MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2004

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

June 2005

Project No: B43054.00 - 0402

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PBS&J

LAND & WATER

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1.0 INTRODUCTION

This annual report summarizes methods and results from the third 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 initial monitoring event was conducted in 2002. 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.

2.0 METHODS

2.1 Monitoring Dates and Activities

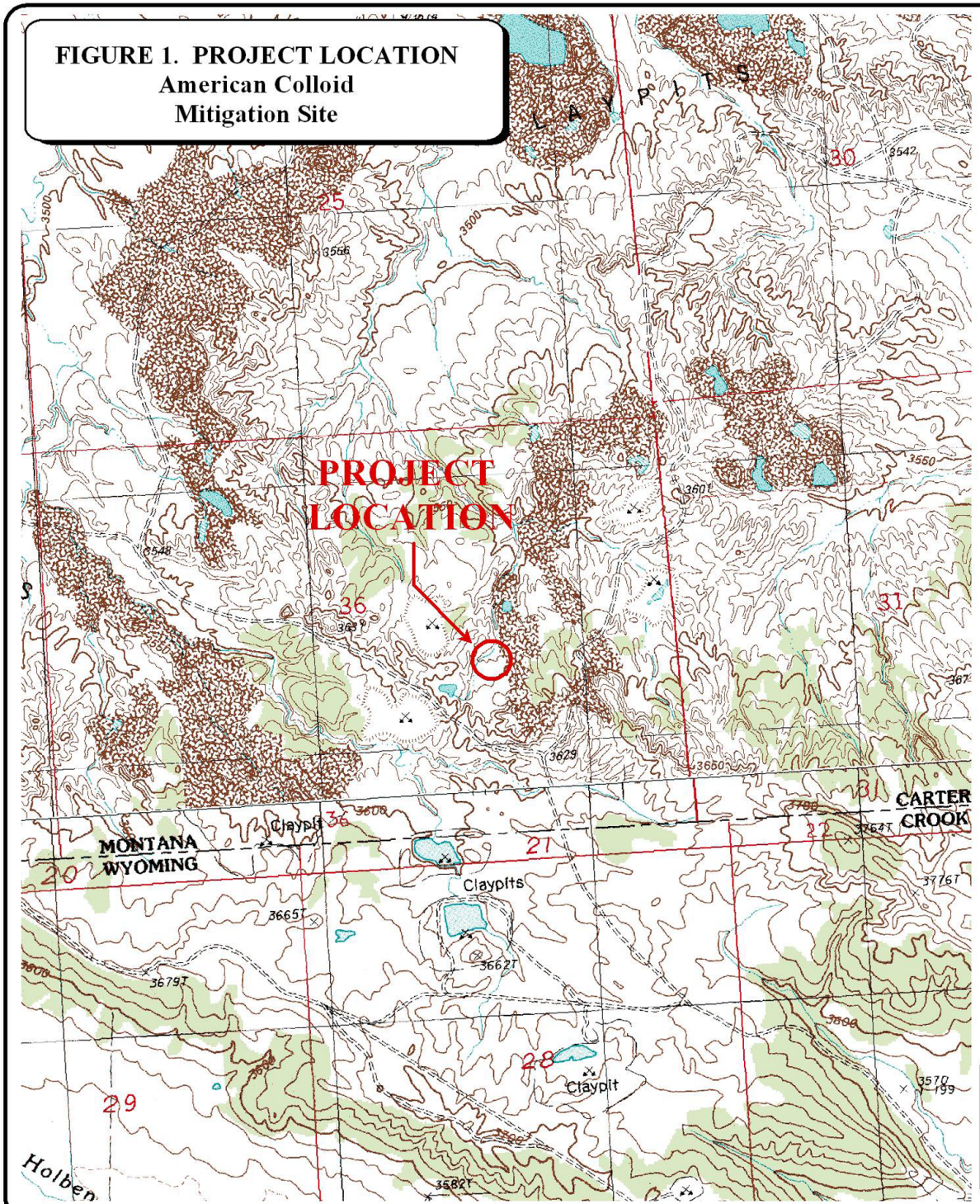
The American Colloid wetland was monitored on July 27, 2004. All information within the Wetland Mitigation Site Monitoring Form **(Appendix B)** was collected at this time. Activities and information conducted/collected included: wetland delineation; wetland/open water boundary mapping; vegetation community 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).

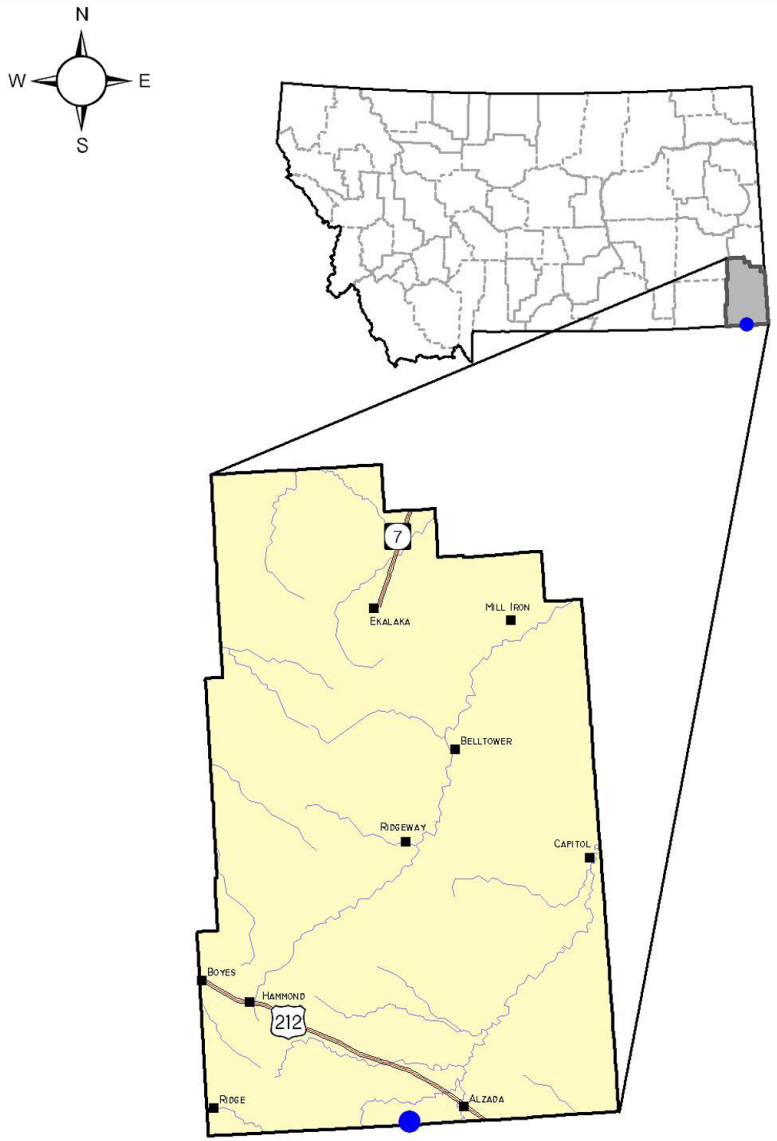
2.2 Hydrology

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 2004 were compared to the 1948-2004 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.

FIGURE 1. PROJECT LOCATION
American Colloid
Mitigation Site





800 0 800 1600 FEET

1: 24,000

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

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1120 CEDAR PO BOX 8254 MISSOULA, MT 59807

2.3 Vegetation

General vegetation types were delineated on an aerial photograph during the site visit (**Figure 3, 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 by mixing samples taken at two different locations at the edge of inundation. 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 2004 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 2004.

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 culverts in the earthen embankment. The site has been filling steadily since it was constructed and at the time of investigation approximately one foot of the outflow pipes remained above water level (see photo page in **Appendix C**). During the July 24, 2004 visit the inundation level had encroached into the upland plant community around the entire circumference of the excavated area for a total of 3.82 acres or 76% of the expected full-pool acreage.

Precipitation data for the Albion 1N station indicate that the yearly average (1948-2004) was 13.67 inches (WRCC 2005); through the month of July the average precipitation was 9.47 inches. During 2004, precipitation through the month of July was 6.17 inches or 65% of the average. Montana, particularly the eastern portion of the state, has been in a drought cycle for over five consecutive years.

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)**.

Table 1: ***2002-2004 American Colloid wetland mitigation vegetation species list.***

Scientific Name[1]	Region 4 (North Plains) Wetland Indicator Status[2]
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

[1] **Bolded** species indicate those documented within the analysis area for the first time in 2004.
[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.

Table 2: ***2002-2004 transect data summary.***

Monitoring Year	2002	2003	2004
Transect Length (feet)	228	290	290
# Vegetation Community Transitions along Transect	1	2	1
# Vegetation Communities along Transect	2	3	2
# Hydrophytic Vegetation Communities along Transect	1	1	1
Total Vegetative Species	7	8	16
Total Hydrophytic Species	2	2	3
Total Upland Species	5	6	13
Estimated % Total Vegetative Cover	80	27	0
% Transect Length Comprised of Hydrophytic Vegetation Communities	84	10	0
% Transect Length Comprised of Upland Vegetation Communities	16	22	0
% Transect Length Comprised of Unvegetated Open Water	0	73	97
% Transect Length Comprised of Bare Substrate	0	0	3

Chart 1: ***Length of vegetation communities along Transect 1.***

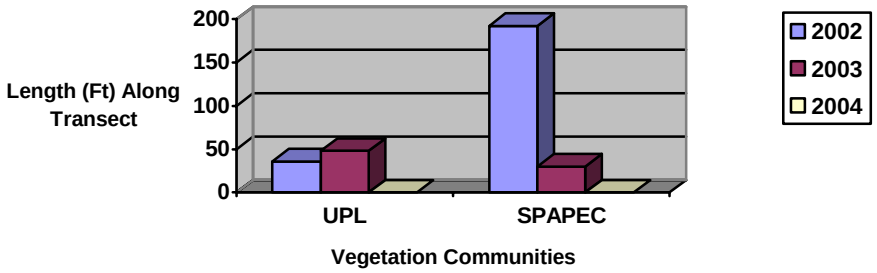
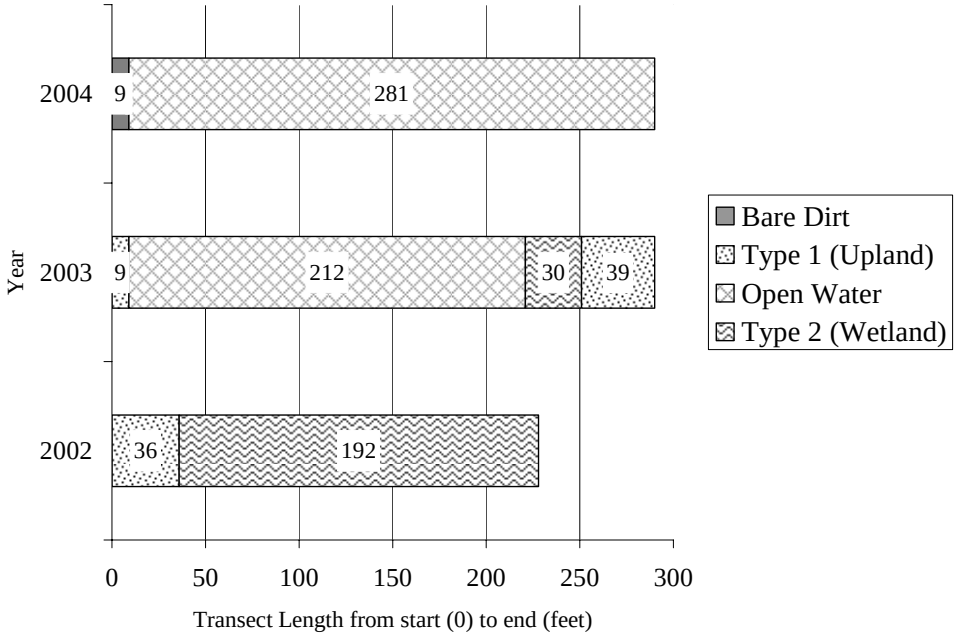


Chart 2: ***Transect maps showing vegetation types from the start of transect (0 feet) to the end of transect (228 feet in 2002 and 290 feet in 2003-2004).***



Though wetland and upland vegetation exists within the assessment area along the transect, vegetation is sparse and does not qualify as communities as their percent cover is <1%. Elsewhere on the site the upland community persists and cover is greater than 30%. There are several small pods of hydrophytic vegetation (*Spartina*) scattered within the open water (**Figure 3, Appendix A**). *Spartina* was more widespread during the first full season (2002) but may have drowned because of inundation. *Spartina* will undoubtedly recolonize the site as the edge of the full pool stabilizes; the stormwater drainage upslope of the pond is colonized with *Spartina* and *Typha* which will readily colonize the wetland.

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 location (SP-1) and one upland (SP-2). Soils at SP-1 were a black (5Y 2.5/1) clay loam with coarse fragments from 0-10 inches. Saturation was noted throughout the profile. Soils at SP-2 were impenetrable as a result of heavy coarse fragments; water in the pit was at 1 inch.

3.4 Wetland Delineation

The open water boundary was delineated and is depicted on **Figure 3, Appendix A**. At the time of the investigation, the area did not qualify as a wetland because of the low percentage of wetland vegetation (1%) within the inundation boundary. This is expected given the wetland is in the initial stages of development. It is fully anticipated that the site will colonize with *Spartina* and *Typha* once the water level has stabilized. 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 tiger salamander *(Ambystoma tigrinum)* was caught in the macro-invertebrate net at the outflow area. A large vole (>6" long) with a very short tail (<1.5 inches) was observed near the edge of water; its apparent nest hole was noted under a rabbit brush. No bird boxes have been installed at this site.

Table 3: ***Wildlife species observed[1] at the American Colloid Mitigation Site from 2002-2004.***

AMPHIBIANS AND REPTILES
northern leopard frog (*Rana pipiens)*
tiger salamander *(Ambystoma tigrinum)*
BIRDS
Spotted Sandpiper *(Actitis macularia)*
Mourning Dove (Zenaida macroura)[2]
American Robin (*Turdus migratorius*)
Brewer's Blackbird (*Euphagus cyanocephalus*)
Red-wing Blackbird (*Agelaius phoeniceus*)
Grasshopper Sparrow *(Ammodramus savannarum)*
Killdeer *(Charadrius vociferous)*
MAMMALS
Odocoileus spp.
Unidentified Vole (likely Sage or Prairie)

[1]**Bolded** species indicate those documented within the analysis area for the first time in 2004.

3.6 Macroinvertebrates

The sample collected at this site was dominated by ceratopogonid gnat larvae (**Bollman 2004**, **Appendix F)**. The biotic index value, which is one of several assessed metrics that increases in response to degradation or impairment, was below the median value for the studied sites, suggesting good water quality. However, the site exhibited very low taxa richness, which could result when there is a lack of variation in habitats. Single individuals of two relatively sensitive taxa were collected. Curiously, one of these was the caddisfly *Rhyacophila*, which is associated exclusively with flowing water. The overall bioassessment score indicated sub-optimal biotic conditions.

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 S1 species, the northern leopard frog. The disturbance value was decreased to low to more accurately reflect current conditions within the site which increased the score of the wetland. Functional units were recorded on the data sheet as 21.7 which represents the maximum credits for the site calculated from the gross inundated wetland acreage. Functional units based exclusively on the area of emergent vegetation (0.035 acre) would result in a minimal 0.2 units.

3.8 Photographs

Representative photos taken from photo points and transect ends are included in **Appendix C.** Extra photos illustrate the captured (and released) tiger salamander and the level of water on the outflow pipes.

3.9 Maintenance Needs/Recommendations

No maintenance issues were noted; the outflow culverts were free on the inlet end. The water level was one foot from the top of the culverts and may be at full pool in 2005.

Table 4: ***Summary of 2002-2004 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
Listed/Proposed T&E Species Habitat	Low (0)	Low (0)	Low (0)
MNHP Species Habitat	Mod (.6)	High (1)	High (1)
General Wildlife Habitat	Mod (.4)	Mod (.4)	High (.9)
General Fish/Aquatic Habitat	NA	NA	NA
Flood Attenuation	Mod (.4)	Mod (.5)	Mod (.5)
Short and Long Term Surface Water Storage	High (.8)	High (.8)	High (.8)
Sediment, Nutrient, Toxicant Removal	Mod (.6)	Mod (.7)	Mod (.7)
Sediment/Shoreline Stabilization	Mod (.7)	Mod (.7)	Low (.3)
Production Export/Food Chain Support	Mod (.6)	Mod (.6)	Mod (.4)
Groundwater Discharge/Recharge	NA	NA	NA
Uniqueness	Low (.3)	Low (.3)	Mod (.4)
Recreation/Education Potential	Mod (.5)	Mod (.5)	Mod (.7)
Actual Points/Possible Points	4.9/10	5.5/10	5.7/10
% of Possible Score Achieved	49%	55%	57%
Overall Category	III	II	II
Total Acreage of Assessed Wetlands within Monitoring Area	**0.69**	**0.69**	**3.82 (max)**
Total Functional Units (acreage x actual points)	**3.38**	**3.79**	**21.7 (max)**
Net Acreage Gain ("new" wetlands)	**0.69**	**0.69**	**3.82 (max)**
Net Functional Unit Gain (new acreage x actual points)	**3.38**	**3.79**	**21.7 (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 the following MDT projects: Alzada-West and Alzada-South (Sickerson 2002), 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 3.82 acres which technically do not qualify as wetlands given the wetland vegetation community is less than 1%; however, the area does qualify as a special aquatic site. At the time of the investigation the area was nearly at full pool; once the water level stabilizes, on-site sources of *Typha* and *Spartina* will colonize readily. The American Colloid mitigation area is rated Category II primarily as a result of the presence of an S3 species, the northern leopard frog. Maximum functional units have increased almost 500% since 2002.

4.0 REFERENCES

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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.

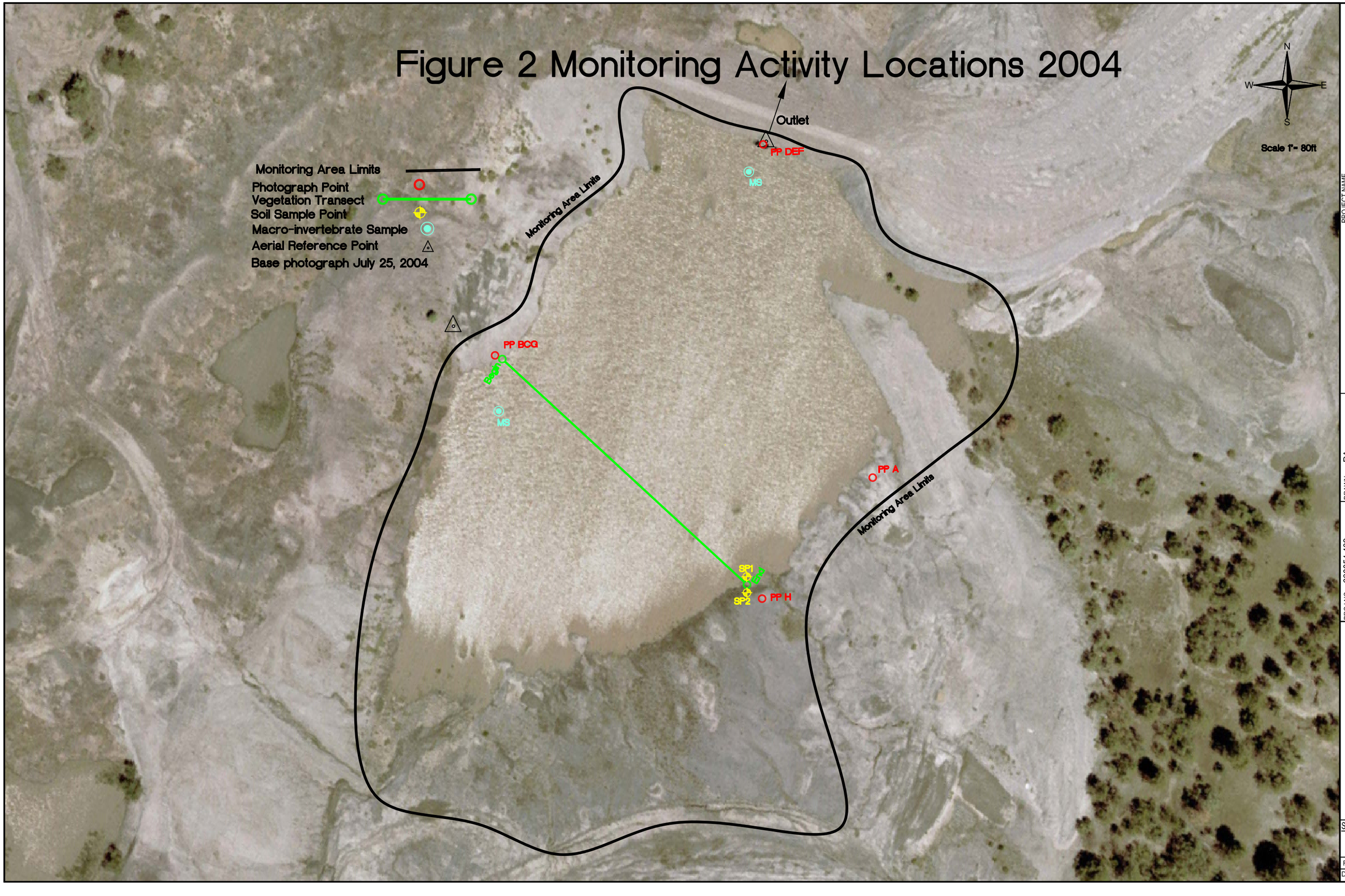
Western Regional Climate Center (WRCC). 2005. Albion 1N, MT Station: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?mtalbi.

Appendix A

FIGURES 2 - 3

MDT Wetland Mitigation Monitoring
American Colloid Mitigation Site
Alzada, Montana

Figure 2 Monitoring Activity Locations 2004



PROJECT NAME
MDT American Colloid Wetland Mitigation

DRAWING TITLE
Monitoring Activity Locations 2004

PROJ NO: 330054.402	DRAWN: RA
FILE NAME: TASK402BASE.dwg	CHECKED: LB
SCALE: 1"= 80 ft	APPVD: JB
LOCATION: American Colloid	PROJ MGR: JB

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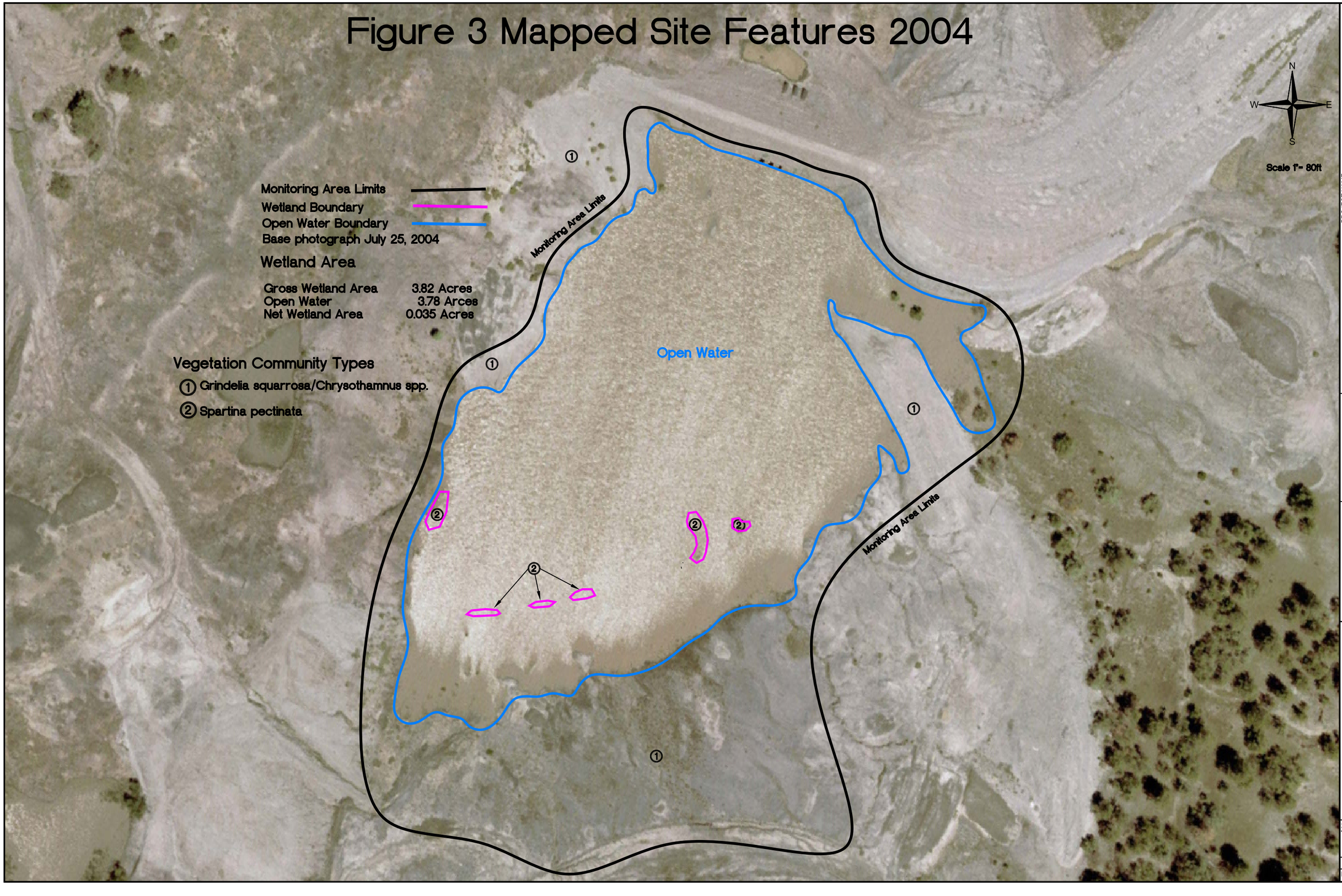
P.O. BOX 8254
Missoula, MT 59807

SHEET NUMBER
2 OF

REV 02
DATE: 06/27/05

Figure 3 Mapped Site Features 2004



PROJECT NAME: MDT American Colloid Wetland Mitigation

DRAWING TITLE: Mapped Site Features 2004

PROJ NO: 330054.402	DRAWN: RA
FILE NAME: TASK402BASE.dwg	CHECKED: LB
SCALE: 1"= 80 ft	APP'VD: JB
LOCATION: American Colloid	PROJ MGR: JB

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Missoula, MT 59807

SHEET NUMBER 3 OF

REV 02

DATE: 06/23/05

Appendix B

2004 WETLAND MITIGATION SITE MONITORING FORM
2004 BIRD SURVEY FORMS
2004 WETLAND DELINEATION FORMS
2004 FULL FUNCTIONAL ASSESSMENT FORM

MDT Wetland Mitigation Monitoring
American Colloid Mitigation Site
Alzada, Montana

LWC / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name:__American Colloid__ Project Number:____B43054.00 0402_ Assessment Date:_7_/_26/_04_
Location:__Alzada_____ MDT District: #16 – Glendive District - Little Missouri River basin Milepost:___
Legal description: T__9 S_ R_58 E___ Section_36___ Time of Day: 8AM-11AM
Weather Conditions:__heavy overcast, lightening ___ Person(s) conducting the assessment:___LB/LWC
Initial Evaluation Date:__7__/_18___/_02_ Visit #:_____3___ Monitoring Year:____2004_____
Size of evaluation area:____ ~5 acres Land use surrounding wetland:___bentonite mine_____

HYDROLOGY

Surface Water Source:___stormwater_____
Inundation**:** Present_X ___ Absent _____ Average depths:_4__ft Range of depths:_0-8__ft
Assessment area under inundation:_99%
Depth at emergent vegetation-open water boundary:_1__ft
If assessment area is not inundated are the soils saturated w/in 12" of surface**:** Yes_X___No____
Other evidence of hydrology on site (drift lines, erosion, stained vegetation etc.): __water lines, stained veg.;
_____

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

Well #	Depth	Well #	Depth	Well #	Depth

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

COMMENTS/PROBLEMS: ____water level almost to full -pool_____

VEGETATION COMMUNITIES

Community No.:__1__ Community Title (main species):__*Grindelia squarosa/Chrysothamnus* spp.__

Dominant Species	% Cover	Dominant Species	% Cover
BROTEC	20	AGRDAS	5
FESOCT	5	ERIPAU	20
(bare dirt)	10	GRISQU	<1
POAURI	10	PLAPAT	5
STICOM	1	ANDSCO	20
CALLON	1		

COMMENTS/PROBLEMS: ___this upland community was partially flooded _____

Community No.:_2___ Community Title (main species):__*Spartina pectinata*_____

Dominant Species	% Cover	Dominant Species	% Cover
SPAPEC	1		
Open water	99		

COMMENTS/PROBLEMS: WETLAND AREA IS FILLING; *Spartina* that was formerly along upstream edge has mostly drown and will very likely re-colonize because of seed source._____

Community No.:_ Community Title (main species):_____

Dominant Species	% Cover	Dominant Species	% Cover

COMMENTS/PROBLEMS:

Additional Activities Checklist:

_X___Record and map vegetative communities on air photo

COMPREHENSIVE VEGETATION LIST

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
Agropyron cristatum	1	***Calamovilfa longifolia***	1
Agropyron dasystacium	1		
Andropogon scoparius	1		
Atriplex argentea	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		
Andropogon scoparius	1		
Species transplanted from Lame Deer Mitigation site on 6/30/03 in shallow water near H-end of transect by Lynn Bacon (LWC):			
Scirpus pungens		*Not seen in 2004; perhaps did not survive or transplants drown. Look for again in 2005.*	
Scirpus acutus			
Juncus bufonius			
Carex lanuginosa			

COMMENTS/PROBLEMS:

_____

_____

_____

_____

_____

PLANTED WOODY VEGETATION SURVIVAL

Species	Number Originally Planted	Number Observed	Mortality Causes
none			

COMMENTS/PROBLEMS:

WILDLIFE

BIRDS

(Attach Bird Survey Field Forms)

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

MAMMALS AND HERPTILES

Species	Number Observed	Indirect indication of use			
		Tracks	Scat	Burrows	Other
Tiger salamander larvae	1				
deer		x	x		
moose (?)			x		

Additional Activities Checklist:
__yes ___Macroinvertebrate sampling (if required)

COMMENTS/PROBLEMS: ____Caught tiger salamander during macroinvertebrate netting; water very "chocolate-milk"-colored with suspended sediment.

PHOTOGRAPHS

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

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

Location	Photograph Description	Compass Reading
A	outlet	2
B	upland buffer	348
C	across wetland and beginning of transect	118
D	downstream of dam	25
E	from dam across wetland	186
F	from dam across wetland	220
G	across wetland and beginning of transect	118
H	end of transect	302
Extra	Tiger Salamander caught in macro net	
Extra	Outflow Pipes; near full pool	

COMMENTS/PROBLEMS: ___

GPS SURVEYING

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

Checklist: (2002)

__X___ Jurisdictional wetland boundary
__X_(3) Landmarks recognizable on the air photo
_ X___ Start and end points of vegetation transect(s) Reset in 2003 and re-GPSed
__X___ Photo reference points
__NA__Groundwater monitoring well locations

COMMENTS/PROBLEMS:

WETLAND DELINEATION

(Attach Corps of Engineers delineation forms)

At each site conduct the items on the checklist below:
__X____Delineate wetlands according to the 1987 Army Corps manual.
__X___ Delineate wetland-upland boundary on the air photo
_(X)__ Survey wetland-upland boundary with a resource grade GPS survey (2002)

COMMENTS/PROBLEMS: _____open-water and veg boundaries hand-drawn 2004.

FUNCTIONAL ASSESSMENT

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

COMMENTS/PROBLEMS:

MAINTENANCE

Were man-made nesting structures installed at this site? YES____ NO ___X___
If yes, do they need to be repaired? YES____ NO____
If yes, describe problems below and indicate if any actions were taken to remedy the problems.

Were man-made structures build or installed to impound water or control water flow into or out of the wetland? YES__X___ NO____
If yes, are the structures working properly and in good working order? YES_X_ NO_____
If no, describe the problems below.

COMMENTS/PROBLEMS: __Water level 1 foot from top of outflow pipe; almost full pool.

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: American Colloid Date: 7/26/04 Examiner: LB/LWC Transect # 1

Approx. transect length: 122 deg Compass Direction from Start **G**: 290 ft

Vegetation type A:	Bare Dirt (CT 1)	
Length of transect in this type:	9’	feet
Species:		Cover:
(bare dirt)		96
ANDSCO		2
ERIPAU		2
(Though this portion of the transect is within CT 1, the vegetation cover is <30% and therefore not truly a “vegetation community”.)		
Total Vegetative Cover:		4%

Vegetation type B:	Open water	
Length of transect in this type:	281’	feet
Species:		Cover:
open water		94
ANDSCO		3
SPAPEC		3
Total Vegetative Cover:		6%

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

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

MDT WETLAND MONITORING – VEGETATION TRANSECT (back of form)

Cover Estimate		**Indicator Class:**	**Source:**
+ = <1%	3 = 11-20%	+ = Obligate	P = Planted
1 = 1-5%	4 = 21-50%	- = Facultative/Wet	V = Volunteer
2 = 6-10%	5 = >50%	0 = Facultative	

Percent of perimeter <1 % developing wetland vegetation – excluding dam/berm structures.

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

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

Notes:

Because the basin is filling wetland vegetation that was present last year has disappeared, likely drowned. Spartina will regenerate because there is an active source in one area of the wetland. One cattail plant was seen in deeper water, but there is also a source upslope in one of the hillside drainages. WL vegetation comprises <1% of the total open water boundary and therefore does not qualify as a wetland.

3

BIRD SURVEY – FIELD DATA SHEET

Page_1___of__1__
Date: 7/26/04
Survey Time: 8-11AM

SITE: American Colloid

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Spotted Sandpiper	1	F	WL edge				

Notes:

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

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

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

Project/Site: American Colloid	Date: 7/26/04
Applicant/Owner: MDT	County: Carter
Investigator: LB/LWC	State: MT

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

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	SPAPEC	H	FACW	9			
2				10			
3				11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 1/1

SPAPEC comprises <1% coverage within entire open water area. SPAPEC growing in ~<10'x10' areas on South end of open water.

HYDROLOGY

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

No Recorded Data Available

Field Observations:

Depth of Surface Water: - (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

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

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

Remarks:

Basin filling; almost to full pool. Water is 1 foot below top of outlet pipe.

SOILS

Map Unit Name (Series and Phase): Neldore-rock outcrop complex (58D)

Drainage Class: well

Field Observations

Taxonomy (Subgroup): Aridic Ustorthents

Confirm Mapped Type? X Yes ____ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
10	A	5Y 2.5/1			clay loam w/ coarse frags

Hydric Soil Indicators:

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

Positive hydric soil indicators, though likely the nature of the substrate in this area.

WETLAND DETERMINATION

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

Remarks:

Hydric veg present but <1% cover because basin is in process of filling. SPAPEC and TYPLAT sources within this basin, will colonize readily once the water level stabilizes.

Approved by HQUSACE 2/92

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

Project/Site: American Colloid	Date: 7/26/04
Applicant/Owner: MDT	County: Carter
Investigator: LB/LWC	State: MT

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

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	ANDSCO		No listing	9			
2	ERIPAU		No listing	10			
3				11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 0/2

Ni listing, however species likely represent an upland community that has been flooded.

HYDROLOGY

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

No Recorded Data Available

Field Observations:

Depth of Surface Water: - (in.)

Depth to Free Water in Pit: 1 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

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

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

Remarks:

edge of water close to pit (15'); basin filling and flooding former upland community. Upland vegetation species recently flooded given they were observed in inundation area (small juniper noted and this area was upland 2 years previous).

SOILS

Map Unit Name (Series and Phase): Neldore-rock outcrop complex (58D)

Drainage Class: well

Field Observations

Taxonomy (Subgroup): Aridic Ustorthents

Confirm Mapped Type? X Yes ____ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
		impenetrable			Coarse frag, rock chips

Hydric Soil Indicators:

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

clay/rock chips were impenetrable w/ auger.

WETLAND DETERMINATION

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

Remarks:

Water levels increasing and this area may be inundated next year.

Approved by HQUSACE 2/92

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

1. Project Name: American Colloid **2. Project #:** -B43054 **Control #:** _____

3. Evaluation Date: 7/27/2004 **4. Evaluator(s):** LB/LWC **5. Wetland / Site #(s):** 0402

6. Wetland Location(s) i. T: 9 S **R:** 58 E **S:** 36 **T:** __ N **R:** __ E **S:** _____

ii. Approx. Stationing / Mileposts: _____

iii. Watershed: 10110201 **GPS Reference No. (if applies):** _____

Other Location Information: _____

7. A. Evaluating Agency LWC

8. Wetland Size (total acres): _____ (visually estimated)
0.035ac (measured, e.g. GPS)

B. Purpose of Evaluation:

- ☐ Wetlands potentially affected by MDT project
- ☐ Mitigation wetlands; pre-construction
- ☒ Mitigation wetlands; post-construction
- ☐ Other

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

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA

HGM CLASS [1]	SYSTEM [2]	SUBSYSTEM [2]	CLASS [2]	WATER REGIME [2]	MODIFIER [2]	% OF AA
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

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

Conditions Within AA	Predominant Conditions Adjacent (within 500 Feet) To AA		
	Land managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed or selectively logged or has been subject to minor clearing; contains few roads or buildings.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.
AA occurs and is managed in predominantly a natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings.	---	low disturbance	---
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 Classes Present in AA	≥3 Vegetated Classes or ≥ 2 if one class is forested	2 Vegetated Classes or 1 if forested	≤ 1 Vegetated Class
Select Rating	---	---	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)**	☐ D	☐ S
Secondary habitat **(list species)**	☐ D	☐ S
Incidental habitat **(list species)**	☐ D	☐ S
No usable habitat	☐ D	☐ S

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

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	---	---	---	---	---	0 (L)

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

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

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

Primary or Critical habitat **(list species)**	☐ D	☐ S	_____
Secondary habitat **(list species)**	☒ D	☐ S	Rana pipiens
Incidental habitat **(list species)**	☐ D	☐ S	_____
No usable habitat	☐ D	☐ S	_____

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

Highest Habitat Level:	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	---	.7 (M)	---	---	---	---

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

14C. General Wildlife Habitat Rating

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

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

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

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

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

Structural Diversity (from #13)	☐High								☐Moderate								☒Low			
Class Cover Distribution (all vegetated classes)	☐Even				☐Uneven				☐Even				☐Uneven				☒Even			
Duration of Surface Water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	E	--	--	--
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 from 14C(i)	**Wildlife Habitat Features Rating** from 14C(ii)			
	☒ Exceptional	☐ High	☐ Moderate	☐ Low
Substantial	--	--	--	--
Moderate	.9 (H)	--	--	--
Low	--	--	--	--

Comments: potential is certianly here for avian use, though only 1 bird seen on survey day. Collected and released a tiger salamander with bug net.

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

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

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

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

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

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

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

Comments: _____

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

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

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

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

ii. **Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA?** (check)
☐**Y** ☒**N** **Comments:** _____

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

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

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

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

Comments: _____

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

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

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

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	☐ ≥ 70%		☒ < 70%		☐ ≥ 70%		☐ < 70%	
Evidence of flooding or ponding in AA	☐ Yes	☐ No	☒ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No
AA contains **no or restricted outlet**	--	--	.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 shoreline by species with deep, binding rootmasses.	Duration of Surface Water Adjacent to Rooted Vegetation		
	☒Permanent / Perennial	☐Seasonal / Intermittent	☐Temporary / Ephemeral
≥ 65 %	--	--	--
35-64 %	--	--	--
< 35 %	.3 (L)	--	--

Comments: basin is flooding and subsequently drown wetland vegetation. Will lkely regenerate.

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

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

A	☐ Vegetated component >5 acres						☐ Vegetated component 1-5 acres						☒ Vegetated component <1 acre					
B	☐ High		☐ Moderate		☐ Low		☐ High		☐ Moderate		☐ Low		☐ High		☐ Moderate		☒ Low	
C	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☒Y	☐N
P/P	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.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)

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

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

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

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

Comments:

14K. UNIQUENESS

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

Replacement Potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland or plant association listed as "S1" by the MTNHP.			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MTNHP.			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate.		
Estimated Relative Abundance from #11	☐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? ☐ **Yes (Rate** ☐ **High (1.0)**, then proceed to 14L(ii) only] ☒ **No** [Proceed to 14L(iii)]

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

iii. Based on the location, diversity, size, and other site attributes, is there a strong potential for recreational or educational use?
☒ **Yes** [Proceed to 14L (ii) and then 14L(iv).] ☐ **No** [Rate as low in 14L(iv)]

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

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

Comments: _____

FUNCTION, VALUE SUMMARY, AND OVERALL RATING

Function and Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	L	0.00	1	
B. MT Natural Heritage Program Species Habitat	M	0.70	1	
C. General Wildlife Habitat	H	0.90	1	
D. General Fish/Aquatic Habitat	NA		--	
E. Flood Attenuation	L	0.20	1	
F. Short and Long Term Surface Water Storage	M	0.40	1	
G. Sediment/Nutrient/Toxicant Removal	M	0.70	1	
H. Sediment/Shoreline Stabilization	L	0.30	1	
I. Production Export/Food Chain Support	M	.40	1	
J. Groundwater Discharge/Recharge	NA		--	
K. Uniqueness	M	0.40	1	
L. Recreation/Education Potential	M	0.70	1	
	Totals:	4.70	10.00	0
	Percent of Total Possible Points:		**47%** (Actual / Possible) x 100 [rd to nearest whole #]	

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

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

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

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

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

☐ **I** ☒ **II** ☐ **III** ☐ **IV**

Appendix C

REPRESENTATIVE PHOTOGRAPHS
2004 AERIAL PHOTOGRAPH

MDT Wetland Mitigation Monitoring
American Colloid Mitigation Site
Alzada, Montana

2004 AMERICAN COLLOID

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

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

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

Location: D **Description:** Downstream of dam. **Compass Reading:** 25°

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

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

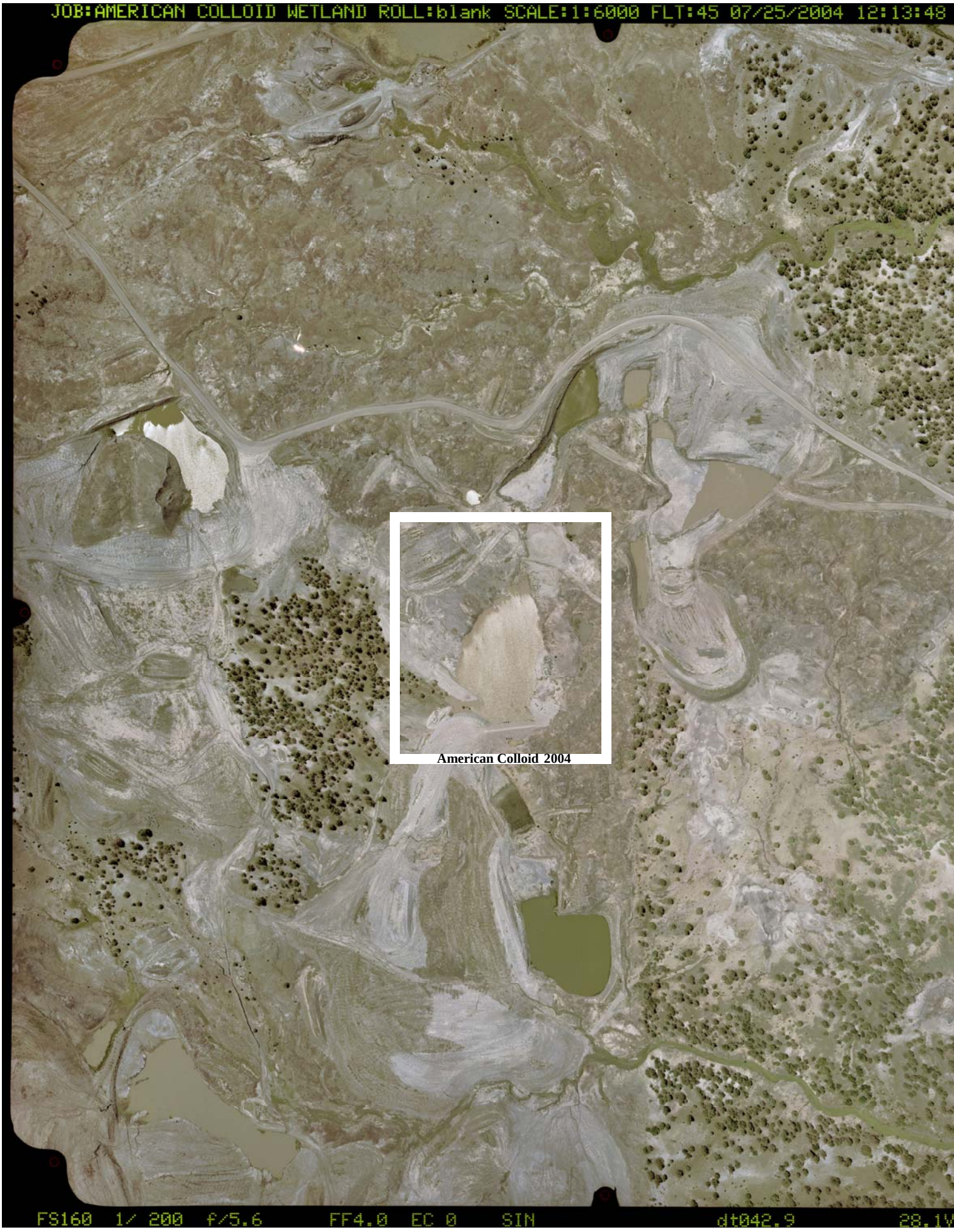
2004 AMERICAN COLLOID

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

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

Location: outlet area **Description:** Tiger salamander caught in macro net.

Location: outlet area **Description:** Outflow pipes.



American Colloid 2004

Appendix D

MDT Revised Preliminary Field Review Report
MDT Addendum Attachments (Plan Sheets)

MDT Wetland Mitigation Monitoring
American Colloid Mitigation Site
Alzada, Montana

LAND & WATER D-1

Montana Department of Transportation
Helena, Montana 59620-1001

Memorandum

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

From: Gordon J. Stockstad
Resources Bureau Chief

Date: December 23, 1998

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

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

Approved D. John Blacker 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

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

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

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

Legal

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

Estimated Cost

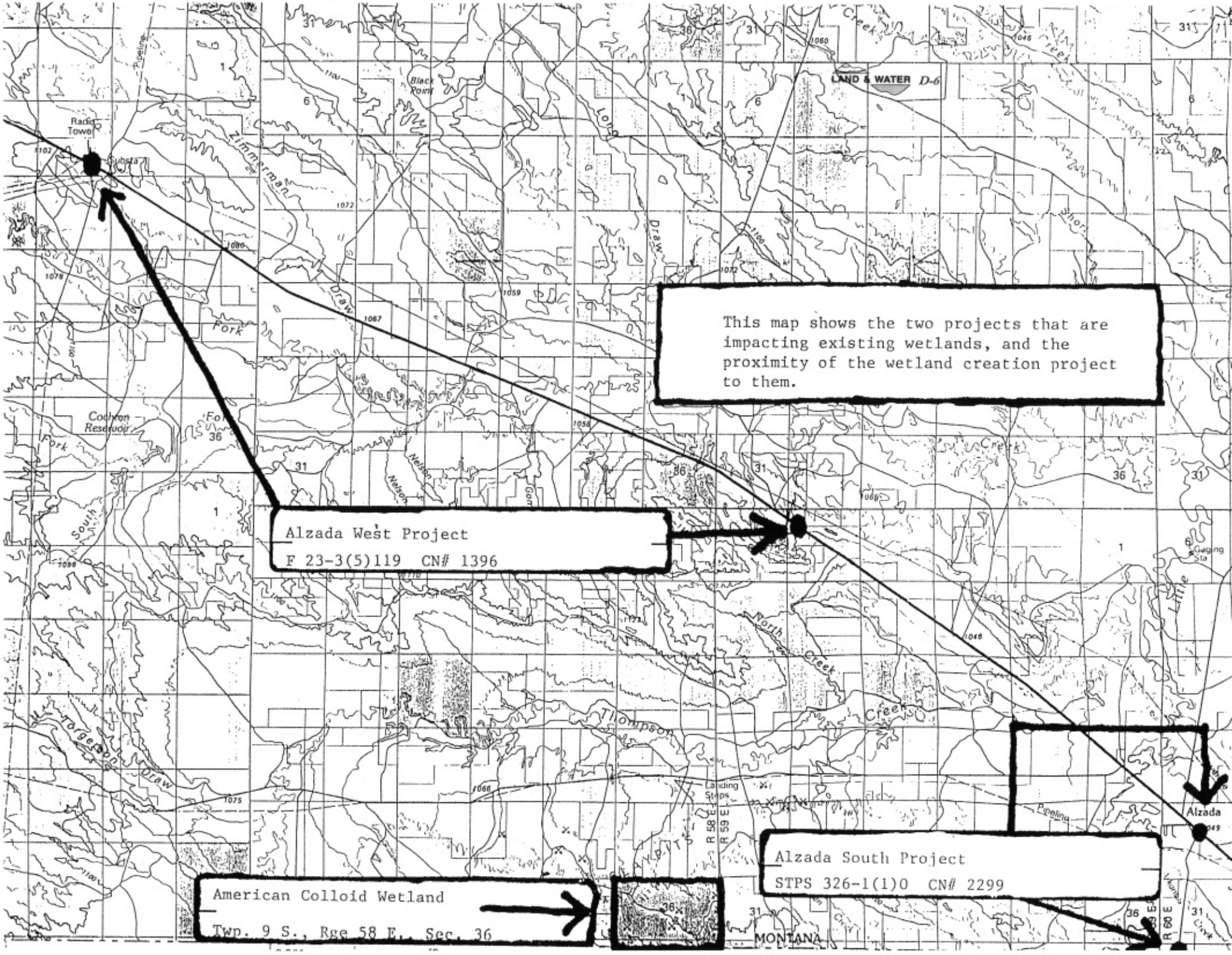
The estimated cost to construct this project is $15,500. This estimate includes Preliminary Engineering, Acquisition of Right-of-Way, and Construction costs. As soon as more information is available a modification to the programming will be made.

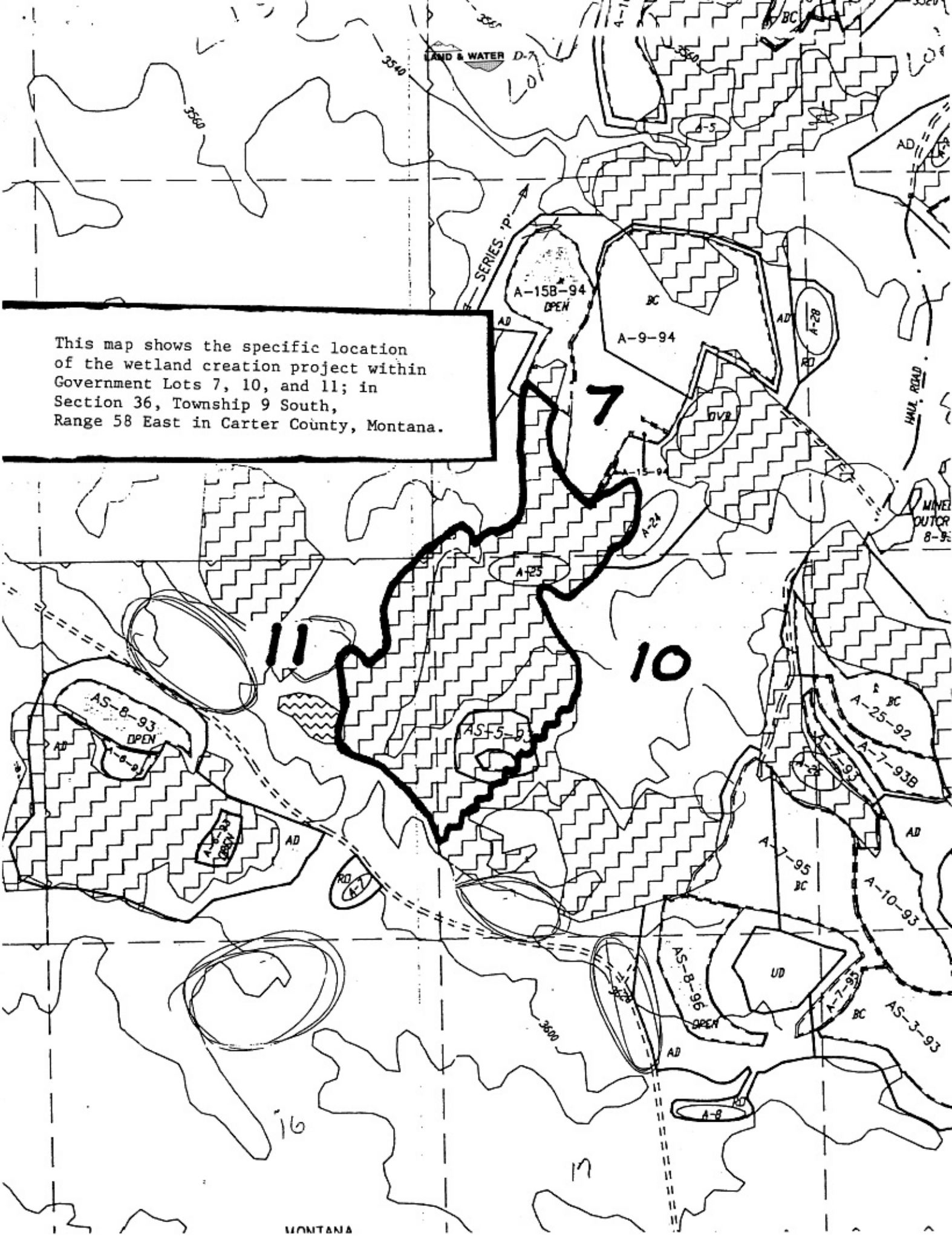
Attachment

GJS:DSA

Distribution:

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


This map shows the two projects that are impacting existing wetlands, and the proximity of the wetland creation project to them.
Alzada West Project
F 23-3(5)119 CN# 1396
Alzada South Project
STPS 326-1(1)0 CN# 2299
American Colloid Wetland
Twp. 9 S., Rge 58 E., Sec. 36
LAND & WATER D-6
Radio Tower
Black Point
Zimmerman Draw
Cedron Reservoir
Nelson Draw
North Creek
Thompson Creek
Forgeson Draw
Alzada
Loading Chute
Pipeline
R 58 E
R 59 E
MONTANA


This map shows the specific location
of the wetland creation project within
Government Lots 7, 10, and 11; in
Section 36, Township 9 South,
Range 58 East in Carter County, Montana.
LAND & WATER D-7
SERIES 'P'
A-15B-94
OPEN
A-9-94
A-5
A-28
A-24
A-25
A-15-94
HAUL ROAD
7
10
11
AS-8-93
OPEN
AS-5-93
A-25-92
A-7-93
A-7-93B
A-7-95
A-10-93
AS-8-96
OPEN
AS-3-93
A-8
3600
3540
3560
16
17
MONTANA

LAND & WATER D-8

MONTANA DEPARTMENT OF TRANSPORTATION
HELENA, MONTANA 59620-1001

DATE ISSUED: July 18, 2001

A D D E N D U M

For the Following Project
To Be Let On

July 26, 2001

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

~~ADDENDUM NO. 1~~

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

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

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

INSTRUCTIONS – READ CAREFULLY

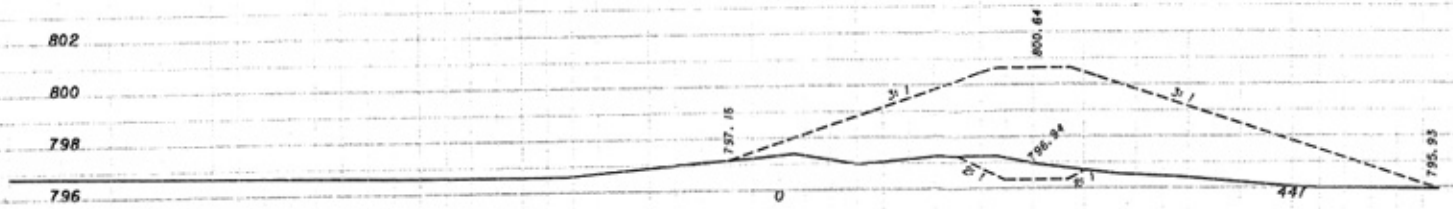
Load the electronic amendment file while in the opened project file to apply the addendum. In order to be responsive, the Schedule of Items printout on projects with addendums must show the addendum(s) applied at the bottom of each page.

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

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

EXCAVATION
cubic meters

EMBANKMENT
cubic meters



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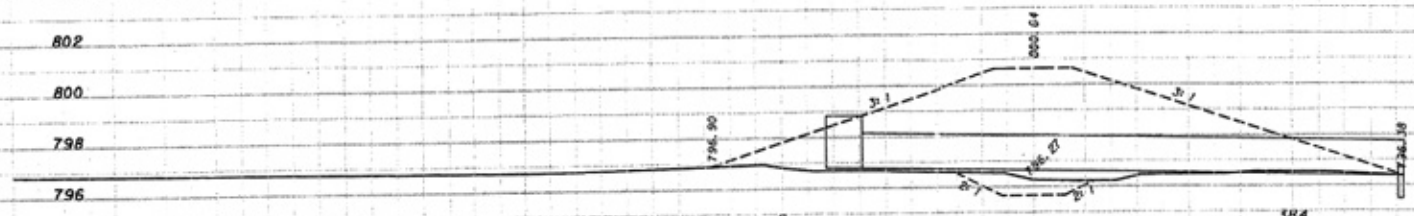
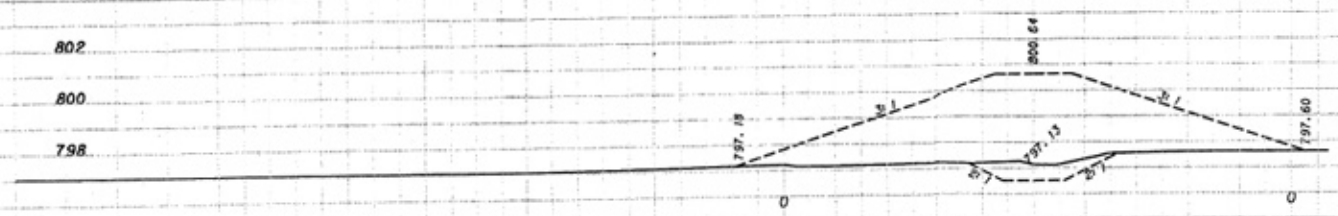


0+20
TRIPLE 1350 mm x 63.0 m CSP
TRIPLE 1350 mm x 5.5 m CSP RISER LT
2.6 m³ CL DD CONC CUTOFF WALL
0.7 m³ CL DD CONC BASE
2.9 m COVER

0+20.00



0+10.00 TO 0+50.00
KEY
106 m³ ADD EXC.

0+10.00

0+00.00
BEGIN DAM

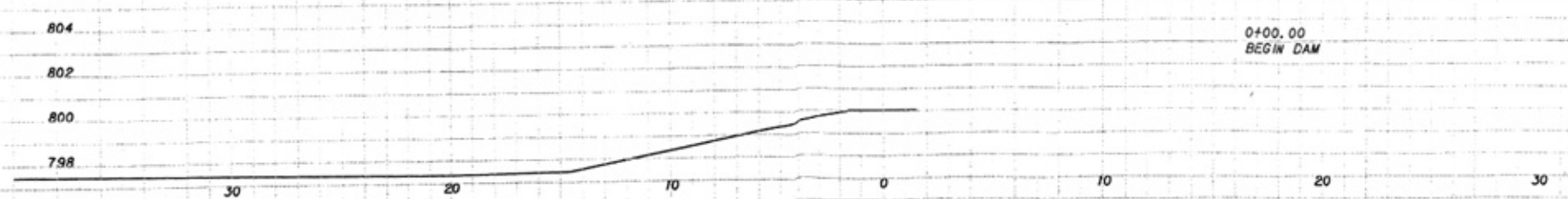


TABLE OF CONTENTS

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.

MONTANA DEPARTMENT OF TRANSPORTATION

MONTANA CADD

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05/30/01	DRAWN BY	L. ZEIGLER	5-08-2001
9:11:15 52	APPROVED BY	P. FERRY	5-08-2001
~ 2	EPS - U6564	REVISED BY	

SUMMARY

ADDENDUM NO. 1
ATTACHMENT NO. 3

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH-STPS-BR 6(10)	3

LAND & WATER D-II

GRADING

STATION	cubic meters EXCAVATION		cubic meters 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

FENCING

STATION* FROM	STATION* TO	meters TYPE FSM			EACH SINGLE PANEL	EACH DOUBLE PANEL		meters GATES G2		REMARKS
		1 043			4	4		9.6		
TOTAL		1 043			4	4		9.6		

* REFERENCE TO SURVEYED EASEMENT

TOPSOIL & SEEDING*

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

* SEEDING WILL BE HAND BROADCAST

CULVERTS

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

MONTANA DEPARTMENT OF TRANSPORTATION

MONTANA CADD

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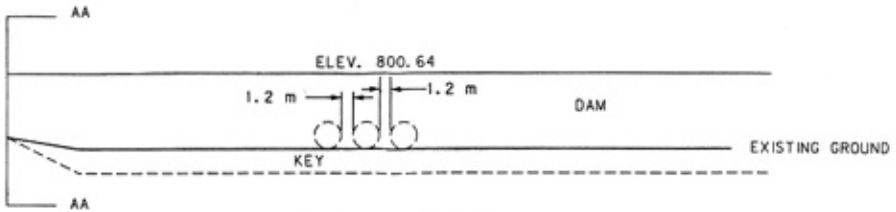
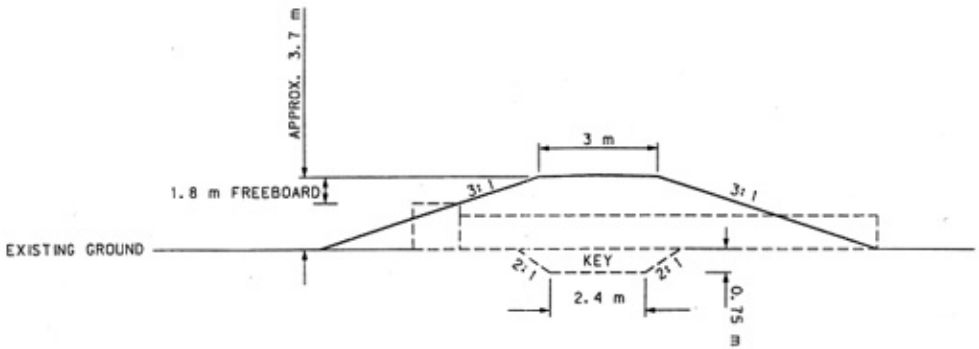
3 CPS - U6564	REVISED BY		
2			
1			

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH-STPS-BR 6(10)	4

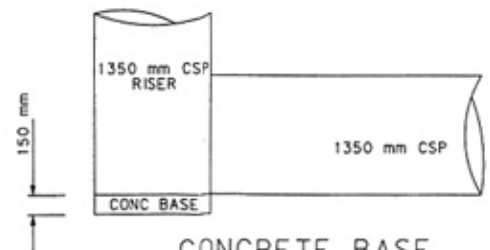
DETAILS



SIDE VIEW DAM
NOT TO SCALE



END VIEW DAM
NOT TO SCALE
SECTION AA



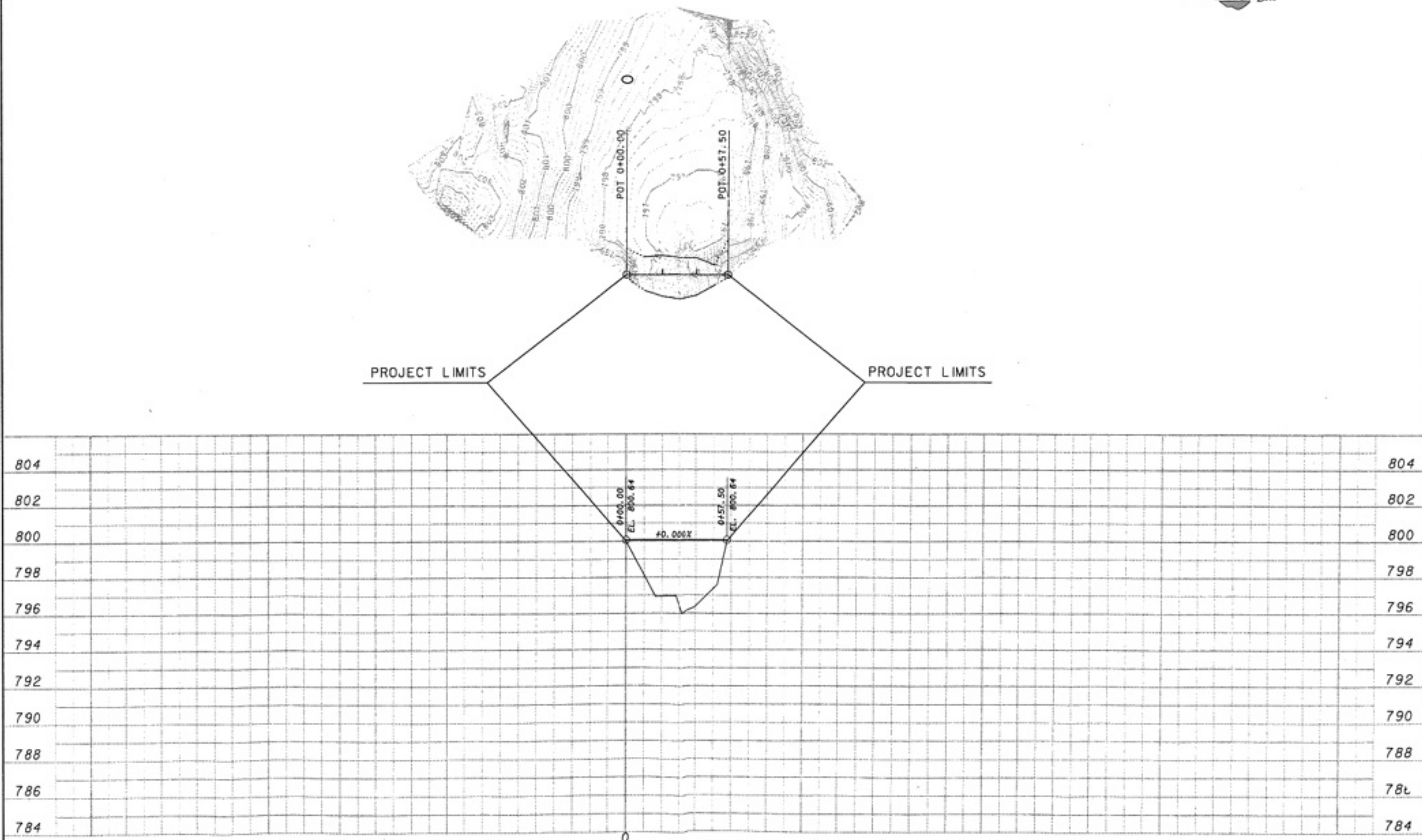
CONCRETE BASE
NOT TO SCALE

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH-STPS-BR 6(10)	5

LAND & WATER D.13

MONTANA DEPARTMENT OF TRANSPORTATION

MONTANA CADD



DESIGNED BY	L. ZEIGLER	5-08-2001
DRAWN BY	L. ZEIGLER	5-08-2001
APPROVED BY	P. PENNY	5-08-2001
REVISED BY		

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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

2004 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 see 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 Wetland Mitigation Monitoring Project
Aquatic Invertebrate Monitoring
Summary 2001 - 2004

METHODS

Among other monitoring activities, aquatic invertebrate assemblages were collected at a number of mitigation wetlands throughout Montana. This report summarizes data generated from four years of collection.

The method employed to assess these wetlands is based on constructing an index using a battery of 12 bioassessment metrics or attributes (Table1) 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, 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, and 2004, was assessed using the tested metric battery developed for montane streams of Western Montana (Bollman 1998).The fauna at the Camp Creek site was different from that of the other sites, and suggested montane stream conditions rather than wetland conditions. For the wetlands, “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 “sub-optimal” and “poor” assessment categories. A score of 5, 3, or 1 was assigned to optimal, sub-optimal, and poor metric performance, respectively. In this way, metric values were translated into normalized metric scores, and scores for all metrics were summed to produce a total bioassessment score. Total bioassessment scores were classified according to a similar process, using the ranges and distributions of total scores for all sites studied in all years.

The purpose of constructing an index from biological attributes or metrics is to provide a means of integrating information to facilitate the determination of whether management action is needed. The nature of the action needed is not determined solely by the index score, however, but by consideration of an analysis of the component metrics, the taxonomic composition of the assemblages, and other issues. The diagnostic functions of the metrics and taxonomic data need more study; 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.

Sample processing

Aquatic invertebrate samples were collected at mitigation wetland sites in the summer months of 2001, 2002, 2003, and 2004 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 1 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.

RESULTS

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. Thus, the 2004 database contains data for 122 sampling events at 50 unique sites. Table 2 summarizes sites and sampling years.

Metric scoring criteria were re-developed each year as new data was added. For 2004, all 122 records were utilized. Ranges of individual metrics, as well as median metric values remained remarkably consistent in each of the 4 years; minimal changes resulted from the addition of new data in 2004. The summary metric values and scores for the 2004 samples are given in Tables 3a-3d.

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.

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.

Table 1. Aquatic invertebrate metrics employed in the MTDT mitigation wetland monitoring study, 2001- 2004.

Metric	Metric Calculation	Expected Response to Degradation or Impairment
Total taxa	Count of unique taxa identified to lowest recommended taxonomic level	Decrease
POET	Count unique Plecoptera, Trichoptera, Ephemeroptera, and Odonata taxa identified to lowest recommended taxonomic level	Decrease
Chironomidae taxa	Count unique midge taxa identified to lowest recommended taxonomic level	Decrease
Crustacea taxa + Mollusca taxa	Count 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. Montana Department of Transportation Mitigated Wetlands Monitoring Project sites. 2001 – 2004.

2001	2002	2003	2004
Beaverhead 1	Beaverhead 1	Beaverhead 1	Beaverhead 1
Beaverhead 2	Beaverhead 2		
Beaverhead 3	Beaverhead 3		Beaverhead 3
Beaverhead 4	Beaverhead 4	Beaverhead 4	
Beaverhead 5	Beaverhead 5	Beaverhead 5	Beaverhead 5
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
Fourchette – Flashlight	Fourchette – Flashlight	Fourchette – Flashlight	Fourchette – Flashlight
Fourchette – Penguin	Fourchette – Penguin	Fourchette – Penguin	Fourchette – Penguin
Fourchette – Albatross	Fourchette – Albatross	Fourchette – Albatross	Fourchette – Albatross
Big Spring	Big Spring	Big Spring	Big Spring
Vince Ames			
Ryegate			
Lavinia			
Stillwater	Stillwater	Stillwater	Stillwater
Roundup	Roundup	Roundup	Roundup
Wigeon	Wigeon	Wigeon	Wigeon
Ridgeway	Ridgeway	Ridgeway	Ridgeway
Musgrave – Rest. 1	Musgrave – Rest. 1	Musgrave – Rest. 1	Musgrave – Rest. 1
Musgrave – Rest. 2	Musgrave – Rest. 2	Musgrave – Rest. 2	Musgrave – Rest. 2
Musgrave – Enh. 1	Musgrave – Enh. 1	Musgrave – Enh. 1	Musgrave – Enh. 1
Musgrave – Enh. 2			
	Hoskins Landing	Hoskins Landing	Hoskins Landing
	Peterson - 1	Peterson – 1	Peterson – 1
	Peterson – 2		Peterson – 2
	Peterson – 4	Peterson – 4	Peterson – 4
	Peterson – 5	Peterson – 5	Peterson – 5
	Jack Johnson - main	Jack Johnson - main	
	Jack Johnson - SW	Jack Johnson - SW	
	Creston	Creston	Creston
	Lawrence Park		
	Perry Ranch		
	SF Smith River	SF Smith River	SF Smith River
	Camp Creek	Camp Creek	Camp Creek
	Kleinschmidt	Kleinschmidt – pond	Kleinschmidt – pond
		Kleinschmidt – stream	Kleinschmidt – stream
		Ringling - Galt	
			Circle
			Cloud Ranch Pond
			Cloud Ranch Stream
			Colloid
			Jack Creek
			Norem

Table 3a.

	BEAVER HEAD #1	BEAVER HEAD #3	BEAVER HEAD #5	BEAVER HEAD #6	BIG SPRING CREEK	CIRCLE	CLOUD RANCH POND	CLOUD RANCH STREAM	COLLOID	CRESTON
Total taxa	27	12	21	18	25	16	16	20	8	18
POET	3	0	2	3	4	2	2	4	2	3
Chironomidae taxa	7	5	5	5	8	5	6	11	1	2
Crustacea + Mollusca	7	3	4	6	7	1	6	1	1	7
% Chironomidae	0.33636	0.18888	0.39285	0.57547	0.44329	0.55855	0.41666	0.84	0.09090	0.06087
Orthocladiinae/Chir	0.05405	0.35294	0.06818	0.36065	0.27907	0.69354	0.4	0.16666	0	0
%Amphipoda	0.03636	0	0.01785	0.05660	0.05154	0	0.00925	0	0	0
%Crustacea + %Mollusca	0.31818	0.73333	0.05357	0.12264	0.18556	0.03603	0.36111	0.01	0.09090	0.73913
HBI	7.97169	7.88888	8.36363	8.15789	7.61855	7.19090	7.32291	4.84	6	6.92173
%Dominant taxon	0.2	0.57777	0.23214	0.25471	0.23711	0.38738	0.13888	0.38	0.27272	0.37391
%Collector-Gatherers	0.40909	0.75555	0.51785	0.62264	0.78350	0.05405	0.67592	0.74	0.18181	0.29565
%Filterers	0.12727	0	0	0	0.01030	0.15315	0.09259	0.17	0	0.06087
Total taxa	5	1	5	3	5	3	3	3	1	3
POET	3	1	1	3	5	1	1	5	1	3
Chironomidae taxa	5	3	3	3	5	3	3	5	1	1
Crustacea + Mollusca	5	1	3	5	5	1	5	1	1	5
% Chironomidae	3	3	3	1	1	1	1	1	5	5
Orthocladiinae/Chir	1	3	1	3	3	5	3	1	1	1
%Amphipoda	5	5	5	3	3	5	5	5	5	5
%Crustacea + %Mollusca	5	1	5	5	5	5	3	5	5	1
HBI	1	1	1	1	1	3	3	5	5	3
%Dominant taxon	5	1	5	5	5	3	5	3	5	3
%Collector-Gatherers	1	3	3	3	3	1	3	3	1	1
%Filterers	1	3	3	3	3	1	1	1	3	1
	40	26	38	38	44	32	36	38	34	32
	0.666667	0.433333	0.633333	0.633333	0.733333	0.533333	0.6	0.633333	0.566667	0.533333
	sub-optimal	poor	sub-optimal	sub-optimal	optimal	sub-optimal	sub-optimal	sub-optimal	sub-optimal	sub-optimal

Table 3b.

	FOURCHETTE CREEK ALBATROSS RESERVOIR	FOURCHETTE CREEK FLASHLIGHT RESERVOIR	FOURCHETTE CREEK PENGUIN RESERVOIR	FOURCHETTE CREEK PUFFIN RESERVOIR	JACK CREEK	MDT CAMP CREEK	MDT HOSKINS LANDING	MDT KLEINSCHMIDT CREEK	MDT KLEINSCHMIDT POND
Total taxa	18	23	19	22	23	35	25	19	19
POET	3	5	4	3	5	12	4	4	6
Chironomidae taxa	6	9	6	4	8	14	4	6	4
Crustacea + Mollusca	3	4	5	8	7	1	6	2	4
% Chironomidae	0.135135	0.265306	0.066116	0.247934	0.352113	0.37963	0.036697	0.438776	0.047619
Orthocladiinae/Chir	0.2	0.346154	0.625	0.3	0.52	0.585366	0.5	0.627907	0.8
%Amphipoda	0.126126	0.336735	0.578512	0.041322	0.028169	0	0.018349	0.010204	0.009524
%Crustacea + %Mollusca	0.684685	0.387755	0.77686	0.371901	0.380282	0.111111	0.541284	0.061224	0.190476
HBI	7.972973	7.216495	7.7	6.950413	7.647059	4.570093	6.59633	6.561224	6.67619
%Dominant taxon	0.495495	0.336735	0.561983	0.140496	0.15493	0.111111	0.366972	0.316327	0.552381
%Collector-Gatherers	0.873874	0.816327	0.702479	0.38843	0.394366	0.416667	0.091743	0.683673	0.114286
%Filterers	0	0.010204	0.132231	0.008264	0.042254	0.12037	0.018349	0.153061	0.047619
Total taxa									
POET	3	5	3	5	5	5	5	3	3
Chironomidae taxa	3	5	5	3	5	5	5	5	5
Crustacea + Mollusca	3	5	3	3	5	5	3	3	3
% Chironomidae	1	3	3	5	5	1	5	1	3
Orthocladiinae/Chir	5	3	5	3	3	3	5	1	5
%Amphipoda	3	3	5	3	5	5	5	5	5
%Crustacea + %Mollusca	3	1	1	3	5	5	5	5	5
HBI	1	3	1	3	3	5	3	5	5
%Dominant taxon	1	3	1	3	1	5	5	5	5
%Collector-Gatherers	1	5	1	5	5	5	3	5	1
%Filterers	5	5	3	1	1	1	1	3	1
	3	3	1	3	3	1	3	1	3
	32	44	32	40	46	46	48	42	44
	0.533333	0.733333	0.533333	0.666667	0.766667	0.766667	0.8	0.7	0.733333
	sub-optimal	optimal	sub-optimal	optimal	optimal	optimal	optimal	optimal	optimal

Table 3d.

	ROUNDUP	SOUTH FORK SMITH RIVER	STILLWATER	WIGEON
Total taxa	9	20	23	16
POET	0	5	4	3
Chironomidae taxa	4	7	9	5
Crustacea + Mollusca	3	3	4	3
% Chironomidae	0.55	0.482143	0.466667	0.314815
Orthocladiinae/Chir	0.072727	0.055556	0.244898	0.647059
%Amphipoda	0	0.071429	0.12381	0.481481
%Crustacea + %Mollusca	0.42	0.116071	0.180952	0.574074
HBI	8.89	6.589286	6.47619	7.534653
%Dominant taxon	0.28	0.294643	0.133333	0.481481
%Collector-Gatherers	0.56	0.839286	0.628571	0.657407
%Filterers	0.14	0	0	0.083333
Total taxa				
POET	1	3	5	3
Chironomidae taxa	1	5	5	3
Crustacea + Mollusca	3	5	5	3
% Chironomidae	1	1	3	1
Orthocladiinae/Chir	1	1	1	3
%Amphipoda	1	1	3	5
%Crustacea + %Mollusca	5	3	3	1
HBI	3	5	5	3
%Dominant taxon	1	5	5	3
%Collector-Gatherers	5	5	5	3
%Filterers	3	5	3	3
	1	3	3	1
	26	42	46	32
	0.433333	0.7	0.766667	0.533333
	poor	optimal	optimal	Sub-optimal

Aquatic Invertebrate Data Summary

Project ID: MDT04LW
STORET Station ID:
Station Name: COLLOID

Activity ID:
Sample Date:

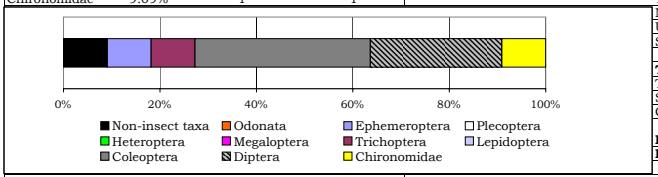
Sample type	
SUBSAMPLE TOTAL ORGANISMS	11
Portion of sample used	100.00%
Estimated number in total sample	11
Conversion factor	1.345
Estimated number in 1 square meter	15
Sampling effort	
Habitat type	
EPT abundance	2
Taxa richness	8
Number EPT taxa	2
Percent EPT	18.18%

TAXONOMIC COMPOSITION

GROUP	PERCENT	ABUNDANCE	#TAXA
Non-insect taxa	9.09%	1	1
Odonata	0.00%	0	0
Ephemeroptera	9.09%	1	1
Plecoptera	0.00%	0	0
Heteroptera	0.00%	0	0
Megaloptera	0.00%	0	0
Trichoptera	9.09%	1	1
Lepidoptera	0.00%	0	0
Coleoptera	36.36%	4	3
Diptera	27.27%	3	1
Chironomidae	9.09%	1	1

TAXONOMIC RATIOS

METRIC	VALUE
EPT/Chironomidae	2.00
Baetidae/Ephemeroptera	1.00
Hydropsychidae/Trichopt	0.00

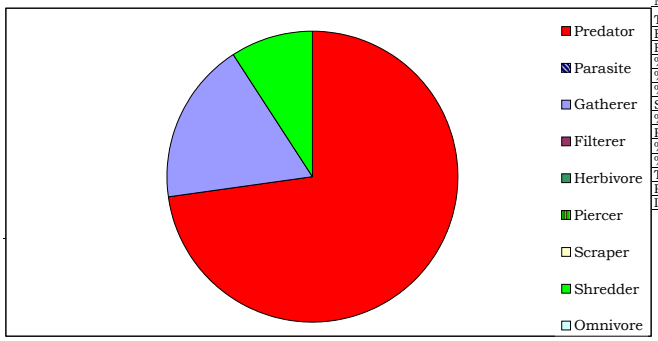


FUNCTIONAL COMPOSITION

GROUP	PERCENT	ABUNDANCE	#TAXA
Predator	72.73%	8	5
Parasite	0.00%	0	0
Gatherer	18.18%	2	2
Filterer	0.00%	0	0
Herbivore	0.00%	0	0
Piercer	0.00%	0	0
Scraper	0.00%	0	0
Shredder	9.09%	1	1
Omnivore	0.00%	0	0
Unknown	0.00%	0	0

FUNCTIONAL RATIOS

METRIC	VALUE
Scraper/Filterer	#DIV/0!
Scraper/Scraper + Filtere	#DIV/0!



COMMUNITY TOLERANCES

Sediment tolerant taxa	0
Percent sediment tolerant	0.00%
Sediment sensitive taxa	0
Percent sediment sensitive	0.00%
Metals tolerance index (McGuire)	4.71
Cold stenotherm taxa	0
Percent cold stenotherms	0.00%

HABITUS MEASURES

Hemoglobin bearer richness	1
Percent hemoglobin bearers	9.09%
Air-breather richness	3
Percent air-breathers	36.36%
Burrower richness	1
Percent burrowers	27.27%
Swimmer richness	2
Percent swimmers	27.27%

DOMINANCE

TAXON	ABUNDANCE	PERCENT
Ceratopogoninae	3	27.27%
Berosus	2	18.18%
Ostracoda	1	9.09%
Callibaetis	1	9.09%
Rhyacophila	1	9.09%
SUBTOTAL 5 DOMINANTS	8	72.73%
Dytiscidae	1	9.09%
Hydrophilidae	1	9.09%
Endochironomus	1	9.09%
Turbellaria	0	0.00%
Nematoda	0	0.00%
TOTAL DOMINANTS	11	100.00%

TOLERANCE/CONDITION INDICES

Community Tolerance Quotient (CTQa)	74.57
Hilsenhoff Biotic Index	6.00

DIVERSITY

Shannon H (loge)	2.73
Shannon H (log2)	1.90
Margalef D	2.91
Simpson D	0.07
Evenness	0.24

VOLTINISM

TYPE	ABUNDANCE	# TAXA	PERCENT
Multivoltine	3	3	27.27%
Univoltine	4	2	36.36%
Semivoltine	4	3	36.36%

TAXA CHARACTERS	#TAXA	PERCENT
Tolerant	4	45.45%
Sensitive	0	0.00%
Clinger	1	9.09%

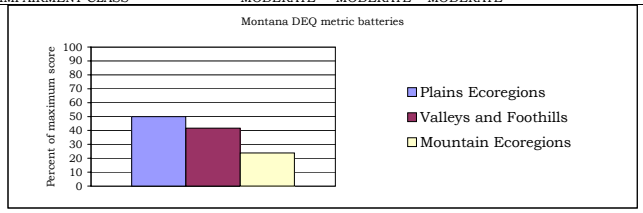
BIOASSESSMENT INDICES

B-IBI (Karr et al.)

METRIC	VALUE	SCORE
Taxa richness	8	1
E richness	1	1
P richness	0	1
T richness	1	1
Long-lived	3	3
Sensitive richness	0	1
%tolerant	45.45%	3
%predators	72.73%	5
Clinger richness	1	1
%dominance (3)	54.55%	3
	TOTAL SCORE	20 40%

MONTANA DEQ INDICES (Bukantis 1998)

METRIC	VALUE	Plains Ecoregions	Valleys and Foothills	Mountain Ecoregions
Taxa richness	8	0	0	0
EPT richness	2	0	0	0
Biotic Index	6.00	1	1	0
%Dominant taxon	27.27%	3	3	2
%Collectors	18.18%	3	3	3
%EPT	18.18%	1	0	0
Shannon Diversity	1.90	1		
%Scrapers +Shredde	9.09%	1	0	0
Predator taxa	5	2		
%Multivoltine	27.27%	3		
%H of T	0.00%		3	
TOTAL SCORES		15	10	5
PERCENT OF MAXIMUM		50.00	41.67	23.81
IMPAIRMENT CLASS		MODERATE	MODERATE	MODERATE



Montana Valleys and Foothills revised index (Bollman 1998)

Percent max.	16.67%	Impairment class	SEVERE

Montana Plains ecoregions metrics (Bramblett and Johnson 2002)

Riffle		*Pool*	
EPT richness	2	E richness	1
Percent EPT	18.18%	T richness	1
Percent Oligochaetes and Leeches	0.00%	Percent EPT	18.18%
Percent 2 dominants	45.45%	Percent non-insect	9.09%
Filterer richness	0	Filterer richness	0
Percent intolerant	9.09%	Univoltine richness	2
Univoltine richness	2	Percent supertolerant	27.27%
Percent clingers	9.09%		
Swimmer richness	2		

Aquatic Invertebrate Taxonomic Data

Site Name COLLOID

Date Collected

Order	Family	Taxon	Count	Percent	Unique	BI	FFG
		Ostracoda	1	9.09%	Yes	8	CG
Coleoptera							
	Dytiscidae						
		Dytiscidae	1	9.09%	Yes	5	PR
	Hydrophilidae						
		Berosus	2	18.18%	Yes	5	PR
		Hydrophilidae	1	9.09%	Yes	5	PR
Diptera							
	Ceratopogonidae						
		Ceratopogoninae	3	27.27%	Yes	6	PR
	Chironomidae						
		Endochironomus	1	9.09%	Yes	10	SH
Ephemeroptera							
	Baetidae						
		Callibaetis	1	9.09%	Yes	9	CG
Trichoptera							
	Rhyacophilidae						
		Rhyacophila	1	9.09%	Yes	1	PR
Grand Total			**11**				