EXECUTIVE SUMMARY
2004 MONITORING RESULTS

Prepared for:

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1.0 INTRODUCTION

This document summarizes the results of 2004 monitoring efforts at 26 wetland mitigation sites located throughout Montana that were constructed by the Montana Department of Transportation (MDT). Full monitoring reports for each of these sites were prepared and presented to MDT in June 2005. The following mitigation sites were monitored during 2004:

American Colloid
Batavia Waterfowl Production Area
Beaverhead Gateway Ranch
Big Spring Creek
Browns Gulch
Camp Creek
Circle
Cloud Ranch
Cow Coulee
Creston
Fourchette Creek
Hoskins Landing
Jack Creek Ranch
Kleinschmidt Creek
Lame Deer-East
Little Muddy Creek
Musgrave Lake
Norem Ranch
Perry Ranch
Peterson Ranch
Ridgeway Complex
Ringling-Galt
Roundup
South Fork Smith River
Stillwater River
Wigeon Reservoir

Monitoring activities were conducted between April and October 2004 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 (**Attachment 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, 2004 wetland acreage and functional assessment category, enhancement credit ratios, upland credit ratios, total wetland acreage and functional unit gain as of 2004, and comments.

Table 2 presents target verses actual credit acreage by watershed basin at MDT mitigation sites monitored in 2001, 2002, 2003, and 2004. Statewide, the target credit acreage at monitored sites is approximately 516 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 2004 monitoring season, approximately 338 acres of "wetland credit" have developed at these monitored sites. Thus, cumulatively, monitored mitigation projects are at approximately 66% of the credit target.

The current 178-acre discrepancy between target and credit figures is due to a few main factors. A primary consideration is that several sites (Jack Creek Ranch, Cloud Ranch, Little Muddy Creek, Norem Ranch, Musgrave Lake, Perry Ranch, Camp Creek, Hoskins Landing, American

Table 2: ***Target Verses Actual Credit Acreage by Watershed Basin at MDT Mitigation Sites Monitored in 2001-2004.***

Major Montana Watershed Basin	Sites	Minimum Target Credit Acreage[1]	Credit Acreage as of 2004 Monitoring	Percent of Target Acreage Achieved as of 2004 Monitoring	Approximate Functional Units Gain as of 2004 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	19.26 acres	58%	186.39 funct. units
3 – Lower Clark Fork	Camp Creek Hoskins Landing	19.5 acres	3.92 acres[2]	20%	218.96 funct. units
4 – Flathead	Batavia WPA Creston Lawrence Park	34.7 acres	21.27 acres[3]	61%	305.5 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 Rey Creek Jack Creek Ranch	103.2 acres	107.54 acres[4]	104%	993.88 funct. units
7 – Missouri-Sun-Smith	Cow Coulee Ringling-Galt SF Smith River Little Muddy Creek	88.07 acres	2.87 acres	3%	21.73 funct. units
8 – Marias	Jack Johnson Perry Ranch	49.2 acres	31.56 acres	64%	173.96 funct. units
9 – Middle Missouri	Fourchette Creek Big Spring Creek	17.21 acres[5]	15.08 acres[5]	88%	95.27 funct. units
10 – Musselshell	Lavina Ryegate Roundup	25.3 acres	25.52 acres	101%	184.4 funct. units
11 – Milk	Big Sandy Musgrave Lake	36.64 acres	35.24 acres	96%	245.03 funct. units
12 – Lower Missouri	Vida Circle Plentywood-N	8.3 acres	4.94 acres	60%	41.10 funct. units
13 – Upper Yellowstone	Stillwater Vince Ames Wyola-Sunlight Cloud Ranch Norem Ranch	39.13 acres	29.73 acres	76%	227.15 funct. units[6]
14 – Middle Yellowstone	Lame Deer-East	3.29 acres	1.49 acres	45%	9.3 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	38.02 acres	67%	91.95 funct. units[7]
Totals	**37**	**515.6 acres**	**338.04 acres**	**66%**	**2,801.82 func. units**
Average per site	**--**	**13.94 acres**	**9.14 acres**	**--**	**75.72 func. units**

[1] Includes proposed "reserves" as well as impact-specific targets.
[2] Does not include possible functional unit-based credits at Camp Creek mitigation site.
[3] Accounts for agency negotiation that resulted in 19.6 acres of additional enhancement credit at Batavia WPA.
[4] Wetland "credit" total no longer includes 20.3 acres at Beaverhead Ranch that MDT elected not to purchase from the landowner.
[5] Assumes 7.21 acres for both target and credit at Big Spring Creek.
[6] Does not include functional unit gain at Clound Ranch as baseline was unavailable.
[7] Does not include functional units from 15 reservoirs at the Ridgeway mitigation project, for which functional assessments were not conducted.

Colloid, Lame Deer, Peterson Ranch, South Fork Smith River, Ringling-Galt) were recently constructed and are just beginning to develop wetland characteristics. The credit target for Little Muddy Creek and Jack Creek Ranch alone, both constructed in 2003/2004, is in excess of 114 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 2001-2004.

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.

A discussion of each mitigation site monitored in 2004 is presented (sites are listed in alphabetical order) following **Table 2**. Each individual discussion includes site history and objectives, delineation and functional assessment results, maintenance needs, and other recommendations, where applicable. Site maps, figures, data forms, photographs, and other supporting materials are included in the full monitoring reports and are not included in this summary.

2.0 INDIVIDUAL MITIGATION SITE DISCUSSIONS

2.1 American Colloid (Glendive District, Year 3)

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 Watershed 16 (Little Missouri). 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, Montana, near the community of Alzada, Section 36, Township 9 South, Range 58 East.

As of 2004, the inundation area totals 3.82 acres, only 0.035 acre of which technically qualify as wetlands, with the remaining 3.78 classified as open water in 2004. At the time of the investigation the area was nearly at full pool. Once the water level stabilizes, on-site sources of *Typha* and *Spartina* will colonize readily. The American Colloid mitigation area is rated Category II site.

Functional assessment results are summarized in **Table 3** below. The American Colloid mitigation wetland rated as a Category II wetland as 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 (*Rana pipiens*). Leopard frogs are considered a "species of special concern" by the Montana Natural Heritage Program (MNHP).

Table 3: ***Summary of 2004 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	2002	2003	2004
Listed/Proposed T&E Species Habitat	Low (0)	Low (0)	Low (0)
MNHP Species Habitat	Moderate (.6)	High (1)	Moderate (.7)
General Wildlife Habitat	Moderate (.4)	Moderate (.4)	High (.9)
General Fish/Aquatic Habitat	NA	NA	NA
Flood Attenuation	Moderate (.4)	Moderate (.5)	Low (.2)
Short and Long Term Surface Water Storage	High (.8)	High (.8)	Moderate (.4)
Sediment, Nutrient, Toxicant Removal	Moderate (.6)	Moderate (.7)	Moderate (.7)
Sediment/Shoreline Stabilization	Moderate (.7)	Moderate (.7)	Low (.3)
Production Export/Food Chain Support	Moderate (.6)	Moderate (.6)	Moderate (.4)
Groundwater Discharge/Recharge	NA	NA	NA
Uniqueness	Low (.3)	Low (.3)	Moderate (.4)
Recreation/Education Potential	Moderate (.5)	Moderate (.5)	Moderate (.7)
Actual Points/Possible Points	4.9/10	5.5/10	4.7/10
% of Possible Score Achieved	49%	55%	47%
Overall Category	III	II	II
Total Acreage of Assessed Aquatic Habitats within Monitoring Area	0.69	0.69	3.82 (max)
Total Functional Units (acreage x actual points)	3.38	3.79	17.9 (max)
Net Acreage Gain (“new” wetlands + open water)	0.69	0.69	3.82 (max)
Net Functional Unit Gain (new acreage x actual points)	3.38	3.79	17.9 (max)

2.2 Batavia Waterfowl Production Area (Missoula District, Year 4)

The Batavia Waterfowl Production Area (WPA) mitigation project is located in Smith Valley, approximately 5 miles southwest of Kalispell. The general property location is within Township 28 North, Range 22 West, Sections 20 and 21, 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 Watershed 4 (Flathead). 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.

Monitoring results in 2004 were identical to 2002 and 2003. Little wetland habitat had been created either in the borrow areas (1.73 acres) or around the periphery of the site. Lack of water has been the primary influencing factor.

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 has 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 1.73 acres creation + 19.6 acres = 21.33 acres. Subtracting 4.3 acres from dike construction leaves 17.03 acres of net wetland credit.

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 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 MTNHP species habitat (Forster's and black terns), groundwater discharge/recharge, and recreation/education potential. The original functional

Table 4: ***Summary of Baseline and 2004 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[1]	2004 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
Total Acreage of Assessed Wetlands within Easement	137 ac (north and south cells)	138.73 ac (north and south cells)
Functional Units (acreage x actual points)	1069	1332
Net Acreage Gain	NA	1.73 ac
Net Functional Unit Gain	NA	263
Total Functional Unit "Gain"	NA	263

[1] Baseline assessment was performed by MDT using the Montana Field Evaluation Form (Revised 7/1/96)

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. Assessment results in 2004 were unchanged from those in 2001- 2003.

In order for this site to reach its full potential, it is critical that the designed water elevation of 3128.5 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. Corrective measures were implemented post-monitoring in 2004 and will be assessed in 2005.

2.3 Beaverhead Gateway Ranch (Butte District, Year 4)

The Beaverhead Gateway Ranch Wetland Mitigation Site was developed to mitigate wetland impacts associated with MDT roadway projects in Watershed 6 (Upper Missouri). Some of these projects were completed and some have yet to be constructed. The mitigation site is located 13 miles northeast of Dillon and 14 miles southwest of Twin Bridges on Highway 41. Elevations range from approximately 4825 to 4830 feet. 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 storm water 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: storm water 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 storm water flows from nearby farmland and allow silts/suspended sediments to settle out within the wetland.

2004 monitoring results were identical to 2003 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, and so the monitoring area will be reduced to the area above the dike in 2005 (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 2004 are similar to those from past years, although a slightly higher recreation/education score was afforded in 2004 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 exceptional 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 weed invasion, 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.

Table 5: ***Summary of 2004 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	2004 Ratings and Scores
Listed/Proposed T&E Species Habitat	Mod (0.7)
MNHP Species Habitat	High (1.0)
General Wildlife Habitat	Exceptional (1.0)
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 (1.0)
Groundwater Discharge/Recharge	High (1.0)
Uniqueness	Mod (0.5)
Recreation/Education Potential	Mod (0.5)
Actual Points/Possible Points	9.0 / 12
% of Possible Score Achieved	75%
Overall Category	II
Total Acreage of Assessed Wetlands and Other Aquatic Habitats	118.2
Functional Units (acreage x actual points)	1063.8
Net Acreage Gain	112.8
Net Functional Unit Gain	1015.2

Dike erosion and sediment production from the poorly vegetated shoreline should be monitored more closely by installing permanent markers or conducting periodic surveys. 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.

2.4 Big Spring Creek (Billings District, Year 4)

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. 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, an 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 Watershed 9 (Middle Missouri).

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.

Target wetland communities to be produced at the site included shallow marsh/wet meadow and wet meadow/scrub-shrub). Target wetland functions to be provided 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 2004, approximately 10.44 wetland acres and 2.4 acres of non-wetland perennial stream channel occur within the monitoring area. Based on maps provided in the project 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 2.58 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 (Rabbe 1998). 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 (Rabbe 1998). No performance standards were required by the COE, although the site appears to be well on its way to functioning as anticipated.

Functional assessment results in 2004 were virtually unchanged from the 2001 - 2003 assessments, and are summarized in **Table 6** below. 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. 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 90 functional units (using the 1999 method), for a conservative gain of at least 61 functional units.

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 Wood Duck box was found 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.

Table 6: ***Summary of 2004 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	Wetland Sites			
	2004: Large Wetland Polygons Bisected by Creek Near North, East and South Ends of Site	**2004: Isolated Wetland Depressions West of Creek**	**2004: Narrow Wetland Fringe Segments along Creek**	**1998 Baseline Assessment**
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.0)	Low (0.3)	Low (0.2)
MNHP Species Habitat	Mod (0.6)	Low (0.1)	Low (0.1)	Low (0.0)
General Wildlife Habitat	High (0.9)	Mod (0.5)	Mod (0.7)	Mod (0.5)
General Fish/Aquatic Habitat	High (0.9)	NA	Mod (0.7)	High (1.0)
Flood Attenuation	High (0.7)	Low (0.2)	Low (0.2)	Low (0.3)
Short and Long Term Surface Water Storage	Mod (0.6)	Low (0.3)	Low (0.3)	--
Sediment, Nutrient, Toxicant Removal	High (1.0)	High (1.0)	Mod (0.6)	Low (0.1)
Sediment/Shoreline Stabilization	Mod (0.7)	NA	Mod (0.7)	NA
Production Export/Food Chain Support	High (0.9)	Low (0.3)	Mod (0.4)	Low (0.4)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	NA
Uniqueness	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.2)
Recreation/Education Potential	High (1.0)	Mod (0.5)	High (1.0)	High (1.0)
Actual Points/Possible Points	8.9 / 12	4.2 / 10	5.3 / 12	3.7 / 10
% of Possible Score Achieved	74%	42%	44%	37%
Overall Category	II	III	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.	9.84 wetland ac	0.54 wetland ac	0.06 wetland ac	7.86 wetland ac.
Functional Units (acreage x actual points)	87.6 fu	2.3 fu	0.3 fu	29.1 fu
Net Acreage Gain	Site currently supports 10.44 acres of wetlands and 2.4 acres of non-wetland perennial stream channel. 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 2.58 wetland acres and 1.1 acres of non-wetland perennial stream channel.**			
Net Functional Unit Gain	Approximately 61.1 Functional Units			

2.5 Browns Gulch (Butte District, Year 4, Final Year)

The Browns Gulch wetland mitigation project was constructed in early 2000 in Watershed 2 (Upper Clark Fork). It was anticipated that this site would compensate for wetland impacts resulting from road widening and culvert lengthening where the Brown Gulch Road (State

Highway 276) crosses Oro Fino Creek and at two other unnamed wetland crossings along this same road. Constructed on MDT right-of-way, the mitigation site is located approximately 1.5 miles north of Rocker and 5 miles northwest of Butte in Silverbow County. The goal of the project is to adjust grade by excavation adjacent to Oro Fino Gulch Creek in order to create 0.24 acres of wetland credit.

The project is located adjacent to Oro Fino Gulch Creek and the Browns Gulch Road. Wetland hydrology is to be supplied by stream flow and by shallow groundwater or "springs" associated with the stream. Precipitation and surface runoff may provide minor contributions to wetland hydrology at this site. No pre-project wetlands were delineated at this location. The COE has approved allocation of 1:1 credit for wetland creation at this site, which occurs entirely within the MDT right-of-way and will not be developed. The entire site is fenced within MDT right-of-way.

Delineation results in 2004 were identical to 2001 - 2003 results. At this time approximately 0.17 of the 0.24 acres of wetland creation have been accomplished. Currently this site has 0.476 functional units. It is likely that additional acreage will form given additional time and normal precipitation. Functional assessment results were the same in 2004 as in 2001 – 2003 (**Table 7**).

Table 7: ***Summary of 2004 Wetland Function/Value Ratings and Functional Points at the Browns Gulch Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2004
Listed/Proposed T&E Species Habitat	Low (0.0)
MNHP Species Habitat	Low (0.0)
General Wildlife Habitat	Low (0.1)
General Fish/Aquatic Habitat	Low (0.1)
Flood Attenuation	Low (0.1)
Short and Long Term Surface Water Storage	Low (0.3)
Sediment, Nutrient, Toxicant Removal	Mod (0.6)
Sediment/Shoreline Stabilization	NA
Production Export/Food Chain Support	Low (0.3)
Groundwater Discharge/Recharge	High (1.0)
Uniqueness	Low (0.2)
Recreation/Education Potential	Low (0.1)
Actual Points/ Possible Points	2.8 / 11
% of Possible Score Achieved	26%
Overall Category	IV
Total Acreage of Assessed Wetlands and Other Aquatic Habitats	0.17 ac
Functional Units (acreage x actual points)	0.476 fu
Net Acreage Gain	0.17 ac
Net Functional Unit Gain	0.476 fu

Erosion is still carrying sediment into the northeast corner of the site from an adjacent unpaved and unvegetated roadway. This sediment should be prevented from reaching the wetland area temporarily by using sediment fences and permanently by revegetation, regrading and/or other runoff controls.

2.6 Camp Creek (Missoula District, Year 3)

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, Watershed 3 (Lower Clark Fork). 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).

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 the functional restoration/enhancement of 42.7 acres of wetland, enhancement of 24 acres of heavily grazed and cleared riparian vegetation, and creation and restoration of about 16.5 acres of channel bottom and floodplain margins. However, no written agreement between MDT and the Corps of Engineers regarding eventual credit allocation exists. 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 new channel.
- Restore hydrology and vegetation, recreating high value wetland habitat along Camp Creek riparian corridor.
- Fill existing drainage ditches.

Enhancements

- Riparian shrub and tree plantings throughout the created floodplain margins.
- Drier upland species planting in areas of 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: storm water retention, roadway runoff filtration, sediment and nutrient retention, water quality, groundwater recharge, and wildlife habitat.

Pre-project wetland delineation acreages within the current monitoring limits ranged between 33.47 (28.3 MDT, 5.17 Grasser) to 63.17 (55.32 MDT, 7.85 Grasser) acres. To resolves these discrepancies, in 2004 LWC used a stereoscope and examined the 2000 (pre-fire) aerial photographs, as well as the two pre-project delineation maps and data, and the post-project delineation maps and data to date to provide an opinion regarding pre-project wetlands at the site. Using these methods, LWC mapped 43.36 acres of wetland /open water channel signature on the MDT parcel and concurred with the 5.37- acre wetland / open water channel total within

the monitoring limits on the Grasser parcel for a total baseline of 48.73 acres. This clarification of baseline conditions was approved by the Corps of Engineers in 2004

As of 2004, the project has gained 2.7 wetland acres and 0.45 stream acre on the Grasser property, and "lost" an estimated 5.58 wetland acres and gained 0.2 stream acre on the MDT property. Cumulatively, approximately 44.15 wetland acres and 2.15 open water acres now occur within the monitoring area (**Figure 3, Appendix A**), for a total of 46.3 acres of aquatic habitat. Prior to construction, the site contained approximately 48.73 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. No change in the net wetland area or open water area was observed between 2003 and 2004. However, the overall cumulative change in aquatic habitat at the site since construction has been approximately 46.3 – 48.73 = (-2.43) 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.

Despite the apparent decrease in wetland acreage, approximately 160 functional units (score x wetland acreage) have been gained thus far at the Camp Creek mitigation site. Approximately 129 functional units have been gained at the MDT parcel, and 31 have been gained on the Grasser parcel. In 2004, 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 2004 monitoring has 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 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 8** below.

Planted woody species survival rates were observed to have decreased during the 2004 monitoring. In 2003, a majority of the survival rates ranged from 70% to 100%. Survival data recorded in 2004 showed seven out of 13 species had a survival rate below 50 %. 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

Table 8: ***Summary of 2001 (baseline) and 2004 wetland function/value ratings and functional points [1] 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	2004 Grasser Property	2004 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] ac	1.06[1] ac	3.51[1] ac	0.50[1] ac	1.36[1] ac	8.52	37.78
Functional Units (acreage x actual points)	215.73 fu	6.57 fu	17.90 fu	2.95 fu	8.43 fu	60.49fu	351.35 fu
Functional Unit Gain to Date by Ownership	NA	NA	NA	NA	NA	31.21 fu	129.05 fu
Total Functional Unit Gain to Date	NA	NA	NA	NA	NA	160.26 fu	

[1] baseline acreages adjusted per subsequent study

from 60% to 90%. These included alder, aspen, cottonwood and willows. The willow sprigs are spreading out along the banks, increasing in sizes and density. Several other planted shrubs had increased in overall stature and exhbitied vigorous growth.

Per Corps 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 could be excavated between the creek and existing swales to enhance the connectivity of these two systems during high water events. Construction of such a channel should be considered by MDT.

Several noxious weeds are present on both MDT and Grasser parcels including bull thistle, Canada thistle, hound's-tongue and spotted knapweed. 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. Survival of plantings will continue to be monitored, and supplemental planting may need to be implemented if success of current plantings is low.

A final method of credit allocation for this site is being worked out between MDT and COE, and will be based upon 2004 monitoring data and other information. As such, the current amount of credit applicable to this site is unknown. 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 9**. Using this approach, a current maximum of approximately 18.28 credit acres could be assigned to the Camp Creek site.

Table 9: ***Potential Functional Unit-Based Credit - Camp Creek Mitigation Project***

Property	2004 Wetland & Channel Acreage	2004 Score	2004 Functional Units	Baseline Functional Units	Functional Unit "Gain"	"Gain" Divided by Current Score (potential credit acres)
MDT	37.78 ac	9.3	351.35 fu	222.30 fu	129.05 fu	13.88 ac
Grasser	8.52 ac	7.1	60.49 fu	29.28 fu	31.21 fu	4.40 ac
Total	46.3 ac	--	411.84 fu	251.58 fu	160.26 fu	18.28 ac

2.7 Circle (Glendive District, Year 4, Final Year)

The Circle wetland, located in Watershed 12 (Lower Missouri), was constructed to mitigate the impacts for 1.7 acres of wetlands associated with MDT improvements to Highway 200. The site is located in McCone County along the northwest side of Highway 200 between highway markers 276.2 and 276.5, Section 20, Township 19 North, Range 48 East. Elevations are approximately 2,430 feet above sea level. The Circle wetland was constructed in 1999 in a former oxbow of the Redwater River. The pre-project wetland limits totaled approximately 2.98 acres.

The Circle Wetland has met the 4.3-acre wetland creation goal. The site currently contains 7.11 acres of wetlands and 0.49 acre of open water, for a total of 7.6 acres. Subtracting the pre-exitsing wetlands (2.98) yields a net gain of 4.62 acres. The shallow open water area provides optimum habitat for shorebirds and is intermittent in nature. Wetlands impacted during the Southwest-Brockway East projects totaled 1.7 acres. Consequently, approximately 2.92 acres of "credit" may remain at this site for application to other projects as of 2004.

Functional assessment results for 2004 are summarized in **Table 10** below, and were similar to past post-construction results. The wetland has rated as a Category II wetland since 2002. An adjustment was made to the short and long term surface water storage value to acknowledge the water-holding capacity of the nearly fully vegetated wetland. The functional units have therefore increased 25% within the new wetland acreage since 2001. It is unlikely that the rating of this wetland will improve further unless structural diversity is increased by planting with shrubs and trees and maintaining the cattle-exclusion conditions.

Table 10: ***Summary of 2001-2004 Wetland Function/Value Ratings and Functional Points at the Circle Wetland Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2001	2002	2003	2004
Listed/Proposed T&E Species Habitat	Low (.3)	Low (.3)	Low (.3)	Low (.3)
MNHP Species Habitat	Moderate (.6)	High (.8)	High (.8)	High (.8)
General Wildlife Habitat	Exceptional (1)	Exceptional (1)	Exceptional (1)	Exceptional (1)
General Fish/Aquatic Habitat	NA	NA	NA	NA
Flood Attenuation	Moderate (.5)	Moderate (.5)	Moderate (.5)	Moderate (.5)
Short and Long Term Surface Water Storage	Moderate (.7)	High (.8)	High (.8)	High (.9)
Sediment, Nutrient, Toxicant Removal	High (1)	High (1)	High (1)	High (1)
Sediment/Shoreline Stabilization	High (1)	High (1)	High (1)	High (1)
Production Export/Food Chain Support	Moderate (.7)	Moderate (.7)	Moderate (.7)	Moderate (.7)
Groundwater Discharge/Recharge	High (1)	High (1)	High (1)	High (1)
Uniqueness	Moderate (.4)	Moderate (.4)	Moderate (.4)	Moderate (.4)
Recreation/Education Potential	Low (.1)	High (1)	High (1)	High (1)
Actual Points/ Possible Points	7.3/11	8.5/11	8.5/11	8.6/11
% of Possible Score Achieved	66%	77%	77%	78%
Overall Category	II	II	II	II
Total Acreage of Assessed Wetlands within Monitoring Area	7.33 ac (2.98 pre-existing)	7.6 ac (2.98 pre-existing)	7.6 ac (2.98 pre-existing)	7.6 ac (2.98 pre-existing)
Total Functional Units (acreage x actual points)	53.73 fu	64.6 fu	64.6 fu	65.4 fu
Net Acreage Gain ("new" wetlands)	4.35 ac	4.62 ac	4.62 ac	4.62 ac
Net Functional Unit Gain (new acreage x actual points)	31.76 fu	39.27 fu	39.27 fu	39.73 fu

No maintenance is required at this site. The cattle exclusion fence was intact and it is recommended that the fence be maintained in perpetuity while providing watering access points.

2.8 Cloud Ranch (Billings District, Year 1)

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 Billings District - watershed #13. The site is located in Sweetgrass County approximately twelve

miles northwest of Big Timber. Elevations within the assessment area range from approximately 4840 to 4900 feet above 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 are 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. 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.

Table 11 outlines the target wetland credits and ratios from the COE and the current net acres delineated during the 2004 wetland monitoring. The net off-channel wetland / open water acreage is 1.47 acres (1.92 acres wetland + 0.27 acre open water – 0.72 acre pre-existing wetlands = 1.47 acres). The Big Timber Creek net wetland acreage is 0.48 acres which includes 0.28 acres of riparian wetland and 0.20 acres of emergent wetlands. The Big Timber Creek channel itself is not included in acreage totals.

The mitigation efforts have so far resulted in a total of 1.68 wetland credit acres, 0.27 shallow open water credit acres, and 0.89 credit acre of wetland/upland buffers. The grand total for the Cloud Ranch to date is 2.84 credit acres or 52 percent of the goal.

Functional assessment results for 2004 are summarized in **Table 12** below. Pre-construction functional assessments were completed for the wetlands by the ADC (2003) but the results were unavailable. The creek corridor wetlands currently rate as a Category II community, as do the off-channel wetlands.

The site supports two State of Montana-listed noxious weeds (Canada thistle and houndstongue) and one weed on the Stillwater County list (black henbane). All three species were observed within the off-channel wetland assessment area. Chemical or biological control measures are recommended for the Canada thistle, houndstongue and henbane.

Table 11. ***2004 Cloud Ranch wetland mitigation monitoring results.***

Wetland Mitigation	Current Net Acres	Ratio	Current Credit Acres	Target Credit Acres	Comments
Off-channel					
Creation and restoration wetlands, open water	1.47	1:1	1.47	2.02	72% of the proposed wetland creation and restoration area has been converted to wetlands / open water.
Subtotal	**1.47**		**1.47**	**2.02**	
Big Timber Creek					
Riparian wetland restoration	0.28	1:1	0.28	2.00	Riparian wetland community represented by Type 2.
Emergent wetland restoration	0.20	1:1	0.20	0.58	Emergent wetland restoration represented by Type 3.
Subtotal	**0.48**		**0.48**	**2.58**	
Upland and wetland buffer	3.56	4:1	0.89	0.89	Credited only if livestock grazing is prohibited on wetland sites.
Subtotal	**3.56**		**0.89**	**0.89**	
GRAND TOTAL	**5.51**		**2.84**	**5.49**	**52% of goal**

Table 12: ***Summary of 2004 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	2004 Post-Construction Off-Channel Wetlands	2004 Post-Construction Big Timber Creek
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)
MNHP Species Habitat	Low (0.1)	Mod (0.6)
General Wildlife Habitat	Mod (0.7)	High (0.9)
General Fish/Aquatic Habitat	NA	Mod (0.7)
Flood Attenuation	Mod (0.5)	Mod (0.4)
Short and Long Term Surface Water Storage	High (0.8)	High (0.8)
Sediment, Nutrient, Toxicant Removal	High (1.0)	Mod (0.6)
Sediment/Shoreline Stabilization	High (1.0)	Mod (0.7)
Production Export/Food Chain Support	Mod (0.7)	Mod (0.7)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Mod (0.4)	Mod (0.4)
Recreation/Education Potential	Mod (0.7)	Mod (0.7)
Actual Points/Possible Points	7.2/11	7.8/12
% of Possible Score Achieved	65%	65%
Overall Category	II	II
Total Acreage of Assessed Wetlands within Easement (ac)	**2.02**	**2.65**
Functional Units (acreage x actual points) (fu)	**14.5**	**20.67**
Net Acreage Gain (ac)	**1.47**	**0.48**
Net Functional Unit Gain[1]	**Presently unavailable**	**Presently unavailable**
Total Functional Unit Gain[1]	**Presently unavailable**	**Presently unavailable**

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

2.9 Cow Coulee (Butte District, Year 4)

The Cow Coulee wetland mitigation project was constructed in 1997 to provide partial mitigation for existing and projected wetland impacts resulting from MDT projects in Watershed 7 (Missouri-Sun-Smith). At the time of site construction, just over 60 acres of wetland loss were either projected or documented in association with MDT projects within this watershed. Specifically, wetland credits from this project were allocated to offset impacts resulting from the White Sulphur Springs-South project. The 9-acre mitigation site is located approximately 1 mile southwest of the Townsend city limits in Broadwater County. The site occurs on private land located west of U.S. Highway 12/287 and just east of the Missouri River.

Design features included minor excavation and placement of a low-level dike to retain surface water. Wetland hydrology is primarily provided by surface water from an irrigation ditch, and is supplemented by groundwater and precipitation. Following construction, the site was seeded with emergent and graminoid seed mixes. Additionally, portions of the site were planted with narrow-leaf cottonwood, yellow willow, and a "mesic/upland" shrub mix. Approximately 0.07 acre of low-quality wetland occurred at the site prior to project implementation.

Target wetland communities to be produced at the site included open water/aquatic bed; shallow marsh; shallow marsh/wet meadow; and wet meadow/scrub-shrub. Target wetland functions to be provided at the site included habitat diversity, flood control & storage, threatened/endangered species habitat, general wildlife habitat, sediment filtration, nutrient cycling, and uniqueness.

No specific performance criteria were required to be met at this site in order to document its success. The overall intent of the project was to create 4.5 acres of aquatic habitat to include open water, emergent marsh, and wet meadow habitat. Based on monitoring results, these goals have been partially achieved. Improving the water delivery system would likely result in additional wetland credit.

Delineation results in 2004 were identical to 2003 results. As the project stands, approximately 2.94 acres of aquatic habitats have been created, inclusive of all open water (mud flat in 2004) components. Open water areas were a designed habitat feature. Subtracting the 0.07 acre of pre-existing wetland, approximately 2.87 acres of aquatic habitat have been gained at this site.

Functional assessment results in 2004 were virtually unchanged from the 2001 - 2003 assessments, and are summarized in **Table 13** below. The mitigation site rated as a Category III (moderate value) site, primarily due to its small size and low ratings for T&E and sensitive species habitat, uniqueness, and recreation/education potential. The site received a moderate rating for general wildlife habitat, food chain support, sediment/nutrient/toxicant removal, and sediment/shoreline stabilization. The site received a high rating for surface water storage and groundwater discharge/recharge. Based on functional assessment results, approximately 15.88 functional units have been provided thus far at the Cow Coulee mitigation site.

At the request of MDT, a small side channel of the Missouri River, which lies outside the monitoring area, was inspected to determine if lateral migration of the stream bank had occurred since efforts to stabilize the bank had been implemented at the time of project completion. The

riprap protection appeared to be working well at preventing further lateral migration of the stream bank and no maintenance appears necessary at this time.

Table 13: ***Summary of 2004 Wetland Function/Value Ratings and Functional Points at the Cow Coulee Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2004
Listed/Proposed T&E Species Habitat	Low (0.3)
MNHP Species Habitat	Low (0.1)
General Wildlife Habitat	Mod. (0.5)
General Fish/Aquatic Habitat	NA
Flood Attenuation	NA
Short and Long Term Surface Water Storage	High (0.9)
Sediment, Nutrient, Toxicant Removal	Mod (0.7)
Sediment/Shoreline Stabilization	Mod. (0.6)
Production Export/Food Chain Support	Mod. (0.7)
Groundwater Discharge/Recharge	High (1.0)
Uniqueness	Low (0.3)
Recreation/Education Potential	Low (0.3)
Actual Points/Possible Points	5.4 / 10
% of Possible Score Achieved	54%
Overall Category	III
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries	2.94 ac
Functional Units (acreage x actual points)	15.88 fu

As previously mentioned, water delivery is recognized as being a problem at this site. A more efficient delivery system would benefit the project by filling the impoundment sooner in the spring, thus encouraging use by more wildlife species, especially pair bonding waterfowl and shorebirds. Filling the impoundment to the design elevation earlier in the season might also encourage the establishment of wetland habitat beyond the current limits (particularly to the east), as soil near the existing periphery would be saturated for a longer duration, thus encouraging the establishment of hydrophytic vegetation. This, in turn, could result in the development of additional wetland and result in additional mitigation credit.

Improvements to the water delivery system would need to be discussed with and agreed upon by the landowner, and might ultimately depend on the costs associated with upgrading the system. At this time it appears that a new delivery system taken from a different point of diversion and piped to the site would be the most efficient way in which to deliver water to the mitigation site. This option will be explored further in 2005.

2.10 Creston (Missoula District, Year 4)

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 Watershed 4 (Flathead). The site elevation is 2,940 feet above mean sea level.

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 two acres of existing wetland and create four acres of wetland. A formal wetland delineation and functional assessment were not performed prior to construction.

Delineation results in 2004 were identical to 2003 results. Approximately 5.2 acres of wetlands were present on the mitigation site. Based on pre-construction goals, 2 acres were to be enhanced and 4 acres created for a total of 6 acres. The existing acreage is close to the goal. Based on current site conditions, it is expected that additional wetland acres will develop in the future if hydrology is restored to pre-drought conditions; however, continued drought in this part of Montana could result in the temporary or permanent loss of wetland acreage over time.

Functional assessment results are summarized in **Table 14** below. The site was evaluated as a single assessment area 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 35.44 functional units and achieved 76% of possible points. This was essentially unchanged from the 2001 - 2003 assessments. A functional assessment was not conducted prior to site construction and therefore cannot be used for comparison.

Table 14: ***Summary of 2004 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
Listed/Proposed T&E Species Habitat	Mod (0.7)
MNHP Species Habitat	Low (0.1)
General Wildlife Habitat	High (0.9)
General Fish/Aquatic Habitat	NA
Flood Attenuation	NA
Short and Long Term Surface Water Storage	High (0.8)
Sediment, Nutrient, Toxicant Removal	Mod (0.7)
Sediment/Shoreline Stabilization	NA
Production Export/Food Chain Support	High (1.0)
Groundwater Discharge/Recharge	High (1.0)
Uniqueness	Mod (0.6)
Recreation/Education Potential	High (1.0)
Actual Points/Possible Points	6.8 / 9
% of Possible Score Achieved	76%
Overall Category	II
Total Acreage of Assessed Wetlands within Easement	5.2 ac
Functional Units (acreage x actual points)	35.44 fu
Net Acreage Gain	NA
Net Functional Unit Gain	NA
Total Functional Unit “Gain”	NA

2.11 Fourchette Creek (Glendive District, Year 4, Final Year)

The Fourchette Creek Reservoir Complex was constructed in the Missouri River Breaks in 1997. The project was enacted to mitigate wetland impacts associated with several MDT projects constructed between 1992 and 1995 that resulted in the cumulative loss of 9.84 wetland acres. These include Stanford East & West, Geyser-North, Eddies Corner-South, Ross Fork Creek – Judith Basin County, Judith River – 6 miles NW of Moore, and Ross Fork Creek – 5 Miles NW of Moore. Constructed in Watershed 9 (Middle Missouri), the site is located approximately 15 miles southwest of Sun Prairie (50 miles south of Malta) in Phillips County. The site occurs on Bureau of Land Management (BLM) lands roughly 2 miles west and 1.5 miles north of the Charles M. Russell National Wildlife Refuge.

In conjunction with the BLM, MDT's intent was to construct five 2.6 to 6-acre shallow reservoirs at the mitigation site: Puffin, Albatross, Flashlight, Pintail, and Penguin. Spaced over approximately four linear miles, these structures were designed to maximize surface area with water depths less than 3 feet, maximizing the potential for establishment of emergent vegetation. The reservoirs were constructed in intermittent drainages to collect surface runoff during spring snowmelt and rainstorm events. No wetlands were present in these areas prior to construction.

The primary objectives at the mitigation site are to provide waterfowl pair and brood habitat and promote greater distribution and use of available habitat for additional wildlife species by providing water sources, food, and cover. Specifically, MDT and BLM seek to provide approximately 10 to 22 acres of emergent wetlands with semi-permanent, fresh-mixosaline water regimes at the mitigation site. Primary wetland functions to be provided include streambank stabilization; nutrient detention/removal/transformation; sediment detention/reduction; intra/inter ecosystem integrity maintenance; and provision of a setting for recreational activities.

Final general success criteria at each reservoir include provision of: waterfowl pair and brood habitat (open water interspersed with emergent vegetation); a mosaic of emergent wetland vegetation communities; and adequate hydrology (maximization of areas three feet in depth) (MDT undated). Again, the goal was to create between 10 and 22 wetland acres between the five ponds.
Target performance criteria included provision of 10 to 20 percent emergent species cover within 5 years of construction. In 2004, this was achieved substantively at Penguin, Flashlight, Pintail, and Albatross reservoirs, and minimally at Puffin reservoir.

Primary target wetland functions included wildlife use, enhanced biodiversity, water retention, silt retention, recreational opportunity, and erosion control. Highest quality wildlife habitat is provided at Penguin and Flashlight, as are biodiversity, silt retention, and erosion control. Other reservoirs provide silt retention, but in excessive quantities that impair them. A degree of erosion control is also provided at these sites, but is limited by scant vegetation. All sites provide water retention, and none of the sites were perceived to provide substantial recreational opportunities.

As the project stands, inclusive of open water areas, approximately 7.87 acres of aquatic habitat have been created on the Fourchette Creek mitigation site to date. This is a 1.74-acre increase

from the 6.13 acres delineated during 2003, apparently due to increased inundation during 2004. Approximately 34.17 functional units have been created at the site to date. The maximum assignable credit at this site as of 2004, inclusive of all open water areas, is approximately 7.87 acres.

Functional assessment results for 2004 are summarized in **Table 15** below. Penguin and Flashlight rated as Category II wetlands, primarily due to high sensitive species habitat (northern leopard frog. These sites would have achieved higher scores, but for the high disturbance associated with grazing. Each of these sites provides habitat for a variety of wildlife species, particularly amphibians. Penguin and Flashlight both support emergent and aquatic bed communities, and, Flashlight provides a degree of fish habitat. Pintail rated as a Category III site in 2004 due to its increased size, while Albatross again rated as a Category IV site. As wetlands occurred at Puffin for the first time in 2004, a functional assessment form was completed, resulting in a Category IV designation at this site.

Table 15: ***Summary of 2004 Wetland Function/Value Ratings and Functional Points at the Fourchette Creek Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Wetland Sites				
	Penguin Reservoir	Flashlight Reservoir	Pintail Reservoir	Albatross Reservoir	Puffin Reservoir
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.0)
MNHP Species Habitat	High (1.0)	High (1.0)	Low (0.2)	Low (0.2)	Low (0.0)
General Wildlife Habitat	High (0.8)	High (0.8)	Mod (0.7)	Low (0.3)	Low (0.1)
General Fish/Aquatic Habitat	NA	Mod (0.5)	NA	NA	NA
Flood Attenuation	Mod (0.5)	Low (0.2)	Low (0.2)	Low (0.2)	Low (0.2)
Short and Long Term Surface Water Storage	Mod (0.6)	Mod (0.6)	Mod (0.6)	Mod (0.6)	Low (0.3)
Sediment, Nutrient, Toxicant Removal	Mod (0.5)	Mod (0.5)	Low (0.3)	Low (0.3)	Low (0.3)
Sediment/Shoreline Stabilization	Mod (0.6)	Mod (0.6)	Low (0.2)	Low (0.2)	NA
Production Export/Food Chain Support	Mod (0.7)	Mod (0.7)	Mod (0.6)	Low (0.3)	Low (0.3)
Groundwater Discharge/Recharge	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)
Uniqueness	Low (0.2)	Low (0.2)	Low (0.2)	Low (0.2)	Low (0.2)
Recreation/Education Potential	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)
Actual Points/Possible Points	5.4 / 11	5.6 / 12	3.5 / 11	2.8 / 11	1.6 / 10
% of Possible Score Achieved	49%	47%	32%	25%	16%
Overall Category	II	II	III	IV	IV
Total Acreage of Assessed Aquatic Habitats within Easement	2.48 ac	1.76 ac	2.03 ac	1.04 ac	0.56 ac
Functional Units (acreage x actual points)	13.39 fu	9.86 fu	7.11 fu	2.91 fu	0.90 fu
Net Acreage Gain	2.48 ac	1.76 ac	2.03 ac	1.04 ac	0.56 ac
Net Functional Unit Gain	13.39 fu	9.86 fu	7.11 fu	2.91 fu	0.90 fu
Total Functional Unit "Gain"	34.17 Total Functional Units				

Based on functional assessment results, approximately 34.17 functional units have been gained thus far at the Fourchette Creek mitigation site, a gain of 9.17 functional units since 2003.

Puffin Reservoir has only developed nominal fringe wetlands, presumably due to the depth of excavation and steep gradient of side slopes. As discussed in the 2001-2003 reports, it is our recommendation that MDT/BLM re-visit the design of this site, which could involve filling in a portion of the pit excavated along the dike face and minor upstream excavation. This may allow water to back further upgradient, reduce water depths and side slope gradients, and increase

surface area of the reservoir. This would also likely result in a more undulating shoreline, as opposed to the largely rectangular shoreline that currently exists.

All sites were impacted to some extent by grazing, primarily through trampling. MDT/BLM may want to consider fencing these areas and providing water gaps to deeper areas in order to allow cattle access while confining associated impacts.

2.12 Hoskins Landing (Missoula District, Year 3)

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 Watershed 3 (Lower Clark Fork). The mitigation site is located approximately one quarter mile north of Dixon, adjacent to the Flathead River. Elevation is approximately 2,500 feet with slight topographic variation throughout the project site. Western EcoTech conducted the original wetland delineation for the Hoskins Landing proposed mitigation site in 1999. 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 though alluvium also 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.

Most 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 of 2003. 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 characteristics in 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 south 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: storm water retention, roadway runoff filtration, sediment and nutrient retention, water quality, groundwater recharge, wildlife habitat and riparian vegetation. At this time approximately 11.88 acres of wetland and 1.14 acres of open water occur on the mitigation site. Subtracting the original 6.67 acres of pre-project wetlands from this total yields a current net of approximately 6.35 wetland/open water acres. It is likely that additional acreage will form with additional time and more normal precipitation. Additionally, approximately 58.7

functional units have been gained at the site, although pre- and post-construction functional assessment methods slightly differed.

Functional assessment results are summarized in **Table 16** below. Functional assessment results for 2004 were similar to 2003 results. 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, approximately 89.9 functional units occur at the Hoskins Landing mitigation site. However, it should be noted that direct comparison between the baseline and 2004 functional assessments is not possible as they were completed using different versions of the MDT functional assessment method. The baseline assessment was completed using the 1996 version, while the 2002 - 2004 assessments were conducted using the most current (1999) version.

Survival rates for native shrub plantings were assessed during the summer of 2003 and 2004. Two upland plantings areas were evaluated; these areas include the upland islands and side channel. Survival rates for the upland areas ranged from 90% to 100 % for shrub species. No survival data was collected for tree species planted in fall 2003. All planted shrub species are exhibiting a high survival rate.

Two wetland-planting areas were also evaluated; these sites included the excavated wetland and inlet channel. Survival rates for the wetland areas ranged from 91% to 100% for the tree species and 29% to 81% for the shrub species. Cottonwood and red osier dogwood had some of the highest survival rates. Several species that had low survival rates during the 2003 monitoring were replanted in 2004. The replacement plants are doing well and exhibited a high survival rate in 2004. The excavated wetland was also re-sprigged with two species of willows. Approximately 2000 willow cuttings were installed around the fringe of excavated wetland. The low survival rates observed during 2003 monitoring have been increased due to consistent irrigation of plantings. The irrigation system was non-functional in 2003, but was repaired and used during the 2004 season.

Several Category 1 noxious weeds were still present: Canada thistle, hound's-tongue, and dalmatian toadflax. The Category 3 yellowflag iris was also present within the mitigation site. Weed control activities were observed during the early and 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.

Table 16: ***Summary of Baseline and 2004 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	Wetland Numbers							
	Baseline 1A (1996 Method)	Baseline 1B (1996 Method)	Baseline 3 (1996 Method)	Baseline 8 (1996 Method)	Baseline 2, 9A, 9B, 10, 11, 12, 13 (1996 Method)	Baseline 5, 6, 7, 14A, 14B (1996 Method)	2004 Site 5 (1999 Method)	2004 Remainder of Wetlands (1999 Method)
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 (0.7)
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	Mod (0.6)
Flood Attenuation	Mod (0.5)	Low (0.2)	Low (0.2)	Low (0.1)	Low (0.2)	NA	Low (0.2)	Mod (0.5)
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 (0.5)
Sediment/Shoreline Stabilization	Mod (0.7)	Mod (0.7)	NA	Mod (0.4)	High (0.9)	NA	NA	Low (0.2)
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	7.0 / 12
% of Possible Score Achieved	55%	53%	44%	57%	28%	26%	28%	58%
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	0.29	12.73
Functional Units (acreage x actual points)	17.03	4.99 fu	2.73 fu	0.37 fu	2.10 fu	4.00 fu	0.81	89.11
Total Acreage at Site	6.67 ac						**13.02**	
Total Functional Units at Site	31.22 fu						**89.92**	
Net Acreage Gain	NA						**6.35**	
Net Functional Unit Gain	NA						**58.7**	

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.

2.13 Jack Creek Ranch (Butte District, Year 1)

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 mitigate for wetland impacts associated with proposed MDT transportation projects. The highway projects were constructed within the vicinity of Ennis and the Madison River drainage in watershed #6 (Upper Missouri River) of the MDT Butte District. The site is located in Madison County approximately 2.5 miles northeast of the town of Ennis. Elevations within the assessment area range from approximately 4889 to 4892 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 naturally functioning stream channel. The objectives are consistent with historical conditions prior to the drainage of the Horseshoe pasture and the creation of in-stream reservoirs within the McKee creek channel. During the 1940's, ditches were excavated in the Horseshoe pasture as a recommendation from the Soil Conservation Service (SCS) to lower groundwater. Field notes from SCS personnel describe the site as "very wet, hummocky with standing water, sedges and water loving plants." The final drainage system was a horseshoe shaped ditch that averaged 20 feet wide, 6 to 8 feet deep and nearly 1 mile long. In addition to draining wetland areas within the ranch, significant impacts occurred to McKee Spring Creek, such as widening as a result of prolonged cattle grazing and the mechanical excavation of ponds within the creek channel.

In the summer of 2003, the drainage systems along the perimeter of the Horseshoe pasture were filled. Selected areas within the Horseshoe field were graded to increase habitat diversity. Disturbed areas were seeded with a wetland seed mix and planted with containerized wetland species. Woody species were planted to restore a scrub-shrub wetland within portions of the pasture. Also, in the summer of 2003, a new channel was constructed for 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 gross wetland boundary encompasses 21.51 acres and includes 2.13 acres of shallow open water (<4 feet deep). MDT anticipates creating at least 50 acres of wetland within the 86-acre conservation easement. The mitigation efforts have thus far resulted in 21.51 gross wetland acres or 43% of the goal (the 50 acre goal included the pre-existing wetlands). Subtracting the pre-existing wetland acreage of 1.99 acres, the new net acreage of aquatic habitats totals 19.52 acres.

Functional assessment results are summarized in **Table 17** below. 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 17.** The monitoring area has gained approximately 156 functional units since construction due to several high to

Table 17: ***Summary of 2002 and 2004 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	2002[1] Pre-construction	2004[2] Post-construction
Listed/Proposed T&E Species Habitat	Low (0)	Low (0.3)
MNHP Species Habitat	Mod (0.6)	Mod (0.60)
General Wildlife Habitat	Low (0.3)	High (1.00)
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	Mod (0.7)
Production Export/Food Chain Support	Low (0.3)	High (0.9)
Groundwater Discharge/Recharge	Low (0.1)	High (1.0)
Uniqueness	Low (0.1)	Mod (0.4)
Recreation/Education Potential	Low (0.1)	Mod (0.7)
Actual Points/Possible Points	2.7/9	8.0/12
% of Possible Score Achieved	30%	67%
Overall Category	III	II
Total Acreage of Assessed Wetland / Open Water Areas within Easement	**23.6**	**21.51**
Functional Units (acreage x actual points) (fu)	**49.8**	**172**
Net Acreage Gain in Mitigation Area (ac)	**NA**	**19.52**
Approximate Functional Unit Gain in Mitigation Area (acreage gain x actual points) (fu)	**---**	**156.2**

[1] 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.
[2] 2004 assessment included the horseshoe wetlands and the middle reach of McKee Spring Creek (the mitigation area).

exceptional ranking variables. The wetland has attained Category II wetland status in 2004, an improvement from the Category III status in 2002.

2.14 Kleinschmidt Creek (Missoula District, Year 3)

This report documents the 2004 (third year) monitoring results at the Kleinschmidt Creek mitigation site. The site was developed to mitigate wetland impacts associated with two Montana Department of Transportation (MDT) projects, Clearwater Junction North and Helmville Junction, and to serve as a reserve for future MDT projects in the watershed. Kleinschmidt Creek is located in Powell County, MDT Watershed # 2, in the Upper Clark Fork River Basin. The mitigation site is located approximately six miles east of Ovando, Montana and 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 project was designed by LWC, 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 the Kleinschmidt Flats and eventually discharging along Kleinschmidt Creek corridor.

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: storm water 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

As of 2004, approximately 23.08 acres of wetland and 2.72 acres of open water (restored stream channel/portions of excavated wetlands) occur at the Kleinschmidt Creek mitigation site. This

represents an approximate increase of 9.3 wetland acres and a 4.87 acre decrease of over-excavated, straightened open water channel as compared to baseline conditions. Open water on the site is currently comprised of 1.89 acres of restored sinuous channel and 0.83 acre of excavated shallow water as a component of wetland creation.

Table 18 summarizes the maximum credit that could be assigned to the site as of 2004. 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.

Table 18: ***Maximum Kleinschmidt Creek mitigation site credit as of 2004.***

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 1.89 acres of open water stream channel. Calculated stem density (3,430) is exceeding performance standard (500).
Designed Creation	1.19	1:1	1.19	1.19	Includes 0.83 acre of designed shallow open water. Calculated stem density along upland / wetland border (2,883) is exceeding performance standard (500).
Designed High-Intensity Enhancement	8.05	1:2	4.02	4.02	Calculated stem density (2,083) is exceeding performance standard (1,000)
Designed Low-Intensity Enhancement	3.43	1:3	0.0	1.14	Plantings were destroyed by grazing. Calculated stem density (0) is no longer 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**

Functional assessment results are summarized in **Table 19** 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 208 since project construction.

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, hounds tongue, oxeye

daisy and spotted knapweed, which should be controlled. Several other aggressive species are present on the site. These include the non-native musk thistle and 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.

2.15 Lame Deer (Glendive District, Year 3)

The Lame Deer - East wetlands, located in Watershed 14 (Middle Yellowstone), 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, Section 34, Township 2 South, Range 41 East. 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 of all 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 recreate approximately 1.5 acres of wetland.

The 2004 delineation at the school site resulted in a total of 0.62 acre of wetland development within the north and south cells; an increase of 0.47 acre since 2002. The estimated gross wetland acreages for the recreated wetlands along Hwy. 212 were 0.57 acre at Wetland 369 and 0.30 acre at Wetland 380 for a total of 0.87 acre. The total gross wetland acreage within the three Lame Deer-East mitigation sites as of 2004 is 1.49 acres or 47% of the mitigation goal.

Table 19: ***Summary of 1998 (baseline), 2002, 2003, and 2004 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[1]	1998 Channel & Wetlands Lower Section (MDT/USFWS)	1998 Channel & Wetlands Upper Section (MDT/USFWS	2002 - 2003 Channel & Wetlands (LWC)	2002 - 2003 Ponds (LWC)	2004 Channel & Wetlands (LWC)	2004 Ponds (LWC)
Listed/Proposed T&E Species Habitat	Low (0.2)	Low (0.2)	Mod (0.8)	Low (0.2)	Mod (0.8)	Low (0.2)
MNHP Species Habitat	Low (0.1)	Low (0.1)	Mod (0.7)	Low (0.1)	Mod (0.7)	Low (0.1)
General Wildlife Habitat	Mod (0.5)	Mod (0.5)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	Low (0.2)	Low (0.2)	Mod (0.7)	NA	Mod (0.7)	NA
Flood Attenuation	NA	NA	NA	NA	NA	NA
Short and Long Term Surface Water Storage	Mod (0.5)	Mod (0.5)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Sediment, Nutrient, Toxicant Removal	Mod (0.5)	High (1.0)	High (0.9)	Mod (0.7)	High (0.9)	Mod (0.7)
Sediment/Shoreline Stabilization	Mod (0.4)	Mod (0.4)	High (1.0)	Mod (0.7)	High (1.0)	Mod (0.7)
Production Export/Food Chain Support	High (0.8)	High (0.8)	High (0.8)	Mod (0.7)	High (0.8)	Mod (0.6)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Low (0.2)	Low (0.3)	Low (0.2)	Low (0.3)	Low (0.3)
Recreation/Education Potential	Low (0.1)	Low (0.1)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)
Actual Points/Possible Points	4.5/11	5/11	8.2/11	5.6/10	8.2/11	5.6/10
% of Possible Score Achieved	41%	45%	75%	56%	75%	56%
Overall Category	III	III	II	III	II	III
Total Acreage of Assessed Wetlands and Open Water within Easement (acre)	10.40	12.90	24.35	1.64	24.25	1.55
Functional Units (acreage x actual points)	46.8	64.5	199.67	9.18	198.85	8.68
Total Functional Units At Site	111.30		208.85		207.53	
Total Functional Unit "Increase"[1]	NA		97.55		96.23	

[1] The baseline assessment was performed using the 1997 MDT Assessment Method. Several parameters were substantially revised in the 1999 MDT Assessment method, which was used to evaluate 2002 - 2004 monitoring conditions. Thus, direct comparison of pre- and post-project functions is not possible; although, some general trends can be noted.

Functional assessment of the school and creek monitoring sites are summarized in **Table 20** 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 again scored as a Category III wetland in 2004 (**Table 20**). The percent possible score has increased from 39% to 55% as the wetland vegetation and most other parameters improve. Wetland 369 is classified as a Category II wetland in 2004 due to a high rating for wildlife habitat. Wetland 380 is also a Category II as it is suspected northern leopard frog primary habitat and has a high wildlife habitat rating, although it also rates very close to the Category II threshold with a percent possible score of 62%. Total functional unit gain for all Lame Deer-East Mitigation sites as of 2004 is 9.3 units.

Table 20: ***Summary of Baseline and 2004 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[1]	2004 School Site	2004 W-369	2004 W-380
Listed/Proposed T&E Species Habitat	Low (.3)	Low (0)	Low (0)	Low (0)
MNHP Species Habitat	Low (0)	Moderate (.7)	Low (0)	High (.8)
General Wildlife Habitat	High (.7)	Moderate (.7)	High (.9)	High (.9)
General Fish/Aquatic Habitat	NA	NA	Moderate (.6)	High (.8)
Flood Attenuation	Mod (.4)	Low (.2)	Low (.2)	Low (.1)
Short and Long Term Surface Water Storage	-	Moderate (.6)	Moderate (.4)	Moderate (.4)
Sediment, Nutrient, Toxicant Removal	High (1)	Moderate (.7)	Moderate (.7)	Moderate (.6)
Sediment/Shoreline Stabilization	Mod (.7)	High (.9)	Low (.3)	High (1.0)
Production Export/Food Chain Support	High (.8)	Low (.3)	Moderate (.4)	Moderate (.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)	Moderate (.5)	High (1)	High (1.0)
Actual Points/Possible Points	4.9/9	6.0/11	5.9/12	7.4/12
% of Possible Score Achieved	54%	55%	49%	62%
Overall Category	III	III	II	II
Total Acreage of Assessed Wetlands within Monitoring Area	20-30	0.62	0.57	0.30
Total Functional Units (acreage x actual points)	-	3.72	3.36	2.22
Net Acreage Gain ("new" wetlands)	-	0.62	0.57	0.30
Net Functional Unit Gain (new acreage x actual points)	-	3.72	3.36	2.22
Total Functional Unit Gain 2003		9.3 units		

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

The stormwater inlet culvert in the southwest corner of the south cell was in working order and required no maintenance. Soil saturation was evident in the north cell during the investigation and was obviously enough to support an increase in hydrophytic vegetation between 2003 and

2004. Outflow from Wetland-369 is blocked by debris in the culvert and a beaver dam in the outflow area.

2.16 Little Muddy Creek (Great Falls District, Year 1)

The Little Muddy Creek wetland mitigation project 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 63.57 acres of wetland credit from Ducks Unlimited for 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 (#7), and is seeking to hold another 50 credits in reserve, for a total of 63.57 credits. The Little Muddy Creek wetland project is located on private land which is approximately 1 mile west of Interstate 15 between the towns of Cascade and Ulm, Montana in Cascade County.

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 foot 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.

Target wetland communities to be produced at the site include open water/aquatic bed and shallow marsh/wet meadow. As combined flows in Missouri and Sun rivers at Ulm and Vaughn did not exceed 7,880 cfs by June 1, no water was turned into the site in 2004. Consequently, the 2004 monitoring report largely documented baseline conditions.

In its first year, no wetland or other aquatic habitat developed at the site. Therefore, no wetland credit, COE approved or otherwise, was attributed to this project in 2004.

2.17 Musgrave Lake (Great Falls District, Year 4)

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 dropped from consideration in 2003. 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 attempts 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 has been dropped from the mitigation site***).

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 19.04 wetland/aquatic habitat acres have been "restored" on the mitigation site to date (RS1: 12.19 acres; RS2: 6.67 acres; ES1: 0.18 acre), while approximately 4.8 acres have been enhanced (ES1). In 2004, it was discovered that previous gross aquatic area calculations at RS1 included 1.89 acres of the adjacent reference area. These 1.89 acres were not included in 2004 RS1 totals, which is why 2004 totals for RS-1 are lower than 2003 totals. Approximately 0.16 wetland acres were gained at RS2 in 2004 due to increased inundation. The slight wetland expansion (0.18 acre) along the south border of ES1 (along the dike) observed in 2003 remained consistent in 2004.

Appreciable functional enhancement has been achieved across about 4.98 acres within the easement area at ES1, currently calculated at an approximate 18.17 functional unit "gain". An applied 1:3 credit ratio at ES1 would result in approximately 1.66 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 6 acres short of the original 11-acre estimate, 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 2004 is approximately 19.04 + 1.66 + 0.75 = 21.45 acres.

Functional assessment results are summarized in **Table 21** 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 2003 and 2004. Based on the baseline functional assessments conducted by MDT and the landowner, the site has experienced an apparent gain of about 120 functional units (acreage x functional points) at restoration sites RS1 and RS2, and 18.17 functional units at ES1. All three sites again rated as Category II wetlands in 2004.

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.

Table 21: ***Summary of 2004 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 (Stutzman 1999)[1]	Pre-Project ES1 (MDT 1999)	2004 RS1	2004 RS2	2004 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	Low (0.3)	Low (0.3)
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)	Low (0.2)	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 (0.8)	High (0.8)
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)	Low (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	6.6 / 10	7.3 / 11	7.6 / 12
% of Possible Score Achieved	66%	22%	37%	66%	66%	63%
Overall Category	II	III	III	II	II	II*
Total Acreage of Assessed Wetlands within Easement	6.5 ac (estimated)	4.59 ac	4.8 ac (ES1)	12.19 ac	6.67 ac	4.98 ac
Functional Units (acreage x actual points)	42.9 fu	9.18 fu	19.68 fu (ES1)	80.45 fu	48.69 fu	37.85 fu
Net Acreage Gain	NA	NA	NA	7.6 ac	6.67 ac	0.18 ac
Net Functional Unit Gain	NA	NA	NA	71.27 fu	48.69 fu	18.17 fu
Total Functional Unit "Gain" over baseline	138.13 Total Functional Units; 119.96 at restoration wetlands; 18.17 at enhancement wetlands					

[1]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.
* Did not achieve Category II rating based on functional points, but did achieve Category II rating based on score for MNHP species and/or general wildlife habitat.

2.18 Norem Ranch (Billings District, Year 1)

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 and the middle reaches of watershed #13 - Upper Yellowstone River Basin. The Norem wetland project site is located in Sweetgrass County approximately two miles northeast of Big Timber, Montana. Elevations within the assessment area range from approximately 4,000 to 4,018 feet above 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.

As of 2004, the gross wetland boundary encompasses 10.82 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 included 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 10.82 – 6.93 = 3.89 acres since construction (2002). As of 2004, the approximate assignable wetland credit at the site is 7.71 acres or 52% of the goal, as outlined in **Table 22** below.

Table 22: ***2004 Norem Ranch Wetland Mitigation Monitoring Results***

Wetland Mitigation Type	2004 Net Acres	Ratio	2004 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	2.39	1:1	2.39	9.46	25% of the wetland creation area has been converted to wetlands
Open Water Creation	1.50	1:1	1.5	1.58	95% of the intended open water has developed.
Buffer Zone Implementation	6.0	4:1	1.5	1.50	2004 net buffer area was assumed within easement.
Berm impact	--	--	--	-0.15	
Total	**16.87**		**7.71**	**14.71**	**52% of goal**

Functional assessment results are summarized in **Table 23** below. Pre-construction functional assessments were completed for the wetlands by Maxim and results of that assessment are included in **Table 23.** The net functional units have increased by 37.81 points since 2001 due to increased ratings for several variables. The overall wetland rating increased from a Category III to a Category II.

Table 23: ***Summary of 2001 and 2004 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	Pre-construction 2001	Post-construction 2004
Listed/Proposed T&E Species Habitat	Low (0)	Low (0.3)
MNHP Species Habitat	Low (0.1)	Moderate (0.6)
General Wildlife Habitat	Moderate (0.5)	Moderate (0.9)
General Fish/Aquatic Habitat	Low (0.1)	NA
Flood Attenuation	Moderate (0.5)	Moderate (0.5)
Short and Long Term Surface Water Storage	Moderate (0.6)	Moderate (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)	Moderate (0.7)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Moderate (0.4)
Recreation/Education Potential	Low (0.1)	Moderate (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	10.82
Functional Units (acreage x actual points)	33.6 fu	71.41 fu

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Pre-construction 2001	Post-construction 2004
Net Acreage Gain	NA	3.89 ac
Net Functional Unit Gain	NA	37.81 fu
Total Functional Unit "Gain"	**NA**	37.81 fu

2.19 Perry Ranch (Great Falls District, Year 3)

The Perry Ranch wetland mitigation site was constructed during early summer 2001 to mitigate wetland impacts associated with MDT projects NH 1-3(12)225F (Browning-Meriwether) and F BRF 1-3(11)219 (Browning East & West). These two projects resulted in a combined projected wetland loss of approximately 14.7 acres. Constructed in Watershed 8 (Marias), the mitigation site is located approximately 13 miles west of Browning 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 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 three-foot depth.

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.

Approximately 12.33 acres of wetlands presently occur on the site. Wetland acreage at the site decreased by approximately 0.08 acre in 2004, while mudflat areas decreased by 6.2 (none were delineated in 2004). This was presumably due to the effects of two consecutive poor precipitation years.

Approximately 3.4 acres of wetland occurred at the site prior to construction. The 27.6-acre mitigation goal is inclusive of these 3.4 acres of pre-existing wetlands. Consequently, the goal for net wetland gain at the site is 27.6 – 3.4 = 24.2 acres. As of 2004, the site has netted 12.33 – 3.4 = 8.93 wetland acres and 0.0 open water/mudflat acres, for a total of 8.93 acres of aquatic habitats, or 37% of the goal. This is presently the maximum assignable credit at this site as of 2004.

Functional assessment results are summarized in **Table 24** below. Forms were prepared for the inner and outer oxbows. Results in 2004 were identical to 2003 results for the inner oxbow and very similar to 2003 results for the outer oxbow. 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. The wildlife score was lowered slightly for the outer oxbow in 2004 due to decreased inundation and decreases in observed wildlife use. 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 24)**, approximately 67 functional units have been gained thus far at the Perry Ranch mitigation site.

Several dike problems were noted during the 2002 summer visit, but these were repaired during 2003 and were still stable in 2004.

Table 24: ***Summary of 2004 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[1]	Wetland Sites			
	Inner Oxbow Pre-construction (1997 method)	Outer Oxbow Pre-construction (1997 method)	2004 Inner Oxbow Post-construction (1999 method)	2004 Outer Oxbow Post-construction (1999 method)
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 (0.6)	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	6.1 / 10	6.9 / 10
% of Possible Score Achieved	44%	27%	61%	69%
Overall Category	III	IV	III	II
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries	2.3 ac	1.1 ac	6.28 ac	6.05 ac
Functional Units (acreage x actual points)	10.12 fu	2.97 fu	38.31 fu	41.74 fu
Net Acreage Gain	NA	NA	6.28 – 2.3 = 3.98 ac*	6.05 – 1.1 = 4.95 ac
Net Functional Unit Gain	NA	NA	38.31 - 10.12 = 28.19 fu	41.74 – 2.97 = 38.77 fu
Total Functional Unit "Gain"	66.96 Total Functional Units			

2.20 Peterson Ranch (Missoula District, Year 3)

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

Seasonal flooding of Flint Creek and an irrigation- influenced shallow groundwater table provide the primary wetland hydrology. The local groundwater systems are also influenced by the adjacent Flint Creek and the movement of subsurface flow though the highly permeable alluvium substrate located within the floodplain of the Flint Creek Valley. 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.

At this time approximately 22.77 acres of wetland and 0.61 acres of open water occur on the mitigation site, for a total of 23.38 acres of aquatic habitat. Subtracting the original 22.6 acres of pre-project wetlands from this total yields a current net of approximately 0.78 wetland/open water acres. It is likely that additional acreage will form with additional time and more normal precipitation, and if the irrigation issue is rectified. The site has gained approximately 73 functional units to date.

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.

The Peterson Ranch was separated into three assessment areas (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). OW/pond #2 was not included during 2002 assessment of these areas, but was included in the 2003 assessment due to the development of emergent vegetation class around the pond fringe. During the 2004 monitoring areas mapped as OW/ponds # 1 and 2 were mapped as wetlands and were included in the assessment. A complete breakdown of ratings for each assessment area and pre-project assessments areas are presented in **Table 25** below.

Based on functional assessment results, approximately 141.41 functional units occur at the Peterson Ranch mitigation site. Baseline functional assessment results are also provided for general comparative purposes. However, it should be noted that direct comparison between the baseline and 2003 functional assessments are not possible, as they were completed using different versions of the MDT functional assessment method. However, assessments can still be compared qualitatively. The baseline assessment was completed using the 1996 version, while the 2002 – 2004 assessments were conducted using the most current (1999) version. The site has gained approximately 73.34 functional units to date.

Planted woody species survival data were collected for the Peterson Ranch. Plantings were difficult to find during the 2003 and 2004 monitoring due to extensive herbaceous cover of upland grass species. In general, species survival was good except for two species, silverberry and red osier dogwood, which exhibited low survival rates. The following species had higher survival rates: woods rose, golden current, and chokecherry. The number of willow sprigs were approximated, but not accurately counted due to high numbers of cuttings. In general most of the observed sprigs were alive and exhibited good survival. The plantings that were located had evidence of heavy browse from wildlife and livestock grazing. The high mortality of red osier dogwood likely can attributed to heavy browse.

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, hound's tongue and spotted knapweed.

The general lack of water at the majority of this site continues preclude wetland development in many areas.

Table 25: ***Summary of Baseline and 2004 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	Assessment Area and Year			
	Baseline 1998 (1996 Method)	2004 AA 1 (1999 Method)	2004 AA 2 (1999 Method)	2004 AA 3 (1999 Method)
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)
MNHP Species Habitat	Low (0.1)	None (0.0)	Low (0.1)	None (0.0)
General Wildlife Habitat	Low (0.1)	Mod (0.5)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	NA	NA	NA	NA
Flood Attenuation	NA	Mod (0.5)	Low (0.2)	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 (0.9)	Mod (0.7)
Sediment/Shoreline Stabilization	NA	Low (0.3)	High (1.0)	Mod (0.7)
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)
Actual Points/ Possible Points	3.0 / 8	5.6 / 11	6.4 / 11	6.2 / 11
% Of Possible Score Achieved	38%	51%	58%	56%
Overall Category	III (borderline IV)	III	III	III
Total Acreage of Assessed Wetlands and Open Water within Easement by AA	22.6 ac	7.35	3.00	13.03
Functional Units (acreage x actual points) by AA	67.8 fu	41.16	19.20	80.78
Total Acreage of Assessed Wetlands and Open Water on Site	22.6 ac	23.38		
Total Functional Units on Site	67.8 fu	141.14		
Net Acreage Gain (assessed wetlands and open water only)	NA	0.78		
Net Functional Unit Gain	NA	73.34		

[1] 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.

2.21 Ridgeway Complex (Glendive District, Year 4)

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

Eight wetlands were created during the summer of 2000 and an additional eight were completed in January of 2001. Hydrophytic vegetation had not developed at the majority of these sites as of 2002 because of the drought and grazing. The objective for the Ridgeway Complex was to maximize the surface acres of each individual project to create 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.

For 2004 monitoring purposes, Wetland #9 (W-9) was sampled for the fourth season according to the full sampling protocol on July 26, 2004. Wetland 9 was chosen out of the sixteen constructed open-water impoundments because of its representative wetland qualities. The wetland areas at the remainder of the fifteen sites, impoundments 1-8, and 10-16, were approximated and general wetland vegetation boundaries were recorded on an aerial photograph during the 2004 site visit.

The 2004 complex-wide gross wetland area was estimated at 28.7 acres, approximately 57% of the 50-acre goal. Total wetland acreage increased 1.72 acres since 2003. However, net emergent wetland area increased from 8.72 acres in 2003 to 15.44 acres in 2004. In 2003, seven of the constructed pond sites had not developed into wetlands. In 2004, the number of undeveloped sites decreased to four: W-1, W-11, W-14, and W-15. A lack of one or more of the three wetland parameters was observed at each of these sites. The lack or near-lack of surface water at sites 11, 14, and 15 may in part be a result of the drought, but may also be the result of the construction methods and/or borrow pit and berm locations. A widening of the borrow pit area to enable a higher probability of runoff capture may be beneficial at these sites.

Functional assessment was only conducted at Wetland #9 (**Table 26**). 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 9 percentage points to 75%, very close to a Category I wetland. Functional units have increased 9 points since 2002.

No maintenance needs were observed for W-9. Three of the wetland sites had no open water at the time of the investigation: W-11, 14, and 15. This lack of surface water may in part be a result of the drought, but may also be the result of the construction methods and/or borrow pit and berm locations. A widening of the borrow pit area to enable a higher probability of runoff capture may be beneficial.

Table 26: ***Summary of 2004 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	2004
Listed/Proposed T&E Species Habitat	Low (0)
MNHP Species Habitat	High (.8)
General Wildlife Habitat	High (.9)
General Fish/Aquatic Habitat	NA
Flood Attenuation	Mod (0.5)
Short and Long Term Surface Water Storage	High (0.9)
Sediment, Nutrient, Toxicant Removal	High (1.0)
Sediment/Shoreline Stabilization	High (1.0)
Production Export/Food Chain Support	Mod (0.7)
Groundwater Discharge/Recharge	High (1.0)
Uniqueness	Low (0.4)
Recreation/Education Potential	High (1.0)
Actual Points/Possible Points	8.2/11
% of Possible Score Achieved	75%
Overall Category	II
Total Acreage of Assessed Wetlands within Easement	4.0
Functional Units (acreage x actual points)	32.8
Net Acreage Gain	4.0
Net Functional Unit Gain	32.8
Total Functional Unit "Gain"	32.8

2.22 Ringling-Galt (Butte District, Year 3)

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

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

No wetland habitat occurred at the site prior to project implementation. Target wetland communities to be produced at the site included open water/aquatic bed and shallow marsh/wet meadow. Target wetland functions to be provided at the site included habitat diversity, flood control & storage, general wildlife habitat, sediment filtration, and nutrient cycling. The site was formally monitored in 2001, 2003, and 2004, but was not monitored in 2002 due to extreme drought conditions and lack of surface water.

Prior to project implementation, MDT did not document any wetland habitat in the analysis area. Despite the fact that water was retained on-site in 2003, the site has not had sufficient hydrology to begin wetland development and thus no wetlands were delineated within the monitoring area to date. Inundation in future years may result in wetland establishment behind the dike and will be documented during future monitoring.

In May 2000, the COE determined that this site could not be used as permanent mitigation for the Ringling – North project due to the lack of a perpetual conservation easement. No specific performance criteria were required to be met at this site in order to document its success. To date, the site has yet to create any wetland habitat and therefore no credit, COE approved or otherwise, for wetland creation can be attributed to this project.

2.23 Roundup (Billings District, Year 4)

The Roundup wetland site was created to provide wetland mitigation credits for MDT's reconstruction of U.S. Highway 12 in Watershed 10 (Musselshell). The site is located in Musselshell County, Montana, Section 18, Township 8 North, Range 26 East, 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 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 DEQ and 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 storm water 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 2004 delineation again showed a total of 22 acres of developing aquatic habitats. Of that, 9.97 acres are shallow, open water and 2.51 acres are intermittently exposed soil for a net emergent wetland area of 9.52 acres. In 2003, the net wetland area was 11.09 acres as a result of an area of kochia in the south lagoon. In 2004, this area of kochia had disappeared, likely the result of inundation and subsequent drowning. In effect, though the net wetland acreage appears to be declining, it is a result of the removal of an undesirable FAC weed. As water levels increase, and/or the weeds are treated and removed, the net wetland area will likely initially decrease because of the extirpation of the FAC weed species, then eventually increase as more desirable wetland species colonize the site. Given the shallowness of the open water and special aquatic status of the mud flats, the entire site should be considered creditable for a total of 22 acres.

Functional assessment results are summarized in **Table 27** below. This represents an increase of approximately 220% since 2001, but only a 6% increase over 2002 functional units. 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 27: ***Summary of 2004 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	2004 Roundup Wetland
Listed/Proposed T&E Species Habitat	Low (0)
MNHP Species Habitat	High (.8)
General Wildlife Habitat	High (.9)
General Fish/Aquatic Habitat	NA
Flood Attenuation	Mod. (.6)
Short and Long Term Surface Water Storage	High (1)
Sediment, Nutrient, Toxicant Removal	Mod. (.7)
Sediment/Shoreline Stabilization	High (1)
Production Export/Food Chain Support	High (.8)
Groundwater Discharge/Recharge	Low (.1)
Uniqueness	Low (.3)
Recreation/Education Potential	High (1)
Actual Points/ Possible Points	7.2/11
% of Possible Score Achieved	65%
Overall Category	II
Total Acreage of Assessed Wetlands within Easement	22.00
Functional Units (acreage x actual points)	158.40
Net Acreage Gain	22.00
Net Functional Unit Gain	158.40
Total Functional Unit "Gain"	158.40

Based on LWC's 2003 and 2004 monitoring data, kochia dominates this mitigation site. Effective weed control for 2005 may include the following measures:

- Burn old kochia skeletons to remove the canopy cover in the early spring.

- Spray (using the appropriate herbicide) early in the spring while the kochia plants are actively growing and the kochia seedlings are 3 to 4 inches tall.
- Reseed in the spring with a seed mix formulated with some quick germinating species (e.g. barley, and includes MDT recommended wetland seed mix) to help control the invasion of other annual and undesirable weedy species. A specified amount of time is needed prior to reseeding as not to injure the seed or newly seeded grass and forb species with herbicide soil residual effects. This reseeding time is directly related to the chemical and the amount of herbicide applied.
- Visit the site later in the summer to assess the weed control and seedling efforts, identify locations, if any, of new weed infestation or areas particularly susceptible to new infestations. Spot-spraying may be needed and some areas may need to be reseeded in the fall.

2.24 South Fork Smith (Butte District, Year 3)

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.

Located in Watershed 7 (Missouri-Sun-Smith), the approximate 2-mile stream restoration is located approximately 7 miles north of Ringling in Meagher County. The site occurs on private land (Galt Ranch) located west of U.S. Highway 89.

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 shrub/scrub. 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.

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. Wetland habitat has not expanded since reactivation, but minor shifts in vegetation community types are occurring, as emergent habitat transitions to aquatic bed within the channel. Some 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 GPS may be useful in future monitoring efforts to detect minor wetland expansion that may be too subtle to detect otherwise.

Functional assessment results are summarized in **Table 28** below and were identical to 2002 results. 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 28: ***Summary of Baseline & 2004 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	Wetland Site	
	Historic Channel S.F. Smith River – 2001	Reactivated Channel S.F. Smith River - 2004
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)	Low (0.3)
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	5.6/ 12
% of Possible Score Achieved	41%	47%
Overall Category	III	III
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries	8.9 ac	8.9 ac
Functional Units (acreage x actual points)	43.61 fu	49.84

At this time, extensive 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.

2.25 Stillwater River (Billings District, Year 4)

The Stillwater River wetland 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 in Watershed 13 (Upper Yellowstone). The site is located in Stillwater County approximately eight miles southwest of the interstate interchange at Columbus, Section 22, Township 3 South, Range 19 East. Elevations within the assessment area range from approximately 3,382 to 3,387 feet above sea level. The surrounding land uses include grazing, cropland and residential areas.

The project was anticipated to create approximately 10.69 acres of wetlands within a conservation easement 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. Excavation was completed to reach groundwater flows from the adjacent Stillwater River. The two dikes were 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.

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.

Emergent vegetation has developed around 100% of the open water circumference. The wetland boundary encompasses 9.25 acres of wetland and includes 5.41 acres of shallow open water (<6 feet deep). Gross wetland acreage has increased 0.74 acre while approximately 1.1 acres of open water has converted to emergent wetland since 2001.

MDT anticipated creating 10.69 acres of wetland within a 15 to 20-acre conservation easement. The mitigation efforts have thus far resulted in 9.25 gross wetland acres or 86% of the goal (the 10.69-acre goal included the pre-existing wetlands). The gross aquatic habitat (wetlands plus open water) acreage has been fairly stable since 2002, however, the open water areas have decreased as a result of emergent wetland encroachment.

Functional assessment results are summarized in **Table 29** below. Pre-construction functional assessments were completed for the wetlands by MDT and results of that assessment are included below**.** The net functional units have increased by 39 points since 2001 due to several high to exceptional ranking variables. The wetland has been assigned the Category 1 Wetland status since 2002. Ten of the 12 evaluated parameters received high to exceptional ratings, six with functional points of 1.0.

Only two (2) wood duck boxes remain attached to trees. A third, found on the ground, was brought out and placed beside the lower cattle guard for reattachment by the landowner's son. The fence around the wetland was intact though cattle were observed grazing within the wetland area; their entrance location into the wetland could not be discerned. 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). Active control measures are recommended for knapweed and spurge.

The cottonwood forest continues to decline as a result of beaver kill and may be negatively affected by the expanding saturation zone. Recruitment is occurring, but at low to moderate numbers. Discussion regarding the future of the cottonwood forest as it relates to the wetland mitigation goals is warranted.

Table 29: ***Summary of Baseline and 2004 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	Pre-construction 1998	Post-construction 2004
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	9.25
Functional Units (acreage x actual points)	15fu	98.1
Net Acreage Gain	NA	5.48
Net Functional Unit Gain	NA	83.1

2.26 Wigeon Reservoir (Glendive District, Year 4)

The Wigeon wetland was created to provide mitigation credits for wetland impacts associated with MDT roadway projects that have been constructed in Watershed 16 (Little Missouri). The site is located in Carter County, Montana, approximately 22 miles directly north of Alzada in Sections 23 and 26, Township 5 South, Range 59 East. Elevations range from approximately 3,169 to 3,175 feet above 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 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 5.5 acres of gross aquatic habuitat area encompasses 2.81 acres of goosefoot, foxtail, and mud. No other wetland species were observed. In 2001, the gross wetland area totaled 8.2 acres and included 3.0 acres of emergent wetland. The drought has caused a 33% decline in the gross

wetland area and nearly 100% loss of desirable wetland vegetation species. It is likely, however, that wetland area and species will be regained with normal precipitation. Credit should be considered for the shallow water habitat which is admittedly difficult to quantify in terms of "wetland" credit, but which does provide a valuable aquatic resource in this arid region of the state.

Functional assessment results are summarized in **Table 30** below. Functional units have decreased 28% since 2001 because of a 2.7-acre decrease in gross wetland area caused by drought. 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 wildlife that use the reservoir is high as evidenced by the diversity of waterfowl, amphibians and reptiles. Disturbance by cattle or observations of heavily cattle-tracked areas appeared to be less in 2004 at the time of the investigation. Thus, the disturbance rating was revised from high to moderate, which increased some of the values resulting in an increase in actual functional points.

Table 30: ***Summary of 2004 Wetland Function/Value Ratings and Functional Points at the Wigeon Reservoir Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2004
Listed/Proposed T&E Species Habitat	Low (0)
MNHP Species Habitat	High (1)
General Wildlife Habitat	High (.9)
General Fish/Aquatic Habitat	Mod (.5)
Flood Attenuation	Mod (.5)
Short and Long Term Surface Water Storage	High (1)
Sediment, Nutrient, Toxicant Removal	Mod (.7)
Sediment/Shoreline Stabilization	Low (.3)
Production Export/Food Chain Support	High (.8)
Groundwater Discharge/Recharge	High (1)
Uniqueness	Low (.3)
Recreation/Education Potential	Low (.5)
Actual Points/Possible Points	7.5/12
% of Possible Score Achieved	63%
Overall Category	II
Total Acreage of Assessed Wetlands within Easement	5.50
Functional Units (acreage x actual points)	41.25
Net Acreage Gain	5.50
Net Functional Unit Gain	41.25

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.

Attachment A

TABLE 1

MDT Wetland Mitigation Monitoring
2004 Executive Summary

LAND & WATER

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Table 1: *Summary of MDT Wetland Mitigation Sites Monitored 2001 – 2004.*

Site	Year Built	Major MT Watershed Basin	Pre-Project Wetland Acreage and MDT Category	Target Wetland Credit	2004 Wetland / Open Water Acreage and MDT Category	Enhancement Credit (ratio)?	Upland Credit (ratio)?	Total Acreage and Functional Unit Gain as of 2004	Comments
Missoula District									
Batavia	1998	4 - Flathead	137 ac Category II 1069 fu	28.7 ac (see comments)	138.73 ac Category II 1332 fu	See comments	NA	Unknown pending full site delineation. So far have gained 1.73 ac creation, 19.6 acres enhancement, 263 fu. Subtracting 4.3 ac. for dike = 17.03 ac net.	Fourth monitoring year. Similar results as 2002 and 2003. 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 2004. Only monitored new borrow areas. Water delivery from Ashley Creek appears to be a major problem at this site (diversion not maintained).
Camp Creek	2002	3 – Lower Clark Fork	48.73 ac Category III 251.58 fu	11.4 acre minimum (see comments)	44.15 ac wetland 2.15 ac channel Category II & III 411.84 fu	None specified	None specified	Loss of 2.43 ac aquatic habitat Gain of 160.26 fu	Third monitoring year. Intended to mitigate for Sula N&S (11.4 acres) and possibly other projects. Goals: functional restoration/enhancement of 42.7 wetland acres, enhancement of 24 acres grazed/cleared riparian vegetation, restoration of 16.5 acres channel bottom and floodplain margins. No agreement between Corps and MDT regarding crediting mechanism. Using functional unit-based crediting approach would yield up to 18.28 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)	5.2 ac Category II 35.9 fu	2 ac, no ratio specified.	NA	3.2 ac created; fu gain at pre-existing 2 ac unknown	Fourth monitoring year. Same results as 2001 - 2003. No baseline delineation or functional assessment available. No performance criteria for enhancement. If functional enhancement achieved, then currently at 87% 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)	13.02 ac Category III (12.73 ac), IV (0.29 ac) 89.92 fu	None specified	None specified	6.35 ac created 58.7 fu	Third monitoring year. Gain of 0.89 wetland acres since 2002. Planting at adjacent uplands was accomplished in 2003. 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	23.08 ac wetland 2.72 ac open water Category II & III 207.53 fu	1:2 on 8.05 = 4.02 1:3 on 3.43 = 1.14 Total = 5.16 ac	1:4 on 12.69 = 3.17 ac	11.24 ac. restored 1.19 ac created 4.02 enhancement 3.17 buffer 18.31 total credit 97.55 fu	Third monitoring year; first 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.
Peterson Ranch	2002	2 – Upper Clark Fork	22.6 ac Category III 67.8 fu	17.5 ac	23.38 ac Category III 141.14 fu	None specified	None specified	0.78 ac 73.34 fu	Third monitoring year. Lost 0.13 acre in 2004. Currently at 5% of project goal. Weed control recommended. Water rights problematic and may prevent site from functioning as designed.
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.
Butte District									
Beaverhead Ranch	1997	6 – Upper Missouri	5.2 ac Category and fu unknown	52 ac	92.7 ac Category II 834.3 fu	NA	NA	87.5 ac 834.3 fu	Fourth monitoring year. Same results as 2001 - 2003. Excellent site with heavy wildlife use. Project is currently at 168% of goal. MDT opted not to purchase additional credits outside the current easement, which is why credit acreage appears lower in 2004. 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	Fourth and likely final monitoring year. Same results as 2001 - 2003. Drought years likely have inhibited wetland development. Currently at 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	Fourth monitoring year. Results identical to 2002 and 2003 results. Water delivery would be improved via repair of leaking ditch system. This may also increase saturation and wetland development. Currently at 64% of project goal.
Jack Creek Ranch	2003	6 – Upper Missouri	1.99 ac Category III 49.8 fu (see comments)	50 ac	19.38 ac wetland 2.13 ac open water Category II 170 fu	None specified	None specified	19.52 ac restored 156.2 fu	First monitoring year. The 50-acre goal includes pre-existing wetlands; currently at 43% 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 year 3. Site was not monitored in 2002 due to absence of water, but was monitored in 2003 despite the absence of water. Temporary inundation of uplands was observed during 2003, but none was observed in 2004. No wetland or other aquatic habitats have developed to date. Site contains no conservation easement.
South Fork Smith	2001	7 – Missouri-Sun-Smith	8.32 ac wetland 0.57 ac open water Category III 43.61 fu	Not specified	8.32 ac wetland 0.57 ac open water Category III 49.84 fu	NA	NA	0 ac 6.23 fu	Monitoring year 3. No change in wetlands or 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.

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Table 1 (continued): Summary of MDT Wetland Mitigation Sites Monitored 2001 – 2004.

Site	Year Built	Major MT Watershed Basin	Pre-Project Wetland Acreage and MDT Category	Target Wetland Credit	2004 Wetland / Open Water Acreage and MDT Category	Enhancement Credit (ratio)?	Upland Credit (ratio)?	Total Acreage and Functional Unit Gain as of 2004	Comments
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	0 ac	NA	NA	0 ac	First monitoring year. 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), which were not met in 2004, so no water was diverted to site.
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: 12.19 ac Category II 80.45 fu RS2: 6.67 ac Category II 48.69 fu ES1: 4.98 ac Category II 37.85 fu	1:3 ratio at ES-1 (1.66 acres)	0.75 ac	21.45 ac total credit 19.04 ac restored 1.66 ac enhancement 0.75 ac buffer 138.13 fu	Monitoring year 4. Correction of 2002/2003 GPS error at RS1 lowered acreage. ES2 removed from project 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 79% of project goal.
Perry Ranch	2001	8 - Marias	3.4 ac Category III (2.3 ac) and IV (1.1 ac), 13.09 fu	24.2 ac	12.33 ac Category II and III 80.05 fu	NA	NA	8.93 ac 66.96 fu	Monitoring year 3. No open water / mudflat in 2004. Poor water year. Currently at about 37% of project goal.
Glendive District									
American Colloid	2001	16 – Little Missouri	0 ac	4.4 ac	3.82 ac Category III 17.9 fu	NA	NA	3.82 ac 17.9 fu	Third monitoring year. Site primarily open water in 2004, with minor (0.035 acre) wetlands. Functional units increased. Counting open water, currently at 87% 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	Fourth and final monitoring year. Results virtually identical to 2002 and 2003 results. Currently at 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	Fourth and final monitoring year. 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. Currently at about 79% of minimum 10-acre project goal.
Lame Deer	2001	14 – Middle Yellowstone	0 ac	1.68 ac (school) 1.5 ac (creek) 3.29 total	0.62 ac (school) 0.87 ac (creek) 1.49 ac total Category II & III 9.3 fu	NA	NA	1.49 ac 9.3 fu	Monitoring year 3. Site consists of school site and two Alderson Creek sites. Currently at approximately 45% 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	28.7 ac Category II (W-9 only) 32.8 fu (W-9 only)	NA	NA	28.7 ac. Pond 9: Category II, 32.8 fu	Fourth monitoring year. One of the 16 ponds in this complex (W-9) was intensively sampled / monitored in 2001-2004, although all ponds were delineated. The project is at approximately 57% of project goal. Total includes 13.26 acres of open water.
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	5.5 ac Category II 41.25 fu	NA	NA	5.5 ac 41.25 fu	Monitoring year 4. Project goal exceeded by 3.3 acres. Drought impacted this site in 2004, which decrteased from 8.09 acres. Includes 2.69 acres of open water.

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Table 1 (continued): Summary of MDT Wetland Mitigation Sites Monitored 2001 – 2004.

Site	Year Built	Major MT Watershed Basin	Pre-Project Wetland Acreage and MDT Category	Target Wetland Credit	2004 Wetland / Open Water Acreage and MDT Category	Enhancement Credit (ratio)?	Upland Credit (ratio)?	Total Acreage and Functional Unit Gain as of 2004	Comments
Billings District									
Big Spring Creek	1998 - 1999	9 – Middle Missouri	7.86 ac wetland, 1.3 ac stream Category III 29.1 fu	create 1.5 wetland, enh. 6.36 wetland and stream	10.44 ac wetland, 2.4 ac stream Category II and III 90.2 fu	NA	NA	7.21 ac (assumed) Gained 2.58 ac wetland, 1.11 ac stream, and 61.1 fu	Fourth monitoring year. Site gained additional 0.73 wetland acre and 6 functional units in 2004. Maximum Corps-allowable credit at this site is 7.21 ac (no performance standards, etc.), based subjectively on overall site improvement. About 2.58 wetland and 1.11 stream acres have been created (3.69 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: 2.19 ac Creek fringe: 0.48	NA	1:4 on 3.56 = 0.89 ac	1.95 ac restoration 0.89 ac buffer 2.84 ac total fu gain undetermined	First monitoring year. Site currently at 52% 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	6.98 ac Category III 33.6 fu	14.71 ac (total)	10.82 ac Category II 71.41	1:3 on 6.98 ac =2.32 ac	1:4 on 6 ac = 1.5 ac	2.32 ac enhancement 2.39 ac creation 1.5 ac OW creation 1.5 ac buffer 7.71 ac total 37.81 fu	First monitoring year. Site currently at 52% 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	22 ac (developing) Category II 158.4 fu	NA	NA	22 ac total 158.4 fu	Monitoring year 4. Aquatic habitats similar to 2002 and 2003. Currently 22 ac of developing wetlands, including 9.97 ac shallow open water, 2.51 ac developing mudflats and 9.52 ac emergent wetlands.
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)	9.25 ac Category I 98.1 fu	NA	NA	5.48 ac 83.1 fu	Fourth monitoring year. Results similar to 2002 and 2003. 10.69-ac goal included existing wetlands. Currently at 87% 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.
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]				**515.6 ac**				**338.04 ac**[2] **2,801.82 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. [3] Functional unit totals do not include 15 reservoirs at the Ridgeway site, for which functional assessments were not conducted.