

MONTANA DEPARTMENT OF TRANSPORTATION STATEWIDE WETLAND MITIGATION SITE MONITORING PROJECT

EXECUTIVE SUMMARY - 2007 MONITORING RESULTS



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ABBREVIATIONS AND ACRONYMS

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

1.0 INTRODUCTION

This document summarizes the results of the 2007 monitoring efforts at 22 wetland mitigation sites located throughout Montana that were constructed by or for the Montana Department of Transportation (MDT). Full monitoring reports for each of these sites were prepared and presented to MDT in December 2007. The following mitigation sites were monitored during 2007:

| | |
|-----------------------------------|-------------------------|
| Alkali Lake | Meriwether-East |
| American Colloid | Norem Ranch |
| Batavia Waterfowl Production Area | Perry Ranch |
| Camp Creek | Peterson Ranch |
| Cloud Ranch | Ridgeway Complex |
| DH Ranch | Rock Creek Ranch |
| Hoskins Landing | Roundup |
| Jack Creek Ranch | Selkirk Ranch |
| Kleinschmidt Creek | Wagner Marsh |
| Lame Deer-East | West Fork Charley Creek |
| Little Muddy Creek | Woodson Creek |

Monitoring activities were conducted by PBS&J wetland scientists between April and October 2007 in accordance with standard MDT wetland mitigation site monitoring protocols. Activities and information conducted/collected included: wetland delineation; wetland/open water aquatic habitat boundary mapping; vegetation community mapping; vegetation transects; soils data; hydrology data; seasonal bird and general wildlife use; photograph points; macroinvertebrate sampling; functional assessment; and (non-engineering) examination of constructed features. Monitoring methods are discussed at length in the individual site monitoring reports and are generally not discussed further in this summary.

Table 1 (Appendix A) provides, for each monitored mitigation site: site name, MDT District, year constructed, major Montana watershed basin, pre-project wetland acreage and functional assessment category, target wetland credit, 2007 wetland acreage and functional assessment category, enhancement credit ratios, upland credit ratios, total wetland acreage gain / credit and functional unit gain as of 2007, and comments.

Table 2 presents target versus actual credit acreage by watershed basin at MDT mitigation sites monitored in 2001, 2002, 2003, 2004, 2005, 2006, and 2007. **Chart 1** presents this information on a percentage basis. Statewide, the target credit acreage at monitored sites is approximately 886 acres. For purposes of **Table 2**, “target” acreage includes projected credit reserves as well as impact-specific compensatory targets. Consequently, the target may actually be substantially larger than the required mitigation needs in some watersheds. As of the 2007 monitoring season, approximately 813 acres of “wetland credit” have developed at these monitored sites. Thus, cumulatively, monitored mitigation projects are at approximately 92% of the statewide credit target as of 2007.

A summary of maintenance issues identified in 2007 is provided in **Table 35 (Appendix B)**.

Table 2: Target verses actual credit acreage by watershed basin at the MDT Wetland Mitigation Sites monitored during 2001 to 2007.

| Major Montana Watershed Basin | Monitoring Site | Minimum Target Credit Acreage ^a | Credit Acreage as of 2007 Monitoring | Percent of Target Acreage Achieved as of 2007 Monitoring | Approximate Functional Unit Gain as of 2007 Monitoring (acre x functional point) |
|-------------------------------|--|--|--------------------------------------|--|--|
| 1 – Kootenai | No Sites | --- | --- | --- | --- |
| 2 – Upper Clark Fork | Peterson Ranch Brown's Gulch Kleinschmidt Creek | 29.74 | 12.65 | 43 | 180.9 |
| 3 – Lower Clark Fork | Camp Creek Hoskins Landing | 19.50 | 26.21 ^b | 134 | 240.32 |
| 4 – Flathead | Batavia WPA Creston Lawrence Park | 36.72 | 30.86 ^c | 84 | 369.72 |
| 5 – St Mary | No Sites | --- | --- | --- | --- |
| 6 – Upper Missouri | Beaverhead Jack Creek Ranch Rey Creek | 103.20 | 139.65 ^d | 135 | 1,160.6 |
| 7 – Missouri-Sun-Smith | Cow Coulee Little Muddy Creek Ringling-Galt SF Smith River Woodson Creek | 138.07 ^e | 70.14 ^e | 50 | 722.13 |
| 8 – Marias | Alkali Lake Jack Johnson Meriwether-East Perry Ranch | 212.97 | 217.9 | 102 | 1,305.3 |
| 9 – Middle Missouri | Fourchette Creek Big Spring Creek | 17.21 ^f | 15.08 ^f | 88 | 108.15 |
| 10 – Musselshell | Lavina Ryegate Roundup Selkirk Ranch | 86.4 | 24.93 | 29 | 569.3 |
| 11 – Milk | Big Sandy Musgrave Lake Rock Creek Ranch | 86.64 | 131.45 | 152 | 864.25 |
| 12 – Lower Missouri | Vida Circle Plentywood-N WF Charley Creek | 13.30 | 11.11 | 84 | 46.97 |
| 13 – Upper Yellowstone | Cloud Ranch DH Ranch Norem Ranch Stillwater Vince Ames Wagner Marsh Wyola-Sunlight | 81.89 | 58.91 | 72 | 364.6 ^g |
| 14 – Middle Yellowstone | Lame Deer-East | 2.4 | 2.09 | 87 | 15.72 |
| 15 – Lower Yellowstone | Crackerbox Creek | 1.20 | 1.60 | 133 | 7.20 |
| 16 – Little Missouri | American Colloid Ridgeway Wigeon Reservoir | 56.60 | 70.27 | 124 | 501.11 |
| TOTAL | 45 | 885.84 acres | 812.85 acres | 92% | 6,452.27 funct. units |
| Average per Site | -- | 19.69 acres | 18.06 acres | -- | 143.47 funct. units |

^a Includes proposed "reserves" as well as impact-specific targets.

^b Includes functional unit-based credits at Camp Creek mitigation site.

^c Accounts for agency negotiation that resulted in 19.6 acres of additional enhancement credit at Batavia WPA.

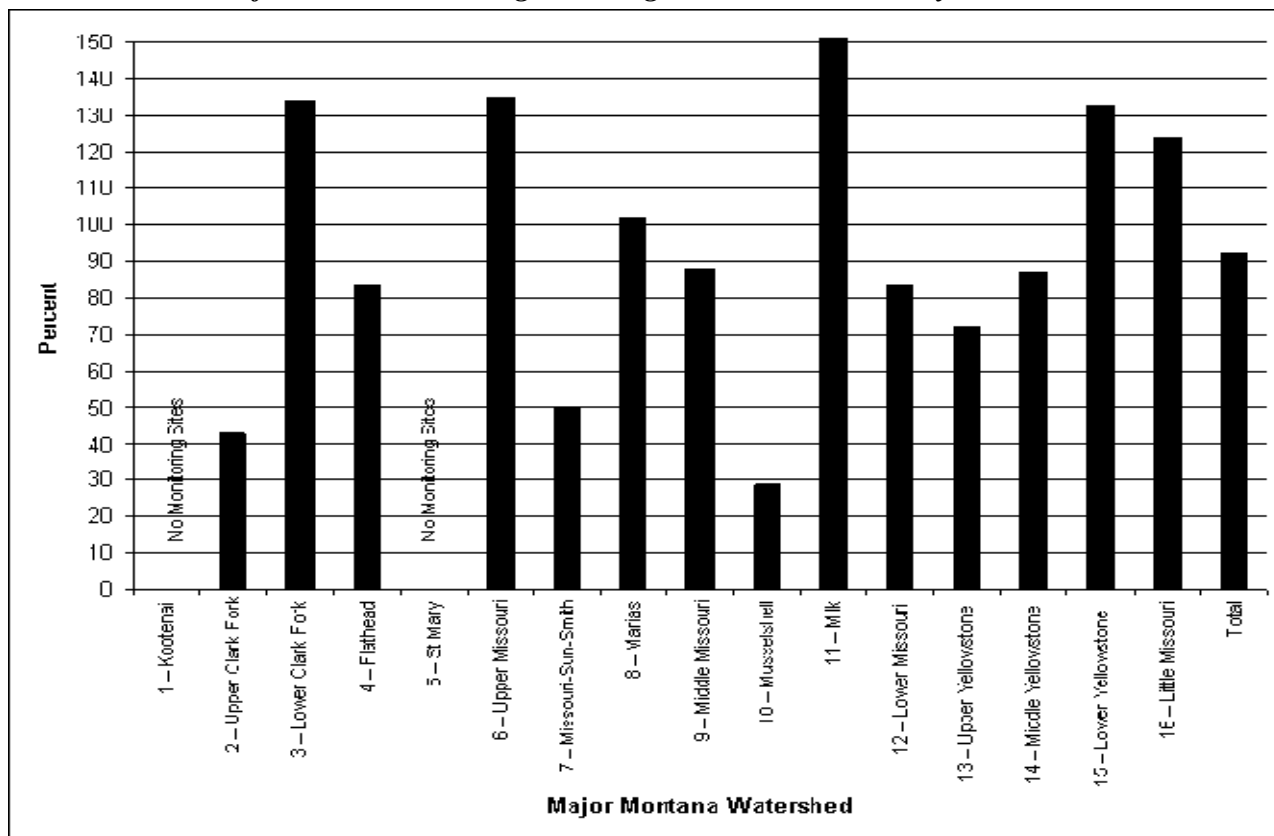
^d Wetland "credit" total no longer includes 20.3 acres at Beaverhead Ranch that MDT elected not to purchase from the landowner.

^e Does not include wetland acreage for SF Smith site because no target was assigned. Caps credits at 63.57 acres at Little Muddy Creek site per COE; although more wetlands were present in 2007.

^f Assumes 7.21 acres for both target and credit at Big Spring Creek.

^g Does not include functional unit gain at Cloud Ranch as baseline was unavailable.

Chart 1: Percent of MDT wetland mitigation target achieved in 2007 by watershed.



The current 73-acre discrepancy between target and credit figures is due to a few main factors. A primary factor was that some large sites (Woodson Creek, Selkirk Ranch, DH Ranch) were constructed in 2007 and were just beginning to develop wetland characteristics. The cumulative credit target for these three sites was nearly 128 acres. Another main factor was that one of the larger sites, Peterson Ranch (17.5-acre target), was not receiving its planned hydrology due to water right permit denial.

For reference, **Tables 1** and **2** include the following sites that were monitored only one year for “final” documentation purposes in 2001: Lawrence Park, Big Sandy, Crackerbox Creek, Vida, Lavina, Ryegate, Vince Ames, and Wyola-Sunlight Ranch. These tables also include the Plentywood-North mitigation site, which was only monitored in 2001. The MDT determined that the Plentywood-North mitigation site would be monitored in-house subsequent to 2001 due to its small size and remote location. **Tables 1** and **2** also include the Jack Johnson and Rey Creek sites, which were finalized in 2003; the Fourchette, Brown’s Gulch, and Circle sites, which were finalized in 2004; the Creston, Big Spring Creek, and Stillwater sites which were finalized in 2005, and the Beaverhead Ranch, Musgrave Lake, and Wigeon Reservoir sites finalized in 2006. The Cow Coulee site was also included, which has not been finalized nor was it monitored in 2006 or 2007. Monitoring at this site was suspended during 2005-2007 due to water delivery problems. Similarly, the South Fork Smith and Ringling sites were also included in **Tables 1** and **2**, although monitoring was suspended at both sites following 2006.

Summaries of each of the mitigation sites monitored in 2007 are presented in alphabetical order in Section 2.0. Each discussion includes site history and objectives, delineation and functional assessment results, maintenance needs, and other recommendations, where applicable. Supporting materials such as site maps, figures, data forms, photographs, and other information are provided in each of the individual monitoring reports, and are not included in this summary.

2.0 INDIVIDUAL MITIGATION SITE DISCUSSIONS

2.1 Alkali Lake (Great Falls District, Year 2)

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

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

In 2007, approximately 85 acres of emergent wetlands were delineated at the mitigation site. These acres satisfied soils, hydrology, and vegetation performance standards. Further, they represent more than double the acreage found in 2006. Another 82 acres were mapped as Transitional Open Water/Mudflat. All together, about 164 acres of aquatic habitat was mapped in 2007. The upland buffer also satisfied applicable performance standards. The 2007 credits at the site, applying Tribal and COE credit ratios, are presented in **Table 3**. It is anticipated that with proper monitoring of water levels that wetlands will continue to develop where Transitional Open Water and Mudflat were mapped.

In 2007, the Alkali Lake Wetland Mitigation Site continued to rate as a Category II wetland (**Table 4**). However, the site scored higher than in 2006 as it rated moderate to exceptional for the following functions or values: T&E Species Habitat; General Wildlife Habitat; and Short and Long Term Surface Water Storage (**Table 4**).

Table 3: 2007 Tribal and Corps of Engineers credits at the Alkali Lake Wetland Mitigation Site.

| Proposed Feature | 2007 Delineated Acres | Tribal Credit Ratio and 2007 Calculated Credit | Tribal Credit Target | Corps Credit Ratio and 2007 Calculated Credit ^a | Corps Credit Target |
|--------------------------------------|-----------------------|--|----------------------|---|---|
| Primary emergent wetland restoration | 84.64 | 1:2.5 credit ratio 33.86 credit acres | 29.77 credit acres | 1:1 credit ratio 84.64 credit acres | 74.42 credit acres |
| Shallow open water restoration | 81.79 | 1:2.5 credit ratio 32.72 credit acres | 40.56 credit acres | 1:1 credit ratio (to a max. matching wetland acres) 81.79 credit acres | 74.42 credit acres |
| 100-ft-wide upland buffer | 45.12 | 1:4 credit ratio 11.28 credit acres | 11.28 credit acres | 1:4 credit ratio (on max. 50-ft width) 5.64 credit acres | 1:4 credit ratio (on max. 50-ft width) 5.64 credit acres |
| TOTALS | 166.43 (aquatic only) | 77.86 credit acres | 81.61 credit acres | 172.07 credit acres^a | 154.48 credit acres |

^a Maximum credits as of 2007. Final credits are subject to compliance with the performance standards at the end of the monitoring period.

Table 4: Summary of 2007 wetland function/value ratings and functional points at the Alkali Lake Wetland Mitigation Site.

| Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method ¹ | 2007 |
|--|-------------------|
| Listed/Proposed T&E Species Habitat | Mod (0.8) |
| MTNHP Species Habitat | Mod (0.6) |
| General Wildlife Habitat | Exc (1.0) |
| General Fish/Aquatic Habitat | N/A |
| Flood Attenuation | N/A |
| Short and Long Term Surface Water Storage | High (0.9) |
| Sediment, Nutrient, Toxicant Removal | Mod (0.7) |
| Sediment/Shoreline Stabilization | Low (0.3) |
| Production Export/Food Chain Support | Mod (0.7) |
| Groundwater Discharge/Recharge | Low (0.1) |
| Uniqueness | Mod (0.5) |
| Recreation/Education Potential | Mod (0.7) |
| Actual Points/Possible Points | 6.3 / 10.0 |
| % of Possible Score Achieved | 63% |
| Overall Category | II |
| Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries (ac) | 166.43 |
| Functional Units (acreage x actual points) | 1048.50 |

The excavated inlet channel was in good condition during all site visits. Fencing, control structures, and the western berm were also in good condition. Water management was improved in 2007. It will be important in 2008 to manage water levels throughout the summer to maintain

saturated soils without over-inundating the site in order to maximize wetland development and promote nesting habitat for the Piping Plover.

2.2 American Colloid (Glendive District, Year 6)

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

The net vegetated wetland area for 2007 totals 0.06 acre. No open water habitat was observed because of a dam breach which had occurred sometime between July 2006 and July 2007. Water lines were visible at the time of the monitoring event, suggesting the breach occurred sometime during 2007.

Functional assessment results are summarized in **Table 5** below. The mitigation site continues to rate as a Category III wetland, even though there was a lack of water in the site at the time of the investigation. Signs of inundation earlier in the year were evident. The breach event is viewed as an atypical situation resulting from a natural event; the dam was not breached because of human activities, rather a result of water seeping through the clay embankment, which lead to the creation of a hole large enough to allow the site to drain. Functional units decreased from 15.1 in 2006 to 13.4 FU in 2007 because of a decrease in the Recreational/Educational Potential rating. Until an increase in percent cover of hydrophytic vegetation communities occurs, with subsequent increases in General Wildlife Habitat, Sediment/Nutrient/Toxicant Removal, Short and Long Term Water Storage, and Production Export/Food Chain Support, the potential of this site to have moderate to high recreational/educational values is questionable.

MDT was notified by the aerial photographer in early July that the site was dry. At the time of the investigation in mid-July it was confirmed that no water was in the site and the dam had been breached. There are three risers on the south side of the berm and three horizontal culverts attached to these risers which convey overflow water to the north side of the dam. The dam failed due to a horizontal hole on the east side of the center riser on the south side of the berm. MDT was immediately notified of the breach.

2.3 Batavia Waterfowl Production Area (Missoula District, Year 7 – Final Year)

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

Table 5: Summary of 2002 (initial) and 2007 wetland function/value ratings and functional points at the American Colloid Wetland Mitigation Project.

| Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method | 2002 | 2007 |
|---|-------------|-----------------------|
| Listed/Proposed T&E Species Habitat | Low (0) | Low (0) |
| MTNHP Species Habitat | Mod (.6) | Mod (.7) |
| General Wildlife Habitat | Mod (.4) | Mod (.5) |
| General Fish/Aquatic Habitat | NA | NA |
| Flood Attenuation | Mod (.4) | NA |
| Short and Long Term Surface Water Storage | High (.8) | Mod (.4) |
| Sediment, Nutrient, Toxicant Removal | Mod (.6) | Low (.3) |
| Sediment/Shoreline Stabilization | Mod (.7) | Low (.3) |
| Production Export/Food Chain Support | Mod (.6) | Mod (.4) |
| Groundwater Discharge/Recharge | NA | NA |
| Uniqueness | Low (.3) | Mod (.4) |
| Recreation/Education Potential | Mod (.5) | Low (.3) |
| Actual Points/Possible Points | 4.9/10 | 3.3/9 |
| % of Possible Score Achieved | 49% | 37% |
| Overall Category | III | III |
| Total Acreage of Assessed Wetlands within Monitoring Area | 0.69 | 4.08 (max) |
| Total Functional Units (acreage x actual points) | 3.38 | 13.4 (max) |
| Net Acreage Gain (“new” wetlands) | 0.69 | 4.08 (max) |
| Net Functional Unit Gain (new acreage x actual points) | 3.38 | 13.4 (max) |

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 USFWS, and 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 and South Cell. 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. Also, in this the final year of monitoring, MDT and PBS&J decided to conduct a full wetland delineation, incorporating the entire north and south cells, to determine the extent of wetland creation that resulted from the project.

In March of 2005, Ducks Unlimited (DU) lowered the four borrow areas through excavation to ensure inundation and future wetland establishment in these areas. The delineation results at the borrow areas in 2007 are similar to those observed in 2006, except in the areas excavated in 2005, where aquatic vegetation began to establish. In 2006, only scattered plants were noted, whereas the open water areas filled in significantly with various aquatic plants in 2007. Combined aquatic habitat creation for the four areas is 6.68 acres.

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. The full delineation completed in 2007 shows a net gain of 9.63 acres of aquatic habitat across the entire site, of which 6.68 acres occurs within the borrow areas. The remaining 2.95 acres was likely gained around the periphery of the north and south cells due to an improved and more efficient water delivery and storage system, not as a result of any significant water level increase across the site. In total, the project is 8.57 acres of creation short of the intended goal because of the inability to raise water levels to the desired 3128.5 elevation. However, it is important to note that, due to the credit ratios involved, this equates to a 4.3- acre *credit* shortfall.

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

Post-project credits as of 2007 are broken down as follows:

| | | | |
|---|----------------------------|---|--------------------|
| Wetland Creation minus impacts from new dike: | 9.63 acres credited at 2:1 | = | 4.82 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>10.00 acres</u> |
| | Total | = | 24.42 acres |

The total credits to date are 4.3 acres short of the intended 28.72-acre goal for the project because of the inability to raise water levels to the desired 3128.5 elevation. While the project fell short of the anticipated goal, the resulting increase in wetland acreage across the site (9.63 acres) and overall benefit of the project to the Batavia WPA is substantial. Unless MDT, the USFWS, and Ducks Unlimited are able to formulate a plan to raise water levels to the desired elevation, no additional mitigation credits beyond those that have been achieved are likely possible at this site.

Functional assessment results are summarized in **Table 6** 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 [past USFWS observations] and black terns [2005 observations]), groundwater discharge/recharge, and recreation/education potential. The original functional assessment rated the wetland as a Category II with 65% of possible points, while the current assessment rated the wetland as a Category II with 80% of possible points. This assessment is unchanged from 2006. Total acreage for the north and south cells has been updated in the table below to reflect the 2007 acreage.

The berm and associated water control structures were in good condition during the monitoring visit. Excavated soils were deposited in adjacent upland areas during the spring of 2005 and some of these areas were infested with weedy species, primarily thistle and spotted knapweed. Weed control, as proposed by the USFWS, should continue in these areas until desired species become established.

2.4 Camp Creek (Missoula District, Year 6)

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

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

Table 6: Summary of 1996 (baseline) and 2007 wetland function/value ratings and functional points at the Batavia Wetland Mitigation Project.

| Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method | 1996 Baseline Assessment ¹ | 2007 Assessment |
|---|---------------------------------------|-------------------|
| Listed/Proposed T&E Species Habitat | Low (0.3) | Low (0.3) |
| MTNHP 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 (north and south cells) | 137.00 | 146.73 |
| Functional Units (acreage x actual points) | 1069 | 1408 |
| Net Acreage Gain (ac) | NA | 9.73 |
| Net Functional Unit Gain (fu) | NA | 340 |
| Total Functional Unit Gain (fu) | NA | 340 |

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

Sula Basin. Several smaller creeks drain into Camp Creek, including Andrews, Praine, Waugh and Dick creeks.

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

Functional Restoration

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

Enhancements

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

Creation

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

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

Overall, the project has gained 0.65 stream acre and “lost” an estimated 5.46 wetland acres in comparison to baseline conditions (same results as 2006). Cumulatively, approximately 41.77 wetland acres and 2.15 open water acres now occur within the monitoring area, for a total of 43.92 acres of aquatic habitat. Prior to construction, the site contained approximately 47.23 acres of wetlands and 1.5 open water channel acres within the current monitoring limits. Open water channels were located in the extreme south end of the Grasser property and the in the northwest corner of the MDT property. The overall cumulative change in aquatic habitat at the site since construction has been approximately $43.92 - 48.73 = (-4.81)$ acres.

Approximately 172.98 functional units (score x wetland acreage) have been gained thus far at the Camp Creek mitigation site, despite the decrease in wetland acres between pre-project and post-project assessments on the MDT parcel. Approximately 135.60 functional units have been gained at the MDT parcel, and 37.38 have been gained on the Grasser parcel.

The credit allocation method for this site was worked out between MDT and COE in early 2006, and is functional unit-based, whereby wetland acreage for each AA is multiplied by the total score for that AA to arrive at an overall functional unit score. This is done both pre-project and post-project. The difference between these two numbers (the functional unit “gain”) is then divided by the post-project score to arrive at an approximate credit acreage for that AA. Credit acreages from each AA are summed to arrive at a total for the site. This approach is illustrated below in **Table 7**. Using this approach, a current maximum of approximately 18.11 credit acres is assignable to the Camp Creek site as of 2007.

Table 7: 2007 functional unit-based credit for the Camp Creek Wetland Mitigation Project.

| Property | 2007 Wetland & Channel Acreage | 2007 Score | 2007 Functional Units | Baseline Functional Units | Functional Unit “Gain” | “Gain” Divided by Current Score (potential credit acres) |
|--------------|--------------------------------|------------|-----------------------|---------------------------|------------------------|--|
| MDT | 35.79 | 10 | 357.90 | 222.30 | 135.60 | 13.56 |
| Grasser | 8.13 | 8.2 | 66.66 | 29.28 | 37.38 | 4.55 |
| Total | 43.92 | -- | 424.56 | 251.58 | 172.98 | 18.11 |

Pre-project and post-project wetland assessment scores are presented in **Table 8** below.

Survival rates within the upland areas were similar to those observed during 2004 to 2006 monitoring. In 2003, a majority of the survival rates ranged from 70% to 100%. Survival data recorded in 2004-2007 showed most upland species had a survival rate below 50%. These

Table 8: Summary of 2001 (baseline) and 2007 wetland function/value ratings and functional points at Camp Creek Wetland Mitigation Site.

| Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method | 2001 Type I, MDT Property | 2001 Type III, MDT Property | 2001 Type I, Grasser Property | 2001 Type II, Grasser Property | 2001 Type III, Grasser Property | 2007 Grasser Property | 2007 MDT Property |
|---|---------------------------|-----------------------------|-------------------------------|--------------------------------|---------------------------------|--------------------------|---------------------------|
| Listed/Proposed T&E Species Habitat | Mod (0.8) | Mod (0.8) | Mod (0.8) | Mod (0.8) | Mod (0.8) | Mod (0.8) | Mod (0.8) |
| MTNHP Species Habitat | Low (0.1) | Low (0.1) | Low (0.1) | Low (0.1) | Low (0.1) | High (0.8) | High (0.8) |
| General Wildlife Habitat | Low (0.3) | Mod (0.5) | Low (0.3) | Mod (0.5) | Mod (0.5) | Mod (0.7) | Mod (0.7) |
| General Fish/Aquatic Habitat | Low (0.1) | Mod (0.5) | Low (0.1) | Low (0.1) | Mod (0.5) | High (0.9) | High (0.9) |
| Flood Attenuation | Mod (0.6) | Mod (0.4) | Mod (0.6) | Mod (0.5) | Mod (0.4) | Mod (0.4) | Mod (0.6) |
| Short and Long Term Surface Water Storage | Low (0.3) | High (0.8) | Low (0.3) | Low (0.3) | High (0.8) | Mod (0.6) | High (1.0) |
| Sediment, Nutrient, Toxicant Removal | Mod (0.7) | Mod (0.6) | Mod (0.7) | Mod (0.7) | Mod (0.6) | Mod (0.6) | High (0.9) |
| Sediment/Shoreline Stabilization | Low (0.2) | Low (0.3) | Low (0.2) | Mod (0.6) | Low (0.3) | High (1.0) | High (1.0) |
| Production Export/Food Chain Support | Mod (0.7) | High (0.9) | Mod (0.7) | Mod (0.7) | High (0.9) | High (0.9) | High (0.9) |
| Groundwater Discharge/Recharge | High (1.0) | High (1.0) | High (1.0) | High (1.0) | High (1.0) | High (1.0) | High (1.0) |
| Uniqueness | Low (0.1) | Low (0.2) | Low (0.1) | Low (0.3) | Low (0.2) | Low (0.2) | Mod (0.4) |
| Recreation/Education Potential | Low (0.2) | Low (0.1) | Low (0.2) | Low (0.3) | Low (0.1) | Low (0.3) | High (1.0) |
| Actual Points/Possible Points | 5.1 / 12 | 6.2 / 12 | 5.1 / 12 | 5.9 / 12 | 6.2 / 12 | 8.20 / 12 | 10.0 / 12 |
| % of Possible Score Achieved | 42% | 52% | 42% | 49% | 52% | 68% | 83% |
| Overall Category | III | III | III | III | III | II | I |
| Total Acreage of Assessed Wetlands and Open Water within Easement | 42.3 | 1.06^a | 3.51^a | 0.50^a | 1.36^a | 8.13 | 35.79 |
| Functional Units (fu) (acreage x actual points) | 215.73 | 6.57 | 17.90 | 2.95 | 8.43 | 66.66 | 357.90 |
| Functional Unit Gain to Date by Ownership (fu) | NA | NA | NA | NA | NA | 37.38^b | 135.60^b |
| Total Functional Unit Gain to Date (fu) | NA | NA | NA | NA | NA | 172.98 | |

^a Baseline acreages adjusted per subsequent aerial photograph study.

^b Baseline Functional Units used to determine the 2007 Functional Unit Gain included the combined totals for the 2001 MDT (222.30 fu) and Grasser (29.28 fu) properties.

included such species as woods rose, ponderosa pine, snowberry, shrubby potentilla and red-osier dogwood. Almost all the Douglas-fir observed had died after initial planting. In 2007, the wetter species planted along the streambank and floodplain margins had a survival rate ranging from 60% to 90%. These included alder, aspen, cottonwood and willows. The willow sprigs are spreading out along the banks, continuing to increase in size and density each growing season. Several other wetter planted shrubs had increased in overall stature and exhibited vigorous growth.

The excavated channel between the creek and the large emergent complex on the MDT parcel was examined during 2007 monitoring, and is functioning according to design.

Several Category 1 noxious weeds are present on both MDT and Grasser parcels including Canada thistle, hound's-tongue, oxeye daisy, spotted knapweed and yellow toadflax. The MDT parcel has the least amount of invasive species and distribution is primarily limited to upland areas not affected during construction efforts. Control measures for these areas were implemented and observed during the 2007 monitoring. Even though the uplands areas were sprayed, some knapweed still persists. Additional spraying is recommended for areas missed during the initial control activities.

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

2.5 Cloud Ranch (Billings District, Year 4)

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

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

The 2003 baseline wetland delineation conducted by Aquatic Design and Construction Inc. (ADC) identified 1.00 acre of wetlands within the project area. Approximately 0.28 acre was later determined to be outside of the project area, reducing pre-existing wetland acreage to 0.72 acre. The COE approved allocation of 1:1 credit ratio for creation and restoration, as well as 4:1 ratio for the maintenance of a buffer zone around the wetland and riparian areas. More

specifically, the wetland credit breakdown approved by the COE is as follows: 0.61 acre for off-channel wetland creation, 1.41 acres for off-channel wetland restoration, 2.0 acres for riparian wetland restoration along Big Timber Creek, 0.58 acre for emergent wetland restoration along Big Timber Creek, and a 0.89 acre upland buffer (4:1 ratio) for a total of 5.5 acres of wetland credit.

Table 9 outlines the target wetland credits and ratios from the COE (2002) and the net acres delineated during the 2007 wetland monitoring. In 2007, the net off-channel wetland/open water acreage is 2.21 acres (2.69 acres total wetland +0.24 acre open water – 0.72 acre of pre-existing wetlands = 2.21 acres). The Big Timber Creek wetland acreage is 1.1 acre; an increase of 0.39 acre compared to 2006 due to the population of young cottonwood seedlings along the upper reach of the creek. Riparian wetlands comprise 0.92 acre along Big Timber Creek with 0.18 acre of emergent wetlands. The Big Timber Creek channel itself is not included in acreage totals.

As of 2007, the mitigation efforts have resulted in a total of 3.07 wetland credit acres, 0.24 shallow open water credit acres, and 0.89 credit acre of wetland/upland buffer. The grand total for the Cloud Ranch to date is 4.2 credit acres or 76 percent of the 5.49-acre goal.

Table 9: 2007 credit acreages and ratios for the Cloud Ranch Wetland Mitigation Site.

| Wetland Mitigation | Current Net Acres | Ratio | 2007 Credit Acres | Target Credit Acres | Comments |
|--|-------------------|-------|-------------------|---------------------|--|
| Off-channel Creation and restoration wetlands and open water | 2.21 | 1:1 | 2.21 | 2.02 | |
| Subtotal | 2.21 | | 2.21 | 2.02 | |
| Big Timber Creek Riparian wetland restoration | 0.92 | 1:1 | 0.92 | 2.00 | Riparian wetland community represented by Type 2. |
| Emergent wetland restoration | 0.18 | 1:1 | 0.18 | 0.58 | Emergent wetland restoration represented by Type 3. |
| Subtotal | 1.10 | | 1.1 | 2.58 | |
| Upland and Wetland Buffer | 3.56 | 4:1 | 0.89 | 0.89 | Credited only if livestock grazing is prohibited on wetland sites. |
| Subtotal | 3.56 | | 0.89 | 0.89 | |
| GRAND TOTAL | 6.87 | | 4.20 | 5.49 | 76% of goal |

It may be difficult to attain the remaining 1.48-acre wetland development goal along the creek in the short term. The migration of the stream in 2006 created a new channel by cutting through a small point bar wetland. The abandoned channel is a broad dry rock meander and represents a fairly large sparsely or barren area within the project. This area may take considerable amount of time to establish wetland vegetation along the higher terraces. The lower area will likely continue to serve as a overflow channel or oxbow.

Functional assessment results for 2004 and 2007 are summarized in **Table 10**. Pre-construction functional assessments were completed for the wetlands by ADC (2003) but have thus far not been received for use in monitoring reports. The creek corridor wetlands currently rate as a Category II community, primarily due to wildlife habitat, while the off-channel wetlands were assigned a Category III rating. The ratings have been consistent over the monitoring period to date, although in 2007 ratings for threatened and endangered species habitat decreased due to the

Table 10: Summary of 2004 to 2007 wetland function/value ratings and functional points at the Cloud Ranch Wetland Mitigation Project.

| Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method | 2004 Post-Construction Off-Channel Wetlands | 2004 Post-Construction Big Timber Creek | 2007 Off-Channel Wetlands | 2007 Big Timber Creek |
|---|---|---|-------------------------------------|--------------------------|
| Listed/Proposed T&E Species Habitat | Low (0.3) | Low (0.3) | Low (0.0) | Low (0.0) |
| MTNHP Species Habitat | Low (0.1) | Mod (0.6) | Low (0.1) | Mod (0.6) |
| General Wildlife Habitat | Mod (0.7) | High (0.9) | Mod (0.7) | High (0.9) |
| General Fish/Aquatic Habitat | NA | Mod (0.7) | NA | Mod (0.7) |
| Flood Attenuation | Mod (0.5) | Mod (0.4) | Mod (0.5) | Mod (0.4) |
| Short and Long Term Surface Water Storage | Mod (0.6) | Mod (0.6) | Mod (0.6) | Mod (0.6) |
| Sediment, Nutrient, Toxicant Removal | High (1.0) | Mod (0.6) | High (1.0) | High (0.9) |
| Sediment/Shoreline Stabilization | High (1.0) | Mod (0.7) | High (1.0) | Mod (0.7) |
| Production Export/Food Chain Support | Mod (0.7) | Mod (0.7) | Mod (0.7) | High (0.8) |
| Groundwater Discharge/Recharge | High (1.0) | High (1.0) | High (1.0) | High (1.0) |
| Uniqueness | Mod (0.4) | Mod (0.4) | Mod (0.4) | Mod (0.4) |
| Recreation/Education Potential | Mod (0.7) | Mod (0.7) | Mod (0.7) | Mod (0.7) |
| Actual Points/Possible Points | 7/11 | 7.6/12 | 6.7/11 | 7.7/12 |
| % of Possible Score Achieved | 64% | 63% | 61% | 64% |
| Overall Category | III | II | III | II |
| Total Acreage of Assessed Wetlands and Open Water within Easement (ac) | 2.19 | 2.65 | 2.93 | 3.27 |
| Baseline Acreage of Assessed Wetlands and Open Water within Easement (ac) | 0.72 | 2.17 (ow) | 0.72 | 2.17 (ow) |
| Functional Units (acreage x actual points) (fu) | 15.33 | 20.14 | 19.63 | 25.18 |
| Net Acreage Gain (ac) | 1.47 (1.2 wetland, 0.27 ow) | 0.48 (wetland) | 2.21 (1.97 wetland, 0.24 ow) | 1.1 (wetland) |
| Net Functional Unit Gain¹ | Presently unavailable | Presently unavailable | 4.3 (since 2004) | 5.04 (since 2004) |
| Total Functional Unit Gain¹ | Presently unavailable | | 9.34 (since 2004) | |

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

de-listing of the Bald Eagle, which could no longer be considered under this parameter. An erroneous rating for surface water storage in 2004 and 2005 at both sites resulted in incorrect Category II designations for the off-channel wetlands in those years, which was corrected for 2004-2007 as shown on **Table 10**.

The site supports three State of Montana-listed noxious weeds: Canada thistle, hound's-tongue, and spotted knapweed as well as two County listed noxious weeds; black henbane and musk thistle. Canada thistle, hound's-tongue, black henbane, musk thistle and a few spotted knapweed plants were observed along Big Timber Creek. Canada thistle and hound's-tongue were observed within the off-channel wetland assessment area. The spotted knapweed, hound's-tongue and Canada thistle appeared to have been sprayed in 2006 and 2007 in the upland areas adjacent to the off-channel wetlands. Continued chemical or biological control measures are recommended for Canada thistle, hound's-tongue, spotted knapweed, musk thistle and black henbane.

The water level control structures within the off-channel wetlands were functioning and in good working order at the time of the July monitoring. Big Timber Creek channel migration resulted in minor bank loss in 2007. Gravel bars and new deposition areas will continue to be monitored to track riparian wetland gains or losses, development of the cottonwood communities and/or negative or undesirable changes in vegetation. The project designer commented in 2006 that the upper end of the lowest reach is likely to continue shifting before it stabilizes and some minor intervention in this area may eventually be warranted. If ultimately considered necessary by the designer, landowner, and MDT, any such intervention should be completed within the monitoring period.

2.6 DH Ranch (Billings District, Year 1)

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

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

Success criteria for all created wetland areas will be based on the following criteria:

1. Sites will develop hydrophytic vegetation, wetland hydrology, and hydric soils as outlined in the COE 1987 wetlands delineation manual.
2. Ocular coverage of desirable herbaceous wetland plant species will be at least 80 percent. No species may comprise more than 25 percent of a vegetated layer. Non-preferred species will comprise a maximum of 10 percent of any given wetland area.
3. Soil saturation will be present for at least 12.5 percent of the growing season (18 days). A monitoring well will be installed in each credit area to verify this.
4. Woody planting zones (berms) will have a minimum of 1,000 stems/acre

The COE will determine which crediting ratios are applicable to the site. However, using the credit ratios listed, **Table 11** summarizes compensatory mitigation credits developed to date at DH Ranch. No groundwater monitoring wells have been installed on the site, and therefore the success criteria for hydrology cannot be completely confirmed. However, wetland hydrology was assumed based on typical field indicators, and credits were tentatively assigned to wetland creation areas. Standing water was observed in open water areas, and so credits were also assigned for those areas.

Credits for the upland buffer were not assigned in 2007 because the area is generally unvegetated, though many woody shrub species had been planted. The wetland mitigation design report also includes a credit category for shrubby riparian islands that would be located on the water diversion berms. These berms were essentially unvegetated, and so no credits were calculated for them this year. Based on this information and assumed credit ratios for wetlands, open water, and upland buffer, approximately 13.57 acres of credit, or 78% of the 17.4-acre MDT credit purchase goal, are currently available at the DH Ranch mitigation site (**Table 11**). Credits for wetland creation and upland buffer areas may be negotiated between the COE and MDT at their discretion.

Table 11: 2007 mitigation credit summary for the DH Ranch Wetland Mitigation Site.

| Credit Category | Acre | Assumed Credit Ratio ^a | Credit ^a |
|----------------------------|--------------|-----------------------------------|---------------------|
| Emergent wetland creation | 11.31 | 1:1 | 11.31 ^c |
| Open water | 5.39 | Up to 20% of wetland area | 2.26 |
| Upland buffer ^b | 0.80 | 4:1 | 0.00 ^c |
| TOTAL | 17.50 | | 13.57 |

^aThe Corps of Engineers is the regulatory authority and will determine the actual mitigation ratios.

^bThe upland/riparian buffer acreage was derived from the design report.

^cAll success criteria have not been met. Credits for these areas may be negotiated between MDT and the COE.

Functional assessment results are summarized in **Table 12**. For comparative purposes, the functional assessment results for baseline conditions prepared by Oasis Environmental in 2005 are also included in **Table 12**. The created wetlands at DH Ranch were ranked as Category II wetlands in 2007 as compared to Category III in 2005. Functions that increased substantially over 2005 baseline conditions include general wildlife habitat, short and long term surface water storage, sediment/nutrient/toxicant removal, and production export. The pre-project site provided about 1.596 functional units within the monitoring area, and the post-project site currently provides about 73.5 functional units, for a conservative gain of roughly 71 functional units.

Table 12: Summary of baseline and 2007 wetland function/value ratings and functional points at the DH Ranch Wetland Mitigation Site.

| Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method ¹ | 2005 Baseline Assessment | 2007 |
|--|--------------------------------|--------------|
| Listed/Proposed T&E Species Habitat | Low (0.0) | Low (0.0) |
| MNHP Species Habitat | Low (0.1) | Low (0.1) |
| General Wildlife Habitat | Mod (0.5) | High (0.9) |
| General Fish/Aquatic Habitat | NA | NA |
| Flood Attenuation | NA | NA |
| Short and Long Term Surface Water Storage | Low (0.3) | High (1.0) |
| Sediment, Nutrient, Toxicant Removal | NA | Mod (0.7) |
| Sediment/Shoreline Stabilization | High (0.9) | Low (0.3) |
| Production Export/Food Chain Support | Mod (0.5) | High (0.9) |
| Groundwater Discharge/Recharge | NA | Low (0.1) |
| Uniqueness | Mod (0.4) | Low (0.3) |
| Recreation/Education Potential | Low (0.1) | Low (0.1) |
| Actual Points/Possible Points | 2.8/8 | 4.4/10 |
| % of Possible Score Achieved | 35 | 44 |
| Overall Category | III | II |
| Total Acreage of Assessed Aquatic Habitat within AA Boundaries | 0.570 | 16.70 |
| Functional Units (acreage x actual points) | 1.596 | 73.50 |
| Net Acreage Gain | NA | 16.13 |
| Net Functional Unit Gain | NA | 71.90 |

Several breaches in berms were identified during the reconnaissance site visit, but were repaired prior to site monitoring in September. No other specific maintenance issues were identified, however, it may be worthwhile to adjust the distribution of water on the site in order to maximize the available acreage.

In the mitigation design report, the berm areas are indicated to be riparian scrub-shrub areas. These areas were bare ground and had not been planted with riparian shrubs when the site was monitored, though some cottonwood seedlings had established. It is likely that these seedlings will grow taller in subsequent years, however they occur in a single line near the bases of the berms. If these berm areas are to be counted for credit in future years it is likely that the upper portions of the berms will need to be planted with shrubby riparian species.

2.7 Hoskins Landing (Missoula District, Year 6)

The Hoskins Landing Wetland Mitigation Site was developed to mitigate wetland impacts associated with the MDT proposed Dixon-West and Paradise-East highway reconstruction projects along Highway 200. Hoskins Landing is located in Sanders County, in the Lower Clark Fork Watershed (watershed #3). The mitigation site is located approximately one quarter mile north of Dixon, adjacent to the Flathead River. The elevation of the site is approximately 2,500 feet above mean sea level with slight topographic variation throughout. Pre-construction wetland delineation documented 5.85 acres of wetlands and 0.82 acre of “extremely marginal” reed canarygrass swales at the site. Consequently, definitive baseline wetland acreage was 5.85 acres.

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

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

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

The site was designed to mitigate for specific wetland functions impacted by MDT roadway projects, including: stormwater retention, roadway runoff filtration, sediment and nutrient retention, water quality, groundwater recharge, wildlife habitat and riparian vegetation.

As of 2007, approximately 13.01 wetland acres occur on the mitigation site. The initially-calculated net increase in aquatic habitat acres to date is approximately $13.01 - 5.85 = 7.16$ acres, or 0.94 acre short of the 8.1-acre goal. However, further investigation of the baseline delineation report and MDT mitigation project design plans revealed that approximately 0.6 acre of pre-project wetlands (two small, isolated emergent depressions) occurred within the proposed 8.1-acre “wetland creation” footprint. Also, approximately 0.3 to 0.4 acre of wetlands were mapped on the site during the baseline delineation, essentially outside of project disturbance limits, that are no longer present on the site due to climate or other hydrologic conditions. These included a very narrow (1-foot wide) spotty emergent fringe along the Flathead River, patchy occurrences in the floodplain, and an area in the historic side channel that was since filled by natural gravel deposition. Combined, these areas virtually equate to the 0.94-acre discrepancy between the 2007 “net” 7.16-acre wetland total and the 8.1-acre goal.

The two pre-existing wetland patches within the designed wetland creation footprint were isolated, low-quality, grazed reed canarygrass-dominated areas providing little wetland function (Category IV). These sites were converted to part of a single, much larger, and higher-quality Category III wetland upon project implementation. As such, credit may be warranted for these areas (e.g., they would not be counted in the “pre-existing” acreage total, and therefore not subtracted from the 2007 13.01-acre wetland total). Similarly, the 0.3 to 0.4 acre of small pre-existing sites that are no longer present on the project site due to natural conditions should not be

debited against credit totals. Taking these factors into consideration, the adjusted “pre-existing” acreage total would be $5.85 - (0.6) - (0.3 \text{ to } 0.4) = 4.85 \text{ to } 4.95$ acres. The 2007 credit total would then be $13.01 - (4.85 \text{ to } 4.95) = 8.06 \text{ to } 8.16$ acres, virtually equal to the 8.1-acre goal. This potential credit allocation would be subject to COE and CSKT review / approval.

Functional assessment results are summarized in **Table 13** below. The vast majority of wetlands on the Hoskins Landing mitigation site are currently rated as Category III (moderate value), primarily due to moderate ratings for wildlife/fish habitat, threatened and endangered species habitat, and flood attenuation variables. During 2006, the site received a moderate rating for T&E habitat due to observation of a bald eagle (*Haliaeetus leucocephalus*) at the site. In 2007, the bald eagle was de-listed as an endangered species and currently is considered a MNHP species with a S3 rating. In turn, the de-listing changed the functional assessment ratings by decreasing the T & E species habitat and increasing the MNHP species habitat rating. The change in ratings did not have any effect on the overall functional assessment score for the site with it remaining similar to 2006 scores. Based on functional assessment results (**Table 13**), approximately 96.67 functional units occur at the Hoskins Landing mitigation site. Baseline functional assessment results are also provided in **Table 13** for general comparisons. Approximately 65.45 functional units have been gained at the site, although pre- and post-construction functional assessment methods differed slightly.

Three upland plantings areas were evaluated; these areas include the upland islands, river bank terrace and along the upper banks of the backwater (side) channel. During 2007 monitoring, species survival remained similar to those observed in 2006 with an overall estimate of moderate to high rating. Woods rose and snowberry, which had the highest survival following the initial plantings, were healthy with vigorous new growth. The other species including hawthorn, chokecherry, serviceberry, ponderosa pine and American plum were less healthy and had low occurrences. Survival ratings were considered low, following the 2004 planting season, due to a high mortality experienced that season. The remaining live plantings observed in 2005, 2006 and 2007 are successfully surviving at this site.

One wetland planting area was evaluated; along the south slopes of the excavated wetland. Survival rates for the wetland plantings were high with sandbar willow and cottonwood having the highest overall estimated rates. Several other species including Bebb's willow, red osier dogwood and alder were present but at lower counts. Several woody species that had low survival rates during the 2003 monitoring were replanted in 2004. The replacement plants are doing well and exhibited an overall estimated high survival rate in 2007. Approximately 2,000 willow cuttings were installed around the fringe of excavated wetland and show vigorous seasonal growth.

Several Category 1 noxious weeds were still present but at low cover values: Canada thistle, Dalmatian toadflax, hound's-tongue, oxeye daisy, St. John's wort, and spotted knapweed. Category 3 yellowflag iris and a water-milfoil species were also present within the mitigation site. The Confederated Salish and Kootenai Tribes are diligently following a five year (2005 to 2010) vegetation management plan that includes invasive weed control and revegetation efforts. Weed control activities were observed during the mid-season visits including herbicide

Table 13: Summary of 1999 (baseline^a) and 2007 wetland function/value ratings and functional points at the Hoskins Landing Wetland Mitigation Project.

| Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method | Evaluation Year/Assessment Area | | | | | | | |
|---|---------------------------------|------------------|-----------------|-----------------|---|---------------------------------|--------------|----------------------------|
| | 1999 Baseline 1A | 1999 Baseline 1B | 1999 Baseline 3 | 1999 Baseline 8 | 1999 Baseline 2, 9A, 9B, 10, 11, 12, 13 | 1999 Baseline 5, 6, 7, 14A, 14B | 2007 Site 5 | 2007 Remainder of Wetlands |
| Listed/Proposed T&E Species Habitat | Low (0.3) | Mod (0.7) | None (0.0) | Mod (0.7) | None (0.0) | None (0.0) | Low (0.0) | Low (0.3) |
| MTNHP Species Habitat | Low (0.1) | Low (0.1) | Low (0.1) | Mod (0.7) | None (0.0) | None (0.0) | Low (0.0) | Mod (0.7) |
| General Wildlife Habitat | High (0.9) | Mod (0.5) | Mod (0.5) | High (0.9) | Low (0.1) | Low (0.1) | Low (0.2) | Mod (0.7) |
| General Fish/Aquatic Habitat | Low (0.2) | Mod (0.7) | NA | High (1) | NA | NA | NA | High (0.8) |
| Flood Attenuation | Mod (0.5) | Low (0.2) | Low (0.2) | Low (0.1) | Low (0.2) | NA | Low (0.2) | Mod (0.4) |
| Short and Long Term Surface Water Storage | High (0.8) | NA | Low (0.3) | NA | NA | Low (0.3) | Low (0.3) | High (0.9) |
| Sediment, Nutrient, Toxicant Removal | High (1.0) | High (1.0) | High (1.0) | Mod (0.5) | High (1.0) | Mod (0.5) | Mod (0.5) | Mod (0.4) |
| Sediment/Shoreline Stabilization | Mod (0.7) | Mod (0.7) | NA | Mod (0.4) | High (0.9) | NA | NA | Mod (0.6) |
| Production Export/ Food Chain Support | High (0.8) | Mod (0.6) | Mod (0.6) | Mod (0.7) | Low (0.2) | Low (0.1) | Low (0.2) | High (1.0) |
| Groundwater Discharge/ Recharge | High (1.0) | High (1.0) | High (1.0) | Low (0.1) | Low (0.1) | High (1.0) | High (1.0) | 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 (1.0) | Low (0.1) | Low (0.1) | Low (0.1) | Low (0.3) |
| Actual Points/ Possible Points | 6.6 / 12 | 5.8 / 11 | 4.0 / 9 | 6.3 / 11 | 2.8 / 10 | 2.3 / 9 | 2.8 / 10 | 7.6 / 12 |
| % of Possible Score Achieved | 55% | 53% | 44% | 57% | 28% | 26% | 28% | 63% |
| Overall Category | III | III | III | II* | IV | IV | IV | III |
| Total Acreage of Assessed Wetlands and Open Water within Easement (ac) | 2.58 | 0.86 | 0.68 | 0.06 | 0.75 | 1.74 | 0.46 | 12.55 |
| Functional Units (fu) (acreage x actual points) | 17.03 | 4.99 | 2.73 | 0.37 | 2.10 | 4.00 | 1.29 | 95.38 |
| Total Acreage at Site | 6.67 | | | | | | 13.01 | |
| Total Functional Units at Site | 31.22 | | | | | | 96.67 | |
| Net Acreage Gain | NA | | | | | | 6.34 | |
| Net Functional Unit Gain | NA | | | | | | 65.45 | |

^aThe 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 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 monitoring.



applications, minor grazing and mowing. Weed control activities seem to be working with observations of lower cover values for previous weedy areas. .

Evidence of livestock accessing the site was observed during a fall 2007 visit. During 2006, an electric fence was periodically put into place, running parallel with the river setback from the shoreline. Fences were removed prior to seasonal flows and re-installed during August to exclude livestock. The drier upland grass meadows were grazed and trampling within the wetlands was observed. Minor browse on the woody plantings within the wetland area was also observed.

2.8 Jack Creek Ranch (Butte District, Year 4)

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

The project was intended to develop approximately 50 acres of wetlands within the 86-acre pasture owned by the Jack Creek Ranch, LLC. The overall goal for restoration consists of two main areas: restoring wetland hydrology to the Horseshoe pasture and restoring a reach of McKee Spring Creek to a naturally functioning stream channel. The objectives are consistent with historical conditions prior to the drainage of the Horseshoe pasture and the creation of in-stream reservoirs within the McKee Creek channel. During the 1940's, ditches were excavated in the Horseshoe pasture as a recommendation from the Soil Conservation Service (SCS) to lower groundwater. Field notes from SCS personnel describe the site as "very wet, hummocky with standing water, sedges and water loving plants." The final drainage system was a horseshoe shaped ditch that averaged 20 feet wide, 6 to 8 feet deep and nearly 1 mile long. In addition to draining wetland areas within the ranch, significant impacts occurred to McKee Spring Creek, such as widening as a result of prolonged cattle grazing and the mechanical excavation of ponds within the creek channel.

In the summer of 2003, the drainage systems along the perimeter of the Horseshoe pasture were filled. Selected areas within the Horseshoe pasture were graded to increase habitat diversity. Disturbed areas were seeded with a wetland seed mix and planted with containerized wetland species. Woody species were planted to restore a scrub-shrub wetland within portions of the pasture. Also, in the summer of 2003, a new channel was constructed for McKee Spring Creek and the over-widened areas (in-stream reservoirs) were filled. Disturbed areas were revegetated with containerized wetland plants and wetland seed. Trees and shrubs were also planted along portions of the channel to restore a scrub-shrub wetland community along the new stream corridor.

The gross wetland boundary increased to 46.43 acres in 2007. From 2006 to 2007, this one-year gain encompasses 4.28 acres and includes 2.13 acres of shallow open water (<4 feet deep). The

mitigation efforts have thus far resulted in 46.43 gross wetland acres or 93% of the goal (the 50 acre goal included the pre-existing wetlands). Subtracting the original wetland acreage of 1.99 acres, the new net acreage of aquatic habitats totals 44.44 acres.

Functional assessment results are summarized in **Table 14**. Pre-construction functional assessments were completed for the wetlands as well as the middle reach of McKee Spring Creek by ADC. The results of that assessment are included in **Table 14**. The monitoring area has gained 373 functional units since construction. The site remains a Category II wetland and scores 390 functional units.

Table 14: Summary of 2002 and 2007 wetland function/value ratings and functional points at the Jack Creek Ranch Wetland Mitigation Project.

| Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method | 2002 ¹ Pre-construction | 2007 ² Post-construction |
|--|---------------------------------------|--|
| Listed/Proposed T&E Species Habitat | Low (0) | Low (0.3) |
| MTNHP Species Habitat | Mod (0.6) | Mod (0.6) |
| General Wildlife Habitat | Low (0.3) | Exc (1.0) |
| General Fish/Aquatic Habitat | Mod (0.6) | Mod (0.7) |
| Flood Attenuation | NA | Low (0.1) |
| Short / Long Term Surface Water Storage | NA | High (0.9) |
| Sediment, Nutrient, Toxicant Removal | NA | High (0.9) |
| Sediment/Shoreline Stabilization | NA | High (1.0) |
| Production Export/Food Chain Support | Low (0.3) | High (0.8) |
| Groundwater Discharge/Recharge | Low (0.1) | High (1.0) |
| Uniqueness | Low (0.1) | Mod (0.4) |
| Recreation/Education Potential | Low (0.1) | Mod (0.7) |
| Actual Points/Possible Points | 2.7/9 | 8.4/12 |
| % of Possible Score Achieved | 30% | 70% |
| Overall Category | III | II |
| Total Acreage of Assessed Wetland / Open Water Areas within Easement | 23.6 | 46.43 |
| Functional Units (acreage x actual points) (fu) | 49.8 | 390.0 |
| Net Acreage Gain in Mitigation Area (ac) | NA | 44.44 |
| Approximate Functional Unit Gain in Mitigation Area (acreage gain x actual points) (fu) | --- | 373.3 |

¹ 2002 baseline assessment included the horseshoe wetland as well as the lower and middle reaches of McKee Spring Creek.

Approximately 1.99 acres of wetlands occurred in the mitigation area pre-project.

² Assessment areas include the horseshoe wetlands and the middle reach of McKee Spring Creek (the mitigation area).

The site has two State of Montana Noxious Weeds, Canada thistle and hounds tongue. Only a few live hounds tongue were noted during the July 2007 monitoring visit within the McKee Spring creek floodplain. Weed control efforts have been effective in significantly reducing these two species. Canada thistle still continues to pose the greatest problem in the transition and upland areas. Continued spot spraying is recommended in 2007 primarily for Canada thistle and hounds tongue.

2.9 Kleinschmidt Creek (Missoula District, Year 6 – Final Year)

Kleinschmidt Creek is located in the Upper Clark Fork River Basin (watershed # 2) in Powell County. The mitigation site is located approximately six miles east of Ovando and is directly adjacent to MT Highway 200. Elevations of the site range from 4,200 ft. at the eastern boundary to 4,180 ft. at the western boundary. The site was privately designed and constructed, and the MDT agreed to purchase 12 acres of credit at the site to mitigate wetland impacts associated with two MDT projects, Clearwater Junction North and Helmville Junction, and to serve as a reserve for future MDT projects in the watershed.

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

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

Restoration

- Narrowing and deepening the existing manipulated stream channel, restoring the portion narrowed as wetland.
- Planting woody vegetation at a density of 500 stems per acre.
- Eliminating the existing stock water channel under the highway.

Creation

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

High Intensity Enhancements

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

Low Intensity Enhancements

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

The site was designed to mitigate for specific wetland functions impacted by MDT roadway projects, including: stormwater retention, roadway runoff filtration, sediment and nutrient

retention, water quality, groundwater recharge, and wildlife habitat. Overall mitigation credit goals and credit ratios approved by the COE are as follows. MDT agreed to purchase 12 acres of credit from the site.

| Project Component | Total Estimated Acres | Credit Ratio | Credit Acres |
|------------------------------------|------------------------------|---------------------|--------------------------|
| Restoration | 6.00 | 1:1 | 6.00 |
| Creation | 1.19 | 1:1 | 1.19 |
| High-Intensity Enhancement | 8.05 | 1:2 | 4.02 |
| Low-Intensity Enhancement | 3.43 | 1:3 | 1.14 |
| 75-Foot Upland Buffer Preservation | 12.69 | 1:4 | 3.17 |
| Total | 31.36 | | 15.52^a |

^a MDT agreed to purchased 12 acres of credit from the site.

As of 2007, approximately 22.71 acres of wetland and 2.41 acres of open water (restored stream channel/portions of excavated wetlands) occur at the Kleinschmidt Creek mitigation site. This represents an approximate increase of 8.93 wetland acres and, per the design, a 5.18-acre decrease of over-excavated, straightened open water channel as compared to baseline conditions. Open water on the site is currently comprised of 1.75 acres of restored sinuous channel and 0.66 acre of excavated shallow water as a component of wetland creation.

Table 15 summarizes the maximum credit that could be assigned to the site as of 2007. Target mitigation credit ratios and acres were agreed upon prior to site construction, with the exception of incidental wetland restoration within proposed upland buffer areas, for which no performance standards or ratios were discussed. As these areas are restoring naturally within the easement, a 1:1 credit ratio was assumed.

Extrapolated stem densities are likely greater than actual densities; however, the site has developed 4.7 acres of unanticipated wetland and shown substantive functional and habitat improvement. Consequently, although a maximum of 17.9 acres of “potential credit” is estimated, it is recommended that 12 acres of actual credit be certified at this time by the Corps to account for the estimation (an approximate 1.5:1 adjustment), and monitoring be discontinued. Additional credit could be sought from the Corps by the landowner / MDT should the low-intensity area at some point be re-planted with woody vegetation to account for incidental grazing impacts.

Functional assessment results are summarized in **Table 16** below. The two assessment areas (AA’s) evaluated at Kleinschmidt Creek, separated into the channel corridor/wetlands and excavated wetland areas, both rated Category II (high value) and Category III (moderate value) areas, respectively. Functional units at the site have essentially doubled since project construction.

Although the landowner treated weeds near upper excavated shallow open water area and other areas in 2004 and 2007, several noxious weeds are present, but at much lower quantities. These included Canada thistle, hounds tongue, oxeye daisy and spotted knapweed. Significant progress has been made during the 2007 season to eradicate weeds from the site. The continued spread of

Table 15: Maximum 2007 credit for the Kleinschmidt Creek Wetland Mitigation Site.

| Mitigation Type | Current Acres | Ratio | Current Maximum Credit Acres | Overall Target Credit Acres | Comments |
|-------------------------------------|---------------|-----------|------------------------------|-----------------------------|---|
| Designed Restoration | 6.0 | 1:1 | 6.0 | 6.0 | Does not include 1.75 acres of open water stream channel. Extrapolated stem density (1,607) is exceeding performance standard (500). |
| Designed Creation | 1.19 | 1:1 | 1.19 | 1.19 | Includes 0.66 acre of designed shallow open water. Extrapolated stem density along upland / wetland border (1,700) is exceeding assumed performance standard (500). |
| Designed High-Intensity Enhancement | 8.05 | 1:2 | 4.02 | 4.02 | Extrapolated stem density (1,917) is exceeding performance standard (1,000) |
| Designed Low-Intensity Enhancement | 3.43 | 1:3 | 0.0 | 1.14 | Plantings were destroyed by grazing. Actual stem density (38) is not meeting performance standard (500). No credit likely at this time. Recommend re-planting this area if credit is desired. |
| Incidental Restoration | 4.70 | 1:1 | 4.70 | 0.0 | 4.70 acres of intended 12.69-acre upland buffer within easement reverted to emergent wetland. 1:1 ratio is assumed and has not been verified with the Corps of Engineers. |
| Designed Upland Buffer | 7.99 | 4:1 | 1.99 | 3.17 | 7.99 acres of intended 12.69-acre upland buffer. |
| Grand Total | 31.36 | -- | 17.90 | 15.52^a | 115% of 15.52-acre overall goal, 149% of 12-acre MDT goal |

^a MDT agreed to purchase 12 acres of credit at the site.

noxious weeds within the dry portion of upland areas within the mitigation areas is still possible and annual control efforts should continued to eliminate this spread.

Areas outside the perimeter of the excavated wetlands, which are currently dominated by mostly invasive species, could be treated via mechanical and cultural weed control activities to control invasive species. These include mowing or hand whipping of taller weed species and seeding of bare ground with an appropriate mix suited for the hydrological regime. Mechanical weed control would be recommended due to the woody vegetation already installed in this area. Areas where aggressive reed canarygrass is encroaching on planted woody species could be mechanically controlled to limit disturbance to plantings. Heavy browse from local wildlife has been observed across the entire site. Control measures such as chemical browse repellants should be considered to avoid further browse damage or eventual mortality to shrub and tree species.

To achieve credit in the low intensity sections, the areas impacted by livestock grazing would likely need to be revegetated with woody plants.

Table 16: Summary of 1998 (baseline) and 2007 wetland function/value ratings and functional points at the Kleinschmidt Creek Wetland Mitigation Project.

| Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method ^a | Evaluation Year/Assessment Area | | | |
|--|---------------------------------------|---------------------------------------|---------------------------------|---|
| | 1998 Channel & Wetlands Lower Section | 1998 Channel & Wetlands Upper Section | 2007 Channel & Wetlands (PBS&J) | 2007 Ponds ² (PBS&J ³) |
| Listed/Proposed T&E Species Habitat | Low (0.2) | Low (0.2) | Mod (0.8) | Low (0.0) |
| MTNHP Species Habitat | Low (0.1) | Low (0.1) | High (1.0) | Low (0.2) |
| General Wildlife Habitat | Mod (0.5) | Mod (0.5) | Mod (0.7) | Mod (0.7) |
| General Fish/Aquatic Habitat | Low (0.2) | Low (0.2) | Mod (0.7) | NA |
| Flood Attenuation | NA | NA | NA | NA |
| Short and Long Term Surface Water Storage | Mod (0.5) | Mod (0.5) | High (1.0) | High (1.0) |
| Sediment, Nutrient, Toxicant Removal | Mod (0.5) | High (1.0) | High (0.9) | Mod (0.7) |
| Sediment/Shoreline Stabilization | Mod (0.4) | Mod (0.4) | High (1.0) | Mod (0.7) |
| Production Export/Food Chain Support | High (0.8) | High (0.8) | High (0.8) | Mod (0.7) |
| Groundwater Discharge/Recharge | High (1.0) | High (1.0) | High (1.0) | High (1.0) |
| Uniqueness | Low (0.2) | Low (0.2) | Low (0.3) | Low (0.3) |
| Recreation/Education Potential | Low (0.1) | Low (0.1) | Low (0.3) | Low (0.3) |
| Actual Points/Possible Points | 4.5/11 | 5/11 | 8.5/11 | 5.6/10 |
| % of Possible Score Achieved | 41% | 45% | 77% | 56% |
| Overall Category | III | III | II | III |
| Total Acreage of Assessed Wetlands and Open Water within Easement (acre) | 10.40 | 12.90 | 23.57 | 1.55 |
| Functional Units (acreage x actual points) | 46.80 | 64.50 | 200.34 | 8.68 |
| Total Functional Units At Site | 111.30 | | 209.02 | |
| Total Functional Unit “Increase”^{aa} | NA | | 97.72 | |

^a The baseline assessment (1998) was performed using the 1997 MDT Assessment Method. Several parameters were substantially revised in the 1999 MDT Assessment method, which was used to evaluate 2006 monitoring conditions. Thus, direct comparison of pre- and post-project functions is not possible; although, some general trends can be noted.

2.10 Lame Deer (Glendive District, Year 6 – Final Year)

The Lame Deer - East wetlands, located in the Middle Yellowstone Watershed (watershed #14), were constructed to mitigate in part for the 2.5 acres of wetland impact to the Alderson Creek corridor during the Hwy. 212 reconstruction project. The monitoring site is located in Rosebud County within the town of Lame Deer, MT. There are three 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.

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.

Several changes in the original grading plan of the School Mitigation Site have occurred and thus affected the mitigation goal of 1.79 acres. A trail (0.1 acre) was constructed through the southwest side of the originally planned wetland, decreasing the mitigation acreage to 1.68 acres (1.23 acres creation and 0.45 acre restoration). In 2000, due to concerns regarding the presence of a sanitary sewer line through the wetland, MDT further redesigned the mitigation site to place fill over the line to protect from freeze and thaw problems. A 6-meter wide area with a 6:1 slope was to be left at existing elevation over the sewer line; no adjustment to the mitigation acreage was performed at this time because it was assumed that this area would develop into wetlands. However, the sewer line overburden will not convert to wetland given the elevation of the deposition. The upland acreage resulting from the sewer line overburden is estimated as 0.2 acre.

Further adjustment to the goal is necessary based on physical area constraints. The original goal includes areas that are outside of the MDT-defined monitoring boundary and beyond the created south and north cells. These include the stormwater inlet swale southwest of the trail (0.4 acre), the willow-dominated area west of the north cell (0.1 acre), and small areas north and east of the north cell and east of the south cell (0.1 acre). The adjusted mitigation wetland goal for the School Site within the monitoring area, accounting for all of the estimated adjustments, is 0.9 acre.

The two recreated wetlands along Hwy. 212 are adjacent to Alderson Creek: Wetland 369 is approximately 4.75 miles from the intersection of Hwy. 39 and 212 in Lame Deer, and Wetland 380 is 5.5 miles from the intersection. The intent of these mitigation efforts was to re-create approximately 1.5 acres of wetland. The total adjusted mitigation acreage goal is 2.4 acres, of which 0.9 acre (adjusted goal) was intended to be created within the School Mitigation Site defined monitoring area and a total of 1.5 acres at the Highway 212 wetlands.

The 2007 delineation resulted in a total of 0.91 acre of wetland development within the north and south cells of the School Mitigation Site. The estimated gross wetland acreages for the recreated wetlands along Hwy. 212 were 0.79 acre at Wetland 369 and 0.39 acre at Wetland 380. The total gross wetland acreage within the three Lame Deer-East mitigation sites is 2.09 acres, a 0.17 acre increase since 2006; representing 87% of the adjusted mitigation acreage goal for the Lame Deer-East mitigation site. There is a potential for the north and south cells of the School Mitigation Site to expand from the current 0.91 acre to approximately 1 acre. The maximum potential wetland acreage at W-369 is the current gross wetland boundary of 0.79 acre and is 0.39 acre for W-380; in both areas the potential maximum wetland acreage is identical to the current gross wetland acreage.

The 2007 functional assessments of the school and creek monitoring sites are summarized in **Table 17**. The school mitigation monitoring site continued to score as a Category III wetland in 2007. Functional units (FU) decreased slightly from 2006 as the site is no longer subject to wave action (increased vegetation), which nominally affected the score. Wetland 369 increased to a Category II wetland as a result of the new observation of northern leopard frogs within the wetland; FU increased from 5.04 in 2006 to 6.95 in 2007. Wetland 380 is also a Category II site

Table 17: Summary of 2007 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 | 2007 School Site | 2007 W-369 | 2007 W-380 |
|---|------------------|---------------|---------------|
| Listed/Proposed T&E Species Habitat | Low (0) | Low (0) | Low (0) |
| MTNHP Species Habitat | Moderate (.7) | High (.8) | High (1.0) |
| General Wildlife Habitat | Moderate (.7) | High (.9) | High (.9) |
| General Fish/Aquatic Habitat | NA | High (.8) | High (.8) |
| Flood Attenuation | Low (.2) | Low (.2) | Low (.1) |
| Short and Long Term Surface Water Storage | Moderate (.6) | High (.8) | High (.8) |
| Sediment, Nutrient, Toxicant Removal | High (1) | High (1) | High (.9) |
| Sediment/Shoreline Stabilization | NA | High (1) | High (1.0) |
| Production Export/Food Chain Support | Mod (.4) | Moderate (.7) | Moderate (.6) |
| Groundwater Discharge/Recharge | High (1) | High (1) | High (1) |
| Uniqueness | Mod (.4) | Mod (.6) | Mod (.4) |
| Recreation/Education Potential | High (1) | High (1) | High (1) |
| Actual Points/Possible Points | 6.0/10 | 8.8/12 | 8.5/12 |
| % of Possible Score Achieved | 60% | 73% | 71% |
| Overall Category | III | II | II |
| Total Acreage of Assessed Wetlands within Monitoring Area | 0.91 | 0.79 | 0.39 |
| Total Functional Units (acreage x actual points) | 5.46 | 6.95 | 3.31 |
| Net Acreage Gain (“new” wetlands) | 0.91 | 0.79 | 0.39 |
| Net Functional Unit Gain (new acreage x actual points) | 5.46 | 6.95 | 3.31 |
| Total Functional Unit Gain Lame Deer-East Mitigation Sites | 15.72 | | |

due to the breeding population of the northern leopard frogs; FU remained the same from 2006 to 2007. Total functional unit gain for all Lame Deer-East Mitigation sites as of 2007 is 15.72, a slight increase since 2006.

The stormwater inlet culvert in the southwest corner of the south cell of the School Mitigation Site was in working order and required no maintenance. Although not technically part of the MDT project, the outflow culvert in Wetland-369 is blocked by sediment and woody debris; the beaver dam remains present.

2.11 Little Muddy Creek (Great Falls District, Year 4)

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

to offset impacts associated with ten different projects within the Missouri-Sun-Smith River watershed (#7). An additional 50 acres of reserve credit was also being sought by MDT. Thus, MDT originally sought a total 63.57 acres of compensatory wetland mitigation credit.

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

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

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

As of 2007, the Little Muddy site has developed 65.06 acres of Class II wetland, 66.66 acres of transitional open water, and 24.72 acres of mudflat for a total of 156.44 acres of aquatic habitat.

Approximately 0.80 acre, 9.97 acres, and 2.80 acres of the originally-anticipated 13.57-acre impacts to be mitigated at this site were projected at Class II, III, and IV wetlands, respectively. The COE approved application of these projected impact acres to the Little Muddy site as previously “owed” mitigation, with the exception of the Bowman’s Corner project, which comprised 10.7 of the 13.57 projected impact acres. Consequently, 2.87 acres of “owed” mitigation was approved for application against the Little Muddy site, with any additional projects (including Bowman’s Corner) to be applied against the 50-acre “reserve”. Final application of projected or incurred wetland impacts against this mitigation site are subject to ongoing discussions and specific agreements between the COE and MDT. However, as of 2007, the site appears to be developing the anticipated target credits.

In 2007, the Little Muddy Creek Wetland Mitigation Site continued to rate as a Category II wetland because it achieved an exceptional wildlife habitat rating (**Table 18**). The site also rated high for short and long term surface water storage and production export/food chain support (**Table 18**). However, the total score and functional units dropped slightly from 2006. This drop was attributable to the de-listing of the Bald Eagle and the absence of aquatic bed habitat.

Table 18: Summary of 2007 wetland function/value ratings and functional points at the Little Muddy Creek Wetland Mitigation Site.

| Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method | 2007 |
|--|-----------------|
| Listed/Proposed T&E Species Habitat | Low (0.0) |
| MTNHP Species Habitat | Mod (0.6) |
| General Wildlife Habitat | Exc (1.0) |
| General Fish/Aquatic Habitat | Mod (0.4) |
| Flood Attenuation | Mod (0.6) |
| Short and Long Term Surface Water Storage | High (1.0) |
| Sediment, Nutrient, Toxicant Removal | Mod (0.7) |
| Sediment/Shoreline Stabilization | Low (0.3) |
| Production Export/Food Chain Support | High (0.8) |
| Groundwater Discharge/Recharge | Low (0.1) |
| Uniqueness | Mod (0.4) |
| Recreation/Education Potential | Mod (0.7) |
| Actual Points/Possible Points | 6.6 / 12 |
| % of Possible Score Achieved | 55% |
| Overall Category | II |
| Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries (ac) | 156.44 |
| Functional Units (acreage x actual points) | 1032.50 |

The berm, diversion structures, excavated channels, and inlet/outlet structures were in good condition during the mid-season visit. During the initial filling of the site, water was released in phases in order to prevent erosion of the berm. Vegetation on the berm has grown dense and tall. In 2006 it was suggested that extremely wide and deep cracks on the berm near PP-5 should be monitored. However, these cracks were much shallower in 2007, indicating they are ephemeral and a result of how the soil responds to precipitation events.

2.12 Meriwether-East (Great Falls District, Year 2)

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

At Site 1, no wetland or other aquatic habitat has yet developed. At Site 2, approximately 4.55 acres of wetland and 2.09 acres of mudflat developed. Although it appeared that mudflat was being colonized by vegetation, the area of wetland decreased and mudflat increase when compared to 2006. This is most likely a result of mapping technology. It is assumed that

acreage calculations in 2007 were more accurate than in 2006. Consequently, 6.64 acres is the maximum assignable credit at Site 2 as of 2007.

As in 2006, Site 2 continued to rate as a Category III wetland (**Table 19**). Notable functions or values included Short and Long Term Water Storage and Groundwater Discharge/Recharge. The functional assessment score decreased by two points because general wildlife habitat was deemed low quality in 2007. In 2007 the site lacked patches of surface water that had attracted several shorebirds and insect species in 2006. As a result the total functional units decreased slightly in 2007.

The dikes were surveyed for erosion problems in 2007. The dikes were covered evenly with erosion control fabric and no erosion problems were found.

Table 19: Summary of 2007 wetland function/value ratings and functional points at Site 2 of the Meriwether-East Wetland Mitigation Site.

| Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method | 2007 Site 2 |
|--|-------------|
| Listed/Proposed T&E Species Habitat | Low (0.0) |
| MTNHP Species Habitat | Low (0.0) |
| General Wildlife Habitat | Low (0.2) |
| General Fish/Aquatic Habitat | NA |
| Flood Attenuation | Mod (0.5) |
| Short and Long Term Surface Water Storage | High (0.9) |
| Sediment, Nutrient, Toxicant Removal | Mod (0.7) |
| Sediment/Shoreline Stabilization | NA |
| Production Export/Food Chain Support | Mod (0.6) |
| Groundwater Discharge/Recharge | High (1.0) |
| Uniqueness | Low (0.3) |
| Recreation/Education Potential | Low (0.1) |
| Actual Points/Possible Points | 4.3 / 10 |
| % of Possible Score Achieved | 43% |
| Overall Category | III |
| Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries (ac) | 6.64 |
| Functional Units (acreage x actual points) | 28.5 |

2.13 Norem Ranch (Billings District, Year 4)

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

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

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

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

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

As of 2007 the gross wetland boundary encompasses 12.54 acres, including 1.35 acres of shallow open water (<4 feet deep). However, it should be noted that this total does not include two small pre-existing wetland lobes (totaling 0.05 acre) within the easement that extend to the southeast outside of the MDT-defined monitoring area in the northeast corner of the site. Pre-existing wetland acreage totaled 6.98 acres, which did include the two wetland lobes outside of the current monitoring area. Therefore, pre-existing wetland within the current monitoring area was approximately $6.98 - 0.05 = 6.93$ acres. Wetland / shallow open water acreage within the shown monitoring area has therefore increased by approximately $12.54 - 6.93 = 5.61$ acres since construction (2002). Credit is assigned for enhancement of the original 6.98 wetland acres on the property, as well as the open water (1.35 acres) and wetland creation (4.26 acres) achieved within the monitoring area to date. As of 2007, the approximate assignable wetland credit at the site is 9.43 acres or 64% of the goal, as outlined in **Table 20**.

Table 20: 2007 wetland credits and acreages for the Norem Ranch Wetland Mitigation Site.

| Wetland Mitigation Type | 2007 Net Acres | Ratio | 2007 Credit Acres | Target Credit Acres | Comments |
|----------------------------|----------------|-----------|-------------------|---------------------|--|
| Wetland Enhancement | 6.98 | 3:1 | 2.32 | 2.32 | Grazing removal, hydrological enhancement, and planting completed, with plants developing. |
| Wetland Creation | 4.26 | 1:1 | 4.26 | 9.46 | 45% of the wetland creation area has been converted to wetlands. |
| Open Water Creation | 1.35 | 1:1 | 1.35 | 1.58 | 85% of the intended open water has developed. |
| Buffer Zone Implementation | 6.00 | 4:1 | 1.50 | 1.50 | 2007 net buffer area was assumed within easement. |
| Berm impact | -- | -- | --- | -0.15 | --- |
| Total | 18.59 | -- | 9.43 | 14.71 | 64% of goal |

The cottonwood community adjacent to the river is likely to shift from an upland understory to a wetland understory over time. Elevations at the proposed wetland creation area in the northwest corner of the site may be too high to achieve the desired wetlands in this area; this area will continue to be examined in subsequent monitoring years.

Functional assessment results are summarized in **Table 21** below. Pre-construction functional assessments were completed for the wetlands by Maxim in 2001 and results of that assessment are included in **Table 21**. The site rated as an overall Category II wetland and scores 82 functional units. This represents an increase of approximately 48.25 units since 2001. Wildlife use, particularly migratory birds, will continue to increase with the expansion of the wetlands, open water features and the proliferation of the trees and shrubs.

In 2005, the site had four State of Montana noxious weeds: Canada thistle, leafy spurge, whitetop and spotted knapweed. During the 2006 monitoring trip very few leafy spurge, whitetop and spotted knapweed plants were noted. Most of these weed species had been sprayed and were not viable at the time of the monitoring. During the 2007 monitoring, whitetop was not observed. Effective weed control has eliminated or significantly reduced this weedy species. Leafy spurge, field bindweed and spotted knapweed are small infestations located along the access road or around Pond 1. Canada thistle is still present, typically in the transition zones between wetlands and uplands. The landowner has implemented biological, mechanical and chemical control and has significantly reduced the population of Canada thistle. Due to the difficulty in controlling this noxious weed and leafy spurge, continued weed control measures are recommended.

2.14 Perry Ranch (Great Falls District, Year 6)

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

Table 21: Summary of 2001 (baseline) and 2007 wetland function/value ratings and functional points at the Norem Ranch Wetland Mitigation Project.

| Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method | 2001 Baseline Assessment | 2007 Post-construction |
|---|--------------------------|------------------------|
| Listed/Proposed T&E Species Habitat | Low (0) | Low (0.0)* |
| MTNHP Species Habitat | Low (0.1) | Mod (0.6) |
| General Wildlife Habitat | Moderate (0.5) | Exc (1.0) |
| General Fish/Aquatic Habitat | Low (0.1) | NA |
| Flood Attenuation | Moderate (0.5) | Mod (0.5) |
| Short and Long Term Surface Water Storage | Moderate (0.6) | Mod (0.6) |
| Sediment, Nutrient, Toxicant Removal | High (1.0) | High (0.9) |
| Sediment/Shoreline Stabilization | NA | NA |
| Production Export/Food Chain Support | Moderate (0.7) | High (0.8) |
| Groundwater Discharge/Recharge | High (1.0) | High (1.0) |
| Uniqueness | Low (0.2) | Mod (0.4) |
| Recreation/Education Potential | Low (0.1) | Mod (0.7) |
| Actual Points/Possible Points | 4.8/11 | 6.5*/10 |
| % of Possible Score Achieved | 50 | 65* |
| Overall Category | III | II |
| Total Acreage of Assessed Wetlands within Easement | 7.0 | 12.54 |
| Functional Units (acreage x actual points) | 33.6 | 81.51* |
| Net Acreage Gain | NA | 5.61 |
| Net Functional Unit Gain | NA | 48.25* |

*The delisting of the bald eagle from the threatened and endangered species list reduced the functional points/scores in 2007.

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

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

No specific performance criteria were required to be met at this site in order to document its success. In general, the site appears to be developing as designed, subject to the limitations of dry and wet years. Approximately 19.9 acres of wetlands presently occur on the site.

Approximately 3.4 acres of wetland occurred at the site prior to construction. The 27.6-acre mitigation goal is inclusive of these 3.4 acres of pre-existing wetlands. Consequently, the net goal for this project is to create 24.2 acres. As of 2007 the site has netted 16.56 wetland acres, or 68% of the project target.

As wetlands have developed within the oxbows and northern excavated area, so have their associated functions and values (**Table 22**). In 2007, the inner oxbow rating remained a Category II site (**Table 22**). A large scrub-shrub (willow) component continues to develop within Type 4 Wetland. In 2007, the outer oxbow maintained its Category II status, and the northern excavated area remained a Category III site (**Table 22**). It rated lower primarily because of its lower value associated with rare and general wildlife species and production export/food chain support. It appears to be maintaining this category because it is being fed by groundwater; however, soils will need to be inundated or saturated for a longer period for it can increase in function or value. In 2007, the total 121 functional units represent the net gain for the Perry Ranch Wetland Mitigation Site.

Table 22: Summary of baseline and 2007 wetland function/value ratings and functional points at the Perry Ranch Wetland Mitigation Project.

| Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method ¹ | Pre-Construction (1997 method) | | Post-construction (1999 method) | | |
|--|-----------------------------------|-------------|------------------------------------|--------------------------------|------------------------------|
| | Inner Oxbow | Outer Oxbow | 2007 Inner Oxbow | 2007 Outer Oxbow | 2007 Northern Excavated Area |
| Listed/Proposed TE Species Habitat | Low (0.1) | Low (0.1) | Low (0.3) | Low (0.3) | Low (0.3) |
| MTNHP Species Habitat | None (0.0) | None (0.0) | Mod (0.7) | Mod (0.7) | Mod (0.6) |
| General Wildlife Habitat | Mod (0.4) | Low (0.1) | Mod (0.7) | Mod (0.7) | Mod (0.4) |
| General Fish/Aquatic Habitat | NA | NA | NA | NA | NA |
| Flood Attenuation | Mod (0.5) | Low (0.2) | Mod (0.5) | Mod (0.5) | Mod (0.5) |
| Short and Long Term Surface Water Storage | -- | -- | High (0.9) | High (0.9) | High (0.9) |
| Sediment, Nutrient, Toxicant Removal | Mod (0.5) | Mod (0.5) | High (1.0) | High (1.0) | High (1.0) |
| Sediment/Shoreline Stabilization | NA | NA | NA | NA | NA |
| Production Export/Food Chain Support | Mod (0.7) | Mod (0.6) | Mod (0.7) | Mod (0.6) | Mod (0.7) |
| Groundwater Discharge/Recharge | High (1.0) | Low (0.1) | High (1.0) | High (1.0) | High (1.0) |
| Uniqueness | Low (0.3) | Low (0.2) | Mod (0.4) | Mod (0.4) | Mod (0.4) |
| Recreation/Education Potential | Low (0.1) | Low (0.1) | Mod (0.7) | Mod (0.7) | Mod (0.7) |
| Actual Points/Possible Points | 4.4 / 10 | 2.7 / 10 | 6.9 / 10 | 6.8 / 10 | 6.5 / 10 |
| % of Possible Score Achieved | 44% | 27% | 69% | 68% | 65% |
| Overall Category | III | IV | II | II | III |
| Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries (ac) | 2.30 | 1.10 | 5.52 | 7.97 | 6.47 |
| Functional Units (acreage x actual points) | 10.12 | 2.97 | 38.09 | 54.20 | 42.1 |
| Net Acreage Gain (ac) | NA | NA | 5.52 – 2.30 = 3.22 | 7.97 – 1.10 = 6.87 | 6.47 – 0.00 = 6.47 |
| Net Functional Unit Gain (fu) | NA | NA | 38.09-10.12 = 27.97 | 54.20 – 2.97 = 51.23 | 42.1 – 0.00 = 42.1 |
| Total Functional Unit Gain | 121.3 | | | | |

Several dike problems were noted during the 2002 summer visit, repaired during 2003, and have been stable into 2007. However, it seems that the site is not getting sufficient water from Cut Bank Creek either because streamflows have been insufficient or because the inlet channel is too high. The Blackfeet Tribe and MDT have developed a weed plan for the Perry Ranch site. Bio-control was established for leafy spurge and Canada thistle and will be monitored through aerial photograph assessments and at four established Weed Photo Points. Leafy spurge is fairly apparent on the 2006 and 2007 aerial photographs as yellow-green patches. It is recommended that the two occurrences of hound's-tongue be removed from the site in 2008.

2.15 Peterson Ranch (Missoula District, Year 6)

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

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

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

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

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

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

Large excavated (proposed) wetland cells west of the main ditch bisecting the property do not appear to be receiving water as originally intended. With the exception of the small ponds, most of these areas were completely dry during all site visits. This is apparently due to the lack of

directly applied irrigation water as originally proposed. The use of irrigation water for these sites was denied by the DNRC as a result of the water rights permitting process.

In 2007, approximately 22.00 acres of wetland and 1.08 acres of open water were mapped on the mitigation site, for a total of 23.08 acres of aquatic habitat. Subtracting the original 22.6 acres of pre-project wetlands from this total yields a current net of approximately 0.48 wetland/open water acres. Additional acreage may form with additional time and more normal precipitation; however, as the originally designed water source (irrigation water) was unable to be implemented, additional wetland development is not likely to be substantive.

The Peterson Ranch was separated into three AAs for purposes of functional assessment. These areas included the created excavation # 1, 2, and associated emergent wet meadow west of the main drainage (AA 1), scrub-shrub/emergent wetlands along the main drainage (AA 2), and the created wetland OW/ponds #3, 4 and 5 with associated emergent vegetation east of the main drainage (AA 3). A complete breakdown of ratings for each assessment area and pre-project AAs are presented in **Table 23** below.

Ratings in 2007 were slightly lower than those derived in 2006. The wetlands on the Peterson Ranch mitigation site are currently rated as Category III (AA 1, 2 and 3) (moderate value). During 2006, the site received a low rating for T&E habitat due to documented incidental habitat with observation of a bald eagle (*Haliaeetus leucocephalus*) at the site. Since last year's monitoring, the bald eagle has been de-listed as an endangered species and currently is considered a MNHP species with a S3 rating. In turn, the delisting changed the functional assessment ratings by decreasing the T & E species habitat and lowering the overall category rating to III. The MNHP species habitat rating remained similar to 2006 and was not changed by the de-listing.

Woody species survival data were collected for the Peterson Ranch. Plantings were difficult to find during the 2004, 2005, 2006 and 2007 monitoring due to extensive herbaceous cover of upland grass species and heavy browse by livestock. The excavation areas # 1 & 2 areas west of the irrigation ditch experienced the heaviest grazing this summer; potential for shrub development in these areas has been greatly reduced due to grazing. Most or all plantings observed in this area prior to 2004 have been removed by livestock. Willow species within this area also had a low survival rate due to either grazing effects or low water levels. OW/ponds # 3, 4 & 5 showed the best survival with higher rates. OW/pond # 3 had the majority of the willows that showed vigorous growth and spread. No silverberry, red osier dogwood, woods rose, or golden current shrubs were observed in 2007. Only nine chokecherry shrubs were observed in 2007.

Several noxious weeds are present including Canada thistle, hound's tongue, oxeye daisy, and spotted knapweed. These generally consist of scattered individuals with moderate coverage. However, weed control and revegetation of disturbed sites would prevent further weed spread, and reduce the risk of new weeds invading. A large population of Canada thistle occurs just outside the north property boundary that could facilitate spread of this species on the site.

Table 23: Summary of 1998 (baseline) and 2007 wetland function/value ratings and functional points at the Peterson Ranch Wetland Mitigation Project.

| Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method | Evaluation Year/Assessment Area | | | |
|---|---------------------------------|---------------|--------------|--------------|
| | 1998 Baseline ^a | 2007 AA 1 | 2007 AA 2 | 2007 AA 3 |
| Listed/Proposed T&E Species Habitat | Low (0.3) | Low (0.0) | Low (0.0) | Low (0.0) |
| MTNHP Species Habitat | Low (0.1) | Low (0.1) | Mod (0.7) | Mod (0.7) |
| 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 (0.3) | Mod (0.5) |
| Short and Long Term Surface Water Storage | High (1.0) | High (0.8) | High (0.8) | High (0.8) |
| Sediment, Nutrient, Toxicant Removal | Mod (0.5) | Mod (0.7) | High (1.0) | Mod (0.7) |
| Sediment/Shoreline Stabilization | NA | Low (0.3) | High (1.0) | High (1.0) |
| Production Export/Food Chain Support | Mod (0.7) | High (0.9) | High (0.8) | High (0.9) |
| Groundwater Discharge/ Recharge | UNK | High (1.0) | High (1.0) | High (1.0) |
| Uniqueness | Low (0.2) | Low (0.3) | Low (0.3) | Low (0.3) |
| Recreation/Education Potential | Low (0.1) | Low (0.1) | Low (0.3) | Low (0.3) |
| Actual Points/ Possible Points | 3.0 / 8 | 5.2 / 11 | 6.9 / 11 | 6.9 / 11 |
| % Of Possible Score Achieved | | 47% | 63% | 63% |
| Overall Category | 38% | III | III | III |
| Total Acreage of Assessed Wetlands and Open Water within Easement by AA | III (borderline IV) | 6.47 | 3.0 | 13.61 |
| Functional Units by AA (acreage x actual points) | 22.6 ac | 33.64 | 20.70 | 93.91 |
| Total Acreage of Assessed Wetlands and Open Water on Site | 67.8 | 23.08 | | |
| Total Functional Units on Site | 22.6 ac | 148.25 | | |
| Net Acreage Gain (assessed wetlands and open water only) | 67.8 fu | 0.48 | | |
| Net Functional Unit Gain | NA | 80.45 | | |

^aThe 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 2007 monitoring. Thus, direct comparison of pre- and post-project functions is not possible, although some general trends can be noted.

The general lack of water at the majority of this site continues to preclude wetland development in many areas. Continued livestock grazing within the area of Pond 1 and 2 is slowing wetland development.

2.16 Ridgeway Complex (Glendive District, Year 7 – Final Year)

The Ridgeway wetland complex was created to provide wetland mitigation credits for MDT impacts in the Little Missouri Watershed (watershed #16). The complex, comprised of sixteen constructed impoundments, is located in Carter County, MT.

Eight wetlands were created during the summer of 2000 and an additional eight were completed in January 2001. The objective for the Ridgeway Complex was to maximize the surface acres of each individual project to create a total of 50 acres of shallow waterfowl habitat. Several

construction designs were employed to create the impoundments; 15 of the 16 impoundments were originally intended to have a surface area of 3.5 acres and one impoundment (#3) 22 surface acres.

As of July 2007, the total aquatic habitat area within the Ridgeway Complex, which includes open water and net wetland acreage, is 57.48 acres, a 4% increase since 2006. The net wetland area (total aquatic habitat minus unvegetated open water) increased from 41.94 acres in 2006 to 47.17 acres in 2007; a 12% increase. As of the 2007 field season, approximately 114% (57.48 acres) of the 50-acre wetland creation goal had been accomplished. Cumulatively, the complex is approximately 82% vegetated emergent wetland, and 18% open water.

Functional Assessment results are summarized in **Table 24**. Several parameter scores have increased as a result of observations since 2001: increase in structural diversity, wildlife usage, and vegetation coverage. The total functional units for the Ridgeway Complex aquatic habitat acreage is 425.87 FU (**Table 24**). All wetlands are Class II sites as a result northern leopard frog observations in 2006 and/or 2007.

The breach is still present in the dam at W-16. Water moves freely between the excavated pond and a developing wetland area south of the berm. There is a breach around the east end of the W-13 dam, which is likely how fish species entered into this wetland. The berm northeast of the W-11 excavated pond may inhibit water from the northeast drainage from entering the site; there is a developing wetland adjacent to this berm. A similar situation exists for W-7; a berm to the northwest may prevent water from entering that side of the wetland. However, W-7 receives water from drainages to the west and wetland vegetation has colonized the entire perimeter of the wetland.

2.17 Rock Creek Ranch (Glendive District, Year 3)

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

Constructed in fall 2004, the Rock Creek Ranch wetland mitigation project seeks to create / restore (re-establish) up to 75 acres of primarily emergent and, as an added component, scrub/shrub wetlands, within an approximate 116.75-acre perpetual conservation easement in the southeast corner of the ranch property. The first 50 acres of successfully established credits would be allocated to MDT, and MDT would have the option of purchasing additional wetland credits developing within the easement. Approximately 1.08 acres of wetlands occurred in the project area prior to construction. This does not include pre-existing wetlands in an excavated east-west trench within the easement just north of U.S. Highway 2, which were not part of the Rock Creek Ranch project, but were previously constructed by MDT to mitigate wetland impacts associated with the Hinsdale East and West project.

Table 24: Summary of 2007 wetland function/value ratings and functional points for all Ridgeway Complex Wetland Mitigation Sites.¹

| Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method | Wetland 4, 16 | Wetland 11, 15 | Wetlands 1, 3, 5, 7/8, 10, 12, 13 | Wetlands 2, 6, 9 |
|---|---------------|----------------|-----------------------------------|------------------|
| Listed/Proposed T&E Species Habitat | Low (0.0) | Low (0.0) | Low (0.0) | Low (0.0) |
| MNHP Species Habitat | High (1.0) | High (1.0) | High (1.0) | High (1.0) |
| General Wildlife Habitat | Mod (0.7) | Mod (0.4) | High (0.9) | High (0.9) |
| General Fish/Aquatic Habitat | NA | NA | NA | NA |
| Flood Attenuation | Low (0.2) | Low (0.2) | Mod (0.5) | Mod (0.6) |
| Short and Long Term Surface Water Storage | Mod (0.4) | Mod (0.4) | High (0.8) | High (1.0) |
| Sediment/ Nutrient/ Toxicant Removal | High (1.0) | Mod (0.7) | High (1.0) | High (1.0) |
| Sediment/Shoreline Stabilization | High (1.0) | Low (0.3) | High (1.0) | High (1.0) |
| Production Export/Food Chain Support | Mod (0.4) | Low (0.3) | Mod (0.7) | High (0.8) |
| Groundwater Discharge/Recharge | NA | NA | High (1.0) | High (1.0) |
| Uniqueness | Mod (0.3) | Mod (0.3) | Mod (0.3) | Mod (0.3) |
| Recreation/Education Potential | Mod (0.3) | Low (0.1) | Mod (0.5) | Mod (0.6) |
| Actual Points/ Possible Points | 5.5/10 | 3.7/10 | 7.7/11 | 8.1/11 |
| % of Possible Score Achieved | 55% | 37% | 77% | 74% |
| Overall Category | II | II | II | II |
| Total Acreage of Assessed Wetlands within Easement | 3.65 | 1.81 | 30.18 | 20.58 |
| Functional Units (acreage x actual points) | 20.08 | 6.7 | 232.39 | 166.7 |
| Net Acreage Gain | 3.65 | 1.81 | 30.18 | 20.5 |
| Net Functional Unit Gain | 20.08 | 6.7 | 232.39 | 166.7 |
| Grand Total Functional Unit “Gain” for Ridgeway Complex Wetland | 425.87 | | | |

¹ Site 14 is not included because it does not qualify as a wetland (lacks hydrophytic vegetation).

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

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

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

Approximately 87.41 acres of wetlands were delineated on the mitigation site in 2007. Approximately 1.08 acres of wetlands occurred on the site prior to project implementation. Consequently, the net aquatic habitat created / restored to date is $87.41 - 1.08 = 86.33$ acres. This is credited at a 1:1 ratio. Additionally, the pre-existing 1.08 acres were enhanced at a credit ratio of 1:3, resulting in 0.36 acre of credit. Finally, approximately 3.6 acres of upland buffer were included in the easement at a credit ratio of 1:4, resulting in 0.9 acre of credit.

As of 2007, the maximum assignable credit at the Rock Creek Ranch mitigation site is $86.33 + 0.36 + 0.9 = 87.59$ acres, or 175% of the initial 50-acre goal. Additional wetland communities are likely to form and stabilize with consistent inundation from year to year

Functional assessment results are summarized in **Table 25**. For comparative purposes, the functional assessment results for baseline conditions are also included in **Table 25**. The site currently rates as a Category II wetland, a substantial improvement over baseline Category IV ratings. More significantly, the site has gained almost 575 functional units over baseline conditions. Prominent functions include general wildlife habitat, surface water storage, sediment/nutrient/toxicant removal, documented MTNHP species habitat (northern leopard frog, scarlet ammannia), and production export.

All dikes were in good condition during the spring, mid-season, and fall visits with no indications of seepage observed during 2007.

2.18 Roundup (Billings District, Year 7)

The Roundup wetland site was created to provide wetland mitigation credits for MDT's reconstruction of U.S. Highway 12 in the Musselshell Watershed (watershed #10). The site is located in Musselshell County, MT, immediately south of U.S. Highway 12 and approximately one mile east of the town of Roundup. Elevations range from approximately 3,169 to 3,175 feet above mean sea level. The mitigation site is located at the site of the former wastewater lagoons for the city of Roundup. This former two-celled treatment facility, covering approximately 26 acres, contained sludge of varying depths with concentrations of nitrates, and possibly heavy metals of which portions were capped during construction modification. Five monitoring wells were installed around the lagoon to monitor any possible groundwater contamination from the sludge. After a review of groundwater quality sampling data, both the MT Department of Environmental Quality (DEQ) and the U.S. Environmental Protection Agency (EPA) agreed that there was not a groundwater contamination problem associated with the lagoons. The organic "sludge" was left in the west end of the southern end of the wetland bed and capped with one foot of soil during construction to prevent potential biohazards risks. The dike between cells was breached to allow water to access both cells.

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

Table 25: Summary of 2003 and 2007 wetland function/value ratings and functional points at the Rock Creek Ranch Wetland Mitigation Project.

| Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method | Wetland Numbers | | |
|---|------------------------------------|---|-------------------|
| | Pre-Project Wetland Ditches (2003) | Pre-Project Isolated Wetland Patches (2003) | Post-Project 2007 |
| Listed/Proposed T&E Species Habitat | Low (0.3) | Low (0.0) | Low (0.3) |
| MTNHP Species Habitat | Low (0.1) | Low (0.1) | High (1.0) |
| General Wildlife Habitat | Low (0.3) | Low (0.1) | High (0.9) |
| General Fish/Aquatic Habitat | NA | NA | NA |
| Flood Attenuation | Low (0.2) | NA | Moderate (0.6) |
| Short and Long Term Surface Water Storage | Low (0.3) | Low (0.3) | High (0.9) |
| Sediment, Nutrient, Toxicant Removal | Low (0.3) | Mod (0.5) | High (1.0) |
| Sediment/Shoreline Stabilization | Low (0.2) | NA | NA |
| Production Export/ Food Chain Support | Low (0.3) | Low (0.2) | Moderate (0.7) |
| Groundwater Discharge/Recharge | Low (0.1) | Low (0.1) | Low (0.1) |
| Uniqueness | Low (0.1) | Low (0.1) | Mod (0.4) |
| Recreation/Education Potential | Low (0.1) | Low (0.1) | Mod (0.7) |
| Actual Points/Possible Points | 2.3 / 11 | 1.5 / 9 | 6.6 / 10 |
| % of Possible Score Achieved | 21 | 17 | 66 |
| Overall Category | IV | IV | II |
| Total Acreage of Assessed Wetlands within Easement (ac) | 0.77 | 0.31 | 87.41 |
| Functional Units (acreage x actual points) (fu) | 1.77 | 0.47 | 576.9 |
| Net Acreage Gain (ac) | NA | NA | 86.33 |
| Net Functional Unit Gain (fu) | NA | NA | 574.66 |

One source of hydrology is through a channel, which funnels stormwater runoff from the northeastern section of the city of Roundup and U.S. Highway 12 into the southwestern end of the wetland. The estimated runoff volume for this system is 12,700 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 been filling with the wastewater and stormwater since July of 2001.

In 2007, groundwater elevations at nearby wells were lower than any previous sampling event and averaged 0.6 feet lower than elevations measured during the October 2006 event. Field measurements of water temperature at the wells were higher in 2007, while electrical conductivity values varied among all sampling locations. Nutrient concentrations were quite variable during 2007. As was the case in all other sampling years, the concentration of nitrate + nitrite nitrogen in Well #1 exceeded the human health standard of 10 mg/L for groundwater during 2007, with a concentration of 16.1 mg/L.

The 2007 wetland delineation boundary included 4.97 acres of open water and 16.1 acres of net wetland area for a total of 21.07 wetland acres, a 1-acre decrease since 2006. The colonization of three new weedy upland vegetation communities and one new upland grass community comprised of Great Basin Wild Rye resulted 1-acre decrease in wetland acreage.

The site rated as an overall Category II wetland and scores 137 Functional Units (**Table 26**). The slight drop in the FU is the result of a 1-acre decrease in wetland acreage as a result of the development of the weedy upland communities and the Great Basin Wild Rye Community between the north and south lagoons. Also, the score for sediment shoreline stabilization was reduced as wetlands adjacent to the shoreline are currently dominated by species lacking binding root systems (kochia and goosefoot). The functional units will continue to remain the same unless the wetland starts to develop a more preferred wetland vegetation community and includes higher structural diversity. The list of avian species has increased since monitoring began and has consequently increased the General Wildlife Habitat rating to high (0.9) which qualifies the wetland as a Category II wetland. Wildlife use, particularly by migratory songbirds, would further increase with the survival and proliferation of a willow shrub community.

All dikes and inlet structures were functioning satisfactorily. All located bird boxes were in good condition. Kochia control is recommended.

Some areas were treated for weeds within the wetland complex during 2007 by MDT staff. Unless all weedy areas can be flooded continuously for a prolonged period (likely more than 1 year), an aggressive weed management program is recommended.

Table 26: Summary of 2001 and 2007 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 | 2001 | 2007 |
|---|--------------|---------------|
| Listed/Proposed T&E Species Habitat | Low (0.0) | Low (0.0) |
| MTNHP Species Habitat | Low (0.0) | High (0.8) |
| General Wildlife Habitat | Low (0.3) | High (0.9) |
| General Fish/Aquatic Habitat | NA | NA |
| Flood Attenuation | High (1.0) | Mod. (0.6) |
| Short and Long Term Surface Water Storage | High (0.8) | High (1.0) |
| Sediment, Nutrient, Toxicant Removal | Mod. (0.7) | Mod. (0.7) |
| Sediment/Shoreline Stabilization | NA | Low (0.3) |
| Production Export/Food Chain Support | Mod. (0.6) | High (0.8) |
| Groundwater Discharge/Recharge | Low (0.1) | Low (0.1) |
| Uniqueness | Low (0.2) | Low (0.3) |
| Recreation/Education Potential | Low (0.2) | High (1.0) |
| Actual Points/ Possible Points | 3.9/10 | 6.5/11 |
| % of Possible Score Achieved | 39% | 59% |
| Overall Category | III | II |
| Total Acreage of Assessed Wetlands within Easement | 18.51 | 21.07 |
| Functional Units (acreage x actual points) | 72.21 | 137.00 |
| Net Acreage Gain | 18.51 | 21.07 |
| Net Functional Unit Gain | 72.21 | 137.00 |

2.19 Selkirk Ranch (Billings District, Year 1)

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

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

Four different crediting areas were developed, each with their own specific performance standards and mitigation ratios. Credit ratios vary from 1:1 to 5:1 for the four types of mitigation: rehabilitation, 1.5:1; re-establishment and creation, 1:1; enhancement, 3:1; and, upland buffer, 5:1. Final ratios will be determined by the COE and will be based on the achievement of performance standards.

Overall the site has improved considerably over pre-construction conditions and appears to be functioning very well; especially considering that it was constructed in early 2007. However,

there are specific performance criteria that ultimately need to be satisfied in order to achieve credit. Under the strictest interpretation, only the upland buffer satisfied those performance criteria in 2007. Partial credit may be possible for some of the other areas upon negotiation between MDT and the COE. As shown in **Table 27**, the maximum amount of credit in 2007, applying the credit ratios in the absence of the ultimate performance standards, is approximately 54.84 acres. Applying the credit ratios and ultimate performance standards, the maximum available would be 0.34 acre. Thus, the currently available credit ranges between 0.34 and 54.84 acres and is subject to Corps/MDT discussion. The more conservative 0.34-acre figure was applied in **Table 1** and **Table 2** of this summary.

Table 27: 2007 mitigation credit acreage summary for the Selkirk Wetland Mitigation Reserve.

| CREDIT AREA | CREDIT CATEGORY | ACRES | | ASSUMED CREDIT RATIO ¹ | CREDIT ACRES | |
|--------------|-----------------------------|-------------|-------------|-----------------------------------|--------------|-----------------------|
| | | Target | 2007 | | Max. 2007 | Ultimate ² |
| 1 | Re-establishment & Creation | 38.6 | 32.9 | 1:1 | 32.9 | 0 |
| 2 | Rehabilitation | 31.9 | 31.9 | 1.5:1 | 21.3 | 0 |
| 3 | Enhancement | 1.0 | 1.0 | 3:1 | 0.3 | 0 |
| 4 | Upland Buffer | 2.9 | 1.7 | 5:1 | 0.34 | 0.34 |
| TOTAL | | 74.4 | 67.5 | | 54.84 | 0.34 |

¹The Corps of Engineers is the regulatory authority and will determine the actual mitigation ratios.

² Though much of the wetland reserve site qualified as wetland at the time of the investigation, all of the success criteria had not been met. Credits are ultimately to be applied as the site meets the success criteria; final crediting is at discretion of COE and MDT.

Functional assessment results are presented in **Table 28**. For comparative purposes, the functional assessment results for baseline conditions prepared by Oasis Environmental in 2006 are also included in **Table 28**.

The reestablished and created mitigation wetlands at the Selkirk Wetland Mitigation Reserve were ranked as Category II in 2007; this area was upland prior to construction. The rehabilitated mitigation area classified as Category II in 2007 and was rated as Category III wetland in 2006. The enhanced wetland rated as Category III in 2006 and 2007. Functional unit gain in 2007 was 406.3 units. Most functions in 2007 increased over the 2006 baseline conditions, with the largest gained in sensitive and general wildlife habitat, uniqueness and recreational potential.

Non-preferred grass species, namely *Alopecurus arundinaceus* may require flood or chemical control to reduce cover below the COE-required threshold of 10% within each mitigation credit area. Non-noxious weeds, such as Chenopodium species and perennial sowthistle will require monitoring; it is likely that prolonged saturation will discourage expansion and reproduction of these species.

Table 28: Summary of 2006¹ and 2007 wetland function/value ratings and functional points at the Selkirk Wetland Mitigation Reserve.

| Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method | Re-Establishment & Creation ² 2007 | Rehabilitation | | Enhancement | |
|---|--|----------------|--------------|-------------|------------|
| | | 2006 | 2007 | 2006 | 2007 |
| Listed/Proposed T&E Species Habitat | Low (0.0) | Low (0.0) | Low (0.0) | Low (0.0) | Low (0.0) |
| MNHP Species Habitat | Mod (0.7) | Low (0.0) | Mod (0.7) | Low (0.0) | Low (0.7) |
| General Wildlife Habitat | High (0.9) | Low (0.3) | High (0.9) | Mod (0.5) | Mod (0.7) |
| General Fish/Aquatic Habitat | NA | NA | NA | NA | NA |
| Flood Attenuation | Mod (0.5) | NA | Mod (0.5) | NA | Low (0.2) |
| Short and Long Term Surface Water Storage | High (0.9) | Low (0.3) | High (0.9) | Low (0.2) | Low (0.3) |
| Sediment, Nutrient, Toxicant Removal | High (1.0) | Mod (0.6) | High (1.0) | High (0.9) | High (1.0) |
| Sediment/Shoreline Stabilization | Mod (0.6) | NA | High (0.9) | NA | High (0.9) |
| Production Export/Food Chain Support | Mod (0.7) | Mod (0.7) | Mod (0.7) | Mod (0.6) | Mod (0.7) |
| Groundwater Discharge/Recharge | High (1.0) | High (1.0) | High (1.0) | High (1.0) | High (1.0) |
| Uniqueness | Mod (0.6) | Low (0.1) | Mod (0.6) | Low (0.3) | Mod (0.6) |
| Recreation/Education Potential | Mod (0.7) | Low (0.1) | Mod (0.7) | Low (0.1) | Mod (0.7) |
| Actual Points/Possible Points | 7.6/11 | 3.1 / 9 | 7.9 / 11 | 3.6 / 9 | 6.8/11 |
| % of Possible Score Achieved | 69% | 34% | 72% | 43% | 62% |
| Overall Category | II | III | II | III | III |
| Total Acreage of Assessed Aquatic Habitat within AA Boundaries | 32.9 | 31.9 | 31.9 | 1.0 | 1.0 |
| Functional Units (acreage x actual points) | 250.0 | 98.9 | 252.0 | 3.6 | 6.8 |
| Net Acreage Gain | 32.9 | NA | 0 | NA | 0 |
| Net Functional Unit Gain | 250.0 | NA | 153.1 | NA | 3.2 |

¹ Baseline data provided by Oasis (2006a).

² Area an upland prior to construction; no functional assessment conducted for this area in 2006.

2.20 Wagner Marsh (Billings District, Year 3)

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

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

Based on documentation provided by MDT, approximately 2.12 acres of wetland and 1.75 acres of open water (3.87 acres total of aquatic habitat) were incidentally created on the site via pit excavation prior to formal mitigation project implementation in 2005. MDT is receiving credit for these wetlands as they were originally created in association with the 2000-2001 Shiloh Road interchange project and protected from disturbance by MDT. As of 2007, a total of approximately 13.3 acres of open water and wetland habitat (including the original 3.87 acres) occur within the monitoring area. This is an increase of approximately 1.81 acres from 2006 totals (11.49 acres) and is attributed primarily to higher water levels in October 2007.

Of the 13.30-acre 2007 total, approximately 5.80 acres are currently open water habitat and the remaining 7.50 acres are vegetated wetland areas. Due to the variability in water levels at Wagner Marsh, it is unclear how much of the open water habitat will evolve into emergent wetland areas. Much of the ‘disturbed-moist’ vegetation type of previous monitoring years was classified as emergent wetlands or open water in 2007. A 50 foot wetland buffer around wetlands on the site comprises approximately 5.19 acres.

The Corps of Engineers will determine which crediting ratios are applicable to the site. However, using the credit ratios listed, **Table 29** summarizes compensatory mitigation credits developed to date at the Wagner Marsh. Using these assumed credit ratios for wetlands, open water, and upland buffer, approximately 10.3 acres of credit are currently available.

Table 29: 2007 mitigation credit summary for the Wagner Marsh Wetland Mitigation Site.

| Credit Category | Acres | Assumed Credit Ratio ^a | Credit ¹ |
|--|--------------|-----------------------------------|---------------------|
| Total Scrub/Shrub and Emergent Wetland | 7.50 | 1:1 | 7.50 |
| Total Open water | 5.80 | 20% of wetland acreage | 1.5 |
| 50-foot wide upland buffer | 5.19 | 4:1 | 1.3 |
| TOTAL | 16.68 | | 10.3 |

¹The Corps of Engineers is the regulatory authority and will determine the actual mitigation ratios.

A total of 550 woody plantings were installed as part of the overall revegetation plan for the site. As of August 6, 2007, the overall survival rate is estimated at 57 percent, with a total of 204 individuals observed to be dead and an additional 32 that were not located and presumed dead. This is down from the 92 percent survival rate reported in 2005 and the 64 percent survival rate in 2006. Juniper plantings continue to do well; mortality of the other species is likely due to a lack of available water during the summer months.

The created wetlands at Wagner Marsh were ranked as Category II wetlands in 2006 and 2007, as compared to Category IV in 2001 (**Table 30**). Functions that increased substantially over 2001 baseline conditions include general wildlife habitat, short and long term surface water storage, production export, uniqueness, and recreation/education potential. The pre-project site provided about 16.6 functional units within the monitoring area, and the post-project site currently provides about 89 functional units, for a conservative gain of at least 72 functional units.

A few tamarisk saplings were observed and removed during monitoring in 2007. The presence of tamarisk on the site should continue to be monitored and individuals removed when encountered, but overall the threat of tamarisk invasion appears to be low. The majority of tamarisk seedlings/saplings that were pulled were found in the central portion of the site, east of the crescent shaped pond and south of the wetland cell containing the vegetation transect.

In 2006 it was noted that spotted knapweed was well established on the berm on the east side of the site, and in upland communities and that Canada thistle was prevalent in the cattail area in the northwestern portion of the site. During the 2007 mid-season visit it was noted that a comprehensive weed spraying program had been implemented at the site. This effort made significant progress toward eradicating these species from the site, however, spraying in subsequent years is needed to fully address the severity of the problem.

Water levels continue to be variable, with the site being the driest observed to date in August 2007 and the wettest to date in October 2007.

The plant protectors used when planting woody species have started to greatly affect the growth of many of these plants. It is suggested that the plant protectors be removed.

Table 30: Summary of 2001 (baseline) and 2007 wetland function/value ratings and functional points at the Wagner Marsh Wetland Mitigation Site.

| Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method | Evaluation Year | |
|---|-----------------------------|--------------------------------------|
| | 2001 Baseline Assessment | 2007 |
| Listed/Proposed T&E Species Habitat | Low (0.5) | Low (0.0) |
| MTNHP Species Habitat | Low (0.2) | Low (0.2) |
| General Wildlife Habitat | Low (0.3) | Mod (0.7) |
| General Fish/Aquatic Habitat | N/A | N/A |
| Flood Attenuation | N/A | N/A |
| Short and Long Term Surface Water Storage | Moderate (0.6) | High (1.0) |
| Sediment, Nutrient, Toxicant Removal | Moderate (0.7) | Mod (0.7) |
| Sediment/Shoreline Stabilization | N/A | Mod (0.7) |
| Production Export/Food Chain Support | Moderate (0.6) | High (0.9) |
| Groundwater Discharge/Recharge | High (1.0) | High (1.0) |
| Uniqueness | Low (0.2) | Mod (0.5) |
| Recreation/Education Potential | Low (0.2) | High (1.0) |
| Actual Points/Possible Points | 4.3/9 | 6.7/10 |
| % of Possible Score Achieved | 48% | 67% |
| Overall Category | IV | II |
| Total Acreage of Assessed Aquatic Habitat within AA Boundaries | 3.87 | 13.30 |
| Functional Units (acreage x actual points) | 16.64 | 89.11 |
| Net Acreage Gain | NA | 1.81 |
| Net Functional Unit Gain | NA | 72.47 (2001) 12.11 (2006) |

2.21 West Fork Charley Creek (Glendive District, Year 1)

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

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

Approximately 1.38 acres of vegetated wetlands and 4.82 acres of open water were delineated on the mitigation site in 2007, for a total of 6.2 acres of aquatic habitat. Approximately 0.03 acre of

wetlands occurred on the site prior to project implementation. Consequently, the net aquatic habitat created / restored to date is $6.2 - 0.03 = 6.17$ acres, which is the maximum assignable credit at this site in 2007. No performance standards for the site were found in the project files; however, the goal of the project was to provide approximately 5 acres of palustrine, semi-permanent, emergent wetland. Additional flooded uplands and shallow open water areas are likely to convert to emergent wetland over time, given consistent inundation.

Functional assessment results are summarized in **Table 31**. Functional assessment results for baseline conditions are also provided in **Table 31** for comparison. The site currently rates as a Category III wetland and has gained 35 functional units. Prominent functions include general wildlife habitat, surface water storage, sediment/nutrient/toxicant removal, documented MTNHP species habitat (northern leopard frog), and production export.

Table 31: Summary of 2007 and baseline wetland function/value ratings and functional points at the WF Charley Creek Mitigation Project.

| Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method | 2005 (Baseline) | 2007 |
|---|-----------------|--------------|
| Listed/Proposed T&E Species Habitat | Low (0.0) | Low (0.3) |
| MTNHP Species Habitat | Low (0.0) | Mod (0.7) |
| General Wildlife Habitat | Low (0.2) | Mod (0.7) |
| General Fish/Aquatic Habitat | NA | NA |
| Flood Attenuation | Low (0.1) | Low (0.2) |
| Short and Long Term Surface Water Storage | Low (0.3) | Mod (0.6) |
| Sediment, Nutrient, Toxicant Removal | Mod (0.6) | Mod (0.7) |
| Sediment/Shoreline Stabilization | Low (0.2) | Low (0.3) |
| Production Export/ Food Chain Support | Low (0.3) | Mod (0.7) |
| Groundwater Discharge/Recharge | NA | NA |
| Uniqueness | Low (0.3) | Low (0.3) |
| Recreation/Education Potential | Low (0.1) | Low (0.3) |
| Actual Points/Possible Points | 2.1 / 10 | 5.7 / 10 |
| % of Possible Score Achieved | 21 | 57 |
| Overall Category | IV | III |
| Total Acreage of Assessed Aquatic Habitat within Easement (ac) | 0.03 | 6.2 |
| Functional Units (acreage x actual points) (fu) | 0.06 | 35.34 |
| Net Acreage Gain (ac) | NA | 6.17 |
| Net Functional Unit Gain (fu) | NA | 35.28 |

All dikes were in good condition during the spring reconnaissance and mid-season visits. The designed water gap (for cattle watering) appeared to be functioning as designed, although the gate to the site was open during both visits, allowing cattle access. The site did not appear impacted or exhibit evidence of overgrazing; cattle did not appear to congregate within the site substantively in 2007.

2.22 Woodson Creek (Butte District, Year 1)

This mitigation site was constructed in 2006 in Meagher County in the south-eastern portion of the Missouri-Sun-Smith watershed (Watershed #7). Approximately 50 acres of wetland credit at

this site is to be provided to MDT through a credit purchase agreement. It is anticipated that this site will compensate for wetland impacts resulting from MDT highway and bridge reconstruction projects in the watershed. Woodson Creek was constructed on the Ringling Land and Cattle Company property. The goal of the project is to restore Woodson Creek to its original configuration (i.e., increase sinuosity), improve wetland hydrology within some portions of the site, and create wetlands in other portions of the site. It is anticipated that the project will ultimately provide a maximum of 75.14 acres of palustrine emergent and scrub-shrub wetland within the confines of the 105-acre site.

Crediting for the Woodson Creek Mitigation Site is complex and comprised of seven different credit areas, each with their own success criteria. A detailed discussion of these, and how these affected 2007 credit calculations, is provided in the individual monitoring report. In general terms, if the standards are met, credit ratios are 1:1 for restoration and creation and 1.5:1 for rehabilitation. **Table 32** summarizes open water and wetland acreages observed in 2007.

In the strictest terms, none of the seven credit areas achieved all of their success criteria in 2007. Credit area 6 (swale area) did not have any monitoring wells, but otherwise achieved all of the success criteria. Partial credit may be possible for some of the areas upon negotiation between MDT and the COE.

Overall the site has improved considerably over pre-construction conditions, but there are specific actions that need to be implemented in order to fulfill the success criteria. Generally these actions are:

- Improve plant species diversity by killing Garrison creeping meadow foxtail and seeding/planting other hydrophytic species.
- Plant woody cuttings at the specified densities and provide a map so that they can be located and monitored in the field. The density of the Garrison creeping meadow foxtail makes finding (and monitoring) woody cuttings almost impossible.
- Install groundwater monitoring wells so that soil saturation requirements can be verified.

Table 32. Summary of open water and wetland acreages at the Woodson Creek Wetland Mitigation Site, pre and post construction.

| Year | Open Water/Aquatic Bed (acres) | Wetland (acres) | Total Aquatic Habitat |
|--------------------------|--------------------------------|-----------------|-----------------------|
| 2004 (pre-mitigation) | 0 | 57.48 | 57.48 |
| 2007 (post-construction) | 2.55 | 61.86 | 64.42 |

The Corps of Engineers will determine which crediting ratios are applicable to the site. However, using the credit ratios listed, **Table 33** summarizes compensatory mitigation credits developed to date at the Woodson Creek Wetland Mitigation Site. Because the success criteria have not been achieved credit areas 1-5 and 7, no wetland mitigation credits are considered to have developed at these areas site in their first year of monitoring. The possible exception to this

Table 33: 2007 mitigation credit summary for the Woodson Creek Wetland Mitigation Site.

| Credit Area | Credit Category | Acres | Assumed Credit Ratio ^a | Credit ^{a,c} |
|-------------|---|--------------|-----------------------------------|-----------------------|
| 1 | Restoration (Re-establishment) | 4.02 | 1:1 | None |
| 2 | Restoration (Re-establishment) | 4.57 | 1:1 | None |
| 3 | Restoration (Rehabilitation/Re-establishment) | 18.27 | 1:1 ^b | None |
| 4 | Restoration (Rehabilitation/Re-establishment) | 22.7 | 1:1 ^b | None |
| 5 | Restoration (Rehabilitation/Re-establishment) | 9.3 | 1:1 ^b | None |
| 6 | Restoration (Rehabilitation) | 5.55 | 1.5:1 | 3.7 acres |
| 7 | Creation | 0 | 1:1 | None |
| | TOTAL | 64.42 | | 3.7 acres |

^aThe Corps of Engineers is the regulatory authority and will determine the actual mitigation ratios.

^bRestoration (Rehabilitation/Re-establishment) will be credited at 1:1 if a functional replacement performance standard is met; otherwise, they will be credited at 1.5:1 if the remaining performance criteria are met.

^cAll conditions in the success criteria have not been fulfilled, therefore credits have not been calculated. Crediting is at discretion of COE and MDT.

is Credit Area 6, which has accomplished all of the success criteria but no monitoring wells have been installed in the area as specified in the crediting arrangement with the COE, and therefore the success criteria for hydrology cannot be completely confirmed. However, wetland hydrology was assumed based on typical field indicators, and credits were tentatively assigned to Credit Area 6 on this basis. Actual crediting will need to be negotiated between MDT and the COE.

Functional assessment results are summarized in **Table 34**. For comparative purposes, the functional assessment results for baseline conditions prepared by Oasis Environmental in 2005 are also included in **Table 34**. The restored wetlands at Woodson Creek were ranked as Category II and III wetlands in 2007 as compared to Category III and IV in 2005. Functions that increased over 2005 baseline conditions include sensitive species habitat, general wildlife habitat, flood attenuation, short and long term surface water storage, sediment/nutrient/toxicant removal, bank/shoreline stabilization, and production export. The pre-project site provided a total of about 141.8 functional units within the monitoring area, the post-project site currently provides about 410 functional units, for a conservative gain of approximately 268 functional units.

The lower dike on the eastern parcel was breached in June causing the majority of the ponded water to drain. The cause of the failure is unknown. The breach is approximately 10 feet wide. Garrison creeping foxtail continues to dominate the majority of the site. As part of the mitigation agreement, much of the existing Garrison creeping foxtail is to be eliminated at the site. Eradication measures are expected to occur in fall 2007.

Canada thistle has become established in disturbed areas. It is especially prevalent in and around where Woodson Creek enters the mitigation site, on the dikes, and in the vicinity of the outlet culvert at the southern end of the restored creek channel. The installation of monitoring wells needs to be completed to fulfill success criteria requirements. Similarly, woody cuttings need to be planted to fulfill success criteria requirements.

Table 34: Summary of 2007 wetland function/value ratings and functional points at the Woodson Creek Wetland Mitigation Site.

| Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method ¹ | Woodson Floodplain | | East Parcel* | | West Parcel* | |
|--|--------------------|--------------|--------------|--------------|--------------|-------------|
| | 2005 | 2007 | 2005 | 2007 | 2005 | 2007 |
| Listed/Proposed T&E Species Habitat | Low (0.0) | Low (0.0) | Low (0.0) | Low (0.0) | Low (0.0) | Low (0.0) |
| MNHP Species Habitat | Low (0.1) | Mod (0.7) | Low (0.1) | High (1.0) | Low (0.1) | Mod (0.7) |
| General Wildlife Habitat | Low (0.3) | High (0.9) | Low (0.3) | High (0.9) | Low (0.3) | Mod (0.5) |
| General Fish/Aquatic Habitat | Low (0.3) | Low (0.2) | NA | NA | NA | NA |
| Flood Attenuation | Low (0.1) | Mod (0.6) | NA | NA | NA | NA |
| Short and Long Term Surface Water Storage | Low (0.3) | High (0.9) | NA | High (0.8) | NA | Mod (0.5) |
| Sediment, Nutrient, Toxicant Removal | Mod (0.6) | High (1.0) | Mod (0.7) | High (0.9) | Mod (0.7) | Mod (0.9) |
| Sediment/Shoreline Stabilization | Mod (0.7) | High (1.0) | NA | NA | NA | NA |
| Production Export/Food Chain Support | Mod (0.4) | High (0.9) | Mod (0.7) | High (0.9) | Mod (0.7) | Mod (0.7) |
| Groundwater Discharge/Recharge | High (1.0) | High (1.0) | Low (0.1) | High (1.0) | Low (0.1) | High (1.0) |
| Uniqueness | Low (0.2) | Low (0.2) | Low (0.2) | Low (0.2) | Low (0.2) | Low (0.2) |
| Recreation/Education Potential | Low (0.1) | Low (0.1) | Low (0.1) | Low (0.1) | Low (0.1) | Low (0.1) |
| Actual Points/Possible Points | 4.1/12 | 7.5/12 | 2.2/8 | 5.8/9 | 2.2/8 | 4.6/9 |
| % of Possible Score Achieved | 34 | 62.5 | 27.5 | 64.4 | 27.5 | 51 |
| Overall Category | III | II | IV | II | IV | III |
| Total Acreage of Assessed Aquatic Habitat within AA Boundaries | 0.48 | 27.84 | 51 | 27.27 | 6 | 9.3 |
| Functional Units (acreage x actual points) | 16.4 | 208.8 | 112.2 | 158.2 | 13.2 | 42.8 |
| Net Acreage Gain | NA | 27.36 | NA | NA | NA | 4 |
| Net Functional Unit Gain | NA | 192.4 | NA | 46 | NA | 29.6 |

*The East and West Parcels were combined for the 2005 assessment, therefore the values for 2005 are the same for these two areas.

Appendix A

TABLE 1: SUMMARY INFORMATION FOR MDT WETLAND MITIGATION SITES

*MDT Wetland Mitigation Monitoring
2007 Executive Summary*

Table 1: Summary of MDT Wetland Mitigation Sites monitored during 2001 to 2007.

| Site | Year Built | Major Montana Watershed Basin | Pre-Project Wetland Acreage and MDT Category | Target Wetland Credit | 2007 Wetland / Open Water Acreage and MDT Category | Enhancement Credit (ratio) | Upland Credit (ratio) | Total Acreage Gain / Credit and Functional Unit Gain as of 2007 | Comments |
|---------------------------|------------|-------------------------------|---|--|--|--|---|---|--|
| MISSOULA DISTRICT | | | | | | | | | |
| Batavia | 1998 | 4 – Flathead | 137 ac Category II 1069 fu | 28.72 ac (see comments) | 146.73 ac Category II 1408 fu | See comments | NA | Applying ratios, site has achieved 24.42 ac. of credit. Gain of 340 fu | 2007 is seventh and final year of monitoring. Site at 85% of goal. Full delineation conducted in 2007. 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 Water delivery from Ashley Creek appears to be a problem at this site (diversion not maintained). Desired pool elevation of 3,128.5 not achieved. |
| Camp Creek | 2002 | 3 – Lower Clark Fork | 48.73 ac Category III 251.58 fu | 11.4 ac minimum (see comments) | 41.77 ac wetland 2.15 ac channel Category II & III 424.56 fu | None specified | None specified | Loss of 4.81 ac aquatic habitat Gain of 172.98 fu FU-based credit approach = 18.11 ac credit | 2007 is sixth monitoring year. Intended to mitigate for Sula N&S (11.4 acres) and possibly other projects. Goals: overall goals of this project were restoration of Camp Creek channel bottom, associated wetland functional restoration/enhancement and creation, and enhancement of heavily grazed and cleared riparian vegetation. Corps agreed to functional unit-based crediting approach in 2006. This currently yields up to 18.11 acres of credit to date. |
| Creston | 1998 | 4 – Flathead | 2 ac Category and fu unknown | 6 ac (4 created, 2 enhanced) | 5.4 ac Category II 36.72 fu | 2 acre; no ratio specified. | NA | 3.4 ac created <u>2.0 ac enhanced</u> 5.4 ac total credit fu gain at pre-existing 2 ac unknown; 23.12 fu gain at created wetlands | 2005 final year of monitoring. Similar results as 2001 - 2004. No baseline delineation or functional assessment available. No performance criteria for enhancement. If functional enhancement achieved, then currently at 90% of goal. |
| Hoskins Landing | 2002 | 3 – Lower Clark Fork | 5.85 ac (total) Category II (0.06 ac) Category III (4.12 ac) Category IV (1.69 ac) 29.33 fu | 8.1 ac (restore & create) 5.2 acre (upland enhance) | 13.01 ac Category III (12.55 ac) Category IV (0.46 ac) 96.67 fu | None specified | None specified | Approx. 8.1 ac 67.34 fu | 2007 is sixth monitoring year. See report text for explanation of credits. Gain of 0.89 wetland acre since 2002. Planting at adjacent uplands was accomplished in 2003 and 2004. Virtually at wetland acreage goal. Weed control is ongoing by Tribes. |
| Kleinschmidt Creek | 2001 | 2 – Upper Clark Fork | 13.78 ac wetlands 7.59 ac open water Category III 111.3 fu | 12 ac | 22.71 ac wetland 2.41 ac open water Category II & III 209 fu | 1:2 on 8.05 = 4.02 1:3 on 3.43 = 1.14 Total Acres = 5.16 | 1:4 on 7.99 = 1.99 ac. 4.70 ac of upland buffer reverted to wetland | 10.70 ac. restored 1.19 ac created 4.02 enhancement <u>1.99 buffer</u> 17.90 max. total credit Recommend 12 ac credit 97.72 fu | 2007 is sixth and final monitoring year. No credit for low intensity enhancement due to accidental grazing impacts; recommend eventual re-planting in this zone. Recommend certification of 12 credits (see report text). |
| Lawrence Park | 1998 | 4 – Flathead | 0 ac | Up to 2 ac | 1.04 ac (2001) Category II 6.63 fu | NA | NA | 1.04 ac (2001) 6.6 fu | Monitoring completed in 2001. Wetland creation ability limited by size of mitigation site. Currently at 52% of “maximum” goal. |
| Peterson Ranch | 2002 | 2 – Upper Clark Fork | 22.6 ac Category III 67.8 fu | 17.5 ac (created) | 22.0 ac wetland 1.08 ac open water Category III 150.84 fu | None specified | None specified | 0.48 ac created 83 fu | 2007 is sixth monitoring year. Currently at 3% of project goal. Grazing control recommended. Water rights problematic and may prevent site from functioning as designed. |

Table 1 (continued): Summary of MDT Wetland Mitigation Sites monitored during 2001 to 2007.

| Site | Year Built | Major Montana Watershed Basin | Pre-Project Wetland Acreage and MDT Category | Target Wetland Credit | 2007 Wetland / Open Water Acreage and MDT Category | Enhancement Credit (ratio) | Upland Credit (ratio) | Total Acreage Gain / Credit and Functional Unit Gain as of 2007 | Comments |
|-----------------------|------------|-------------------------------|---|-----------------------|---|----------------------------|-----------------------|---|--|
| BUTTE DISTRICT | | | | | | | | | |
| Beaverhead Ranch | 1997 | 6 – Upper Missouri | 5.2 ac Category and fu unknown | 52 ac | 97.9 ac Category II 841.94 fu | NA | NA | 92.7 ac 797.22 fu | Monitoring completed in 2006. Excellent site with heavy wildlife use. Project at 178% of goal. MDT opted not to purchase additional credits outside the current easement (below the dike). Total credit “gain” includes 6.5 acres of open water. |
| Brown’s Gulch | 2000 | 2 – Upper Clark Fork | 0 ac | 0.24 ac | 0.17 ac Category IV 0.48 fu | NA | NA | 0.17 ac 0.48 fu | Monitoring completed in 2004. Achieved 71% of project goal. |
| Cow Coulee | 1997 | 7 – Missouri-Sun-Smith | 0.07 ac Category and fu unknown | 4.5 ac | 2.94 ac Category III 15.88 fu | NA | NA | 2.87 ac 15.5 fu | Monitoring suspended after 2004 season due to water delivery problems. Monitoring to be re-instated when delivery issues are addressed. |
| Jack Creek Ranch | 2003 | 6 – Upper Missouri | 1.99 ac Category III 49.8 fu (see comments) | 50 ac | 44.3 ac wetland 2.13 ac open water Category II 376.1 fu | None specified | None specified | 46.43 ac restored 360 fu | 2007 is fourth monitoring year. The 50-acre goal includes pre-existing wetlands; currently at 93% of goal. Baseline functional units included stream reaches outside of project area, so functional unit gain to date is considered a minimum. |
| Rey Creek | 1999 | 6 – Upper Missouri | 0 ac | 1.2 ac | 0.52 ac Category III 3.38 fu | NA | NA | 0.52 ac 3.38 fu | Monitoring completed in 2003. Project at 45% of “maximum” project goal of 1.2 acres. However, project exceeds specific 0.27-acre replacement goal associated with Highway 10 bridge and culvert project. Therefore, the project resulted in an “excess” of 0.25 acre of mitigation credit. |
| Ringling Galt | 2000 | 7 – Missouri-Sun-Smith | 0 ac | 20 ac | 2.54 acres open water | NA | NA | 0 ac | Site monitored in 2001, 2003, 2004, and 2006; not monitored in 2007. No wetlands have developed to date. Site contains no conservation easement. |
| South Fork Smith | 2001 | 7 – Missouri-Sun-Smith | 8.32 ac wetland 0.57 ac open water Category III 43.61 fu | Not specified | 8.79 ac wetland 0.57 ac open water Category III 56.16 fu | NA | NA | 0.47 ac created wetland 12.55 fu | Monitoring suspended after 2006 (fifth monitoring year). Site contains no conservation easement, and grazing impacts are extensive. No specific project acreage target was established. |
| Woodson Creek | | 7 – Missouri-Sun-Smith | 57.48 ac wetland Category III/IV 141.8 fu | 50 ac | 61.86 ac wetland 2.55 ac open water Category II/III 410 fu | NA | NA | 3.7 ac credit 268 fu | 2007 is first monitoring year. Complex performance standards (see individual report). Gained 6.93 acres of aquatic habitat in 2007, but current credit 3.7 acres based on performance standards and ratios. |

Table 1 (continued): Summary of MDT Wetland Mitigation Sites monitored during 2001 to 2007.

| Site | Year Built | Major Montana Watershed Basin | Pre-Project Wetland Acreage and MDT Category | Target Wetland Credit | 2007 Wetland / Open Water Acreage and MDT Category | Enhancement Credit (ratio) | Upland Credit (ratio) | Total Acreage Gain / Credit and Functional Unit Gain as of 2007 | Comments |
|-----------------------------|------------|-------------------------------|---|--|--|----------------------------|---|---|--|
| GREAT FALLS DISTRICT | | | | | | | | | |
| Alkali Lake | 2005 | 8 - Marias | 0 ac | COE: 154.48 ac Tribe: 81.61 ac | 84.64 ac wetland 81.79 ac open water Category II 1048.5 fu | NA | COE: 1:4 ratio on 22.56 ac = 5.64 ac Tribe: 1:4 ratio on 45.12 ac = 11.28 ac | 166.43 ac 172.07 ac COE credit 77.86 ac Tribal credit 1048.5 fu | 2007 is second monitoring year. COE credits = 84.64 ac wetlands @ 1:1, 81.79 ac open water @ 1:1 (but limited to amount matching wetland credit), 22.56 ac buffer @ 1:4 = 166.43 ac total credit. Tribal credits = 84.64 ac wetlands @ 1:2.5, 81.79 ac open water @ 1:2.5, 45.12 ac buffer @ 1:4 = 77.86 ac total credit. Ratios applied to credit, therefore impacts can be debited at 1:1. |
| Big Sandy | 1991 | 11 - Milk | 0 ac | 9.44 ac | 13.79 ac (2001) Category II 106.9 fu | NA | NA | 13.79 ac (2001) Category II 106.9 fu | Monitoring completed in 2001. Very good site; excellent hydrology despite drought conditions. Project goals exceeded. Currently at 146% of project goal. |
| Jack Johnson | 1994 | 8 - Marias | 2.5 ac Category and fu unknown | 25 to 29 ac | 22.63 ac Category II (16.99 ac), Category III (5.05 ac), Category IV (0.59 ac) 122 fu | NA | NA | 22.63 ac 107 fu | Monitoring completed in 2003. 2.5-ac pre-existing wetlands not subtracted from total as this area was likely "enhanced", per agency agreements. No baseline functional assessment performed. Project goal not clear (25 to 29 acres). Currently at 78% to 91% of project goal. |
| Little Muddy Creek | 2004 | 7 - Missouri-Sun-Smith | 0 ac | 63.57 ac | 65.06 ac wetland 24.72 ac mudflat 66.66 ac open water Category II 1032.5 fu | NA | NA | 65.06 ac wetland 24.72 ac mudflat 66.66 ac open water 1032.5 fu | 2007 is fourth monitoring year. Essentially exceeding original 63.57-ac credit goal again in 2007. Wetlands are likely to continue development. |
| Meriwether-East Onsite | 2005 | 8 - Marias | 0 ac | 9.29 ac | 4.55 ac wetland 2.09 ac mudflat Category III 28.5 fu | NA | NA | 4.55 ac wetland <u>2.09 ac mudflat</u> 6.64 ac Category III 28.5 fu | 2007 is second monitoring year. No wetland development to date at Site 1. Currently at 71% of goal. |
| Musgrave Lake | 2000-2001 | 11 - Milk | RS1: 4.59 ac Category III 9.2 fu RS2: 0 ac ES1: 4.8 ac Category III 19.6 fu | 27.2 ac minimum; 28.95 ac maximum (see comments) | RS1: 13.29 ac Category II 93.03 fu RS2: 10.21 ac Category II 73.51 fu ES1: 5.77 ac Category II 45.01 fu ES2: 3.8 ac Category II Ref Area: 5.29 ac | NA | 1:4 ratio on 3 ac = 0.75 ac | 24.63 ac restored 3.2 ac rehab. 1.49 ac preserved <u>0.75 ac buffer</u> 30.07 ac total credit 182.69 fu (minimum - does not include ES-2) | 2006 was final monitoring year. 2006 approved ratios: Restoration Site 1, Restoration Site 2, and any additional or restored wetlands: 1:1 ratio Rehabilitation of pre-existing wetlands at Enhancement Site 1: 1:1.5 ratio Preservation of original Enhancement Site 2 and Wetland Reference Area: 1:6 ratio Upland buffer: 1:4 ratio Previous column applies these ratios to 2006 acreages to arrive at 2006 credits. Landowner committed to providing a minimum of 27.2 acres wetland credit. Project at 111% of goal. |
| Perry Ranch | 2001 | 8 - Marias | 3.4 ac Category III (2.3 ac) and IV (1.1 ac), 13.09 fu | 27.6 ac total - 3.4 ac existing = 24.2 ac | 19.9 ac wetland Category II and III 134.39 fu | NA | NA | 16.56 ac 121.3 fu | 2007 is sixth monitoring year. Currently at about 68% of project goal. |

Table 1 (continued): Summary of MDT Wetland Mitigation Sites monitored during 2001 to 2007.

| Site | Year Built | Major Montana Watershed Basin | Pre-Project Wetland Acreage and MDT Category | Target Wetland Credit | 2007 Wetland / Open Water Acreage and MDT Category | Enhancement Credit (ratio) | Upland Credit (ratio) | Total Acreage Gain / Credit and Functional Unit Gain as of 2007 | Comments |
|--------------------------|------------|-------------------------------|--|---|--|-----------------------------|---------------------------|--|---|
| GLENDIVE DISTRICT | | | | | | | | | |
| American Colloid | 2001 | 16 – Little Missouri | 0 ac | 4.4 ac | 4.08 ac Category III 13.4 fu | NA | NA | 4.08 ac 13.4 fu | 2007 is sixth monitoring year. Site primarily open water in 2005 and 2006, with minor (0.06 acre) wetlands in 2006 and 2007. Functional units slightly decreased. Counting presumed open water, currently at 93% of project goal. Dike breach temporarily drained site sometime during 2007. |
| Circle | 1999 | 12 – Lower Missouri | 2.98 ac Category and fu unknown | 1.7 ac | 7.6 ac Category II 65.4 fu | NA | NA | 4.62 ac 39.73 fu | Monitoring completed in 2004. Project goals satisfied. Achieved 155% of project goal. |
| Crackerbox Creek | 1997 | 15 – Lower Yellowstone | 0 ac | 1.2 ac | 1.6 ac (2001) Category III 7.2 fu | NA | NA | 1.6 ac (2001) 7.2 fu | Monitoring completed in 2001. Project goals satisfied. Currently at 133% of project goal. |
| Fourchette Creek Reserve | 1992-1995 | 9 – Middle Missouri | 0 ac | 10-22 ac | 7.87 ac Category II, III, IV 34.17 fu | NA | NA | 7.87 ac 34.17 fu | Monitoring completed in 2004. Consists of 5 reservoirs. Puffin reservoir excavated too deep and supports minimal wetland. Grazing is impacting most sites. Extensive northern leopard frog use at Penguin and Flashlight reservoirs. Achieved 79% of minimum 10-acre project goal. |
| Lame Deer | 2001 | 14 – Middle Yellowstone | 0 ac | 0.9 ac (school) 1.5 ac (creek) 2.4 ac total | 0.91 ac (school) <u>1.18 ac (creek)</u> 2.09 ac total Category II & III 15.72 fu | NA | NA | 2.09 ac 15.72 fu | 2007 is sixth and final monitoring year. Site consists of school site and two Alderson Creek sites. Currently at approximately 87% of adjusted project goal. Project goal adjusted based on as-built verses design features and MDT-specified monitoring area limits. |
| Plentywood-North | 2000 | 12 – Lower Missouri | 0 ac | 2.7 ac | 0.32 ac (2001) Category III 1.1 fu | NA | NA | 0.32 ac (2001) 1.1 fu | Numerical values shown are from 2001. Not monitored in 2002, 2003, or 2004 – removed from monitoring contract. |
| Ridgeway | 2000-2001 | 16 – Little Missouri | 0 | 50 total ac | 47.17 ac wetland <u>10.31 ac open water</u> 57.48 ac total Category II 425.87 fu | NA | NA | 57.48 ac Category II 425.87 fu | 2007 is seventh and final monitoring year. One of the 16 ponds in this complex (W-9) was intensively sampled / monitored in 2001-2007, although all ponds were delineated and functionally assessed in 2007. Counting shallow open water development, the project is at approximately 115% of project goal. Total includes 10.31 acres of shallow open water. |
| Rock Creek Ranch | 2004 | 11 - Milk | 1.08 ac Category IV 2.24 fu | 50 ac | 86.33 ac wetland 0.0 ac open water Category II 576.9 fu | 1:3 on 1.08 ac = 0.36 ac | 1:4 on 3.6 ac = 0.9 ac | 86.33 ac creation 0.36 ac enhancement <u>0.9 ac buffer</u> 87.59 ac total credit 574.66 fu | 2007 is third monitoring year. Site is currently at 175% of 50-acre goal. Shrub planting occurred in 2007. |
| Vida | 1995 | 12 – Lower Missouri | 0.2 ac | 3.9 ac | 0.11 ac (2001) Category III 0.32 fu | NA | NA | 0 ac (wetlands lost to dike construction) (2001) | Monitoring completed in 2001. Water delivery to the site has been cut off by upstream users. |
| Wigeon Reservoir | 1997 | 16 – Little Missouri | 0 ac | 2.2 ac | 2.07 ac wetland <u>6.64 ac open water</u> 8.71 ac total Category II 61.84 fu | NA | NA | 8.71 ac 61.84 fu | 2006 is sixth and final monitoring year. Project goal exceeded by 6.51 acres. Drought impacted this site in 2004 and 2005, which decreased size. Includes 6.64 acres of open water. |
| W.F. Charley Creek | 2006 | 12 – Lower Missouri | 0.03 ac Category IV 0.06 fu | 5.0 ac | 1.38 ac wetlands <u>4.82 ac open water</u> 6.2 ac total Category III 6.2 fu | NA | NA | 1.35 ac wetlands <u>4.82 ac open water</u> 6.17 ac total Category III 6.14 fu | 2007 is first formal monitoring year. Counting all aquatic habitat, site is at 123% of goal. Vegetated wetlands will likely continue to develop. |

Table 1 (continued): Summary of MDT Wetland Mitigation Sites monitored during 2001 to 2007.

| Site | Year Built | Major Montana Watershed Basin | Pre-Project Wetland Acreage and MDT Category | Target Wetland Credit | 2007 Wetland / Open Water Acreage and MDT Category | Enhancement Credit (ratio) | Upland Credit (ratio) | Total Acreage Gain / Credit and Functional Unit Gain as of 2007 | Comments |
|--------------------------|-------------|-------------------------------|---|---|---|----------------------------|--------------------------|---|---|
| BILLINGS DISTRICT | | | | | | | | | |
| Big Spring Creek | 1998 - 1999 | 9 – Middle Missouri | 7.86 ac wetland, 1.3 ac stream Category III 29.1 fu | 7.21 ac total, create 1.5 ac wtln d creation, enh exist. wtln d and str m | 11.97 ac wetland, 2.41 ac stream Category II and III 103.03 fu | NA | NA | Gained 4.11 ac wetland, 1.11 ac stream, and 73.98 fu Minimum 7.21 acres credit | 2005 was final monitoring year. Site gained additional 1.53 wetland acres and 12.83 functional units in 2005. Maximum Corps-allowable credit at this site is 7.21 ac (no performance standards, etc.), based subjectively on overall site improvement. About 4.11 wetland and 1.11 stream acres have been created (5.22 ac of aquatic habitat) and the site has been enhanced. How this equates to allowable credit is undetermined, but at least 7.21 acres of credit was assumed at this site. Fish habitat greatly enhanced. |
| Cloud Ranch | 2003 | 13 – Upper Yellowstone | 0.72 ac Category and fu unknown | 5.5 ac total | Off-chan: 2.21 ac Creek fringe: 1.10 ac Category II and III 44.81 fu | NA | 1:4 on 3.56 ac = 0.89 ac | 3.31 ac restoration <u>0.89 ac buffer</u> 4.20 ac total 9.34 fu gain since 2004 | 2007 is fourth monitoring year. Site currently at 76% of goal. Actual acreage of restored Big Timber Creek is not included in acreage totals. Goals (total 5.5 ac): Off-Channel Wetland Creation: 0.61 ac @ 1:1 = 0.61 ac Off-Channel Wetland Restoration: 1.41 ac @ 1:1 = 1.41 ac Riparian Wetland Restoration – Big Timber Creek: 2.0 ac @ 1:1 = 2.0 ac Emergent Wetland Restoration – Big Timber Creek: 0.58 ac @ 1:1 = 0.58 ac Buffer: 3.56 ac @ 1:4 = 0.89 ac |
| DH Ranch | 2007 | 13 – Upper Yellowstone | 0.57 ac Category III 1.6 fu | 17.4 ac | 11.31 ac wetland 5.39 ac open water Category II 73.5 fu | NA | 1:4 (none yet) | 11.31 ac wetland <u>2.26 ac ow (20% of wet.)</u> 13.57 ac credit 71.9 fu | 2007 is first monitoring year. Open water credit limited to 20% of wetland acreage. No credit for upland buffer to date as performance standard not yet met. |
| Lavina | 1987 | 10 - Musselshell | 0.45 ac Category and fu unknown | 1 ac total | 1.75 ac (2001) Category III 12.3 fu | NA | NA | 1.3 ac (2001) 9.1 fu | Monitoring completed in 2001. Site functioning well. Intended to be combined with Ryegate mitigation site to mitigate for 1.3 acres of highway impact. Currently at 130% of project goal. |
| Norem Ranch | 2002 | 13 – Upper Yellowstone | 6.93 ac Category III 33.6 fu | 14.71 ac total | 11.24 ac wetland <u>1.35 ac open water</u> 12.59 total Category II 81.51 | 1:3 on 6.98 ac =2.32 ac | 1:4 on 6 ac = 1.5 ac | 2.32 ac enhancement 4.26 ac creation 1.35 ac open water creation <u>1.5 ac buffer</u> 9.43 ac total 48.25 fu | 2007 is fourth monitoring year. Site currently at 64% of goal. Goals (total 14.71 ac): Enhancement: 6.98 ac @ 1:3 = 2.32 ac Wetland Creation: 9.46 ac @ 1:1 = 9.46 ac Open Water Creation: 1.58 ac @ 1:1 = 1.58 ac Buffer: 6 ac @ 1:4 = 1.5 ac |
| Roundup | 2000 | 10 - Musselshell | 0 ac | 24 ac | 16.1 ac wetland <u>4.97 ac open water</u> 21.07 ac developing Category II 137 fu | NA | NA | 21.07 ac total 137 fu | 2007 is seventh monitoring year. Site currently at 88% of goal. Kochia and goosefoot dominance somewhat problematic. |
| Ryegate | 1987 | 10 - Musselshell | 0.3 ac | 1 ac | 2.22 ac (2001) Category II 16.9 fu | NA | NA | 2.22 ac (2001) 16.9 fu | Monitoring completed in 2001 Site functioning well. Intended to be combined with Lavina mitigation site to mitigate for 1.3 acres of highway impact. Currently at 220% of project goal. |
| Stillwater River | 1999 | 13 – Upper Yellowstone | 3.77 ac Category III 15 fu | 10.69 ac total | 4.16 ac wetland 5.56 ac open water 9.72 ac Category I 101.88 fu | 1:1 on 3.77 ac = 3.77 ac | NA | 5.95 ac creation <u>3.77 ac enhancement</u> 9.72 ac total credit 86.88 fu | 2005 was final monitoring year. Results similar to 2002 - 2005. 10.69-ac goal included existing wetlands. Currently at 91% of goal. |
| Selkirk Ranch | 2006/ 2007 | 10 - Musselshell | 32.9 ac Category III 102.5 fu | 60.4 ac | 64.8 ac wetland 1.0 ac open water 508.8 fu | 1:3 | 1:5 | 0.34 ac credit (buffer) 406.3 fu | 2007 is first monitoring year. Complex performance standards (see individual report). Gained 31.9 acres of aquatic habitat in 2007, but current credit 0.34 acres based on ultimate performance standards and ratios. Additional interim credit may be available as determined by Corps. |
| Vince Ames | 1992 - 1994 | 13 – Upper Yellowstone | 2.39 ac Category III Category IV fu unknown | 9.8 ac | 15.24 ac (2001) Category III 117.3 | NA | NA | 12.85 ac (2001) 98.94 fu | Monitoring completed in 2001. Consists of 4 ponds. Acreage and functional goals met. Currently at 131% of project goal. |
| Wagner Marsh | 2005 | 13 – Upper Yellowstone | 2.12 ac wetland 1.75 ac open water 3.87 ac total Category IV 16.64 fu | 21.59 ac total | 7.5 ac wetland <u>5.8 ac open water</u> 13.3 ac total Category III 89.11 fu | NA | 1:4 on 5.19 ac = 1.3 ac | 7.5 ac (total wetland) 1.5 ac (open water) <u>+1.3 ac (buffer)</u> 10.3 ac credit 72.47 fu | 2007 is third monitoring year. Open water credit limited to 20% of wetland credit. Much of the open water habitat observed in 2007 is expected to become vegetated with emergent hydrophytic species over time. |

Table 1 (continued): Summary of MDT Wetland Mitigation Sites monitored during 2001 to 2007.

| Site | Year Built | Major Montana Watershed Basin | Pre-Project Wetland Acreage and MDT Category | Target Wetland Credit | 2007 Wetland / Open Water Acreage and MDT Category | Enhancement Credit (ratio) | Upland Credit (ratio) | Total Acreage Gain / Credit and Functional Unit Gain as of 2007 | Comments |
|--------------------------|------------|-------------------------------|---|-----------------------|--|----------------------------|-----------------------|---|---|
| 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. |
| TOTAL¹ | | | | 885.84 ac | | | | 812.85 ac 6,542.27 fu | ¹ No target or credit figures were included for the South Fork Smith site. |

Appendix B

TABLE 35: 2007 MAINTENANCE SUMMARY/UPDATE

*MDT Wetland Mitigation Monitoring
2007 Executive Summary*

Table 35: 2007 maintenance summary and update for each MDT Wetland Mitigation Site.

| Mitigation Site | 2007 Maintenance Summary/Update |
|---------------------------|---|
| MISSOULA DISTRICT | |
| Batavia | <p>The berm and associated water control structures were in good condition during the mid-season visit.</p> <p><i>Noxious Weeds</i> Excavated soils were deposited in adjacent upland areas during the spring of 2005 and some of these areas were infested with weedy species, primarily thistle and spotted knapweed. Weed control, as proposed by the USFWS, should continue in these areas until desired species become established.</p> |
| Camp Creek | <p>Supplemental planting and irrigation in upland areas within the MDT parcel should be considered.</p> <p><i>Noxious Weeds</i> Several Category 1 noxious weeds are present on both MDT and Grasser parcels including Canada thistle, hound's-tongue, oxeye daisy, spotted knapweed and yellow toadflax. The MDT parcel has the least amount of invasive species and distribution is primarily limited to upland areas not affected during construction efforts. Control measures for these areas were implemented and observed during the 2007 monitoring. Even though the uplands areas were sprayed, some knapweed still persists. Additional spraying is recommended for areas missed during the initial control activities.</p> |
| Hoskins Landing | <p>Evidence of livestock accessing the site was observed during a fall 2007 visit. During 2006, an electric fence was periodically put into place, running parallel with the river setback from the shoreline. Fences were removed prior to seasonal flows and re-installed during August to exclude livestock. The drier upland grass meadows were grazed and trampling within the wetlands was observed. Minor browse on the woody plantings within the wetland area was also observed.</p> <p><i>Noxious Weeds</i> Several Category 1 noxious weeds were still present but at low cover values: Canada thistle, Dalmatian toadflax hound's-tongue, oxeye daisy, St. John's wort, and spotted knapweed. Category 3 yellowflag iris and a water-milfoil species were also present within the mitigation site. The Confederated Salish and Kootenai Tribes are diligently following a five year (2005 to 2010) vegetation management plan that includes invasive weed control and revegetation efforts. Weed control activities were observed during the mid-season visits including herbicide applications, minor grazing and mowing. Weed control activities seem to be working with observations of lower cover values for previous weedy areas.</p> |
| Kleinschmidt Creek | <p>A new jackleg fence was installed at the site in 2004. Bird boxes installed by MDT at the site were in good condition. Areas disturbed by livestock grazing in the low intensity sections should be revegetated with woody plants. Heavy browse from local wildlife has been observed across the entire site. Control measures such as chemical browse repellants should be considered to avoid further browse damage or eventual mortality to shrub and tree species.</p> <p><i>Noxious Weeds</i> Although the landowner treated weeds near upper excavated shallow open water area and other areas in 2004 and 2007, several noxious weeds are present, but at much lower quantities. These included Canada thistle, hounds tongue, oxeye daisy and spotted knapweed. Significant progress has been made during the 2007 season to eradicate weeds from the site. The continued spread of noxious weeds within the dry portion of upland areas within the mitigation areas is still possible and annual control efforts should continued to eliminate this spread.</p> |
| Peterson Ranch | <p>The general lack of water at the majority of this site continues preclude wetland development in many areas. Continued livestock grazing within excavated wetlands # 1 & 2 also continue to slow development of wetlands and preclude shrub development.</p> <p><i>Noxious Weeds</i> Several noxious weeds are present including Canada thistle, hound's tongue, oxeye daisy, and spotted knapweed. These generally consist of scattered individuals with very low coverage. However, weed control and revegetation of disturbed sites would prevent further weed spread, and reduce the risk of new weeds invading. A large population of Canada thistle occurs just outside the north property boundary that could facilitate spread of this species on the site.</p> |

Table 35 (continued): 2007 maintenance summary and update for each site.

| Mitigation Site | 2007 Maintenance Summary/Update |
|--------------------------------|--|
| BUTTE DISTRICT | |
| Jack Creek Ranch | <p><i>Noxious Weeds</i> The site has two State of Montana Noxious Weeds, Canada thistle and hounds tongue. Only a few live hounds tongue were noted during the July 2007 monitoring visit within the McKee Spring creek floodplain. Weed control efforts have been effective in significantly reducing these two species. Canada thistle still continues to pose the greatest problem in the transition and upland areas. Continued spot spraying is recommended in 2007 primarily for Canada thistle and hounds tongue.</p> |
| Woodson Creek | <p>The lower dike on the eastern parcel was breached in June causing the majority of the ponded water to drain. The cause of the failure is unknown. The breach is approximately 10 feet wide. The installation of monitoring wells needs to be completed to fulfill success criteria requirements. Similarly, woody cuttings need to be planted to fulfill success criteria requirements. Garrison creeping foxtail continues to dominate the majority of the site. As part of the mitigation agreement, much of the existing Garrison creeping foxtail is to be eliminated at the site. Eradication measures are expected to occur in fall 2007.</p> <p><i>Noxious Weeds</i> Canada thistle has become established in disturbed areas. It is especially prevalent in and around where Woodson Creek enters the mitigation site, on the dikes, and in the vicinity of the outlet culvert at the southern end of the restored creek channel.</p> |
| GREAT FALLS DISTRICT | |
| Alkali Lake | It will be important in 2008 to manage water levels throughout the summer to maintain saturated soils without over-inundating the site in order to maximize wetland development and promote nesting habitat for the Piping Plover. |
| Little Muddy Creek | In 2006 it was suggested that extremely wide and deep cracks on the berm near PP-5 should be monitored. However, these cracks were much shallower in 2007, indicating they are ephemeral and a result of how the soil responds to precipitation events. |
| Meriwether-East | The dikes were covered evenly with erosion control fabric and no erosion problems were found. |
| Perry Ranch | <p>Several dike problems were noted during the 2002 summer visit, repaired during 2003, and have been stable into 2007. No problems with the dike were found in 2007. However, it seems that the site is not getting sufficient water from Cut Bank Creek either because streamflows have been insufficient or because the inlet channel is too high.</p> <p><i>Noxious Weeds</i> The Blackfoot Tribe and MDT have developed a weed plan for the Perry Ranch site. Bio-control was established for leafy spurge and Canada thistle and will be monitored through aerial photograph assessments and at four established Weed Photo Points. Leafy spurge is fairly apparent on the 2006 and 2007 aerial photographs. It is recommended that the two occurrences of hound's-tongue be pulled, bagged, and removed from the site in 2008.</p> |
| GLENDIVE DISTRICT | |
| American Colloid | At the time of the investigation in mid-July it was confirmed that no water was in the site and the dam had been breached. There are three risers on the south side of the berm and three horizontal culverts attached to these risers which convey overflow water to the north side of the dam. The dam failed due to a horizontal hole on the east side of the center riser on the south side of the berm. The breach should be repaired. |
| Lame Deer | The stormwater inlet culvert in the southwest corner of the south cell of the School Mitigation Site was in working order and required no maintenance. Although not technically part of the MDT project, the outflow culvert in Wetland-369 is blocked by sediment and woody debris; the beaver dam remains present. |
| Ridgeway | The breach is still present in the dam at W-16. Water moves freely between the excavated pond and a developing wetland area south of the berm. There is a breach around the east end of the W-13 dam, which is likely how fish species entered into this wetland. |
| Rock Creek Ranch | All dikes were in good condition during the spring, mid-season, and fall visits with no indications of seepage observed during 2007. |
| West Fork Charley Creek | All dikes were in good condition during the spring reconnaissance and mid-season visits. The designed water gap (for cattle watering) appeared to be functioning as designed, although the gate to the site was open during both visits, allowing cattle access. |

Table 35 (continued): 2007 maintenance summary and update for each site.

| Mitigation Site | 2007 Maintenance Summary/Update |
|--------------------------|--|
| BILLINGS DISTRICT | |
| Cloud Ranch | <p>The water level control structures within the off-channel wetlands were functioning and in good working order at the time of the July monitoring.</p> <p><i>Noxious Weeds</i> The site supports three State of Montana-listed noxious weeds: Canada thistle, hound's-tongue, and spotted knapweed as well as two County listed noxious weeds; black henbane and musk thistle. Canada thistle, hound's-tongue, black henbane, musk thistle and a few spotted knapweed plants were observed along Big Timber Creek. Canada thistle and hound's-tongue were observed within the off-channel wetland assessment area. The spotted knapweed, hound's-tongue and Canada thistle appeared to have been sprayed in 2006 and 2007 in the upland areas adjacent to the off-channel wetlands. Continued chemical or biological control measures are recommended for Canada thistle, hound's-tongue, spotted knapweed, musk thistle and black henbane.</p> |
| DH Ranch | <p>Several breaches in berms were identified during the reconnaissance site visit, but were repaired prior to site monitoring in September. No other specific maintenance issues were identified, however, it may be worthwhile to adjust the distribution of water on the site in order to maximize the available acreage.</p> <p>In the mitigation design report, the berm areas are indicated to be riparian scrub-shrub areas. These areas were bare ground and had not been planted with riparian shrubs when the site was monitored, though some cottonwood seedlings had established. It is likely that these seedlings will grow taller in subsequent years, however they occur in a single line near the bases of the berms. If these berm areas are to be counted for credit in future years it is likely that the upper portions of the berms will need to be planted with shrubby riparian species.</p> |
| Norem Ranch | <p>All outflow structures were functioning and the fence around the wetland was intact.</p> <p><i>Noxious Weeds</i> During the 2007 monitoring, whitetop was not observed. Effective weed control has eliminated or significantly reduced this weedy species. Leafy spurge, field bindweed and spotted knapweed are small infestations located along the access road or around Pond 1. Canada thistle is still present, typically in the transition zones between wetlands and uplands. The landowner has implemented biological, mechanical and chemical control and has significantly reduced the population of Canada thistle. Due to the difficulty in controlling this noxious weed and leafy spurge, continued weed control measures are recommended.</p> |
| Roundup | <p>All dikes and inlet structures were functioning satisfactorily. All located bird boxes are in good condition.</p> <p><i>Noxious Weeds</i> Some areas were treated for weeds within the wetland complex during 2007 by MDT staff. Unless all weedy areas can be flooded continuously for a prolonged period (likely more than 1 year), an aggressive weed management program is recommended.</p> |
| Selkirk Ranch | <p>Non-preferred grass species, namely <i>Alopecurus arundinaceus</i> may require flood or chemical control to reduce cover below the COE-required threshold of 10% within each mitigation credit area. Non-noxious weeds, such as <i>Chenopodium</i> species and perennial sowthistle will require monitoring; it is likely that prolonged saturation will discourage expansion and reproduction of these species.</p> |
| Wagner Marsh | <p>Water levels continue to be variable, with the site being the driest observed to date in August 2007 and the wettest to date in October 2007.</p> <p>The plant protectors used when planting woody species have started to greatly affect the growth of many of these plants. It is suggested that the plant protectors be removed.</p> <p><i>Noxious Weeds</i> A few tamarisk saplings were observed and removed during monitoring in 2007. The presence of tamarisk on the site should continue to be monitored and individuals removed when encountered, but overall the threat of tamarisk invasion appears to be low. The majority of tamarisk seedlings/saplings that were pulled were found in the central portion of the site, east of the crescent shaped pond and south of the wetland cell containing the vegetation transect.</p> <p>In 2006 it was noted that spotted knapweed was well established on the berm on the east side of the site, and in upland communities and that Canada thistle was prevalent in the cattail area in the northwestern portion of the site. During the 2007 mid-season visit it was noted that a comprehensive weed spraying program had been implemented at the site. This effort made significant progress toward eradicating these species from the site, however, spraying in subsequent years is needed to fully address the severity of the problem.</p> |