MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2005

American Colloid Mitigation Site Alzada, Montana



Prepared for:

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

December 2005

Project No: B43054.00 - 0402

Prepared by:

LAND & WATER CONSULTING ~ A DIVISION OF PBS&J P.O. Box 239 Helena, MT 59624





MONTANA DEPARTMENT OF TRANSPORTATION

WETLAND MITIGATION MONITORING REPORT:

YEAR 2005

American Colloid Mitigation Site Alzada, Montana

Prepared for:

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

Prepared by:

LAND & WATER CONSULTING A DIVISION OF PBS&J P.O. Box 239 Helena, MT 59624

December 2005

Project No: B43054.00 - 0402





TABLE OF CONTENTS

| 1.0 | INTRODUCTION1 |
|-----|---------------------------------------|
| 2.0 | METHODS1 |
| | 2.1 Monitoring Dates and Activities1 |
| | 2.2 Hydrology1 |
| | 2.3 Vegetation |
| | 2.4 Soils |
| | 2.5 Wetland Delineation |
| | 2.6 Mammals, Reptiles and Amphibians |
| | 2.7 Birds |
| | 2.8 Macroinvertebrates |
| | 2.9 Functional Assessment |
| | 2.10 Photographs |
| | 2.11 GPS Data |
| | 2.12 Maintenance Needs4 |
| 3.0 | RESULTS4 |
| | 3.1 Hydrology |
| | 3.2 Vegetation |
| | 3.3 Soils7 |
| | 3.4 Wetland Delineation7 |
| | 3.5 Wildlife |
| | 3.6 Macroinvertebrates |
| | 3.7 Functional Assessment |
| | 3.8 Photographs |
| | 3.9 Maintenance Needs/Recommendations |
| | 3.10 Current Credit Summary |
| 4.0 | REFERENCES10 |

Front Page Photograph: Wetland vegetation colonization in stormwater inlet at H end of transect.





TABLES

| Table 1 | 2002-2005 American Colloid wetland mitigation vegetation species list. |
|---------|---|
| Table 2 | 2002-2005 transect data summary. |
| Table 3 | <i>Wildlife species observed at the American Colloid Mitigation Site from 2002-2005.</i> |
| Table 4 | Summary of 2002-2005 wetland function/value ratings and functional points at the American Colloid Wetland Mitigation Project. |

FIGURES

| Figure 1 | Project Site Location Map |
|----------|------------------------------------|
| Figure 2 | Monitoring Activity Locations 2005 |
| Figure 3 | Mapped Site Features 2005 |

CHARTS

| Chart 1 | Length of vegetation communities within Transect 1 during 2002 to 2005 |
|---------|--|
| Chart 2 | $Transect\ maps\ showing\ vegetation\ types\ from\ state\ (0\ feet)\ to\ the\ end\ of\ transect$ |
| | (228 feet in 2002; 290 feet in 2003-2005). |
| Chart 3 | Bioassessment scores from 2004-2005. |

APPENDICES

| Appendix A | Figures 2 - 3 |
|------------|---|
| Appendix B | 2005 Wetland Mitigation Site Monitoring Form |
| | 2005 Bird Survey Forms |
| | 2005 Wetland Delineation Forms |
| | 2005 Full Functional Assessment Forms |
| Appendix C | Representative Photographs |
| Appendix D | MDT Revised Preliminary Field Review Report |
| | MDT Addendum Attachments (Plan Sheets) |
| Appendix E | Bird Survey Protocol |
| | GPS Protocol |
| Appendix F | 2005 Macroinvertebrate Sampling Protocol and Data |





1.0 INTRODUCTION

This annual report summarizes methods and results from the fourth year of monitoring for 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, 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 25, 2005. 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 the year 2005 (January to June) were compared to the January through June 1948 - 2005 average (WRCC 2005).

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







2.3 Vegetation

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

The location of the transect is shown on **Figure 2**, **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 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**, **Appendix A**. Results are included in **Appendix F**.

2.9 Functional Assessment

A functional assessment form was completed in 2005 for the American Colloid mitigation site using the 1999 MDT Montana Wetland Assessment Method. 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, 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 2005.

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 11.5 inches of the outflow pipes remained above water level (see





photo page in **Appendix C**). During the July 25, 2005 visit the area of inundation represented 99% of the total delineation boundary or 4.19 acres.

Precipitation data for the Albion 1N station indicate that the yearly average (1948- March 2005) was 13.63 inches (WRCC 2005); through the month of June the historic average precipitation was 7.53 inches. During 2005, precipitation through the month of June was 6.68 inches or 86% of the historic average. The effects of the drought over the last five years may be decreasing.

3.2 Vegetation

Vegetation species identified within the wetland are presented in **Table 1** and in the monitoring form (**Appendix B**); **Table 2** and **Charts 1** and **2** illustrate transect data trends over time. The communities include: Type 1, *Grindelia squarrosa/ Chrysothamnus* spp. and Type 2, *Spartina pectinata*. Dominant species within each community are listed on the monitoring form (**Appendix B**).

| Scientific Name ¹ | Region 4 (North Plains) Wetland Indicator Status² |
|------------------------------|---|
| Agropyron cristatum | - (UPL) |
| Agropyron dasystacium | FAC |
| Andropogon scoparius | - (UPL) |
| Atriplex argentea | FACU |
| Calamovilfa longifolia | - (UPL) |
| Chenopodium atrovirens | - (UPL) |
| Chrysothamnus spp. | - (UPL) |
| Eriogonum pauciflora | - (UPL) |
| Festuca octiflora | - (UPL) |
| Grindelia squarrosa | FACU |
| Plantago patagonica | UPL |
| Poa urida | - (UPL) |
| Puccinellia nuttalliana | OBL |
| Sarcobatus vermiculatus | FACU |
| Spartina pectinata | FACW |

 Table 1: 2002-2005 American Colloid wetland mitigation vegetation species list.

¹**Bolded** species indicate those documented within the analysis area for the first time in 2005.

² 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.

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

 Table 2: 2002-2005 transect data summary.







Chart 1: Length of vegetation communities within Transect 1 during 2002 to 2005.

Chart 2: Transect maps showing vegetation types from the start (0 feet) to the end of transect (228 feet in 2002; 290 feet in 2003-2005).







Though wetland and upland vegetation exist within the assessment area along the transect, vegetation is sparse (<1% cover) and as a result do not qualify as true vegetation communities. Elsewhere on the site the upland community persists and cover is greater than 30%. There are two developing areas of *Spartina* within the wetland boundary; former colonizations have drowned as the water levels increased (**Figure 3, Appendix A**). *Hordeum jubatum* has newly colonized a mud flat east of the outflow stand pipes. The stormwater drainage outside of the assessment area that enters the south end of the pond is colonized with *Spartina* and *Typha* which will serve as a seed source as the water level stabilizes.

3.3 Soils

The site was mapped as part of the Carter County Soil Survey. The soil series mapped by the 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 SP-1 were a black (10YR 2/1) clay loam with coarse fragments from 0-10 inches. Saturation was noted throughout the profile. Soils were absent at SP-2; coarse fragments were noted to a depth of 6 inches.

3.4 Wetland Delineation

The open water boundary was delineated and is depicted on **Figure 3**, **Appendix A**. At the time of the investigation, most of the area did not qualify as a wetland because of the low percentage of wetland vegetation (<1%) within the delineation boundary. This is expected given that the full pool level has not stabilized. The gross wetland and open water boundary totaled 4.22 acres at the time of the investigation, an increase of approximately 0.4 acre since 2004. Net wetland area comprised 0.03 acre. 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. No avian species were observed and no bird boxes have been installed at this site.

|] | Cable 3: | Wildlife species observed | ¹ at the American Colloid Mitigation Site fro | om 2002-2005. |
|---|----------|---------------------------|--|---------------|
| | AMPHI | BIANS AND REPTILES | | |

northern leopard frog (*Rana pipiens*) tiger salamander (*Ambystoma tigrinum*)

BIRDS

Spotted Sandpiper (Actitis macularia) Mourning Dove (Zenaida macroura) American Robin (Turdus migratorius) Brewer's Blackbird (Euphagus cyanocephalus) Red-wing Blackbird (Agelaius phoeniceus) Grasshopper Sparrow (Ammodramus savannarum) Killdeer (Charadrius vociferous)





Table 3 (continued): Wildlife species observed¹ at the American Colloid Mitigation Site from 2002-2005.

| <u>J'</u> | |
|-----------|--|
| | MAMMALS |
| | Cottontail Rabbit (Sylvilagus floridanus) |
| | Deer (tracks) (Odocoileus sp.) |
| | Unidentified Vole (likely Sage or Prairie) |
| | 1 |

¹**Bolded** species indicate those documented within the analysis area in 2005.

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 2005).

The sample collected at this site was dominated by ceratopogonid gnat larvae. Conditions at this site apparently worsened between 2004 and 2005, when very low taxa richness and a highly tolerant assemblage characterized the site. Ostracods dominated the fauna and the other significant faunal components were hemoglobin-bearing chironomids. This suggests that hypoxic substrates were the dominant habitat available. There is little evidence that macrophytes were present, thus habitat monotony may have limited biologic potential here.





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 II wetland as a result of the presence of an S3 species, the northern leopard frog. Actual functional points did not change since 2004, however total functional units increased slightly as a result of the slight increase in inundation acreage. The functional units on the data sheet (19.74) represent the maximum units for the site calculated from the gross inundated acreage. Functional units based exclusively on the area of emergent vegetation (0.03 acre) would result in a minimal functional unit value as 0.14 units.





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 2002-2005 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 |
|--|-----------|-----------|------------|------------|
| Listed/Proposed T&E Species Habitat | Low (0) | Low (0) | Low (0) | Low (0) |
| MNHP Species Habitat | Mod (.6) | High (1) | Mod (0.7) | Mod (0.7) |
| General Wildlife Habitat | Mod (.4) | Mod (.4) | High (.9) | High (.9) |
| General Fish/Aquatic Habitat | NA | NA | NA | NA |
| Flood Attenuation | Mod (.4) | Mod (.5) | Low (.2) | Low (.2) |
| Short and Long Term Surface Water Storage | High (.8) | High (.8) | Mod (.4) | Mod (.4) |
| Sediment, Nutrient, Toxicant Removal | Mod (.6) | Mod (.7) | Mod (.7) | Mod (.7) |
| Sediment/Shoreline Stabilization | Mod (.7) | Mod (.7) | Low (.3) | Low (.3) |
| Production Export/Food Chain Support | Mod (.6) | Mod (.6) | Mod (.4) | Mod (.4) |
| Groundwater Discharge/Recharge | NA | NA | NA | NA |
| Uniqueness | Low (.3) | Low (.3) | Mod (.4) | Mod (.4) |
| Recreation/Education Potential | Mod (.5) | Mod (.5) | Mod (.7) | Mod (.7) |
| Actual Points/Possible Points | 4.9/10 | 5.5/10 | 4.7/10 | 4.7/10 |
| % of Possible Score Achieved | 49% | 55% | 47% | 47% |
| Overall Category | III | II | II | II |
| Total Acreage of Assessed Wetlands within Monitoring Area | 0.69 | 0.69 | 3.82 (max) | 4.2 (max) |
| Total Functional Units | 3 38 | 3 79 | 17.95 | 19.74 |
| (acreage x actual points) | 5.50 | 5.19 | (max) | (max) |
| Net Acreage Gain ("new" wetlands) | 0.69 | 0.69 | 3.82 (max) | 4.2 (max) |
| Net Functional Unit Gain | 3 38 | 3 79 | 17.95 | 19.74 |
| (new acreage x actual points) | 5.50 | 5.13 | (max) | (max) |

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 inundation area totals 4.22 acres which technically do not qualify as wetlands given the wetland vegetation community is less than 1% (0.03 acre). At the time of investigation, the water level was just under one foot from the top of the stand culverts; in 2004 the water level was 12 inches from the top. The water surface area has increased since 2004, but the level may be stabilizing given the exposed stand pipe has remained at approximately 12 inches for 2 years. Water has never overtopped the culverts; no mud or staining was visible in the bottom of the





stand culvert. Once the water level stabilizes, on-site sources of *Typha* and *Spartina* will colonize the inundated area readily. The American Colloid mitigation area achieved a Category II rating primarily as a result of the presence of an S3 species, the northern leopard frog. Maximum functional units have increased more than 800% since 2002.

4.0 REFERENCES

- Berglund, J. 1999. *MDT Montana Wetland Assessment Method*. May. Montana Department of Transportation, Helena, Montana.
- Bollman, W. 2005. MDT Mitigated Wetland Monitoring Project Aquatic Invertebrate Monitoring Summary 2001-2005. Rhithron Associates Inc. Missoula, MT.
- Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. U.S. Army Corps of Engineers, Washington, DC.
- Reed, P.B. 1988. National list of plant species that occur in wetlands: North Plains (Region 4). Biological Report 88(26.4), May 1988. U.S. Fish and Wildlife Service. Washington, D.C.
- Montana Department of Transportation (MDT). 1999. Revised Preliminary Field Review Report. Montana Department of Transportation, Helena, Montana.
- Montana Department of Transportation (MDT). 2001. Addendum, Attachments 1-3. Montana Department of Transportation, Helena, Montana.
- Sickerson, L. 2002. District Biologist, Montana Department of Transportation, Helena, Montana. December 2002 E-mail Correspondence.
- USDA Natural Resource Conservation Service (NRCS). 2003. Soil Survey of Carter County, Montana.
- Western Regional Climate Center (WRCC). 2005. Albion 1N, MT Station: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?mtalbi.





Appendix A

FIGURES 2 & 3

MDT Wetland Mitigation Monitoring American Colloid Mitigation Site Alzada, Montana





Appendix B

2005 WETLAND MITIGATION SITE MONITORING FORM 2005 BIRD SURVEY FORMS 2005 WETLAND DELINEATION FORMS 2005 FULL FUNCTIONAL ASSESSMENT FORM

MDT Wetland Mitigation Monitoring American Colloid Mitigation Site Alzada, Montana

LWC / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: <u>American Colloid</u> Project Number: <u>B43054.00-402</u> Assessment Date: <u>July 25, 2005</u> Person(s) conducting the assessment: <u>LBacon, PBSJ</u> Location: <u>Alzada</u> MDT District: <u>Glendive</u> Milepost: _____ Legal Description: T <u>9S</u> R <u>58E</u> Section <u>36</u> Weather Conditions: <u>overcast, rain threatening</u> Time of Day: <u>2PM</u> Initial Evaluation Date: <u>July 18, 2002</u> Monitoring Year: <u>4</u> # Visits in Year: <u>1</u> Size of evaluation area: <u>5 acres</u> Land use surrounding wetland: <u>bentonite mine</u>

HYDROLOGY

Surface Water Source: stormwater

Inundation: <u>Present</u> Average Depth: <u>4 feet</u> Range of Depths: <u>0-8 ft</u>

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: <u>Yes</u> 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

| 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% | | |
| | | | |
| | | | |

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

Comments / Problems:

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

| Dominant Species | % Cover | Dominant Species | % Cover |
|------------------|-----------|-------------------------|---------|
| SPAPEC | 5 = > 50% | | |
| HORJUB | + = < 1% | | |
| | | | |
| | | | |
| | | | |
| | | | |

Comments / Problems:

Community Number: <u>3</u> Community Title (main species): <u>Hordeum jubatum</u>

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

Comments / Problems:

Community Number: ____ Community Title (main species): _____

| Dominant Species | % Cover | Dominant Species | % Cover |
|------------------|---------|------------------|---------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Comments / Problems:

VEGETATION COMMUNITIES (continued)

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:

Community Number: ____ Community Title (main species): _____

| Dominant Species | % Cover | Dominant Species | % Cover |
|------------------|---------|------------------|---------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Comments / Problems:

VEGETATION COMMUNITIES (continued)

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:

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.

COMPREHENSIVE VEGETATION LIST

| Plant Species | Vegetation Community Number (s) | Plant Species | Vegetation Community Number (s) |
|-------------------------|---------------------------------------|---------------|---------------------------------------|
| Agropyron cristatum | 1 | | |
| Agropyron dasystacium | 1 | | |
| Andropogon scoparius | 1 | | |
| Atriplex argente | 1 | | |
| Chenopodium atrovirens | 1 | | |
| Chrysothamnus spp. | 1 | | |
| Eriogonum pauciflora | 1 | | |
| Festuca octiflora | 1 | | |
| Grindelia squarrosa | 1 | | |
| Plantago patagonica | 1 | | |
| Poa urida | 1 | | |
| Puccinellia nuttalliana | 2 | | |
| Sarcobatus vermiculatus | 1 | | |
| Spartina pectinata | 2 | | |
| Calamovilfa longifolia | 1 | | |
| Hordeum jubatum | 1,2 | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Comments / Problems:

PLANTED WOODY VEGETATION SURVIVAL

| Plant Species | Number Originally Planted | Number Observed | Mortality Causes |
|---------------|---------------------------------|--------------------|------------------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Comments / Problems: <u>No planted woody species.</u>

WILDLIFE

Birds

Were man-made nesting structures installed? <u>No</u> If yes, type of structure: _____ How many? _____ Are the nesting structures being used? <u>NA</u> Do the nesting structures need repairs? _____

Mammals and Herptiles

| Mammal and Herntile Species | Number | Indirect Indication of Use | | | |
|------------------------------|----------|-----------------------------------|-----------|---------|-------|
| Manimar and Herptile Species | Observed | Tracks | Scat | Burrows | Other |
| eastern cottontail | 1 | | | | |
| deer | | \square | \square | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Additional Activities Checklist:

Yes Macroinvertebrate Sampling (if required)

Comments / Problems:

PHOTOGRAPHS

Using a camera with a 50mm lens and color film take photographs of the following permanent reference points listed in the check list below. Record the direction of the photograph using a compass. When at the site for the first time, establish a permanent reference point by setting a ½ inch rebar or fencepost extending 2-3 feet above ground. Survey the location with a resource grade GPS and mark the location on the aerial photograph.

Photograph Checklist:

- One photograph for each of the four cardinal directions surrounding the wetland.
- At least one photograph showing upland use surrounding the wetland. If more than one upland exists then take additional photographs.
- \boxtimes At least one photograph showing the buffer surrounding the wetland.
- \boxtimes One photograph from each end of the vegetation transect, showing the transect.

| Location | Photograph Frame # | Photograph Description | Compass Reading (°) |
|----------|-----------------------|---|------------------------|
| А | | toward outlet | 2 |
| В | | upland buffer | 348 |
| С | | across wetland toward H transect end | 118 |
| D | | downstream of dam | 25 |
| Е | | along dam front (opposite direction of F) | 186 |
| F | | along dam front (opposite direction of E) | 220 |
| G | | across wetland toward H end of transect | 118 |
| Н | | across wetland toward G end of transect | 302 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

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.
- \boxtimes 4-6 landmarks that are recognizable on the aerial photograph.

 \boxtimes Start and End points of vegetation transect(s).

Photograph reference points.

 \boxtimes 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? <u>NA</u> If yes, do they need to be repaired? <u>NA</u>

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? <u>Yes</u>

If yes, are the structures working properly and in good working order? <u>Yes</u> If no, describe the problems below.

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

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: American ColloidDate: July 25, 2005Examiner: LBacon, PBSJTransect Number: 1Approximate Transect Length: 290 feetCompass Direction from Start: 122*

| Vegetation Type A: CT-1 | |
|---|-----------|
| Length of transect in this type: 2 feet | |
| Plant Species | Cover |
| bare dirt | 5 = > 50% |
| ANDSCO | 1 = 1-5% |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| Total Vegetative Cover: | 10% |

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

| 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

 Site:
 Date:
 Examiner:

 Transect Number:
 Approximate Transect Length:
 feet
 Compass Direction from Start (Upland):

 •
 Note:

| Vegetation Type E: | | Vegetation Type F: | | |
|---------------------------------------|-------|---------------------------------------|-------|--|
| Length of transect in this type: feet | | Length of transect in this type: feet | | |
| Plant Species | Cover | Plant Species | Cover | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| Total Vegetative Cover: | % | Total Vegetative Cover: | % | |

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

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

MDT WETLAND MONITORING - VEGETATION TRANSECT

 Site:
 Date:
 Examiner:

 Transect Number:
 Approximate Transect Length:
 feet

 Compass Direction from Start (Upland):
 • Note:

| Vegetation Type I: | | Vegetation Type J: | |
|---------------------------------------|-------|---------------------------------------|-------|
| Length of transect in this type: feet | | Length of transect in this type: feet | |
| Plant Species | Cover | Plant Species | Cover |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| Total Vegetative Cover: | % | Total Vegetative Cover: | % |

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

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

MDT WETLAND MONITORING – VEGETATION TRANSECT

| Cover Estimate | | Indicator Class |
|-----------------------|------------|---------------------|
| + = < 1% | 3 = 11-10% | + = Obligate |
| 1 = 1-5% | 4 = 21-50% | - = Facultative/Wet |
| 2 = 6-10% | 5 => 50% | 0 = Facultative |

Source P = PlantedV = Volunteer

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): $\underline{1}$ %

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: There are 2 clumps (<1ft diameter) Spartina within the 10 ft wide belt transect.

BIRD SURVEY – FIELD DATA SHEET

Site: <u>American Colloid</u> Date: <u>7/25/05</u> Survey Time: <u>2 pm to 4</u> pm

| Image: Second | Bird Species | # | Behavior | Habitat | Bird Species | # | Behavior | Habitat |
|---|--------------|---|----------|---------|--------------|---|----------|---------|
| Image: Sector of the sector | | | | | | | | |
| Image: state of the state | | | | | | | | |
| Image: Second | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

BEHAVIOR CODES

 $\begin{array}{l} \textbf{BP} = \text{One of a breeding pair} \\ \textbf{BD} = \text{Breeding display} \\ \textbf{F} = \text{Foraging} \\ \textbf{FO} = \text{Flyover} \\ \textbf{L} = \text{Loafing} \end{array}$

- $\mathbf{N} =$ Nesting
- $\mathbf{N} = \text{Inesting}$

Weather: overcast, threatening to storm

Notes: none seen or heard

HABITAT CODES

AB = Aquatic bed FO = Forested I = Island MA = Marsh MF = Mud Flat OW = Open Water

SS = Scrub/Shrub UP = Upland buffer WM = Wet meadow US = Unconsolidated shore

DATA FORM **ROUTINE WETLAND DETERMINATION**

(1987 COE Wetlands Delineation Manual)

| Project / Site: American Colloid | Date: July 25, 2005 |
|--|---------------------------|
| Applicant / Owner: MDT | County: <u>Carter</u> |
| Investigator: LBacon/PBSJ | State: MT |
| | |
| Do Normal Circumstances exist on the site? Yes | Community ID: <u>CT-1</u> |
| Is the site significantly disturbed (Atypical Situation)? No | Transect ID: Upland |
| Is the area a potential Problem Area? No | Plot ID: <u>SP-1</u> |
| (If needed, explain on reverse side) | |

VEGETATION

| Dominant Species | Stratum | Indicator | Dominant Species | Stratum | Indicator |
|--|-------------|-----------|----------------------|---------|-----------|
| 1. ANDSCO | Herb | | 11. | | |
| 2. ERIPAU | | | 12. | | |
| 3. | | | 13. | | |
| 4. | | | 14. | | |
| 5. | | | 15. | | |
| 6. | | | 16. | | |
| 7. | | | 17. | | |
| 8. | | | 18. | | |
| 9. | | | 19. | | |
| 10. | | | 20. | | |
| Percent of Dominant Species that | are OBL, FA | ACW, or | FAC Neutral: $/ = 9$ | % | |
| FAC (excluding FAC-): $0/2 = 0\%$ | | | | | |
| Remarks: Upland community similar to other years in this SP location; other areas (head of OW) the | | | | | |
| community is changing nercent cover over time | | | | | |

HYDROLOGY

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

| | SOILS | | | | | | |
|---------------------|--|---------------------------------|------------------------------------|------------------------------|---|--|--|
| Map Unit Map Sym | Map Unit Name (Series and Phase): <u>Nelodre-rock outcrop complex</u> Map Symbol: 58D Drainage Class: well Mapped Hydric Inclusion? | | | | | | |
| Taxonom | y (Subgrou | p): Aridic Ustorthen | nts Field Observati | ons confirm Mapped Ty | pe? <u>Yes</u> | | |
| Profile Des | cription | - | | | | | |
| Depth (inches) | Horizon | Matrix Color (Munsell Moist) | Mottle Color(s) (Munsell Moist) | Mottle Abundance/Contrast | Texture, Concretions, Structure, etc. | | |
| 6" | А | 2.5 Y 4/2 | / | N/A | | | |
| | | | / | N/A | silt clay | | |
| | | / | / | N/A | | | |
| | | | / | N/A | | | |
| | | / | / | N/A | | | |
| | | | / | N/A | | | |
| | | / | / | N/A | | | |
| | | | / | N/A | | | |
| | | / | / | N/A | | | |
| | | | / | N/A | | | |
| Hydric So | oil Indicator | s: | | | | | |
| NO H | Histosol | | NO Concretion | 18 | | | |
| NO H | listic Epipe | edon | NO High Orga | nic Content in Surface La | ayer in Sandy Soils | | |
| NO S | NO Sulfidic Odor NO Organic Streaking in Sandy Soils | | | | | | |
| NO A | NO Aquic Moisture Regime NO Listed on Local Hydric Soils List | | | | | | |
| NO F | NO Reducing Conditions NO Listed on National Hydric Soils List | | | | | | |
| YES | YES Gleyed or Low-Chroma Colors NO Other (Explain in Remarks) | | | | | | |
| Remarks: | Impenetra | able | | | | | |
| <u> </u> | rr | | | | | | |

WETLAND DETERMINATION

| Hydrophytic Vegetation Present? | NO | Is this Sampling Point within a Wetland? NO | | | |
|--|-----------|---|--|--|--|
| Wetland Hydrology Present? | <u>NO</u> | | | | |
| Hydric Soils Present? | <u>NO</u> | | | | |
| Remarks: No wetland indicators adjacent to saturated edge of OW or inlet drainage. | | | | | |

DATA FORM ROUTINE WETLAND DETERMINATION

(1987 COE Wetlands Delineation Manual)

| Project / Site: American Colloid | Date: July 25, 2005 |
|--|---------------------------|
| Applicant / Owner: MDT | County: Carter |
| Investigator: LBacon/PBSJ | State: MT |
| | |
| Do Normal Circumstances exist on the site? Yes | Community ID: <u>CT-2</u> |
| Is the site significantly disturbed (Atypical Situation)? No | Transect ID: <u>WL</u> |
| Is the area a potential Problem Area? No | Plot ID: <u>SP-1</u> |
| (If needed, explain on reverse side) | |

VEGETATION

| Dominant Species | Stratum | Indicator | Dominant Species | Stratum | Indicator |
|--|-------------|-----------|--------------------|---------|-----------|
| 1. SPAPEC | Herb | FACW | 11. | | |
| 2. | | | 12. | | |
| 3. | | | 13. | | |
| 4. | | | 14. | | |
| 5. | | | 15. | | |
| 6. | | | 16. | | |
| 7. | | | 17. | | |
| 8. | | | 18. | | |
| 9. | | | 19. | | |
| 10. | | | 20. | | |
| Percent of Dominant Species that | are OBL, FA | ACW, or | FAC Neutral: / = % | , 0 | |
| FAC (excluding FAC-): $1/1 = 10$ | 00% | | | | |
| Remarks: Wetland SP in stormwater inlet unslone of H transect end. Sparting has colonized since last year. | | | | | |

HYDROLOGY

| Yes Recorded Data (Describe in Remarks): | Wetland Hydrology Indicators |
|---|--|
| <u>N/A</u> Stream, Lake, or Tide Gauge | Primary Indicators: |
| Yes Aerial Photographs | NO Inundated |
| <u>N/A</u> Other | NO Saturated in Upper 12 Inches |
| N N D LID | YES Water Marks |
| No Recorded Data | YES Drift Lines |
| | YES Sediment Deposits |
| | YES Drainage Patterns in Wetland |
| Field Observations: | Secondary Indicators (2 or more required): |
| Donth of Surface Water N/A (in) | NO Oxidized Root Channels in Upper 12 inches |
| Depin of Surface water N/A (III.) | NO Water-Stained Leaves |
| Depth to Free Water in Pit N/A (in.) | NO Local Soil Survey Data |
| | NO FAC-Neutral Test |
| Depth to Saturated Soil N/A (in.) | NO Other (Explain in Remarks) |
| Remarks: Soil is damp, but water drainage patte | rn prominent. |

| | SOILS | | | | | | | |
|-------------------|--|---------------------------------|------------------------------------|------------------------------|---------------------------------|--|--|--|
| Map Unit | Map Unit Name (Series and Phase): <u>Nelodre-rock outcrop complex</u> | | | | | | | |
| Map Sym | Map Symbol: <u>58D</u> Drainage Class: <u>well</u> Mapped Hydric Inclusion? | | | | | | | |
| Taxonom | y (Subgrou | p): <u>Aridic Ustorthe</u> i | nts Field Observati | ons confirm Mapped Ty | pe? <u>Yes</u> | | | |
| Profile Des | Profile Description | | | | | | | |
| Depth (inches) | Horizon | Matrix Color (Munsell Moist) | Mottle Color(s) (Munsell Moist) | Mottle Abundance/Contrast | Concretions, Structure, etc. | | | |
| 10" | А | 10 YR 2/1 | / | N/A | Clay Loam | | | |
| | | | / | N/A | w/ coarse frags | | | |
| | | / | / | N/A | | | | |
| | | | / | N/A | | | | |
| | | / | / | N/A | | | | |
| | | | / | N/A | | | | |
| | | / | / | N/A | | | | |
| | | | / | N/A | | | | |
| | | / | / | N/A | | | | |
| | | | / | N/A | | | | |
| Hydric So | oil Indicator | rs: | | | | | | |
| <u>NO</u> H | Iistosol | | NO Concretion | 18 | | | | |
| NO H | listic Epipe | edon | NO High Orga | nic Content in Surface L | ayer in Sandy Soils | | | |
| <u>NO</u> S | NO Sulfidic Odor NO Organic Streaking in Sandy Soils | | | | | | | |
| <u>NO</u> A | NO Aquic Moisture Regime NO Listed on Local Hydric Soils List | | | | | | | |
| NO F | NO Reducing Conditions NO Listed on National Hydric Soils List | | | | | | | |
| YES | Gleyed or l | Low-Chroma Colors | NO Other (Exp | plain in Remarks) | | | | |
| Remarks: | | | | | | | | |

WETLAND DETERMINATION

| Hydrophytic Vegetation Present? YES | Is this Sampling Point within a Wetland? YES |
|---|--|
| Wetland Hydrology Present? YES | |
| Hydric Soils Present? <u>YES</u> | |
| Remarks: Stormwater inlet upslope from H transect end is developing into a wetland area. No | |
| wetland veg around circumference of openwater. | |
MDT MONTANA WETLAND ASSESSMENT FORM (revised May 25, 1999)

| 1. Project Name: American Colloid | 2. Project | #: <u>B43054402</u> | Control #: | | | | | |
|--|----------------------------|--|--|--|--|--|--|--|
| 3. Evaluation Date: <u>7/25/2005</u> 4. Evaluation | valuator(s): <u>LB/LWC</u> | 5. We | tland / Site #(s): | | | | | |
| 6. Wetland Location(s) i. T : <u>9</u> <u>S</u> R : <u>58</u> <u>E</u> | S: <u>36</u> | T: <u>N</u> R: | <u> </u> | | | | | |
| ii. Approx. Stationing / Mileposts: | | | | | | | | |
| iii. Watershed: <u>10110201</u> | GPS Reference No. (if a | pplies): | | | | | | |
| Other Location Information: | | | | | | | | |
| 7. A. Evaluating Agency <u>LWC</u> | 8. Wetland Size | (total acres): $\frac{0.03a}{0.03a}$ | (visually estimated) (measured, e.g. GPS) | | | | | |
| B. Purpose of Evaluation: | | | · · · · / | | | | | |
| Wetlands potentially affected by MDT | project 9. Assessment A | 9. Assessment Area (total acres): (visually es | | | | | | |
| Mitigation wetlands; pre-construction | | | 4.19 (measured, e.g. GPS) | | | | | |
| Mitigation wetlands; post-construction | 1 | | | | | | | |

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA

| HGM CLASS ¹ | SYSTEM ² | SUBSYSTEM ² | BSYSTEM ² CLASS ² WATER REGIME ² M | | MODIFIER ² | % OF AA |
|------------------------|---------------------|------------------------|---|---------------------|-----------------------|------------|
| Depression | Palustrine | None | Emergent Wetland | Permanently Flooded | | 1 |
| Depression | Palustrine | | Unconsolidated Bottom | Permanently Flooded | | 99 |
| | | | | | | |
| | | | | | | |

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

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

12. GENERAL CONDITION OF AA

Other

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

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

Comments: (types of disturbance, intensity, season, etc.) no disturbance, well fenced

ii. Prominent weedy, alien, & introduced species: some chenopodium

iii. Briefly describe AA and surrounding land use / habitat: BLM bentonite mine; pond protected from site and use by fence and distance from road

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

| Number of 'Cowardin' Vegetated | \geq 3 Vegetated Classes or | 2 Vegetated Classes or | \leq 1 Vegetated Class |
|--------------------------------|-----------------------------------|------------------------|--------------------------|
| Classes Present in AA | \geq 2 if one class is forested | 1 if forested | |
| Select Rating | | | Low |

Comments: since area is fenced shrubs may grow well here

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) | $\Box D \Box S$ |
|--|-----------------------|
| Secondary habitat (list species) | $\square D \square S$ |
| Incidental habitat (list species) | $\Box D \Box S$ |
| No usable habitat | $\Box D \Box S$ |

| ii. Rating (Based on th | e strongest habi | tat chosen in 14A | (i) above, find the | corresponding ra | ting 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 th | e strongest habi | tat chosen in 14B | (i) above, find the | corresponding ra | ting 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 common (a c | abcomistions ro | aarda ata). I.D/r | a h a ta gramh | | |

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

14C. General Wildlife Habitat Rating

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

Moderate (based on any of the following)

observations of scattered wildlife groups or individuals or relatively few species during peak periods

common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.

adequate adjacent upland food sources

interviews with local biologists with knowledge of the AA

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

| Structural Diversity (from #13) | | High | | | | | | Moderate | | | | | | Low | | | | | | |
|---|-----|------|------|---|-----|-----|-------|----------|-----|-----|------|---|-----|-----|-------|---|-----|-----|------|---|
| Class Cover Distribution (all vegetated classes) | | □ŀ | Even | | | U | neven | | | DE | lven | | | UU | neven | | | Ø | Even | |
| Duration of Surface Water in \geq 10% of AA | P/P | S/I | T/E | А | P/P | S/I | T/E | А | P/P | S/I | T/E | А | P/P | S/I | T/E | А | P/P | S/I | T/E | А |
| Low disturbance at AA (see #12) | | | | | | | | | | | | | | | | | Е | | | |
| Moderate disturbance at AA (see #12) | | | | | | | | | | | | | | | | | | | | |
| High 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 | W | Wildlife Habitat Features Rating from 14C(ii) | | | | | | | | | | | |
|--------------------------|-------------|---|----------|-----|--|--|--|--|--|--|--|--|--|
| from 14C(i) | Exceptional | 🗌 High | Moderate | Low | | | | | | | | | |
| Substantial | | | | | | | | | | | | | |
| Moderate | .9 (H) | | | | | | | | | | | | |
| Low | | | | | | | | | | | | | |

Comments: potential high for waterfowl and shorebird use.

- **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

14D. GENERAL FISH/AQUATIC HABITAT RATING XA (proceed to 14E)

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

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

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

| Duration of Surface Water in AA | Permanent/Perennial | | | Sea | asonal / Inte | rmittent | Temporary / Ephemeral | | | |
|--|---------------------|--------|------|------|---------------|----------|-----------------------|--------|------|--|
| Cover - % of waterbody in AA containing cover objects (<i>e.g.</i> 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? $\mathbf{Y} \quad \mathbf{N} \quad \mathbf{N}$ If yes, reduce the rating from 14D(i) by one level and check the modified habitat quality rating: $\mathbf{E} \quad \mathbf{H} \quad \mathbf{M} \quad \mathbf{L}$

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 | Modified Habitat Quality from 14D(ii) | | | | | | | | | |
|------------------------|---------------------------------------|------|----------|--|--|--|--|--|--|--|
| Suspected Within AA | Exceptional | High | Moderate | | | | | | | |
| Native game fish | | | | | | | | | | |
| Introduced game fish | | | | | | | | | | |
| Non-game fish | | | | | | | | | | |
| No fish | | | | | | | | | | |

Comments:

14E. FLOOD ATTENUATION INA (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 | | $\square \ge 10 \text{ acres}$ | | | □ <10, >2 acres | | | ⊠ ≤2 acres | | |
|---|-----|--------------------------------|------|-----|-----------------|------|-----|------------|--------|--|
| % of flooded wetland classified as forested, scrub/shrub, or both | 75% | 25-75% | <25% | 75% | 25-75% | <25% | 75% | 25-75% | <25% | |
| AA contains no outlet or restricted outlet | | | | | | | | | .2 (L) | |
| AA contains unrestricted outlet | | | | | | | | | | |

ii. Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA? (check)

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. | | \square >5 acre feet | | | \Box <5, >1 acre feet | | | $\boxtimes \leq 1$ 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 of to moderate le other function sedimentation eutrophicatior | or surrounding lan- evels of sediments is are not substanti , sources of nutrio present. | d use has potent , nutrients, or cc ially impaired. 1 ents or toxicants | ial to deliver low mpounds such that Minor , or signs of | development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present. | | | | | |
|--|---|--|--|---|--|------|-------|------|--|--|
| % cover of wetland vegetation in AA | | ≥ 70% | X | < 70% | $\Box \ge 70\%$ $\Box < 70\%$ | | | 70% | | |
| Evidence of flooding or ponding in AA | 🗌 Yes | 🗌 No | 🛛 Yes | 🗆 No | ☐ Yes | 🗆 No | 🗌 Yes | 🗌 No | | |
| AA contains no or restricted outlet | | | .7 (M) | | | | | | | |
| AA contains unrestricted outlet | | | | | | | | | | |

Comments:

14H. SEDIMENT/SHORELINE STABILIZATION

NA (proceed to 14I)

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

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

| % Cover of wetland streambank or | Duration of Surface Water Adjacent to Rooted Vegetation | | | | | | | |
|---|---|-------------------------|-----------------------|--|--|--|--|--|
| shoreline by species with deep, binding rootmasses. | Permanent / Perennial | Seasonal / Intermittent | Temporary / Ephemeral | | | | | |
| ≥ 65 % | | | | | | | | |
| 35-64 % | | | | | | | | |
| < 35 % | .3 (L) | | | | | | | |

Comments: No regeneration around pond perimeter as of 2005 site viist. Water level may be stabilizing, so expect more WL veg in 2006

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 | | U Vege | etated co | mponent | >5 acres | | □ Vegetated component 1-5 acres | | | | ☑ Vegetated component <1 acre | | | | | | | |
|-------|----|--------|-----------|---------|----------|-----|---------------------------------|------|-------|---------|-------------------------------|-----|-------|------|-------|---------|---------------|-----|
| В | | High | 🗌 Mo | oderate | | Low | | High | Mc Mc | oderate | | Low | - D I | High | Mc Mc | oderate | 🖂 I | Low |
| С | ΠY | N | ΠY | ΠN | ΓY | ΠN | ΓY | ΠN | ΠY | ΠN | ΞY | N | ΓY | ΠN | ΠY | ΠN | $\boxtimes Y$ | ΠN |
| P/P | | | | | | | | | | | | | | | | | .4M | |
| S/I | | | | | | | | | | | | | | | | | | |
| T/E/A | | | | | | | | | | | | | | | | | | |

Comments:

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

П Vegetation growing during dormant season/drought.

ŏ 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.
- Ē 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.

Ы

Other

Permeable substrate presents without underlying impeding layer.

Wetland contains inlet but not outlet.

| 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, b (>80 yr-old) foreste association listed a | AA does no types and st or contains by the MTN | t contain previou ructural diversity plant association [HP. | sly cited rare (#13) is high listed as "S2" | AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate. | | | | |
|---------------------------------------|--|---|--|---|---|----------|------|--------|----------|
| Estimated Relative Abundance from #11 | rare | Common | abundant | rare | Common | abundant | rare | Common | abundant |
| Low disturbance at AA (#12i) | | | | | | | | .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? \Box Yes (Rate \Box High (1.0), then proceed to 14L(ii) only] \boxtimes No [Proceed to 14L(iii)] ii. Check categories that apply to the AA: 🛛 Educational / scientific study Non-consumptive rec. Other

- Consumptive rec. 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).] \square 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.

| | Disturbance at AA from #12(i) | | | | | | | |
|-------------------|-------------------------------|------------|--------|--|--|--|--|--|
| Ownership | 🛛 Low | ☐ Moderate | 🗌 High | | | | | |
| Public ownership | | | | | | | | |
| Private ownership | .7(M) | | | | | | | |

Comments:

i. Discharge Indicators

Springs are known or observed.

| 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 | М | 0.70 | 1 | |
| C. General Wildlife Habitat | Н | 0.90 | 1 | |
| D. General Fish/Aquatic Habitat | NA | | | |
| E. Flood Attenuation | L | 0.20 | 1 | |
| F. Short and Long Term Surface Water Storage | М | 0.40 | 1 | |
| G. Sediment/Nutrient/Toxicant Removal | М | 0.70 | 1 | |
| H. Sediment/Shoreline Stabilization | L | 0.30 | 1 | |
| I. Production Export/Food Chain Support | М | .40 | 1 | |
| J. Groundwater Discharge/Recharge | NA | | | |
| K. Uniqueness | М | 0.40 | 1 | |
| L. Recreation/Education Potential | М | 0.70 | 1 | |
| | Totals: | 4.70 | 10.00 | 19.83 |
| | Total Possible Points: | 47% (Actual / Possible) |) x 100 [rd to nearest whole #] | |

FUNCTION, VALUE SUMMARY, AND OVERALL RATING

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

"Low" rating for Production Export / Food Chain Support; and

Percent of total possible points is < 30%.

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

__ I

II

Appendix C

2005 Representative Photographs

MDT Wetland Mitigation Monitoring American Colloid Mitigation Site Alzada, Montana

AMERICAN COLLOID MITIGATION SITE 2005



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



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



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



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

AMERICAN COLLOID MITIGATION SITE 2005



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



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



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



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

Appendix D

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

MDT Wetland Mitigation Monitoring American Colloid Mitigation Site Alzada, Montana

RECEIVED

LAND & WATER D-1

JAN 06 1999

ENVIRONMENTAL

Montana Department of Transportation Helena, Montana 59620-1001



Memorandum

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

> Gordon J. Stockstad Resources Bureau Chief

From:

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 Date 1/4/99 Carl S. Peil, P.E. Preconstruction Engineer

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 exclosure to livestock grazing. This exclosure 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

LAND & WATER D-5

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 | 1 |
| 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 Super | visor |





SPECIAL PROVISIONS

NH-STPS-BR 6(10)

LAND & WATER D-8

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

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



LAND & WATER D. P

TABLE OF CONTENTS

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

NOTES

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.

| | | | F | FENCING | | |
|----------|----|---------|-------|---------|--------|--|
| | | meters | | EACH | meters | |
| STATION* | | | | GATES | | |
| | | FSM FSM | PANEL | PANEL | 62 | |
| FROM | то | 7 | | | UE . | |
| | | 1 043 | 4 | 4 | 9. 6 | |
| | | | | | | |
| TOT | AL | 1 043 | 4 | 4 | 9.6 | |

* REFERENCE TO SURVEYED EASEMENT

| | | GRADIN | G | |
|----------|------------|------------------|---------------------|--|
| | cubl | c meters | | |
| STATION | EXCAVATION | EMB. IN PLACE | REMARKS | |
| 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

UNTARA DEPARTMENT

WONTAWA CADD

1396\RD\wetsu1.dgn

5-08-2001 5-08-2001 5-08-2001

) Br L ZEKLER Y L ZEKLER D Br P FERRY

DESIGNED DRAWN BY APPROVED

396wsum1. dgn

U6564

SC DS

| | | | | | | | т | DPS | 01 | L & | | SEE | D | ING* | |
|---------|---------|-----------------|-----|---|-------|-----|---|-----|----|--------|-----|-----|---|----------------------|---------|
| | | cubic meters | | _ | | | | - | ł | nector | ·05 | | _ | 1 | - |
| 51 | ATION | | | | SEED | | | | | FERT | LIZ | ER | | CONDITION SEEDBED | REMARKS |
| FROM | то | & PLACING | NO. | 1 | NO. 2 | NO. | 3 | NQ. | 1 | NO. | 2 | NO. | 3 | | |
| 0+00.00 | 0+57.50 | 109 | | 1 | | + | _ | + | 1 | 1 | _ | - | | 1 | DAM |
| | | | | - | | | | | - | | _ | | _ | | |
| т | OTAL | 109 | | 1 | | | | | 1 | | | | | 1 | |

* SEEDING WILL BE HAND BROADCAST

| | | - | | | | CI | JLVER | TS | | | | | | | | |
|--|---------|--------|---------|------------|----------|------------|-------|--------|-------|-------------|--------|--------------------|-------------------------------|---------|--|--|
| maters cubic meters maters HEIGHT EACH | | | | | | | | | | | | | | | | |
| STATION | CSP | END SI | ECTIONS | CULVERT | BEDDING | CLASS 'DD' | | REMOVE | RELAY | OF COVER | | IN PLACE mm X m | REMARKS | | | |
| | 1350 mm | LEFT | RIGHT | EXCAVATION | MATERIAL | CONCRETE | CLASS | | | meters | meters | meters | meters | COLVERT | | |
| 0+20 | 68.5 | | SQ. | 100 | | 3.3 | | | | 2.9 | | | TRIPLE 1350 mm x 5.5 m CSP Rt | | | |
| | | | | | | | | | | | | | | | | |
| TOTAL | 68.5 | \sim | \sim | 100 | | 3.3 | | \sim | | \sim | | | | | | |









Appendix E

BIRD SURVEY PROTOCOL GPS PROTOCOL

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

2005 MACROINVERTEBRATE SAMPLING PROTOCOL AND DATA

MDT Wetland Mitigation Monitoring American Colloid Mitigation Site Alzada, Montana

AQUATIC INVERTEBRATE SAMPLING PROTOCOL

Equipment List

- D-frame sampling net with 1 mm mesh. Wildco is a good source of these.
- Spare net.
- 1-liter plastic sample jars, wide-mouth. VWR has these: catalog #36319-707.
- 95% ethanol: Northwest Scientific in Billings carries this.

All these other things are generally available at hardware or sporting goods stores. Make the labels on an ink jet printer preferably.

- hip waders.
- pre-printed sample labels (printed on Rite-in-the-Rain or other coated paper, two labels per sample).
- pencil.
- plastic pail (3 or 5 gallon).
- large tea strainer or framed screen.
- towel.
- tape for affixing label to jar.
- cooler with ice for sample storage.

Site Selection

Select the sampling site with these considerations in mind:

- Select a site accessible with hip waders. If substrates are too soft, lay a wide board down to walk on.
- Determine a location that is representative of the overall condition of the wetland.

Sampling

Wetland invertebrates inhabit the substrate, the water column, the stems and leaves of aquatic vegetation, and the water surface. Your goal is to sweep the collecting net through each of these habitat types, and then to combine the resulting samples into the 1-liter sample jar.

Dip out about a gallon of water into the pail. Pour about a cup of ethanol into the sample jar. Fill out the top half of the sample labels, using pencil, since ink will dissolve in the ethanol.

Ideally, you can sample a swath of water column from near-shore outward to a depth of approximately 3 feet with a long sweep of the net, keeping the net at about half the depth of the water throughout the sweep. Sweep the water surface as well. Pull the net through a vegetated area, beneath the water surface, for at least a meter of distance.

Sample the substrate by pulling the net along the bottom, bumping it against the substrate several times as you pull.

This step is optional, but it gives you a chance to <u>see</u> that you've collected some invertebrates. Rinse the net out into the bucket, and look for insects, crustaceans, etc. If necessary, repeat the sampling process in a nearby location, and add the net contents to the bucket. Remember to sample all four environments.

Sieve the contents of the bucket through the straining device and pour or carefully scrape the contents of the strainer into the sample jar.

If you skip the bucket-and-sieve steps, simply lift handfuls of material out of the sampling net into the jars. In either case, please include some muck or mud and some vegetation in the jar. Often, you will have collected a large amount of vegetable material. If this is the case, lift out handfuls of material from the sieve into the jar, until the jar is about half full. Please limit material you include in the sample, so that there is only a single jar for each sample.

Top off the sample jar with enough ethanol to cover all the material in the jar. Leave as little headroom as possible.

It is not necessary to sample habitats in any specified order. Keep in mind that disturbing the habitats prior to sampling will chase off the animals you are trying to capture.

Complete the sample labels. Place one label inside the sample jar and tape the other label securely to the outside of the jar. Dry the jar before attaching the outer label if necessary. In some situations, it may be necessary to collect more than one sample at a site. If you take multiple samples from the same site, clearly indicate this by using individual sample numbers, along with the total number of samples collected at the site (e.g. Sample #3 of 5 total samples).

Photograph the sampled site.

Sample Handling/Shipping

- In the field, keep collected samples cool by storing them in a cooler. Only a small amount of ice is necessary.
- Inventory all samples, preparing a list of all sites and enumerating all samples, before shipping or delivering to the laboratory.
- Deliver samples to Rhithron.

MDT Mitigated Wetland Monitoring Project

Aquatic Invertebrate Monitoring Summary 2001 - 2005

METHODS

Among other monitoring activities, aquatic invertebrate assemblages were collected at a number of mitigated wetlands throughout Montana. This report summarizes data generated from five years of collection. In 2001, 29 sites were sampled statewide. Nineteen of these sites were revisited in 2002, and 13 new sites were sampled. In 2003, 17 sites that had been visited in both 2001 and 2002 were re-sampled, and 11 sites sampled for the first time in 2001 were re-visited. In addition, 2 new sites were sampled. In 2004, 25 sites were re-visited, and 6 new sites were sampled. In 2005, an additional 2 sites were added. Over all years of sampling, a total of 151 sites were sampled for invertebrates. Table 2 summarizes sites and sampling years.

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, and 2005, and Kleinschmidt Creek, sampled in 2003, 2004, and 2005, were assessed using the tested metric battery developed for montane streams of Western Montana (Bollman 1998). Invertebrate assemblages at these sites were different from that 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 75th percentile (for those metrics that decrease in value in response to stress) or below the 25th 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 75th percentile for decreasing scores (or above the 25th percentile for increasing scores) into "suboptimal" 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; our understanding of the interrelationships of natural environmental factors and anthropogenic disturbances are tentative. Thus, the further interpretive remarks accompanying the raw taxonomic and metric data are offered cautiously.

| 2001 | 2002 | 2003 | 2004 | 2005 |
|-------------------------|-------------------------|--|-------------------------|-----------------------|
| Beaverhead 1 | Beaverhead 1 | Beaverhead 1 | Beaverhead 1 | Beaverhead 1 |
| Beaverhead 2 | Beaverhead 2 | | | |
| Beaverhead 3 | Beaverhead 3 | | Beaverhead 3 | Beaverhead 3 |
| Beaverhead 4 | Beaverhead 4 | Beaverhead 4 | | |
| Beaverhead 5 | Beaverhead 5 | Beaverhead 5 | Beaverhead 5 | Beaverhead 5 |
| Beaverhead 6 | Beaverhead 6 | Beaverhead 6 | Beaverhead 6 | Beaverhead 6 |
| Big Sandy 1 | | | | |
| Big Sandy 2 | | | | |
| Big Sandy 3 | | | | |
| Big Sandy 4 | | | | |
| Johnson-Valier | | | | - |
| VIDA | | | | |
| Cow Coulee | Cow Coulee | Cow Coulee | | |
| Fourchette – Puffin | Fourchette - Puffin | Fourchette - Puffin | Fourchette - Puffin | 1 |
| Fourchette – Flashlight | Fourchette – Flashlight | Fourchette – Flashlight | Fourchette – Flashlight | 1 |
| Fourchette – Penguin | Fourchette – Penguin | Fourchette – Penguin | Fourchette – Penguin | |
| Fourchette – Albatross | Fourchette – Albatross | Fourchette – Albatross | Fourchette – Albatross | 1 |
| Big Spring | Big Spring | Big Spring | Big Spring | Big Spring |
| Vince Ames | | 2.5.5.5 | 2.5.5.5 | |
| Ryegate | | | | |
| Lavinia | | | | |
| Stillwater | Stillwater | Stillwater | Stillwater | Stillwater |
| Roundup | Boundup | Roundun | Roundun | Roundup |
| Wigeon | Wigeon | Wigeon | Wigeon | Wigeon |
| Ridgeway | Ridgeway | Ridgeway | Ridgeway | Ridgeway |
| Musgrave Pest 1 | Mugerava Past 1 | Muserava Past 1 | Muserave Pest 1 | Muserava Past 1 |
| Musgrave – Rest 2 | Musgrave = Rest 2 | $\frac{1}{1} \frac{1}{1} \frac{1}$ | $\frac{1}{1}$ | Musgrave = Rest. 1 |
| Musgrave – Fnh 1 | Musgrave – Fnh 1 | Musgrave – Frb. 1 | Musgrave – Frb. 1 | Musgrave – Frb. 1 |
| Musgrave – Enh. 7 | Musgrave – Lini, 1 | Wusgrave – Lini. 1 | Wusgrave – Lini. 1 | Wusgrave – Lini. 1 |
| Musgrave Emil. 2 | Hoskins Landing | Hoskins Landing | Hoskins Landing | Hoskins Landing |
| | Peterson - 1 | Peterson – 1 | Peterson – 1 | Peterson – 1 |
| | Peterson – 2 | Teterson T | Peterson – 2 | Peterson – 2 |
| | Peterson -4 | Peterson -4 | Peterson -4 | Peterson -4 |
| | Peterson – 5 | Peterson – 5 | Peterson -5 | Peterson – 5 |
| | Iack Johnson - main | Jack Johnson - main | | |
| | Jack Johnson - SW | Jack Johnson - SW | | |
| | Creston | Creston | Creston | Creston |
| | Lawrence Park | | Creston | Creston |
| | Perry Ranch | | | Perry Ranch |
| | SF Smith River | SF Smith River | SF Smith River | SF Smith River |
| | Camp Creek | Camp Creek | Camp Creek | Camp Creek |
| | Kleinschmidt | Kleinschmidt – pond | Kleinschmidt – pond | Kleinschmidt – pond |
| | Riemsenning | Kleinschmidt – stream | Kleinschmidt – stream | Kleinschmidt – stream |
| | | Ringling - Galt | Kieliisellillidi Stream | Kiemsennindt stream |
| | | Temping Out | Circle | |
| | <u> </u> | | Cloud Ranch Pond | Cloud Ranch Pond |
| | <u> </u> | | Cloud Ranch Stream | |
| | | | Colloid | Colloid |
| | | | Jack Creek | Jack Creek |
| | | | Norem | Norem |
| | | | 11010m | Rock Creek Ranch |
| | | | | Wagner March |
| | | | | vi agnei maisii |

Table 1. Montana Department of Transportation Mitigated Wetlands Monitoring Project sites, 2001 – 2005.

Sample Processing

Aquatic invertebrate samples were collected at mitigation wetland sites in the summer months of 2001, 2002, 2003, 2004, and 2005 by personnel of Land and Water Consulting, 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, over the water surface, and included disturbing and scraping substrates at each sampled sites. Samples were preserved in ethanol at each wetland site and subsequently 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, when possible, from each sample. In some cases, the entire sample contained fewer than 100 organisms; in these cases, all organisms from the sample were taken. Taxa were identified in general accordance with the taxonomic resolution standards set out in the MT DEQ Standard Operating Procedures for Sampling and Sample Analysis (Bukantis 1998). All samples were re-identified by a second taxonomist for quality assurance purposes. The identified samples have been archived at Rhithron's laboratory. Taxonomic data and organism counts were entered into an Excel 2000 spreadsheet, and metrics were calculated and scored using spreadsheet formulae.

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, %Orthocladiinae 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 2005 data, no changes were made to scoring criteria this year. Summary metric values and scores for the 2005 samples are given in Tables 3a-3d.

| | | 1 |
|-----------------------------------|--|---|
| Metric | Metric calculation | Expected response to degradation or impairment |
| 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 times that taxon's modified Hilsenhoff Biotic Index 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 |

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

RESULTS

(Note: Individual site discussions were removed from this report by Land &Water Consulting / PBS&J and are included in the Macro-Invertebrate sections of individual reports. Summary tables are provided on the following pages.)

| | BEAVERHEAD #1 | BEAVERHEAD #3 | BEAVERHEAD #5 | BEAVERHEAD #6 | BIG SPRING CREEK | STILLWATER | ROUNDUP | WIDGEON |
|---------------------------|------------------|------------------|------------------|------------------|---------------------|------------|---------|---------|
| Total taxa | 22 | 9 | 14 | 18 | 28 | 17 | 7 | 19 |
| POET | 2 | 0 | 0 | 2 | 4 | 4 | 0 | 0 |
| Chironomidae taxa | 7 | 4 | 4 | 4 | 9 | 5 | 3 | 11 |
| Crustacea + Mollusca | 4 | 3 | 1 | 4 | 7 | 5 | 2 | 4 |
| % Chironomidae | 59.80% | 7.55% | 50.00% | 16.67% | 33.65% | 9.43% | 22.22% | 76.47% |
| Orthocladiinae/Chir | 0.197 | 0.625 | 0.059 | 0.067 | 0.457 | 0.500 | 0.000 | 0.205 |
| %Amphipoda | 1.96% | 0.94% | 0.00% | 1.11% | 18.27% | 7.55% | 0.00% | 10.78% |
| %Crustacea + %Mollusca | 10.78% | 90.57% | 2.94% | 55.56% | 33.65% | 53.77% | 72.65% | 15.69% |
| HBI | 7.71 | 7.88 | 7.88 | 7.98 | 7.55 | 7.28 | 8.33 | 8.25 |
| %Dominant taxon | 34.31% | 76.42% | 35.29% | 25.56% | 18.27% | 33.02% | 71.79% | 44.12% |
| %Collector-Gatherers | 56.86% | 93.40% | 47.06% | 21.11% | 70.19% | 64.15% | 82.05% | 26.47% |
| %Filterers | 0.00% | 0.00% | 0.00% | 0.00% | 0.96% | 3.77% | 0.00% | 6.86% |
| | | | | | | | | |
| Total taxa | 5 | 1 | 1 | 3 | 5 | 3 | 1 | 3 |
| POET | 1 | 1 | 1 | 1 | 5 | 5 | 1 | 1 |
| Chironomidae taxa | 5 | 3 | 3 | 3 | 5 | 3 | 3 | 5 |
| Crustacea + Mollusca | 3 | 1 | 1 | 3 | 5 | 3 | 1 | 3 |
| % Chironomidae | 1 | 5 | 1 | 5 | 3 | 5 | 3 | 1 |
| Orthocladiinae/Chir | 3 | 5 | 1 | 1 | 5 | 5 | 1 | 3 |
| %Amphipoda | 5 | 5 | 5 | 5 | 3 | 3 | 5 | 3 |
| %Crustacea + %Mollusca | 5 | 1 | 5 | 3 | 3 | 3 | 1 | 5 |
| HBI | 1 | 1 | 1 | 1 | 3 | 3 | 1 | 1 |
| %Dominant taxon | 3 | 1 | 3 | 5 | 5 | 5 | 1 | 3 |
| %Collector-Gatherers | 3 | 5 | 3 | 1 | 3 | 3 | 5 | 1 |
| %Filterers | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 1 |
| | | | | | | | | |
| Total score | 38 | 32 | 28 | 34 | 48 | 44 | 26 | 30 |
| Impairment classification | sub-optimal | poor | poor | sub-optimal | optimal | optimal | poor | poor |

Table 3a. Metric values and scores for Montana Department of Transportation mitigated wetland sites in 2005.

| | RIDGEWAY | MUSGRAVE REST. 1 | MUSGRAVE REST. 2 | MUSGRAVE ENH. 1 | HOSKINS LANDING | PETERSON RANCH 1 | PETERSON RANCH 2 | PETERSON RANCH 4 | PETERSON RANCH 5 |
|---------------------------|-------------|---------------------|---------------------|--------------------|--------------------|---------------------|---------------------|---------------------|---------------------|
| Total taxa | 19 | 19 | 23 | 19 | 27 | 29 | 16 | 25 | 16 |
| POET | 3 | 1 | 3 | 1 | 5 | 4 | 2 | 4 | 4 |
| Chironomidae taxa | 6 | 6 | 8 | 3 | 6 | 11 | 6 | 8 | 7 |
| Crustacea + Mollusca | 5 | 5 | 3 | 7 | 6 | 6 | 5 | 6 | 2 |
| % Chironomidae | 9.26% | 14.55% | 22.00% | 2.80% | 17.58% | 17.48% | 13.91% | 24.55% | 16.96% |
| Orthocladiinae/Chir | 0.600 | 0.750 | 0.136 | 0.667 | 0.188 | 0.556 | 0.563 | 0.630 | 0.632 |
| %Amphipoda | 6.48% | 3.64% | 0.00% | 0.93% | 0.00% | 0.97% | 7.83% | 1.82% | 8.04% |
| %Crustacea + %Mollusca | 22.22% | 30.91% | 38.00% | 58.88% | 27.47% | 31.07% | 72.17% | 20.00% | 8.93% |
| HBI | 7.71 | 7.22 | 7.77 | 7.16 | 6.81 | 7.16 | 7.43 | 7.65 | 8.08 |
| %Dominant taxon | 53.70% | 21.82% | 35.00% | 28.04% | 14.29% | 26.21% | 33.04% | 18.18% | 31.25% |
| %Collector-Gatherers | 68.52% | 40.00% | 15.00% | 11.21% | 31.87% | 59.22% | 28.70% | 43.64% | 68.75% |
| %Filterers | 0.00% | 0.00% | 0.00% | 2.80% | 0.00% | 4.85% | 33.91% | 5.45% | 1.79% |
| | | | | | | | | | |
| Total taxa | 3 | 3 | 5 | 3 | 5 | 5 | 3 | 5 | 3 |
| POET | 3 | 1 | 3 | 1 | 5 | 5 | 1 | 5 | 5 |
| Chironomidae taxa | 3 | 3 | 5 | 3 | 3 | 5 | 3 | 5 | 5 |
| Crustacea + Mollusca | 3 | 3 | 1 | 5 | 5 | 5 | 3 | 5 | 1 |
| % Chironomidae | 5 | 5 | 3 | 5 | 5 | 5 | 5 | 3 | 5 |
| Orthocladiinae/Chir | 5 | 5 | 1 | 5 | 3 | 5 | 5 | 5 | 5 |
| %Amphipoda | 3 | 5 | 5 | 5 | 5 | 5 | 3 | 5 | 3 |
| %Crustacea + %Mollusca | 5 | 5 | 3 | 3 | 5 | 5 | 1 | 5 | 5 |
| HBI | 1 | 3 | 1 | 3 | 5 | 3 | 3 | 1 | 1 |
| %Dominant taxon | 1 | 5 | 3 | 5 | 5 | 5 | 5 | 5 | 5 |
| %Collector-Gatherers | 3 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 3 |
| %Filterers | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 3 | 3 |
| | | | | | | | | | |
| Total score | 38 | 42 | 34 | 42 | 50 | 54 | 34 | 48 | 44 |
| Impairment classification | sub-optimal | 0.7 optimal | sub-optimal | optimal | optimal | optimal | sub-optimal | optimal | 0.755555 optimal |

Table 3b. Metric values and scores for Montana Department of Transportation mitigated wetland sites in 2005.

| | CRESTON | PERRY RANCH | SOUTH FORK SMITH RIVER | CAMP CREEK | KLEINSCH MIDT POND | KLEINSCH MIDT STREAM | CLOUD RANCH POND | COLLOID | JACK CREEK |
|---------------------------|--------------------------|-------------------------|---------------------------------|----------------|-----------------------|----------------------------|-------------------------|------------------|-------------------------|
| Total taxa | 16 | 18 | 19 | 36 | 27 | 23 | 22 | 9 | 16 |
| POET | 0 | 0 | 4 | 14 | 6 | 5 | 2 | 1 | 1 |
| Chironomidae taxa | 4 | 8 | 6 | 13 | 6 | 9 | 11 | 4 | 9 |
| Crustacea + Mollusca | 6 | 4 | 5 | 0 | 2 | 3 | 3 | 1 | 4 |
| % Chironomidae | 27.62% | 43.69% | 21.67% | 45.54% | 8.85% | 45.08% | 37.50% | 25.83% | 29.41% |
| Orthocladiinae/Chir | 0.931 | 0.622 | 0.192 | 0.804 | 0.200 | 0.473 | 0.256 | 0.000 | 0.467 |
| %Amphipoda | 0.00% | 0.00% | 29.17% | 0.00% | 5.31% | 0.82% | 0.00% | 0.00% | 0.98% |
| %Crustacea + %Mollusca | 52.38% | 38.83% | 62.50% | 0.00% | 7.96% | 3.28% | 7.69% | 67.50% | 41.18% |
| HBI | 7.52 | 7.31 | 7.54 | 5.06 | 7.40 | 5.83 | 6.96 | 8.53 | 7.39 |
| %Dominant taxon | 25.71% | 25.24% | 29.17% | 18.81% | 30.09% | 32.79% | 41.35% | 67.50% | 35.29% |
| %Collector-Gatherers | 64.76% | 47.57% | 65.00% | 47.52% | 37.17% | 50.82% | 75.96% | 88.33% | 91.18% |
| %Filterers | 6.67% | 27.18% | 8.33% | 5.94% | 0.88% | 2.46% | 2.88% | 0.00% | 2.94% |
| | | | | | | | | | |
| Total taxa | 3 | 3 | 3 | 5 | 5 | 5 | 5 | 1 | 3 |
| POET | 1 | 1 | 5 | 5 | 5 | 5 | 1 | 1 | 1 |
| Chironomidae taxa | 3 | 5 | 3 | 5 | 3 | 5 | 5 | 3 | 5 |
| Crustacea + Mollusca | 5 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 3 |
| % Chironomidae | 3 | 1 | 3 | 1 | 5 | 1 | 3 | 3 | 3 |
| Orthocladiinae/Chir | 5 | 5 | 3 | 5 | 3 | 5 | 3 | 1 | 1 |
| %Amphipoda | 5 | 5 | 1 | 5 | 3 | 5 | 5 | 5 | 5 |
| %Crustacea + %Mollusca | 3 | 3 | 3 | 5 | 5 | 5 | 5 | 1 | 3 |
| HBI | 3 | 3 | 3 | 5 | 3 | 5 | 3 | 1 | 3 |
| %Dominant taxon | 5 | 5 | 5 | 5 | 5 | 5 | 3 | 1 | 3 |
| %Collector-Gatherers | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 5 | 5 |
| %Filterers | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 |
| | | | | | | | | | |
| Total score | 40 | 38 | 36 | 48 | 42 | 48 | 40 | 26 | 38 |
| Percent of maximum score | 0.000007/ sub-ontimal | 0.633333 sub-ontimal | U.0 sub-ontimel | 0.8 ontimal | 0.7 ontimal | U.8 ontimal | U.000007 sub-ontimal | 0.433333 poor | 0.633333 sub-ontimal |
| impan ment classification | sub-optimal | sab-optimal | sub-optimal | opuna | opuna | opuna | sub-optimal | poor | sab-optimal |

Table 3c. Metric values and scores for Montana Department of Transportation mitigated wetland sites in 2005.
| | NOREM | ROCK CREEK RANCH | WAGNER MARSH |
|--------------------------------------|--------|---------------------|--------------|
| Total taxa | 4 | 24 | 23 |
| POET | 0 | 2 | 5 |
| Chironomidae taxa | 2 | 8 | 8 |
| Crustacea + Mollusca | 2 | 4 | 5 |
| % Chironomidae | 37.50% | 22.00% | 24.00% |
| Orthocladiinae/Chir | 0.000 | 0.318 | 0.167 |
| %Amphipoda | 0.00% | 3.00% | 7.00% |
| %Crustacea + %Mollusca | 62.50% | 40.00% | 19.00% |
| HBI | 7.50 | 7.61 | 8.58 |
| %Dominant taxon | 56.25% | 18.00% | 38.00% |
| %Collector-Gatherers | 6.25% | 57.00% | 40.00% |
| %Filterers | 0.00% | 0.00% | 3.00% |
| | | | |
| Total taxa | 1 | 5 | 5 |
| POET | 1 | 1 | 5 |
| Chironomidae taxa | 1 | 5 | 5 |
| Crustacea + Mollusca | 1 | 3 | 3 |
| % Chironomidae | 3 | 3 | 3 |
| Orthocladiinae/Chir | 1 | 3 | 1 |
| %Amphipoda | 5 | 5 | 3 |
| %Crustacea + %Mollusca | 3 | 3 | 5 |
| HBI | 3 | 1 | 1 |
| %Dominant taxon | 1 | 5 | 3 |
| %Collector-Gatherers | 1 | 3 | 1 |
| %Filterers | 3 | 3 | 3 |
| | | | 22 |
| Total score Porcent of maximum score | 24 | 40 | 38 |
| Impairment classification | poor | sub-optimal | sub-optimal |

Table 3d. Metric values and scores for Montana Department of Transportation mitigated wetland sites in 2005.

Literature Cited

Bollman, W. 1998. Montana Valleys and Foothill Prairies Ecoregion. Master's Thesis. (M.S.) University of Montana. Missoula, Montana.

Bukantis, R. 1998. Rapid bioassessment macroinvertebrate protocols: Sampling and sample analysis SOP's. Working draft. Montana Department of Environmental Quality. Planning Prevention and Assistance Division. Helena, Montana.

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

McCune, B. and M.J. Mefford. 2002. PC-ORD. Multivariate Analysis of Ecological Data, Version 4. MjM Software Design, Gleneden Beach, Oregon, USA.

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: MDT05LW RAI No.: MDT05LW027

| RAI No.: | MDT05LW0 | 27 | | : | Sta. Name | : AMEF | RICAN COLLOID | | |
|---------------|---------------------|--------------|--------------|--------|-----------|---------|---------------|----|----------|
| Date Coll.: | 7/25/2005 | No. Ja | rs: 1 | : | STORET | D: | | | |
| Taxonomic Nan | ne | | Count | PRA | Unique | Stage | Qualifier | BI | Function |
| Non-Insect | | | | | | | | | |
| Ostra | coda | | 81 | 67.50% | Yes | Unknown | | 8 | CG |
| Odonata | | | | | | | | | |
| Coenagrio | nidae | | | | | | | | |
| Coena | agrionidae | | 1 | 0.83% | Yes | Larva | Early Instar | 7 | PR |
| Heteroptera | | | | | | | | | |
| Corixidae | | | | | | | | | |
| Corixi | dae | | 5 | 4.17% | No | Larva | Larva | 10 | PH |
| Tricho | ocorixa sp. | | 1 | 0.83% | Yes | Adult | | 11 | PR |
| Coleoptera | | | | | | | | | |
| Dytiscidae | | | | | | | | | |
| Dytisc | cidae | | 1 | 0.83% | Yes | Larva | Larva | 5 | PR |
| Chironomidae | | | | | | | | | |
| Chironomi | dae | | | | | | | | |
| Chirol | <i>nomus</i> sp. | | 23 | 19.17% | Yes | Larva | | 10 | CG |
| Dicrot | <i>tendipes</i> sp. | | 1 | 0.83% | Yes | Larva | | 8 | CG |
| Glypte | otendipes sp. | | 6 | 5.00% | Yes | Larva | | 10 | SH |
| Pseud | dochironomus sp. | | 1 | 0.83% | Yes | Larva | | 5 | CG |
| | | Sample Count | 120 | | | | | | |

Metrics Report

 Project ID:
 MDT05LW

 RAI No.:
 MDT05LW027

 Sta. Name:
 AMERICAN COLLOID

 Client ID:

 STORET ID

 Coll. Date:
 7/25/2005

Abundance Measures

| Sample Count: | 120 |
|-------------------|----------|
| Sample Abundance: | 1,285.71 |
| Total Abundance: | 1,729.29 |
| Coll. Procedure: | |
| Sample Notes: | |

9.33% of sample used

Taxonomic Composition

| Category | R | Α | PRA | |
|---------------|---|----|--------|--|
| Non-Insect | 1 | 81 | 67.50% | |
| Odonata | 1 | 1 | 0.83% | |
| Ephemeroptera | | | | |
| Plecoptera | | | | |
| Heteroptera | 1 | 6 | 5.00% | |
| Megaloptera | | | | |
| Trichoptera | | | | |
| Lepidoptera | | | | |
| Coleoptera | 1 | 1 | 0.83% | |
| Diptera | | | | |
| Chironomidae | 4 | 31 | 25.83% | |



Dominant Taxa

| Category | Α | PRA |
|------------------|----|-------|
| Ostracoda | 81 | 67.50 |
| Chironomus | 23 | 19.17 |
| Glyptotendipes | 6 | 5.00% |
| Corixidae | 5 | 4.17% |
| Trichocorixa | 1 | 0.83% |
| Pseudochironomus | 1 | 0.83% |
| Dytiscidae | 1 | 0.83% |
| Dicrotendipes | 1 | 0.83% |
| Coenagrionidae | 1 | 0.83% |

Functional Composition

| Category | R | Α | PRA |
|----------------------|---|-----|--------|
| Predator | 3 | 3 | 2.50% |
| Parasite | | | |
| Collector Gatherer | 4 | 106 | 88.33% |
| Collector Filterer | | | |
| Macrophyte Herbivore | | | |
| Piercer Herbivore | 0 | 5 | 4.17% |
| Xylophage | | | |
| Scraper | | | |
| Shredder | 1 | 6 | 5.00% |
| Omivore | | | |
| Unknown | | | |



ıg

ere

ere

erate

Metric Values and Scores Metric BIBI MTP MTV MTM Value Composition Taxa Richness 8 1 0 0 Non-Insect Percent 67.50% E Richness 0 0 1 P Richness 0 0 1 T Richness 0 0 1 EPT Richness 0 0 0 EPT Percent 0 0.00% 0 Oligochaeta+Hirudinea Percent Baetidae/Ephemeroptera 0.000 Hydropsychidae/Trichoptera 0.000 Dominance Dominant Taxon Percent 67.50% 0 0 Dominant Taxa (2) Percent 86.67% Dominant Taxa (3) Percent 91.67% 1 Dominant Taxa (10) Percent 100.00% Diversity Shannon H (loge) 0.929 Shannon H (log2) 1.340 0 Margalef D 1.475 Simpson D 0.535 Evenness 0.119 Function Predator Richness 3 1 Predator Percent 2.50% 1 Filterer Richness 0 Filterer Percent 0.00% 3 Collector Percent 88.33% 0 1 0 Scraper+Shredder Percent 5.00% Scraper/Filterer 0.000 Scraper/Scraper+Filterer 0.000 Habit **Burrower Richness** 4 Burrower Percent 25.83% Swimmer Richness 1 Swimmer Percent 5.00% **Clinger Richness** 0 1 **Clinger Percent** 0.00% Characteristics Cold Stenotherm Richness 0 0.00% Cold Stenotherm Percent Hemoglobin Bearer Richness 4 Hemoglobin Bearer Percent 25.83% Air Breather Richness 1 0.83% Air Breather Percent Voltinism

Univoltine Richness 2 Semivoltine Richness 1 1 Multivoltine Percent 93.33% 0 Tolerance Sediment Tolerant Richness 0 Sediment Tolerant Percent 0.00% Sediment Sensitive Richness 0 Sediment Sensitive Percent 0.00% Metals Tolerance Index 4.250 Pollution Sensitive Richness 0 1 0 Pollution Tolerant Percent 21.67% 3 1 Hilsenhoff Biotic Index 8.513 0 0 Intolerant Percent 0.00% Supertolerant Percent 96.67% CTQa 102.000



Bioassessment Indices

| BioIndex | Description | Score | Pct | Rati |
|----------|--|-------|--------|------|
| BIBI | B-IBI (Karr et al.) | 12 | 24.00% | |
| MTP | Montana DEQ Plains (Bukantis 1998) | 3 | 10.00% | Seve |
| MTV | Montana Revised Valleys/Foothills (Bollman 1998) | 4 | 22.22% | Mod |
| MTM | Montana DEQ Mountains (Bukantis 1998) | 0 | 0.00% | Seve |
| | | | | |