

EXECUTIVE SUMMARY

2003 MONITORING RESULTS

MONTANA DEPARTMENT OF TRANSPORTATION STATEWIDE WETLAND MITIGATION SITE MONITORING PROJECT



Prepared for:



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1.0 INTRODUCTION

This document summarizes the results of 2003 monitoring efforts at 23 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 March 2004. The following mitigation sites were monitored during 2003:

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

Monitoring activities were conducted between April and October 2003 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, 2003 wetland acreage and functional assessment category, enhancement credit ratios, upland credit ratios, total wetland acreage and functional unit gain as of 2003, and comments.

Table 2 presents target versus actual credit acreage by watershed basin at MDT mitigation sites monitored in 2001, 2002, and 2003. Statewide, the target credit acreage at monitored sites is approximately 361 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 larger than the required mitigation needs in some watersheds. As of the 2003 monitoring season, approximately 301 acres of “wetland credit” have developed at these monitored sites. Thus, cumulatively, monitored mitigation projects are at approximately 83% of the credit target.

**Table 2: Target Verses Actual Credit Acreage by Watershed Basin at
MDT Mitigation Sites Monitored in 2001-2003**

Major Montana Watershed Basin	Sites	Minimum Target Credit Acreage ¹	Credit Acreage as of 2003 Monitoring	Percent of Target Acreage Achieved as of 2003 Monitoring	Approximate Functional Units Gain as of 2002 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	17.74 acres	1.08 acres	6%	74.59 funct. units
3 – Lower Clark Fork	Camp Creek Hoskins Landing	19.5 acres	(-11.05 acres) ²	0%	38.68 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	53.2 acres	113.52 acres ⁴	213%	995.98 funct. units
7 – Missouri-Sun-Smith	Cow Coulee Ringling-Galt SF Smith River	24.5 acres	2.87 acres	12%	21.73 funct. units
8 – Marias	Jack Johnson Perry Ranch	49.2 acres	37.84 acres	77%	178.09 funct. units
9 – Middle Missouri	Fourchette Crk. Big Spring Crk.	11.5 acres	9.09 acres	79%	80.00 funct. units
10 – Musselshell	Lavina Ryegate Roundup	25.3 acres	25.52 acres	101%	180.00 funct. units
11 – Milk	Big Sandy Musgrave Lake	36.64 acres	36.84 acres	101%	250.16 funct. units
12 – Lower Missouri	Vida Circle Plentywood-N	8.3 acres	4.94 acres	60%	40.40 funct. units
13 – Upper Yellowstone	Stillwater Vince Ames Wyola-Sunlight	18.92 acres	19.32 acres	102%	186.08 funct. units
14 – Middle Yellowstone	Lame Deer-East	3.29 acres	1.64 acres	50%	8.13 funct. units
15 – Lower Yellowstone	Crackerbox Crk.	1.2 acres	1.6 acres	133%	7.20 funct. units
16 – Little Missouri	American Colloid Ridgeway Wigeon Res.	56.6 acres	36.38 acres	64%	84.34 funct. units ⁵
Totals	32	360.59 acres	300.86 acres	83%	2,470.88 funct. units
Averages per site	--	11.27 acres	9.4 acres	--	77.22 funct. units

¹ Includes proposed "reserves" as well as impact-specific targets.

² Reflects 14.55 acre discrepancy between pre- and post-project delineation at Camp Creek mitigation site.

³ Accounts for post-monitoring agency negotiation that resulted in 19.6 acres of additional enhancement credit at Batavia WPA.

⁴ Wetland "credit" total includes 20.3 acres at Beaverhead Ranch that MDT may elect not to purchase from the landowner.

⁵ Does not include functional units from 15 reservoirs at the Ridgeway mitigation project, for which functional assessments were not conducted.

The current 60-acre discrepancy between target and credit figures is due to a few main factors. A primary consideration is that several sites (Musgrave Lake, Perry Ranch, Camp Creek, Hoskins Landing, American Colloid, Lame Deer, Peterson Ranch, South Fork Smith River, Ringling-Galt) were recently constructed and are just beginning to develop wetland characteristics. The Ringling-Galt site flooded for the first time in 2003, and vegetation has not yet responded. Another main consideration is that one of the larger sites, Batavia (29 acre target), did not appear to receive adequate hydrology in 2001-2003 due to drought conditions and diversion problems and was not delineated/monitored in its entirety in 2001-2003.

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.

A discussion of each mitigation site monitored in 2003 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 2)

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 2003, 0.69 acre of gross wetland area had developed at the mitigation site, which is comprised of 0.38 acre of shallow (<4' deep) open water and 0.31 acre of net wetland area. These are identical to 2002 results. Because the open water component is shallow with a potential for supporting emergent vegetation, the entire 0.69 acre should be credited as wetland area.

Functional assessment results are summarized in **Table 3** below. The American Colloid mitigation wetland rated as a Category II wetland in 2003 primarily due to the presence of a Montana Natural Heritage Program (MTNHP)-listed S1 species, the northern leopard frog.

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

2.2 Batavia Waterfowl Production Area (Missoula District, Year 3)

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 =	<u>10.0 acres</u>
		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 2003 were identical to 2002. Little wetland habitat has 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. A full delineation of the north and south cells is proposed for 2004 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. 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 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 2003 were unchanged from those in 2001 and 2002.

Table 4: Summary of Baseline and 2003 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	2003 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

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

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.

2.3 Beaverhead Gateway Ranch (Butte District, Year 3)

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 under a conservation easement. The wetland easement area is not 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.

2003 monitoring results were identical to 2002 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 indicated that they might not purchase the credits that have developed below the dike, and that the monitoring area may be reduced to the area above the dike in 2004. Consequently, available credit at the site ranges between 92.7 and 113 acres, depending on whether or not credits below the dike are purchased.

The functional assessment scores for 2003 were unchanged from 2001 and 2002. 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, which must be controlled under the Montana County Noxious Weed Control Act [7-22-2151].

Spoil piles left from ditch excavation will continue to be a weed source, a wind and water erosion hazard and a sedimentation source. This same issue applies to the dike and other poorly vegetated sites. The most effective remedy is to grade the spoil piles and revegetate them along with other sites needing revegetation. It may be necessary to treat these sites with organic matter or other amendments and plant desired native species.

Table 5: Summary of 2003 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	2003
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	Low (0.3)
Actual Points/Possible Points	8.8 / 12
% of Possible Score Achieved	73%
Overall Category	II
Total Acreage of Assessed Wetlands and Other Aquatic Habitats	118.2 ac
Functional Units (acreage x actual points)	1040.16 fu
Net Acreage Gain	112.8 ac
Net Functional Unit Gain	992.64 fu

Dike erosion and sediment production from the poorly vegetated shoreline should be monitored more closely by installing permanent markers or conducting periodic surveys. Examples of potential solutions to erosion problems include shoreline reinforcement, off-shore wave protection, protected off-shore plantings, and shoreline plantings.

2.4 Big Spring Creek (Billings District, Year 3)

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.

Approximately 9.71 wetland acres and 2.4 acres of non-wetland perennial stream channel occur within the monitoring area as of 2003. 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 1.85 wetland acres and 1.11 acres of non-wetland perennial stream channel, substantially improving fish habitat.

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 2003 were virtually unchanged from the 2001 and 2002 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 84 functional units (using the 1999 method), for a conservative gain of at least 55 functional units.

All stream banks were in good condition during the spring and mid-season visits. 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 2003 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			
	2003: Large Wetland Polygons Bisected by Creek Near North, East and South Ends of Site	2003: Isolated Wetland Depressions West of Creek	2003: 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.	9.11 wetland ac	0.54 wetland ac	0.06 wetland ac	7.86 wetland ac.
Functional Units (acreage x actual points)	81.1 fu	2.3 fu	0.3 fu	29.1 fu
Net Acreage Gain	Site currently supports 9.71 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 1.85 wetland acres and 1.1 acres of non-wetland perennial stream channel.			
Net Functional Unit Gain	Approximately 55 Functional Units			

2.5 Browns Gulch (Butte District, Year 3)

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.

Delineation results in 2003 were identical to 2001 and 2002 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 2003 as in 2001 and 2002.

Table 7: Summary of 2003 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	2003
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 2)

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. Turnstone Biological conducted the original wetland delineation and functional assessment for the Camp Creek proposed mitigation site in the summer of 2001.

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.

As of 2003, approximately 44.15 acres of wetland and 2.15 acres of open water (stream channel) occur on the MDT parcel and within the fenced portion of the Grasser parcel. This represents an approximate decrease of 19.02 wetland acres and an increase of 2.15 open water (stream channel) acres from baseline conditions. Functional units have decreased from 328.45 (pre-construction) to 319, an overall decrease in 9.45 functional points. A method of credit allocation for this site is being worked out between MDT and COE. As such, the current amount of credit applicable to this site is unknown.

Functional assessment results in 2003 were the same as those derived in 2002, although functional units decreased due to decreased wetland acreage. The two functional assessment areas evaluated for Camp Creek rated as Category II (high value) and Category III (moderate value) sites. Assessment areas were separated into the new channel/floodplain and emergent wetland not disturbed by construction. Category II ratings for the new channel/floodplain were primarily due to moderate ratings for wildlife/fish habitat, flood attenuation, and sediment/nutrient removal, and a high rating for production export/food chain support. Other factors contributing to this score were low to moderate ratings for sediment/shoreline stabilization, uniqueness, and recreation/education ratings.

Category III ratings for emergent wetlands were primarily due to moderate ratings for T&E species habitat, flood attenuation, surface water storage, and production export/food chain support. Other factors contributing to this score were low to moderate ratings for wildlife/fish habitat, MNHP species habitat, sediment/shoreline stabilization, uniqueness and recreation/education ratings. The site received a high rating for sediment/nutrient removal and groundwater discharge/recharge.

Pre-project and post-project wetland assessment scores are presented in **Table 8** below. Turnstone Biological conducted the initial wetland delineation and functional assessments for the Camp Creek Mitigation Site. Category ratings remained the same between the different assessments. Individual scores were higher during post-project evaluation than with the initial evaluation completed during 2001. Turnstone Biological separated the site into three assessment areas: emergent, scrub-shrub emergent and rock bottom wetland classifications. During the 2002 and 2003 evaluations, two of these areas were grouped into one assessment area; the scrub-shrub emergent and rock bottom types formed the channel/floodplain assessment area.

In general, most of the planted species exhibited strong survival rates in 2003. Eleven of thirteen species planted had survival rates ranging from 70% to 100% success. The two remaining species, Douglas-fir and red osier dogwood, exhibited a higher mortality rate. Almost all the Douglas-fir observed had died after initial planting; mortality is likely due to weak planting stock and lack of irrigation. Areas planted with upland species such as shrubby potentilla had a survival rate of approximately 70% and ponderosa pine had a 74% survival rate. Willows sprigged along the banks had an 83% success rate in the areas assessed. Other deciduous species located on floodplains such as aspen, cottonwood, alder, and birch had great success with averages near 100% survival.

Several noxious weeds are present including Canada thistle, hound's-tongue, and spotted knapweed, which must be controlled under the Montana County Noxious Weed Control Act [7-22-2151]. 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. A weed management plan for this site should be developed and implemented to control noxious weeds.

Table 8: Summary of Baseline and 2003 Wetland Function/Value Ratings and Functional Points at the Camp Creek Mitigation Project

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2001 Type I (Turnstone)	2001 Type II (Turnstone)	2001 Type III (Turnstone)	2003 Channel & Floodplain (LWC)	2003 Emergent Wetlands (LWC)
Listed/Proposed T&E Species Habitat	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)	High (0.8)	Low (0.1)
General Wildlife Habitat	Low (0.3)	Mod (0.5)	Mod (0.5)	Mod (0.7)	Mod (0.5)
General Fish/Aquatic Habitat	Low (0.1)	Low (0.1)	Mod (0.5)	Mod (0.7)	NA
Flood Attenuation	Mod (0.6)	Mod (0.5)	Mod (0.4)	Mod (0.5)	Mod (0.6)
Short and Long Term Surface Water Storage	Low (0.3)	Low (0.3)	High (0.8)	High (1.0)	Mod (0.6)
Sediment, Nutrient, Toxicant Removal	Mod (0.7)	Mod (0.7)	Mod (0.6)	Mod (0.6)	High (1.0)
Sediment/Shoreline Stabilization	Low (0.2)	Mod (0.6)	Low (0.3)	Low (0.3)	NA
Production Export/Food Chain Support	Mod (0.7)	Mod (0.7)	High (0.9)	High (1.0)	Mod (0.7)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Low (0.1)	Low (0.3)	Low (0.2)	Mod (0.4)	Low (0.3)
Recreation/Education Potential	Low (0.2)	Low (0.3)	Low (0.1)	Mod (0.5)	Mod (0.5)
Actual Points/Possible Points	5.1/12	5.9/12	6.2/12	8.3/12	6.1/10
% of Possible Score Achieved	42%	49%	52%	69%	61%
Overall Category	III	III	III	II	III
Total Acreage of Assessed Wetlands and Open Water within Easement	57.72 ac	1.59 ac	3.86 ac	16	30
Functional Units (acreage x actual points)	294.37 fu	9.38 fu	24.70 fu	132.8 fu	183 fu
Net Acreage Gain	NA	NA	NA	0 ac	0 ac
Total Functional Units At Site	328.45			315.8	
Total Functional Unit "Decrease"	Approximately 12.65 units				

Survival of plantings will continue to be monitored, and supplemental planting may need to be implemented if success of current plantings is low. Areas invaded by spotted knapweed along floodplain margins should be controlled and reseeded or planted with appropriate wetland species.

2.7 Circle (Glendive District, Year 3)

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 gross wetland area has remained stable since 2002 at 7.6 acres, which includes 2.98 acres of pre-existing wetlands and 1.18 acres of bare ground (mud flat) at the time of the investigation. The net wetland area in 2002 (excluding shallow open water) was 2.92 acres and in 2003 the net area (excluding mud flat) was 3.44 acres. In both 2002 and 2003, open water / temporarily bare substrate areas were included in "net gain" totals of 4.62 acres. Wetland vegetation is apparently

expanding into open-water/bare substrate areas. The lack of observed water in the wetland is the result of the late-season visit and drought; the dry condition of the wetland is not a negative factor given the causes. 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 2003.

Functional assessment results for 2003 are summarized in **Table 9** below, and were identical to 2002 results. The 1998 baseline functional assessment resulted in a Class III (43%) rating and the 2001 assessment resulted in a Class II (66%) rating. The 2002 and 2003 assessments indicate that the wetland has improved within the Class II rating (77%) since 2001. The entire wetland has increased 10.9 functional units since 2001. The mitigation site has been rated as a Category II wetland primarily as a result of the excellent general wildlife habitat, water storage, sediment removal, and potential for educational use.

Table 9: Summary of 2003 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	2003
Listed/Proposed T&E Species Habitat	Low (.3)
MNHP Species Habitat	High (.8)
General Wildlife Habitat	Exceptional (1)
General Fish/Aquatic Habitat	NA
Flood Attenuation	Moderate (.5)
Short and Long Term Surface Water Storage	High (.8)
Sediment, Nutrient, Toxicant Removal	High (1)
Sediment/Shoreline Stabilization	High (1)
Production Export/Food Chain Support	Moderate (.7)
Groundwater Discharge/Recharge	High (1)
Uniqueness	Moderate (.4)
Recreation/Education Potential	High (1)
Actual Points/ Possible Points	8.5/11
% of Possible Score Achieved	77%
Overall Category	II
Total Acreage of Assessed Wetlands within Monitoring Area	7.6 ac (2.98 pre-existing)
Total Functional Units (acreage x actual points)	64.6 fu
Net Acreage Gain (“new” wetlands)	4.62 ac
Net Functional Unit Gain (new acreage x actual points)	39.27 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 Cow Coulee (Butte District, Year 3)

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 2003 were identical to 2002 results. Approximately 2.94 acres of aquatic habitats occur on the site, inclusive of all open water components. Open water areas were a designed habitat feature. Subtracting the 0.07acre of pre-existing wetland, approximately 2.87 acres of aquatic habitat have been gained.

Functional assessment results in 2003 were virtually unchanged from the 2001 and 2002 assessments, and are summarized in **Table 10** 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 10: Summary of 2003 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	2003
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. A qualified hydraulics engineer would need to evaluate the site prior to making any site-specific recommendations. Options to be explored might include:

- Re-grading the existing delivery ditch.
- Lining the ditch with a less permeable substrate (e.g. clay, bentonite, concrete).
- Enlarging and re-setting all road culverts crossed by the ditch.
- Piping the water through losing reaches of the ditch or for the entire length.

2.9 Creston (Missoula District, Year 3)

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 2003 were identical to 2002 results. Approximately 5.2 acres of wetlands were present on the mitigation site. Based on pre-construction goals, two acres were to be enhanced and four 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. If precipitation patterns remain similar to 2001-2003 conditions, additional wetland development is unlikely.

Functional assessment results are summarized in **Table 11** 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 and 2002 assessments. A functional assessment was not conducted prior to site construction and therefore cannot be used for comparison.

Table 11: Summary of 2003 Wetland Function/Value Ratings and Functional Points at the Creston Mitigation Project

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2003
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

2.10 Fourchette Creek (Glendive District, Year 3)

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. This appears to have been achieved at Penguin, Flashlight, and possibly Pintail and Albatross reservoirs (during drawdown periods), but not at Puffin.

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, approximately 6.13 acres of aquatic habitats have been created, inclusive of all open water components. Approximately 4.66 acres of “wetlands” have been created, inclusive of minor open water components associated with Penguin and Flashlight reservoirs. Approximately 25 functional units have been created at the site to date. The maximum assignable credit at this site as of 2003, inclusive of all open water areas, is approximately 6.13 acres.

Functional assessment results for 2003 are summarized in **Table 12** below and are similar to 2001 and 2002 results, although the score for Pintail Reservoir increased slightly due to increased inundation. Penguin and Flashlight rated as Category II wetlands, primarily due to high sensitive species habitat (northern leopard frog) ratings. 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, based on past MDT observations, Flashlight provides a degree of fish habitat. Wildlife habitat, surface water storage, sediment/nutrient/toxicant removal, shoreline stabilization, and food chain support are prominent functions at these sites.

Pintail and Albatross rated as Category IV wetlands. This was primarily due to low vegetative diversity, high disturbance (grazing), and low acreage of actual wetlands present within these assessment areas. Surface water storage is a prominent function at these sites. It should be noted that sediment/nutrient/toxicant removal received a low rating due to the extreme turbidity (impairment) and lack of wetland vegetation at these sites. A wetland functional assessment was not conducted at Puffin due to the absence of wetlands at this site. According to MDT, the site is periodically used as an elk wallow, but contained a dozen cattle during 2002 and 2003 monitoring.

Based on functional assessment results, approximately 25 functional units have been gained at the Fourchette Creek mitigation site, a gain of 4 functional units since 2002.

Puffin Reservoir has developed no wetlands, presumably due to the depth of excavation and steep gradient of side slopes. As discussed in the 2001 and 2002 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 & 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 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.

Table 12: Summary of 2003 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)	NA (no wetlands)
MNHP Species Habitat	High (1.0)	High (1.0)	Low (0.2)	Low (0.1)	NA (no wetlands)
General Wildlife Habitat	High (0.8)	High (0.8)	Mod (0.7)	Low (0.3)	NA (no wetlands)
General Fish/Aquatic Habitat	NA	Mod (0.5)	NA	NA	NA (no wetlands)
Flood Attenuation	Low (0.2)	Low (0.2)	Low (0.2)	Low (0.2)	NA (no wetlands)
Short and Long Term Surface Water Storage	Mod (0.6)	Mod (0.6)	Mod (0.6)	Mod (0.6)	NA (no wetlands)
Sediment, Nutrient, Toxicant Removal	Mod (0.5)	Mod (0.5)	Low (0.3)	Low (0.3)	NA (no wetlands)
Sediment/Shoreline Stabilization	Mod (0.6)	Mod (0.6)	Low (0.2)	Low (0.2)	NA (no wetlands)
Production Export/Food Chain Support	Mod (0.7)	Mod (0.7)	Low (0.3)	Low (0.3)	NA (no wetlands)
Groundwater Discharge/Recharge	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)	NA (no wetlands)
Uniqueness	Low (0.2)	Low (0.2)	Low (0.2)	Low (0.2)	NA (no wetlands)
Recreation/Education Potential	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)	NA (no wetlands)
Actual Points/Possible Points	5.1 / 11	5.6 / 12	3.2 / 11	2.7 / 11	NA (no wetlands)
% of Possible Score Achieved	46%	47%	29%	25%	NA (no wetlands)
Overall Category	II	II	IV	IV	NA (no wetlands)
Total Acreage of Assessed Aquatic Habitats within Easement	1.75 ac	1.52 ac	1.60 ac	0.92 ac	0.20 ac (OW only)
Functional Units (acreage x actual points)	8.9 fu	8.5 fu	5.12 fu	2.48 fu	NA (no wetlands)
Net Acreage Gain	1.75 ac	1.52 ac	1.60 ac	0.92 ac	0.34 ac (OW only)
Net Functional Unit Gain	8.9 fu	8.5 fu	5.12 fu	2.48 fu	NA (no wetlands)
Total Functional Unit "Gain"	25 Total Functional Units				

2.11 Hoskins Landing (Missoula District, Year 2)

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 through 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 11.35 acres of wetland and 1.14 acres of open water occur on the mitigation site, an increase of 0.36 wetland acre since 2002. Subtracting the original 6.67 acres of pre-project wetlands from this total yields a current net of approximately 5.82 wetland/open water acres. It is likely that additional acreage will form with additional time and more normal precipitation. Additionally, approximately 51.33 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 13** below. Functional assessment results for 2003 were identical to 2002 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 82.55 functional units occur at the Hoskins Landing mitigation site. However, it should be noted that direct comparison between the baseline and 2003 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 and 2003 assessments were conducted using the most current (1999) version.

Survival rates for native shrub plantings were assessed during the summer of 2003. Two upland plantings areas were evaluated; the upland islands and access road sites. Survival rates for the upland islands ranged from 58% to 80% for the tree species and 60% to 81% for the shrub species. The access road site had a survival rate of 60% for tree species and a range of 0% to 40% for the shrub species.

Two wetland-planting areas were also evaluated; the created open water fringe and backwater channel. Survival rates for the pond fringe area ranged from 37% to 55% for the tree species and 29% to 81% for the shrub species. Areas located around the open water fringe were also sprigged with sandbar willow cuttings. Survival rates for the cuttings were the highest out of any revegetation efforts conducted on site. The survival rate for sandbar willow was 98%.

Table 13: Summary of Baseline and 2003 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)	2003 Site 5 (1999 Method)	2003 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)	Low (0.3)
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 (0.9)
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	6.7 / 12
% of Possible Score Achieved	55%	53%	44%	57%	28%	26%	28%	55%
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 ac	12.20 ac
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 fu	81.74
Total Acreage at Site	6.67 ac						12.49 ac	
Total Functional Units at Site	31.22 fu						82.55 fu	
Net Acreage Gain	NA						5.82 ac	
Net Functional Unit Gain	NA						51.33 fu	

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 2003 delineation.

Low survival rates found in the upland islands could be due to the lack water and maintenance of new seedlings. An irrigation system was present on site, but was not operational. For species located along the excavated wetland fringes, where adequate water supply was available, mortality is mostly due to weak planting stock.

Weed control activities were observed during the early-season visit. Several noxious weeds were present including Canada thistle, hound's-tongue, and spotted knapweed that must be controlled under the Montana County Noxious Weed Control Act [7-22-2151]. Some barren soils are still present in certain areas and should be seeded or planted with additional native species. Areas where plantings failed or had low survival should be replanted with new seedlings of species that exhibited higher survival rates.

2.12 Johnson-Valier (Great Falls District, Year 3, Final Year)

The Johnson-Valier wetland mitigation site was constructed in 1994 to mitigate wetland impacts associated with MDT projects F 44-1(3)14 (Valier-East), F 44-1(7)0 (Valier-West), and other projects in Watershed 8 (Marias). The Valier-East and Valier-West projects resulted in a combined wetland loss of approximately 17 acres. The mitigation site is located approximately 2 miles northwest of Valier. The entire site occurs in Pondera County.

The intent of the project was to create three impoundments: a main impoundment, which would hold approximately 19.9 acres of surface water at capacity (3-foot depth), and two smaller impoundments ranging in size between 4.1 and 4.8 acres at maximum capacity (2-foot depth). The total projected surface water area at the site was 28.8 acres.

The exact area of wetlands to be created was left to be determined during future monitoring, although “approximately 28 acres” of created wetlands were specified in the 1994 Wetland Development Agreement. The total projected surface water area at the site was 28.8 acres; however, the diagram referenced in calculating this 28.8 acres actually shows 25.4 surface water acres.

An approximate 2.5-acre remnant wetland pothole occurred in the area of the main impoundment prior to project construction. This area was to be subtracted from total wetland acreage credit unless determined that its wetland functions have been improved.

No specific performance criteria were required to be met at this site in order to document its success. The project was designed to support waterfowl and wetland communities while also providing habitat for upland game birds, ungulates, furbearers, predators, amphibians, songbirds, and small mammals. It was also expected that an increasing diversity of invertebrates would benefit from shallow impoundments over time. Based on 2001, 2002, and 2003 monitoring results, most of these goals have been achieved. Wetland hydrology was improved in 2002 over 2001, and in 2003 over 2002, increasing the overall habitat value at the site.

As the project stands, approximately 22.63 acres of wetlands and open water presently occur on the site. This figure has not changed between 2001 and 2003, indicating that the site has more or less stabilized from a wetland development standpoint. Consequently, 22.63 acres is presently the maximum assignable credit at this site.

Functional assessment results are summarized in **Table 14** below. The 2003 scores and ratings increased slightly over those calculated in 2001 and 2002. This was primarily due to increased inundation throughout the site, which improved ratings for wildlife habitat and other functions.

Table 14: Summary of 2003 Wetland Function/Value Ratings and Functional Points at the Johnson - Valier Mitigation Project

Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method	Wetland Sites		
	Main Impoundment	Southwest and Northeast Impoundments	Two Small Depressions Outside of Main and SW Impoundments
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.0)	Low (0.0)
MNHP Species Habitat	High (0.8)	High (0.8)	Low (0.1)
General Wildlife Habitat	High (0.9)	Mod (0.5)	Low (0.2)
General Fish/Aquatic Habitat	NA	NA	NA
Flood Attenuation	Mod (0.6)	Mod (0.5)	NA
Short and Long Term Surface Water Storage	High (0.9)	Low (0.3)	Low (0.2)
Sediment, Nutrient, Toxicant Removal	High (1)	High (1.0)	NA
Sediment/Shoreline Stabilization	Mod (0.6)	NA	NA
Production Export/Food Chain Support	High (0.8)	Mod (0.7)	Low (0.3)
Groundwater Discharge/Recharge	Low (0.1)	Low (0.1)	Low (0.1)
Uniqueness	High (0.8)	Low (0.3)	Low (0.3)
Recreation/Education Potential	Low (0.3)	Low (0.3)	Low (0.1)
Actual Points/Possible Points	7.1 / 11	4.5 / 10	1.3 / 8
% of Possible Score Achieved	65%	45%	16%
Overall Category	II	III	IV
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries	16.99 ac	5.05 ac	0.59 ac
Functional Units (acreage x actual points)	121 fu	23 fu	1 fu
Net Acreage Gain	16.99 – 2.5 = 14.49 ac	5.05 ac	0.59 ac
Net Functional Unit Gain	103 fu	23 fu	1 fu
Total Functional Unit “Gain”	127 Total Functional Units		

The main impoundment of the mitigation site again rated as a Category II site, primarily due to high ratings for wildlife habitat, MNHP species habitat (northern leopard frog), surface water storage, nutrient/toxicant removal, food chain support, and uniqueness. Due to increased inundation, a *Potamogeton pectinatus/Myriophyllum spicatum* community, which is rated as a possibly “critically imperiled” wetland community type by the MTNHP, appeared at the site, increasing the uniqueness rating.

The southwest and northeast impoundments again rated as Category III sites, although the scores at the northeast impoundment greatly improved in 2003 due to increased inundation. The small depressions outside of the main cells again rated as Category IV (low value) sites. This was primarily due to low vegetative diversity and low acreage of actual wetlands present.

Based on functional assessment results, approximately 127 functional units have been gained thus far at the Johnson-Valier mitigation site, a gain of 20 functional units over 2002.

2.13 Lame Deer (Glendive District, Year 2)

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 school mitigation site wetland was constructed in July/August 2001 and is in the initial stages of developing hydric characteristics. The south and north cells have developed 0.84 acre of wetlands as of July of 2003. Wetland acreage within wetlands 369 and 380 was 0.8 acre. Total gross wetland acreage at the three sites is 1.64 acres.

Functional assessment of the school and creek monitoring sites are summarized in **Table 15** 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 site scored as a Category III wetland in 2003, primarily as a result of a high rating in the groundwater discharge parameter and moderate ratings for five other variables, including: sediment removal, water storage, and wildlife variables. Wetlands 369 and 380 also rated as Category III wetlands. To date, the school and creek mitigation sites have gained 8.13 functional units.

Table 15: Summary of Baseline and 2003 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	2003 School Site	2003 W-369	2003 W-380
Listed/Proposed T&E Species Habitat	Low (.3)	Low (0)	Low (0)	Low (0)
MNHP Species Habitat	Low (0)	Low (0)	Low (0)	High (.8)
General Wildlife Habitat	High (.7)	Mod (.5)	High (.8)	High (.8)
General Fish/Aquatic Habitat	NA	NA	Mod (0.6)	Mod (0.6)
Flood Attenuation	Mod (.4)	Low (.2)	Low (.1)	Low (.1)
Short and Long Term Surface Water Storage	-	Mod (.6)	Mod (.4)	Mod (.4)
Sediment, Nutrient, Toxicant Removal	High (1)	Mod (.7)	Mod (.6)	Mod (.6)
Sediment/Shoreline Stabilization	Mod (.7)	NA	Low (0.3)	Low (0.3)
Production Export/Food Chain Support	High (.8)	Mod (.5)	Mod (.6)	Mod (.6)
Groundwater Discharge/Recharge	NA	High (1)	High (1)	NA
Uniqueness	Mod (.5)	Low (.3)	Low (.3)	Low (.3)
Recreation/Education Potential	Mod (.5)	Mod (.5)	High (1)	High (1)
Actual Points/Possible Points	4.9/9	4.3/10	5.7/12	5.5/11
% of Possible Score Achieved	54%	43%	48%	50%
Overall Category	III	III	III	III
Total Acreage of Assessed Wetlands within Monitoring Area	20-30	0.84	0.57	0.23
Total Functional Units (acreage x actual points)	-	3.61	3.25	1.27
Net Acreage Gain (“new” wetlands)	-	0.84	0.57	0.23
Net Functional Unit Gain (new acreage x actual points)	-	3.61	3.25	1.27
Total Functional Unit Gain 2003			8.13 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 requires no maintenance. It remains unknown how much hydrology will be provided by groundwater to the north cell; groundwater is the primary water source. At flood stage, Lame Deer Creek may enter the north cell but must surpass the surrounding berm to flood the cell. The rate of wetland development in the north cell will indicate if groundwater is providing sufficient hydrology.

2.14 Musgrave Lake (Great Falls District, Year 3)

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 two “enhancement” sites. 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 Corps of Engineers (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 (MLR 2001) and tentatively approved by the COE (2001), 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.

Inclusive of open water/transitional areas at RS1, approximately 20.64 wetland/aquatic habitat acres have been “restored” on the mitigation site to date, an increase of 4.74 acres over 2002 totals. Wetland fringes were continuing to develop below the RS1 northwest dike in addition to pre-existing wetlands associated with the ditch, as well as along the south border of the impoundment in forested areas. “Open water/transitional” areas at RS1 consist of recently flooded wetland and previously-mapped upland areas that were under from one to an estimated four feet of water during the mid-season visit. Rooted vegetation in these areas was not observable due to water depth/turbidity. These areas are expected to develop emergent or aquatic bed wetland vegetation over the next few years.

Approximately 3.81 wetland acres were gained at RS2 due to increased inundation. Slight wetland expansion (0.18 acre) occurred along the south border of ES1 (along the dike) in 2003. 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 2003 is approximately $20.64 + 1.66 + 0.75 = 23.05$ acres.

Functional assessment results are summarized in **Table 16** 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 improved in 2003 at RS1, RS2, and ES1 due to dramatically increased inundation.

Net functional unit gain nearly doubled at the mitigation site from 74.44 units in 2002 to 143.26 units in 2003. This was due to increased wetland area at RS1 and ES1, increased wildlife habitat scores at all sites, and documentation of northern leopard frog habitat at all three sites. All three sites rated as Category II wetlands in 2003.

All dikes were in good condition during the spring and mid-season visits, although the culvert between ES1 and RS2 had been removed between the May and July monitoring visits. This did not appear to affect the inundation extent at either ES1 or RS2.

Table 16: Summary of 2003 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)	2003 RS1	2003 RS2	2003 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 (0.8)	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 (0.5)	Mod (0.5)	Mod (0.5)
Short and Long Term Surface Water Storage	High (1)	Low (0.2)	Low (0.3)	High (0.9)	Mod (0.6)	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] ¹	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 (0.3)	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	6.5 / 10	6.7 / 11	7.6 / 12
% of Possible Score Achieved	66%	22%	37%	65%	61%	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)	14.07 ac	6.39 ac	4.98 ac
Functional Units (acreage x actual points)	42.9 fu	9.18 fu	19.68 fu (ES1)	91.46 fu	42.81 fu	37.85 fu
Net Acreage Gain	NA	NA	NA	9.48 ac	6.39 ac	0.18
Net Functional Unit Gain	NA	NA	NA	82.28 fu	42.81 fu	18.17 fu
Total Functional Unit "Gain" over baseline	143.26 Total Functional Units; 125.09 at restoration wetlands; 18.17 at enhancement wetlands (ES1 only)					

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.

2.15 Perry Ranch (Great Falls District, Year 2)

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 2.3 acres of wetland occurred at the inner oxbow prior to construction, while approximately 1.1 acres occurred at the outer oxbow. The 27.6-acre mitigation figure is inclusive of these 3.4 acres of existing wetlands. Consequently, the goal for net wetland gain at the site is $27.6 - 3.4 = 24.2$ acres. To date, the site has netted $12.41 - 3.4 = 9.01$ wetland acres and 6.2 open water/mudflat acres, for a total of 15.21 acres of aquatic habitats, a gain of 0.69 acre since 2002. This is presently the maximum assignable credit at this site as of 2003.

Functional assessment results are summarized in **Table 17** below. Forms were prepared for the inner and outer oxbows. No functional assessment was conducted at the stand-alone open water/mudflat area at the north end of the site due to the absence of wetlands in this area.

Results in 2003 were identical to 2002 results. The inner oxbow rated as Category III site, while the outer oxbow 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. 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. Approximately 71 functional units have been gained at this site, a gain of 5 functional units since 2002.

Several dike problems were noted during the 2002 summer visit, but these were repaired during 2003. An approximate 150-foot long section of fence was down during the May and July 2003 visits, allowing cattle free access to the site. The fence was repaired by the time the October visit was conducted.

Table 17: Summary of 2003 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)	2003 Inner Oxbow Post-construction (1999 method)	2003 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)	High (0.9)
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	7.1 / 10
% of Possible Score Achieved	44%	27%	61%	71%
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*	6.36 ac
Functional Units (acreage x actual points)	10.12 fu	2.97 fu	38.31 fu	45.16 fu
Net Acreage Gain	NA	NA	6.28 – 2.3 = 3.98 ac*	6.36 – 1.1 = 5.26 ac
Net Functional Unit Gain	NA	NA	38.31 - 10.12 = 28.19 fu	45.16 – 2.97 = 42.9 fu
Total Functional Unit "Gain"	71.09 Total Functional Units			

* Includes 0.23 acre of adjacent open water / mudflat

2.16 Peterson Ranch (Missoula District, Year 2)

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. Turnstone Biological conducted the original wetland delineation for the Peterson Ranch in 1998.

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 through 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 21.61 acres of wetland and 1.90 acres of open water occur on the mitigation site, for a total of 23.51 acres of aquatic habitat. Subtracting the original 22.6 acres of pre-project wetlands from this total yields a current net of approximately 0.91 wetland/open water acres, a slight decrease (0.84 acre) from 2002 results. 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 74 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 three 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 (AA's) for purposes of functional assessment. These areas included the created wetland 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 ponds #3, 4 and 5 with associated emergent vegetation east of the irrigation ditch (AA 3). Pond #2 was not included during 2002 assessment of these areas, but was included in 2003 due to the development of emergent vegetation class around pond fringe. A complete breakdown of ratings for each assessment area and pre-project assessments areas are presented in **Table 18** below.

Table 18: Summary of Baseline and 2003 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)	2003 AA 1 (1999 Method)	2003 AA 2 (1999 Method)	2003 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 ac	3.0 ac	13.16 ac
Functional Units (acreage x actual points) by AA	67.8 fu	41.16 fu	19.2 fu	81.59 fu
Total Acreage of Assessed Wetlands and Open Water on Site	22.6 ac	23.51 ac		
Total Functional Units on Site	67.8 fu	141.95 fu		
Net Acreage Gain (assessed wetlands and open water only)	NA	0.91 ac		
Net Functional Unit Gain	NA	74.11 fu		

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.



Based on functional assessment results, approximately 141.95 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 and 2003 assessment was conducted using the most current (1999) version. The site has gained approximately 75.5 functional units to date.

Planted woody species survival data were collected for the Peterson Ranch. In general, species survival was good except for two species, silverberry and red osier dogwood, which exhibited low survival rates of 28% and 38%. The following species had higher survival rates: woods rose (90%), golden current (99%), and chokecherry (81%). In general most of the observed willow sprigs were alive and exhibited survival rate of approximately 80%. Plantings were difficult to find during the 2003 monitoring due to extensive herbaceous cover of upland grass species. The plantings that were located exhibited 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 that must be controlled under the Montana County Noxious Weed Control Act [7-22-2151].

2.17 Rey Creek (Butte District, Year 3, Final Year)

The Rey Creek mitigation site is located approximately 2.5 miles west of the town of Logan and approximately 1.5 miles east of Three Forks in Gallatin County. The project site is located within Watershed 6(Upper Missouri), Section 28, Township 2 North, Range 2 East. The wetland is situated south and adjacent to Frontage Road (Hwy 10) and north of Interstate-90 and the Burlington Northern railroad tracks; the ponds were constructed in what was historically a railroad bed. Construction was completed in September of 1999. The Rey Creek mitigation wetland was developed adjacent to a perennial stream, Rey Creek, to mitigate wetland impacts associated with replacement of the onsite culvert and safety improvement to Hwy 10. The elevation of the site is approximately 4,077 feet above sea level.

Two off-stream impoundments were created adjacent to Rey Creek south of Hwy. 10 and were designed to capture seasonal high water flows. The impoundments were constructed without permanent control structures and have inlets originally designed at elevations to facilitate movement of high water flows into the created wetlands.

Impoundment #1, located on the east side of Rey Creek, was designed to hold approximately 8,438 ft² of standing water. This eastern impoundment has a direct connection to the stream via an inlet and an outlet channel. Impoundment #2, located on the west side of Rey Creek, was designed to hold approximately 7,680 ft² of standing water. This impoundment is separated from the stream by a riprapped inlet which allows the capture of overflow; the inlet functions as an

outlet during high flows and allows the impoundment some degree of turnover. The Rey Creek site was designed to mitigate for specific wetland functions impacted by MDT roadway projects. These functions include: storm water retention, roadway runoff filtration, sediment and nutrient retention, water quality, groundwater recharge, and wildlife habitat.

Wetlands and/or waters of the U.S. that were impacted during the removal of the Hwy. 10 bridge and installation of the culvert totaled 0.27 acre; no wetlands or waters of the U.S were impacted to create these two mitigation impoundments. Mitigation wetland acreage totaled 0.52 acre for the 2003 season; no increase in total area was observed since 2002. However, emergent vegetation area has increased within the wetland boundary.

Although both impoundments have open water components, the depth is likely estimated at <6 feet. Obligate wetland species continue to encroach into the open water; credit for the entire 0.52 acre of wetland and waters of the U.S. should be considered for the entire site within the delineation boundary. Assuming this, the Rey Creek site has met its numeric and functional objectives. The initial 0.27-acre loss has been mitigated with a 0.52-acre project, resulting in an “excess” of 0.25 acre of mitigation credit.

Functional assessment results are summarized in **Table 19** below. The two cells were assessed together along with the open-water component of the stream. The mitigation site ranked as a Category III wetland site but has improved since 2001. The site ranked moderately for wildlife but scored high for sediment/nutrient/toxicant removal as well as groundwater discharge/recharge. Functional units increased from 2.75 in 2001 to 3.38 in 2003, an 18% increase.

Table 19: Summary of 2003 Wetland Function/Value Ratings and Functional Points at the Rey Creek Wetland Mitigation Project

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2003
Listed/Proposed T&E Species Habitat	Low (.3)
MNHP Species Habitat	Low (.1)
General Wildlife Habitat	Moderate (.5)
General Fish/Aquatic Habitat	Moderate (.7)
Flood Attenuation	Low (.15)
Short and Long Term Surface Water Storage	Moderate (.4)
Sediment, Nutrient, Toxicant Removal	High (.95)
Sediment/Shoreline Stabilization	High (1)
Production Export/Food Chain Support	Moderate (.6)
Groundwater Discharge/Recharge	High (1)
Uniqueness	Low (.3)
Recreation/Education Potential	Moderate (.5)
Actual Points/Possible Points	6.5/12
% of Possible Score Achieved	54%
Overall Category	III
Total Acreage of Assessed Wetlands within Easement	0.52
Functional Units (acreage x actual points)	3.38 fu
Net Acreage Gain (Includes stream segment)	0.52 ac
Net Functional Unit Gain	3.38 fu
Total Functional Unit “Gain”	3.38 Total FU

No maintenance was required at the site.

2.18 Ridgeway Complex (Glendive District, Year 3)

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, in Section 36, Township 4 South, Range 57 East and Sections 31-35, Township 4 South, Range 58 East. 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 2003 monitoring purposes, Wetland #9 (W-9) was sampled for the third season according to the full sampling protocol on July 12, 2003. 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 2003 site visit.

In 2003, wetland acreage within the entire complex was estimated at 9.97 acres and open water acreage totaled 17.63 acres. The total acreage of open water and wetland habitat was estimated at 27.60 acres, approximately 55% of the 50-acre shallow waterfowl habitat goal.

Functional assessment was only conducted at Wetland #9. Wetland #9 rated as a Category II wetland because of its high function and value in the MTNHP species category. Functional points have increased slightly since 2002. Other high ratings occurred in the following categories: short and long-term surface water storage, groundwater discharge/recharge, sediment/nutrient/toxicant removal, and sediment/shoreline stabilization.

No maintenance needs were observed for W-9. Five of the 16 constructed impoundments at the time of investigation did not contain water, which in part is a result of the drought, but may also be a result of construction methods and/or borrow pit and berm locations. All of the borrow pits are nearly square and do not blend into the drainage landscape. Blending the constructed wetlands into the landscape may enable the depression to capture more water in a controlled manner while providing more substrate for shallow open-water areas; generally the elongated shallows colonize more readily with diverse wetland vegetation communities. The berm at Site 16 had a large trench on the west end excavated by stormwater flow.

Table 20: Summary of 2003 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	2003
Listed/Proposed T&E Species Habitat	Low (0)
MNHP Species Habitat	High (1.0)
General Wildlife Habitat	Mod (0.5)
General Fish/Aquatic Habitat	NA
Flood Attenuation	Mod (0.5)
Short and Long Term Surface Water Storage	High (.9)
Sediment, Nutrient, Toxicant Removal	High (1.0)
Sediment/Shoreline Stabilization	High (.9)
Production Export/Food Chain Support	Mod (0.6)
Groundwater Discharge/Recharge	High (1.0)
Uniqueness	Low (0.3)
Recreation/Education Potential	Mod (0.5)
Actual Points/Possible Points	7.2/11
% of Possible Score Achieved	65%
Overall Category	II
Total Acreage of Assessed Wetlands within Easement	3.41 ac
Functional Units (acreage x actual points)	25.55 fu
Net Acreage Gain	3.41 ac
Net Functional Unit Gain	25.55 fu
Total Functional Unit "Gain"	25.55 fu

2.19 Ringling-Galt (Butte District, Year 2)

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 and 2003, but was not monitored in 2002 due to extreme drought conditions and lack of surface water.

Despite the fact that water was temporarily 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. As no wetland habitat occurs within the monitoring area, a functional assessment form was not completed for this site. Continued inundation in 2004 and beyond 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.

2.20 Roundup (Billings District, Year 3)

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 m³, and 17,825 m³ 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 2003 delineation showed a total of 22 acres of developing aquatic habitats. Of that, 5.42 acres are shallow, open water and 5.49 acres are intermittently exposed soil (mudflat) for a net emergent wetland area of 11.09 acres. The site is three years old and is anticipated to develop more emergent vegetation over time as water levels increase. 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 21** below. The site rated as an overall Category II wetland and scores 154.0 functional units. This represents an increase of approximately 213% since 2001, but only a 3% 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 if a willow shrub community were introduced. Wetland shrubs would survive very well within the saturation zone of the north lagoon.

Table 21: Summary of 2003 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	2003 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	Moderate (.6)
Short and Long Term Surface Water Storage	High (1)
Sediment, Nutrient, Toxicant Removal	Moderate (.7)
Sediment/Shoreline Stabilization	High (1)
Production Export/Food Chain Support	Moderate (.6)
Groundwater Discharge/Recharge	Low (.1)
Uniqueness	Low (.3)
Recreation/Education Potential	High (1)
Actual Points/ Possible Points	7/11
% of Possible Score Achieved	63%
Overall Category	II
Total Acreage of Assessed Wetlands within Easement	22 ac
Functional Units (acreage x actual points)	154.0 fu
Net Acreage Gain	22 ac
Net Functional Unit Gain	154.0 fu
Total Functional Unit "Gain"	154.0 fu

Based on LWC's 2003 monitoring data, kochia dominates this mitigation site. Effective weed control for 2004 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 reseeded 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.

2.21 South Fork Smith (Butte District, Year 2)

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.

No net gain or loss of wetland habitat was documented on the site in 2003. 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. As anticipated, the narrow open-water thalweg in the stream became more definitive as vegetation in the channel died off. Some

wetland expansion seems probable over time, but will be limited by the deeply incised S.F. Smith River channel.

Functional assessment results are summarized in **Table 22** 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 22: Summary of Baseline & 2003 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 - 2003
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, its banks, and the surrounding uplands is limiting the extent to which restoration can occur on the site. Fencing of the stream corridor would allow for the re-establishment of woody vegetation along the creek, help protect stream banks from trampling, and improve the overall health of the system. Function and value ratings would also increase substantially, thus generating considerably more functional units from the site.

2.22 Stillwater River (Billings District, Year 3)

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 almost 100% of the wetland and open water circumference. Submerged aquatic vegetation has apparently colonized most of the open water area. The gross wetland boundary encompasses 9.39 acres and includes 6.29 acres of shallow open water (<6 feet deep) and 3.1 acres of wetlands. The gross aquatic acreage has increased 0.9 acre since 2001 monitoring, and net wetland acreage has increased 1.15 acres.

MDT anticipated creating 10.69 acres of wetland within the 20-acre conservation easement. The mitigation efforts have thus far resulted in 9.39 gross wetland acres or 88% of the goal (the 10.69-acre goal included the pre-existing wetlands). Subtracting the original wetland impact that resulted from the wetland creation, 3.77 acres, the new net acreage of aquatic habitats totals 5.62 acres.

Functional assessment results are summarized in **Table 23** below. The wetland attained a Category 1 rating in 2003. 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 approximately 80 points over baseline conditions due to several high to exceptional ranking variables.

All inflow and outflow structures were functioning, however some beaver debris was observed in the structures. Only two wood duck boxes could be located and one of these is poorly hung (near northwest boundary). The fence around the wetland was intact. The site has three State of Montana Noxious Weeds (Canada thistle, spotted knapweed, and leafy spurge) and one on the Stillwater County list (mullein). Active control measures are recommended for knapweed and spurge. Lastly, the cottonwood forest appears to be diminishing as a result of beaver kill and inevitably will likely be negatively affected by the expanding saturation zone. Discussion regarding the future of the cottonwood forest as it relates to the wetland mitigation goals is warranted.

Table 23: Summary of Baseline and 2003 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 2003
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 (0.6)
Recreation/Education Potential	Low (0.1)	High (1.0)
Actual Points/Possible Points	5/10	10.1/12
% of Possible Score Achieved	50%	84%
Overall Category	III	I
Total Acreage of Assessed Wetlands within Easement	3.77	9.39 ac
Functional Units (acreage x actual points)	15fu	94.84 fu
Net Acreage Gain	NA	9.39 ac
Net Functional Unit Gain	NA	94.84 fu
Total Functional Unit "Gain"	NA	94.84 fu

2.23 Wigeon Reservoir (Glendive District, Year 3)

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 8.09 acre gross "aquatic area" boundary encompasses 2.5 acres of emergent wetland (which is comprised of an estimated 50% bare mud substrate) and 5.6 acres of open water of 1-6 feet depth. 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 24** below. The wetland ranks as a Category II wetland due to the presence of the MTNHP species of special concern, the leopard frog, during 2001 and 2003. The diversity of wildlife that use the reservoir is high as evidenced by the high diversity of waterfowl, amphibians, and reptiles observed. However, because the disturbance is high due to grazing, ratings are still suppressed in several categories. Functional units decreased 3 points in 2003 because of a lower rating in sediment stabilization as a result of the lack of deep-rooted vegetation along the shoreline.

Table 24: Summary of 2003 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	2003
Listed/Proposed T&E Species Habitat	Low (0)
MNHP Species Habitat	High (1)
General Wildlife Habitat	Moderate (.7)
General Fish/Aquatic Habitat	Moderate (.6)
Flood Attenuation	Moderate (.5)
Short and Long Term Surface Water Storage	High (1)
Sediment, Nutrient, Toxicant Removal	Moderate (.7)
Sediment/Shoreline Stabilization	Moderate (.3)
Production Export/Food Chain Support	Moderate (.6)
Groundwater Discharge/Recharge	High (1)
Uniqueness	Low (.2)
Recreation/Education Potential	Low (.2)
Actual Points/Possible Points	6.8/12
% of Possible Score Achieved	56%
Overall Category	II
Total Acreage of Assessed Wetlands within Easement	8.09 ac
Functional Units (acreage x actual points)	55 fu
Net Acreage Gain	8.09 ac
Net Functional Unit Gain	55 fu
Total Functional Unit "Gain"	55 fu

The wetland remains a Category II site because of the presence of the northern leopard frog. However, the site has lost functional points since 2002 as a result of drought and large ungulate pressure (cattle) in the fragile saturated zones. Grazing and trampling pressure around the entire circumference of the reservoir has decreased the viability of the hydrophytic plant community. Fencing the reservoir from cattle access while providing 3-4 watering access points is recommended.

Attachment A

TABLE 1

*MDT Wetland Mitigation Monitoring
2003 Executive Summary*

Table 1: Summary of MDT Wetland Mitigation Sites Monitored 2001 - 2003

Site	Year Built	Major MT Watershed Basin	Pre-Project Wetland Acreage and MDT Category	Target Wetland Credit	2003 Wetland / Open Water Acreage and MDT Category	Enhancement Credit (ratio)?	Upland Credit (ratio)?	Total Acreage and Functional Unit Gain as of 2003	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.	Third monitoring year. Similar results as 2002. 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 2003. 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	63.17 ac Category III	11.4 acre minimum (see comments)	44.15 ac wetland 2.15 ac channel	None specified	None specified	Loss of 19.02 ac wetland Gain of 2.15 ac channel Loss of 12.65 fu	Second 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. Lost 2.23 wetland acres along channel floodplain since 2002.
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	Third monitoring year. Same results as 2001 and 2002. 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)	12.49 ac Category III (12.2 ac), IV (0.29 ac) 82.55 fu	None specified	None specified	5.82 ac created 51.33 fu	Second monitoring year. Gain of 0.36 wetland acres since 2002. Planting at adjacent uplands was accomplished in 2003. Currently at 72% of wetland acreage goal. Weed control and elimination of cattle grazing (fencing adjustment) are recommended.
Peterson Ranch	2002	2 - Upper Clark Fork	22.6 ac Category III 67.8 fu	17.5 ac	23.51 ac Category III 141.95 fu	None specified	None specified	0.91 ac 74.11 fu	Second monitoring year. Lost 0.84 acre in 2003. 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	118.2 ac Category II 1040.16 fu	NA	NA	113 ac 992.6 fu	Third monitoring year. Same results as 2001 and 2002. Excellent site with heavy wildlife use. Project goal of 52 acres doubled (217% of goal). Some erosion occurring along dike faces; grazing may be affecting woody vegetation development. The wetland "credit" total includes 20.3 acres below the main dike, which MDT may elect not to purchase from the landowner.
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	Third monitoring year. Same results as 2001 and 2002. 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	Third monitoring year. Results identical to 2002 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.
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	Third and final monitoring year. Results similar to 2001 and 2002. Currently 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 (temporary inundation observed)	NA	NA	0 ac	Monitoring year 2. Site was not monitored in 2002 due to absence of water. Temporary inundation of uplands was observed during 2003, but 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 2. 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.

Table 1: Summary of MDT Wetland Mitigation Sites Monitored 2001 – 2003 (continued)

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	Third and final year. Similar results to 2002 (site gained additional 0.14 wetland acres in 2002). 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.
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 ES2: 3.11 ac Category and fu unknown	27.2 ac minimum; 28.95 ac maximum (see comments)	RS1: 14.07 ac Category II 91.46 fu RS2: 6.39 ac Category II 42.81 fu ES1: 4.98 ac Category II 38.75 fu ES2: 3.11 ac (2001) Category II 26.8 fu	1:3 ratio at ES-1 (1.66 acres) Unknown at ES2	0.75 ac	23.05 ac total credit 20.64 ac restored 1.66 ac enhancement 0.75 ac buffer 143.26 fu	Monitoring year 3. Increase of 3.89 ac credit over 2002. ES2 not monitored in 2002 or 2003 per MDT / Corps direction. 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. Site is developing; enhancement of Enhancement Site 2 (Musgrave Lake) difficult to quantify and not included in total credit—no pre-project functional assessment available. Not including possible enhancement at ES2, currently at about 85% of minimum 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	18.61 ac Category II and III 83.47 fu	NA	NA	15.21 ac 71.09 fu	Monitoring year 2. Total includes 6.2 acres of open water / mudflat. Currently at about 63% of project goal.
Glendive District									
American Colloid	2001	16 – Little Missouri	0 ac	4.4 ac	0.69 ac Category III	NA	NA	0.69 ac 3.79 fu	Second monitoring year. Results similar to 2002. Functional units increased slightly. Currently at 16% of project goal.
Circle	1999	12 – Lower Missouri	2.98 ac Category and fu unknown	1.7 ac	7.6 ac Category II 64.6 fu	NA	NA	4.62 ac 39.3 fu	Third monitoring year. Results virtually identical to 2002 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	6.13 ac Category II & IV 25 fu	NA	NA	6.13 ac 25 fu	Third and final monitoring year. Site gained about 0.91 ac of wetland and open water since 2002. Consists of 5 reservoirs. Puffin reservoir excavated too deep and supports no wetland. Grazing is impacting most sites. Extensive northern leopard frog use at Penguin and Flashlight reservoirs. Currently at about 61% of minimum 10-acre project goal.
Lame Deer	2001	14 – Middle Yellowstone	0 ac	1.79 ac (school) 1.5 ac (creek) 3.29 total	0.84 ac (school) 0.8 ac (creek) 1.64 ac total Category III 8.13 fu	NA	NA	1.64 ac 8.13 fu	Monitoring year 2. Site consists of school site and two Alderson Creek sites. Full monitoring conducted at school, delineation estimates conducted at creek in 2003. Currently at approximately 50% 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 or 2003 – removed from monitoring contract.
Ridgeway	2000 - 2001	16 – Little Missouri	0	50 ac	27.6 ac Category II (W-9 only) 25.55 fu (W-9 only)	NA	NA	27.6 ac. Pond 9: Category II, 25.55 fu	Third monitoring year. One of the 16 ponds in this complex (W-9) was intensively sampled / monitored in 2001-2003, although all ponds were delineated. The project is at approximately 55% of project goal. Total includes 17.63 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	8.09 ac Category II 55 fu	NA	NA	8.09 ac 55 fu	Monitoring year 3. Project goal exceeded by nearly 6 acres. Currently at 372% of project goal. Drought exposed bare substrate within wetland area in 2003. Includes 5.6 acres of open water.



Table 1: Summary of MDT Wetland Mitigation Sites Monitored 2001 – 2003 (continued)

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	9.71 ac wetland, 2.4 ac stream Category II and III 83.7 fu	NA	NA	Credits Unknown Gained 1.85 ac wetland, 1.11 ac stream, and 55 fu	Third monitoring year. Site gained additional 0.91 wetland acre and 9 functional units in 2003. Maximum Corps-allowable credit at this site is 7.21 ac (no performance standards, etc.), based subjectively on overall site improvement. About 1.85 wetland and 1.11 stream acres have been created (2.96 ac of aquatic habitat) and the site has been enhanced. How this equates to allowable credit is undetermined. Fish habitat greatly enhanced.
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.
Roundup	2000	10 - Musselshell	0 ac	24 ac	22 ac (developing) Category III 154 fu	NA	NA	22 ac total 154 fu	Monitoring year 3. Aquatic habitats similar to 2002. Currently 22 ac of developing wetlands, including 5.42 ac shallow open water and 5.49 ac developing mudflats.
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)	9.39 ac Category II 94.84 fu	NA	NA	5.62 ac 79.84 fu	Third monitoring year. Results similar to 2002. 10.69-ac goal included existing wetlands. Currently at 88% 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.
Totals¹				360.59 ac				300.86 ac 2,470.88 fu²	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 Functional unit totals do not include 15 reservoirs at the Ridgeway site, for which functional assessments were not conducted.