional units within the monitoring area (using the 1997 method), and the post-project site provides about 103 functional units (using the 1999 method), for a conservative gain of at least 73 functional units.

2.5 Camp Creek (Missoula District, Year 4)

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. MDT is currently developing a credit allocation scheme for this site in cooperation with the Corps of Engineers. Project details for each of the three main goals are included in the following list:

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.

The Corps of Engineers concurred with a revised baseline delineation of 43.36 acres of wetland /open water channel signature on the MDT parcel and 5.37 acres of wetland / open water channel within the monitoring limits on the Grasser parcel for a total of 48.73 acres

Overall, the project has gained 0.65 stream acre and "lost" an estimated 5.17 wetland acres in comparison to baseline conditions. Cumulatively, approximately 42.06 wetland acres and 2.15 open water acres now occur within the monitoring area, for a total of 44.21 acres of aquatic habitat. Prior to construction, the site contained approximately 47.23 acres of wetlands and 1.5 open water channel acres within the current monitoring limits. Open water channels were located in the extreme south end of the Grasser property and the in the northwest corner of the MDT property. A decrease of 2.09 acres in net wetland area was observed between 2004 and 2005. The overall cumulative change in aquatic habitat at the site since construction has been approximately 44.21 – 48.73 = (-4.52) acres.

This "decrease" in wetland acreage could be attributable to several factors. However, a primary cause is thought to be the virtual termination of flood irrigation on both the MDT and adjacent Grasser parcels, which appears to have had a substantive impact on site hydrology. Other possible causes include drought, fire, short-term construction-related disturbance (haul routes, drive-through areas, staging areas, etc.), longer-term construction-related disturbance, slight differences in pre- and post-construction delineation approaches, or a combination of all factors.

Channel down-cutting has been observed in scattered short project reaches (<100 feet long), which may be playing a role in this observed decrease. However, stream flow was sub-normal during the majority of the 2005 growing season and may have resulted in the wetland loss. Based on USGS data from the stream gauge on the Bitterroot River near Darby, flows in May, June, and July of 2005 were only 65%, 50%, and 61% of the long-term mean monthly flows for these months. Flows during 2004 were similarly low.

Despite the apparent decrease in wetland acreage, a total of 141.68 functional units (score x wetland acreage) have been gained thus far at the Camp Creek mitigation site. Approximately 113.24 functional units have been gained at the MDT parcel, and nearly 28.44 have been gained on the Grasser parcel. In 2004-2005, the MDT site received a moderate sediment/shoreline stabilization rating due to the increase in species with deep binding roots along the streambank. Shoreline species during evaluation consisted of grasses and willow sprigs; an increase in willow cover between 2003 and 2005 monitoring increased the functional rating for sediment/shoreline stabilization category. Over time, willow sprigs will develop into larger, even more robust shrubs with extensive deep binding roots systems. Enhancement of both wetland and upland vegetation should increase wildlife usage throughout the site.

The assessment are (AA) on the Grasser parcel is subject to a higher degree of disturbance (it is not within a conservation easement), and rated as Category III (moderate value). This AA received high ratings for MNHP species habitat (again due to west-slope cutthroat trout), production export / food chain support, and groundwater discharge/recharge. All other parameters rated low to moderate. Pre-project and post-project wetland assessment scores are presented in **Table 7** below.

Table 7: ***Summary of 2001 (baseline) and 2005 Wetland Function/Value Ratings and Functional Points at Camp Creek***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2001 Type I, MDT Property	2001 Type III, MDT Property	2001 Type I, Grasser Property	2001 Type II, Grasser Property	2001 Type III, Grasser Property	2005 Grasser Property	2005 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)
MNHP 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 (0.5)	Mod (0.7)
General Fish/Aquatic Habitat	Low (0.1)	Mod (0.5)	Low (0.1)	Low (0.1)	Mod (0.5)	Mod (0.7)	Mod (0.7)
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)	Mod (0.7)
Sediment/Shoreline Stabilization	Low (0.2)	Low (0.3)	Low (0.2)	Mod (0.6)	Low (0.3)	Low (0.3)	Mod (0.7)
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 (1.00)
Actual Points/Possible Points	5.1 / 12	6.2 / 12	5.1 / 12	5.9 / 12	6.2 / 12	7.1 / 12	9.3 / 12
% of Possible Score Achieved	42%	52%	42%	49%	52%	59%	78%
Overall Category	III	III	III	III	III	III	II
Total Acreage of Assessed Wetlands and Open Water within Easement	**42.3**	**1.06[a]**	**3.51[a]**	**0.50[a]**	**1.36[a]**	**8.13**	**36.08**
Functional Units (fu) (acreage x actual points)	**215.73**	**6.57**	**17.90**	**2.95**	**8.43**	**57.72**	**335.54**
Functional Unit Gain to Date by Ownership (fu)	**NA**	**NA**	**NA**	**NA**	**NA**	**28.44[b]**	**113.24[b]**
Total Functional Unit Gain to Date (fu)	**NA**	**NA**	**NA**	**NA**	**NA**	**141.68**	

[a] Baseline acreages adjusted per subsequent aerial photograph study.

[b] Baseline Functional Units used to determine the 2005 Functional Unit Gain included the combined totals for the 2001 MDT (222.30 fu) and Grasser (29.28 fu) properties.

Planted woody species survival rates in 2005 were observed to be similar to those observed in 2004. In 2003, a majority of the survival rates ranged from 70 to 100 percent. Survival data recorded in 2004 showed seven out of 13 species had a survival rate below 50 percent. These mostly included species planted in uplands such as woods rose, ponderosa pine, snowberry, shrubby potentilla and red-osier dogwood. Almost all the Douglas-fir observed had died after initial planting; mortality is likely due to weak planting stock and lack of irrigation. The wetter species planted along the streambank and floodplain margins had a much higher survival rate ranging from 60 to 90 percent. These included alder, aspen, cottonwood and willows. The willow sprigs are spreading out along the banks, increasing in size and density. Several other planted shrubs had increased in overall stature and exhbited vigorous growth.

Per COE recommendations, the potential for enhancing the surface connection between Camp Creek and the large emergent complex on the MDT parcel was investigated. Based on field survey investigations, a shallow flood channel was excavated during fall 2005 between the creek and existing swales to enhance the connectivity of these two systems during high water events.

Several noxious weeds are present on both MDT and Grasser parcels including bull thistle, Canada thistle, houndstongue and spotted knapweed. The MDT parcel has the least amount of invasive species and distribution is limited to upland areas not affected during construction efforts. The Grasser parcel supports the majority of the noxious weed species with extensive distribution along the floodplain corridor. Weed control and re-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. Areas of invading spotted knapweed located along floodplain margins should be controlled and reseeded or planted with appropriate wetland species to help control further spread of invasive species.

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

A final method of credit allocation for this site is being worked out between MDT and COE, and will be based upon this monitoring data and other information. As such, the current amount of credit applicable to this site is undetermined. However, one approach under consideration pertains to the use of functional units, 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 8**. Using this approach, a current maximum of approximately 16.17 credit acres could be assigned to the Camp Creek site as of 2005.

Table 8: ***Potential Functional Unit-Based Credit - Camp Creek Mitigation Project***

Property	2005 Wetland & Channel Acreage	2005 Score	2005 Functional Units	Baseline Functional Units	Functional Unit "Gain"	"Gain" Divided by Current Score (potential credit acres)
MDT	36.08	9.3	335.54	222.30	113.24	12.17
Grasser	8.13	7.1	57.72	29.28	28.44	4.00
Total	**44.21**	**--**	**393.26**	**251.58**	**141.68**	**16.17**

2.6 Cloud Ranch (Billings District, Year 2)

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 9 outlines the target wetland credits and ratios from the COE and the current net acres delineated during the 2005 wetland monitoring. In 2005, the new off-channel wetland/open water acreage is 2.03 acres (2.51 acres total wetland + 0.24 acre open water – 0.72 acre of pre-existing wetlands = 2.03 acres). The open water decreased slightly in 2005 due to an increase in cattail cover. The Big Timber Creek new wetland acreage is 0.76 acre which includes 0.53 acre of riparian wetland and 0.23 acre of emergent wetlands. The Big Timber Creek channel itself is not included in acreage totals.

In 2005 mitigation efforts have resulted in a total of 2.55 wetland credit acres, 0.24 shallow open water credit acres, and 0.89 credit acre of wetland/upland buffers. The grand total for the Cloud

Table 9: ***2005 Cloud Ranch Wetland Mitigation Monitoring Results***

Wetland Mitigation	Current Net Acres	Ratio	2005 Credit Acres	Target Credit Acres
Off-channel - Creation and restoration wetlands, open water	2.03	1:1	2.03	2.02
Subtotal	**2.03**		**2.03**	**2.02**
Big Timber Creek - Riparian wetland restoration	0.53	1:1	0.53	2.00
Emergent wetland Restoration	0.23	1:1	0.23	0.58
Subtotal	**0.76**		**0.76**	**2.58**
Upland and wetland buffer	3.56	4:1	0.89	0.89
Subtotal	**3.56**		**0.89**	**0.89**
GRAND TOTAL	**6.35**		**3.68**	**5.49**

Ranch to date is 3.68 credit acres or 67 percent of the goal. This is a fifteen percent increase over 2004, and is primarily a result of an increase in wetland area by 0.87 acres.

The site supports three State of Montana-listed noxious weeds (Canada thistle, houndstongue, and spotted knapweed) and one weed on the Stillwater County list (black henbane). Canada thistle, houndstongueand black henbane were observed within the off-channel wetland assessment area. Canada thistle and a few spotted knapweed plants were observed along Big Timber Creek. The henbane and Canada thistle appeared to have been sprayed in 2005. Mowing was also observed on the upland buffer areas most likely to control Canada thistle and annual weeds. Chemical or biological control measures are recommended for the Canada thistle, houndstongue, and spotted knapweed and henbane.

The water level control structures within the off-channel wetlands were functioning and in good working order at the time of the August monitoring. Changes in the creek migration resulting in bank loss, gravel bars and new deposition areas will continue to be monitored to track riparian wetland gains or losses, and negative or undesirable changes in vegetation.

Functional assessment results for 2004 and 2005 are summarized in **Table 10**. Pre-construction functional assessments were completed for the wetlands by ADC in 2003, but the results were unavailable. The creek corridor wetlands currently rate as a Category II community, as do the off-channel wetlands. Functional units increased by 6.28 units between 2004 and 2005.

2.7 Creston (Missoula District, Year 5 – Final Year)

The Creston mitigation site was constructed in 1998 to mitigate wetland impacts associated with three MDT roadway projects; the Flathead River Bridge and Creston North and South projects. The site is located one mile south of the Creston Fish Hatchery adjacent to Highway 35 and Broeder Loop. The site consists of 20 acres located in Flathead County within the Flathead Watershed (watershed #4). The site elevation is 2,940 feet above mean sea level.

Table 10: ***Summary of 2005 Wetland Function/Value Ratings and Functional Points at the Cloud Ranch Wetland Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Evaluation Year/Assessment Area			
	2004 Off-Channel Wetlands	2004 Big Timber Creek	2005 Off-Channel Wetlands	2005 Big Timber Creek
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)
MNHP Species Habitat	Low (0.1)	Mod (0.6)	Low (0.1)	Mod (0.6)
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 (0.7)
Flood Attenuation	Mod (0.5)	Mod (0.4)	Mod (0.5)	Mod (0.4)
Short and Long Term Surface Water Storage	High (0.8)	High (0.8)	High (0.8)	High (0.8)
Sediment, Nutrient, Toxicant Removal	High (1.0)	Mod (0.6)	High (1.0)	Mod (0.6)
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)	Mod (0.7)	Mod (0.7)
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 (0.7)	Mod (0.7)
Actual Points/Possible Points	7.2/11	7.8/12	7.2/11	7.8/12.00
% of Possible Score Achieved	65%	65%	65%	65%
Overall Category	II	II	II	II
Total Acreage of Assessed Wetlands and Open Water within Easement (ac)	2.19	2.65	2.75	2.93
Baseline Acreage of Assessed Wetlands and Open Water within Easement (ac)	0.72	2.17 (ow)	0.72	2.17 (ow)
Functional Units (acreage x actual points) (fu)	15.7	20.67	19.8	22.85
Net Acreage Gain (ac)	1.47 (1.2 wetland, 0.27 ow)	0.48 (wetland)	2.03 (1.79 wetland, 0.24 ow)	0.76 (wetland)
Net Functional Unit Gain[a]	Presently unavailable	Presently unavailable	4.1 (since 2004)	2.18 (since 2004)
Total Functional Unit Gain[a]	Presently unavailable		6.28 (since 2004)	

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

The site was designed to mitigate for riparian floodplain habitat, rooted emergent wetland, and ditches associated with previous highway construction. The mitigation goal was to enhance approximately 2 acres of existing wetland and create 4 acres of wetland. A formal wetland delineation and functional assessment were not performed prior to construction.

Delineation results indicated acreage that increased slightly (0.2 acre) from 2004, with wetland vegetation becoming prevalent within the small stormwater ditch that flows from the highway into the upper pond. A total of 5.4 acres of wetland occurs on the site. Based on pre-construction goals, the site has achieved 90 percent of this goal. If and when hydrology is restored to pre-drought conditions through natural precipitation and runoff, the site would likely meet or exceed project goals.

The berm was in good condition during the spring and mid-season visits and the bird boxes also appeared to be in good condition. Weed control on the entire site is recommended. Weedy species most commonly noted onsite include spotted knapweed, Canada thistle, common houndstongue, and common mullein. The parking area has substantial knapweed, with other infestations occurring in upland areas that were heavily disturbed during construction. Canada thistle is common along the dike. It does not appear that any weed management has occurred onsite since project construction.

Functional assessment results are summarized in **Table 11** below. The site was evaluated as a single AA and rated as a Category II wetland. Wildlife habitat and groundwater discharge were the primary functions of the site. The site provided a total of 36.7 functional units, up slightly from 2004 due to minor increase in wetland area and achieved 76 percent of possible points, which was unchanged from the 2001 assessment. A functional assessment was not conducted prior to site construction and therefore cannot be used for comparison.

Table 11: ***Summary of 2005 Wetland Function/Value Ratings and Functional Points at the Creston Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2004 Assessment	2005 Assessment
Listed/Proposed T&E Species Habitat	Mod (0.7)	Mod (0.7)
MNHP Species Habitat	Low (0.1)	Low (0.1)
General Wildlife Habitat	High (0.9)	High (0.9)
General Fish/Aquatic Habitat	NA	NA
Flood Attenuation	NA	NA
Short and Long Term Surface Water Storage	High (0.8)	High (0.8)
Sediment, Nutrient, Toxicant Removal	Mod (0.7)	Mod (0.7)
Sediment/Shoreline Stabilization	NA	NA
Production Export/Food Chain Support	High (1.0)	High (1.0)
Groundwater Discharge/Recharge	High (1)	High (1)
Uniqueness	Mod (0.6)	Mod (0.6)
Recreation/Education Potential	High (1)	High (1)
Actual Points/Possible Points	6.8 / 9	6.8 / 9
% of Possible Score Achieved	76%	76%
Overall Category	II	II
Total Acreage of Assessed Wetlands within Easement (ac)	**5.2**	**5.4**
Functional Units (acreage x actual points) (fu)	**35.44**	**36.72**
Net Acreage Gain	**3.2**	**3.4**
Net Functional Unit Gain	**21.76[a]**	**23.12[a]**

[a] Does not account for functional gain at pre-existing 2 acres, for which baseline functional assessment was not conducted.

2.8 Hoskins Landing (Missoula District, Year 4)

The Hoskins Landing Wetland Mitigation Site was developed to mitigate wetland impacts associated with the MDT proposed Dixon-West and Paradise-East highway reconstruction projects along Highway 200. Hoskins Landing is located in Sanders County, in the Lower Clark Fork Watershed (watershed #3). The mitigation site is located approximately one quarter mile north of Dixon, adjacent to the Flathead River. The elevation of the site is approximately 2,500 feet above mean sea level with slight topographic variation throughout. Pre-construction wetland delineation documented 6.67 acres of wetlands at the site.

The project is located adjacent to the Flathead River in an area of historic floodplain heavily impacted from past agriculture activities. Seasonal flooding provides the primary wetland hydrology with inundation of backwater channels. Local groundwater systems moving through alluvium provide a secondary source of hydrology for this site. The site is located on the Flathead Indian Reservation and is managed by the Confederated Salish & Kootenai Tribes. The wetland easement area is mostly fenced with several exclusions on the east and west ends near the river banks.

Initial construction was completed in fall 2002 with the goal of restoring/creating 8.1 acres of wetlands and enhancing vegetation on 5.2 acres of heavily grazed and cleared lands. Revegetation work was conducted during the spring and fall of 2003, 2004 and 2005, and a berm / road crossing of the backwater channel was removed during spring 2005 to reconnect historical flow patterns. The primary components of construction included:

- Excavation and grading of 8.1 acres to facilitate wetland development.
- Enhancement of 5.2 acres of native vegetation, characteristic of the lower Flathead River riparian corridor.
- Filling of inlet channel and removal of headgate in the northeast corner of the site.
- Removal of outlet dam along the remnant channel bordering the southern portion of the site.
- Removal of man-made flood control berm along the Flathead River and grading of excavated ground to 10:1 slopes.
- Removal of a man-made berm along the remnant backwater channel.

The site was designed 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, wildlife habitat and riparian vegetation.

Approximately 13.01 wetland acres are currently within the monitoring area, and represent an increase of 1.13 acres between 2004 and 2005. The open water areas (1.14 ac.) mapped during previous monitoring years were considered shallow water with aquatic vegetation during 2005. The pre-construction wetland delineation reported 6.67 wetland and no open water acres. The net increase in aquatic habitat acres is 13.01 – 6.67 = 6.35 acres. Over time and with more normal precipitation, additional wetland area may form around the low gradient portions of the current wetland area.

Functional assessment results are summarized in **Table 12** below. The vast majority of wetlands on the Hoskins Landing mitigation site are currently rated as Category III (moderate value), primarily due to moderate ratings for wildlife/fish habitat, threatened and endangered species habitat, and flood attenuation variables. It is significant to note that the wildlife habitat functional capacity would likely increase at wetlands as an indirect result of vegetation enhancement in adjacent uplands.

Based on functional assessment results (**Table 12)**, approximately 91.65 functional units occur at the Hoskins Landing mitigation site. Baseline functional assessment results are also provided in **Table 12** for general comparisons. Approximately 64.17 functional units have been gained at the site, although pre- and post-construction functional assessment methods differed slightly.

Two upland plantings areas were evaluated; these areas include the upland islands and along the upper banks of the side channel. Survival rates for the upland areas were low; only two species included woods rose and snowberry showed higher rates. Several other species including hawthorn, chokecherry, serviceberry, ponderosa pine and American plum were counted but at lower levels.

One wetland planting area was evaluated; along the south slopes of the excavated wetland. Survival rates for the wetland planting were high with sandbar willow and cottonwood having the highest rate. Several other species including Bebbs willow, red-osier dogwood and alder were present but at lower counts. Several woody species that had low survival rates during the 2003 monitoring were replanted in 2004. The replacement plants were doing well and exhibited a high survival rate in 2005. Approximately 2,000 willow cuttings were installed around the fringe of excavated wetland.

Several Category 1 noxious weeds were still present: Canada thistle, Dalmatian toadflax houndstongue, oxeye daisy, St. John's wort, and spotted knapweed. The Category 3 noxious weeds yellowflag iris and Eurasian water-milfoil were also present within the mitigation site. Weed control activities were observed during the mid-season visits. The continued eradication of noxious weeds at this site is important. The majority of the invasive species were still found at this site within the dry backwater channels adjacent to the river.

Evidence of livestock accessing the site was observed during a fall 2005 visit. An electric fence has been put into place, running parallel with the river setback from the shoreline. The drier upland grass meadows were heavily grazed and tramping within the wetlands was observed. Minor browse on the woody plantings within the wetland area was also observed.

Table 12: ***Summary of Baseline[a] and 2005 Wetland Function/Value Ratings and Functional Points at the Hoskins Landing Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Evaluation Year/Assessment Area							
	1999 Baseline 1A	1999 Baseline 1B	1999 Baseline 3	1999 Baseline 8	1999 Baseline 2, 9A, 9B, 10, 11, 12, 13	1999 Baseline 5, 6, 7, 14A, 14B	2005 Site 5	2005 Remainder of Wetlands
Listed/Proposed T&E Species Habitat	Low (0.3)	Mod (0.7)	None (0.0)	Mod (0.7)	None (0.0)	None (0.0)	Low (0.0)	Mod (0.8)
MNHP Species Habitat	Low (0.1)	Low (0.1)	Low (0.1)	Mod (0.7)	None (0.0)	None (0.0)	Low (0.0)	Low (0.1)
General Wildlife Habitat	High (0.9)	Mod (0.5)	Mod (0.5)	High (0.9)	Low (0.1)	Low (0.1)	Low (0.2)	Mod (0.7)
General Fish/Aquatic Habitat	Low (0.2)	Mod (0.7)	NA	High (1)	NA	NA	NA	High (0.8)
Flood Attenuation	Mod (0.5)	Low (0.2)	Low (0.2)	Low (0.1)	Low (0.2)	NA	Low (0.2)	Mod (0.4)
Short and Long Term Surface Water Storage	High (0.8)	NA	Low (0.3)	NA	NA	Low (0.3)	Low (0.3)	High (0.9)
Sediment, Nutrient, Toxicant Removal	High (1)	High (1)	High (1)	Mod (0.5)	High (1)	Mod (0.5)	Mod (0.5)	Mod (0.4)
Sediment/Shoreline Stabilization	Mod (0.7)	Mod (0.7)	NA	Mod (0.4)	High (0.9)	NA	NA	Mod (0.6)
Production Export/ Food Chain Support	High (0.8)	Mod (0.6)	Mod (0.6)	Mod (0.7)	Low (0.2)	Low (0.1)	Low (0.2)	High (1.0)
Groundwater Discharge/ Recharge	High (1)	High (1)	High (1)	Low (0.1)	Low (0.1)	High (1)	High (1)	High (1.0)
Uniqueness	Low (0.2)	Low (0.2)	Low (0.2)	Low (0.2)	Low (0.2)	Low (0.2)	Low (0.3)	Mod (0.5)
Recreation/Education Potential	Low (0.1)	Low (0.1)	Low (0.1)	High (1)	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.3)
Actual Points/ Possible Points	6.6 / 12	5.8 / 11	4.0 / 9	6.3 / 11	2.8 / 10	2.3 / 9	2.8 / 10	7.5 / 12
% of Possible Score Achieved	55%	53%	44%	57%	28%	26%	28%	63%
Overall Category	III	III	III	II*	IV	IV	IV	III
Total Acreage of Assessed Wetlands and Open Water within Easement	2.58 ac	0.86 ac	0.68 ac	0.06 ac	0.75 ac	1.74 ac	0.46	12.55
Functional Units (acreage x actual points)	17.03	4.99 fu	2.73 fu	0.37 fu	2.10 fu	4.00 fu	1.29	94.1
Total Acreage at Site	6.67						13.01	
Total Functional Units at Site	31.22						95.39	
Net Acreage Gain	NA						6.34	
Net Functional Unit Gain	NA						64.17	

[a]The baseline assessment was performed using the 1996 MDT assessment method, several parameters which were substantially revised during development of the 1999 MDT assessment method, which was applied during 2003 monitoring. Thus, direct comparison of pre- and post-project functions is not possible, although some general trends can be noted. * Did not achieve Category II rating based on functional points, but did achieve Category II rating based on score for fish and wildlife habitat; this narrow fringe wetland was absent during 2004 delineation.

2.9 Jack Creek Ranch (Butte District, Year 2)

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 pasture 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 McKee Spring Creek and the over-widened areas (in-stream reservoirs) were filled. 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.

The 2004 wetland boundary encompassed 21.51 acres of gross wetland area including 2.13 acres of shallow open water (<4 feet deep). In 2005, the gross wetland boundary encompassed 33.44 acres and included 2.13 acres of shallow open water (<4 feet deep), an increase of 11.93 acres. To date, mitigation efforts have achieved 67% of the 50-acre goal. Subtracting the original wetland acreage of 1.99 acres, the new net acreage of aquatic habitats totals 31.45 acres.

The site supports two State of Montana Noxious Weeds (Canada thistle and houndstongue) and two that are on the Madison County list (musk thistle and black henbane). Continued spot spraying is recommended in 2006 for these four weed species.

Functional assessment results are summarized in **Table 13**. Pre-construction functional assessments were completed for the wetlands as well as the middle reach of McKee Spring Creek by ADC. The results of that assessment are included in **Table 13.** The monitoring area has gained approximately 224 functional units since construction due to several high to exceptional ranking variables. Since 2004 the site has gained 68 functional units.

Table 13: ***Summary of 2002 and 2005 wetland function/value ratings and functional points at the Jack Creek Ranch Wetland Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Evaluation Year	
	2002[a] Pre-construction	2005[b] Post-construction
Listed/Proposed T&E Species Habitat	Low (0)	Low (0.3)
MNHP Species Habitat	Mod (0.6)	Mod (0.6)
General Wildlife Habitat	Low (0.3)	High (1.0)
General Fish/Aquatic Habitat	Mod (0.6)	Mod (0.7)
Flood Attenuation	NA	Low (0.1)
Short and Long Term Surface Water Storage	NA	Mod (0.7)
Sediment, Nutrient, Toxicant Removal	NA	High (0.9)
Sediment/Shoreline Stabilization	NA	High (1.0)
Production Export/Food Chain Support	Low (0.3)	High (0.8)
Groundwater Discharge/Recharge	Low (0.1)	High (1.0)
Uniqueness	Low (0.1)	Mod (0.4)
Recreation/Education Potential	Low (0.1)	Mod (0.7)
Actual Points/Possible Points	2.7/9	8.2/12
% of Possible Score Achieved	30%	68%
Overall Category	III	II
Total Acreage of Assessed Wetland / Open Water Areas within Easement	23.6	33.44
Functional Units (acreage x actual points) (fu)	49.8	274.2
Net Acreage Gain in Mitigation Area (ac)	NA	31.45
Approximate Functional Unit Gain in Mitigation Area (acreage gain x actual points) (fu)	---	257.9

[a] 2002 baseline assessment included the horseshoe wetland as well as the lower and middle reaches of McKee Spring Creek. Approximately 1.99 acres of wetlands occurred in the mitigation area pre-project.
[b] 2005 assessment included the horseshoe wetlands and the middle reach of McKee Spring Creek (the mitigation area).

2.10 Kleinschmidt Creek (Missoula District, Year 4)

Kleinschmidt Creek is located in in the Upper Clark Fork River Basin (watershed # 2) in Powell County, MT. The mitigation site is located approximately six miles east of Ovando, MTand is directly adjacent to MT Highway 200. Elevations of the site range from 4,200 ft. at the eastern boundary to 4,180 ft. at the western boundary. The Kleinschmidt Creek site was developed to mitigate wetland impacts associated with two MDT projects, Clearwater Junction North and Helmville Junction, and to serve as a reserve for future MDT projects in the watershed.

The project was designed by LWC/PBS&J, and is located on property owned by Thomas Rue, within a 47-acre perpetual wetland conservation easement. Kleinschmidt Creek flows west until eventually draining into the North Fork of the Blackfoot River. The perennial creek is spring fed, which provides the primary hydrology source. Local groundwater systems serve as a secondary hydrology source, flowing through the deep alluvial substrate contained along Kleinschmidt Flats and eventually discharging along Kleinschmidt Creek corridor. The 1999 pre-construction wetland delineation documented 13.78 acres of wetland and 7.59 acres of over-excavated open water channel on the mitigation site.

Construction at the Kleinschmidt Creek Mitigation Site was completed during the summer of 2001. The overall goals of this project were the restoration, creation, and enhancement (high and low intensity) of heavily grazed and degraded creek/wetlands. Primary restoration objectives included channel reconstruction and fish habitat enhancement on approximately 5,000 ft of Kleinschmidt Creek and the creation of additional wetland areas along the spring fed corridor. Project objectives and task details are included in the following list:

Restoration

- Narrowing and deepening the existing manipulated stream channel, restoring the portion narrowed as wetland.
- Conversion of degraded channel/open water into wetland on approximately 6 acres.
- Planting woody vegetation at a density of 500 stems per acre.
- Eliminating the existing stock water channel under the highway.

Creation

- Converting approximately 1.19 acres of upland area to wetland / shallow open water by adjusting the surface elevation.
- Planting woody vegetation at a density of 500 stems per acre along the perimeter of the shallow open water areas.

High Intensity Enhancements

- Planting woody vegetation on approximately 8.05 acres of existing degraded wetlands at a density of 1,500 stems per acre.

Low Intensity Enhancements

- Planting woody vegetation on the remaining 3.43 acres of existing degraded wetlands at a density of 500 stems per acre (clumped).

The site was designed 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.

Mitigation credit goals and credit ratios, approved by the Corps of Engineers are as follows:

Project Component	Total Estimated Acres	Credit Ratio	Credit Acres
Restoration	6.0	1:1	6.0
Creation	1.19	1:1	1.19
High-Intensity Enhancement	8.05	1:2	4.02
Low-Intensity Enhancement	3.43	1:3	1.14
75-Foot Upland Buffer Preservation	12.69	1:4	3.17
Totals	31.36		15.52

In 2005 approximately 22.82 wetland acres and 2.43 restored channel/open water acres were delineated in the monitoring area. The pre-construction wetland delineation reported 13.78 wetland and 7.59 over-excavated open water channel acres. The net increase in gross wetland acres for 2005 was 22.82– 13.78 = 9.04 acres, while the open water of 7.59 (degraded channel) acres decreased to 2.43 acres, consisting of restored sinuous stream channel (1.75 acres) and portions of one excavated shallow wetlands (0.68 acre). Wetland area decreased approximately 0.26 acre and open water areas decreased 0.29 acre between 2004 and 2005. Slight refinements / corrections to upland / wetland boundary locations on the lower section in 2005 resulted in a minor decrease in wetland area from that delineated during 2004 monitoring.

Table 14 summarizes the maximum credit that could be assigned to the site as of 2005. Target mitigation credit ratios and acres were agreed upon prior to site construction, with the exception of incidental wetland restoration within proposed upland buffer areas, for which no performance standards or ratios were discussed. As these areas are restoring naturally within the easement, a 1:1 credit ratio was assumed.

As of 2005, approximately 22.82 acres of wetland and 2.43 acres of open water (restored stream channel/portions of excavated wetlands) occur at the Kleinschmidt Creek mitigation site. This represents an approximate increase of 9.04 wetland acres and a 5.16 acre decrease of over-excavated, straightened open water channel as compared to baseline conditions. Open water on the site is currently comprised of 1.75 acres of restored sinuous channel and 0.68 acre of excavated shallow water as a component of wetland creation.

Table 14: ***Maximum Kleinschmidt Creek Mitigation Site Credit as of 2005***

Mitigation Type	Current Acres	Ratio	Current Maximum Credit Acres	Target Credit Acres	Comments
Designed Restoration	6.0	1:1	6.0	6.0	Does not include 1.75 acres of open water stream channel. Calculated stem density (3,200) is exceeding performance standard (500).
Designed Creation	1.19	1:1	1.19	1.19	Includes 0.68 acre of designed shallow open water. Calculated stem density along upland / wetland border (1,800) is exceeding performance standard (500).
Designed High-Intensity Enhancement	8.05	2:1	4.02	4.02	Calculated stem density (3,629) is exceeding performance standard (1,000)

Table 14 (Continued): ***Maximum Kleinschmidt Creek Mitigation Site Credit as of 2005***

Mitigation Type	Current Acres	Ratio	Current Maximum Credit Acres	Target Credit Acres	Comments
Designed Low-Intensity Enhancement	3.43	3:1	0.0	1.14	Plantings were destroyed by grazing. Actual stem density (21) is not meeting performance standard (500). No credit likely at this time. Recommend re-planting this area.
Incidental Restoration	5.24	1:1	5.24	0.0	5.24 acres of intended 12.69-acre upland buffer within easement reverted to emergent wetland. 1:1 ratio is assumed and has not been verified with the Corps of Engineers.
Designed Upland Buffer	7.45	4:1	1.86	3.17	5.24 acres of intended 12.69-acre upland buffer reverted to wetland.
Grand Total	**31.36**	**--**	**18.31**	**15.52**	**118% of goal**

Although the landowner treated weeds near upper excavated shallow open water area and other areas in 2004, several noxious weeds are present including Canada thistle, houndstongue, oxeye daisy and spotted knapweed, which should be controlled. Several other aggressive species are present on the site including non-native musk thistle and the native wetland species, reed canarygrass. A weed management plan for this site should be considered to control noxious weeds.

Areas disturbed by livestock grazing in the low intensity sections should be revegetated with woody plants. Areas outside the perimeter of the excavated wetlands, which are currently dominated by mostly invasive species, should be treated via mechanical and cultural weed control activities to control invasive species. A new jackleg fence was installed at the site in 2004. Bird boxes installed by MDT at the site were in good condition.

Functional assessment results are summarized in **Table 15** below. The two assessment areas (AA's) evaluated at Kleinschmidt Creek, separated into the channel corridor/wetlands and excavated wetland areas, both rated Category II (high value) and Category III (moderate value) areas, respectively. Functional units at the site have essentially doubled to over 211 since project construction.

Table 15: ***Summary of 1998 (baseline), and 2005 wetland function/value ratings and functional points at the Kleinschmidt Creek Mitigation Project***

Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method[a]	Evaluation Year/Assessment Area			
	1998 Channel & Wetlands Lower Section	1998 Channel & Wetlands Upper Section	2005 Channel & Wetlands	2005 Ponds
Listed/Proposed T&E Species Habitat	Low (0.2)	Low (0.2)	Mod (0.8)	Low (0.5)
MNHP Species Habitat	Low (0.1)	Low (0.1)	High (1.0)	Low (0.1)
General Wildlife Habitat	Mod (0.5)	Mod (0.5)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	Low (0.2)	Low (0.2)	Mod (0.7)	NA

Table 15 (Continued): ***Summary of 1998 (baseline), and 2005 wetland function/value ratings and functional points at the Kleinschmidt Creek Mitigation Project***

Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method[a]	Evaluation Year/Assessment Area			
	1998 Channel & Wetlands Lower Section	1998 Channel & Wetlands Upper Section	2005 Channel & Wetlands	2005 Ponds
Flood Attenuation	NA	NA	NA	NA
Short and Long Term Surface Water Storage	Mod (0.5)	Mod (0.5)	High (1.0)	High (1.0)
Sediment, Nutrient, Toxicant Removal	Mod (0.5)	High (1.0)	High (0.9)	Mod (0.7)
Sediment/Shoreline Stabilization	Mod (0.4)	Mod (0.4)	High (1.0)	Mod (0.7)
Production Export/Food Chain Support	High (0.8)	High (0.8)	High (0.8)	Mod (0.7)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Low (0.2)	Low (0.3)	Low (0.3)
Recreation/Education Potential	Low (0.1)	Low (0.1)	Low (0.3)	Low (0.3)
Actual Points/Possible Points	4.5/11	5/11	8.5/11	6.0/10
% of Possible Score Achieved	41%	45%	77%	60%
Overall Category	III	III	II	III
Total Acreage of Assessed Wetlands and Open Water within Easement (acre)	10.40	12.90	23.70	1.55
Functional Units (acreage x actual points)	46.8	64.5	201.45	9.3
Total Functional Units At Site	111.30		210.75	
Total Functional Unit "Increase"[1]	NA		99.45	

[a] The baseline assessment (1998) was performed using the 1997 MDT Assessment Method. Several parameters were substantially revised in the 1999 MDT Assessment method, which was used to evaluate 2005 monitoring conditions. Thus, direct comparison of pre- and post-project functions is not possible; although, some general trends can be noted.

2.11 Lame Deer (Glendive District, Year 4)

The Lame Deer - East wetlands, located in the Middle Yellowstone Watershed (watershed #14), were constructed to mitigate in part for the 2.5 acres of wetland impact to the Alderson Creek corridor during the Hwy. 212 reconstruction project. The monitoring site is located in Rosebud County within the town of Lame Deer, MT. There are three (3) mitigation sites within this area: the Lame Deer – East site is adjacent to a school in the center of town and is often referred to as the "school mitigation or reserve site"; and two recreated wetlands are located along Highway 212, Wetland 369 and Wetland 380. Elevations for the three mitigation sites range from 3,250 to 4,337 feet above sea level.

The Lame Deer - East monitoring site wetland (school mitigation site) was constructed in July/August 2001 within the historic floodplain of Lame Deer Creek; fill was historically placed within the current mitigation site to create a ball field for the school. The fill was removed to create and restore wetlands in the area; the intent was to create 1.23 acres and restore 0.56 acres

for a total of 1.79 acres. The wetland is bisected by a sewer line that was in place prior to the wetland construction; fill removed from the constructed wetland areas was placed on top of the sewer line to create a thermal barrier and, in effect, an access trail to the creek. The area represented by the sewer line/trail system represents approximately 0.1 acre, which adjusts the intended size of the mitigation wetland to 1.68 acres. The resulting areas within the bisected wetland are referred to as the north and south cell.

The two recreated wetlands along Hwy. 212 are adjacent to Alderson Creek: Wetland 369 is approximately 4.75 miles from the intersection of Hwy. 39 and 212 in Lame Deer, and Wetland 380 is 5.5 miles from the intersection. The intent of these mitigation efforts was to re-create approximately 1.5 acres of wetland.

The 2005 delineation at the school site resulted in a total of 0.82 acre of wetland development within the north and south cells; an increase of 0.20 acre since 2004. The estimated gross wetland acreages for the re-created wetlands along Hwy. 212 were 0.7 acre at Wetland 369 and 0.36 acre at Wetland 380 for a total of 1.07 acres. The total gross wetland acreage within the three Lame Deer-East mitigation sites is 1.89 acres or 59 percent of the mitigation goal.
The stormwater inlet culvert in the southwest corner of the south cell was in working order and required no maintenance. Soil saturation has expanded in the north cell since 2004. The outflow culvert in Wetland-369 is blocked by sediment and debris and the beaver dam along the edge of the outflow area is larger than it was in 2004. It is likely that the sediment input resulted from the collapse of the bank along the north east edge of the excavated area. Water had washed over the road within the last year and has begun to erode the fill around the culvert. Water was flowing around and undermining the culvert at the time of the investigation.

Functional assessment of the school and creek monitoring sites are summarized in **Table 16** below. The 1999 functional assessment is not directly comparable because the AA included 20-30 acres of floodplain on the north and south sides of Hwy. 212. The 1999 assessment does provide valuable information regarding the baseline characteristics of floodplain wetlands in that area; the general wetland floodplain rated as a Category III wetland in 1999.

The school mitigation monitoring site continued to score as a Category III wetland in 2005 (**Table 16**). The percent possible score increased from 55% to 61% since 2004. As wildlife use increases the school mitigation site will likely attain a Category II status. Wetland 369 is classified as a Category II wetland due to a high rating for wildlife habitat. The functional units are the "maximum" value because of the low percentage of hydrophytic vegetation (11% or 0.04 acre) within the site boundary. Wetland 380 is also a Category II site due to the breeding population of the northern leopard frog. Total functional unit gain for all Lame Deer-East Mitigation sites as of 2005 is 12.99 units.

Table 16: ***Summary of Baseline and 2005 Wetland Function/Value Ratings and Functional Points at the Lame Deer - East Wetland Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	1999[a]	2005 School Site	2005 W-369	2005 W-380
Listed/Proposed T&E Species Habitat	Low (.3)	Low (0)	Low (0)	Low (0)
MNHP Species Habitat	Low (0)	Mod (.7)	Low (0)	High (1.0)
General Wildlife Habitat	High (.7)	Mod (.7)	High (.9)	High (.9)
General Fish/Aquatic Habitat	NA	NA	Mod (.6)	High (.8)
Flood Attenuation	Mod (.4)	Low (.2)	Low (.2)	Low (.1)
Short and Long Term Surface Water Storage	-	Mod (.6)	Mod (.4)	Mod (.4)
Sediment, Nutrient, Toxicant Removal	High (1)	Mod (.7)	Mod (.7)	Mod (.6)
Sediment/Shoreline Stabilization	Mod (.7)	High (.9)	Low (.3)	High (1.0)
Production Export/Food Chain Support	High (.8)	Low (.5)	Mod (.4)	Mod (.4)
Groundwater Discharge/Recharge	NA	High (1)	High (1)	High (1)
Uniqueness	Mod (.5)	Mod (.4)	Mod (.4)	Mod (.4)
Recreation/Education Potential	Mod (.5)	High (1)	High (1)	High (1.0)
Actual Points/Possible Points	4.9/9	6.7/11	5.9/12	7.6/12
% of Possible Score Achieved	54%	61%	49%	63%
Overall Category	III	III	II	II
Total Acreage of Assessed Wetlands within Monitoring Area	20-30	0.82	0.7	0.36
Total Functional Units (acreage x actual points)	-	5.49	4.76 (Maximum)	2.74
Net Acreage Gain ("new" wetlands)	-	0.82	0.7	0.36
Net Functional Unit Gain (new acreage x actual points)	-	5.49	4.76 (Maximum)	2.74
Total Functional Unit Gain since 2003		12.99		

[a] FA done on general area in 1999, and includes the area cells 1 and 2 are currently located.

2.12 Little Muddy Creek (Great Falls District, Year 2)

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, MT 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. MDT anticipated needing about 13.57 acres of compensatory wetland mitigation credit for impacts associated with ten different projects within the Missouri-Sun-Smith River watershed, and is seeking to hold another 50 credits in reserve, for a total of 63.57 credits.

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.

In Year 1 (2004), combined flows in the Missouri River at Ulm and the Sun River at Vaughn did not exceed 7,880 cfs by June 1, and therefore, no water was turned into the site. In this second year, enough precipitation occurred in May 2005 that the most of the mitigation site was inundated. During the July 2005 site visit, 194.02 acres were inundated, about 90% of the anticipated 216 possible acres. Depth of inundation ranged from a few inches to about three feet in the main project impoundment. Depth of the deepest portion of the inlet channel was approximately six to eight feet.

In 2004, no wetland or other aquatic habitat developed at the site. In 2005, the entire site received water, but hydrophytic vegetation had not yet developed. Therefore, no wetland credit, COE approved or otherwise, was attributed to this project in 2004 or 2005. Though no wetlands had developed in 2005, 194 acres of aquatic habitat had been created and wetlands are expected to develop in 2006. Because no wetlands existed, a functional assessment form was not completed for this site.

The berm, diversion structures, excavated channels, and inlet/outlet structures were in excellent condition during the mid-season visit. Water was let into the mitigation site during phases in order to prevent erosion of the berm. During the mid-July visit vegetation cover on the berm was filling in very well, though mostly by exotic species. Seeded plants were just starting to germinate on the berm during mid-July and establishment seemed patchy in distribution.

2.13 Musgrave Lake (Great Falls District, Year 5)

The Musgrave Lake wetland mitigation project was constructed in late 2000 and early 2001 in Watershed 11 (Milk). It is anticipated that this site will compensate for wetland impacts resulting from several proposed MDT highway and bridge reconstruction projects along the U.S. Highway 2 corridor between Havre and Harlem. Constructed on private land, the mitigation site is located approximately four miles south of Zurich and U.S. Highway 2 within 0.25 mile of the Milk River in Blaine County. The goal of the project is to restore hydrology via construction of ditch plugs in natural drained wetland basins and historic oxbow sections, providing approximately 27 acres of wetland credit within the confines of a 100-acre conservation easement.

The project is comprised of two "restoration" sites and one "enhancement" site. A second enhancement site was initially approved for credit consideration by the COE and implemented within the easement, but was subsequently dropped from MDT monitoring upon the COE's recommendation in 2002. Restoration Site 1 (RS1) occurs in a basin in the northwest corner of the mitigation area. Restoration Site 2 (RS2) occurs within a drained and farmed historic oxbow section of Musgrave Lake located along the south property boundary. Wetland hydrology in these areas is to be supplied by precipitation, surface runoff, and possibly groundwater, and is anticipated to result in maximum depths of 3-3.5 feet and 1-1.5 feet at RS1 and RS2, respectively.

Approximately 4.6 acres of impaired, low-quality wetlands were delineated by MDT at RS1 prior to project implementation. However, given the restoration of hydrology, the COE has approved allocation of 1:1 credit at the two basins, inclusive of these existing impaired wetlands (1:1 ratio). No pre-project wetlands were delineated by MDT at RS2. A target of 24.5 credit acres was established in these two basins by the landowner. An additional 0.75 acre of credit was proposed by the landowner and tentatively approved by the COE for maintenance of at least three acres of 75-foot wide upland buffer around all wetland and riparian areas (4:1 ratio).

The project further intends to enhance approximately four to five acres of Musgrave Lake an area referenced as Enhancement Site 1 (ES1). Although currently wetland, Enhancement Site 1, the "middle" portion of Musgrave Lake, is separated from the lake's southern arm by an earthen dike and was impacted by a large drainage ditch, a perched culvert causing headcutting & associated sedimentation, and chronic overgrazing. The project attempted to remedy these problems by relocating the water control structure, installing a larger culvert, and revising the grazing system. Grazing will be prohibited for five years, after which grazing prescriptions will follow a Natural Resources Conservation Service grazing management plan. Assuming that an appropriate increase in wetland functional condition is achieved, a ratio of 3:1 was tentatively approved by the COE.

The wetland credit breakdown proposed by the landowner and tentatively approved by the COE, once performance standards are met, is as follows:

- Restoration Site 1: 13.6 acres, 1:1 ratio, 13.6 credits
- Restoration Site 2: 10.9 acres, 1:1 ratio, 10.9 credits
- Enhancement Sites 1 and 2: 11.2 acres, 3:1 ratio, 3.7 credits
- Upland Buffer: 3 acres, 4:1 ratio, 0.75 credits

Total Credits: 28.95 acres (*note: the agreement between the landowner and MDT specifies that approximately 27.2 acres of wetland credit will be developed; this is the minimum target for the project. Enhancement Site 2 was dropped from monitoring in 2002-2005 per COE / MDT discussions as it was considered to be a reasonably well-functioning system, but may be again monitored in 2006 to ascertain possible enhancement*).

To achieve a 3:1 ratio for wetland enhancement, the COE has required that significant functional improvement be demonstrated. This will occur if the composite functional assessment score improves to within 10 percent of that achieved at the onsite reference wetland. The COE further

stated that "*enhancement of an existing wetland must show significant functional increase to qualify for any credit. Simply changing the character or type of an existing good wetland to a different type of equally good wetland may not qualify for credit.*" Other than these improvements to functional attributes, and a five-year monitoring term, no performance standards or success criteria were required by the COE or other agencies.

Approximately 21.24 wetland/aquatic habitat acres have been "restored" on the mitigation site to date (RS1: 12.35 acres; RS2: 8.43 acres; ES1: 0.46 acre), while approximately 4.8 acres have been enhanced (ES1). Approximately 0.16 acre, 1.76 acres, and 0.28 acre of wetlands were gained respectfully at RS1, RS2, and ES1 between 2004 and 2005.

Appreciable functional enhancement has been achieved across the original 4.8 acres within the easement area at ES1, currently calculated at an approximate 19 functional unit "gain". An applied 1:3 credit ratio at ES1 would result in approximately 1.6 acres of credit. Also, it should be noted that the total wetland acreage within the easement area at the enhancement site appears to be approximately six acres short of the original 11-acre estimate (original acreage for enhancement was estimated at 11.2 acres for both enhancement sites 1 and 2; Enhancement Site 2 was dropped from monitoring in 2002), reducing the amount of credit available at this site.

Approximately 0.75 acre of credit is associated with the upland buffer surrounding wetlands. Consequently, the maximum assignable credit at this site (RS1, RS2, ES1, and upland buffer) as of 2005 is approximately 21.24 + 1.6 + 0.75 = 23.59 acres, which is 87% of the 27.2 acre goal.

It is recommended that MDT and the landowner approach the Corps about re-including enhancement credit at Enhancement Site 2, which was dropped from monitoring by MDT and the Corps in 2002-2005. This area was delineated at 3.11 acres in 2001, occurs within the conservation easement, has had cattle excluded, and appears to have been hydrologically enhanced. In 2005, the area was cursorily examined and appeared to have increased inundation and may have expanded in size since 2001. It is recommended that this site be monitored in 2005 in an attempt to quantify any expansion or enhancement. At a 3:1 credit ratio for enhancement, this area could produce at least another acre of credit at the site, in addition to any expansion, which would be credited at 1:1.

It is also recommended that MDT approach the Corps about possibly including the reference wetland (north of RS1) in the mitigation site, and garnering enhancement or preservation credit for this site as it also occurs within the conservation easement.

Functional assessment results are summarized in **Table 17** below. For comparative purposes, the functional assessment results for the reference wetland site and baseline conditions prepared by MDT and the landowner are also included. Ratings and scores were very similar between 2004 and 2005. Based on the baseline functional assessments conducted by MDT and the landowner, the site has experienced an apparent gain of about 137 functional units (acreage x functional points) at restoration sites RS1 and RS2, and 19 functional units at ES1. No pre-project functional assessment was conducted at RS2 due to the absence of pre-project wetlands. All three sites again rated as Category II wetlands in 2005..

Table 17: ***Summary of 2005 Wetland Function/Value Ratings and Functional Points at the Musgrave Lake Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Wetland Numbers					
	Reference Wetland (Stutzman 1999)	Pre-Project RS1[a] (Stutzman 1999)	Pre-Project ES1 (MDT 1999)	2005 RS1	2005 RS2	2005 ES1
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)
MNHP Species Habitat	Mod (0.7)	Low (0.1)	Mod (0.7)	High (1.0)	High (1.0)	High (1.0)
General Wildlife Habitat	High (0.9)	Low (0.1)	Mod (0.7)	Exceptional (1.0)	High (0.9)	High (0.9)
General Fish/Aquatic Habitat	NA	NA	Low (0.3)	NA	NA	NA
Flood Attenuation	Mod (0.5)	Low (0.1)	Mod (0.5)	Mod (0.6)	Mod (0.5)	Mod (0.5)
Short and Long Term Surface Water Storage	High (1)	Low (0.2)	Low (0.3)	High (0.9)	High (0.9)	Mod (0.6)
Sediment, Nutrient, Toxicant Removal	Mod (0.7)	Mod (0.4)	Low (0.2)	NA	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	NA	NA	Low (0.2)	Mod (0.6)	NA	Mod (0.6)
Production Export/ Food Chain Support	High (0.9)	Mod (0.5) [Low 0.2]	Mod (0.7)	High (0.9)	High (0.9)	High (0.9)
Groundwater Discharge/Recharge	High (1)	NA	NA	High (1.0)	High (1)	High (1)
Uniqueness	Low (0.3)	Low (0.2)	Low (0.1)	Mod (0.6)	Mod (0.5)	Mod (0.5)
Recreation/Education Potential	Low (0.3)	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)
Actual Points/Possible Points	6.6 / 10	2.0 / 9	4.1 / 11	7.0 / 10	7.1 / 10	7.4 / 11
% of Possible Score Achieved	66	22	37	70	71	67
Overall Category	II	III	III	II	II	II
Total Acreage of Assessed Wetlands within Easement (ac)	**6.5 (estimated)**	**4.59**	**4.8**	**12.35**	**8.43**	**5.26**
Functional Units (acreage x actual points) (fu)	**42.90**	**9.18**	**19.68**	**86.45**	**59.85**	**38.92**
Net Acreage Gain (ac)	**NA**	**NA**	**NA**	**7.76**	**8.43**	**0.46**
Net Functional Unit Gain (fu)	**NA**	**NA**	**NA**	**77.27**	**59.85**	**19.24**
Total Functional Unit Gain over baseline	**156.36** Total Functional Units; **137.12** at restoration wetlands; **19.24** at enhancement wetlands					

[a] Production Export rating was corrected based on size of vegetated component in the AA and shown in bold; this resulted in site rating as Category III.

All dikes were in good condition during the spring and mid-season visits. Lowering the water level slightly at RS1 may be necessary to prevent drowning of existing mature cottonwoods

2.14 Norem Ranch (Billings District, Year 2)

This project was constructed in the fall of 2002 by the landowner and Maxim Technologies, Inc. (Maxim) to provide MDT with wetland mitigation credits that offset wetland impacts associated with proposed road and bridge reconstruction projects in the vicinity of Big Timber, MT and the middle reaches of the Upper Yellowstone River Basin (watershed #13). The Norem wetland project site is located in Sweetgrass County approximately two miles northeast of Big Timber, MT. Elevations within the mitigation area range from approximately 4,000 to 4,018 feet above mean sea level. The Yellowstone River borders the southern project boundary and to the east is it bounded by Big Timber Creek. Fenced pastures delineate the western and northern project boundaries. The surrounding land uses include pastures, hay production and residential areas.

The project was intended to develop approximately 14.71 acres of wetland credit within a 26.88-acre conservation easement on property owned by Mark Norem. The overall wetland development objectives are to enhance existing wetlands, create emergent wetlands and shallow open water ponds, as well as establish a buffer zone around the majority of the project site. More specifically, primary goals are to create contiguous, Palustrine emergent and shrub/scrub wetlands within the project boundaries.

Approximately 6.98 acres of pre-existing wetlands were delineated on the Norem property by Maxim Technologies, Inc. in 2001. The COE has approved allocation of 2.32 credit acres (3:1 ratio) for the enhancement of these existing wetlands. Enhancement is being achieved by several methods including: the removal of high impact grazing; the addition and subsequent maturation of herbaceous and woody plants to increase species diversity; and by increasing the depth and period of inundation. An additional 1.50 acres of credit was approved by the COE for dedication and maintenance of an upland buffer zone around the perimeter of the wetlands (4:1 ratio).

The project further intends to create 9.46 acres of wetlands and 1.58 acres of shallow open water ponds (1:1 ratio approved by COE). Construction activities included the placement of a low berm in the southeast portion of the site to impound irrigation water and groundwater in addition to the four shallow open water ponds. The berm construction impacted approximately 0.15 acre of existing wetlands, which was subtracted from the 14.86 proposed credit total, resulting in the 14.71-acre credit figure. An outflow culvert located through the berm in the far eastern corner of the project diverts excess water to the wetlands east of the berm. The shallow open water ponds have standing water with depths ranging from 12 inches to 3 feet.

The majority of the project site is within the 100-year floodplain of the Yellowstone River; a historic meander channel of the Yellowstone River forms the majority of the existing wetlands on the property. Springs/seeps exist along the northern perimeter of the existing wetlands and are likely the result of irrigation water that has infiltrated at up-gradient locations and is migrating toward the Yellowstone River. Site hydrology appears strongly related to river surface and subsurface hydrology. Late in the year, a small portion of water may be irrigation influenced.

During the July 19, 2005 monitoring visit, approximately 35 percent of the assessment area was inundated with several inches of standing water. Ponds 3 and 4 were full-pond level, while ponds 1 and 2 were approximately 4 to 6 inches below normal pond level as indicated by saturated mud flats and water marks on the islands.

As of 2005 the gross wetland boundary encompasses 11.39 acres, including 1.50 acres of shallow open water (<4 feet deep). However, it should be noted that this total does not include two small pre-existing wetland lobes (totaling 0.05 acre) within the easement that extend to the southeast outside of the MDT-defined monitoring area in the northeast corner of the site. Pre-existing wetland acreage totaled 6.98 acres, which did include the two wetland lobes outside of the current monitoring area. Therefore, pre-existing wetland within the current monitoring area was approximately 6.98 - 0.05 = 6.93 acres. Wetland / shallow open water acreage has therefore increased by approximately 11.39 – 6.93 = 4.46 acres since construction (2002). As of 2005, the approximate assignable wetland credit at the site is 8.23 acres or 56% of the goal, as outlined in **Table 18** below.

Table 18: ***2005 Norem Ranch Wetland Mitigation Monitoring Results***

Wetland Mitigation Type	2005 Net Acres	Ratio	2005 Credit Acres	Target Credit Acres	Comments
Wetland Enhancement	6.98	3:1	2.32	2.32	Grazing removal, hydrological enhancement, and planting completed, with plants developing.
Wetland Creation	2.91	1:1	2.91	9.46	31% of the wetland creation area has been converted to wetlands.
Open Water Creation	1.50	1:1	1.50	1.58	98% of the intended open water has developed.
Buffer Zone Implementation	6.00	4:1	1.50	1.50	2005 net buffer area was assumed within easement.
Berm impact	--	--	---	-0.15	
Total	**16.87**	**--**	**8.23**	**14.71**	**56% of goal**

All outflow structures were functioning and the fence around the wetland was intact. The site has four State of Montana Noxious Weeds (Canada thistle, leafy spurge, whitetop and spotted knapweed). Continued weed control measures are recommended. During the July site visit, a few scattered Russian olive trees were noted within the AA.

Functional assessment results are summarized in **Table 19** below. Pre-construction functional assessments were completed for the wetlands by Maxim in 2001 and results of that assessment are included in **Table 19**. In 2005 **t**he site rated as an overall Category II wetland and scores 75.17 functional units. This represents an increase of approximately 41.57 units since 2001.

Table 19: ***Summary of 2001 and 2005 Wetland Function/Value Ratings and Functional Points at the Norem Wetland Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Evaluation Year	
	2001 Baseline conditions	2005
Listed/Proposed T&E Species Habitat	Low (0)	Low (0.3)
MNHP Species Habitat	Low (0.1)	Mod (0.6)
General Wildlife Habitat	Moderate (0.5)	Mod (0.9)
General Fish/Aquatic Habitat	Low (0.1)	NA
Flood Attenuation	Moderate (0.5)	Mod (0.5)
Short and Long Term Surface Water Storage	Moderate (0.6)	Mod (0..6)
Sediment, Nutrient, Toxicant Removal	High (1.0)	High (0.9)
Sediment/Shoreline Stabilization	NA	NA
Production Export/Food Chain Support	Moderate (0.7)	Mod (0.7)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Mod (0.4)
Recreation/Education Potential	Low (0.1)	Mod (0.7)
Actual Points/Possible Points	4.8/11	6.6/10
% of Possible Score Achieved	50	66
Overall Category	III	II
Total Acreage of Assessed Wetlands within Easement	7.0	11.39
Functional Units (acreage x actual points)	33.6	75.17
Net Acreage Gain	NA	4.46
Net Functional Unit Gain	NA	41.57
Total Functional Unit "Gain"	NA	41.57

2.15 Perry Ranch (Great Falls District, Year 4)

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.

Although very little water was in the site during the May 20th visit, the 7.0 inches of precipitation received in June flooded the site, which was still observed during the July 2005 visit. In addition to annual precipitation, areas of the site also seem to receive minor discharge from groundwater sources.

Approximately 13.65 acres of wetlands and 6.39 acres of open water presently occur on the site. This has resulted in an increase of almost 4 acres in wetland habitat since 2002, and an increase of 1.32 acres since 2004. Although the acreage of open water/mud flat has substantially increased from 2004, it is still slightly less than that observed in 2002. The open water/mudflat area is filled with shallow water. It remains to be seen whether this open water/mudflat area will become inundated next spring and transition to wetland or remain as open water or become dry and return to mud flat as it was in 2004.

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 by the end of the 5-year period. As of 2005 the site had netted 10.25 wetland acres and 6.39 acres of open water/mudflat, for a net total of 16.64 acres of aquatic habitat.

Several dike problems were noted during the 2002 summer visit, repaired during 2003, and have been stable into 2005. No problems with the dike were found in 2005. It is recommended that chemical and hand control be applied to the leafy spurge as the population is relatively small, and may be relatively new to the area. Control at this point would prevent an infestation from erupting. It is also recommended that the population be better mapped during the mid-July visit in 2006. Chemical control on Canada thistle should also be implemented once or twice during the growing season as the plant is increasing in abundance.

Functional assessments were completed for both the inner and outer oxbows. Results in 2005 were similar to results in 2004 with an increasing trend in wetland development and function. The inner oxbow of the mitigation site again rated as Category III site, while the outer oxbow again rated as a Category II site using the 1999 MDT functional assessment method. Both are developing, and it is anticipated that both will receive higher wildlife habitat and other functional ratings as wetland communities continue to grow and establish with normal precipitation. Baseline functional conditions were determined by MDT using a modified 1997 MDT functional assessment method; thus, results between the two assessments are not directly comparable, but do provide a sense of where functions have improved. Prior to construction, the inner oxbow rated as a Category III site, and the outer oxbow rated as a Category IV site. Based on functional assessment results (**Table 20)**, approximately 75 functional units have been gained thus far at the Perry Ranch mitigation site.

Table 20: ***Summary of 2005 Wetland Function/Value Ratings and Functional Points at the Perry Ranch Mitigation Project***

Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method	Evaluation Year/Assessment Area			
	1998 Inner Oxbow[a]	1998 Outer Oxbow[a]	2005 Inner Oxbow	2005 Outer Oxbow
Listed/Proposed T&E Species Habitat	Low (0.1)	Low (0.1)	Low (0.3)	Low (0.3)
MNHP Species Habitat	None (0.0)	None (0.0)	Mod (0.6)	Mod (0.7)
General Wildlife Habitat	Mod (0.4)	Low (0.1)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	NA	NA	NA	NA
Flood Attenuation	Mod (0.5)	Low (0.2)	Mod (0.5)	Mod (0.5)
Short and Long Term Surface Water Storage	--	--	Mod (0.6)	High (0.9)
Sediment, Nutrient, Toxicant Removal	Mod (0.5)	Mod (0.5)	Mod (0.7)	High (1)
Sediment/Shoreline Stabilization	NA	NA	NA	NA
Production Export/Food Chain Support	Mod (0.7)	Mod (0.6)	Mod (0.5)	Mod (0.7)
Groundwater Discharge/Recharge	High (1.0)	Low (0.1)	High (1.0)	High (1.0)
Uniqueness	Low (0.3)	Low (0.2)	Mod (0.4)	Mod (0.4)
Recreation/Education Potential	Low (0.1)	Low (0.1)	Mod (0.7)	Mod (0.7)
Actual Points/Possible Points	4.4 / 10	2.7 /10	6.0 / 10	6.9 / 10
% of Possible Score Achieved	44%	27%	60%	69%
Overall Category	III	IV	III	II
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries (ac)	2.30	1.10	6.25	7.40
Functional Units (acreage x actual points)	10.12	2.97	37.50	51.06
Net Acreage Gain (ac)	NA	NA	6.25 – 2.30 = 3.95	7.40 – 1.10 = 6.30
Net Functional Unit Gain (fu)	NA	NA	37.50 - 10.12 = 27.38	51.06 – 2.97 = 48.09
Total Functional Unit Gain	75.47			

[a] The baseline assessment (1998) was performed using the 1997 MDT Assessment Method. Several parameters were substantially revised in the 1999 MDT Assessment method, which was used to evaluate 2005 monitoring conditions. Thus, direct comparison of pre- and post-project functions is not possible; although, some general trends can be noted.

2.16 Peterson Ranch (Missoula District, Year 4)

The Peterson Ranch is located in Granite County, in the Upper Clark Fork watershed (watershed #2), south and east of Hall, MT. The elevation of the site is approximately 4,200 feet with slight topographic variation throughout the project area. The Peterson Ranch wetland mitigation site was developed to mitigate wetland impacts associated with the MDT reconstruction of Highway 1 between Maxville and Drummond, MT.

This mitigation site occurs in the Flint Creek Valley floodplain consisting of areas of low topography, small side channels (irrigation ditches) and ponds. The main source of hydrology is seasonal flooding by Flint Creek. Another primary source of hydrology is the high groundwater table influenced by irrigation ditches and persistent upwelling and lateral movement of groundwater through the floodplain alluvium. The pre-construction wetland delineation reported 90 acres of wetland and no open water acres throughout the entire 135-acre conservation easement. The mitigation site encompasses only 48 acres of this larger total. The site was designed to mitigate for specific wetland functions including sediment and nutrient retention, water quality, groundwater recharge, and waterfowl/wildlife habitat.

Project goals for the Peterson Ranch wetland mitigation site include the following:

- Creation of a protective easement.
- Creation of 17.5 acres of wetlands.
- Grazing management plan developed to enhance 80.6 acres.
- Enhancement of riparian vegetation through plantings and seeding.
- Creation of new wetlands with open water habitat.
- Improved functions and values ratings.

Construction was completed in the spring of 2002. The primary components of construction include:

- Construction of existing uplands into 8.2 acres of four shallow water pools and adjoining emergent wetlands.
- Construction of degraded wet meadow into 9.4 acres of shallow open water and emergent/scrub-shrub wetlands.

Large excavated (proposed) wetland cells west of the main ditch bisecting the property do not appear to be receiving water as originally intended. With the exception of the small ponds, most of these areas were completely dry during all site visits. This is apparently due to the lack of directly applied irrigation water as originally proposed. The use of irrigation water for these sites was denied by the DNRC as a result of the water rights permitting process. The landowners are attempting to address this issue.

In 2005 approximately 22.59 acres of wetland and 0.61 acres of open water occur on the mitigation site, for a total of 23.20 acres of aquatic habitat. Subtracting the original 22.6 acres of pre-project wetlands from this total yields a current net of approximately 0.6 wetland/open water acre. A slight decrease in wetland area was observed within the previously-mapped Open Water (OW)/ponds # 1 and 2. During 2004 monitoring, OW/ponds # 1 and 2 were mapped as wetland areas. During 2005 monitoring, the *Veronica/Myriophyllum* community type, which had replaced the open water at these areas, had decreased in size since 2004. The decrease in hydrology and additional grazing within these areas likely contributed to the reduction in wetlands at this site. This decrease in wetlands acres was also affected by a small increase in upland area within the *Agrostis/Juncus* community type.

Weed control and revegetation 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. Several noxious weeds are present including Canada thistle, houndstongue and spotted knapweed. The general lack of water at the majority of this site continues preclude wetland development in many areas. Continued livestock grazing within ponds # 1 & 2 also continue to slow development of wetlands.

The Peterson Ranch was separated into three AAs for purposes of functional assessment. These areas included the created wetland OW/pond # 1, 2 and associated emergent wet meadow west of the irrigation ditch (AA 1), scrub-shrub/emergent wetlands along the irrigation ditch (AA 2), and the created wetland OW/ponds #3, 4 and 5 with associated emergent vegetation east of the irrigation ditch (AA 3). A complete breakdown of ratings for each assessment area and pre-project AAs are presented in **Table 21** below.

Based on functional assessment results, approximately 160.21 functional units occur at the Peterson Ranch mitigation site (**Table 21**), an increase of approximately 19 functional units over 2004 results. Baseline functional assessment results are also provided in **Table 21** for general comparative purposes. However, it should be noted that direct comparison between the baseline and 2005 functional assessments are not possible, as they were completed using different versions of the MDT functional assessment method; assessments can still be compared qualitatively. The baseline assessment was completed using the 1996 version, while the 2002 – 2005 assessments were conducted using the most current (1999) version.

The site has gained approximately 92.41 functional units to date. During the 2005 monitoring, AA's 2 and 3 rating for the MNHP species habitat function increased due to the presences of bobolink within the assessment areas. The bobolink is rated as S2 category by the MNHP. AA 2 and AA 3 also both received a higher rating for sediment/shoreline stability due to the presence of mature shrubs, and respectfully emergent wetland type with deep binding root systems.

Woody species survival data were collected for the Peterson Ranch. Plantings were difficult to find during the both the 2004 and 2005 monitoring, respectfully due to extensive herbaceous cover of upland grass species and heavy browse by livestock. Pond # 1 & 2 areas west of the irrigation ditch experienced the heaviest grazing this summer. Most or all plantings observed in this area prior to 2005 have been removed by livestock. Willow species within this area, also had a low survival rate due to either grazing effects or low water levels. OW/ponds # 3, 4 & 5 showed the best survival with higher rates. OW/pond # 3 had the majority of the willows that showed vigorous growth and spread. In the past, prior to the 2005 monitoring, species survival was good. Two species including silverberry and red-osier dogwood exhibited low survival rates. The following species had higher survival rates: Woods rose, golden currant, and chokecherry. In general most of the observed sprigs were alive and exhibited good survival except for areas grazed by livestock. The high mortality of red-osier dogwood likely can attributed to heavy browse.

Table 21: ***Summary of Baseline and 2005 Wetland Function/Value Ratings and Functional Points at the Peterson Ranch Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Evaluation Year/Assessment Area			
	1998 Baseline[a]	2005 AA 1	2005 AA 2	2005 AA 3
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)	Low (0.5)	Low (0.5)
MNHP Species Habitat	Low (0.1)	Low (0.0)	Mod (0.7)	Mod (0.7)
General Wildlife Habitat	Low (0.1)	Mod (0.7)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	NA	NA	NA	NA
Flood Attenuation	NA	Mod (0.5)	Low (0.3)	Mod (0.5)
Short and Long Term Surface Water Storage	High (1.0)	High (0.8)	High (0.8)	High (0.8)
Sediment, Nutrient, Toxicant Removal	Mod (0.5)	Mod (0.7)	High (1.0)	Mod (0.7)
Sediment/Shoreline Stabilization	NA	Low (0.3)	High (1.0)	High (1.0)
Production Export/Food Chain Support	Mod (0.7)	High (0.9)	High (0.8)	High (0.9)
Groundwater Discharge/ Recharge	UNK	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Low (0.3)	Low (0.3)	Low (0.3)
Recreation/Education Potential	Low (0.1)	Low (0.3)	Low (0.3)	Low (0.3)

Table 21(Continued): ***Summary of Baseline and 2005 Wetland Function/Value Ratings and Functional Points at the Peterson Ranch Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Evaluation Year/Assessment Area			
	1998 Baseline[a]	2005 AA 1	2005 AA 2	2005 AA 3
Actual Points/ Possible Points	3.0 / 8	5.8 / 11	7.4 / 11	7.4 / 11
% Of Possible Score Achieved	38%	53%	67%	67%
Overall Category	III (borderline IV)	III	II	II
Total Acreage of Assessed Wetlands and Open Water within Easement by AA	22.6 ac	7.17	3.0	13.03
Functional Units (acreage x actual points) by AA	67.8	41.59	22.20	96.42
Total Acreage of Assessed Wetlands and Open Water on Site	22.6 ac	23.20		
Total Functional Units on Site	67.8 fu	160.21		
Net Acreage Gain (assessed wetlands and open water only)	NA	0.60		
Net Functional Unit Gain	NA	92.41		

[a] The baseline assessment was performed using the 1996 MDT assessment method, several parameters which were substantially revised during development of the 1999 MDT assessment method, which was applied during 2005 monitoring. Thus, direct comparison of pre- and post-project functions is not possible, although some general trends can be noted.

2.17 Ridgeway Complex (Glendive District, Year 5)

The Ridgeway wetland complex was created to provide wetland mitigation credits for MDT impacts in the Little Missouri Watershed (watershed #16). The complex, comprised of sixteen constructed impoundments, is located in Carter County, MT. Elevations in the complex range from approximately 3,300 to 3,400 feet above mean sea level.

Eight wetlands were created during the summer of 2000 and an additional eight were completed in January 2001. The objective for the Ridgeway Complex was to maximize the surface acres of each individual project to create s total of 50 acres of shallow waterfowl habitat. Several construction designs were employed to create the impoundments; 15 of the 16 impoundments were originally intended to have a surface area of 3.5 acres and one impoundment (#3) 22 surface acres.

As of July 2005, the gross wetland area, which includes open water and hydrophytic vegetation, totaled 32.63 acres, a 14% increase since 2004. Net emergent wetland area increased from 15.44 acres in 2004 to 26.53 acres in 2005; a 42% increase. As of the 2005 field season, approximately 65% of the 50-acre wetland creation goal had been accomplished.

In 2003, seven of the constructed pond sites had not developed into wetlands. In 2004, the number of undeveloped sites decreased to five. In 2005, the number of undeveloped sites decreased to three: W-1, W-15 and W-16. A lack of one or more of the three wetland parameters was observed at each of the undeveloped sites: W-1 had no hydrophytic vegetation but was >50% inundated and has hydric soils; W-15 and W-16 are beginning to consistently hold water,

however no wetland vegetation or hydric soils have developed. In general, other constructed wetlands within the Ridgeway complex quickly develop hydric soils and wetland communities once the hydrology has developed.

No maintenance needs were observed for W-9.

Functional assessment was only conducted at W-9 (**Table 22**). Several parameter scores were increased as a result of observations made over the last four years, namely the lack of disturbance within the wetland, perennial presence of surface water, and increase in wildlife usage. The percent possible score has increased 14 percentage points to 77% since 2001; increasingly close to a Category I wetland each year. Functional units increased from 23.81 units in 2002 to 36.4 units in 2005, an increase of 12.59 units.

Table 22: Summary of 2002 and 2005 Wetland Function/Value Ratings and Functional Points at the Ridgeway W-9 Wetland Mitigation Project

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2002[a]	2005
Listed/Proposed T&E Species Habitat	Low (0)	Low (0)
MNHP Species Habitat	High (1.0)	High (1.0)
General Wildlife Habitat	Mod (0.5)	High (1.0)
General Fish/Aquatic Habitat	NA	NA
Flood Attenuation	Mod (0.5)	Mod (0.5)
Short and Long Term Surface Water Storage	High (0.9)	High (0.9)
Sediment, Nutrient, Toxicant Removal	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	High (0.9)	High (1.0)
Production Export/Food Chain Support	Mod (0.7)	Mod (0.7)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Low (0.3)	Low (0.4)
Recreation/Education Potential	Low (0.1)	High (1.0)
Actual Points/Possible Points	6.9/11	8.5/11
% of Possible Score Achieved	62%	77%
Overall Category	II	II
Total Acreage of Assessed Wetlands within Easement	3.45	4.28
Functional Units (acreage x actual points)	23.80	36.40
Net Acreage Gain	3.45	4.28
Net Functional Unit Gain	23.81	36.40
Total Functional Unit "Gain"	23.81	36.4.

[a]In 2001 the acreage was overestimated, so 2002 is used for comparative purposes here.

2.18 Rock Creek Ranch (Glendive District, Year 1)

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. However, it is expected that impacts will

primarily involve emergent wetlands with occasional impacts to scrub-shrub and possible minor impacts to forested wetlands along the Milk River corridor.

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 an added component, scrub/shrub wetlands, within an approximate 116.75-acre perpetual conservation easement in the southeast corner of the ranch property (**Figure 1**). 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 35.08 acres of wetlands and 4.43 acres of open water were delineated on the mitigation site in 2005, for a total of 39.51 acres of aquatic habitat. Approximately 1.08 acres of wetlands occurred on the site prior to project implementation. Consequently, the net aquatic habitat created / restored to date is 39.51 – 1.08 = 38.43 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 2005, the maximum assignable credit at the Rock Creek Ranch mitigation site is 38.43 + 0.36 + 0.9 = 39.69 acres, or 79% of the initial 50-acre goal. Additional wetland acreage is likely to form as inundation area increases.

Functional assessment results are summarized in **Table 23**. For comparative purposes, the functional assessment results for baseline conditions are also included in **Table 23**. The site currently rates as a solid Category III wetland, an improvement over baseline Category IV ratings. More significantly, the site has gained over 222 functional units over baseline conditions. Prominent functions include general wildlife habitat, surface water storage, sediment/nutrient/toxicant removal, MNHP species habitat (northern leopard frog), and production export.

All dikes were in good condition during the spring and mid-season visits.

2.19 Roundup (Billings District, Year 5)

The Roundup wetland site was created to provide wetland mitigation credits for MDT's reconstruction of U.S. Highway 12 in the Musselshell Watershed (watershed #10). The site is located in Musselshell County, MT, immediately south of U.S. Highway 12 and approximately one mile east of the town of Roundup. Elevations range from approximately 3,169 to 3,175 feet above mean sea level.

The mitigation site is located at the site of the former wastewater lagoons for the city of Roundup. This former two-celled treatment facility, covering approximately 26 acres, contained sludge of varying depths with concentrations of nitrates, and possibly heavy metals of which portions were capped during construction modification. Five monitoring wells were installed around the lagoon to monitor any possible groundwater contamination from the sludge. After a review of groundwater quality sampling data, both the MT Department of Environmental Quality (DEQ) and the U.S. Environmental Protection Agency (EPA) agreed that there was not a groundwater contamination problem associated with the lagoons. The organic "sludge" was left in the west end of the southern end of the wetland bed and capped with one foot of soil during construction to prevent potential biohazards risks. The dike between cells was breached to allow water to access both cells.

Construction was completed in April of 2000 with a goal of creating at least 24 acres of wetlands with a diverse vegetative community. The site was designed to develop a hemi-marsh emergent wetland system with standing water depths no greater than three feet. Water depths vary within the wetland due to the natural topography behind the dike. Water was designed to enter the wetland mitigation system through two methods and locations.

One source of hydrology is through a channel, which funnels stormwater runoff from the northeastern section of the city of Roundup and U.S. Highway 12 into the southwestern end of the wetland. The estimated runoff volume for this system is 12,700 m^3, and 17,825 m^3 of water for the 5-and 25-year event, respectively. Treated wastewater from the new Roundup sewage treatment facility is also discharged into the wetland to maintain the design water level elevation. There is no physical "outlet" designed for the system; water leaves only through evaporation and evapotranspiration. The site has only been filling with the wastewater and stormwater since July of 2001.

The 2005 delineation resulted in a total of 22.07 acres of developing aquatic habitats. The wetland boundary excludes the historic dike and the constructed islands. Of the 22.07 gross

Table 23: ***Summary of 2005 Wetland Function/Value Ratings and Functional Points at the Rock Creek Ranch Wetland Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Wetland Numbers		
	Pre-Project Wetland Ditches (2003)	Pre-Project Isolated Wetland Patches (2003)	Post-Project 2005
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.0)	Low (0.3)
MNHP Species Habitat	Low (0.1)	Low (0.1)	Moderate (0.7)
General Wildlife Habitat	Low (0.3)	Low (0.1)	High (0.8)
General Fish/Aquatic Habitat	NA	NA	NA
Flood Attenuation	Low (0.2)	NA	Moderate (0.6)
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)	Moderate (0.7)
Groundwater Discharge/Recharge	Low (0.1)	Low (0.1)	Low (0.1)
Uniqueness	Low (0.1)	Low (0.1)	Low (0.3)
Recreation/Education Potential	Low (0.1)	Low (0.1)	Low (0.3)
Actual Points/Possible Points	2.3 / 11	1.5 / 9	5.7 / 10
% of Possible Score Achieved	21	17	57
Overall Category	IV	IV	III
Total Acreage of Assessed Wetlands within Easement (ac)	**0.77**	**0.31**	**39.51**
Functional Units (acreage x actual points) (fu)	**1.77**	**0.47**	**224.64**
Net Acreage Gain (ac)	**NA**	**NA**	**38.43**
Net Functional Unit Gain (fu)	**NA**	**NA**	**222.4**
Total Functional Unit Gain over baseline	**222.4** Total Functional Units		

wetland acreage, 14.74 acres were shallow, open water; no exposed soil was observed during the field visit as a result of the high precipitation levels from March through July. The kochia within the area of the transect has begun to die off because of the presumed higher saturation level. The net wetland area decreased from 9.52 acres in 2004 to 7.33 acres in 2005 because of the kochia die-off in the south lagoon as a result of inundation. Of the 7.33 acres net wetland area, 0.6 acre (0.3% of gross wetland area) were represented by non-weedy hydrophytic plant species. Areas of preferred hydrophytic vegetation are beginning to develop where *Chenopodium* and kochia are absent, however these areas have not yet increased the net wetland acreage. Preferred wetland species are likely to increase as inundation continues at design levels.

All dikes and inlet structures were functioning satisfactorily. All located bird boxes are in good condition. Weed management for invasive species (e.g., Kochia and *Chenopodium sp.*) is recommended.

Functional assessment results are summarized in **Table 24** below. The Roundup wetland continues to rate as a Category II wetland with little change in overall area since 2002. The site rated as an overall Category II wetland and scores 158.9 Functional Units. This represents an increase of approximately 220 percent since 2001, but only a 6 percent increase since 2002 and almost no change in functional units since 2004. The functional units will continue to remain the same unless the wetland starts to develop a more preferred wetland vegetation community and includes more structural diversity. The list of avian species has increased since monitoring began and has consequently increased the General Wildlife Habitat rating to high (0.9) which qualifies the wetland as a Category II wetland. Wildlife use, particularly migratory songbirds, would further increase with the survival and proliferation of a willow shrub community.

Table 24: ***Summary of 2005 Wetland Function/Value Ratings and Functional Points at the Roundup Wetland Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Evaluation Year	
	2001	2005
Listed/Proposed T&E Species Habitat	Low (0)	Low (0)
MNHP Species Habitat	Low (0)	High (.8)
General Wildlife Habitat	Low (.3)	High (.9)
General Fish/Aquatic Habitat	NA	NA
Flood Attenuation	High (1)	Mod. (.6)
Short and Long Term Surface Water Storage	High (.8)	High (1)
Sediment, Nutrient, Toxicant Removal	Mod. (.7)	Mod. (.7)
Sediment/Shoreline Stabilization	NA	High (1)
Production Export/Food Chain Support	Mod. (.6)	High (.8)
Groundwater Discharge/Recharge	Low (.1)	Low (.1)
Uniqueness	Low (.2)	Low (.3)
Recreation/Education Potential	Low (.2)	High (1)
Actual Points/ Possible Points	3.9/10	7.2/11
% of Possible Score Achieved	39%	65%
Overall Category	III	II
Total Acreage of Assessed Wetlands within Easement	18.51	22.07
Functional Units (acreage x actual points)	72.21	158.90
Net Acreage Gain	18.51	22.07
Net Functional Unit Gain	72.21	158.90
Total Functional Unit "Gain"	72.21	158.90

2.20 South Fork Smith (Butte District, Year 4)

Located in the Missouri-Sun-Smith drainage basin (watershed #7), the approximate 2-mile long stream restoration area is located approximately seven miles north of Ringling in Meagher County, MT. The site occurs on private land (Galt Ranch) located west of U.S. Highway 89. In conjunction with its Ringling–North highway reconstruction project, MDT shifted a portion of the South Fork Smith River from its channelized location on the east side of U.S. Highway 89 to its historic channel on the west side of the roadway. It is estimated from aerial photos and topographic maps that approximately 8,900 feet of river channel length was eliminated with the relocation of the South Fork to the east side of the highway in 1910. The MDT, with restoration of the river to its former channel, is anticipating that various lost functions such as floodplain, fisheries and wetland habitat will be restored to previous conditions.

Highway reconstruction was completed during the 2001 field season, and water was returned to the historic channel in early fall 2001. The MDT did not propose or conduct any in-stream or bank construction prior to returning water to the channel, but rather elected to allow the stream to reach its own equilibrium through natural processes over time.

A baseline wetland delineation and functional assessment was completed during the 2001 field season prior to reactivation of the historic channel. MDT not only anticipates the restoration of high quality in-stream fish habitat, but the restoration of moderate to high quality floodplain wetlands as well, which will be monitored over time. Target wetland communities to be produced at the site include shallow marsh/wet meadow and scrub-shrub. Target wetland functions to be provided at the site include habitat diversity, flood control & storage, general wildlife habitat, fish habitat, sediment filtration, and nutrient cycling.

The historic channel and adjacent habitats have been heavily grazed in recent years, thus limiting the establishment of woody riparian vegetation. MDT anticipates that many of the woody species would establish with protective fencing and/or planting by MDT forces. At this time, no formal revegetation plan is proposed. Prior to project construction, MDT approached the landowner about enacting a conservation easement along the entire corridor. The landowner originally agreed, in concept, to fencing and placing the area within an easement, but rescinded late in the planning process.

The historic channel of the South Fork Smith River was primarily influenced by groundwater prior to reactivation in the fall of 2001. Flowing surface water was present in all reaches of the stream within the analysis area during the 2005 monitoring effort. Water depths varied within the channel depending upon channel geometry. The water tends to be shallow (1”-6”) as it spreads out across widened sections of channel and deeper (6”-36”) in narrow sections of channel and in pools. Examination of the streambanks and bank pins showed no lateral movement of the banks in these areas. No other signs of instability of the stream channel were noted.

Prior to reactivation of the historic channel through the project area, wetland habitat was groundwater fed, with 8.32 acres of wetland habitat and 0.57 acres of open water occurring on-

site. Delineation results for 2005 show that there are 8.76 acres of wetland and 0.57 acres of open water, thereby, providing a total of 9.33 acres of aquatic habitat. This wetland expansion in 2005 occurred in several locations as a result of normal or above normal precipitation in the project area, and represents a net gain of 0.44 acre across the site. Additionally, minor shifts in vegetation community types are occurring, as emergent habitat transitions to aquatic bed within the channel. Additional wetland expansion seems probable over time, but will be limited by the deeply incised S.F. Smith River channel. A full delineation of the site using resource grade global positioning system (GPS) may be useful in future monitoring efforts to detect minor wetland expansion that may be too subtle to detect otherwise.

At this time, cattle grazing within the South Fork Smith River channel, it banks, and the surrounding uplands is limiting the extent to which restoration can occur on the site. Fencing of the stream corridor would allow for the re-establishment of woody vegetation along the creek, help protect stream banks from trampling, and improve the overall health of the system. Function and value ratings would also increase substantially, thus generating considerably more functional units from the site.

Functional assessment results are summarized in **Table 25** below. The wetland habitat associated with the South Fork Smith River rated as a Category III (moderate value), primarily due to high ratings for surface water storage, food chain support and groundwater discharge. All other ratings were low or moderate. Actual functional points increased slightly over the baseline, as perennial flow was reintroduced to the site as well as a fisheries resource.

Table 25: ***Summary of Baseline & 2005 Wetland Function/Value Ratings and Functional Points at the South Fork Smith River Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Evaluation Year/Assessment Area	
	2001 Historic Channel	2005 Reactivated Channel
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)
MNHP Species Habitat	Low (0.1)	Low (0.1)
General Wildlife Habitat	Low (0.3)	Mod (0.5)
General Fish/Aquatic Habitat	Low (0.1)	Mod (0.4)
Flood Attenuation	Mod (0.4)	Mod (0.4)
Short and Long Term Surface Water Storage	High (0.9)	High (1.0)
Sediment, Nutrient, Toxicant Removal	Mod (0.4)	Mod (0.4)
Sediment/Shoreline Stabilization	Low (0.2)	Mod (0.7)
Production Export/Food Chain Support	High (0.8)	High (0.9)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	low (0.3)	low (0.2)
Recreation/Education Potential	Low (0.1)	Low (0.1)
Actual Points/Possible Points	4.9 / 12	6.0/ 12
% of Possible Score Achieved	41%	50%
Overall Category	III	III
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries (ac)	8.9	9.3
Functional Units (acreage x actual points) (fu)	43.61	55.80

2.21 Stillwater River (Billings District, Year 5 – Final Year)

The Stillwater River site is located in the Upper Yellowstone River Watershed (watershed #13) in Stillwater County, MT, approximately eight miles southwest of the interstate interchange at Columbus. It was constructed in the spring of 1999 to mitigate wetland impacts associated with a proposed Federal Aviation Administration expansion of the Columbus Airport and a proposed MDT roadway improvement project between Absarokee and Columbus. Elevations within the assessment area range from approximately 3,382 to 3,387 feet above mean sea level. The surrounding land uses include grazing, cropland and residential areas.

The project was intended to develop approximately 10.69 acres of wetland credit within a 20-acre conservation easement on property owned by Virginia K. Thompson. Two dikes were constructed across a former channel of the Stillwater River to impound return irrigation water from the nearby Whitebird irrigation ditch and groundwater. The two dikes were constructed to create 3.79 acres of wetland behind Dike #1 and 6.90 acres of wetland behind Dike #2 (total 10.69 acres). The mitigation activities were to impact approximately 3.77 acres of existing wetlands, and also enhance 3.77 acres of existing wetlands behind dikes 1 and 2.

The source of hydrology for the Stillwater River mitigation wetland includes groundwater from the river and irrigation return water from the nearby Whitebird irrigation ditch. The impoundments have standing water with depths ranging from 0-6 feet. Outflow from the west (#1) to the east impoundment (#2) is through a beaver control device installed in the central dike separating the two impoundments. A similar device allows outflow through the second dike into a small stream connecting to the Stillwater River. During the August 8, 2005 monitoring visit approximately 57% of the assessment area was inundated with 0-6 feet of standing water and was at full-pond level.

Emergent vegetation has developed around 100% of the open water circumference. The gross wetland boundary encompasses 9.72 acres of wetland that include 5.56 acres of shallow open water (<6 feet deep). Gross wetland acreage has increased 5.95 acres since the site was constructed and increased 0.5 acre since 2004.

MDT anticipated creating 10.69 acres of wetland credit within a 15 to 20-acre conservation easement (MDT 1998). The mitigation efforts have thus far resulted in 9.72 gross wetland acres or 91% of the goal. The 10.69-acre goal included the enhancement of 3.77 acres of pre-existing wetlands, which were generally comprised of closely cropped pasture similar to current adjacent lands. The gross wetland acreage has been fairly stable since 2002; however, the open water areas have decreased as a result of emergent wetland encroachment. Aquatic vegetation is floating on the surface of the east pond and from the air aquatic vegetation has been observed throughout much of the inundated area.

At a minimum, as of 2005 the 9.72 gross wetland acres at the site appear to have mitigated for the wetland impacts associated with the Federal Aviation Administration expansion of the Columbus airport (1.04 acres) and the MDT roadway improvement project between Absarokee and Columbus (2.23 acres).

Most of the bluebird boxes were inhabited with breeding tree swallows during the spring visit. Damaged or missing wood duck boxes were moved or replaced; 7 boxes are located within the cottonwood stand on the northwest side of the ponds. All of the wood duck boxes were scratched beneath the entrance hole but no activity was observed. The site contains five State of Montana Noxious Weeds (Canada thistle, spotted knapweed, field bindweed, houndstongue, and leafy spurge) and one (1) on the Stillwater County list (mullein). The site requires aggressive weed control measures, including a spring and fall spraying program, to eradicate all noxious weeds.

Functional assessment results are summarized in **Table 26** below. The net functional units have increased by 39 points since 2001 due to several high to exceptional ranking variables. The wetland attained the Category 1 Wetland status in 2002. Ten of the 12 evaluated parameters received high to exceptional ratings, six with functional points of 1.0.

Table 26: ***Summary of Baseline and 2005 Wetland Function/Value Ratings and Functional Points at the Stillwater River Wetland Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Evaluation Year	
	1998 Baseline[a]	2005
Listed/Proposed T&E Species Habitat	High (1.0)	Moderate (0.8)
MNHP Species Habitat	Low (0.1)	Low (.1)
General Wildlife Habitat	Moderate (0.5)	Exceptional (1.0)
General Fish/Aquatic Habitat	High (0.8)	High (0.8)
Flood Attenuation	Moderate (0.5)	High (0.9)
Short and Long Term Surface Water Storage	NA	High (1.0)
Sediment, Nutrient, Toxicant Removal	Moderate (0.5)	High (1.0)
Sediment/Shoreline Stabilization	NA	High (1.0)
Production Export/Food Chain Support	High (1.0)	High (0.9)
Groundwater Discharge/Recharge	Low (0.1)	High (1.0)
Uniqueness	Moderate (0.4)	High (0.9)
Recreation/Education Potential	Low (0.1)	High (1.0)
Actual Points/Possible Points	5/10	10.4/12
% of Possible Score Achieved	50%	87%
Overall Category	III	I
Total Acreage of Assessed Wetlands within Easement	3.77	9.72
Functional Units (acreage x actual points)	15fu	101.88
Net Acreage Gain	NA	5.95
Net Functional Unit Gain	NA	86.88

[a] The baseline assessment was performed using the 1996 MDT assessment method, several parameters which were substantially revised during development of the 1999 MDT assessment method, which was applied during 2005 monitoring. Thus, direct comparison of pre- and post-project functions is not possible, although some general trends can be noted.

2.22 Wagner Marsh (Billings District, Year 1)

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, MT 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 1.92 acres of open water had developed without intervention by MDT. It is anticipated that this site will compensate for wetland impacts resulting from MDT highway and bridge reconstruction projects in the watershed.

The project is comprised of two existing wetland/open water areas totaling 3.87 acres and seven wetland creation areas (i.e., wetland cells) totaling approximately 17.72 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.

Of the 39 acres in the monitoring area approximately 20 percent was inundated. Water levels were higher during the fall visit compared to the mid-season visit. Though the specific cause for this is unknown, it is likely that water levels were higher due to less irrigation occurring on farms in the area in September.

Based on documentation provided by MDT, approximately 2.12 acres of wetland and 1.92 acres of open water (4.04 acres total) occurred within the monitoring area prior to project implementation. 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 construction by MDT. As of 2005, a total of approximately 11.84 acres of open water and wetland habitat occur within the monitoring area. Of the 11.84 acres, approximately 7.88 acres are currently open water habitat, and the remaining 3.96 acres are vegetated wetland area (**Table 27**). The increase in vegetated wetland area is 1.84 acres over pre-construction conditions, while the increase in open water area is 5.96 acres. Note that much of the open water habitat observed in 2005 is expected to become vegetated with emergent hydrophytic species over time. An additional 4.02 acres of the 'disturbed-moist' vegetation type is expected to convert to wetland over the next few years; which would increase the total acreage of open water and wetland to 15.88 acres. A 50 foot wetland buffer around wetlands found on the site is approximately 5.19 acres in size (**Table 27**).

Table 27: ***2005 compensatory mitigation credit summary for the Wagner Marsh Mitigation Site.***

Credit Category	Acres	Assumed Credit Ratio	Credit
Palustrine emergent	2.93	1:1	2.93
Palustrine scrub-shrub	1.03	1:1	1.03
Total Wetland	3.96	1:1	3.96
Open water	7.88	20% of wetland acreage	0.79
50-foot wetland buffer	5.19	4:1	1.3
TOTAL	17.03		6.05

Tamarisk eradication measures were undertaken by the MDT Wetland Mitigation Specialist on August 1, 2005. This effort should continue to ensure the complete eradication of this noxious weed species from the site before it becomes well established. The majority of tamarisk seedlings/saplings were observed in the north end of the site, and particularly in the palustrine scrub-shrub wetland area.

A total of 547 woody plantings were observed as part of the overall revegetation plan for the site. As of August 1, 2005, the overall survival rate is estimated at 92 percent, with a total of 41 individuals observed to be dead; likely due to a lack of available water during the summer months, and/or shock due to transplanting.

The wetlands at Wagner Marsh were ranked as Category III wetlands in 2005 as compared to Category IV in 2001 (**Table 28**). Functions that increased substantially over 2001 baseline conditions include general wildlife habitat, short and long term surface water storage, production export, and uniqueness. The pre-project site provided about 17.2 functional units within the monitoring area, and the post-project site currently provides about 68.7 functional units, for a conservative gain of at least 51.5 functional units.

Table 28: ***Summary of Baseline and 2005 wetland function/value ratings and functional points at the Wagner Marsh Mitigation Site***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Evaluation Year	
	2001 Baseline Assessment	2005
Listed/Proposed T&E Species Habitat	Low (0.5)	Low (0.5)
MNHP Species Habitat	Low (0.2)	Low (0.2)
General Wildlife Habitat	Low (0.3)	Moderate (0.7)
General Fish/Aquatic Habitat	N/A	N/A
Flood Attenuation	N/A	N/A
Short and Long Term Surface Water Storage	Moderate (0.6)	High (1.0)
Sediment, Nutrient, Toxicant Removal	Moderate (0.7)	Moderate (0.7)
Sediment/Shoreline Stabilization	N/A	Moderate (0.7)
Production Export/Food Chain Support	Moderate (0.6)	High (0.8)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Moderate (0.5)
Recreation/Education Potential	Low (0.2)	Low (0.1)
Actual Points/Possible Points	4.3/9	5.8/10
% of Possible Score Achieved	48%	58%
Overall Category	IV	III
Total Acreage of Assessed Aquatic Habitat within AA Boundaries	4	11.84
Functional Units (acreage x actual points)	17.2	68.7
Net Acreage Gain	NA	7.84
Net Functional Unit Gain	NA	51.5

2.23 Wigeon Reservoir (Glendive District, Year 5)

The Wigeon Reservoir mitigation site is located in Carter County, MT, approximately 22 miles directly north of Alzada. The Wigeon wetland was created to provide mitigation credits for wetland impacts associated with MDT roadway projects that have been constructed in the Little Missouri Watershed (watershed #16). Elevations range from approximately 3,169 to 3,175 feet above mean sea level.

Construction was completed on this site in October of 1997 with the goal of creating a reservoir to provide nesting and brood rearing habitat for waterfowl and other wildlife species. An impoundment was constructed to collect surface water runoff from an intermittent tributary of Prairie Dog Creek. This wetland was designed by the Bureau of Land Management (BLM) in association with MDT to provide specific wetland functions including: nesting and brood rearing habitat for waterfowl; water for wildlife habitat; increased habitat diversity; water storage and retention; and creating open water and emergent wetland types.

The 3.73 acres of gross wetland area encompasses approximately 0.85 acre of net wetland, 0.6 acre of mud edge, and 2.31 acres of open water. In 2001, the gross wetland area totaled 8.2 acres and included 3.0 acres of emergent wetland. The drought has caused a 55% decline in the gross wetland area and nearly 100% loss of desirable wetland vegetation species. A few sprigs of *Eleocharis* and *Scirpus* were observed and therefore it is likely that the wetland vegetation will regenerate with normal precipitation. Functional units have decreased 51% since 2001, however, the wetland continues to rank as a Category II wetland.

No observable problems were noted concerning the dike structure. Fencing the outer limits of the wetland boundary prior to the end of the drought is recommended to protect reestablishing hydrophytic wetland vegetation. Several watering-access points can be incorporated into the fence perimeter to allow cattle access.

Functional assessment results are summarized in **Table 29** below. Functional units have decreased 51% since 2001 because of a 4.47 acre decrease in gross wetland area primarily caused by drought. Cattle grazing may have exacerbated the decline in wetland vegetation. The wetland continues to rank as a Category II wetland as it provides primary habitat for an MNHP species of special concern, the leopard frog. The diversity of water-loving wildlife that use the reservoir is high as evidenced by the diversity of waterfowl, amphibians and reptiles. Fewer cattle and deer tracks were observed, which may be influenced by the mucky silt along the edge of the open water.

Table 29: ***Summary of 2001 and 2005 Wetland Function/Value Ratings at the Wigeon Reservoir Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2001	2005
Listed/Proposed T&E Species Habitat	Low (0)	Low (0)
MNHP Species Habitat	High (1)	High (1)
General Wildlife Habitat	Mod (.5)	High (.9)
General Fish/Aquatic Habitat	Mod (.6)	Mod (.5)
Flood Attenuation	Mod (.5)	Mod (.5)
Short and Long Term Surface Water Storage	High (1)	High (1)
Sediment, Nutrient, Toxicant Removal	Mod (.7)	Mod (.7)
Sediment/Shoreline Stabilization	Mod (.7)	Low (.3)
Production Export/Food Chain Support	Mod (.6)	High (.8)
Groundwater Discharge/Recharge	High (1)	High (1)
Uniqueness	Low (.3)	Low (.3)
Recreation/Education Potential	Low (.1)	Low (.5)
Actual Points/Possible Points	7/12	7.5/12
% of Possible Score Achieved	58%	63%
Overall Category	II	II
Total Acreage of Assessed Wetlands within Easement	8.20	3.73
Functional Units (acreage x actual points)	57.40	27.98
Net Acreage Gain	8.20	3.73
Net Functional Unit Gain	57.40	27.98

Appendix A

TABLE 1

MDT Wetland Mitigation Monitoring
2005 Executive Summary

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Table 1: *Summary of MDT Wetland Mitigation Sites Monitored 2001 - 2005*

Site	Year Built	Major MT Watershed Basin	Pre-Project Wetland Acreage and MDT Category	Target Wetland Credit	2005 Wetland / Open Water Acreage and MDT Category	Enhancement Credit (ratio)	Upland Credit (ratio)	Total Acreage Gain / Credit and Functional Unit Gain as of 2005	Comments
Missoula District									
Batavia	1998	4 - Flathead	137 ac Category II 1069 fu	28.72 ac (see comments)	138.25 ac Category II 1327 fu	See comments	NA	Unknown pending full site delineation. So far have gained 1.25 ac creation, 19.6 acres enhancement, 4.93 open water creation, 258 fu. Subtracting 4.3 ac. for dike = 21.48 ac net.	2005 fifth year of monitoring. Similar results as 2002 - 2004. Gained 19.6 acres enhancement credit. Project Goals: wetland creation of 18.2 ac. @ 1:2 ratio = 9.1 ac north cell enhancement 76.8 ac @ 1:8 ratio = 9.6 ac south cell enhancement 60 ac @ 1:6 ratio = 10 ac Enhancement has occurred, but poor water year prevented documentation of substantive wetland creation during 2005. Excavation of cells increased open water area. Only monitored new borrow areas. Water delivery from Ashley Creek appears to be a major problem at this site (diversion not maintained). Desired pool elevation of 3,128.5 not achieved; is 1.9 ft below this elevation.
Camp Creek	2002	3 – Lower Clark Fork	48.73 ac Category III 251.58 fu	11.4 acre minimum (see comments)	42.06 ac wetland 2.15 ac channel Category II & III 393.26 fu	None specified	None specified	Loss of 4.52 ac aquatic habitat Gain of 141.68 fu	Fourth 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. No agreement between Corps and MDT regarding crediting mechanism. Using functional unit-based crediting approach would yield up to 16.17 acres of credit to date (not included in credit acreage at this time).
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 ac, 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	6.67 ac (total) Category II (0.06 ac), III (4.12 ac), IV (2.49 ac) 31.22 fu	8.1 ac (restore & create) 5.2 ac (upland enhance)	13.01 ac Category III (12.55 ac), IV (0.46 ac) 95.39 fu	None specified	None specified	6.34 ac created 64.17 fu	Fourth monitoring year. Gain of 0.89 wetland acre since 2002. Planting at adjacent uplands was accomplished in 2003 and 2004. Currently at 78% of wetland acreage goal. Weed control is recommended.
Kleinschmidt Creek	2001	2 – Upper Clark Fork	13.78 ac wetlands 7.59 ac OW Category III 111.3 fu	15.52 ac	22.82 ac wetland 2.43 ac open water Category II & III 210.75 fu	1:2 on 8.05 = 4.02 1:3 on 3.43 = 1.14 Total = 5.16 ac	1:4 on 7.45 = 1.86 ac. 5.24 ac of upland buffer reverted to wetland	11.24 ac. restored 1.19 ac created 4.02 enhancement 1.86 buffer 18.31 total credit 99.45 fu	Fourth monitoring year; second within MDT program. No credit for low intensity enhancement due to accidental grazing impacts; recommend re-planting in this zone. Currently at 118% of goal due to additional "incidental" wetland restoration within easement. 1:1 ratio assumed for "incidental" restoration, but needs to be approved by Corps.
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.
Peterson Ranch	2002	2 – Upper Clark Fork	22.6 ac Category III 67.8 fu	17.5 ac (created)	22.59 ac wetland 0.61 ac open water Category II 160.21 fu	None specified	None specified	0.6 ac created 92.41 fu	Fourth monitoring year. Lost 0.18 acre between 2004 and 2005. Currently at 3% of project goal. Weed control recommended. Water rights problematic and may prevent site from functioning as designed.
Butte District									
Beaverhead Ranch	1997	6 – Upper Missouri	5.2 ac Category and fu unknown	52 ac	97.9 ac Category II 861.52 fu	NA	NA	92.7 ac 815.76 fu	Fifth monitoring year. Same results as 2001 - 2004. Excellent site with heavy wildlife use. Project is currently at 178% of goal. MDT opted not to purchase additional credits outside the current easement. Some erosion occurring along dike face; new fill was place on dike face in 2004.
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	1.99 ac Category III 49.8 fu (see comments)	50 ac	31.31 ac wetland 2.13 ac open water Category II 274.2 fu	None specified	None specified	33.44 ac restored 257.9 fu	Second monitoring year. The 50-acre goal includes pre-existing wetlands; currently at 67% of goal. Baseline functional units included stream reaches outside of project area, so functional unit gain to date is considered a minimum.
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	0 ac (no temporary inundation observed)	NA	NA	0 ac	Monitoring suspended after 2004 season due to water retention problems. No wetland or other aquatic habitats have developed to date. Site contains no conservation easement.

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Site	Year Built	Major MT Watershed Basin	Pre-Project Wetland Acreage and MDT Category	Target Wetland Credit	2005 Wetland / Open Water Acreage and MDT Category	Enhancement Credit (ratio)	Upland Credit (ratio)	Total Acreage Gain / Credit and Functional Unit Gain as of 2005	Comments
South Fork Smith	2001	7 – Missouri-Sun-Smith	8.32 ac wetland 0.57 ac open water Category III 43.61 fu	Not specified	8.76 ac wetland 0.57 ac open water Category III 55.8 fu	NA	NA	0.44 ac created wetland 12.19 fu	Fourth monitoring year. Slight increase in wetland acreage (0.44 ac) over previous years. No change open water, but flow now perennial (increased functional score). Site contains no conservation easement, and grazing impacts are extensive. No specific project acreage target was established.
Great Falls District									
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), III (5.05 ac), and 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	194.02 ac open water (see comments)	NA	NA	194.02 ac open water, no wetlands yet (see comments)	Second monitoring year. 194.02 ac of open water created, hydrophytic vegetation had not developed in 2005. Site subject to strict fill conditions (combined Missouri River at Ulm and Sun River at Vaughn must be greater than 7,880 cfs; no diversion after June 1). Because no wetlands had developed, no functional assessment performed.
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: 12.35 ac Category II 86.45 fu RS2: 8.43 ac Category II 59.85 fu ES1: 5.26 ac Category II 38.92 fu	1:3 ratio at ES-1 (1.6 acres)	1:4 ratio on 3 ac = 0.75 ac	21.24 ac restored 1.6 ac enhancement 0.75 ac buffer 23.59 ac total credit 156.36 fu	Monitoring year 5. ES2 removed from monitoring in 2002 per MDT / Corps direction, although it was included in original project goals. Goals: Restoration Site 1: 13.6 ac, 1:1 ratio, 13.6 credits Restoration Site 2: 10.9 acres, 1:1 ratio, 10.9 credits Enhance. sites 1 and 2: 11.2 acres, 1:3 ratio, 3.7 credits Upland buffer: 3 acres, 1:4 ratio, 0.75 credits Landowner committed to providing a minimum of 27.2 acres wetland credit. Currently at 87% of project 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	13.65 ac wetland 6.39 ac open water/mudflat, Category II and III 88.56 fu	NA	NA	16.64 ac 75.47 fu	Fourth monitoring year. Currently at about 69% of project goal.
Glendive District									
American Colloid	2001	16 – Little Missouri	0 ac	4.4 ac	4.22 ac Category III 19.74 fu	NA	NA	4.22 ac 19.74 fu	Fourth monitoring year. Site primarily open water in 2005, with minor (0.03 acre) wetlands. Functional units increased. Counting open water, currently at 96% of project goal.
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	1.68 ac (school) 1.5 ac (creek) 3.18 total	0.82 ac (school) 1.07 ac (creek) 1.89 ac total Category II & III 12.99 fu	NA	NA	1.89 ac 12.99 fu	Fourth monitoring year. Site consists of school site and two Alderson Creek sites. Currently at approximately 59% of project goal.
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 ac (total)	26.53 ac wetland 6.1 ac open water 32.63 ac total Category II (W-9 only) 36.4 fu (W-9 only)	NA	NA	32.63 ac W-9: Category II, 36.4 fu	2005 is fifth monitoring year. One of the 16 ponds in this complex (W-9) was intensively sampled / monitored in 2001-2005, although all ponds were delineated. The project is at approximately 65% of project goal. Total includes 6.1 acres of open water.

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Site	Year Built	Major MT Watershed Basin	Pre-Project Wetland Acreage and MDT Category	Target Wetland Credit	2005 Wetland / Open Water Acreage and MDT Category	Enhancement Credit (ratio)	Upland Credit (ratio)	Total Acreage Gain / Credit and Functional Unit Gain as of 2005	Comments
Rock Creek Ranch	2004	11 - Milk	1.08 ac Category IV 2.24 fu	50 ac	35.08 ac wetland 4.43 ac open water Category III 224.64 fu	1:3 on 1.08 ac = 0.36 ac	1:4 on 3.6 ac = 0.9 ac	38.43 ac creation 0.36 ac enhancement 0.9 ac buffer 39.69 ac total credit 222.4 fu	2005 is first monitoring year. Site is currently at 79% of goal. Shrub planting proposed in 2006.
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 construc.) (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	0.85 ac wetland 0.6 ac mud edge 2.31 ac open water 3.73 ac total Category II 27.98 fu	NA	NA	3.73 ac 27.98 fu	2005 is fifth monitoring year. Project goal exceeded by 1.53 acres. Drought impacted this site in 2004 and 2005, which decreased size from 8.09 acres. Includes 2.31 acres of open water.
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 is 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: 2.03 ac Creek fringe: 0.76 Category II 42.65 fu	NA	1:4 on 3.56 = 0.89 ac	2.79 ac restoration 0.89 ac buffer 3.68 ac total 6.28 fu gain since 2004	Second monitoring year. Site currently at 67% 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
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)	9.89 ac wetland 1.5 ac open water 11.39 total Category II 75.17	1:3 on 6.98 ac =2.32 ac	1:4 on 6 ac = 1.5 ac	2.32 ac enhancement 2.91 ac creation 1.5 ac OW creation 1.5 ac buffer 8.23 ac total 41.57 fu	Second monitoring year. Site currently at 56% 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	14.74 ac open water 7.33 ac wetland 22.07 ac (developing) Category II 158.9 fu	NA	NA	22.07 ac total 158.9 fu	Fifth monitoring year. Site currently at 92% of goal. Some die off of kochia due to inundation.
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 is final monitoring year. Results similar to 2002 - 2005. 10.69-ac goal included existing wetlands. Currently at 91% of goal.
Vince Ames	1992 - 1994	13 – Upper Yellowstone	2.39 ac Category III & 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.

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Site	Year Built	Major MT Watershed Basin	Pre-Project Wetland Acreage and MDT Category	Target Wetland Credit	2005 Wetland / Open Water Acreage and MDT Category	Enhancement Credit (ratio)	Upland Credit (ratio)	Total Acreage Gain / Credit and Functional Unit Gain as of 2005	Comments
Wagner Marsh	2005	13 – Upper Yellowstone	2.12 ac wetland 1.92 ac open water 4.04 ac total Categori IV 17.2 fu	21.59 ac (total)	3.96 ac wetland 7.88 ac open water 11.84 ac total Category III 68.7 fu	NA	1:4 on 5.19 ac = 1.3 ac	3.96 ac (total wetland) 0.79 ac (open water) +1.3 ac (buffer) 6.05 ac credit 51.5 fu	First monitoring year. Increase of 1.84 ac of wetlands over baseline conditions. Open water credit limited to 20% of wetland credit. Much of the open water habitat (7.88 ac) observed in 2005 is expected to become vegetated with emergent hydrophytic species over time. An additional 4.02 acres of the 'disturbed-moist' vegetation type is expected to convert to wetland over the next few years.
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.
Totals[1]				**593.57 ac**				**429.42 ac**[2] **3,175.85 fu**[3]	[1] The target figure for Batavia was included, although the actual current wetland extent has not yet been determined. No target or credit figures were included for the South Fork Smith site. [2] Does not include possible functional unit-based credits from Camp Creek site; does not include any open water credits from Little Muddy Creek site. [3] Functional unit totals do not include 15 reservoirs at the Ridgeway site, for which functional assessments were not conducted.

Appendix B

2005 MAINTENANCE SUMMARY/UPDATE

MDT Wetland Mitigation Monitoring
2005 Executive Summary

LAND & WATER CONSULTING, INC.
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Mitigation Site	2005 Maintenance Summary/Update
Missoula District	
Batavia	The berm and associated water control structures were in good condition during the mid-season visit. *Noxious Weeds* Excavated soils were deposited in adjacent upland areas during the spring of 2005, and by July some of these areas were infested with weedy species, primarily thistle and spotted knapweed. Weed control is recommended in these areas until desired species get established.
Camp Creek	*Planted woody species survival rates:* Upland species: below 50 percent. Wetter species: 60 to 90 percent. Supplemental planting and irrigation in upland areas within the MDT parcel should be considered. *Noxious Weeds* Bull thistle, Canada thistle, houndstongue and spotted knapweed are present. The MDT parcel has the least amount of invasive species and distribution is limited to upland areas not affected during construction efforts. The Grasser parcel supports the majority of the noxious weed species with extensive distribution along the floodplain corridor. Areas of invading spotted knapweed located along floodplain margins should be controlled and reseeded or planted with appropriate wetland species to help control further spread of invasive species.
Creston	The berm was in good condition during the spring and mid-season visits and the bird boxes also appeared to be in good condition. *Noxious Weeds* Spotted knapweed, Canada thistle, common houndstongue, and common mullein are present. Weed control on the entire site is recommended. The parking area has substantial knapweed, with other infestations occurring in upland areas that were heavily disturbed during construction. Canada thistle is common along the dike. It does not appear that any weed management has occurred onsite since project construction.
Hoskins Landing	Survival rates for the upland areas were low; only two species (woods rose and snowberry) showed higher survival rates. Survival rates for the wetland planting were high with sandbar willow and cottonwood having the highest rate. Several woody species that had low survival rates during the 2003 monitoring were replanted in 2004. The replacement plants were doing well and exhibited a high survival rate in 2005. Evidence of livestock accessing the site was observed during a fall 2005 visit. An electric fence has been put into place, running parallel with the river setback from the shoreline. The drier upland grass meadows were heavily grazed and tramping within the wetlands was observed. Minor browse on the woody plantings within the wetland area was also observed. *Noxious Weeds* Canada thistle, Dalmatian toadflax houndstongue, oxeye daisy, St. John's wort, spotted knapweed, yellowflag iris and Eurasian water-milfoil were present within the mitigation site. Weed control activities were observed during the mid-season visits. The continued eradication of noxious weeds at this site is important. The majority of the invasive species were still found at this site within the dry

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	backwater channels adjacent to the river.
Kleinschmidt Creek	A new jackleg fence was installed at the site in 2004. Bird boxes installed by MDT at the site were in good condition. Areas disturbed by livestock grazing in the low intensity sections should be revegetated with woody plants. *Noxious Weeds* Although the landowner treated weeds near upper excavated shallow open water area and other areas in 2004, several noxious weeds are present including Canada thistle, houndstongue, oxeye daisy and spotted knapweed. Several other aggressive species are present on the site including non-native musk thistle and the native wetland species, reed canarygrass. A weed management plan for this site should be considered to control noxious weeds. Areas outside the perimeter of the excavated wetlands, which are currently dominated by mostly invasive species, should be treated via mechanical and cultural weed control activities to control invasive species.
Peterson Ranch	The general lack of water at the majority of this site continues preclude wetland development in many areas. Continued livestock grazing within ponds # 1 & 2 also continue to slow development of wetlands. *Noxious Weeds* Canada thistle, houndstongue, and spotted knapweed are present. Weed control and revegetation 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.
Butte District	
Beaverhead Ranch	Dike erosion and sediment production from the poorly vegetated shoreline could be monitored more closely by installing permanent markers or by periodic surveys. The DNRC recommended periodically adding fill to the face of the dike where breaching is taking place and vertical slopes are developing. Fill was added to the face of the dike in 2004 to replace eroded material, but has not yet vegetated. Additional examples of potential solutions to erosion problems include shoreline reinforcement, off-shore wave protection, protected off-shore plantings, shoreline plantings, and placement of vegetated sod mats. *Noxious Weeds* Weed control and revegetation of disturbed sites is still 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. Several noxious weeds are present including Canada thistle, hound's-tongue, and spotted knapweed. Spoil piles left from ditch excavation will continue to create a weed problem, a wind and water erosion hazard and a sedimentation source. This same issue applies to portions of the dike and other poorly vegetated sites. A possible remedy would entail chemically treating weeds and re-seeding the spoil piles with desirable grasses.
Jack Creek Ranch	*Noxious Weeds* Canada thistle and houndstongue, musk thistle and black henbane are present. Continued spot spraying is recommended in 2006 for these four weed species.
South Fork Smith River	At this time, cattle grazing within the South Fork Smith River channel, its banks, and the surrounding uplands is limiting the extent to which restoration can occur on the site. Fencing of the stream corridor would allow for the re-establishment of woody vegetation along the creek, help protect stream banks from trampling, and improve the overall health of the system. Function and value ratings would also increase substantially, thus generating considerably more functional units from the site.
Great Falls District	

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Little Muddy Creek	The berm, diversion structures, excavated channels, and inlet/outlet structures were in excellent condition during the mid-season visit. Water was let into the mitigation site in phases to prevent erosion of the berm. During the mid-July visit vegetation cover on the berm was filling in very well, though mostly by exotic species. Seeded plants were just starting to germinate on the berm during mid-July and establishment seemed patchy in distribution.
Musgrave Lake	All dikes were in good condition during the spring and mid-season visits. Lowering the water level slightly at RS1 may be necessary in the future to prevent drowning of existing mature cottonwoods. Beaver control may be necessary at RS-1 due to excessive tree damage.
Perry Ranch	Several dike problems were noted during the 2002 summer visit, repaired during 2003, and have been stable into 2005. No problems with the dike were found in 2005. *Noxious Weeds* Canada thistle and leafy spurge are present. It is recommended that chemical and hand control be applied to the leafy spurge as the population is relatively small, and may be relatively new to the area. Control at this point would prevent an infestation from erupting. It is also recommended that the population be better mapped during the mid-July visit in 2006. Chemical control on Canada thistle should also be implemented once or twice during the growing season as it is increasing in abundance.
Glendive District	
American Colloid	No maintenance issues were noted; the outflow culverts were free of debris on the inlet end.
Lame Deer	The stormwater inlet culvert in the southwest corner of the south cell was in working order and required no maintenance. Soil saturation has expanded in the north cell since 2004. The outflow culvert in Wetland-369 is blocked by sediment and debris and the beaver dam along the edge of the outflow area is larger than it was in 2004. It is likely that the sediment input resulted from the collapse of the bank along the north east edge of the excavated area. Water had washed over the road within the last year and has begun to erode the fill around the culvert. Water was flowing around and undermining the culvert at the time of the investigation.
Ridgeway	No maintenance needs were observed for W-9.
Rock Creek Ranch	All dikes were in good condition during the spring and mid-season visits. *Noxious Weeds* Invasive species Kochia is present and control measures are recommended.
Wigeon Reservoir	No observable problems were noted concerning the dike structure. Fencing the outer limits of the wetland boundary prior to the end of the drought is recommended to protect reestablishing hydrophytic wetland vegetation. Several watering-access points can be incorporated into the fence perimeter to allow cattle access.
Billings District	
Big Spring Creek	Although a thorough investigation of all stream banks was not completed, it does appear that the outside bend of the creek immediately south of the designated parking area is experiencing some minor lateral migration. The one Wood Duck box on the site was hanging upside down on the tree that it is attached to. This problem should be corrected to encourage use of the box by cavity nesting species.
Cloud Ranch	Water level control structures within the off-channel wetlands were functioning and in good working order at the time of the August monitoring. Changes in the creek migration resulting in bank loss, gravel bars and new deposition areas will continue to be monitored to track riparian wetland gains or losses, and negative or undesirable changes in vegetation.

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	Noxious Weeds Canada thistle, houndstongue, spotted knapweed and black henbane are present. Canada thistle, houndstongue, and black henbane were observed within the off-channel wetland assessment area. Canada thistle and a few spotted knapweed plants were observed along Big Timber Creek. The henbane and Canada thistle appeared to have been sprayed in 2005. Mowing was also observed on the upland buffer areas most likely to control Canada thistle and annual weeds. Chemical or biological control measures are recommended for the Canada thistle, houndstongue, and spotted knapweed and henbane.
Norem Ranch	All outflow structures were functioning and the fence around the wetland was intact. *Noxious Weeds* Canada thistle, leafy spurge, Whitetop, and spotted knapweed are present. Continued weed control measures are recommended.
Roundup	All dikes and inlet structures were functioning satisfactorily. All located bird boxes are in good condition. *Noxious Weeds* Invasive species Kochia and *Chenopodium sp.* are present and control measures are recommended.
Stillwater River	Most of the bluebird boxes were inhabited with breeding tree swallows during the spring visit. Damaged or missing wood duck boxes were moved or replaced; 7 boxes are located within the cottonwood stand on the northwest side of the ponds. All of the wood duck boxes were scratched beneath the entrance hole but no activity was observed. *Noxious Weeds* Canada thistle, spotted knapweed, field bindweed, houndstongue, leafy spurge and common mullein are present. The site requires aggressive weed control measures, including a spring and fall spraying program, to eradicate all noxious weeds.
Wagner Marsh	A total of 547 woody plantings were observed as part of the overall revegetation plan for the site. As of August 1, 2005, the overall survival rate is estimated at 92 percent, with a total of 41 individuals observed to be dead; likely due to a lack of available water during the summer months, and/or shock due to transplanting. *Noxious Weeds* Tamarisk, Canada thistle, and Japanese brome are present. Tamarisk eradication measures were undertaken by MDT on August 1, 2005. This effort should continue to ensure the complete eradication of this noxious weed species from the site before it becomes well established. The majority of tamarisk seedlings/saplings were observed in the north end of the site, and particularly in the palustrine scrub-shrub wetland area.