MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: 2003
FINAL MONITORING YEAR

Rey Creek
Three Forks, Montana

Prepared for:

MONTANA DEPARTMENT OF TRANSPORTATION
2701 Prospect Avenue
Helena, MT 59620-1001

March 2004

Project No: 130091.014

Prepared by:

LAND & WATER CONSULTING, INC.
P.O. Box 8254
Missoula, MT 59807

LAND & WATER

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1.0 INTRODUCTION

This annual report summarizes methods and results from the third and final year of formal monitoring efforts at the Montana Department of Transportation's (MDT) Rey Creek mitigation site. MDT personnel informally monitored the site after its creation in 1999.

The site is located approximately 2.5 miles west of the town of Logan and approximately 1.5 miles east of Three Forks, MT in Gallatin County. The project site is located within the MDT Butte District, Watershed (#6), Section 28, Township 2 North, Range 2 East **(Figure 1)**. The elevation of the site is approximately 4,077 feet above sea level.

The wetland is situated south and adjacent to Frontage Road (Hwy 10) and north of Interstate-90 and the Burlington Northern railroad tracks **(Figure 2, Appendix A)**; the ponds were constructed in what was historically a railroad bed. Construction was completed in September of 1999 with a goal of creating wetlands to mitigate for the replacement of the Rey Creek Frontage Road bridge with two galvanized culverts.

Two off-stream impoundments were created adjacent to Rey Creek **(Figure 2, Appendix A)** south of Hwy. 10 and were designed to capture seasonal high water flows. The impoundments were constructed without permanent control structures and have inlets originally designed at elevations to facilitate movement of high water flows into the created wetlands.

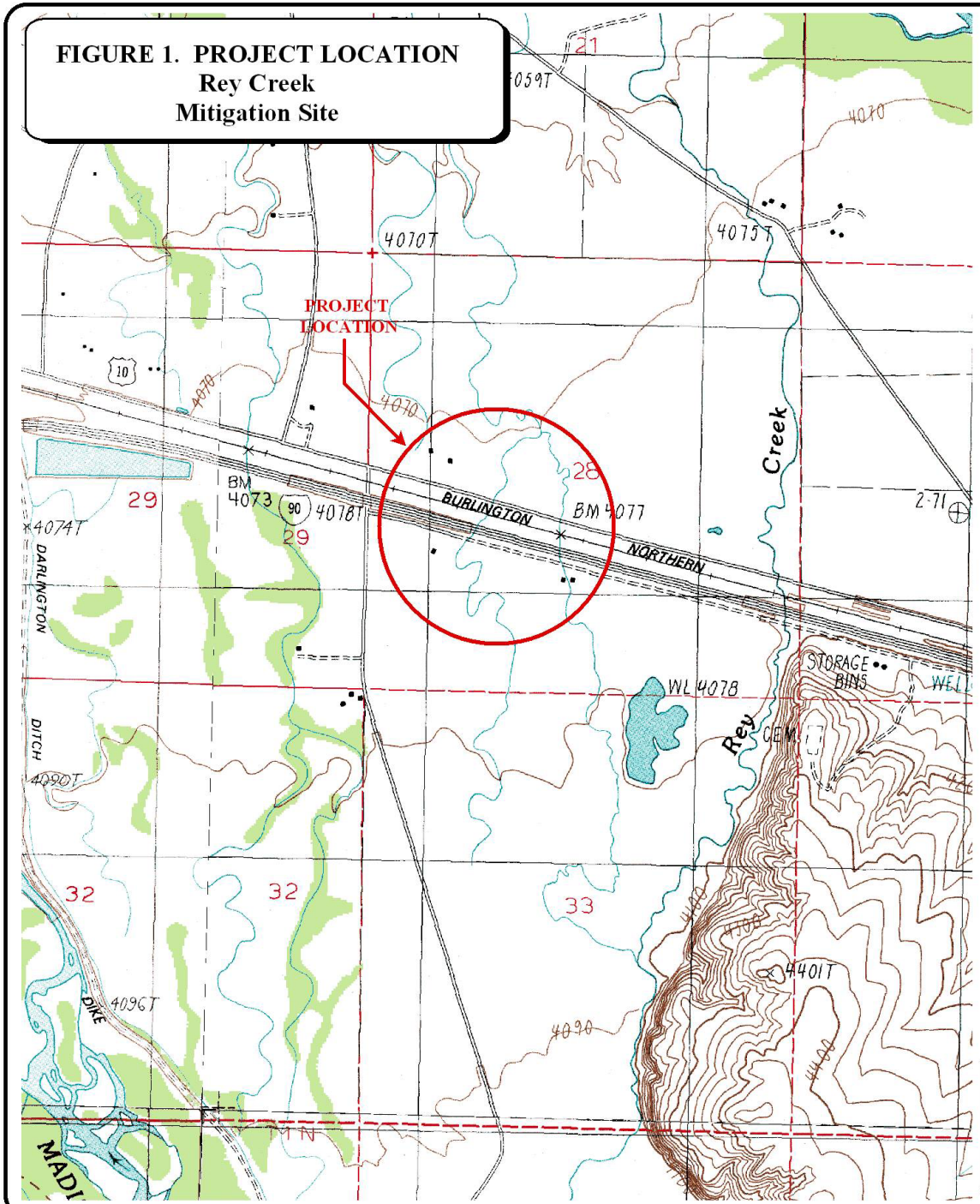
Impoundment #1, located on the east side of Rey Creek, was designed to hold approximately 8,438 ft^2 of standing water **(Appendix E)**. This eastern impoundment has a direct connection to the stream via an inlet and an outlet channel. Impoundment #2, located on the west side of Rey Creek, was designed to hold approximately 7,680 ft^2 of standing water. This impoundment is separated from the stream by a riprapped inlet which allows the capture of overflow; the inlet functions as an outlet during high flows and allows the impoundment some degree of turnover. The Rey Creek site was designed to mitigate for specific wetland functions impacted by MDT roadway projects. These functions include: storm water retention, roadway runoff filtration, sediment and nutrient retention, water quality, groundwater recharge, waterfowl and wildlife habitats, and riparian restoration.

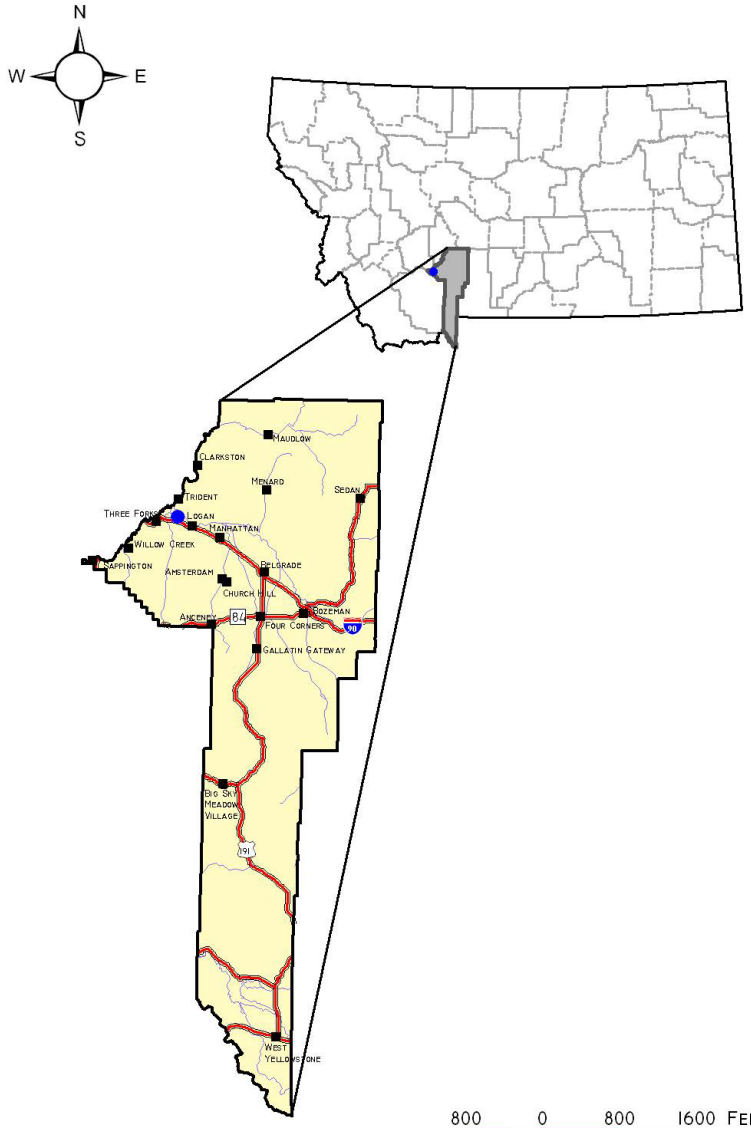
2.0 METHODS

2.1 Monitoring Dates and Activities

The Rey Creek wetland was monitored on June 20, 2003. All collected information is presented on the Wetland Mitigation Site Monitoring Form (**Appendix B**).

FIGURE 1. PROJECT LOCATION
Rey Creek
Mitigation Site





800 0 800 1600 FEET

1: 24,000

PROJECT #: 130091.014
DATE: APRIL 2001
LOCATION:
PROJECT MANAGER: B. DUTTON
DRAWN BY: B. NOECKER

LAND & WATER CONSULTING, INC.
1120 CEDAR PO BOX 8254 MISSOULA, MT 59807

Activities and information conducted/collected included: wetland delineation; wetland/open water boundary mapping; vegetation community mapping; vegetation transects; soils data; hydrology data; bird and general wildlife use; photograph points; functional assessment; and examination of inflow and outflow structures (non-engineering).

2.2 Hydrology

Wetland hydrology indicators were recorded using procedures outlined in the COE 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Hydrology data were recorded on the COE Routine Wetland Delineation Data Form **(Appendix B)** at each wetland determination point.

All additional hydrologic data were recorded on the mitigation site monitoring form **(Appendix B)**. Where possible, the boundary between wetlands and open water (no rooted vegetation) aquatic habitats was mapped on the aerial photograph and an estimate of the average water depth at this boundary was recorded **(Figure 3, Appendix A)**. Precipitation data for the year 2003 were compared to the 1970-2000 average (WRCC 2003).

There are no groundwater monitoring wells at the site.

2.3 Vegetation

General vegetation types were delineated on an air photograph during the site visit (**Figure 3, Appendix A)**. Coverage of the dominant species in each community type is listed on the monitoring form **(Appendix B)**. A comprehensive plant species list for the entire site was compiled in 2001 and has been updated to include new species encountered during the 2003 field season. Observations from past years were compared with new data to document vegetation changes over time. Woody species were not planted on this site.

One (1) transect was established in the vicinity of Impoundment #2 during the 2001 monitoring event to represent the range of current vegetation conditions. The location of the transect is shown on **Figure 2, Appendix A**. The transect was used to evaluate changes over time, especially the establishment and increase of hydrophytic vegetation. Percent cover for each species was recorded on the vegetation transect form within the monitoring form **(Appendix B)**. The transect ends were marked with a metal fence post and its locations recorded with the GPS unit during the 2001 field season. Photographs of the transect were taken from both ends during the 2003 site visit **(Appendix C)**.

2.4 Soils

Soils were evaluated during the site visit according to the procedure outlined in the COE 1987 Wetland Delineation Manual. Soil data were recorded for each wetland determination point on the COE Routine Wetland Delineation Data Form **(Appendix B)**. The most current terminology used by NRCS was used to describe hydric soils.

2.5 Wetland Delineation

A wetland delineation was conducted within the assessment area (AA) according to the 1987 COE Wetland Delineation Manual. The AA includes the areas that were created during the mitigation efforts (impoundments), the inlets and outlet, and the segment of Rey Creek flowing through the site. A larger area, the Monitoring Limits, was investigated to monitor the effect of the impoundments on adjacent wetlands, particularly those areas parallel to the railroad tracks. The total wetland acreage was adjusted to account for the wetlands that were likely present prior to creating the mitigation site.

All areas within the monitoring limits were investigated for the presence of wetland hydrology, hydrophytic vegetation and hydric soils. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1988). The information was recorded on the COE Routine Wetland Delineation Forms **(Appendix B)**. The wetland/upland and open water boundaries were used to calculate the wetland area.

2.6 Mammals, Reptiles, and Amphibians

Mammal, reptile, and amphibian species observations were recorded on the wetland monitoring form during the site visit **(Appendix B)**. Indirect use indicators were also recorded including tracks, scat and burrows. A comprehensive wildlife species list for the entire site was compiled and will be updated as new species are encountered. Observations from past years were compared with new data to determine if wildlife use is changing over time.

2.7 Birds

Bird observations were recorded during the site visit according to the established bird survey protocol **(Appendix E)**. A general, qualitative bird list has been compiled using these observations. Observations were compared between years. No bird nesting structures were observed on this site.

2.8 Macroinvertebrates

No macroinvertebrate samples were collected on the site.

2.9 Functional Assessment

A functional assessment form was completed for the Rey Creek mitigation site using the 1999 MDT Montana Wetland Assessment Method. The assessment was conducted on the constructed mitigation site and did not include areas outside of the impoundments. Field data were collected on a condensed data sheet. The remainder of the assessment was completed in the office and compared to the 2001 functional assessment.

2.10 Photographs

Photographs were taken showing the current land use surrounding the site, the wetland buffer, the monitored area, and the vegetation transects. A description and compass direction for each photograph were initially recorded on the wetland monitoring form during the 2001 season. Each photograph point was marked on the ground with a wooden stake and the location recorded with a resource grade GPS **(Appendix C)**. The approximate locations are shown on **Figure 2, Appendix A**. Photos were retaken during the 2002 and 2003 field seasons in the same locations and directions. Photographs were taken using a digital camera. Copies of 2001-2003 aerial photos are also included in **Appendix C**.

2.11 GPS Data

During the 2001 monitoring season, survey points were collected using a resource grade Trimble, Geoexplorer III hand-held GPS unit **(Appendix E).** Points collected included: the vegetation transect beginning and ending locations; photograph locations; and the jurisdictional wetland boundary. In addition, during the August 2001 monitoring season survey, points were collected at four (4) landmarks recognizable on the air photo for purposes of line fitting to the topography. No new GPS data were collected during the 2003 field season; changes in the wetland boundary, vegetation communities, and sample point locations were drawn on the 2001 aerial photograph.

2.12 Maintenance Needs

The condition of inflow and outflow structures, habitat enhancement structures or other mitigation related structures were evaluated. Inflow of both impoundments is controlled by a riprap berm and there is no control structure at the outlet stream of impoundment #1; the riprap and stream connections were examined for adequacy in controlling water levels in the ponded areas. This examination did not entail an engineering-level analysis.

3.0 RESULTS

3.1 Hydrology

Approximately 56% of the mitigation area is classified as emergent wetland; 40% of the gross wetland area was inundated at the time of investigation. The entire perimeter of the wetland included 1 to 5 feet of exposed muddy substrate. Water depth at the wetland/open water boundary was estimated at 2-3 feet. Water depth appears similar to that of former years or within a range of 0-6 feet deep.

According to the Western Regional Climate Center (WRCC, 2003), the Belgrade Airport station annual mean (1971 – 2000) precipitation was 14.74 inches; the average precipitation through the month of June was 8.43 inches. For the year 2003, precipitation through June was 9.56 inches or

113% of the mean; the drought conditions reappeared after June 2003. Since 1999 the yearly average has been 76% of the yearly 1971-2000 average.

The riprap at the inlets of both impoundments was installed to prevent pond capture of the stream and allow water to flow into the ponds by infiltration and overtopping during storm and high water events. The surface water levels in both ponds appear to be approximately that of the creek (non-surveyed levels). Photographs of the riprap are included in **Appendix C**.

3.2 Vegetation

Vegetation species identified on the site are presented in **Table 1** and in the monitoring form **(Appendix B)**. Six (6) vegetation communities were mapped on the mitigation area map (**Figure 3, Appendix A**). The communities include five wetland and one upland types: Type 1, *Eleocharis palustris/Carex spp.*; Type 2, *Typha latifolia/Scirpus acutus*; Type 3, *Carex utriculata/Juncus balticus*; Type 4, *Agropyron dasystachyum* (UPL); Type 5, *Juncus balticus/Agrostis alba*; and, Type 6, *Scirpus acutus*. Dominant species within each community are listed on the monitoring form **(Appendix B)**. Encroachment of the vegetation into open water areas has increased since 2001 **(Appendix C)**. Willow seedlings in the exposed substrate (mud) areas on the east end of impoundment #1 continue to proliferate.

The vegetation transect results are detailed in the monitoring form **(Appendix B)** and are summarized by year on **Table 2**, the transect maps, and **Chart 1**. Emergent vegetation is increasing around the periphery of the ponds, however no apparent change in length of the community types had occurred along the transect in 2003. Percent cover of *Scirpus* had increased within community type 2 along the belt transect which may encourage growth further into the open water area in 2004.

3.3 Soils

The site was mapped as part of the Gallatin County Soil Survey (USDA unpublished). The soil on the site is mapped as the Greycliff-Toston-Threeriv Complex (Series 525A). The complex is comprised of: the Greycliff silt loam, the Toston loam, and the Threeriv silty clay loam components. Inclusions within this series are: Reycreek, Rivra, and Slickspots; all are unranked. The Greycliff and Toston soils, as independent series, are non-hydric soils. The Threeriv silty clay loam, however, is hydric. Soil characteristics at each wetland determination point were compared with those of the Greycliff-Toston-Threeriv complex.

Soils were sampled at one wetland sample point (SP-1) and one upland sample point (SP-2). The soil at SP-1, taken at the west end of impoundment #2, was a very dark gray (7.5YR 3/1) sandy loam from 0-6 inches without evident mottles. At a depth of 6-12 inches the soil was a Black gravelly sandy loam (10YR 2/1). At 12 inches a gravel layer was observed. The soil at the upland site, SP-2, was a very dark gray (10Yr 3/1) sandy loam from 0-3 inches without mottles. From 3-12 inches the soil was a very dark gray sandy clay gravelly loam. Gravels and cobbles at a depth of 12 inches in both pits are presumed to be the result of the impoundment excavation.

Table 1: ***2001-2003 Rey Creek Wetland Vegetation Species List***

Scientific Name	Region 9 (Northwest) Wetland Indicator Status
Agropyron trachycaulum	FAC
Agropyron dasystachyum	FACU-
Agrostis alba	FACW
Amaranthus albus	FACU
Aster conspicuous	- (FAC)
Bromus inermis	**- (UPL)**
Bromus japonicus	**FACU**
Carex lasiocarpa	OBL
Carex nebrascensis	OBL
Carex utriculata	OBL
Centaurea maculosa	UPL
Chenopodium spp.	FACU+ to FACU -
Cirsium arvense	FACU+
Crepis runcinata	FACU
Eleocharis palustris	OBL
Elymus condensatus	FACU
Equisetum arvense	FAC
Helianthus spp.	UPL
Hordeum jubatum	FAC+
Hyoscyamus niger	**- (UPL)**
Juncus balticus	OBL
Juncus longistylis.	FACW
Juncus nodosus	OBL
Juncus torreyi	FACW
Lactuca serriola	FAC-
Medicago sativa	**- (UPL)**
Melilotus officinalis	FACU
Mentha arvensis	FAC
Phalaris arundinacea	FACW
Poa pratensis	FACU+
Ribes aureum	FAC+
Rosa woodsii	FACU
Sagittaria cuneata	OBL
Salix lutea	OBL
Scirpus acutus	OBL
Scirpus pungens	OBL
Solidago spp.	FAC to FACW-
Stachys palustris	FACW+
Stipa occidentalis	- (UPL)
Symphoricarpos albus	FACU
Sisymbrium altissimum	FACU
Triglochin maritimum	OBL
Typha latifolia	OBL
Urtica dioica	**FAC**
Verbascum thapsus	UPL
Verbena hastate	FAC+
Veronica catenata	OBL
Vicia sativa	UPL

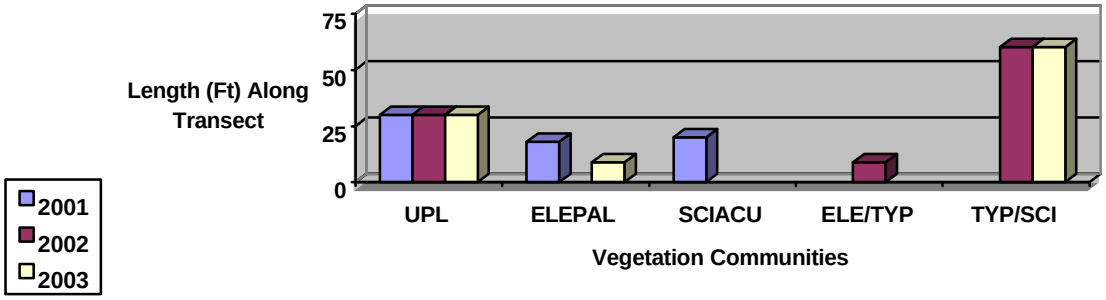
- : Species not listed in the National List of Plant Species that Occur in Wetland (Reed 1988); parenthetical status is assumed.

Bolded species indicate those documented within the analysis area for the first time in 2003.

Table 2: ***2001-2003 Transect Data Summary***

Monitoring Year	2001	2002	2003
Transect Length	147 feet	147 feet	147 feet
# Vegetation Community Transitions along Transect	5	5	5
# Vegetation Communities along Transect	3	3	3
# Hydrophytic Vegetation Communities along Transect	2	2	2
Total Vegetative Species	9	19	22
Total Hydrophytic Species	4	8	9
Total Upland Species	5	11	15
Estimated % Total Vegetative Cover	40%	65%	66%
% Transect Length Comprised of Hydrophytic Vegetation Communities	26%	47%	47%
% Transect Length Comprised of Upland Vegetation Communities	20%	20%	20%
% Transect Length Comprised of Unvegetated Open Water	54%	35%	33%
% Transect Length Comprised of Bare Substrate	6%	0%	0%

Chart 1: Length of Vegetation Communities along Transect 1



2001 Transect Map

Tran-sect 1 Start	Upland Type 4 (15')	Wetland Type 3 (15')	Wetland Type 2 (20')	Open Water (79')	Wetland Type 3 (3')	Upland Type 4 (15')	Total 147'	Transect 1 End

2002 Transect Map

Transect 1 Start	Upland Type 4 (12')	Wetland Type 1 & 2 (9')	Wetland Type 2 (57')	Open Water (48')	Wetland Type 2 (3')	Upland Type 4 (18')	Total 147'	Transect 1 End

2003 Transect Map

Transect 1 Start	Upland Type 4 (12')	Wetland Type 1 (9')	Wetland Type 2 (57')	Open Water (48')	Wetland Type 2 (3')	Upland Type 4 (18')	Total 147'	Transect 1 End

3.4 Wetland Delineation

The delineated wetland boundary is depicted on **Figure 3, Appendix A**. The wetland boundary within the assessment area (mitigation area) encompasses 0.52 gross wetland acre with an open water component of 0.20 acre; the net wetland area is 0.29 acre. There is a 0.03 acre upland island within impoundment 1. An additional 0.2 wetland acre was identified in 2002 outside of the mitigation area, but within the monitoring limits; this acreage has not been added to the mitigation wetland acreage. Hydrophytic vegetation is encroaching into the open water component. The COE data forms are included in **Appendix B**.

3.5 Wildlife

Very few direct or indirect signs of wildlife use were noted for mammals, amphibians, or reptiles at the Rey Creek site; deer tracks were observed in the saturated soil of the open water perimeter. The few wildlife observations are likely a result of the close juxtaposition of the site to the frontage road, railroad, and Interstate 90.

Wildlife species are listed in **Table 3.** Activities associated with these observations area included on the monitoring form in **Appendix B**.

Table 3: ***2001-2003 Wildlife Species Observed at the Rey Wetland Mitigation Site***[1]

BIRDS
Barn Swallow (*Hirundo rustica*) Common yellowthroat (*Geothlypis trichas)* Red-winged blackbird (*Agelaius phoeniceus)* Spotted Sandpiper *(Actitis hypoleucos)* **Yellow Warbler *(Dendroica petechia)***
MAMMALS
Deer tracks (*Odocoileus spp.)*

[1]**Bolded** species indicate those documented within the analysis area for the first time in 2003.

3.6 Macroinvertebrates

No macroinvertebrate samples were collected at this site.

3.7 Functional Assessment

Completed functional assessment forms for the mitigation area are included in **Appendix B** and summarized in **Table 4**. The two cells were assessed together along with the open-water component of the stream. The mitigation site continues to be ranked as a Category III wetland site and continues to improve in some categories, namely general fish and wildlife habitat as a result of improved vegetation cover. Based on the functional assessment results **(Table 4)**, approximately 3.38 functional units have been provided at the Rey Creek mitigation site as of 2003, an increase of 0.63 points since 2001.

3.8 Photographs

Representative photographs taken from photo points and transect ends are included in **Appendix C.** Copies of 2002 and 2003 aerial photos are also included in **Appendix C**. The increase in emergent vegetation coverage is evident in the photographs.

Table 4: ***Summary of 2001-2003 Wetland Function/Value Ratings and Functional Points at the Rey Creek Wetland Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2001	2002	2003
Listed/Proposed T&E Species Habitat	Low (0)	Low (.3)	Low (.3)
MNHP Species Habitat	Low (0)	Low (.1)	Low (.1)
General Wildlife Habitat	Low (.1)	Moderate (.4)	Moderate (.5)
General Fish/Aquatic Habitat	Moderate (.6)	Moderate (.4)	Moderate (.7)
Flood Attenuation	Low (.15)	Low (.15)	Low (.15)
Short and Long Term Surface Water Storage	Low (.3)	Moderate (.4)	Moderate (.4)
Sediment, Nutrient, Toxicant Removal	High (.95)	High (.95)	High (.95)
Sediment/Shoreline Stabilization	High (1)	High (1)	High (1)
Production Export/Food Chain Support	Moderate (.6)	Moderate (.6)	Moderate (.6)
Groundwater Discharge/Recharge	High (1)	High (1)	High (1)
Uniqueness	Low (.2)	Low (.3)	Low (.3)
Recreation/Education Potential	Low (.2)	Moderate (.5)	Moderate (.5)
Actual Points/Possible Points	5.1/12	6.1/12	6.5/12
% of Possible Score Achieved	43%	51%	54%
Overall Category	III	III	III
Total Acreage of Assessed Wetlands within Easement	0.54 ac	0.52	0.52
Functional Units (acreage x actual points)	2.75 fu	3.17 fu	3.38 fu
Net Acreage Gain (Includes stream segment)	0.54 ac	0.52 ac	0.52 ac
Net Functional Unit Gain	2.75 fu	3.17 fu	3.38 fu
Total Functional Unit "Gain"	2.75 Total FU	3.17 Total FU	3.38 Total FU

3.9 Maintenance Needs/Recommendations

No maintenance was required at the site.

3.10 Current Credit Summary

Wetlands and/or waters of the U.S. that were impacted during the removal of the Hwy. 10 bridge and installation of the culvert totaled 0.27 acre; no wetlands or waters of the U.S were impacted to create these two mitigation impoundments. Mitigation wetland acreage totaled 0.52 acre for the 2003 season; no increase in total area since 2002 was observed. However, emergent vegetation area has increased within the wetland boundary. Functional units increased from 2.75 in 2001 to 3.38 in 2002, an 18% increase.

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

4.0 REFERENCES

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Reed, P.B. 1988. National list of plant species that occur in wetlands: North West (Region 9). Biological Report 88(26.9), May 1988. U.S. Fish and Wildlife Service. Washington, D.C.

Urban, L. 2002. Wetland Mitigation Specialist, Montana Department of Transportation. Helena, MT. November 2002 Telephone Phone Conversation.

US Army Corps of Engineers. 1987. *Corps of Engineers Wetlands Delineation Manual*. US Army Corps. Washington, DC.

USDA Natural Resource Conservation Service. Soil Survey of Gallatin County, Montana.

Western Regional Climate Center, 2003. Belgrade Airport Station: www.wrcc.dri.edu/cgi-bin/cliMONtpre.pl?mtbelg.

Appendix A

FIGURES 2 - 3

MDT Wetland Mitigation Monitoring
Rey Creek
Three Forks, Montana

LAND & WATER

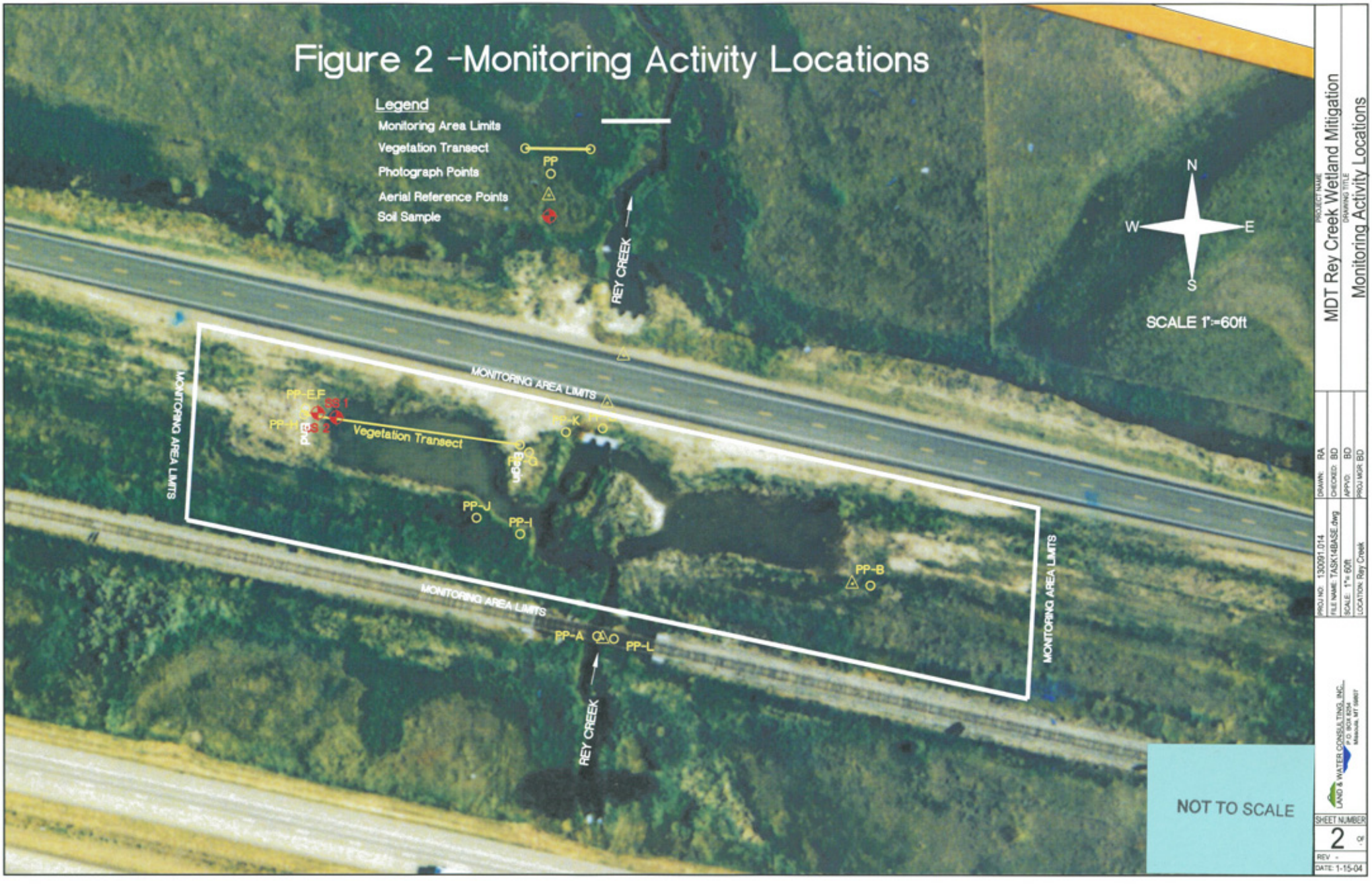
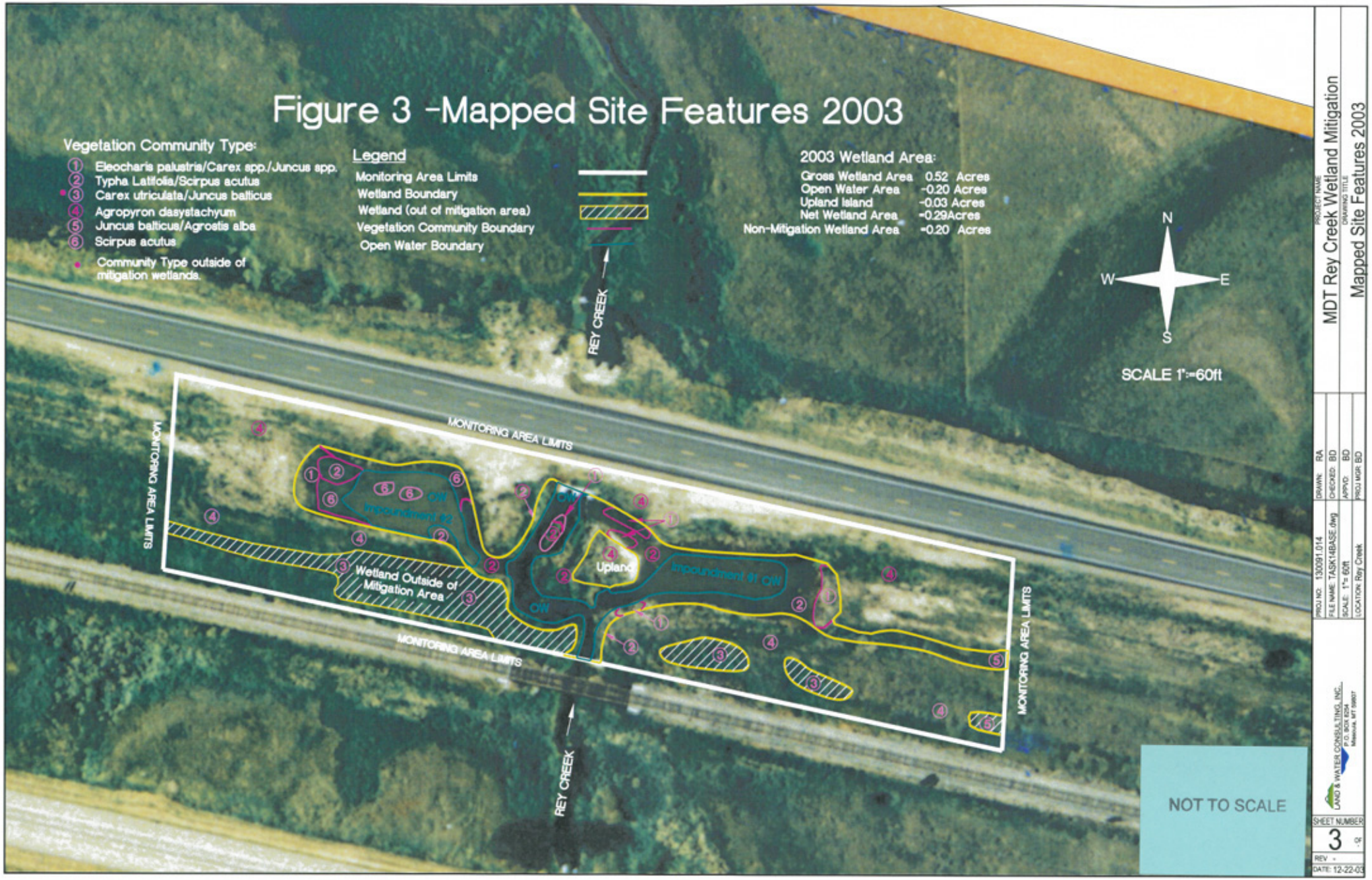


Figure 2 -Monitoring Activity Locations
Legend
Monitoring Area Limits
Vegetation Transect
Photograph Points
Aerial Reference Points
Soil Sample
PP
REY CREEK
N
W
E
S
SCALE 1"=60ft
MONITORING AREA LIMITS
PP-E,F
SS 1
SS 2
PP-H
PP-G
Vegetation Transect
PP-K
PP-J
PP-I
PP-B
PP-A
PP-L
NOT TO SCALE
PROJECT NAME
MDT Rey Creek Wetland Mitigation
DRAWING TITLE
Monitoring Activity Locations
PROJ NO: 130091.014
FILE NAME: TASK14BASE.dwg
SCALE: 1"= 60ft
LOCATION: Rey Creek
DRAWN: RA
CHECKED: BD
APPVD: BD
PROJ MGR: BD
LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807
SHEET NUMBER
2
REV -
DATE: 1-15-04

Figure 3 -Mapped Site Features 2003



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PROJ NO: 130091.014
FILE NAME: TASK14BASE.dwg
SCALE: 1"= 60ft
LOCATION: Rey Creek
DRAWN: RA
CHECKED: BD
APPVD: BD
PROJ MGR: BD
LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807
SHEET NUMBER 3
REV -
DATE: 12-22-03

Appendix B

2003 Wetland Mitigation Site Monitoring Form
2003 Bird Survey Forms
2003 Wetland Delineation Forms
2003 Full Functional Assessment Forms

MDT Wetland Mitigation Monitoring
Rey Creek
Three Forks, Montana

LAND & WATER

LWC / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name:__Rey Creek__ Project Number:____130091_____ Assessment Date:_6_/_20__/_03_
Location:__Three Forks_____ MDT District:__Butte_____ Milepost:_____
Legal description: T__2N_ R_2E___ Section_28___ Time of Day: 8AM-2PM
Weather Conditions:__clear_____ Person(s) conducting the assessment:_____LB/LWC
Initial Evaluation Date:__7__/_23___/_02_ Visit #:_____3____ Monitoring Year:____2003_____
Size of evaluation area:____0.52___acres Land use surrounding wetland:transportation corridors___

HYDROLOGY

Surface Water Source:___Rey Creek_____
Inundation**:** Present_X___ Absent____ Average depths:_3___ft Range of depths:__0_-_6___ft
Assessment area under inundation:_38___%
Depth at emergent vegetation-open water boundary:__3__ft
If assessment area is not inundated are the soils saturated w/in 12" of surface**:** Yes_X___No____
Other evidence of hydrology on site (drift lines, erosion, stained vegetation etc.): __bank-full line_____

Groundwater
Monitoring wells: Present_____ Absent X_____
Record depth of water below ground surface

Well #	Depth	Well #	Depth	Well #	Depth

Additional Activities Checklist:
__X___Map emergent vegetation-open water boundary on air photo
__X__Observe extent of surface water during each site visit and look for evidence of past surface water elevations (drift lines, erosion, vegetation staining etc.)
__-___GPS survey groundwater monitoring wells locations if present

COMMENTS/PROBLEMS: _____

VEGETATION COMMUNITIES

Community No.:__1__ Community Title (main species):__*Eleocharis palustris/Carex spp.*

Dominant Species	% Cover	Dominant Species	% Cover
ELEPAL	40	SAGCUN	<1
CARUTR	25	JUNTOR	<1
CARLAS	20	SALLUT	<1
CARNEB	5	ALOARU	<1
SAlspp. seedlings (east pond)	<5	VERCAT	<1
JUNBAL	<1		

COMMENTS/PROBLEMS: _too early for AGRALB _____

_____

_____

Community No.:_2___ Community Title (main species):__*Typha latifolia/Scirpus acutus*_____

Dominant Species	% Cover	Dominant Species	% Cover
TYPLAT	60	MENARV	<1
SCIACU	20	PHAARU	<1
CARUTR	10	SCIPUN	<1
ELEPAL	5		
ALOARU	<1		
CIRARV	<1		

COMMENTS/PROBLEMS: _____

_____

_____

_____

Community No.:_3___ Community Title (main species):__*Carex utriculata/Juncus balticus*_____

Dominant Species	% Cover	Dominant Species	% Cover
CARUTR	40		
JUNBAL	40		
TYPLAT	15		
SYMspp	<5		
URTDIO	<5		

COMMENTS/PROBLEMS: __This community outside of mitigation wetland; will monitor boundaries to assess whether size is increasing as a result of proximity to constructed WL._____

_____

_____

_____

Additional Activities Checklist:

_X___Record and map vegetative communities on air photo

VEGETATION COMMUNITIES (continued)

Community No.:_4___ Community Title (main species):__*Agropyron dasystachyum*_____

Dominant Species	% Cover	Dominant Species	% Cover
AGRDAS	50	Unidentified upland agricultural grains	25
STIOCC	25		
(SYSALT)			
RIBAUR	<1		

COMMENTS/PROBLEMS: ___too early for SYSALT_____

Community No.:__5__ Community Title (main species):_*Juncus balticus* /(Agrostis alba)_____

Dominant Species	% Cover	Dominant Species	% Cover
JUNBAL	80+?		
(AGRALB)			

COMMENTS/PROBLEMS: __This CT type is outside of the constructed WL; will monitor boundaries to assess whether size is increasing as a result of proximity to constructed WL.__AGRALB not mature at time of investigation. _____

Community No.:_6___ Community Title (main species):__*Scirpus acutus*___

Dominant Species	% Cover	Dominant Species	% Cover
SCIACU	60		
(open water)	(40)		

COMMENTS/PROBLEMS: __This CT is represented by patches of Scirpus w/ in the open water area.____

COMPREHENSIVE VEGETATION LIST

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
Asclepias speciosa	4	*Salix lutea*	1, 2, 4
Agropyron trachycaulum	4	*Scirpus acutus*	2, 6
Agropyron dasystachyum	4	*Scirpus pungens*	2
Agrostis alba	5, 2	*Solidago spp.*	4
Amaranthus albus	4	*Stachys palustris*	1
Aster conspicuous	3	*Stipa occidentalis*	4
Bromus inermis	4	*Symphoricarpos albus*	4
Bromus japonicus	4	*Sisymbrium altissimum*	4
Carex lasiocarpa	1	*Triglochin maritimum*	1
Carex nebrascensis	1	*Typha latifolia*	1, 2, 3
Carex utriculata	1, 2, 3	*Urtica dioica*	2
Centaurea maculosa	4	*Verbascum thapsus*	4
Chenopodium spp.	4	*Verbena hastate*	1
Cirsium arvense	4	*Veronica catenata*	1
Crepis runcinata	4	*Vicia sativa*	4
Eleocharis palustris	1, 2		
Elymus condensatus	4		
Equisetum arvense	1, 3, 4		
Helianthus spp.	4		
Hordeum jubatum	1, 4		
Hyoscyamus niger	4		
Juncus balticus	1, 3, 5		
Juncus longistylis.	1		
Juncus nodosus	1		
Juncus torreyi	1		
Lactuca serriola	4		
Medicago sativa	2,4		
Melilotus officinalis	4		
Mentha arvensis	2		
Phalaris arundinacea	2		
Poa pratensis	4		
Ribes aureum	4		
Rosa woodsii	4		
Sagittaria cuneata	2		

Bold denotes observed in 2003 for the first time.

COMMENTS/PROBLEMS: _____

_____

_____

_____

PLANTED WOODY VEGETATION SURVIVAL

Species	Number Originally Planted	Number Observed	Mortality Causes
none			

COMMENTS/PROBLEMS: _____

WILDLIFE

BIRDS

(Attach Bird Survey Field Forms)

Were man made nesting structures installed? Yes____ No__X__Type:_____ How many?_____ Are the nesting structures being utilized? Yes____ No____ Do the nesting structures need repairs? Yes____ No____

MAMMALS AND HERPTILES

Species	Number Observed	Indirect indication of use			
		Tracks	Scat	Burrows	Other
deer		X			

Additional Activities Checklist:
__NA___Macroinvertebrate sampling (if required)

COMMENTS/PROBLEMS: _____

PHOTOGRAPHS

Using a camera with a 50 mm lenses and color film take photographs of the following permanent reference points listed in the checklist below. Record the direction of the photograph using a compass. (The first time at each site establish a permanent reference point by setting a ½ inch rebar or fencepost extending 2-3' above ground, survey the location with a resource grade GPS and mark the location on the air photo.)
Checklist:

__X__ One photo for each of the 4 cardinal directions surrounding wetland
__X__ At least one photo showing upland use surrounding wetland – if more than one upland use exists, take additional photos
__X__ At least one photo showing buffer surrounding wetland
__X__ One photo from each end of vegetation transect showing transect

Location	Photograph Description	Compass Reading
A	rip rap to east (#1) impoundment	N
B	East Impoundment	W
C	none	
D	center of WL (Rey Creek)	S
E/G	West end of west impoundment (#2)	E
F	West end of #2 buffer zone	E
H	east end of transect	W
I	Riprap to #2	N
J	Riprap to #2	N
K	Outlet of #1	SE

COMMENTS/PROBLEMS: _____

GPS SURVEYING

Using a resource grade GPS survey the items on the checklist below. Collect at least 3 location points with the GPS unit set at 5 second recording rate. Record file numbers fore site in designated GPS field notebook

Checklist:

__-___ Jurisdictional wetland boundary
__-___ 4-6 landmarks recognizable on the air photo
__-___ Start and end points of vegetation transect(s)
___-__ Photo reference points
__NA___ Groundwater monitoring well locations

COMMENTS/PROBLEMS: _WL boundary drawn by hand 2003; photos taken from same locations.

WETLAND DELINEATION

(Attach Corps of Engineers delineation forms)

At each site conduct the items on the checklist below:
__X___Delineate wetlands according to the 1987 Army Corps manual.
__X___ Delineate wetland-upland boundary on the air photo
___-__ Survey wetland-upland boundary with a resource grade GPS survey

COMMENTS/PROBLEMS: ___boundary hand-draw 2003_____

FUNCTIONAL ASSESSMENT

(Complete and attach full MDT Montana Wetland Assessment Method field forms; also attach abbreviated field forms, if used)

COMMENTS/PROBLEMS: __one FA done for whole site for 2002_____

MAINTENANCE

Were man-made nesting structures installed at this site? YES___ NO_N___
If yes, do they need to be repaired? YES____ NO____
If yes, describe problems below and indicate if any actions were taken to remedy the problems.

Were man-made structures build or installed to impound water or control water flow into or out of the wetland? YES__X__ NO____
If yes, are the structures working properly and in good working order? YES_*see below*___ NO___
If no, describe the problems below.

COMMENTS/PROBLEMS: ____Riprap located in inlet to west impoundment still may be excessive to prevent adequate turnover during spring run-off. Water levels at time of investigation d not appear to be compromised because of riprap; water level in pond appears equal to that of creek; likely groundwater influenced.

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Rey Creek Date: 6/20/03 Examiner: LB/LWC Transect # 1

Approx. transect length: 147 Compass Direction from Start (Upland): 100

Vegetation type A:	CT 4	
Length of transect in this type:	12	feet
Species:		Cover:
AGRDAS		90
(SYSALT-too early 2003)		
HORJUB		<1
CIRARV		<5
SILALB		<1
STIOCC		<1
LACSER		<1
HYONIG		<1
ASCSPE		<1
Soladogospp.		<1
Total Vegetative Cover:		100%

Vegetation type B:	CT 1	
Length of transect in this type:	9	feet
Species:		Cover:
SCIACU		85
LACSER		<1
JUNTOR (too early but sprouting in places)		
SCIPUN		<1
CARLAS		10
EQUARV		<1
CARNEB		<1
TYPLAT		5
MEDSAT		<1
Total Vegetative Cover:		100%

Vegetation type C:	CT 2	
Length of transect in this type:	57	feet
Species:		Cover:
SCIACU		95
TYPLAT		<5
(OPEN WATER)		<5
Total Vegetative Cover:		95-98

Vegetation type D:	OPEN WATER	
Length of transect in this type:	48	feet
Species:		Cover:
		(100)
Total Vegetative Cover:		0

MDT WETLAND MONITORING – VEGETATION TRANSECT (continued)

Site: (Rey Creek) Date: _____ Examiner: _____ Transect # **PAGE 2**

Approx. transect length: _____ Compass Direction from Start (Upland): _____

Vegetation type E:	CT 2	
Length of transect in this type:	3	feet
Species:		Cover:
SCIACU		95
TYPLAT		<5
CARLAS		<1
ELEPAL		<1
SERLAC		<1
Total Vegetative Cover:		100%

Vegetation type F:	CT 4	
Length of transect in this type:	18	feet
Species:		Cover:
CHENOPODIUM spp.		10
VICSAT		<1
MELOFF		<1
CENMAC		<1
CIRARV		10
AGRDAS		80
SYSALT (young plants)		<1
BROINE		<1
BROJAP		<1
Total Vegetative Cover:		100%

Vegetation type G:		
Length of transect in this type:		feet
Species:		Cover:
Total Vegetative Cover:		

Vegetation type H:		
Length of transect in this type:		feet
Species:		Cover:
Total Vegetative Cover:		

MDT WETLAND MONITORING – VEGETATION TRANSECT (back of form)

Cover Estimate

+ = <1%
1 = 1-5%
2 = 6-10%
3 = 11-20%
4 = 21-50%
5 = >50%

Indicator Class:

+ = Obligate
- = Facultative/Wet
0 = Facultative

Source:

P = Planted
V = Volunteer

Percent of perimeter 100% % developing wetland vegetation – excluding dam/berm structures.

Establish transects perpendicular to the shoreline (or saturated perimeter). The transect should begin in the upland area. Permanently mark this location with a standard metal fencepost. Extend the imaginary transect line towards the center of the wetland, ending at the 3 food depth (in open water), or at a point where water depths or saturation are maximized. Mark this location with another metal fencepost.

Estimate cover within a 10 ft wide "belt" along the transect length. At a minimum, establish a transect at the windward and leeward sides of the wetland. Remember that the purpose of this sampling is to monitor, not inventory, representative portions of the wetland site.

Notes: Well developed hydrophytic vegetation diversity. Noxious weeds a problem but this is typical of the Three Forks area.

3

BIRD SURVEY – FIELD DATA SHEET

Page_1___of__1__
Date: 6/20/03
Survey Time: 8AM-2PM

SITE: Rey Creek

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Red-winged Blackbird	5-10	BD	MA				
Barn Swallow	1	FO	MA/OW				
Yellow Warbler	1	BD	MA				

Notes:

Behavior: BP – one of a breeding pair; BD – breeding display; F – foraging; FO – flyover; L – loafing; N – nesting

Habitat: AB – aquatic bed; FO – forested; I – island; MA – marsh; MF – mud flat; OW – open water; SS – scrub/shrub; UP – upland buffer; WM – wet meadow, US – unconsolidated shoreline

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	Rey Creek			Date:	6/20/03
Applicant/Owner:	MDT			County:	Gallatin
Investigator:	LB/LWC			State:	MT
Do Normal Circumstances exist on the site:	X	Yes		No	Community ID: CT 1
Is the site significantly disturbed (Atypical Situation)?		Yes	X	No	Transect ID: 1
Is the area a potential Problem Area?:		Yes	X	No	Plot ID: SP-1
(If needed, explain on reverse.)					

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	SCIACU	H	OBL	9			
2	SCIPUN	H	OBL	10			
3	ELEPAL	H	OBL	11			
4	JUNBAL	H	FACW+	12			
5	CARNEB	H	OBL	13			
6	LACSER	H	FACU	14			
7	CARLAS	H	OBL	15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 6/7

Diverse WL community.

HYDROLOGY

X Recorded Data (Describe in Remarks):
- Stream, Lake, or Tide Gauge
- X Aerial Photographs
- Other

No Recorded Data Available

Field Observations:

Depth of Surface Water: - (in.)

Depth to Free Water in Pit: 8” (in.)

Depth to Saturated Soil: surface (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 Inches
- X Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 Inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Positive WL hydrology

LAND & WATER

SOILS

Map Unit Name (Series and Phase):	525A Greycliff-Toston-Threeriv Complex	Drainage Class:	somewhat poor; somewhat poor; very poor
Taxonomy (Subgroup):	Frigid Aridic Natrustrolls; Frigid Typic Fluvaquents; Frigid Aridic Natrustalfs	Field Observations Confirm Mapped Type?	X Yes ____ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-6	A	7.7 YR 3/1	-		sandy loam
6-12	A	10YR 3/1			sandy gravelly loam
12+	C				gravel layer

Hydric Soil Indicators:

____	Histosol	____	Concretions
____	Histic Epipedon	____	High Organic Content in surface Layer in Sandy Soils
____	Sulfidic Odor	____	Organic Streaking in Sandy Soils
____	Aquic Moisture Regime	____	Listed on Local Hydric Soils List
____	Reducing Conditions	____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	____	Other (Explain in Remarks)

Hydric soil evident in this SP location at edge of mud circumference.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X	Yes	____	No	
Wetland Hydrology Present?	X	Yes	____	No	
Hydric Soils Present?	X	Yes	____	No	Is this Sampling Point Within a Wetland? X Yes ____ No

Remarks:

Positive wetland area within ~2 ft of high water mark.

Approved by HQUSACE 2/92

LAND & WATER

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Rey Creek	Date: 6/20/03
Applicant/Owner: MDT	County: Gallatin
Investigator: LB/LWC	State: MT

Do Normal Circumstances exist on the site:	X	Yes		No	Community ID: CT 4
Is the site significantly disturbed (Atypical Situation)?		Yes	X	No	Transect ID: 1
Is the area a potential Problem Area?:		Yes	X	No	Plot ID: SP-2
(If needed, explain on reverse.)					

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	AGRDAS	H	FACU-	9			
2	MEDSAT	H	NI	10			
3	CIRARV	H	FACU+	11			
4				12			
5	(non dom: CARNEB, MENspp.			13			
6	SCIACU, EQUARV, LACSER)			14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 0/3

WL veg may be expanding but does not comprise a dominant portion-individual plants notes.

HYDROLOGY

X Recorded Data (Describe in Remarks):
- Stream, Lake, or Tide Gauge
- X Aerial Photographs
- Other

No Recorded Data Available

Field Observations:

Depth of Surface Water: - (in.)

Depth to Free Water in Pit: 12” (in.)

Depth to Saturated Soil: 0” (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 Inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 Inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Positive hydrologic indicators; wetland may be expanding upslope (This pit ~ 5 ft from WL pit).

LAND & WATER

SOILS

Map Unit Name (Series and Phase):	525A Greycliff-Toston-Threeriv Complex	Drainage Class:	somewhat poor; somewhat poor; very poor
Taxonomy (Subgroup):	Frigid Aridic Natrustrolls; Frigid Typic Fluvaquents; Frigid Aridic Natrustalfs	Field Observations Confirm Mapped Type?	X Yes ____ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-3	A	10YR3/1	-		sandy loam
3-12	A	10YR3/1	–		sandy clay gravelly loam
12+	C				

Hydric Soil Indicators:

____	Histosol	____	Concretions
____	Histic Epipedon	____	High Organic Content in surface Layer in Sandy Soils
____	Sulfidic Odor	____	Organic Streaking in Sandy Soils
____	Aquic Moisture Regime	____	Listed on Local Hydric Soils List
____	Reducing Conditions	____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	____	Other (Explain in Remarks)

Still early in year and soil is saturated and low-chroma in this area.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	____	Yes	X	No	Is this Sampling Point Within a Wetland? ____ Yes X No
Wetland Hydrology Present?	X	Yes	____	No	
Hydric Soils Present?	X	Yes	____	No	

Remarks:

Area not within WL boundary but boundary may be expanding on the ends of ponds by ~ 2 ft.

Approved by HQUSACE 2/92

LAND & WATER

MDT MONTANA WETLAND ASSESSMENT FORM (revised May 25, 1999)

1. Project Name: Rey Creek **2. Project #:** -130091014 **Control #:** _____

3. Evaluation Date: 6/20/2003 **4. Evaluator(s):** LB/LWC **5. Wetland / Site #(s):** _____

6. Wetland Location(s) i. T: 2 N **R:** 2 E **S:** 28 **T:** __ N **R:** __ E **S:** _____

ii. Approx. Stationing / Mileposts: _____

iii. Watershed: 10020007 **GPS Reference No. (if applies):** _____

Other Location Information: _____

7. A. Evaluating Agency LWC

8. Wetland Size (total acres): _____ (visually estimated)
0.52 (measured, e.g. GPS)

B. Purpose of Evaluation:
- ☐ Wetlands potentially affected by MDT project
- ☐ Mitigation wetlands; pre-construction
- ☒ Mitigation wetlands; post-construction
- ☐ Other

9. Assessment Area (total acres): _____ (visually estimated)
~0.75 (measured, e.g. GPS)

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA

HGM CLASS [1]	SYSTEM [2]	SUBSYSTEM [2]	CLASS [2]	WATER REGIME [2]	*MODIFIER* [2]	% OF AA
Riverine	Riverine	Lower Perennial	Rock Bottom	Permanently Flooded	---	10
Depression	Palustrine	None	Emergent Wetland	Seasonally Flooded	Excavated	60
Depression	Palustrine	None	Aquatic Bed	Permanently Flooded	Excavated	30
---	---	---	---	---	---	

[1] = Smith et al. 1995. [2] = Cowardin et al. 1979.

11. ESTIMATED RELATIVE ABUNDANCE (of similarly classified sites within the same Major Montana Watershed Basin)
Common **Comments:** _____

12. GENERAL CONDITION OF AA

i. Regarding Disturbance: (Use matrix below to select appropriate response.)

Conditions Within AA	Predominant Conditions Adjacent (within 500 Feet) To AA		
	Land managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed or selectively logged or has been subject to minor clearing; contains few roads or buildings.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.
AA occurs and is managed in predominantly a natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings.	---	---	---
AA not cultivated, but moderately grazed or hayed or selectively logged or has been subject to relatively minor clearing, or fill placement, or hydrological alteration; contains few roads or buildings.	---	---	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.	---	---	---

Comments: (types of disturbance, intensity, season, etc.) traffic: vehicular and train

ii. Prominent weedy, alien, & introduced species: knapweed, thistle

iii. Briefly describe AA and surrounding land use / habitat: wetland plocated between frontage rd to north and train track/interstate to south

13. STRUCTURAL DIVERSITY (Based on 'Class' column of #10 above.)

Number of 'Cowardin' Vegetated Classes Present in AA	≥3 Vegetated Classes or ≥ 2 if one class is forested	2 Vegetated Classes or 1 if forested	= 1 Vegetated Class
Select Rating	---	Moderate	---

Comments: <2 willows on east pond and seedlings sprouting in mud area of east pond

LAND & WATER

14A. HABITAT FOR FEDERALLY LISTED OR PROPOSED THREATENED OR ENDANGERED PLANTS AND ANIMALS

i. AA is Documented (D) or Suspected (S) to contain (check box):

Primary or Critical habitat **(list species)**	☐ D ☐ S		
Secondary habitat **(list species)**	☐ D ☐ S		
Incidental habitat **(list species)**	☐ D ☒ S	Bald Eagle	
No usable habitat	☐ D ☐ S		

ii. **Rating** (Based on the strongest habitat chosen in 14A(i) above, find the corresponding rating of High (H), Moderate (M), or Low (L) for this function.

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	---	---	---	---	.3 (L)	---

If documented, list the source (e.g., observations, records, etc.)**:** _____

14B. HABITAT FOR PLANTS AND ANIMALS RATED AS S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM.
Do not include species listed in 14A(i).

i. AA is Documented (D) or Suspected (S) to contain (check box):

Primary or Critical habitat **(list species)**	☐ D ☐ S	_____
Secondary habitat **(list species)**	☐ D ☐ S	_____
Incidental habitat **(list species)**	☐ D ☒ S	Ladies' tresses, none seen but found in 3-fks area
No usable habitat	☐ D ☐ S	_____

iii. **Rating** (Based on the strongest habitat chosen in 14B(i) above, find the corresponding rating of High (H), Moderate (M), or Low (L) for this function.

Highest Habitat Level:	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	---	---	---	---	.1 (L)	---

If documented, list the source (e.g., observations, records, etc.)**:** _____

14C. General Wildlife Habitat Rating

i. **Evidence of overall wildlife use in the AA:** (Check either substantial, moderate, or low)

☐ **Substantial** (based on any of the following)
- ☐ observations of abundant wildlife #s or high species diversity (during any period)
- ☐ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☐ presence of extremely limiting habitat features not available in the surrounding area
- ☐ interviews with local biologists with knowledge of the AA

☐ **Low** (based on any of the following)
- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interviews with local biologists with knowledge of AA

☐ **Moderate** (based on any of the following)
- ☒ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- ☐ common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☐ adequate adjacent upland food sources
- ☐ interviews with local biologists with knowledge of the AA

ii. **Wildlife Habitat Features** (Working from top to bottom, select appropriate AA attributes to determine the exceptional (E), high (H), moderate (M), or low (L) rating. Structural diversity is from #13. For class cover to be considered evenly distributed, vegetated classes must be within 20% of each other in terms of their percent composition in the AA (see #10). Duration of Surface Water: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; A= absent.

Structural Diversity (from #13)	☐High								☒Moderate								☐Low			
Class Cover Distribution (all vegetated classes)	☐Even				☐Uneven				☒Even				☐Uneven				☐Even			
Duration of Surface Water in ? 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
High disturbance at AA (see #12)	--	--	--	--	--	--	--	--	M	--	--	--	--	--	--	--	--	--	--	--

iii. **Rating** (Using 14C(i) and 14C(ii) above and the matrix below to arrive at the functional point and rating of exceptional (E), high (H), moderate (M), or low (L) for this function.)

Evidence of Wildlife Use from 14C(i)	**Wildlife Habitat Features Rating** from 14C(ii)			
	☐ Exceptional	☐ High	☒ Moderate	☐ Low
Substantial	--	--	--	--
Moderate	--	--	.5 (M)	--
Low	--	--	--	--

Comments: avian use may be increasing as wWL diversity increases. Still no waterfowl noted during surveys.

14D. GENERAL FISH/AQUATIC HABITAT RATING ☐ **NA** (proceed to 14E)

If the AA is not or was not historically used by fish due to lack of habitat, excessive gradient, then check the NA box above.

Assess if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [*e.g.* fish use is precluded by perched culvert or other barrier, etc.]. If fish use occurs in the AA but is not desired from a resource management perspective (*e.g.* fish use within an irrigation canal], then Habitat Quality [14D(i)] below should be marked as "Low", applied accordingly in 14D(ii) below, and noted in the comments.

i. **Habitat Quality** (Pick the appropriate AA attributes in matrix to pick the exceptional (E), high (H), moderate (M), or low (L) quality rating.

Duration of Surface Water in AA	☒ Permanent/Perennial			☐ Seasonal / Intermittent			☐ Temporary / Ephemeral		
Cover - % of waterbody in AA containing cover objects (*e.g.* submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation)	>25%	10-25%	<10%	>25%	10-25%	<10%	>25%	10-25%	<10%
Shading - >75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities	--	--	--	--	--	--	--	--	--
Shading – 50 to 75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	H	--	--	--	--	--	--	--	--
Shading - < 50% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--

ii. **Modified Habitat Quality:** Is fish use of the AA precluded or significantly reduced by a culvert, dike, other man-made structure or activity **or** is the waterbody included on the 'MDEQ list of waterbodies in need of TMDL development' with 'Probable Impaired Uses' listed as cold or warm water fishery or aquatic life support**?**
☒ **Y** ☐ **N** If yes, reduce the rating from 14D(i) by one level and check the modified habitat quality rating: ☐ E ☐ H ☒ M ☐ L

iii. **Rating** (Use the conclusions from 14D(i) and 14D(ii) above and the matrix below to pick the functional point and rating of exceptional (E), high (H), moderate (M), or low (L).)

Types of Fish Known or Suspected Within AA	**Modified Habitat Quality** from 14D(ii)			
	☐ Exceptional	☐ High	☒ Moderate	☐ Low
Native game fish	--	--	.7 (M)	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: vegetation has colonized almost all of pond perimeters and filling into center areas.

14E. FLOOD ATTENUATION ☐ **NA** (proceed to 14G)

Applies only to wetlands subject to flooding via in-channel or overbank flow.
If wetlands in AA do not flooded from in-channel or overbank flow, check NA above.

i. **Rating** (Working from top to bottom, mark the appropriate attributes to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.)

Estimated wetland area in AA subject to periodic flooding	☐ ≥ 10 acres			☐ <10, >2 acres			☒ ≤2 acres		
% of flooded wetland classified as forested, scrub/shrub, or both	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	--	--	--	--	--	--	--	--	.2 (L)
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--	.1 (L)

ii. **Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA?** (check)
☐**Y** ☒**N** **Comments:** one pond has a restricted outlet and the other does not

14F. SHORT AND LONG TERM SURFACE WATER STORAGE ☐ **NA** (proceed to 14G)

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, check NA above.

i. Rating (Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.)
Abbreviations: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral.

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	☐ >5 acre feet			☐ <5, >1 acre feet			☒ ≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond [3] **5 out of 10 years**	--	--	--	--	--	--	.4 (M)	--	--
Wetlands in AA flood or pond **< 5 out of 10 years**	--	--	--	--	--	--	--	--	--

Comments: _____

14G. SEDIMENT/NUTRIENT/TOXICANT RETENTION AND REMOVAL ☐ **NA** (proceed to 14H)

Applies to wetlands with potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input.
If no wetlands in the AA are subject to such input, check NA above.

i. **Rating** (Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.)

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	☒ ≥ 70%		☐ < 70%		☐ ≥ 70%		☐ < 70%	
Evidence of flooding or ponding in AA	☒ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No
AA contains **no or restricted outlet**	1 (H)	--	--	--	--	--	--	--
AA contains **unrestricted outlet**	.9 (H)	--	--	--	--	--	--	--

Comments: has both outlet types

LAND & WATER

14H. SEDIMENT/SHORELINE STABILIZATION ☐ **NA** (proceed to 14I)

Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body that is subject to wave action. If this does not apply, check NA above.

i. **Rating** (Working from top to bottom, use the matrix below to arrive at the functional point and rating exceptional (E), high (H), moderate (M), or low (L) for this function.

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	***Duration of Surface Water Adjacent to Rooted Vegetation***		
	☒Permanent / Perennial	☐Seasonal / Intermittent	☐Temporary / Ephemeral
[3] **65 %**	1 (H)	--	--
35-64 %	--	--	--
< 35 %	--	--	--

Comments:

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

i. **Rating** (Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.
A = acreage of vegetated component in the AA. **B** = structural diversity rating from #13. **C** = Yes (Y) or No (N) as to whether or not the AA contains a surface or subsurface outlet; **P/P** = permanent/perennial; **S/I** = seasonal/intermittent; **T/E/A**= temporary/ephemeral/absent.

A	☐ Vegetated component >5 acres						☐ Vegetated component 1-5 acres						☒ Vegetated component <1 acre					
B	☐ High		☐ Moderate		☐ Low		☐ High		☐ Moderate		☐ Low		☐ High		☒ Moderate		☐ Low	
C	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☒Y	☐N	☐Y	☐N
P/P	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.6M	--	--	--
S/I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments:

14J. GROUNDWATER DISCHARGE/RECHARGE (D/R) (Check the indicators in i & ii below that apply to the AA)

i. ☐ **Discharge Indicators**
- ☐ Springs are known or observed.
- ☒ Vegetation growing during dormant season/drought.
- ☐ Wetland occurs at the toe of a natural slopes.
- ☐ Seeps are present at the wetland edge.
- ☒ AA permanently flooded during drought periods.
- ☐ Wetland contains an outlet, but no inlet.
- ☐ Other

ii. ☐ **Recharge Indicators**
- ☒ Permeable substrate presents without underlying impeding layer.
- ☐ Wetland contains inlet but not outlet.
- ☐ Other

iii. **Rating:** Use the information from 14J(i) and 14j(ii) above and the table below to arrive at the functional point and rating of high (H) or low (L) for this function.

Criteria	Functional Point and Rating
AA has known Discharge/Recharge area or one or more indicators of D/R present	1 (H)
No Discharge/Recharge indicators present	--
Available Discharge/Recharge information inadequate to rate AA D/R potential	--

Comments:

14K. UNIQUENESS

i. Rating (Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Replacement Potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland or plant association listed as "S1" by the MTNHP.			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MTNHP.			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate.		
Estimated Relative Abundance from #11	☐rare	☐common	☐abundant	☐rare	☐common	☐abundant	☐rare	☒common	☐abundant
Low disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (#12i)	--	--	--	--	--	--	--	.3L	--
High disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--

Comments:

14L. RECREATION / EDUCATION POTENTIAL

i. Is the AA a known recreational or educational site? ☐ **Yes (Rate** ☐ **High (1.0)**, then proceed to 14L(ii) only] ☒ **No** [Proceed to 14L(iii)]

ii. Check categories that apply to the AA: ☒ Educational / scientific study ☐ Consumptive rec. ☐ Non-consumptive rec. ☐ Other

iii. Based on the location, diversity, size, and other site attributes, is there a strong potential for recreational or educational use?

☒ **Yes** [Proceed to 14L (ii) and then 14L(iv).] ☐ **No** [Rate as low in 14L(iv)]

iv. Rating (Use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Ownership	Disturbance at AA from #12(i)		
	☐ Low	☒ Moderate	☐ High
Public ownership	--	.5(M)	--
Private ownership	--	--	--

Comments: high WL plant diverstiy, great botanical study site

FUNCTION, VALUE SUMMARY, AND OVERALL RATING

Function and Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	L	0.30	1	
B. MT Natural Heritage Program Species Habitat	L	0.10	1	
C. General Wildlife Habitat	M	0.50	1	
D. General Fish/Aquatic Habitat	M	0.70	1	
E. Flood Attenuation	L	0.15	1	
F. Short and Long Term Surface Water Storage	M	0.40	1	
G. Sediment/Nutrient/Toxicant Removal	H	0.95	1	
H. Sediment/Shoreline Stabilization	H	1.00	1	
I. Production Export/Food Chain Support	M	0.60	1	
J. Groundwater Discharge/Recharge	H	1.00	1	
K. Uniqueness	L	0.30	1	
L. Recreation/Education Potential	M	0.50	1	
	Totals:	6.50	12.00	3
	Percent of Total Possible Points:		**55%** (Actual / Possible) x 100 [rd to nearest whole #]	

Category I Wetland: (Must satisfy **one** of the following criteria. If not proceed to Category II.)
- ☐ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
- ☐ Score of 1 functional point for Uniqueness; **or**
- ☐ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E(ii) is "yes"; **or**
- ☐ Percent of total Possible Points is > 80%.

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following Category II criteria. If not satisfied, proceed to Category IV.)
- ☐ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
- ☐ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish/Aquatic Habitat; **or**
- ☐ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish / Aquatic Habitat; **or**
- ☐ Score of .9 functional point for Uniqueness; **or**
- ☐ Percent of total possible points is > 65%.

☒ **Category III Wetland:** (Criteria for Categories I, II, or IV not satisfied.)

Category IV Wetland: (Criteria for Categories I or II are not satisfied **and** all of the following criteria are met; If not satisfied, proceed to Category III.)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ "Low" rating for Production Export / Food Chain Support; **and**
- ☐ Percent of total possible points is < 30%.

OVERALL ANALYSIS AREA (AA) RATING: (Check appropriate category based on the criteria outlined above.)

☐ **I** ☐ **II** ☒ **III** ☐ **IV**

Appendix C

REPRESENTATIVE PHOTOGRAPHS
2002 AND 2003 AERIAL PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Rey Creek
Three Forks, Montana

LAND & WATER

Location: A **Description:** Rip rap to east impoundment (#1) **Compass Reading:** N

Location: B **Description:** East impoundment **Compass Reading:** W

Location: D **Description:** Center of wetland **Compass Reading:** S

Location: E **Description:** West end of west impoundment **Compass Reading:** E

Location: F **Description:** West end #2 buffer zone **Compass Reading:** E

Location: G **Description:** West end of transect **Compass Reading:** E

Location: H **Description:** East end of transect **Compass Reading:** W

Location: I **Description:** Rip rap to #2 **Compass Reading:** N

Location: J **Description:** Rip rap to #2 **Compass Reading:** N

Location: K **Description:** Outlet of #1 **Compass Reading:** SE

REY CREEK WETLAND 2001-2003 AERIAL PHOTOGRAPHS

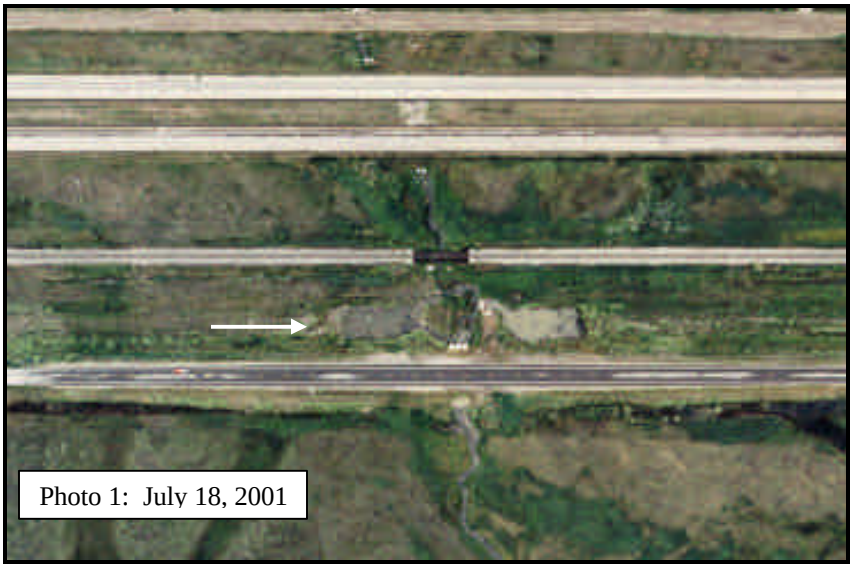


Photo 1: July 18, 2001

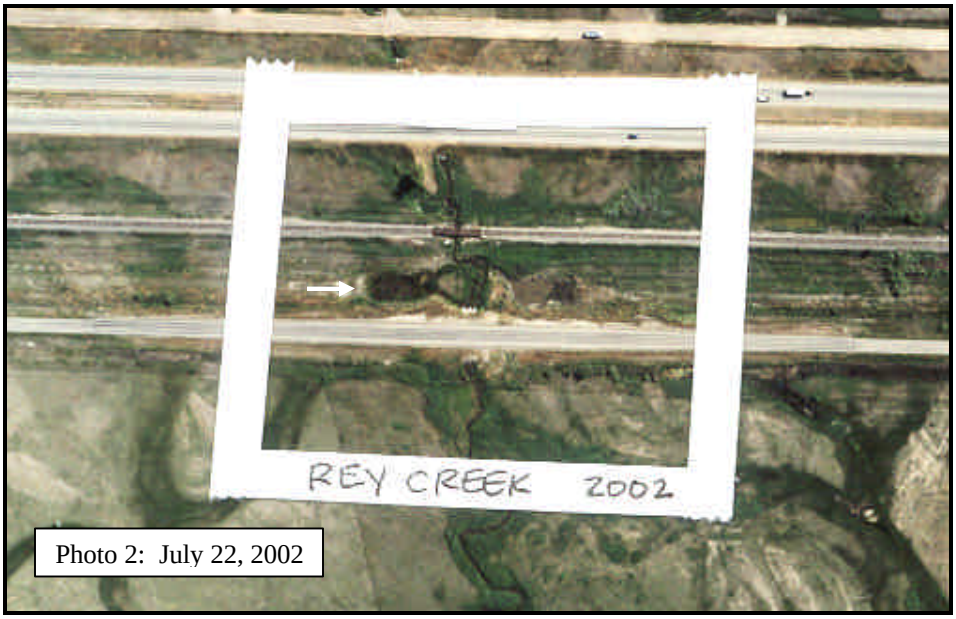


Photo 2: July 22, 2002

Photo 3: July 27, 2003

LAND & WATER

Appendix D

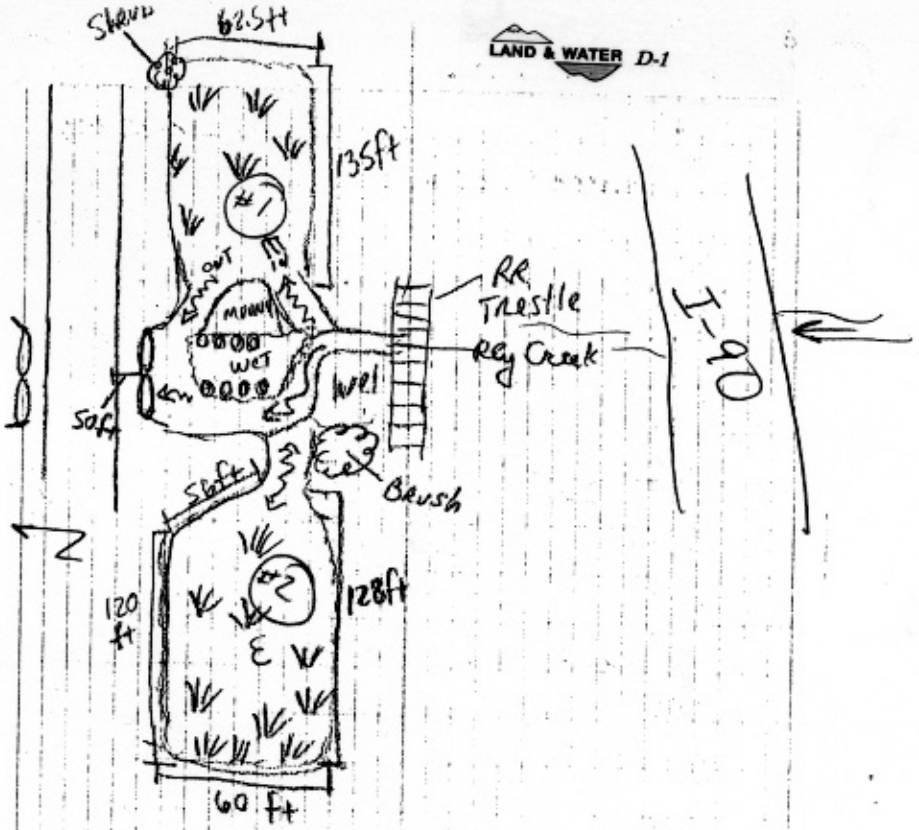
MDT POST-CONSTRUCTION MONITORING OF SITE 1999

MDT Wetland Mitigation Monitoring
Rey Creek
Three Forks, Montana

LAND & WATER

POST INSTRUCTION

- Visited on 10/28/99 approximately 1½ months after completion of project.
- Mitigation for impacts associated with replacement of timber bridge over Rey Creek with Twin galvanized culverts
- Mitigation occurred in areas of excavation within an abandoned railroad grade to the south of the frontage road between I-90.
- Two impoundments were created on either side of Rey Creek with inlets to facilitate movement of high water flows into the created wetlands
- Impoundment #1 situated to the East of Rey Creek is approximately 8,438 sq/ft in size and contains an inlet and outlet.
- Impoundment #2 is situated to the west of Rey Creek, has a single inlet and is approximately 7,680 sq ft in size
- wetland vegetation was salvaged from existing wetlands and utilized in both of the completed excavated wetland areas.



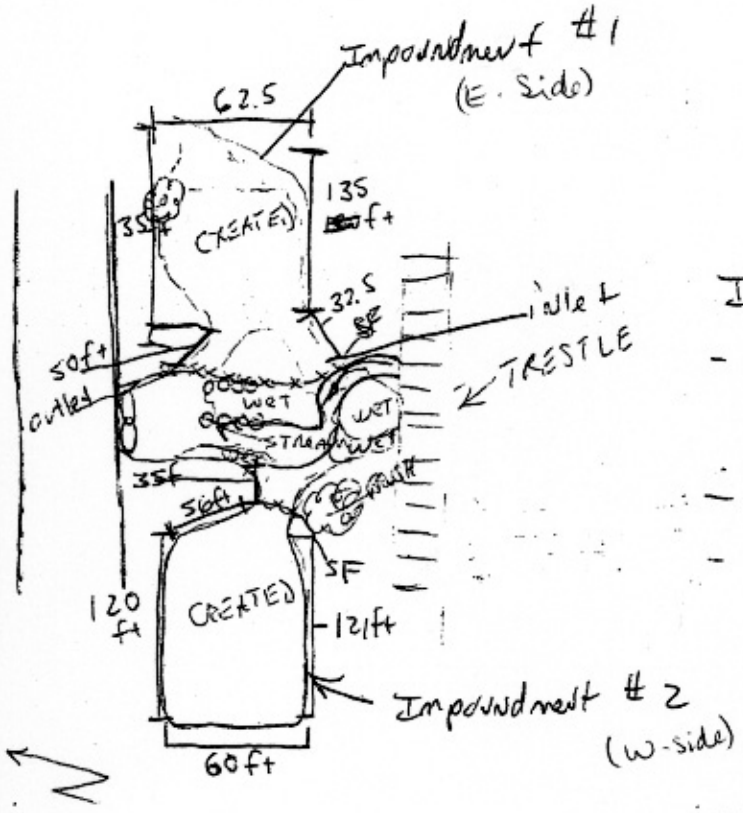
Problems observed:

- Both inlets to each wetland were constructed on an outside bend of Rey Creek which could potentially lead to capture of stream. Each inlet should be hardened with rip-rap to prevent capture of stream.

6

4. Items observed:

- Why only an inlet on the wetland to the west of Rey Creek? —?
- There is some concern that project impacted more wetlands than necessary as culvert on south side of road extends 50 feet from edge of pavement. Slopes and fill into wetland was it really necessary? Why wasn't guard rail considered?
- Wetlands Engineer should be contacted for advice during construction and finalization of wetland projects.



Impoundment #1 - standing water
- Area has be revegetated with wetland plants + soils
- has an inlet and an outlet
- concern about capture of stream in inlet area - recommended hardening of inlet with large Rip-Rap #2 or 3
- island in interior needs + be seeded and/or brought down to a lower elevation

135
X 62.5
675
1350
8437.5

Impoundment #2
- west of stream channel
- inlet area needs to be hardened or vegetated quickly
- concern about outside bend of stream being captured by inlet
- Area has been revegetated ~~at~~ with salvaged vegetation + soils
- concern that project impacted more wetlands than necessary - end of culvert abutment 50 feet from edge of pavement Why ??
- Recommend that wetlands Engineer be involved in future construction of this nature
- Substantial fill placed into north side wetlands needed

Appendix E

BIRD SURVEY PROTOCOL
GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Rey Creek
Three Forks, Montana

LAND & WATER

BIRD SURVEY PROTOCOL

The following is an outline of the MDT Wetland Mitigation Site Monitoring Bird Survey Protocol. Though each site is vastly different, the bird survey data collection methods must be standardized to a certain degree to increase repeatability. An Area Search within a restricted time frame will be used to collect the following data: a bird species list, density, behavior, and habitat-type use. There will be some decisions that team members must make to fit the protocol to their particular site. Each of the following sections and the desired result describes the protocol established to reflect bird species use over time.

Species Use within the Mitigation Wetland: Survey Method

Result: To conduct a bird survey of the wetland mitigation site within a restricted period of time and the budget allotment.

Sites that can be circumambulated or walked throughout.

These types of sites will include ponds, enhanced historic river channels, wet meadows, and any area that can be surveyed from the entirety of its perimeter or walked throughout. If the wetland is not uncomfortably inundated, conduct several "meandering" transects through the site in an orderly fashion (record the number and approximate location/direction of the transects in the field notebook; they do not have to be formalized or staked). If a very small portion of the site cannot be crossed due to inundation, this method will also apply. Though the sizes of the site vary, each site will require surveying to the fullest extent possible within a set time limit. The optimum times to conduct the survey are in the morning hours. Conduct the survey from sunrise to no later than 11:00 AM. (Note: some sites may have to be surveyed in the late afternoon or evening due to time constraints or weather; if this is the case, record the time of day and include this information in your report discussion.) If the survey is completed before 11:00 AM and no additions are being made to the list, then the task is complete. The overall limiting factor regarding the number of hours that are spent conducting this survey is the number of budgeted hours; this determination must be made by site by each individual.

In many cases, binoculars will be the only instrument that is needed to identify and count the birds using the wetland. If the wetland includes deep water habitat that can not be assessed with binoculars, then a scope and tripod are necessary. If this is the case, establish as many lookout posts as necessary from key vantage points to collect the data. Depending on the size of the open water, more time may be spent viewing the mitigation area from these vantage points than is spent walking the peripheries of more shallow-water wetlands.

Sites that cannot be circumambulated.

These types of sites will include large-bodied waters, such as reservoirs, particularly those with deep water habitat (>6 ft) close to the shore and no wetland development in that area of the shoreline. If one area of the reservoir was graded in such a way to create or enhance the development of a wetland, then that will be the area in which the ambulatory bird survey is conducted. The team member must then determine the length of the shoreline that will be surveyed during each visit.

As stated above in the ambulatory site section, these large sites most likely will have to be surveyed from established vantage points.

Species Use within the Mitigation Wetland: Data Recording

Result: A complete list of bird species using the site, an estimate of bird densities and associated behaviors, and identification of habitat use.

1. Bird Species List

Record the bird species on the Bird Survey - Field Data Sheet using the appropriate 4-letter code of the common name. The coding uses the first two letters of the first two words of the birds' common name or if one name, the first four (4) letters. For example, mourning dove is coded MODO and mallard is MALL. If an unknown individual is observed, use the following protocol and define your abbreviation at the bottom of the field data sheet: unknown shorebird: UNSB; unknown brown bird (UNBR); unknown warbler (UNWA); unknown waterfowl (UNWF). For a flyover of a flock of unknown species, use a term that describes the birds' general characteristics and include the approximate flock size in parentheses; do not fill in the habitat column. For example, a flock of black, medium-sized birds could be coded: UNBB / FO (25). You may also note on the data sheet if that particular individual is using a constructed nest box.

2. Bird Density

In the office, sum the Bird Survey – Field Data Sheet data by species and by behavior. Record this data in the Bird Summary Table.

3. Bird Behavior

Bird behavior must be identified by what is known. When a species is simply observed, the behavior that it is immediately exhibiting is what is recorded. Only behaviors that have discreet descriptive terms should be used. The following terms are recommended: breeding pair individual (BP); foraging (F); flyover (FO); loafing (L; e.g. sleeping, roosting, floating with head tucked under wing are loafing behaviors); and, nesting (N). If more behaviors are observed that do have a specific descriptive word, use them and we will add it to the protocol; descriptive words or phrases such as "migrating" or "living on site" are unknown behaviors.

4. Bird Species Habitat Use

We are interested in what bird species are using which particular habitat within the mitigation wetlands. This data is easily collected by simply recording what habitat the species was initially observed. Use the following broad category habitat classifications: aquatic bed (AB - rooted floating, floating-leaved, or submergent vegetation); forested (FO); marsh (MA – cattail, bulrush, emergent vegetation, etc. with surface water); open water (OW – primarily unvegetated); scrub-shrub (SS); and upland buffer (UP); wet meadow (WM – sedges, rushes, grasses with little to no surface water). If other categories are observed onsite that are not suggested here, we will make a new category next year.

GPS Mapping and Aerial Photo Referencing Procedure

The wetland boundaries, photograph location points and sampling locations were field located with mapping grade Trimble Geo III GPS units. The data was collected with a minimum of three positions per feature using Course/Acquisition code. The collected data was then transferred to a PC and differentially corrected to the nearest operating Community Base Station. The corrected data was then exported to ACAD drawings in Montana State Plain Coordinates NAD 83 international feet.

The GPS positions collected and processed had a 68% accuracy of 7 feet except in isolated areas of Tasks .008 and .011, where it went to 12 feet. This is within the 1 to 5 meter range listed as the expected accuracy of the mapping grade Trimble GPS.

Aerial reference points were used to position the aerial photographs. This positioning did not remove the distortion inherent in all photos; this imagery is to be used as a visual aide only. The located wetland boundaries were given a final review by the wetland biologist and adjustments were made if necessary.

Any relationship of features located to easement or property lines are not to be construed from these figures. These relationships can only be determined with a survey by a licensed surveyor.