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**MONTANA DEPARTMENT OF TRANSPORTATION  
WETLAND MITIGATION MONITORING REPORT: YEAR 2006**

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*American Colloid Mitigation Site  
Alzada, Montana*



Prepared for:

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

December 2006

Prepared by:

**POST, BUCKLEY, SCHUH, AND JERNIGAN**  
P.O. Box 239  
Helena, MT 59624

Project No: B43054.00 - 0402



# MONTANA DEPARTMENT OF TRANSPORTATION

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## 1.0 INTRODUCTION

This annual report summarizes methods and results from the fifth year of monitoring at the Montana Department of Transportation's (MDT) American Colloid mitigation site. The American Colloid wetland mitigation site was constructed in October 2001 to mitigate 4.4 acres of unavoidable wetland impacts associated with the following MDT projects: Alzada-West and Alzada-South (Sickerson 2002), in Watershed # 16 (Little Missouri River basin) in the MDT Glendive District. The wetland site was constructed to encompass 5 acres and includes a 10-acre buffer zone; the entire 15 acres have been fenced (MDT 1999, MDT 2001). The wetland mitigation site is located in Carter County, Montana, near the community of Alzada, Section 36, Township 9 South, Range 58 East (**Figure 1**). The mitigation wetland was constructed in July and August of 2001 in an ephemeral drainage (**Figure 2** in **Appendix A**). Elevation is approximately 3,518 feet above sea level. The initial monitoring event was conducted in 2002.

## 2.0 METHODS

### 2.1 Monitoring Dates and Activities

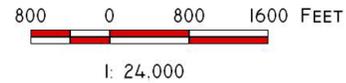
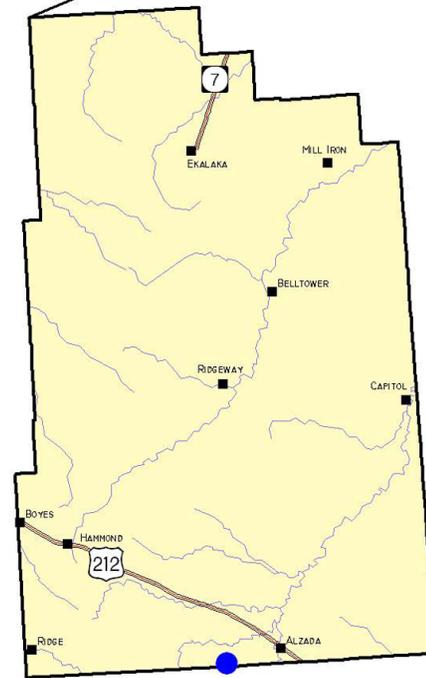
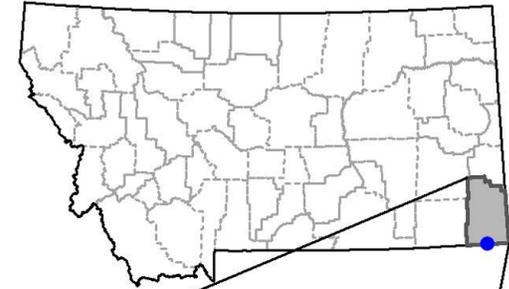
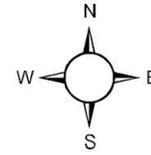
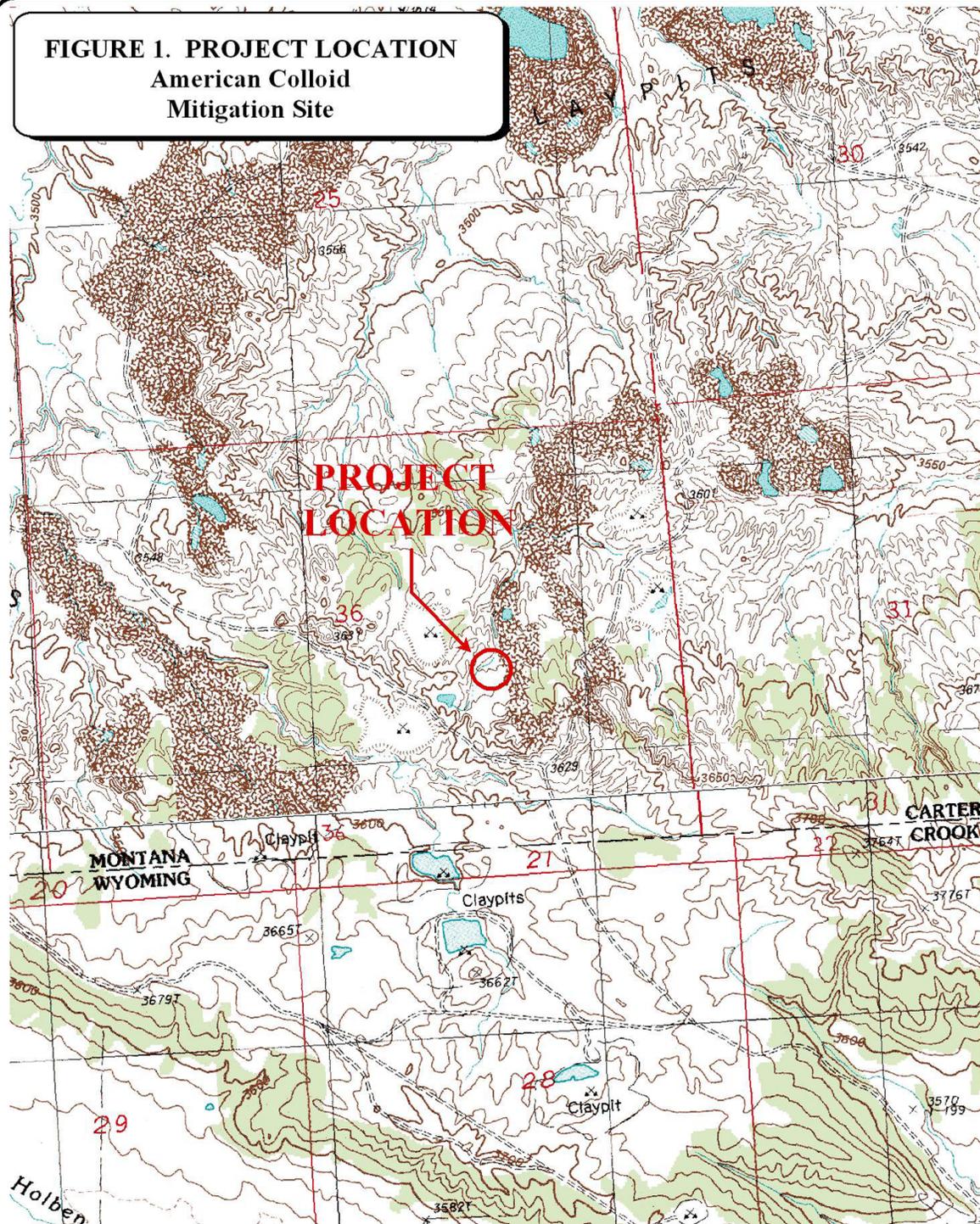
The American Colloid wetland was monitored on July 16, 2006. All information within the Wetland Mitigation Site Monitoring Form (**Appendix B**) was collected at this time. Activities and information conducted/collected included: wetland delineation; wetland/open water boundary mapping; vegetation community mapping; vegetation transects; soils data; hydrology data; bird and general wildlife use; photograph points; GPS data points; functional assessment; and maintenance assessment of any inflow/outflow structures (non-engineering).

### 2.2 Hydrology

Wetland hydrology indicators were recorded using procedures outlined in the US Army Corps' (COE) 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Hydrology data were recorded on the Routine Wetland Delineation Data Form (**Appendix B**) at each wetland determination point. Precipitation data for a portion of early 2006 were compared to the January through December 1948 - 2006 average (WRCC 2006).

All additional hydrologic data were recorded on the Wetland Mitigation Site Monitoring Form (**Appendix B**). The boundary between emergent vegetation and open water was mapped on the aerial photograph (**Figure 3** in **Appendix A**). There are no groundwater monitoring wells at the site.

**FIGURE 1. PROJECT LOCATION**  
**American Colloid**  
**Mitigation Site**



PROJECT #: 130091.037  
 DATE: Dec 2002  
 LOCATION:  
 PROJECT MANAGER: J. BERGLUND  
 DRAWN BY: B. NOECKER



1120 CEDAR PO BOX 8254 MISSOULA, MT 59807

## 2.3 Vegetation

General vegetation types were delineated on an aerial photograph during the site visit (**Figure 3** in **Appendix A**). Coverage of the dominant species in each community type is listed on the Wetland Mitigation Site Monitoring Form (**Appendix B**). A comprehensive plant species list for the entire site was compiled and updated as new species are encountered. Woody species were not planted at this site.

The location of the transect is shown on **Figure 2** in **Appendix A**. Percent cover for each species was recorded on the vegetation transect form (**Appendix B**). Transect ends were marked with metal fence posts and their locations recorded on the vegetation map. Photos of the transect were taken from both ends during the site visit.

## 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**).

## 2.5 Wetland Delineation

A wetland delineation was conducted within the monitoring area according to the 1987 COE Wetland Delineation Manual. Wetland and upland areas within the monitoring area 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: North Plains Region 4 (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 Mitigation Site 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 will be 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 D**). A general, qualitative bird list has been compiled using these observations. Observations will be compared between years in future studies.

## 2.8 Macroinvertebrates

One macroinvertebrate sample was collected on the site. The approximate sampling location is indicated on **Figure 2** in **Appendix A**. Results are included in **Appendix F**.

## 2.9 Functional Assessment

A functional assessment form was completed in 2006 for the American Colloid mitigation site using the 1999 MDT Montana Wetland Assessment Method (Berglund 1999). Field data necessary for this assessment were collected on a condensed data sheet. The remainder of the assessment was completed in the office (**Appendix B**).

## 2.10 Photographs

Photographs were taken showing the current land use surrounding the mitigation site, the wetland buffer, the monitored area, and the vegetation transect (**Appendix C**). A description and compass direction for each photograph were recorded on the wetland monitoring form. During the 2002 monitoring season, each photo-point was marked on the ground with a wooden stake and the location recorded with a resource grade GPS. The approximate locations are shown on **Figure 2** in **Appendix A**. All photographs were taken using a digital camera.

## 2.11 GPS Data

During the 2002 initial 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 delineated wetland boundary. In addition, survey points were collected at several landmarks recognizable on the air photo for purposes of line fitting to the topography. No additional GPS data were collected in 2006.

## 2.12 Maintenance Needs

No bird boxes were located within this site. The outflow structure was checked for obstructions.

## 3.0 RESULTS

### 3.1 Hydrology

The American Colloid mitigation site was constructed in 2001 to be a 5-acre wetland within a reclaimed bentonite mining site (MDT 1999). The source of hydrology for the wetland mitigation site is stormwater runoff that is retained by an earthen embankment. Stormwater enters the project area from the watershed located on the west, south and east sides of the wetland mitigation site. At full pool, water will exit the site through stand culverts in the earthen embankment. The site has been filling steadily since it was constructed. At the time of investigation, approximately 11 inches of the outflow pipes remained above water level. During

the July 17, 2006 visit the area of inundation represented 99% of the total delineation boundary or 4.02 acres.

Precipitation data for the Albion 1N station indicate that the yearly average (1948 - current) was 13.67 inches; in 2005 the yearly total was 15.42 inches or 113% of the average (WRCC 2006). Through the month of June, 2006 the historic average precipitation was 7.52 inches. During 2006, precipitation through the month of June was 7.05 inches or 95% of the average, an improvement over the last few years of drought. Of special note, is the 3.93 inches of precipitation recorded in April, 2006, 279% of the average April precipitation. This precipitation event likely helped sustain full-pond conditions within the American Colloid mitigation site.

### 3.2 Vegetation

Vegetation species identified within the wetland are presented in **Table 1** and in the Wetland Mitigation Site Monitoring Form (**Appendix B**). Transect data trends over time are summarized in tabular format (**Table 2**) and illustrated graphically (**Charts 1 and 2**). The communities include: Type 1, *Grindelia squarrosa/ Chrysothamnus* spp., Type 2, *Spartina pectinata*, Type 3, *Hordeum jubatum*, Type 4, *Typha angustifolia*, and Type 5, *Beckmannia syzygnache*. Dominant species within each community are listed on the monitoring form (**Appendix B**).

**Table 1: 2002-2006 American Colloid Wetland Mitigation Site vegetation species list.**

Scientific Name <sup>1</sup>	Region 4 (North Plains) Wetland Indicator Status <sup>2</sup>
<i>Agropyron cristatum</i>	- (UPL)
<i>Agropyron dasystacium</i>	FAC
<i>Andropogon scoparius</i>	- (UPL)
<i>Atriplex argentea</i>	FACU
<i>Beckmannia syzygnache</i>	OBL
<i>Calamovilfa longifolia</i>	- (UPL)
<i>Chenopodium atrovirens</i>	- (UPL)
<i>Chrysothamnus</i> spp.	- (UPL)
<i>Eriogonum pauciflora</i>	- (UPL)
<i>Festuca octiflora</i>	- (UPL)
<i>Grindelia squarrosa</i>	FACU
<i>Plantago patagonica</i>	UPL
<i>Poa urida</i>	- (UPL)
<i>Puccinellia nuttalliana</i>	OBL
<b><i>Scirpus maritimus</i></b> (likely)	OBL
<i>Sarcobatus vermiculatus</i>	FACU
<i>Spartina pectinata</i>	FACW

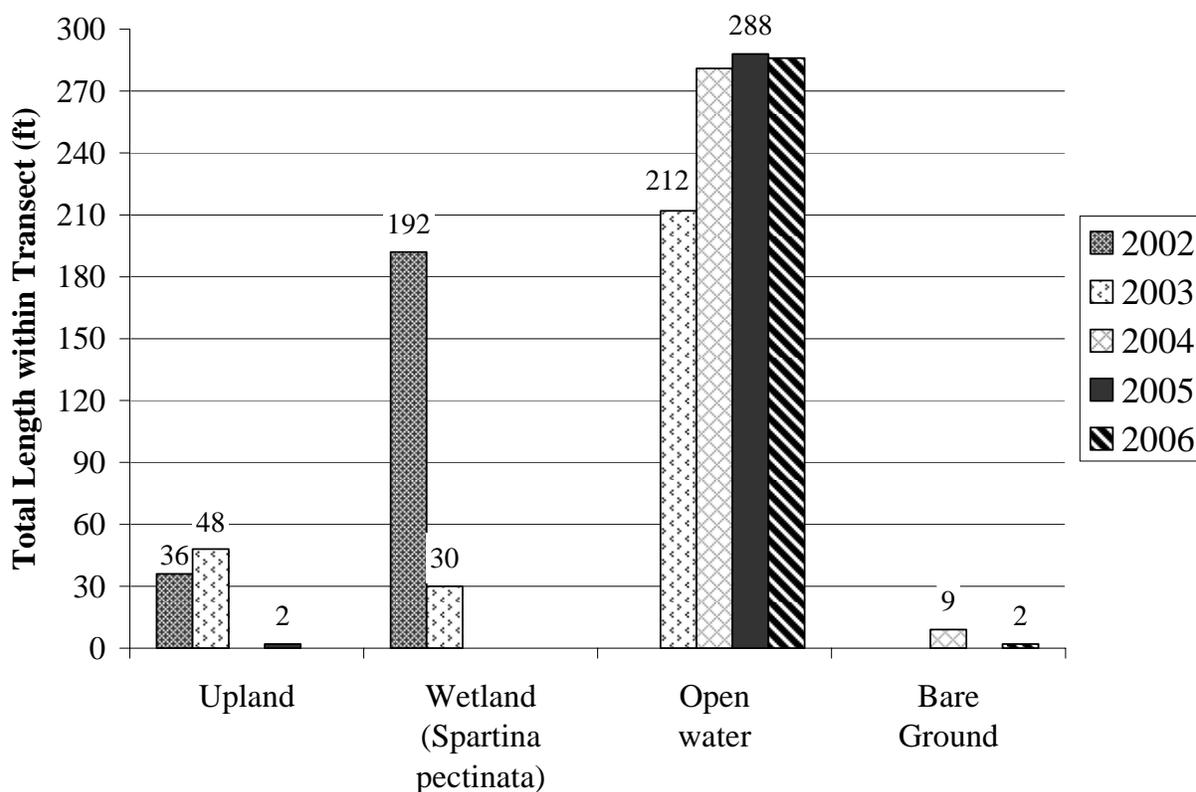
<sup>1</sup> **Bolded** species indicate those documented within the analysis area for the first time in 2006.

<sup>2</sup> Species either not included or classified as “non-indicator” in the *National List of Plant Species that Occur in Wetlands: North Plains (Region 4)* (Reed 1988); status in parentheses are probable and based on biologist’s experience.

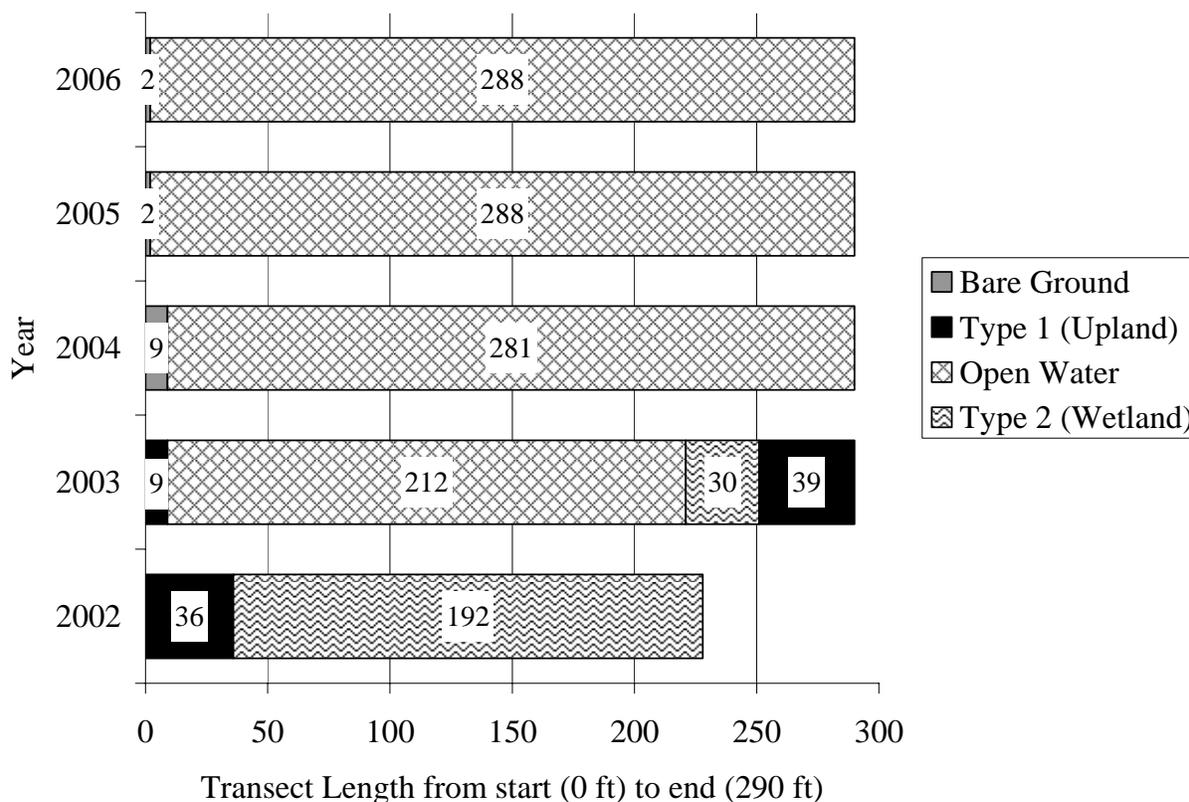
**Table 2: 2002-2006 transect data summary.**

Monitoring Year	2002	2003	2004	2005	2006
Transect Length (feet)	228	290	290	290	290
# Vegetation Community Transitions along Transect	1	2	1	1	0
# Vegetation Communities along Transect	2	3	2	2	0
# Hydrophytic Vegetation Communities along Transect	1	1	1	1	0
Total Vegetative Species	7	8	4	2	0
Total Hydrophytic Species	2	2	1	1	0
Total Upland Species	5	6	3	1	0
Estimated % Total Vegetative Cover	80	27	0	0	0
% Transect Length Comprised of Hydrophytic Vegetation Communities	84	10	0	<1	0
% Transect Length Comprised of Upland Vegetation Communities	16	22	0	<1	0
% Transect Length Comprised of Unvegetated Open Water	0	73	97	>99	>99
% Transect Length Comprised of Bare Substrate	0	0	3	<1	<1

**Chart 1: Length of vegetation communities within Transect 1 during 2002 to 2006.**



**Chart 2: Transect maps showing vegetation types from the start (0 feet) to the end of transect (228 ft in 2002; 290 ft in 2003-2006).**



There are wetland and upland vegetation communities outside of the belt transect, but not within the transect belt. The water mark indicates wave action near the ends of the transect, which also decreased the upland substrate and vegetation. Elsewhere on the site the upland community persists and cover is greater than 30%. The wetland vegetation has not re-colonized the transect area as a result of recent water level stabilization. Since the water levels increased, the wetland community that had colonized the south edge of the pond was inundated and subsequently the vegetation drowned. There is a *Spartina* community adjacent to the transect and within a stormwater drainage, which will effectively wash seeds into the pond. There are several developing areas of *Spartina* within the wetland boundary, and a new community of several wetland species is developing in the northeast thumb adjacent to the berm (**Figure 3 in Appendix A**).

### 3.3 Soils

The site was mapped as part of the Carter County Soil Survey. The soil series mapped by the Natural Resources Conservation Service (NRCS) within the mitigation site is Neldore –Rock Outcrop Complex (Map Unit 58D). The complex is a non-hydric and well drained with clay loam inclusions. The dominant parent material is semiconsolidated shales. Soils were sampled at one wetland (SP-1) and one upland location (SP-2). Soils at both soil pits were a 2.5 Y 2/1 clay. Saturation was only noted in SP-1.

### 3.4 Wetland Delineation

The open water boundary was delineated and is depicted on **Figure 3** in **Appendix A**. At the time of the investigation, the water level was full-pool. *Spartina* is beginning to colonize the outer edges of the full-pool water level and a mixed wetland vegetation community is developing in the northeast thumb at high water level. A dramatic increase in wetland vegetation coverage is expected during the next two growing seasons now that the water level has stabilized and a seed source is developing at various intervals around the pond. The gross wetland and open water boundary totaled 4.08 acres at the time of the investigation and net wetland area comprised 0.06 acre. Wetlands have increased 0.03 acre since 2005. The COE data forms are included in **Appendix B**.

### 3.5 Wildlife

Wildlife species are listed in **Table 3**. Deer tracks and scat were noted within the assessment area and a cottontail rabbit (*Sylvilagus floridanus*) was observed. One avian species was observed and no bird boxes have been installed at this site.

**Table 3: Wildlife species observed at the American Colloid Wetland Mitigation Site from 2002 to 2006<sup>1</sup>.**

<b>AMPHIBIANS AND REPTILES</b>
Northern leopard frog ( <i>Rana pipiens</i> ) Tiger salamander ( <i>Ambystoma tigrinum</i> )
<b>MAMMALS</b>
<b>Eastern cottontail (<i>Sylvilagus floridanus</i>)</b> unidentified vole (likely sage or prairie) Mule deer ( <i>Odocoileus hemionus</i> )
<b>BIRDS</b>
American Robin ( <i>Turdus migratorius</i> ) Brewer's Blackbird ( <i>Euphagus cyanocephalus</i> ) Canada Goose* ( <i>Branta canadensis</i> ) Grasshopper Sparrow ( <i>Ammodramus savannarum</i> ) <b>Killdeer (<i>Charadrius vociferous</i>)</b> Mourning Dove ( <i>Zenaida macroura</i> ) Red-wing Blackbird ( <i>Agelaius phoeniceus</i> ) Spotted Sandpiper ( <i>Actitis macularia</i> )

\* Scat found, likely Canada Goose origin.

<sup>1</sup> **Bolded** species indicate those documented during the 2006 monitoring event.

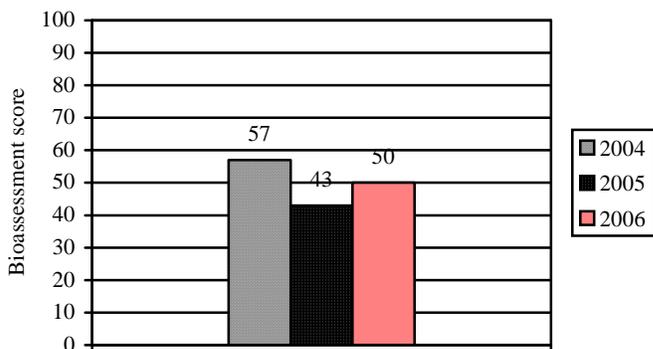
### 3.6 Macroinvertebrates

Macroinvertebrate sampling results are provided in **Appendix F** and **Chart 3** and were summarized by Rhithron Associates in the italicized section below (Bollman 2006).

*Poor biological conditions are indicated by the invertebrate assemblage sampled at this site; only 19 organisms in 7 taxa were collected. These findings suggest that habitats were monotonous, but depauperate assemblages do not lend themselves well to interpretation.*

*Hemoglobin-bearing midges were the most frequently encountered animals. Hypoxic sediments may have been the dominant habitat. Water quality may have been good at this site; a caddisfly and a mayfly were both collected.*

**Chart 3: Bioassessment scores from 2004-2006.**



### 3.7 Functional Assessment

The completed Functional Assessment Form is included in **Appendix B** and summarized below in **Table 4**. The mitigation site has been rated a Category III wetland in 2006, a decrease from the Category II wetland score it was given the last three years. The primary reason for this decrease is the lack of wildlife observations that have been noted in 5 years of monitoring visits and low percentage of actual vegetated wetland at the site in 2006. In addition, the water remained very cloudy with sediment, but may have been the result of a recent storm event. High levels of suspended sediment may be having a negative effect on the development of aquatic species, both vegetative and invertebrate, although nearby wetlands exhibited the same turbidity and were well-vegetated. Functional units (FU) decreased approximately 4.6 points since 2005, from 19.7 to 15.1 FU, as a result of these adjustments.

### 3.8 Photographs

Representative photos taken from photo points and transect ends are included in **Appendix C**.

### 3.9 Maintenance Needs/Recommendations

No maintenance issues were noted; the outflow culverts were free on the inlet end.

**Table 4: Summary of 2002-2006 wetland function/value ratings and functional points at the American Colloid Wetland Mitigation Project.**

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2002	2003	2004	2005	2006
Listed/Proposed T&E Species Habitat	Low (0)	Low (0)	Low (0)	Low (0)	Low (0)
MNHP Species Habitat	Mod (.6)	High (1)	Mod ( 0.7)	Mod ( 0.7)	Mod ( 0.7)
General Wildlife Habitat	Mod (.4)	Mod (.4)	High (.9)	High (.9)	Mod (.5)
General Fish/Aquatic Habitat	NA	NA	NA	NA	NA
Flood Attenuation	Mod (.4)	Mod (.5)	Low (.2)	Low (.2)	NA
Short and Long Term Surface Water Storage	High (.8)	High (.8)	Mod (.4)	Mod (.4)	Mod (.4)
Sediment, Nutrient, Toxicant Removal	Mod (.6)	Mod (.7)	Mod (.7)	Mod (.7)	Low (.3)
Sediment/Shoreline Stabilization	Mod (.7)	Mod (.7)	Low (.3)	Low (.3)	Low (.3)
Production Export/Food Chain Support	Mod (.6)	Mod (.6)	Mod (.4)	Mod (.4)	Mod (.4)
Groundwater Discharge/Recharge	NA	NA	NA	NA	NA
Uniqueness	Low (.3)	Low (.3)	Mod (.4)	Mod (.4)	Mod (.4)
Recreation/Education Potential	Mod (.5)	Mod (.5)	Mod (.7)	Mod (.7)	Mod (.7)
Actual Points/Possible Points	4.9/10	5.5/10	4.7/10	4.7/10	3.7/9
% of Possible Score Achieved	49%	55%	47%	47%	41%
Overall Category	III	II	II	II	III
<b>Total Acreage of Assessed Wetlands within Monitoring Area</b>	<b>0.69</b>	<b>0.69</b>	<b>3.82 (max)</b>	<b>4.2 (max)</b>	<b>4.08 (max)</b>
<b>Total Functional Units (acreage x actual points)</b>	<b>3.38</b>	<b>3.79</b>	<b>17.95 (max)</b>	<b>19.74 (max)</b>	<b>15.1 (max)</b>
<b>Net Acreage Gain (“new” wetlands)</b>	<b>0.69</b>	<b>0.69</b>	<b>3.82 (max)</b>	<b>4.2 (max)</b>	<b>4.08 (max)</b>
<b>Net Functional Unit Gain (new acreage x actual points)</b>	<b>3.38</b>	<b>3.79</b>	<b>17.95 (max)</b>	<b>19.74 (max)</b>	<b>15.1 (max)</b>

### 3.10 Current Credit Summary

The American Colloid wetland mitigation site was constructed in October 2001 to mitigate 4.4 acres of unavoidable wetland impacts associated with MDT projects in Watershed #16. The site was anticipated to be 5 acres with a 10-acre buffer zone and is completely fenced (MDT 1999). The gross aquatic habitat area for 2006 totals 4.08 acres; wetland vegetation has colonized 0.06 acre, up from 0.03 acre since 2005.

The American Colloid mitigation is rated as a Class III wetland, a decrease over the last 3 years, primarily because of the accumulation of actual data: few wildlife species, especially avian, have been noted over the 5 years of monitoring; the water remains turbid; and the development of aquatic vegetative and invertebrate species is limited. Functional units (FU) decreased approximately 4.6 points since 2005, from 19.7 to 15.1 FU, as a result of these adjustments. The site is, however, receiving water as planned, and eventual vegetation of the site is anticipated.

#### 4.0 REFERENCES

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<http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?mtalbi>.

## **Appendix A**

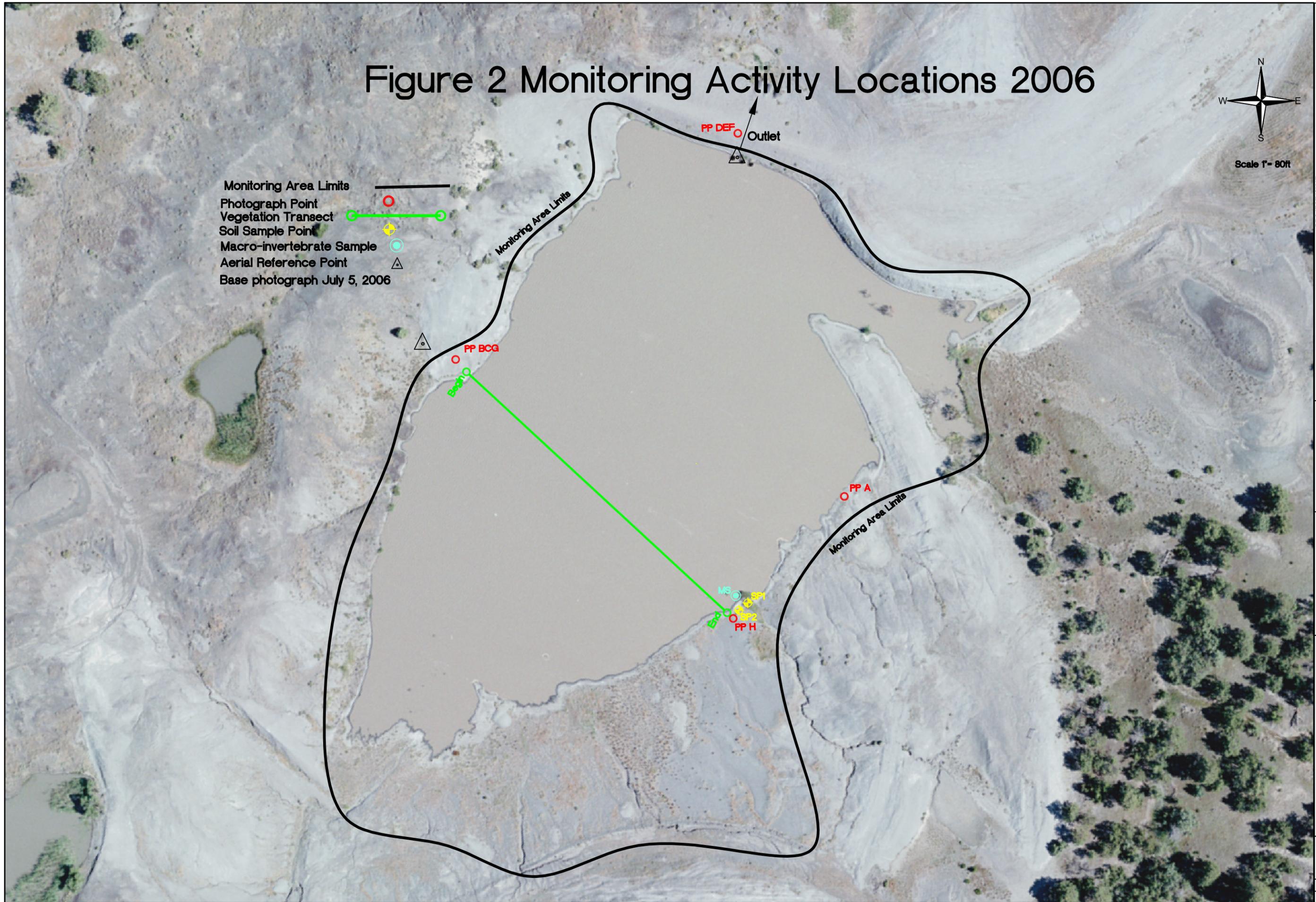
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### **FIGURES 2 & 3**

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*MDT Wetland Mitigation Monitoring  
American Colloid Mitigation Site  
Alzada, Montana*

# Figure 2 Monitoring Activity Locations 2006



- Monitoring Area Limits
- Photograph Point
- Vegetation Transect
- Soil Sample Point
- Macro-invertebrate Sample
- Aerial Reference Point
- Base photograph July 5, 2006



PROJECT NAME <b>MDT AMERICAN COLLOID WETLAND MITIGATION</b>	
DRAWING TITLE <b>MONITORING ACTIVITY LOCATIONS 2006</b>	
PROJ. NO.: B43054.0402	DRAWN: SH/JR
LOCATION: American Colloid	PROJ. MGR.: J. BERGLUND
SCALE: 1" = 80'	CHECKED: LB / APPVD: JB
FILE NAME: 2006 BASE.dwg	
3810 Valley Commons Drive Suite 4 Bozeman, MT 59718	
<b>PBSJ</b>	
FIGURE <b>2</b> OF	
REV - Nov/09/2006	

# Figure 3 Mapped Site Features 2006



Monitoring Area Limits  
 Wetland Boundary  
 Open Water Boundary  
 Base photograph July 5, 2006

Wetland Area

Gross Wetland Area	4.08 Acres
Open Water	4.02 Acres
Net Wetland Area	0.06 Acres

- Vegetation Community Types
- ① *Grindelia squarrosa*/*Chrysothamnus* spp.
  - ② *Spartina pectinata*
  - ③ *Hordeum jubatum*
  - ④ *Typha angustifolia*
  - ⑤ *Beckmannia syzigachne*/*Juncus tenuis*



PROJECT NAME  
**MDT AMERICAN COLLOID WETLAND MITIGATION**

DRAWING TITLE  
**MAPPED SITE FEATURES 2006**

PROJ NO: B43054.0402	DRAWN: SH/JR
LOCATION: American Colloid	PROJ MGR: J. BERGLUND
SCALE: 1" = 80'	CHECKED: LB / APPVD: JB
FILE NAME: 2006 BASE.dwg	

3810 Valley Commons Drive  
 Suite 4  
 Bozeman, MT 59718



## **Appendix B**

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**2006 WETLAND MITIGATION SITE MONITORING FORM**

**2006 BIRD SURVEY FORMS**

**2006 COE WETLAND DELINEATION FORMS**

**2006 FUNCTIONAL ASSESSMENT FORM**

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*MDT Wetland Mitigation Monitoring*

*American Colloid Mitigation Site*

*Alzada, Montana*

**LWC / MDT WETLAND MITIGATION SITE MONITORING FORM**

Project Name: American Colloid Project Number: B43054.00-402  
Assessment Date: July 17, 2006 Person(s) conducting the assessment: LBacon, PBSJ  
Location: Alzada MDT District: Glendive Milepost: \_\_\_\_\_  
Legal Description: T 9S R 58E Section 36  
Weather Conditions: overcast, rain threatening Time of Day: 2PM  
Initial Evaluation Date: July 18, 2002 Monitoring Year: 5 # Visits in Year: 1  
Size of evaluation area: 5 acres Land use surrounding wetland: bentonite mine

**HYDROLOGY**

Surface Water Source: stormwater  
Inundation: Present Average Depth: 4 feet Range of Depths: 0-8 ft  
Percent of assessment area under inundation: 99%  
Depth at emergent vegetation-open water boundary: 1 feet  
If assessment area is not inundated then are the soils saturated within 12 inches of surface: Yes  
Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc.):  
sediment line

Groundwater Monitoring Wells: Absent  
Record depth of water below ground surface (in feet):

Well Number	Depth	Well Number	Depth	Well Number	Depth

- Additional Activities Checklist:
- Map emergent vegetation-open water boundary on aerial photograph.
  - Observe extent of surface water during each site visit and look for evidence of past surface water elevations (drift lines, erosion, vegetation staining, etc.)
  - Use GPS to survey groundwater monitoring well locations, if present.

**COMMENTS / PROBLEMS:**  
GPSed in 2002

## VEGETATION COMMUNITIES

Community Number: **1** Community Title (main species): **Grindelia squarosa/Chrysothamnus**

Dominant Species	% Cover	Dominant Species	% Cover
FESOCT	3 = 11-20%	ANDSCO	4 = 21-50%
CHRsp.	3 = 11-20%	ERIPAU	2 = 6-10%
BROTEC	3 = 11-20%		
GRISQU	1 = 1-5%		

Comments / Problems: \_\_\_\_\_

Community Number: **2** Community Title (main species): **Spartina pectinata**

Dominant Species	% Cover	Dominant Species	% Cover
SPAPEC	5 = > 50%		
HORJUB	+ = < 1%		
SCIMAR	+ = < 1%		
BECSYZ	+ = < 1%		

Comments / Problems: \_\_\_\_\_

Community Number: **3** Community Title (main species): **Hordeum jubatum**

Dominant Species	% Cover	Dominant Species	% Cover
HORJUB	5 = > 50%		

Comments / Problems: \_\_\_\_\_

Community Number: **4** Community Title (main species): **Typha angustifolia**

Dominant Species	% Cover	Dominant Species	% Cover
TYHANG	5 = > 50%		

Comments / Problems: **isolated pod**

**VEGETATION COMMUNITIES (continued)**

Community Number: 5 Community Title (main species): Beckmannia syzigachne/Juncus tenuis

Dominant Species	% Cover	Dominant Species	% Cover
BECSYZ	3 = 11-20%	HORJUB	3 = 11-20%
JUNTEN	3 = 11-20%		
TYPANG	3 = 11-20%		
ALOAEQ	3 = 11-20%		
SCIMAR	3 = 11-20%		
ELEPAL	3 = 11-20%		

**Comments / Problems:** No real dominant species at this time

Community Number: \_\_\_\_\_ Community Title (main species): \_\_\_\_\_

Dominant Species	% Cover	Dominant Species	% Cover

**Comments / Problems:** \_\_\_\_\_

Community Number: \_\_\_\_\_ Community Title (main species): \_\_\_\_\_

Dominant Species	% Cover	Dominant Species	% Cover

**Comments / Problems:** \_\_\_\_\_

Community Number: \_\_\_\_\_ Community Title (main species): \_\_\_\_\_

Dominant Species	% Cover	Dominant Species	% Cover

**Comments / Problems:** \_\_\_\_\_

**Additional Activities Checklist:**

Record and map vegetative communities on aerial photograph.





## WILDLIFE

### Birds

Were man-made nesting structures installed? **No**  
 If yes, type of structure: \_\_\_\_\_ How many? \_\_\_\_\_  
 Are the nesting structures being used? **NA**  
 Do the nesting structures need repairs? \_\_\_\_\_

### Mammals and Herptiles

Mammal and Herptile Species	Number Observed	Indirect Indication of Use			
		Tracks	Scat	Burrows	Other
jackrabbit or cottontail	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
deer		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

### Additional Activities Checklist:

Yes Macroinvertebrate Sampling (if required)

Comments / Problems: \_\_\_\_\_



## GPS SURVEYING

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

### GPS Checklist:

- Jurisdictional wetland boundary.
- 4-6 landmarks that are recognizable on the aerial photograph.
- Start and End points of vegetation transect(s).
- Photograph reference points.
- Groundwater monitoring well locations.

Comments / Problems: **GPSed in 2002**

## WETLAND DELINEATION

(attach COE delineation forms)

At each site conduct these checklist items:

- Delineate wetlands according to the 1987 Army COE manual.
  - Delineate wetland – upland boundary onto aerial photograph.
- Yes** Survey wetland – upland boundary with a resource grade GPS survey.

Comments / Problems: **GPSed in 2002; boundary hand altered thereafter.**

## FUNCTIONAL ASSESSMENT

(Complete and attach full MDT Montana Wetland Assessment Method field forms.)  
(Also attach any completed abbreviated field forms, if used)

Comments / Problems: \_\_\_\_\_

## MAINTENANCE

Were man-made nesting structure installed at this site? **NA**

If yes, do they need to be repaired? **NA**

If yes, describe the problems below and indicate if any actions were taken to remedy the problems.

Were man-made structures built or installed to impound water or control water flow into or out of the wetland? **Yes**

If yes, are the structures working properly and in good working order? **Yes**

If no, describe the problems below.

Comments / Problems: **Stand culverts average 11.5" above water level; no mud in bottom of culvert indicating water has never over-topped stand culvert.**

## MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: American Colloid Date: July 17, 2006 Examiner: LBacon, PBSJ

Transect Number: 1 Approximate Transect Length: 290 feet Compass Direction from Start: 122° Note: \_\_\_\_\_

Vegetation Type A: <b>CT-1</b>	
Length of transect in this type: 2 feet	
Plant Species	Cover
bare dirt	5 = > 50%
Total Vegetative Cover:	0%

Vegetation Type B: <b>open water</b>	
Length of transect in this type: 288 feet	
Plant Species	Cover
open water	5 = > 50%
mud fringe (10 ft wide on H end, none on G end)	+ = < 1%
Total Vegetative Cover:	0%

Vegetation Type C:	
Length of transect in this type:      feet	
Plant Species	Cover
Total Vegetative Cover:	%

Vegetation Type D:	
Length of transect in this type:      feet	
Plant Species	Cover
Total Vegetative Cover:	%

## MDT WETLAND MONITORING – VEGETATION TRANSECT

### Cover Estimate

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

### Indicator Class

+ = Obligate  
- = Facultative/Wet  
0 = Facultative

### Source

P = Planted  
V = Volunteer

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): 0%

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 foot depth (in open water), or at the point where water depths or saturation are maximized. Mark this location with another metal fencepost.

Estimate cover within a 10 foot 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.

Comments: **Spartina community to north of H-transect end, but not within the belt transect, a few sprigs are submerged within ~10ft of the shore on the H-end.**



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

Project / Site: <b>American Colloid</b> Applicant / Owner: <b>MDT</b> Investigator: <b>LBacon/PBSJ</b>	Date: <b>July 17, 2006</b> County: <b>Carter</b> State: <b>MT</b>
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Do Normal Circumstances exist on the site? <b>Yes</b> Is the site significantly disturbed (Atypical Situation)? <b>No</b> Is the area a potential Problem Area? <b>No</b> (If needed, explain on reverse side)	Community ID: <b>CT-1</b> Transect ID: <b>Upland</b> Plot ID: <b>SP-1</b>
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**VEGETATION**

Dominant Species	Stratum	Indicator	Dominant Species	Stratum	Indicator
1. <i>ANDSCO</i>	Herb	NI	11.		
2. <i>FESOCT</i>	Herb	NI	12.		
3. <i>POAURI</i>	Herb	NI	13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		
Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): <b>0 / 3 = 0%</b>			FAC Neutral:     /     =     %		
Remarks: <b>SP just above water mark of pond and above/beyond transect post.</b>					

**HYDROLOGY**

<b>Yes</b> Recorded Data (Describe in Remarks): <u>N/A</u> Stream, Lake, or Tide Gauge <u>Yes</u> Aerial Photographs <u>N/A</u> Other  <b>No</b> No Recorded Data	Wetland Hydrology Indicators Primary Indicators: <u>NO</u> Inundated <u>NO</u> Saturated in Upper 12 Inches <u>NO</u> Water Marks <u>NO</u> Drift Lines <u>NO</u> Sediment Deposits <u>NO</u> Drainage Patterns in Wetland Secondary Indicators (2 or more required): <u>NO</u> Oxidized Root Channels in Upper 12 inches <u>NO</u> Water-Stained Leaves <u>NO</u> Local Soil Survey Data <u>NO</u> FAC-Neutral Test <u>NO</u> Other (Explain in Remarks)
Field Observations: Depth of Surface Water <u>N/A</u> ____ (in.) Depth to Free Water in Pit <u>N/A</u> ____ (in.) Depth to Saturated Soil <u>N/A</u> ____ (in.)	
Remarks: <b>Soil is dry; no water pattern.</b>	

## SOILS

Map Unit Name (Series and Phase): **Nelodre-rock outcrop complex**  
 Map Symbol: **58D** Drainage Class: **well** Mapped Hydric Inclusion? **\_**  
 Taxonomy (Subgroup): **Aridic Ustorthents** Field Observations confirm Mapped Type? **Yes**

Profile Description					
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color(s) (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
6"	A	2.5 Y 2/1	/	N/A	silt clay
		/	/	N/A	
		/	/	N/A	
		/	/	N/A	
		/	/	N/A	
		/	/	N/A	

Hydric Soil Indicators:

<p><b><u>NO</u></b> Histosol  <b><u>NO</u></b> Histic Epipedon  <b><u>NO</u></b> Sulfidic Odor  <b><u>NO</u></b> Aquic Moisture Regime  <b><u>NO</u></b> Reducing Conditions  <b><u>YES</u></b> Gleyed or Low-Chroma Colors</p>	<p><b><u>NO</u></b> Concretions  <b><u>NO</u></b> High Organic Content in Surface Layer in Sandy Soils  <b><u>NO</u></b> Organic Streaking in Sandy Soils  <b><u>NO</u></b> Listed on Local Hydric Soils List  <b><u>NO</u></b> Listed on National Hydric Soils List  <b><u>NO</u></b> Other (Explain in Remarks)</p>
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Remarks: **same soil in wetland and upland areas.**

## WETLAND DETERMINATION

Hydrophytic Vegetation Present? <b><u>NO</u></b>	Is this Sampling Point within a Wetland? <b><u>NO</u></b>
Wetland Hydrology Present? <b><u>NO</u></b>	
Hydric Soils Present? <b><u>YES</u></b>	

Remarks: **Soil dark at this microlocation, otherwise, no wetland indicators above water mark around entire pond.**

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

Project / Site: <b>American Colloid</b> Applicant / Owner: <b>MDT</b> Investigator: <b>LBacon/PBSJ</b>	Date: <b>July 17, 2006</b> County: <b>Carter</b> State: <b>MT</b>
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Do Normal Circumstances exist on the site? <b>Yes</b> Is the site significantly disturbed (Atypical Situation)? <b>No</b> Is the area a potential Problem Area? <b>No</b> (If needed, explain on reverse side)	Community ID: <b>CT-2</b> Transect ID: <b>WL</b> Plot ID: <b>SP-1</b>
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**VEGETATION**

Dominant Species	Stratum	Indicator	Dominant Species	Stratum	Indicator
1. SPAPEC	Herb	FACW	11.		
2. BECSYZ	Herb	OBL	12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		
Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): <b>2 / 2 = 100%</b>			FAC Neutral:     /     =     %		
Remarks: <b>Sp in drainage a few feet north of transect</b>					

**HYDROLOGY**

<b>Yes</b> Recorded Data (Describe in Remarks): <u>N/A</u> Stream, Lake, or Tide Gauge <u>Yes</u> Aerial Photographs <u>N/A</u> Other  <b>No</b> No Recorded Data	Wetland Hydrology Indicators Primary Indicators: <u>NO</u> Inundated <u>YES</u> Saturated in Upper 12 Inches <u>YES</u> Water Marks <u>NO</u> Drift Lines <u>YES</u> Sediment Deposits <u>YES</u> Drainage Patterns in Wetland  Secondary Indicators (2 or more required): <u>NO</u> Oxidized Root Channels in Upper 12 inches <u>NO</u> Water-Stained Leaves <u>NO</u> Local Soil Survey Data <u>NO</u> FAC-Neutral Test <u>NO</u> Other (Explain in Remarks)
Field Observations: Depth of Surface Water <u>N/A</u> ____ (in.) Depth to Free Water in Pit <u>N/A</u> ____ (in.) Depth to Saturated Soil <u>N/A</u> ____ (in.)	
Remarks: <b>Saturated at 10". This storm drainage will be a good source of SPAPEC seed for entire wetland.</b>	

**SOILS**

Map Unit Name (Series and Phase): **Nelodre-rock outcrop complex**  
 Map Symbol: **58D** Drainage Class: **well** Mapped Hydric Inclusion? **\_**  
 Taxonomy (Subgroup): **Aridic Ustorthents** Field Observations confirm Mapped Type? **Yes**

<b>Profile Description</b>					
<b>Depth (inches)</b>	<b>Horizon</b>	<b>Matrix Color (Munsell Moist)</b>	<b>Mottle Color(s) (Munsell Moist)</b>	<b>Mottle Abundance/Contrast</b>	<b>Texture, Concretions, Structure, etc.</b>
10"	A	2.5 Y 2/1	/	N/A	Clay
		/	/	N/A	
		/	/	N/A	
		/	/	N/A	
		/	/	N/A	
		/	/	N/A	

Hydric Soil Indicators:

<b><u>NO</u></b> Histosol	<b><u>NO</u></b> Concretions
<b><u>NO</u></b> Histic Epipedon	<b><u>NO</u></b> High Organic Content in Surface Layer in Sandy Soils
<b><u>NO</u></b> Sulfidic Odor	<b><u>NO</u></b> Organic Streaking in Sandy Soils
<b><u>NO</u></b> Aquic Moisture Regime	<b><u>NO</u></b> Listed on Local Hydric Soils List
<b><u>NO</u></b> Reducing Conditions	<b><u>NO</u></b> Listed on National Hydric Soils List
<b><u>YES</u></b> Gleyed or Low-Chroma Colors	<b><u>NO</u></b> Other (Explain in Remarks)

Remarks:

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present? <b><u>YES</u></b>	Is this Sampling Point within a Wetland? <b><u>YES</u></b>
Wetland Hydrology Present? <b><u>YES</u></b>	
Hydric Soils Present? <b><u>YES</u></b>	

Remarks: **Stormwater inlet upslope from H transect end continues to developing as a wetland area. Wetland vegetation also developing in small pods on west shore and in NE corner.**



**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
- 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	---	---	---	---	---	---	0 (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 Rana pipiens
- Incidental habitat (list species)  D  S \_\_\_\_\_
- 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	---	---	.7 (M)	---	---	---	---

If documented, list the source (e.g., observations, records, etc.): LB/photograph

**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)	<input type="checkbox"/> High								<input type="checkbox"/> Moderate								<input checked="" type="checkbox"/> Low			
Class Cover Distribution (all vegetated classes)	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input checked="" type="checkbox"/> 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
<b>Low</b> disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	E	--	--	--
<b>Moderate</b> disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>High</b> disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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)			
	<input type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input checked="" type="checkbox"/> Moderate	<input type="checkbox"/> Low
Substantial	--	--	--	--
Moderate	--	--	.5 (M)	--
Low	--	--	--	--

**Comments:** RATING ABOVE CHANGED FROM "M 0.7" TO "M 0.5" AS A RESULT OF FOLLOWING RATIONALE: This site has been observed for 5 years and some ungulate and lagomorph scat and tracks have been observed each year, and few bird species /year (recognizing that the survey is only 1 day/year). I have changed the Wildlife Habitat Features rating to "moderate" from "exceptional" in #ii, as there is <1% wetland vegetation within the 5-acre site. There is no aquatic vegetation development and very little macroinvertebrate occurrence.

**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	<input type="checkbox"/> Permanent/Perennial			<input type="checkbox"/> Seasonal / Intermittent			<input type="checkbox"/> 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.	--	--	--	--	--	--	--	--	--
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)			
	<input type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Native game fish	--	--	--	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: \_\_\_\_\_

**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	<input type="checkbox"/> ≥ 10 acres			<input type="checkbox"/> <10, >2 acres			<input type="checkbox"/> ≤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 <b>no outlet or restricted outlet</b>	--	--	--	--	--	--	--	--	--
AA contains <b>unrestricted outlet</b>	--	--	--	--	--	--	--	--	--

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: \_\_\_\_\_

**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.	<input type="checkbox"/> >5 acre feet			<input type="checkbox"/> <5, >1 acre feet			<input checked="" type="checkbox"/> ≤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 ≥ 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.			
	<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input checked="" type="checkbox"/> < 70%	
Evidence of flooding or ponding in AA	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
AA contains <b>no or restricted outlet</b>	--	--	--	--	--	--	.3 (L)	--
AA contains <b>unrestricted outlet</b>	--	--	--	--	--	--	--	--

Comments: Sediment from clay substrate on pond bottom and surrounding topography has not cleared with resultant lack of aquatic veg and macroinvertebrate development, and subsequent lack of bird use.

**14H. SEDIMENT/Shoreline Stabilization**  NA (proceed to 14I)

Applies only if AA occurs on or within the banks of 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		
	<input checked="" type="checkbox"/> Permanent / Perennial	<input type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
≥ 65 %	--	--	--
35-64 %	--	--	--
< 35 %	.3 (L)	--	--

**Comments:** WL vegetation beginning to colonize small areas on west edge and NE corner; <1% of total "Wetland" area.

**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	<input type="checkbox"/> Vegetated component >5 acres				<input type="checkbox"/> Vegetated component 1-5 acres				<input checked="" type="checkbox"/> Vegetated component <1 acre			
B	<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input checked="" type="checkbox"/> Low	
C	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N
P/P	--	--	--	--	--	--	--	--	--	--	--	--
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	--
No Discharge/Recharge indicators present	--
Available Discharge/Recharge information inadequate to rate AA D/R potential	N/A (Unknown)

**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	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input checked="" type="checkbox"/> common	<input type="checkbox"/> abundant
Low disturbance at AA (#12i)	--	--	--	--	--	--	--	.4M	--
Moderate disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--
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)	
	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> High
Public ownership	--	--
Private ownership	.7(M)	--

**Comments:** \_\_\_\_\_

**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	0.00	1	
B. MT Natural Heritage Program Species Habitat	M	0.70	1	
C. General Wildlife Habitat	M	0.50	1	
D. General Fish/Aquatic Habitat	NA		--	
E. Flood Attenuation	NA		--	
F. Short and Long Term Surface Water Storage	M	0.40	1	
G. Sediment/Nutrient/Toxicant Removal	L	0.30	1	
H. Sediment/Shoreline Stabilization	L	0.30	1	
I. Production Export/Food Chain Support	M	0.40	1	
J. Groundwater Discharge/Recharge	NA		--	
K. Uniqueness	M	0.40	1	
L. Recreation/Education Potential	M	0.70	1	
<b>Totals:</b>		3.70	9.00	19.83
<b>Percent of Total Possible Points:</b>			<b>41%</b> (Actual / Possible) x 100 [rd to nearest whole #]	

<p><b>Category I Wetland:</b> (Must satisfy <b>one</b> of the following criteria. If not proceed to Category II.)</p> <input type="checkbox"/> Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; <b>or</b> <input type="checkbox"/> Score of 1 functional point for Uniqueness; <b>or</b> <input type="checkbox"/> Score of 1 functional point for Flood Attenuation <b>and</b> answer to Question 14E(ii) is "yes"; <b>or</b> <input type="checkbox"/> Percent of total Possible Points is > 80%.
<p><b>Category II Wetland:</b> (Criteria for Category I not satisfied <b>and</b> meets any <b>one</b> of the following Category II criteria. If not satisfied, proceed to Category IV.)</p> <input type="checkbox"/> Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; <b>or</b> <input type="checkbox"/> Score of .9 or 1 functional point for General Wildlife Habitat; <b>or</b> <input type="checkbox"/> Score of .9 or 1 functional point for General Fish/Aquatic Habitat; <b>or</b> <input type="checkbox"/> "High" to "Exceptional" ratings for <b>both</b> General Wildlife Habitat <b>and</b> General Fish / Aquatic Habitat; <b>or</b> <input type="checkbox"/> Score of .9 functional point for Uniqueness; <b>or</b> <input type="checkbox"/> Percent of total possible points is > 65%.
<p><input checked="" type="checkbox"/> <b>Category III Wetland:</b> (Criteria for Categories I, II, or IV not satisfied.)</p>
<p><b>Category IV Wetland:</b> (Criteria for Categories I or II are not satisfied <b>and</b> <u>all</u> of the following criteria are met; If not satisfied, proceed to Category III.)</p> <input type="checkbox"/> "Low" rating for Uniqueness; <b>and</b> <input type="checkbox"/> "Low" rating for Production Export / Food Chain Support; <b>and</b> <input type="checkbox"/> 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**

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### **2006 REPRESENTATIVE PHOTOGRAPHS**

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*MDT Wetland Mitigation Monitoring  
American Colloid Mitigation Site  
Alzada, Montana*

**2006 AMERICAN COLLOID WETLAND MITIGATION SITE**



**Location: A Description: Outlet  
Compass Reading: 2°**



**Location: B Description: Upland buffer Compass  
Reading: 348°**



**Location: C Description: Across wetland and beginning  
of transect Compass Reading: 118°**



**Location: D Photo Frame: 16 Description:  
Downstream of dam Compass Reading: 25°**



**Location: E Description: SE from dam across wetland  
Compass Reading: 186°**



**Location: F Description: SW from dam across wetland  
Compass Reading: 220°**

**2006 AMERICAN COLLOID WETLAND MITIGATION SITE**



**Location:** G    **Description:** Across wetland and beginning of transect    **Compass Reading:** 118°



**Location:** H    **Description:** End of transect    **Compass Reading:** 302°

## **Appendix D**

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### **MDT REVISED PRELIMINARY FIELD REVIEW REPORT MDT ADDENDUM ATTACHMENTS (PLAN SHEETS)**

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*MDT Wetland Mitigation Monitoring  
American Colloid Mitigation Site  
Alzada, Montana*

RECEIVED

JAN 06 1999

ENVIRONMENTAL



Montana Department of Transportation  
Helena, Montana 59620-1001

MASTER FILE  
COPY

Memorandum

To: Carl S. Peil, P.E.  
Preconstruction Engineer

From: Gordon J. Stockstad  
Resources Bureau Chief 

Date: December 23, 1998

Subject: NH STPS BR 6(10)  
Watershed 16  
American Colloid  
Control No. 1396

We request that you approve the Revised Preliminary Field Review Report for the subject project.

Approved D. John Blacker  
Carl S. Peil, P.E.  
Preconstruction Engineer

Date 1/4/99

We are requesting comments from the following individuals, who have also received a copy of the report. We will assume their concurrence if no comments are received by two weeks from the above date.

Distribution:

C. S. Peil  
J. M. Marshik  
D. R. McIntyre  
R. E. Williams  
B. F. Juvan  
M. P. Johnson  
J. D. Blacker  
FHWA  
Precon File

P. Saindon  
B. A. Larsen  
D. P. Dusek  
K. H. Neumiller  
T. E. Martin  
R. D. Tholt  
S. Prestipino  
Mark A. Wissinger

## Revised Preliminary Field Review Report

A field review of the subject project was held in September 18, 1997, with the following people in attendance:

R. E. Mengel	Engineering Services Supr.	Glendive
J. S. Michel	Hydraulics Section	Helena
Larry Sickerson	Environmental Services	Helena
Tim Olson	Environmental Services	Helena
Tom Atkins	Road Design	Helena
John Moran	Geotech	Helena

### Introduction

A preliminary field review was previously conducted for this project. The original Preliminary Field Review Report that went out did not request approval from Carl Peil nor did it request comments. The purpose of this Revised Preliminary Field Review Report is to follow the proper procedures for the purpose of activating activities from the Project Management System flow chart for Wetland Mitigation and to include comments that were received after the document had been circulated. The intent of this Report is also to bring everyone up to date on where this project is at and where it is going. Some of the activities on the PMS Wetland Mitigation flow chart have already been completed and will need to be carded out when this project comes around for overrides.

### Purpose

As a result of wetland impacts associated with the Alzada - East & West (STPP 23-3(6)130, Control No. 2150), and Alzada South (STPS 326-1(1)0, Control No. 2299) highway projects, MDT is proposing mitigation efforts on Montana School Trust Land. **It is intended to tie the construction of this mitigation project to Alzada - East and West for letting purposes. The proposed ready date for the Alzada-East and West project is December, 1999.**

To mitigate impacts on the projects mentioned above, MDT is working with American Colloid, the Department of Natural Resources and Conservation (Eastern Land Office), and the Department of Environmental Quality (Reclamation Division) to create wetland habitat. MDT and American Colloid will work together to amend American Colloids reclamation plan to reflect this project. Department of Environmental Quality - Reclamation Division must approve the plan.

MDT is anticipating a mitigation site of approximately 5 acres in size for the wetland impacts associated with the previously mentioned projects. The 5 acres of wetlands will

Carl S. Peil  
Page 3  
December 23, 1998

also be surrounded by a 10 acre buffer zone of upland vegetation. The entire 15 acres will be fenced as an enclosure to livestock grazing. This enclosure will need to be sheep-proof.

#### **Project Location and Limits**

The wetland mitigation site is located in Carter County approximately 2 miles south and 7 miles west of Alzada, MT. This site is located on Montana School Trust Land in the Lot 7, Lot 10, Lot 11 of Section 36, Township 9 South, Range 58 East, M.P.M., as shown on the attached project location map.

#### **Site Description**

The wetland mitigation site is located on land owned by the Montana Department of Natural Resources and Conservation which is leased to the American Colloid Mining Company of Belle Fourche, SD. The 15 acre site was mined for bentonite clay prior to the 1971 Open Cut Mining Act and is in need of reclamation. The topography of the site is typical of open cut mining activities.

#### **Design**

The design for this proposed mitigation site will be provided by MDT's Road Design Section. It is anticipated that no excavation will be necessary. A dike approximately 58 meters in length will need to be constructed to impound the water for this site. Other design criteria will be based on the water budget analysis provided by the Hydraulics Section. Environmental Services will be the lead unit for this project.

#### **Construction**

MDT will be responsible for the project letting, construction, and project manager. This project will be tied to the Alzada - East & West project for letting and construction and has an anticipated ready date of December, 1999.

#### **Hydraulics**

The drainage patterns as shown on existing topographic maps for the watershed associated with this site have been altered due to mining activities. American Colloid provided

Carl S. Peil  
Page 4  
December 23, 1998

MDT with a drainage area of 167 acres of surrounding watershed. Jerry Michaels is working on a water budget for the proposed site.

#### **Water Rights**

The Department of Natural Resources and Conservation will be responsible for acquiring the water rights for this site.

#### **Geotechnical Considerations**

The Geotechnical Section has completed their field investigation. This consisted of five borings at the mitigation site which revealed clay soils underlain by shale. This material is suitable for the creation of a wetland. These soils are highly erodible therefore the design should avoid an earthen spillway for the emergency outlet.

#### **Right-of Way**

The mitigation site lies within the boundaries of Montana School Trust Land and will be managed and maintained by the DNRC. A wetland conservation agreement between DNRC and MDT will be drafted by MDT for perpetuity. It needs to be addressed in this document whom the responsible party will be for removal of the sheep proof fence once the wetland is functional. It is anticipated the R/W Plans Section will review documents prepared by the DNRC. If the easement or legal description is to be provided by MDT, R/W should be notified so they can request the appropriate survey.

#### **Environmental Considerations**

No significant environmental effects or issues were identified. An appropriate environmental evaluation and document will be prepared by MDT through Environmental Services for this project. The project should have minimal effect on the habitat of any threatened or endangered species. A hazardous waste analysis and a Cultural Resource site assessment will be needed for the environmental documentation.

#### **Field Survey**

A topographic survey of the area has been performed. Additional survey for the legal description for the easement

Carl S. Peil  
Page 5  
December 23, 1998

may be required. Right-of-Way Plans Section will be notified so they can request the appropriate survey.

**Legal**

Legal Services will need to review all agreements with American Colloid and DNRC.

**Estimated Cost**

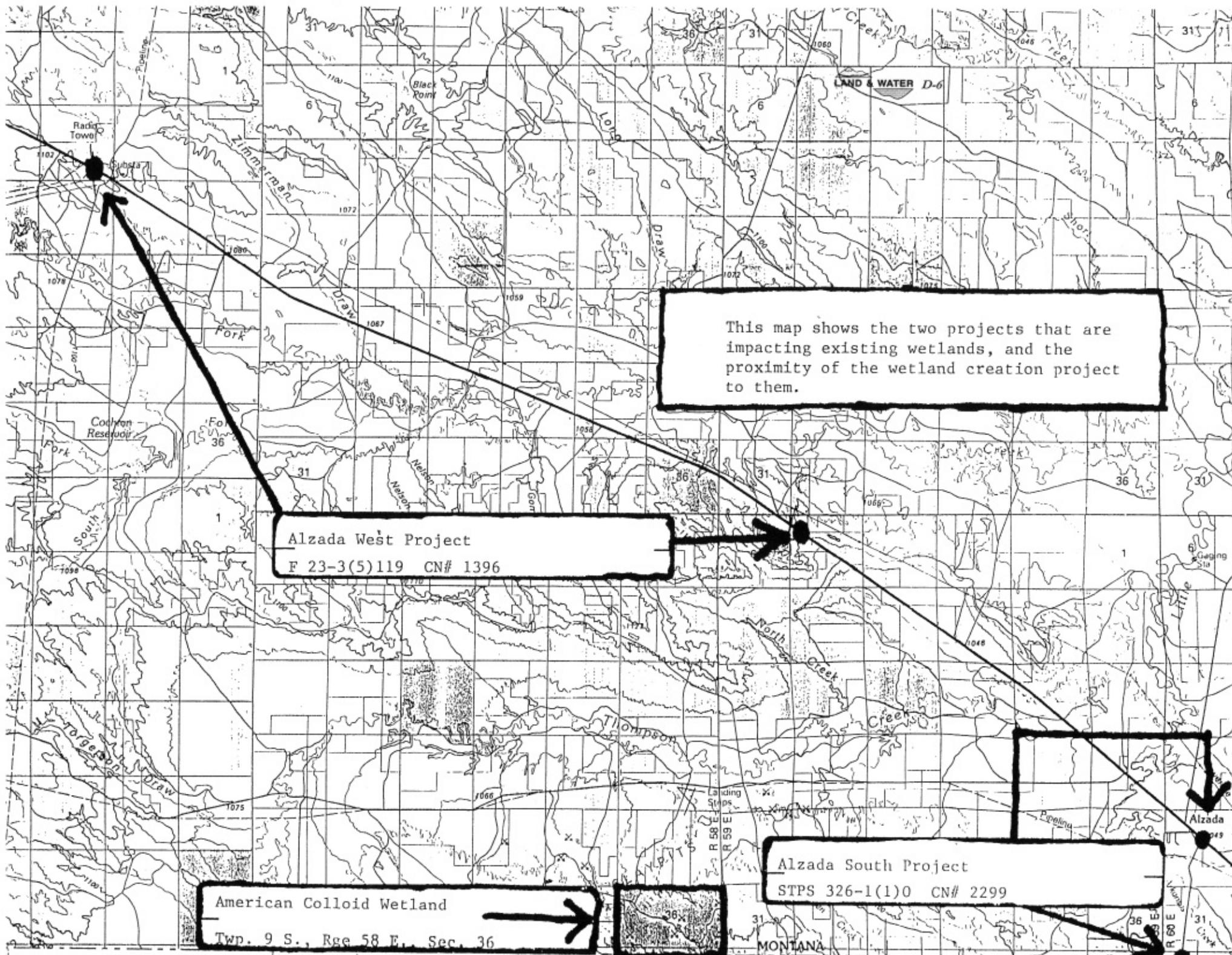
The estimated cost to construct this project is \$15,500. This estimate includes Preliminary Engineering, Acquisition of Right-of-Way, and Construction costs. As soon as more information is available a modification to the programming will be made.

Attachment

GJS:DSA

Distribution:

C.S. Piel - Preconstruction  
M. Johnson - Glendive District  
K.H. Neumiller - Materials  
T.E. Martin - Right of Way  
J.M. Marshik - Environmental  
K.M. Helvik - Environmental  
R.E. Williams - Road Design  
B.F. Juvan - Project Management  
P. Saindon - Planning  
D.W. Jensen - Planning  
J.J. Moran - Geotechnical  
D. Paulson - FHWA  
Environmental File  
Mark A. Wissinger - Contract Plans Supervisor



This map shows the two projects that are impacting existing wetlands, and the proximity of the wetland creation project to them.

Alzada West Project  
F 23-3(5)119 CN# 1396

Alzada South Project  
STPS 326-1(1)0 CN# 2299

American Colloid Wetland  
Twp. 9 S., Rge 58 E., Sec. 36



MONTANA

This map shows the specific location of the wetland creation project within Government Lots 7, 10, and 11; in Section 36, Township 9 South, Range 58 East in Carter County, Montana.



MONTANA DEPARTMENT OF TRANSPORTATION  
HELENA, MONTANA 59620-1001

DATE ISSUED: July 18, 2001

ADDENDUM

For the Following Project  
To Be Let On

July 26, 2001

- 6. NH-STPS-BR 6(10)  
Watershed 16 – Wetland Mitigation

ADDENDUM NO. 1

ATTACHMENT NO. 1- Revised Schedule of Items, deleting item 203 100 000  
Unclassified Excavation, and adding new item  
203 300 000 Embankment In Place 2,115.0 M3.

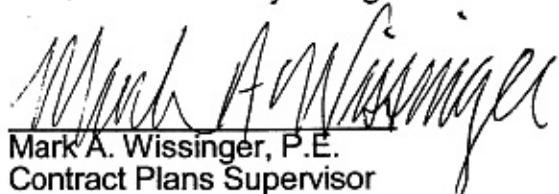
ATTACHMENT NO. 2- Revised Special Provision 6, Dike Embankment.

ATTACHMENT NO. 3- Revised Plan Sheet 3, revision of Grading Frame.

**INSTRUCTIONS – READ CAREFULLY**

Load the electronic amendment file while in the opened project file to apply the addendum. In order to be responsive, the Schedule of Items printout on projects with addendums must show the addendum(s) applied at the bottom of each page.

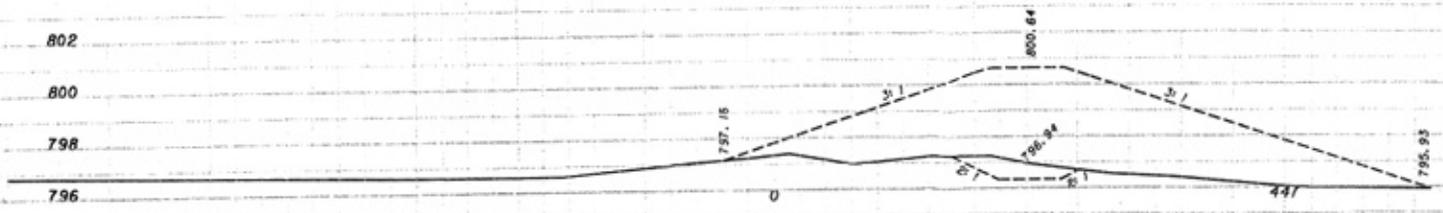
Revised documents supersede and replace the documents you now have. New documents supplement the documents you now have. Make the necessary changes in your bidding documents.

  
 Mark A. Wissinger, P.E.  
 Contract Plans Supervisor

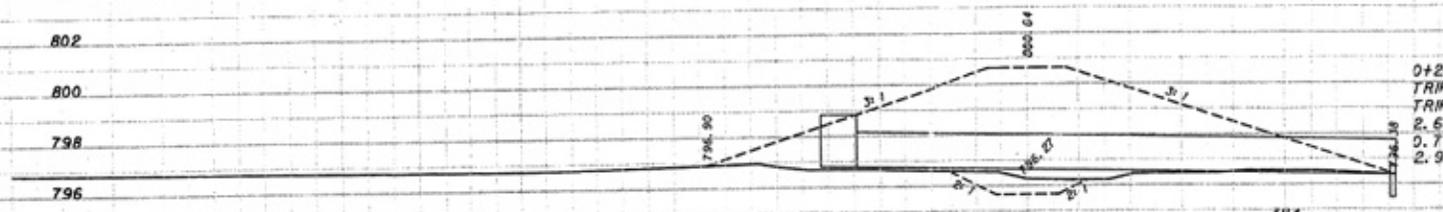
STATE	PROJECT NO.	SHEET NO.
MONTANA	WH-STPS-BR 6(10)	1

EXCAVATION  
cubic meters

EMBANKMENT  
cubic meters

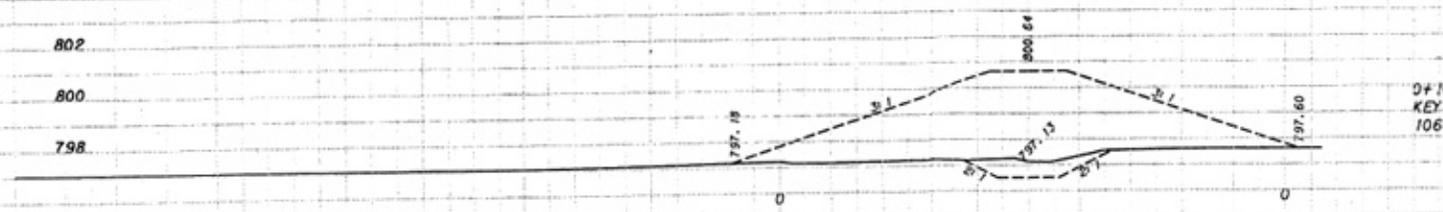


0+30.00



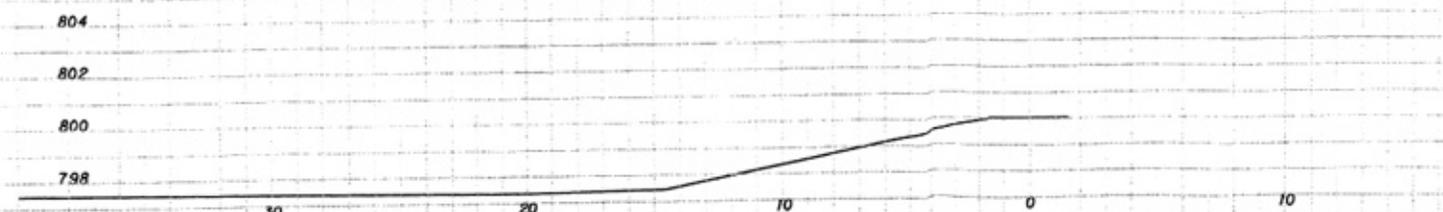
0+20.00

0+20  
TRIPLE 1350 mm x 63.0 m CSP  
TRIPLE 1350 mm x 5.5 m CSP RISER LT  
2.5 m<sup>3</sup> CL DD CONC CUTOFF WALL  
0.7 m<sup>3</sup> CL DD CONC BASE  
2.9 m COVER



0+10.00

0+10.00 TO 0+50.00  
KEY  
106 m<sup>3</sup> ADD EXC.



0+00.00  
BEGIN DAM

30 20 10 0 10 20 30

# TABLE OF CONTENTS

# NOTES

<u>ROAD PLANS</u>	<u>SHEET NO.</u>
TITLE SHEET	1
TABLE OF CONTENTS	2
NOTES	2
SUMMARIES	3
GRADING	3
FENCING	3
TOPSOIL & SEEDING	3
CUVERTS	3
DETAILS	4
DAM SIDE VIEW	4
DAM END VIEW	4
CONCRETE BASE	4
PLAN & PROFILE	5
CROSS SECTIONS	1-2

## PROPERTY CORNER

THE PROPERTY CORNER LOCATED WITHIN THE EASEMENT WILL BE REMOVED AND RESET BY STATE FORCES.

## BACKSLOPE

GRADE AND SHAPE BACKSLOPES OF THE WETLAND SITE TO 4:1 AS DIRECTED BY THE ENGINEER. THE COST OF THE BACKSLOPE WORK IS INCLUDED IN THE OTHER GRADING ON THE PROJECT.

## CLEARING AND GRUBBING

CLEAR AND GRUB TO CONSTRUCTION LIMITS. INCLUDE THE COST OF CLEARING AND GRUBBING IN OTHER ITEMS.



1396 v d \table.dgn

5-08-2007	DESIGNED BY	L. ZEGLER
5-08-2007	DRAWN BY	L. ZEGLER
5-08-2007	APPROVED BY	P. FERRY
5-08-2007	REVISIONS	

# SUMMARY



GRADING			
STATION	cubic meters		REMARKS
	EXCAVATION	EMB. IN PLACE	
0+10.00	106		KEY
0+50.00			
0+00.00			
0+57.50		2006 DAM 109 TOPSOIL REPLACEMENT	
TOTAL	* 106	2115	

\* FOR INFORMATION ONLY

FENCING								
STATION*		meters		EACH		meters		REMARKS
		TYPE FSM		SINGLE PANEL	DOUBLE PANEL	GATES		
FROM	TO							
		1 043		4	4		9.6	
TOTAL		1 043		4	4		9.6	

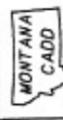
\* REFERENCE TO SURVEYED EASEMENT

TOPSOIL & SEEDING*										
STATION		cubic meters	hectares						CONDITION SEEDBED	REMARKS
			SEED			FERTILIZER				
FROM	TO	TOPSOIL SALVAGING & PLACING	NO. 1	NO. 2	NO. 3	NO. 1	NO. 2	NO. 3		
0+00.00	0+57.50	109	1			1			1	DAM
TOTAL		109	1			1			1	

\* SEEDING WILL BE HAND BROADCAST

CULVERTS													
STATION	meters	END SECTIONS		cubic meters				meters		HEIGHT OF COVER IN meters	EACH	IN PLACE mm X m	REMARKS
	CSP	LEFT	RIGHT	CULVERT EXCAVATION	BEDDING MATERIAL	CLASS "DD" CONCRETE	CULVERT RIPRAP CLASS	REMOVE	RELAY		CLEAN CULVERT		
	1350 mm												
0+20	68.5		SO.	100		3.3				2.9		TRIPLE 1350 mm x 5.5 m CSP RISER LT	
TOTAL	68.5	~	~	100		3.3		~		~			

MONTANA DEPARTMENT OF TRANSPORTATION



1396\RD\wetsu1.dgn

DESIGNED BY L. ZEIGLER  
 DRAWN BY L. ZEIGLER  
 APPROVED BY P. FERRY  
 5-08-2001  
 5-08-2001  
 5-08-2001  
 U P S - 06564 REVISED BY





## **Appendix E**

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### **BIRD SURVEY PROTOCOL GPS PROTOCOL**

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*MDT Wetland Mitigation Monitoring  
American Colloid Mitigation Site  
Alzada, Montana*

## **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.

## **Appendix F**

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### **2006 MACROINVERTEBRATE SAMPLING PROTOCOL AND DATA**

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*MDT Wetland Mitigation Monitoring  
American Colloid Mitigation Site  
Alzada, Montana*

# **MDT Mitigated Wetland Monitoring Project: Aquatic Invertebrate Monitoring**

**Summary 2001 – 2006**

Prepared for PBS&J, Inc.

Prepared by W.Bollman, Rhithron Associates, Inc.

## **INTRODUCTION**

Among other monitoring activities, aquatic invertebrate assemblages were collected at a number of mitigated wetlands throughout Montana. This report summarizes data generated from six years of collection. Over all years of sampling, a total of 182 invertebrate samples were collected. Table 2 summarizes sites and sampling years.

## **METHODS**

### **Sample processing**

Aquatic invertebrate samples were collected at mitigated wetland sites in the summer months of 2001, 2002, 2003, 2004, 2005 and 2006 by personnel of PBS&J, Inc. Sampling procedures utilized were based on the protocols developed by the Montana Department of Environmental Quality (MT DEQ). Sampling consisted of D-frame net sweeps through emergent vegetation (when present), the water column, and over the water surface, and included disturbing and scraping substrates at each sampled site. These sample components were composited and preserved in ethanol at each wetland site. Samples were delivered to Rhithron Associates, Inc. for processing, taxonomic determinations, and data analysis.

At Rhithron's laboratory, Caton subsamplers and stereomicroscopes with 10X magnification were used to randomly select a minimum of 100 organisms from each sample. In some instances, the entire sample contained fewer than 100 organisms; in these cases, all organisms from the sample were taken. Animals were identified to lowest practical taxonomic levels using relevant published resources. Quality control (QC) procedures were applied to sample sorting, taxonomic determinations and enumeration, and data entry. QC statistics are presented in Table 3. The identified samples have been archived at Rhithron's laboratory.

### **Assessment**

The method employed to assess these wetlands is based on an index incorporating a battery of 12 bioassessment metrics or attributes (Table 1) tested and recommended by Stribling et al. (1995) in a report to the Montana Department of Health and Environmental Science. In that study, it was determined that some of the metrics were of limited use in some geographic regions, and for some wetland types. Despite that finding, all 12 metrics are used in this evaluation of mitigated wetlands, since detailed geographic information and wetland classifications were unavailable.

Scoring criteria for metrics were developed by generally following the tactic used by Stribling et al. Boxplots were generated using a statistical software package (Statistica™), and distributions, median values, ranges, and quartiles for each metric were examined. All sites in all years of sampling were used. Camp Creek, which was sampled in 2002, 2003, 2004, 2005 and 2006, and Kleinschmidt Creek, sampled in 2003, 2004, 2005 and 2006, were assessed using the tested metric battery developed for montane streams of Western Montana (Bollman 1998). Invertebrate assemblages at these sites differed from those of the other sites, and suggested montane or foothill stream conditions rather than wetland conditions. For the wetland sites, "optimal" scores were generally those that fell above the 75<sup>th</sup> percentile (for those metrics that decrease in value in response to stress) or below the 25<sup>th</sup> percentile (for metrics that respond to stress by an increase in value) of all scores. Additional scoring ranges were established by bisecting the range below the 75<sup>th</sup> percentile for decreasing scores (or above the 25<sup>th</sup> percentile for increasing scores) into "sub-optimal" and "poor" assessment categories. A score of 5, 3, or 1 was assigned to optimal, sub-optimal, and poor metric performance, respectively. In this way, metric values were translated into normalized metric scores, and scores for all metrics were summed to produce a total bioassessment score. Total bioassessment scores were classified according to a similar process, using the ranges and distributions of total scores for all sites studied in all years.

The purpose of constructing an index from biological attributes or metrics is to provide a means of integrating information to facilitate the determination of whether management action is needed. The nature of the action needed is not determined solely by the index score, however, but by consideration of an analysis of the component metrics, the taxonomic composition of the assemblages, and other issues. The diagnostic functions of the metrics and taxonomic data need more study since our understanding of the interrelationships of natural environmental factors and anthropogenic disturbances is tentative. Thus, the further interpretive remarks accompanying the raw taxonomic and metric data in this summary are offered cautiously. Year-to-year comparisons depend on an assumption that specific sites were revisited in each year, and that equivalent sampling methods were utilized at each site revisit.

### **Bioassessment metrics**

An index based on the performance of 12 metrics was constructed, as described above. Table 2 lists those metrics, describes their calculation and the expected response of each to increased degradation or impairment of the wetland.

In addition to the summed scores of each metric and the associated impairment classification described above, each individual metric informs the bioassessment to some degree. The four richness metrics (Total taxa, POET, Chironomidae taxa, and Crustacea taxa + Mollusca taxa) can be interpreted to express habitat complexity as well as water quality. Complex, diverse habitats consist of variable substrates, emergent vegetation, variable water depths and other factors, and are potential features of long-established stable wetlands with minimal human disturbance. In the study conducted by Stribling et al. (1995), all four richness metrics were found to be significantly associated with water quality parameters including conductance, salinity, and total dissolved solids.

Four composition metrics (%Chironomidae, %Orthoclaadiinae of Chironomidae, %Crustacea + %Mollusca, and %Amphipoda) measure the relative contributions of certain taxonomic groups that may have significant responses to habitat and/or water quality impacts. For example, amphipods have been demonstrated to increase in abundance in alkaline conditions. Short-lived, relatively mobile taxa such as chironomids dominate ephemeral environments; many are hemoglobin-bearers capable of tolerating de-oxygenated conditions.

Two tolerance metrics (the Hilsenhoff Biotic Index and %Dominant taxon) were included in the bioassessment battery. The HBI indicates the overall invertebrate assemblage tolerance to nutrient enrichment, warm water, and/or low dissolved oxygen conditions. The percent abundance of the dominant taxon has been demonstrated to be strongly associated with pH, conductance, salinity, total organic carbon, and total dissolved solids.

Two trophic measures (%Collector-gatherers and %Filterers) may be helpful in expressing functional integrity of the invertebrate assemblage, which can be impacted by poor water quality or habitat degradation. High proportions of filtering organisms suggest nutrient and/or organic enrichment, while abundant collectors suggest more positive functional conditions and well-developed wetland morphology. These organisms graze periphyton growing on stable surfaces such as macrophytes.

Metric scoring criteria were re-examined each year as new data was added. For 2005, all 151 records were utilized. Ranges of individual metrics, as well as median metric values remained remarkably consistent over all 5 years of analysis. Since metric value distributions changed insignificantly with the addition of the 2006 data, no changes were made to scoring criteria this year. Summary metric values and scores for the 2006 samples are given in Tables 3a-3d.

### **Quality control**

Quality control procedures for initial sample processing and subsampling involved checking sorting efficiency. These checks were conducted on 100% of the samples by independent technicians who microscopically re-examined 20% of sorted substrate from each sample. All organisms that were missed were counted and this number was added to the total number obtained in the original sort. Sorting efficiency was evaluated by applying the following calculation:

$$SE = \frac{n_1}{n_2} \times 100$$

Where: SE is the sorting efficiency, expressed as a percentage,  $n_1$  is the total number of specimens in the first sort, and  $n_2$  is the total number of specimens in the first and second sorts combined.

Quality control procedures for taxonomic determinations involved checking accuracy, precision and enumeration. Four samples were randomly selected and all organisms re-identified by independent taxonomists. A Bray-Curtis similarity statistic (Bray and Curtis 1957) was generated to evaluate identifications.

**Table 1.** Montana Department of Transportation Mitigated Wetlands Monitoring Project sites. 2001 – 2006.

Site identifier	2001	2002	2003	2004	2005	2006
Beaverhead 1	+	+	+	+	+	+
Beaverhead 2	+	+				
Beaverhead 3	+	+		+	+	+
Beaverhead 4	+	+	+			
Beaverhead 5	+	+	+	+	+	+
Beaverhead 6	+	+	+	+	+	+
Big Sandy 1	+					
Big Sandy 2	+					
Big Sandy 3	+					
Big Sandy 4	+					
Johnson-Valier	+					
VIDA	+					
Cow Coulee	+	+	+			
Fourchette – Puffin	+	+	+	+		
Fourchette – Flashlight	+	+	+	+		
Fourchette – Penguin	+	+	+	+		
Fourchette – Albatross	+	+	+	+		
Big Spring	+	+	+	+	+	
Vince Ames	+					
Ryegate	+					
Lavinia	+					
Stillwater	+	+	+	+	+	
Roundup	+	+	+	+	+	+
Wigeon	+	+	+	+	+	+
Ridgeway	+	+	+	+	+	+
Musgrave – Rest. 1	+	+	+	+	+	+
Musgrave – Rest. 2	+	+	+	+	+	+
Musgrave – Enh. 1	+	+	+	+	+	+
Musgrave – Enh. 2	+					+
Hoskins Landing		+	+	+	+	
Hoskins Landing						
Peterson - 1		+	+	+	+	+
Peterson – 2		+		+	+	+
Peterson – 4		+	+	+	+	+
Peterson – 5		+	+	+	+	+
Jack Johnson - main		+	+			
Jack Johnson - SW		+	+			
Creston		+	+	+	+	
Lawrence Park		+				
Perry Ranch		+			+	
SF Smith River		+	+	+	+	+
Camp Creek		+	+	+	+	+
Camp Creek						+
Kleinschmidt		+	+	+	+	+
Kleinschmidt – stream			+	+	+	+
Ringling - Galt			+			
Circle				+		
Cloud Ranch Pond				+	+	
Cloud Ranch Stream				+		
American Colloid				+	+	+
Jack Creek				+	+	
Jack Creek						
Norem				+	+	+
Rock Creek Ranch					+	+
Wagner Marsh					+	+
Alkali Lake 1						+
Alkali Lake 2						+

**Table 2.** Aquatic invertebrate metrics employed in the MTDT mitigated wetland monitoring study, 2001- 2005.

<b>Metric</b>	<b>Metric calculation</b>	<b>Expected response to degradation or impairment</b>
Total taxa	Count of unique taxa identified to lowest recommended taxonomic level	Decrease
POET	Count of unique Plecoptera, Trichoptera, Ephemeroptera, and Odonata taxa identified to lowest recommended taxonomic level	Decrease
Chironomidae taxa	Count of unique midge taxa identified to lowest recommended taxonomic level	Decrease
Crustacea taxa + Mollusca taxa	Count of unique Crustacea taxa and Mollusca taxa identified to lowest recommended taxonomic level	Decrease
% Chironomidae	Percent abundance of midges in the subsample	Increase
Orthocladiinae/Chironomidae	Number of individual midges in the sub-family Orthocladiinae / total number of midges in the subsample.	Decrease
% Amphipoda	Percent abundance of amphipods in the subsample	Increase
% Crustacea + % Mollusca	Percent abundance of crustaceans in the subsample plus percent abundance of molluscs in the subsample	Increase
HBI	Relative abundance of each taxon multiplied by that taxon's modified Hilsenhoff Biotic Index (tolerance) value. These numbers are summed over all taxa in the subsample.	Increase
% Dominant taxon	Percent abundance of the most abundant taxon in the subsample	Increase
% Collector-Gatherers	Percent abundance of organisms in the collector-gatherer functional group	Decrease
% Filterers	Percent abundance of organisms in the filterer functional group	Increase

## RESULTS

(Note: Individual site discussions were removed from this report by PBS&J and are included in the macroinvertebrate sections of individual monitoring reports. Summary tables (4a – 4d) are provided on the following pages.)

### Quality Assurance

Table 3 gives the results of quality assurance procedures for sample sorting and taxonomic determinations and enumeration.

**Table 3.** Results of quality control procedures for subsampling and taxonomy.

Sample ID	Site name	SE	Bray-Curtis similarity
MDT06PBSJ001	MUSGRAVE LAKE ES-1	91.67%	
MDT06PBSJ002	MUSGRAVE LAKE ES-2	94.44%	
MDT06PBSJ003	MUSGRAVE LAKE RS-1	87.30%	
MDT06PBSJ004	MUSGRAVE LAKE RS-2	100.00%	
MDT06PBSJ005	ROCK CREEK RANCH	96.49%	95.25%
MDT06PBSJ006	Alkali Lake Sample 1	100.00%	
MDT06PBSJ007	Alkali Lake Sample 2	100.00%	
MDT06PBSJ008	Peterson Ranch Pond # 4	100.00%	
MDT06PBSJ009	Peterson Ranch Pond # 1	97.35%	
MDT06PBSJ010	Peterson Ranch Pond # 5	91.67%	
MDT06PBSJ011	South Fork Smith River	100.00%	
MDT06PBSJ012	Beaverhead 1	100.00%	
MDT06PBSJ013	Beaverhead 3	95.65%	
MDT06PBSJ014	Beaverhead 5	100.00%	
MDT06PBSJ015	Beaverhead 6	94.12%	98.38%
MDT06PBSJ016	Peterson Ranch Pond # 2	91.67%	99.66%
MDT06PBSJ017	American Colloid	100.00%	
MDT06PBSJ018	Norem	100.00%	
MDT06PBSJ019	Cloud Ranch	85.56%	98.89%
MDT06PBSJ020	Jack Creek Pond	100.00%	
MDT06PBSJ021	Jack Creek Stream	100.00%	
MDT06PBSJ022	Camp Creek 1	99.10%	
MDT06PBSJ023	Camp Creek 2	100.00%	
MDT06PBSJ024	Kleinschmidt Pond	100.00%	
MDT06PBSJ025	Kleinschmidt Stream	96.49%	
MDT06PBSJ026	Hoskins Landing 1	97.35%	
MDT06PBSJ027	Hoskins Landing 2	96.49%	
MDT06PBSJ028	Wagner Marsh	100.00%	
MDT06PBSJ029	Wigeon Reservoir	100.00%	
MDT06PBSJ030	Ridgeway	98.21%	
MDT06PBSJ031	Roundup	100.00%	

**Table 4a.** Metric values and scores for Montana Department of Transportation mitigated wetland sites. 2006.

	BEAVERHEAD #1	BEAVERHEAD #3	BEAVERHEAD #5	BEAVERHEAD #6	ROUNDUP	WIDGEON	RIDGEWAY	MUSGRAVE RS-1
Total taxa	12	11	4	15	11	11	21	23
POET	1	0	1	3	2	1	3	4
Chironomidae taxa	5	3	1	7	4	3	10	7
Crustacea + Mollusca	1	4	2	3	2	2	5	7
% Chironomidae	52.38%	25.22%	0.69%	63.06%	18.87%	6.42%	37.25%	9.62%
Orthoclaadiinae/Chir	0.181818	0.965517	0	0.142857	0.2	0.285714	0.289474	0.7
% Amphipoda	0.00%	0.00%	0.00%	0.90%	0.00%	6.42%	11.76%	1.92%
%Crustacea + %Mollusca	9.52%	69.57%	98.62%	3.60%	73.58%	79.82%	45.10%	51.92%
HBI	7.857143	7.773913	7.97931	7.243243	8.09434	8.100917	7.127451	7.403846
%Dominant taxon	33.33%	39.13%	97.93%	27.93%	72.64%	73.39%	28.43%	23.08%
%Collector-Gatherers	61.90%	68.70%	100.00%	84.68%	87.74%	6.42%	49.02%	47.12%
%Filterers	0.00%	2.61%	0.00%	1.80%	0.00%	0.00%	0.00%	4.81%
Total taxa	1	1	1	3	1	1	5	5
POET	1	1	1	3	1	1	3	5
Chironomidae taxa	3	3	1	5	3	3	5	5
Crustacea + Mollusca	1	3	1	1	1	1	3	5
% Chironomidae	1	3	5	1	3	5	3	5
Orthoclaadiinae/Chir	1	5	1	1	3	3	3	5
% Amphipoda	5	5	5	5	5	3	3	5
%Crustacea + %Mollusca	5	1	1	5	1	1	3	3
HBI	1	1	1	3	1	1	3	3
%Dominant taxon	5	3	1	5	1	1	5	5
%Collector-Gatherers	3	3	5	5	5	1	3	3
%Filterers	3	3	3	3	3	3	3	3
<b>Total score</b>	30	32	26	40	28	24	42	52
<b>Percent of maximum score</b>	0.5	0.533333	0.433333	0.666667	0.466667	0.4	0.7	0.866667
<b>Impairment classification</b>	poor	poor	poor	sub-optimal	poor	poor	optimal	optimal

**Table 4b.** Metric values and scores for Montana Department of Transportation mitigated wetland sites. 2006.

	MUSGRAVE RS- 2	MUSGRAVE ES- 1	MUSGRAVE ES- 2	HOSKINS LANDING 1	HOSKINS LANDING 2	PETERSON RANCH 1	PETERSON RANCH 2	PETERSON RANCH 4	PETERSON RANCH 5
<b>Total taxa</b>	10	21	10	22	29	19	17	28	26
POET	1	2	1	5	4	2	2	3	4
Chironomidae taxa	2	7	4	6	6	7	4	13	9
Crustacea + Mollusca	3	6	0	5	9	5	6	5	6
% Chironomidae	3.96%	10.89%	10.00%	18.18%	11.71%	64.08%	7.48%	27.52%	14.29%
Orthoclaadiinae/Chir	0	0.181818	0.125	0.055556	0.307692	0.757576	0.75	0.6	0.75
% Amphipoda	0.00%	2.97%	0.00%	5.05%	1.80%	1.94%	22.43%	2.75%	15.18%
% Crustacea + % Mollusca	8.91%	75.25%	0.00%	20.20%	23.42%	8.74%	42.06%	19.27%	40.18%
HBI	6.326733	6.940594	6	7.111111	7.585586	6.631068	6.719626	7.293578	7.321429
% Dominant taxon	70.30%	38.61%	83.75%	25.25%	42.34%	47.57%	28.04%	20.18%	16.07%
% Collector-Gatherers	15.84%	8.91%	3.75%	64.65%	62.16%	72.82%	31.78%	34.86%	50.89%
% Filterers	0.00%	0.00%	0.00%	6.06%	5.41%	3.88%	3.74%	8.26%	0.89%
<b>Total taxa</b>	1	5	1	5	5	3	3	5	5
POET	1	1	1	5	5	1	1	3	5
Chironomidae taxa	1	5	3	3	3	5	3	5	5
Crustacea + Mollusca	1	5	1	3	5	3	5	3	5
% Chironomidae	5	5	5	3	5	1	5	3	5
Orthoclaadiinae/Chir	1	1	1	1	3	5	5	5	5
% Amphipoda	5	5	5	3	5	5	3	5	3
% Crustacea + % Mollusca	5	1	5	5	5	5	3	5	3
HBI	5	3	5	3	3	5	5	3	3
% Dominant taxon	1	3	1	5	3	3	5	5	5
% Collector-Gatherers	1	1	1	3	3	3	1	1	3
% Filterers	3	3	3	1	3	3	3	1	3
<b>Total score</b>	30	38	32	40	48	42	42	44	50
<b>Percent of maximum score</b>	0.5	0.633333	0.533333	0.666667	0.8	0.7	0.7	0.733333	0.833333
<b>Impairment classification</b>	<b>poor</b>	<b>sub-optimal</b>	<b>poor</b>	<b>sub-optimal</b>	<b>optimal</b>	<b>optimal</b>	<b>optimal</b>	<b>optimal</b>	<b>optimal</b>

**Table 4c.** Metric values and scores for Montana Department of Transportation mitigated wetland sites. 2006.

	<b>SOUTH FORK SMITH RIVER</b>	<b>CAMP CREEK 1*</b>	<b>CAMP CREEK 2*</b>	<b>KLEINSC HMDT POND</b>	<b>KLEINSC HMDT STREAM *</b>	<b>CLOUD RANCH</b>	<b>COLLOID</b>	<b>JACK CREEK POND</b>	<b>JACK CREEK STREAM</b>
Total taxa	14	31	29	20	22	13	7	7	5
POET	4	8	8	5	1	1	2	0	0
Chironomidae taxa	3	10	8	6	8	6	4	4	0
Crustacea + Mollusca	4	1	3	2	5	3	0	2	2
% Chironomidae	18.02%	45.87%	16.07%	8.04%	77.68%	23.81%	84.21%	75.00%	0.00%
Orthoclaadiinae/Chir	0.05	0.26	0.277778	0.222222	0.448276	0.65	0.25	0.555556	0
% Amphipoda	18.02%	0.00%	0.00%	25.00%	0.00%	4.76%	0.00%	0.00%	5.00%
% Crustacea + % Mollusca	58.56%	0.92%	3.57%	25.89%	5.36%	11.90%	0.00%	16.67%	7.50%
HBI	7.540541	4.504587	4.294643	7.241071	5.928571	7.535714	6.315789	8.833333	7.325
% Dominant taxon	25.23%	24.77%	37.50%	25.00%	33.93%	36.90%	52.63%	33.33%	60.00%
% Collector-Gatherers	41.44%	48.62%	31.25%	62.50%	46.43%	64.29%	21.05%	58.33%	67.50%
% Filterers	15.32%	6.42%	7.14%	3.57%	38.39%	2.38%	0.00%	0.00%	0.00%
Total taxa	1	5	5	3	5	1	1	1	1
POET	5	5	5	5	1	1	1	1	1
Chironomidae taxa	3	5	5	3	5	3	3	3	1
Crustacea + Mollusca	3	1	1	1	3	1	1	1	1
% Chironomidae	3	1	5	5	1	3	1	1	5
Orthoclaadiinae/Chir	1	3	3	3	3	5	3	5	1
% Amphipoda	3	5	5	1	5	3	5	5	3
% Crustacea + % Mollusca	3	5	5	5	5	5	5	5	5
HBI	3	5	5	3	5	3	5	1	3
% Dominant taxon	5	5	3	5	5	3	1	5	1
% Collector-Gatherers	1	3	1	3	3	3	1	3	3
% Filterers	1	1	1	3	1	3	3	3	3
<b>Total score</b>	32	44	44	40	42	34	30	34	28
<b>Percent of maximum score</b>	0.533333	0.733333	0.733333	0.666667	0.7	0.566667	0.5	0.566667	0.466667
<b>Impairment classification</b>	<b>poor</b>	<i>optimal</i>	<i>optimal</i>	<i>sub-optimal</i>	<i>optimal</i>	<i>sub-optimal</i>	<b>poor</b>	<i>sub-optimal</i>	<b>poor</b>

\*Sites indicated by asterisks were dominated by lotic fauna, and were evaluated with the MDEQ index for streams in the text and charts. Scores and impairment classifications in this table (italicized) are included only for completeness and are not reliable indications of conditions at these sites. See text.

**Table 4d.** Metric values and scores for Montana Department of Transportation mitigated wetland sites. 2006.

	NOREM	ROCK CREEK RANCH	WAGNER MARSH	ALKALI LAKE 1	ALKALI LAKE 2
Total taxa	6	15	11	6	5
POET	1	0	0	0	0
Chironomidae taxa	2	4	4	3	0
Crustacea + Mollusca	1	4	3	1	1
% Chironomidae	82.93%	8.40%	13.51%	42.86%	0.00%
Orthoclaadiinae/Chir	0	0.2	0.6	0.666667	0
% Amphipoda	0.00%	0.00%	0.00%	0.00%	0.00%
%Crustacea + %Mollusca	7.32%	65.55%	23.42%	7.14%	9.52%
HBI	7.317073	7.638655	7.036036	7.785714	7.904762
%Dominant taxon	65.85%	47.06%	45.95%	42.86%	52.38%
%Collector-Gatherers	68.29%	56.30%	47.75%	28.57%	9.52%
%Filterers	17.07%	0.00%	0.90%	0.00%	0.00%
Total taxa	1	3	1	1	1
POET	1	1	1	1	1
Chironomidae taxa	1	3	3	3	1
Crustacea + Mollusca	1	3	1	1	1
% Chironomidae	1	5	5	1	5
Orthoclaadiinae/Chir	1	3	5	5	1
% Amphipoda	5	5	5	5	5
%Crustacea + %Mollusca	5	1	5	5	5
HBI	3	1	3	1	1
%Dominant taxon	1	3	3	3	1
%Collector-Gatherers	3	3	3	1	1
%Filterers	1	3	3	3	3
<b>Total score</b>	24	34	38	30	26
<b>Percent of maximum score</b>	0.4	0.566667	0.633333	0.5	0.433333
<b>Impairment classification</b>	<b>poor</b>	<b>sub-optimal</b>	<b>sub-optimal</b>	<b>poor</b>	<b>poor</b>

## Literature cited

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McCune, B. and J.B. Grace. 2002. Analysis of Ecological Communities. MjM Software Design, Gleneden Beach, Oregon, USA.

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Stribling, J.B., J. Lathrop-Davis, M.T. Barbour, J.S. White, and E.W. Leppo. 1995. Evaluation of environmental indicators for the wetlands of Montana: the multimetric approach using benthic macroinvertebrates. Report to the Montana Department of Health and Environmental Science. Helena, Montana.

# Taxa Listing

Project ID: MDT06PBSJ  
RAI No.: MDT06PBSJ017

RAI No.: MDT06PBSJ017

Sta. Name: American Colloid

Client ID:

Date Coll.:

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
<b>Ephemeroptera</b>							
Caenidae							
<i>Caenis</i> sp.	1	5.26%	Yes	Larva		7	CG
<b>Trichoptera</b>							
Leptoceridae							
Leptoceridae	1	5.26%	Yes	Larva	Early Instar	4	CG
<b>Coleoptera</b>							
Hydraenidae							
<i>Ochthebius</i> sp.	1	5.26%	Yes	Adult		4	SC
<b>Chironomidae</b>							
Chironomidae							
<i>Cricotopus trifascia</i>	1	5.26%	Yes	Larva		7	SH
<i>Dicrotendipes</i> sp.	2	10.53%	Yes	Larva		8	CG
<i>Phaenopsectra</i> sp.	3	15.79%	Yes	Larva		7	SC
<i>Polypedilum</i> sp.	10	52.63%	Yes	Larva		6	SH
Sample Count	19						

# Metrics Report

Project ID: MDT06PBSJ  
 RAI No.: MDT06PBSJ017  
 Sta. Name: American Colloid  
 Client ID:  
 STORET ID:  
 Coll. Date:

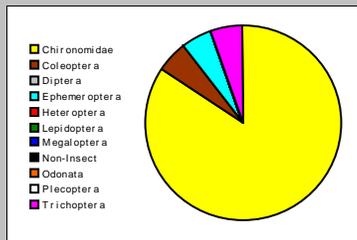
## Abundance Measures

Sample Count: 19  
 Sample Abundance: 19.00 100.00% of sample used

Coll. Procedure:  
 Sample Notes:

## Taxonomic Composition

Category	R	A	PRA
Non-Insect			
Odonata			
Ephemeroptera	1	1	5.26%
Plecoptera			
Heteroptera			
Megaloptera			
Trichoptera	1	1	5.26%
Lepidoptera			
Coleoptera	1	1	5.26%
Diptera			
Chironomidae	4	16	84.21%

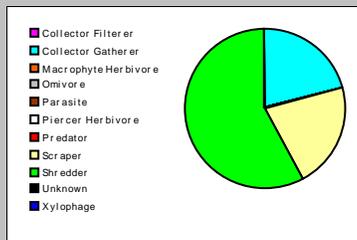


## Dominant Taxa

Category	A	PRA
Polypedium	10	52.63%
Phaenopsectra	3	15.79%
Dicrotendipes	2	10.53%
Ochthebius	1	5.26%
Leptoceridae	1	5.26%
Cricotopus trifascia	1	5.26%
Caenis	1	5.26%

## Functional Composition

Category	R	A	PRA
Predator			
Parasite			
Collector Gatherer	3	4	21.05%
Collector Filterer			
Macrophyte Herbivore			
Piercer Herbivore			
Xylophage			
Scraper	2	4	21.05%
Shredder	2	11	57.89%
Omnivore			
Unknown			



## Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
<i>Composition</i>					
Taxa Richness	7	1	0		0
Non-Insect Percent	0.00%				
E Richness	1	1		0	
P Richness	0	1		0	
T Richness	1	1		0	
EPT Richness	2		0		0
EPT Percent	10.53%		1		0
Oligochaeta+Hirudinea Percent					
Baetidae/Ephemeroptera	0.000				
Hydropsychidae/Trichoptera	0.000				
<i>Dominance</i>					
Dominant Taxon Percent	52.63%		1		0
Dominant Taxa (2) Percent	68.42%				
Dominant Taxa (3) Percent	78.95%	1			
Dominant Taxa (10) Percent	100.00%				
<i>Diversity</i>					
Shannon H (loge)	1.486				
Shannon H (log2)	2.144		1		
Margalef D	2.038				
Simpson D	0.287				
Evenness	0.145				
<i>Function</i>					
Predator Richness	0		0		
Predator Percent	0.00%	1			
Filterer Richness	0				
Filterer Percent	0.00%			3	
Collector Percent	21.05%		3		3
Scraper+Shredder Percent	78.95%		3		3
Scraper/Filterer	0.000				
Scraper/Scraper+Filterer	0.000				
<i>Habit</i>					
Burrower Richness	1				
Burrower Percent	10.53%				
Swimmer Richness	0				
Swimmer Percent	0.00%				
Clinger Richness	4	1			
Clinger Percent	78.95%				
<i>Characteristics</i>					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	3				
Hemoglobin Bearer Percent	78.95%				
Air Breather Richness	0				
Air Breather Percent	0.00%				
<i>Voltinism</i>					
Univoltine Richness	2				
Semivoltine Richness	1	1			
Multivoltine Percent	84.21%		0		
<i>Tolerance</i>					
Sediment Tolerant Richness	0				
Sediment Tolerant Percent	0.00%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	4.063				
Pollution Sensitive Richness	0				
Pollution Tolerant Percent	15.79%	1		0	
Hilsenhoff Biotic Index	6.263		1		0
Intolerant Percent	0.00%				
Supertolerant Percent	10.53%				
CTQa	99.000				

## Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	14	28.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	10	33.33%	Moderate
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	4	22.22%	Moderate
MTM	Montana DEQ Mountains (Bukantis 1998)	6	28.57%	Moderate

