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# MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2001

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*Roundup Wetland  
Roundup, Montana*



Prepared for:

**MONTANA DEPARTMENT OF TRANSPORTATION**  
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Helena, MT 59620-1001

Prepared by:

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P.O. Box 8254  
Missoula, MT 59807

July 2002

Project No: 130091.031



# **MONTANA DEPARTMENT OF TRANSPORTATION**

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## 1.0 INTRODUCTION

This annual report summarizes methods and results from the first year's monitoring program at the Montana Department of Transportation's (MDT) Roundup mitigation site. The Roundup wetland mitigation site was created to provide wetland mitigation credits for MDT's reconstruction of U.S. Highway 12 in Watershed #10 located in District 5, Billings District. The site is located in Musselshell County, Montana, Section 18, Township 8 North, Range 26 East, immediately south of U.S. Highway 12 and approximately one mile east of the town of Roundup (**Figure 1**). Elevations range from approximately 3,169 to 3,175 feet above sea level.

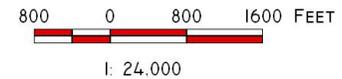
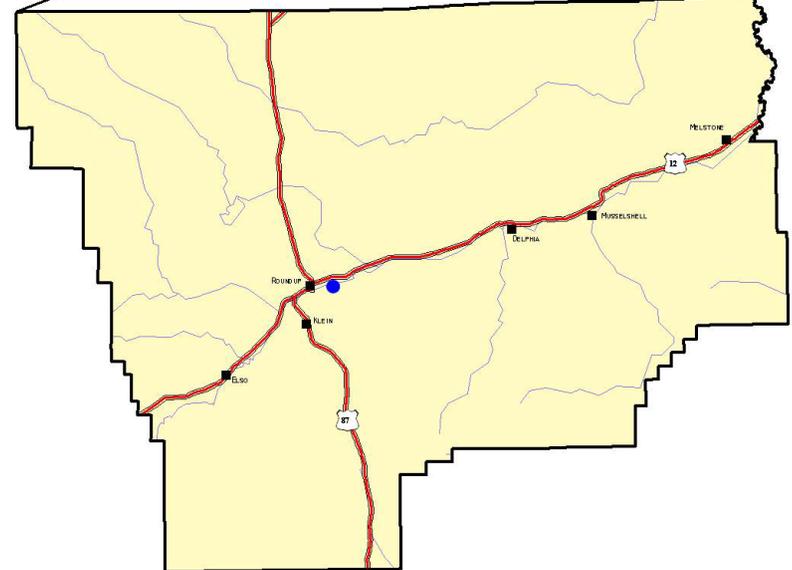
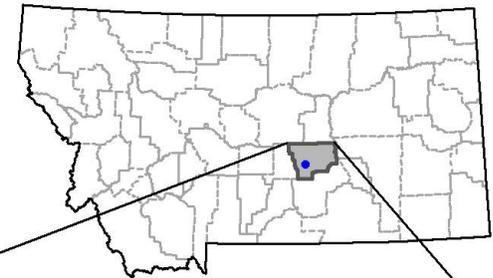
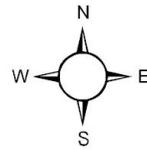
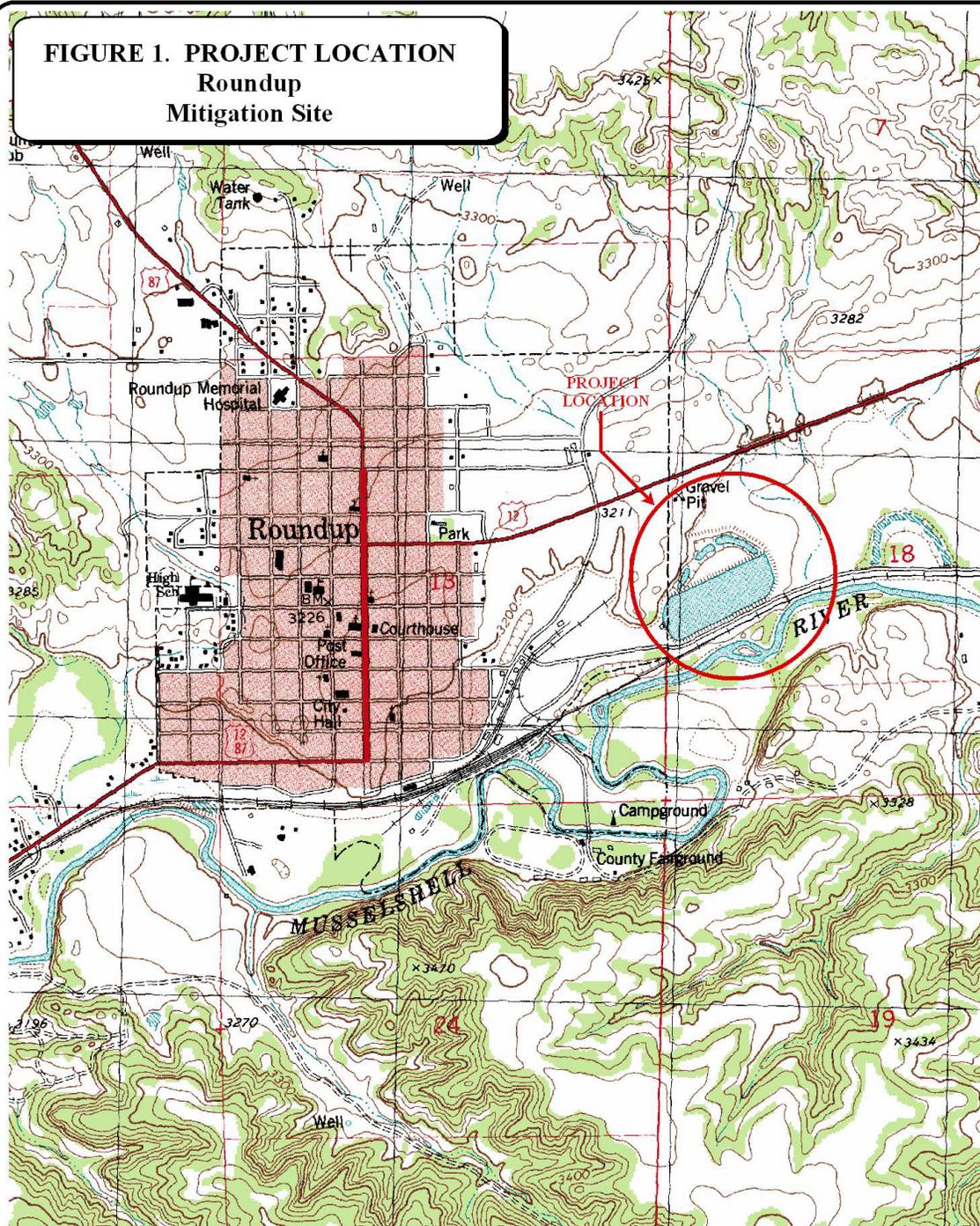
The mitigation site is located at the site of the former wastewater lagoons for the city of Roundup (**Figure 2, Appendix A**). This former two-celled treatment facility, covering approximately 26 acres, contained a sludge of varying depths with concentrations of nitrates, and possibly heavy metals of which portions were capped during construction modification. Five monitoring wells were installed around the lagoon to monitor any possible groundwater contamination from the sludge. After a review of groundwater quality sampling data, both the DEQ and EPA agreed that there was not a groundwater contamination problem associated with the lagoons (MDT). The organic "sludge" was left in the southern end of the wetland bed and capped with one foot of soil during construction. The dam between cells was breached as shown in **Figures 2 and 3**.

Construction was completed on this site in April of 2000 with a goal of creating at least 24 acres of wetlands with a diverse vegetative community. (The delineation data from 2001 suggest that over time, a wetland of >18.56 acres is expected to develop at the lagoons.) The site was designed to develop a hemi-marsh emergent wetland system with standing water depths no greater than three feet. Water depths vary within the wetland due to the natural topography behind the dike. Water was designed to enter the wetland mitigation system through two methods and locations (**MDT Monitoring Plan and Detail: Final Plan, Appendix C**).

One source of hydrology is through a channel which funnels storm water runoff from the northeastern section of the city of Roundup and U.S. Highway 12 into the southwestern end of the wetland. The estimated runoff volume for this system is 12,700 m<sup>3</sup>, and 17,825 m<sup>3</sup> of water for the 5- and 25-year event, respectively (MDT 2000). Second, treated wastewater from the new Roundup sewage treatment facility is discharged into the wetland to maintain the design water level elevation. No data was found on the design elevation. There is no physical "outlet" designed for the system; water leaves only through evaporation and evapotranspiration. The site has only been filling with the wastewater and stormwater since July of 2001. Again, it was completed in April of 2000 and is a very "young" mitigation site.

The Roundup lagoons had a monitoring plan put forth to the US Army Corps of Engineers (COE) by the MDT. This current monitoring plan conforms with the methodology of the former monitoring plan. Therefore, the Roundup wetland site was visited three times in 2001; two of the visits (spring and late fall) were specifically for monitoring bird use. The Roundup wetland will be monitored for at least two more years to assess whether or not the COE's and other agencies' Section 404 requirements have been fulfilled.

**FIGURE 1. PROJECT LOCATION**  
**Roundup**  
**Mitigation Site**



PROJECT #: 130091.031  
 DATE: APRIL 2001  
 LOCATION:  
 PROJECT MANAGER: B. DUTTON  
 DRAWN BY: B. NOECKER



1120 CEDAR PO BOX 8254 MISSOULA, MT 59807

## 2.0 METHODS

### 2.1 Monitoring Dates and Activities

The Roundup wetland mitigation site was monitored on three dates in 2001: April 24 (bird observation), August 14 (monitoring sampling event), and November 6 (bird observation). The same dates will be targeted for sampling in 2002 and 2003 with the exception of the fall bird visit. That visit will be moved up to mid to late October. The complete monitoring protocol was conducted during the second visit. All information contained 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, assess maintenance needs of any bird nesting structures and inflow and outflow structures.

### 2.2 Hydrology

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

All additional hydrologic data were recorded on the mitigation site monitoring form (**Appendix B**). The boundary between emergent vegetation and open water was mapped on the aerial photograph (**Figure 3, Appendix A**). There were five groundwater monitoring wells at the site (**Detail: Final Plan, Appendix C**).

### 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. Minimal woody vegetation was planted at this site by the Conservation District.

One transect was established during the 2001 monitoring event to represent the range of current vegetation conditions. The location of this transect is shown on **Figure 2, Appendix A**. Percent cover for each species was recorded on the vegetation transect form within the monitoring form (**Appendix B**). The transect will be used to evaluate changes over time, especially the establishment and increase of hydrophytic vegetation. Transect ends were marked with metal fence posts and their locations recorded with the GPS unit. 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**). The most current terminology used by NRCS was used to describe hydric soils.

## 2.5 Wetland Delineation

A wetland delineation was conducted within the assessment area 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: Northwest Region 9 (Reed 1988). The information was recorded on the 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**). Five (5) wood duck boxes have been installed on site. 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 during the site visit following the 2001 protocol (**Appendix D**). Samples were preserved as outlined in the sampling procedure and sent to a laboratory for analysis. The approximate sampling location is indicated on **Figure 2, Appendix A**.

## 2.9 Functional Assessment

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

## 2.10 Photographs

Photographs were taken showing the current land use surrounding the site, the wetland buffer, the monitored area, and the vegetation transect. A description and compass direction for each photograph were recorded on the wetland monitoring form.

During the 2001 monitoring season, each photograph point was marked on the ground with a wooden stake and the location recorded with a resource grade GPS (**Appendix E**). The approximate locations are shown on **Figure 2, Appendix A**. All photographs were taken using a 50 mm lens.

## 2.11 GPS Data

During the 2001 monitoring season survey points were collected using a resource grade Trimble, Geoexplorer III hand-held GPS unit. Points collected included: the vegetation transect beginning and ending locations; photograph locations; bird box locations, and the jurisdictional wetland boundary. In addition, during the August 2001 monitoring season survey points were collected at four (4) landmarks recognizable on the air photo for purposes of line fitting to the topography.

## 2.12 Maintenance Needs

The condition of inflow and outflow structures, and nesting structures or other mitigation related structures were evaluated. This examination did not entail an engineering-level analysis.

## 3.0 RESULTS

### 3.1 Hydrology

In March of 1998, five monitoring wells were installed along the railroad south of the wetland to monitor background concentrations of nitrogen in groundwater at the wastewater lagoons. During the 2001 monitoring event, only well numbers (#) 2 and 3 of the original five were found to be within the Roundup wetland monitoring limits. Of those two wells, # 2 could not be located in 2001. (Field investigation in 2002 will again attempt to locate this well.) Water depth in well #3 was measured during the mid-season visit; the groundwater was at a depth of 8.6 feet. The approximate location of well #3 is shown on **Figure 2, Appendix B**.

As mentioned, water was designed to enter the system through two methods and locations. One method of water entry is through a drainage channel which funnels storm water and roadway runoff from the northeastern section of the city of Roundup and U.S. Highway 12 into the southwestern end of the wetland (**Detail: Site Plan, Appendix C**). Second, treated wastewater from the new Roundup sewage treatment facility is discharged into the wetland to maintain the designed water level elevation.

The elevation was designed by MDT engineer Dave Leitheiser. No data could be found on what the ultimate design elevation was to be; however, the City Manager, Mr. Gary Thomas, uses a

wood duck box to mark an elevation of 18" deep at that specific site. To date, he has not had enough water to fill the old lagoons using the treated water and stormwater runoff for 2001 was also minimal as a result of the drought.

The outlet designed for the system was eliminated by the MDT because a stormwater flow-through situation would have negated the wetland mitigation credit (stormwater treatment areas are not considered mitigation by the COE). Water levels in the wetland decrease through evaporation and evapotranspiration.

During the August 2001 visit, only approximately 30% of the assessment area was inundated with approximately 0 to 4 feet of standing water. Drift lines suggest that the water was several feet higher earlier in the season. The site did not receive much water from the stormwater system and apparently anticipated volumes did not meet design expectations in 2001, likely as a result of the drought conditions. According to the Western Regional Climate Center, Roundup yearly precipitation totals for 2000 (8.5 inches) and 2001 (10.9 inches) were 68 and 88 percent, respectively, of the total annual mean precipitation (12.4 inches) in this area.

### 3.2 Vegetation

Vegetation species identified on the site are presented in **Table 1** and in the monitoring form (**Appendix B**). Three (3) vegetation communities were mapped on the mitigation area map (**Figure 3, Appendix A**). The communities include: Type 1, *Chenopodium album*; Type 2, *Kochia spp.*; Type 3, *Phalaris arundinacea*. Dominant species within each community are listed on the monitoring form (**Appendix B**).

The Roundup wetland site has developed very little vegetative diversity or wetland vegetation as of 2001. The area is almost entirely dominated by summer cypress (*Kochia spp.*). The lack of wetland vegetation is likely the result of its recent construction (2000) and low hydrologic inflows. Mr. Gary Thomas, City Manager for Roundup, reports that 2001 is the first year the wetland has actually had standing water.

The upland/"wetland" boundary was delineated based on hydrologic indicators, i.e. open water or evidence of recent past inundation such as drift lines and mud flats. The area delineated as wetland is not truly wetland however, since the vegetation criteria was not met. It is anticipated that over time, and with normal annual precipitation, hydrophytic vegetation will establish itself throughout this delineated area.

The NRCS/District Conservationist for Roundup, John Rouane, was contacted for information regarding plantings in 2001. He stated that only a few species were planted within the fenced area and that overall the survival rate was less than 20% due to the severe drought in 2001. The species planted included buffalo berry, cotoneaster, and chokecherry. He was unsure if anything other than a few buffaloberry had survived. In 2002, the survivors, if any, will be documented. When asked about future plantings, Mr. Rouane was non-committal. He stated that he may plant Russian olive trees on the site but noted that they were considered by some to be undesirable. He will be contacted prior to the 2002 monitoring event to discuss further planting efforts.

**Table 1: 2001 Roundup Wetland Vegetation Species List**

Scientific Name	Common Name	Indicator Status
<i>Agropyron cristatum</i>	crested wheatgrass	Dry Species
<i>Grindelia spp.</i>	gumweed	FACU to FACU-
<i>Cirsium arvense</i>	Canada thistle	FACU+
<i>Kochia scoparia</i>	summer-cypress	FAC
<i>Phalaris arundinacea</i>	reed canary grass	FACW

The vegetation transect results are detailed in the monitoring form (**Appendix B**) and are summarized below.

Transect 1 Start	Upland Type 2 (60')	Wetland * Type 1 (40')	Total 100'	End Transect 1
---------------------	------------------------	---------------------------	---------------	-------------------

\* This segment of the transect has been classified as transitional “wetland” due to evidence of inundation, but it has not developed hydrophytic vegetation as of the 2001 monitoring season and therefore, it is technically not a wetland.

The transect was established on and adjacent to the original dike on the south side of the complex. Though this area may flood and convert to wetland in the future, a more appropriate site for the transect will be located in the vicinity of the constructed islands and central dike that appears to flood annually, even in dry years.

### 3.3 Soils

The site was mapped as part of the Musselshell County Soil Survey. The Havre-Glendive Complex (11A) is the dominant mapped soil at the site. The soil series is well drained and typical of floodplains, alluvial fans and stream terraces; it is classified as an Aridic Ustifluvents. The old lagoons were constructed entirely within this complex. The Havre component is a loamy texture and the Glendive component tends to be a fine, sandy loam.

Soils were sampled at one upland site (SP-1) and one wetland site (SP-2); SP-1 is located on the dike and SP-2 is within the southern lagoon area. Soils at SP-1 (upland) were from 0-4 inches light, yellowish brown (2.5Y 6/3), sandy loam, and grayish brown (2.5Y 5/2) sandy loam from 4-18 inches. No mottles were noted. Soils at SP-2 (wetland) were very dark brown (7.5YR 2.5/2) sandy loam throughout the profile depth of 0-18 inches. Many prominent red (10R 4/6) mottles were evident throughout the profile. Because of the constructed nature of the SP area, the transects and SP will be relocated in 2002.

### 3.4 Wetland Delineation

The delineated “wetland” boundary, which is actually in part a mudflat (special aquatic site) is depicted on **Figure 3, Appendix A**. The area anticipated to develop into vegetated wetlands encompasses 18.517 acres with 1.439 acres of open water habitat. The COE data forms are included in **Appendix B**. Technically, the area is not a true wetland because it lacks hydrophytic vegetation in the mudflat areas. However, this was the first year for the site to have water.

### 3.5 Wildlife

Wildlife species are listed in **Table 2**. Activities and densities associated with these observations area included on the monitoring form in **Appendix B**. Wildlife observation included deer tracks and reports by the Gary Thomas, the City Manager for Roundup, of a family of four red foxes, successful nesting Canada geese, redwinged blackbirds, and many “ducks” and is pleased with the wildlife and waterfowl utilization. He was asked by Wetlands West and agreed to keep an informal list of species observed on the site on a monthly basis.

Only four (4) of the five (5) wood duck boxes were located in 2001; the locations are shown on **Figure 2, Appendix B** and the locations of all 5 boxes are indicated on the Detail plan map in **Appendix C**. The box on the west end of the wetland is missing. None of the boxes showed signs of occupation during any of the monitoring visits. The City Manager did mention that someone had informed him that they had observed some loafing wood ducks on the site in 2001. It is likely that as the vegetation and macroinvertebrate population increases, the wood duck hens will take advantage of the nesting structures.

**Table 2. Fish and Wildlife Species Observed at the Roundup Wetland Mitigation Site**

<p><b>BIRDS</b></p> <p>American Avocet (<i>Recurvirostra americana</i>)                  American Coot (<i>Fulica americana</i>)                  American Robin (<i>Turdus migratorius</i>)                  Canada Goose (<i>Branta canadensis</i>)                  Green-winged Teal (<i>Anas crecca</i>)                  Killdeer (<i>Charadrius vociferous</i>)                  Mallard (<i>Anas platyrhynchos</i>)                  Northern Shoveler (<i>Anas clypeata</i>)                  Red-wing Blackbird (<i>Agelaius phoeniceus</i>)                  Ring-necked Pheasant (<i>Phasianus colchicus</i>)                  Rock Dove (<i>Columba livia</i>)                  Sandhill Crane (<i>Grus canadensis</i>)                  Spotted Sandpiper (<i>Actitis macularia</i>)                  Tree swallow (<i>Tachycineta bicolor</i>)                  Yellow-headed Blackbird (<i>Xanthocephalus xanthocephalus</i>)</p>
<p><b>MAMMALS</b></p> <p>Fox (<i>Vulpes fulva</i>)                  Deer (<i>Odocoileus spp.</i>)</p>

### 3.6 Macroinvertebrates

The macroinvertebrate sampling results are included in **Appendix B**. Rhithron, Inc. summarized the results as stated below.

The analysis employed suggests poor biotic conditions at this site. Taxa richness is very low, despite an adequate sample size. Two of the three midge taxa collected are hemoglobin-bearers, suggesting that anoxic conditions prevail in the substrates. The biotic index value is correspondingly high, implying that anoxic conditions in the substrates may be related to warm water temperatures and/or nutrients.

### 3.7 Functional Assessment

Completed functional assessment forms are included in **Appendix B** and summarized below in **Table 3**. The site rated as an overall Category III wetland. It scored high for: flood attenuation and for short and long-term surface water storage. Overall, the site should increase its rating over time as more vegetation develops to provide more foraging opportunity for waterfowl and wildlife. The total functional unit gain is 72.21 points and is attributable to the large size (18.5 acres).

**Table 3: Summary of 2001 Wetland Function/Value Ratings and Functional Points at the Roundup Wetland Mitigation Project**

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2001 Roundup Wetland
Listed/Proposed T&E Species Habitat	Low (0)
MNHP Species Habitat	Low (0)
General Wildlife Habitat	Low (.3)
General Fish/Aquatic Habitat	NA
Flood Attenuation	High (1)
Short and Long Term Surface Water Storage	High (.8)
Sediment, Nutrient, Toxicant Removal	Moderate (.7)
Sediment/Shoreline Stabilization	NA
Production Export/ Food Chain Support	Moderate (.6)
Groundwater Discharge/ Recharge	Low (.1)
Uniqueness	Low (.2)
Recreation/Education Potential	Low (.2)
Actual Points/ Possible Points	3.9/10
% of Possible Score Achieved	39%
Overall Category	III
Total Acreage of Assessed Wetlands within Easement	18.517 ac
Functional Units (acreage x actual points)	72.21 fu
Net Acreage Gain	18.517 ac
Net Functional Unit Gain	72.21 fu
Total Functional Unit "Gain"	72.21 fu

### 3.8 Photographs

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

### 3.9 Maintenance Needs/Recommendations

All dikes and inlet structures were functioning satisfactorily. All located bird boxes are in good condition. The two not found in 2001 will be located and mapped with GPS in 2002. No maintenance needs were apparent at the site; however, if the flows into the site could be supplemented it would aid in the establishment of hydrophytic vegetation. This may not be

feasible, but with “normal” precipitation, the water levels may stabilize with the addition of stormwater flows.

### 3.10 Current Credit Summary

The goal of the Roundup mitigation project was to create 24 acres of emergent marsh wetland. The 2001 delineation of wetlands and special aquatic sites showed a total of 18.517 acres of developing aquatic habitats. Of that, 1.439 acres is shallow, open water. The site is new and is anticipated to develop more emergent vegetation over time.

The functional assessment revealed a Category III “wetland” has developed at the site to date. The site ranked high for flood attenuation and short and long-term surface water storage. The functional unit gain is 72.21 points and is attributable primarily due to the large acreage of the assessment area.

## 4.0 REFERENCES

Montana Dept. of Transportation. Date Unknown. *Montana Dept. of Transportation Wetland Mitigation Project Roundup Sewage Lagoons Monitoring Plan.*

Berglund, J. 1999. *MDT Montana Wetland Assessment Method.* Prepared for Montana Department of Transportation. May 1999.

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

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

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

## **Appendix A**

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### **FIGURES 2 - 3**

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*MDT Wetland Mitigation Monitoring  
Roundup Wetland  
Roundup, Montana*

# Figure 2 Monitoring Activity Locations

## Legend

- Monitoring Area Limit
- Photograph Point
- Aerial Reference Point
- Vegetation Transect
- Bird Box
- Macro-invertebrate Sample Point
- Soil Sample Point



PROJ. NO.: 150011031 FILE NAME: TASK3-BASE.dwg SCALE: 1" = 150' LOCATION: Roundup Lagoon	DRAWN: RA CHECKED: BD APP'D: BD PROJ. MGR: BD	PROJECT NAME <b>MDT Roundup Lagoon Wetland Mitigation</b> DRAWING TITLE <b>Monitoring Activity Locations</b>
SHEET NUMBER <b>2</b> REV: .01 DATE:		



# Figure 3 - Mapped Site Features

- Legend**
- Monitoring Area Limit
  - Wetland Boundary
  - Vegetation Community Boundary
  - Open Water Boundary
- Wetland Area**
- Gross Area 18.517 Acres
  - Open Water -1.439 Acres
  - Net Area 17.078 Acres
- Vegetation Types:**
- ① *Chenopodium album*
  - ② *Kochia* spp.
  - ③ *Phalaris arundinacea*



<b>PROJECT NUMBER</b>	MDT Roundup Lagoon Wetland Mitigation		
<b>DRAWING TITLE</b>	Mapped Site Features		
<b>PROJ. NO.</b>	130091.031	<b>DRAWN:</b>	RA
<b>FILE NAME</b>	TASKS\BASE\DWG	<b>CHECKED:</b>	
<b>SCALE</b>	1" = 150'	<b>APPROV:</b>	BD
<b>LOCATION</b>	Roundup Lagoon	<b>PROJ. MGR:</b>	BD
<b>SHEET NUMBER</b>	3 of 3		
<b>REV</b>	-		
<b>DATE</b>	-		



NOT TO SCALE

## **Appendix B**

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**COMPLETED 2001 WETLAND MITIGATION SITE MONITORING  
FORM**

**COMPLETED 2001 BIRD SURVEY FORMS**

**COMPLETED 2001 WETLAND DELINEATION FORMS**

**COMPLETED 2001 FIELD AND FUNCTIONAL ASSESSMENT  
FORMS**

**COMPLETED 2001 MACROINVERTEBRATE SAMPLING  
RESULTS**

---

*MDT Wetland Mitigation Monitoring  
Roundup Wetland  
Roundup, Montana*

## DRAFT - MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: Round up Project Number: 215-33 Assessment Date: 14 Aug 01  
 Location: Round up MT MDT District: Five Milepost: 49  
 Legal description: T 8N R 26E Section \_\_\_\_\_ Time of Day: 9:00 AM  
 Weather Conditions: Partly Cloudy, 80° Person(s) conducting the assessment: LeCain, Wetlands West  
 Initial Evaluation Date: -1-1- Visit #: 1 Monitoring Year: 2001  
 Size of evaluation area: 26 acres Land use surrounding wetland: Rangeland

### HYDROLOGY

**Surface Water**

Inundation: Present  Absent \_\_\_\_\_ Average depths: 4 ft Range of depths: 0 - 6 ft  
 Assessment area under inundation: 30%  
 Depth at emergent vegetation-open water boundary: NA ft  
 If assessment area is not inundated are the soils saturated w/in 12" of surface: Yes  No \_\_\_\_\_  
 Other evidence of hydrology on site (drift lines, erosion, stained vegetation etc.):  
mudflats suggest water was several feet higher earlier in season

**Groundwater**

Monitoring wells: Present  Absent \_\_\_\_\_  
 Record depth of water below ground surface

Well #	Depth	Well #	Depth	Well #	Depth
3	8.6 ft				

**Additional Activities Checklist:**

- Map emergent vegetation-open water boundary on air photo
- 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:**

Five monitoring wells were established in area in 1998. Wells #2 & #3 are within assessment area. Well #2 was not found & may have been removed.

## VEGETATION COMMUNITIES

Community No.: 1 Community Title (main species): CHAL

Dominant Species	% Cover	Dominant Species	% Cover
<i>Chenopodium album</i>	4		
<i>Agropyron cristatum</i>	3		
<i>Kochia spp.</i>	2		
<i>Cirsium arvense</i>	3		

COMMENTS/PROBLEMS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Community No.: 2 Community Title (main species): Kochia

Dominant Species	% Cover	Dominant Species	% Cover
<i>Kochia spp.</i>	5		

COMMENTS/PROBLEMS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Community No.: 3 Community Title (main species): PHAR

Dominant Species	% Cover	Dominant Species	% Cover
<i>Phalaris arundinacea</i>	15		
<sup>5</sup> 2/13/01			

COMMENTS/PROBLEMS: There appear to be pockets of PHAR developing in center of wetland. These areas were un-reachable due to surface water & unstable mud flats

## Additional Activities Checklist:

Record and map vegetative communities on air photo





**WETLAND DELINEATION**



At each site conduct the items on the checklist below:

- Delineate wetlands according to the 1987 Army Corps manual.
- Delineate wetland-upland boundary on the air photo
- Survey wetland-upland boundary with a resource grade GPS survey

COMMENTS/PROBLEMS: Boundaries are difficult to delineate  
on small scale air photo

**FUNCTIONAL ASSESSMENT**

Complete Jeff's abbreviated MDT Function and Values Assessment field form.

**MAINTENANCE**

Were man-made nesting structures installed at this site? YES  NO

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  NO

If yes, are the structures working properly and in good working order? YES  NO

If no, describe the problems below.

COMMENTS/PROBLEMS: No evidence of use of bird boxes







Roundup 8/2001



### 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 1/2 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:

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

Roundup

Location	Photo Frame #	Photograph Description	Compass Reading
<input checked="" type="checkbox"/> A	9	wetland view	N
<input checked="" type="checkbox"/> B	7	Upland use	S
<input checked="" type="checkbox"/> C	6	wetland buffer	E
D	8	Wet land view	W
E	34A	Wetland view	S
<input checked="" type="checkbox"/> F	4	Wetland view	E
<input checked="" type="checkbox"/> G	11A	Vegetation transect end begin	
<input checked="" type="checkbox"/> H	103A	Vegetation transect begin end	

Missing ↓

COMMENTS/PROBLEMS: 1-2-02: Per a disc. w/ RL - Photo F is missing.

### 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 for site in designated GPS field notebook

Checklist:

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

COMMENTS/PROBLEMS:



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

Project/Site: <u>Roundup Wetland</u>	Date: <u>14 August 01</u>
Applicant/Owner: <u>MDT</u>	County: <u>Misselshell</u>
Investigator: <u>McCain, Wetlands West, Inc.</u>	State: <u>MT</u>
Do Normal Circumstances exist on the site? <input checked="" type="radio"/> Yes <input type="radio"/> No	Community ID: <u>CHAL</u> Transect ID: <u>UP-1</u> Plot ID: <u>SP-1</u>
Is the site significantly disturbed (Atypical Situation)? <input checked="" type="radio"/> Yes <input type="radio"/> No	
Is the area a potential Problem Area? <input type="radio"/> Yes <input checked="" type="radio"/> No (If needed, explain on reverse.)	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>CHAL</u>	<u>H</u>	<u>FAC</u>	9.		
2. <u>CTAR</u>	<u>H</u>	<u>FACU</u>	10.		
3. <u>AGCR</u>	<u>H</u>	<u>—</u>	11.		
4. <u>Kochia spp.</u>	<u>H</u>	<u>FACU</u>	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 25%

Remarks: disturbed area along impoundment dike

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Recorded Data Available	<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators:</b> <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands <b>Secondary Indicators (2 or more required):</b> <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
<b>Field Observations:</b> Depth of Surface Water: <u>NA</u> (in.) Depth to Free Water in Pit: <u>NA</u> (in.) Depth to Saturated Soil: <u>NA</u> (in.)	
Remarks: <u>Upland site</u>	

SOILS

Map Unit Name (Series and Phase): Haure-Glendive Complex (11A) Drainage Class: well drained  
 Field Observations: \_\_\_\_\_ Confirm Mapped Type? Yes  No

Taxonomy (Subgroup): \_\_\_\_\_

**Profile Description:**

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4	A	Light yellowish brown 2.5Y6/3	—	—	sandy loam
4-18	B	grayish brown 2.5Y5/2	—	—	sandy loam

**Hydric Soil Indicators:**

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Remarks: Not a hydric soil.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (Circle)	Is this Sampling Point Within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (Circle)
Wetland Hydrology Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (Circle)	
Hydric Soils Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (Circle)	

Remarks: Upland site

Approved by HQUSACE 3/92

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

Project/Site: <u>Roundup wetland</u>	Date: <u>14 Aug 2001</u>
Applicant/Owner: <u>MDT</u>	County: <u>Muskegetshell</u>
Investigator: <u>LeCain, Wetlands West, Inc.</u>	State: <u>MT</u>
Do Normal Circumstances exist on the site? <input checked="" type="radio"/> Yes <input type="radio"/> No	Community ID: <u>Kochia</u>
Is the site significantly disturbed (Atypical Situation)? <input checked="" type="radio"/> Yes <input type="radio"/> No	Transect ID: <u>W-1</u>
Is the area a potential Problem Area? <input type="radio"/> Yes <input checked="" type="radio"/> No	Plot ID: <u>SP-2</u>
(If needed, explain on reverse.)	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Kochia spp.</u>	<u>H</u>	<u>FACU</u>	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-). 0

Remarks: This area is within the constructed wetland. Hydrophytic vegetation has not developed yet.

HYDROLOGY

<input type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input checked="" type="checkbox"/> No Recorded Data Available	<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators:</b> <input type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input checked="" type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input checked="" type="checkbox"/> Drainage Patterns in Wetlands <b>Secondary Indicators (2 or more required):</b> <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
<b>Field Observations:</b> Depth of Surface Water: <u>NA</u> (in.) Depth to Free Water in Pit: <u>NA</u> (in.) Depth to Saturated Soil: <u>0</u> (in.)	Remarks: <u>Area was inundated in June of 2001 per conversation with Gary Thomas, city manager</u>



Draft Field Data Collection Sheet for MDT Montana Wetland Assessment Form

1. CLASSIFICATION

Vegetated Cowardin Class	Estimated % of AA	Predominant Water Regime (CIRCLE)
Emergent	—	PF IE SPF SF S TF IF
Aquatic Bed	20%	(PF) IE SPF SF S TF IF
Moss-Lichen	—	PF IE SPF SF S TF IF
Scrub-Shrub	70%	PF IE SPF SF S (TF) IF
Forested	—	PF IE SPF SF S TF IF
Total Estimated % Vegetated	90%	

2. DISTURBANCE is: (High) Moderate Low disturbed last year during construction

3. HYDROLOGY

Do wetlands on site pond or flood? (Y) N (if no, skip to groundwater discharge/recharge portion of this section)

Does AA contain surface or subsurface outlet? Y (N) If outlet present, is it restricted (subsurface will always be "yes")? Y N

Longest duration of surface water:	Surface Water Duration and other attributes (circle)		
at any wetlands within AA	(Perm / Peren)	Seas / Intermit	Temp / Ephem
in at least 10% of AA (both wetlands and nonwetlands [deepwater, streambed...])	(Perm / Peren)	Seas / Intermit	Temp / Ephem
where fish are or historically were present (cross out if not applicable)	Perm / Peren	Seas / Intermit	Temp / Ephem
% of waterbody containing cover objects	>25%	10-25%	(<10%)
% bank or shore with riparian or wetland shrub or forested communities	>75%	50-74%	(<50%)
adjacent to rooted wetland vegetation along a defined watercourse or shoreline subject to wave action (cross out if not applicable)	(Perm / Peren)	Seas / Intermit	Temp / Ephem
% cover of wetland bank or shore by sp. with binding rootmasses	>65%	35-64%	(<35%)

Do any wetlands on site flood as a result of in-channel or overbank flow? (Y) N (if no, go to groundwater section below)  
 Estimated wetland area subject to periodic flooding (acres): ≥10 2-10 <2  
 Estimated % of flooded wetland classified SS, FO or both: ≥75 (25-74) <25

Evidence of groundwater discharge or recharge? (Y) N List: no outlet

4. VERTEBRATES

Evidence of or potential for T&E or MNHP species use? (For general wildlife use, see separate form.) None

Fish observations?

5. OTHERS

Do wetlands have potential to receive excess sediments, nutrients, or toxicants? (Y) N From: sewage effluent storm water drainage  
 Potential to receive: low to moderate levels high levels

Does site contain bog, fen, warm springs, >80 year-old forested wetland, or MNHP "S1" or "S2" plant association? Y (N)  
 List:

Is AA a known recreation / education site? Y (N) Type:  
 Does AA offer strong potential for use as recreation / education site? Y (N) Type:

MDT Montana Wetland Assessment Form (revised 5/25/1999)

1. Project Name: Roundup - MDT 2. Project #: (24) Control

3. Evaluation Date: Mo. 8 Day 14 Yr. 01 4. Evaluator(s): (R. Rain) 5. Wetlands/Site #s) Roundup  
Baca

6. Wetland Location(s): i. Legal: T 90N or S; R 26E or W; S 1B ; T \_\_\_ N or S; R \_\_\_ E or W; S

ii. Approx. Stationing or Mileposts:

City of Roundup's former wastewater lagoons.

iii. Watershed: 10040202 GPS Reference No. (if applies):

Other Location Information:

7. a. Evaluating Agency: Wetlands Dept

8. Wetland size: (total acres) \_\_\_\_\_ (visually estimated)  
\_\_\_\_\_ (measured, e.g. by GPS [if applies])

b. Purpose of Evaluation:

1. \_\_\_ Wetlands potentially affected by MDT project
2. \_\_\_ Mitigation wetlands; pre-construction
3.  Mitigation wetlands; post-construction
4. \_\_\_ Other

9. Assessment area: (AA, tot., ac., \_\_\_\_\_ (visually estimated)  
see instructions on determining AA) \_\_\_\_\_ (measured, e.g. by GPS [if applies])

10. Classification of Wetland and Aquatic Habitats in AA (HGM according to Brinson, first col.; USFWS according to Cowardin [1979], remaining cols.)

3M Class	System	Subsystem	Class	Water Regime	Modifier	% of AA
<u>Palustrine</u>	<u>Palustrine</u>	<u>NA</u>	<u>UB</u>	<u>H/A</u>	<u>A</u>	<u>100</u>

(Abbreviations: System: Palustrine(P)/ Subst.: none/ Classes: Rock Bottom (RB ), Unconsolidated bottom (UB ), Aquatic Bed (AB), Unconsolidated Shore (US ), Moss-lichen Wetland (ML), Emergent Wetland (EM), Scrub-Shrub Wetland (SS), Forested Wetland (FO)/ System: Lacustrine (L), Subst.: Limnetic (2)/ Classes: RB, UB, AB/ Subsystem: Littoral (4)/ Classes: RB, UB, AB, US, EM/ System: Riverine (R)/ Subst.: Lower Perennial (2)/ Classes: RB, UB, AB, US, EM/ Subsystem: Upper Perennial (3)/ Classes: RB, UB, AB, US/ Water Regimes: Permanently Flooded (H), Intermittently Exposed (G), Semipermanently Flooded (F), Seasonally Flooded (C), Saturated (B), Temporarily Flooded (A), Intermittently Flooded (J) Modifiers: Excavated (E), Impounded (I), Diked (D), Partly Drained (PD), Famed (F), Artificial (A) HGM Classes: Riverine, Depressional, Slope, Mineral Soil Flats, Organic Soil Flats, Lacustrine Fringe

11. Estimated relative abundance: (of similarly classified sites within the same Major Montana Watershed Basin, see definitions)  
(Circle one) Unknown Rare Common Abundant  
Comments:

12. General condition of AA:

i. Regarding disturbance: (use matrix below to determine [circle] appropriate response)

Conditions within AA	Predominant conditions adjacent to (within 500 feet of) 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.
Occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings.	moderate disturbance	moderate disturbance	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.	high disturbance	high disturbance	<u>high disturbance</u>

Comments: (types of disturbance, intensity, season, etc.):

ii. Prominent weedy, alien, & introduced species (including those not domesticated, feral): (list) *kochia (all!!)*

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: *sewage treatment plant, land fill, roads*

13. Structural Diversity: (based on number of "Cowardin" vegetated classes present [do not include unvegetated classes], see #10 above)

# of "Cowardin" vegetated classes present in AA (see #10)	≥ 3 vegetated classes (or ≥ 2 if one is forested)	2 vegetated classes (or 1 if forested)	≤ 1 vegetated class
Rating (circle)	High	Moderate	Low

Comments:

SECTION PERTAINING TO FUNCTIONS & VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

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 (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Highest Habitat Level	doc./primary	sus./primary	doc./secondary	sus./secondary	doc./incidental	sus./incidental	None
Functional Points and Rating	1 (H)	.9 (H)	.8 (M)	.7 (M)	.5 (L)	.3 (L)	0 (L)

Sources for documented use (e.g. observations, records, etc):

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in 14A above)

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

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 (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Highest Habitat Level	doc./primary	sus./primary	doc./secondary	sus./secondary	doc./incidental	sus./incidental	None
Functional Points and Rating	1 (H)	.8 (H)	.7 (M)	.6 (M)	.2 (L)	.1 (L)	0 (L)

Sources for documented use (e.g. observations, records, etc.):

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (circle substantial, moderate, or low based on supporting evidence):

- |   |  |
|---|--|
| <p><b>Substantial</b> (based on any of the following [check]):</p> <ul style="list-style-type: none"> <li>___ observations of abundant wildlife #'s or high species diversity (during any period)</li> <li>___ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.</li> <li>___ presence of extremely limiting habitat features not available in the surrounding area</li> <li>___ interviews with local biologists with knowledge of the AA</li> </ul> | <p><b>Low</b> (based on any of the following [check]):</p> <ul style="list-style-type: none"> <li>___ few or no wildlife observations during peak use periods</li> <li>___ little to no wildlife sign</li> <li>___ sparse adjacent upland food sources</li> <li>___ interviews with local biologists with knowledge of the AA</li> </ul> |
|---|--|

- Moderate** (based on any of the following [check]):
- \_\_\_ 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

*mule deer seen in Nov. foxes (reported)*

ii. Wildlife habitat features (working from top to bottom, circle appropriate AA attributes in matrix to arrive at 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 of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial;

S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms].

Structural diversity (see #13)	High								Moderate								Low			
	Even				Uneven				Even				Uneven				Even			
Class cover distribution (vegetated classes)	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
Duration of surface water in > 10% of AA																				
Low disturbance at AA (see #12i)	E	E	E	F	E	E	H	F	E	H	H	M	E	H	M	M	E	H	M	F
Moderate disturbance at AA (see #12i)	H	H	H	F	H	H	H	F	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function)

Evidence of wildlife use (i)	Wildlife habitat features rating (ii)			
	Exceptional	High	Moderate	Low
Substantial	1 (E)	.9 (H)	.8 (H)	.7 (M)
Moderate	.9 (H)	.7 (M)	.5 (M)	.3 (L)
Minimal	.6 (M)	.4 (M)	.2 (L)	.1 (L)

Comments:

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

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

Duration of surface water in AA	Permanent / Perennial			Seasonal / Intermittent			Temporary / Ephemeral		
	>25%	10-25%	<10%	>25%	10-25%	<10%	>25%	10-25%	<10%
Cover - % of waterbody in AA containing cover objects such as submerged logs, large rocks & boulders, overhanging logs, floating-leaved vegetation, etc.									
Shading - >75% of streambank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	E	E	H	H	H	M	M	M	M
Shading - 50 to 75% of streambank or shoreline within AA contains rip. or wetland scrub-shrub or forested communities	H	H	M	M	M	M	M	L	L
Shading - < 50% of streambank or shoreline within AA contains rip. or wetland scrub-shrub or forested communities	H	M	M	M	L	L	L	L	L

ii. Modified Habitat Quality (Circle the appropriate response to the following question. If answer is Y, then reduce rating in i above by one level [E = H, H = M, M = L, L = L]). Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity or is the waterbody included on the MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support? Y N Modified habitat quality rating = (circle) E H M L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function)

Types of fish known or suspected within AA	Modified Habitat Quality (ii)			
	Exceptional	High	Moderate	Low
Native game fish	1 (E)	.9 (H)	.7 (M)	.5 (M)
Introduced game fish	.9 (H)	.8 (H)	.6 (M)	.4 (M)
Non-game fish	.7 (M)	.6 (M)	.5 (M)	.3 (L)
No fish	.5 (M)	.3 (L)	.2 (L)	.1 (L)

Comments:

14E. Flood Attenuation: (applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, circle NA here and proceed to next function.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Flooded wetland area in AA subject to periodic flooding	≥ 10 acres			<10, >2 acres			≤ 2 acres		
	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
% of flooded wetland classified as forested, scrub/shrub, or both									
AA contains no outlet or restricted outlet	1(H)	.9(H)	.6(M)	.8(H)	.7(H)	.5(M)	.4(M)	.3(L)	.2(L)
AA contains unrestricted outlet	.9(H)	.8(H)	.5(M)	.7(H)	.6(M)	.4(M)	.3(L)	.2(L)	.1(L)

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

Y (N)  
Comments:

Stormwater from town(?) is ditched into pond area - dry in Nov.

**Short and Long Term Surface Water Storage:** (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, circle NA here and proceed with the evaluation.)

i. **Rating** (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

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		
	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Duration of surface water at wetlands within the AA									
Wetlands in AA flood or pond ≥ 5 out of 10 years	1(H)	.9(H)	.8(H)	.8(H)	.6(M)	.5(M)	.4(M)	.3(L)	.2(L)
Wetlands in AA flood or pond < 5 out of 10 years	.9(H)	.8(H)	.7(M)	.7(M)	.5(M)	.4(M)	.3(L)	.2(L)	.1(L)

Comments: Not much water in AA in Aug nor in Nov.

**14G. Sediment/Nutrient/Toxicant Retention and Removal:** (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, circle NA here and proceed with the evaluation.)

i. **Rating** (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function.

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with 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 with 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.			
	≥ 70%		< 70%		≥ 70%		< 70%	
% cover of wetland vegetation in AA	Yes	No	Yes	No	Yes	No	Yes	No
Evidence of flooding or ponding in AA								
contains no or restricted outlet	1 (H)	.8 (H)	.7 (M)	.5 (M)	.5 (M)	.4 (M)	.3 (L)	.2 (L)
contains unrestricted outlet	.9 (H)	.7 (M)	.6 (M)	.4 (M)	.4 (M)	.3 (L)	.2 (L)	.1 (L)

Comments: Nasty weeds - no veg, no little hydrology

**14H Sediment/Shoreline Stabilization:** (applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If does not apply, circle NA here and proceed to next function)

i. **Rating** (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] 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%	1 (H)	.9 (H)	.7 (M)
35-64%	.7 (M)	.6 (M)	.5 (M)
< 35%	.3 (L)	.2 (L)	.1 (L)

Comments:

**14I. Production Export/Food Chain Support:**

i. **Rating** (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function. Factor A = acreage of vegetated component in the AA; Factor B = structural diversity rating from #13; Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral or absent [see instructions for further definitions of these terms].)

A	Vegetated component ≥ 5 acres						Vegetated component 1-5 acres						Vegetated component < 1 acre						
	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low		
B	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
C	1H	.9H	.9H	.8H	.8H	.7M	.9H	.8H	.8H	.7M	.7M	.6M	.7M	.6M	.6M	.4M	.4M	.3L	.3L
P/P	.9H	.8H	.8H	.7M	.7M	.6M	.8H	.7M	.7M	.6M	.6M	.5M	.6M	.5M	.5M	.3L	.3L	.2L	.2L
S/I	.8H	.7M	.7M	.6M	.6M	.5M	.7M	.6M	.6M	.5M	.5M	.4M	.5M	.4M	.4M	.2L	.2L	.1L	.1L
T/E																			
A																			

Comments: water: a problem - looks like not enough!

**Groundwater Discharge/Recharge:** (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 slope
- Seeps are present at the wetland edge
- AA permanently flooded during drought periods
- Wetland contains an outlet, but no inlet

ii. **Recharge Indicators**

- Permeable substrate present without underlying impeding layer
- Wetland contains inlet but no outlet
- Other

No

Other

iii. Rating: Use the information from i and ii above and the table below to arrive at [circle] the functional points and rating [H = high, L = low] for this function.

Criteria	Functional Points and Rating
AA is known Discharge/Recharge area or one or more indicators of D/R present	1 (H)
No Discharge/Recharge indicators present	.1 (L)
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 [circle] the functional points and rating [H = high, M = moderate, or L = low] 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 MNHP			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MNHP			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate		
	rare	common	abundant	rare	common	abundant	rare	common	abundant
Estimated relative abundance (#11)									
Low disturbance at AA (#12i)	1 (H)	.9 (H)	.8 (H)	.8 (H)	.6 (M)	.5 (M)	.5 (M)	.4 (M)	.3 (L)
Moderate disturbance at AA (#12i)	.9 (H)	.8 (H)	.7 (M)	.7 (M)	.5 (M)	.4 (M)	.4 (M)	.3 (L)	.2 (L)
High disturbance at AA (#12i)	.8 (H)	.7 (M)	.6 (M)	.6 (M)	.4 (M)	.3 (L)	.3 (L)	.2 (L)	.1 (L)

Comments:

14L. Recreation/Education Potential: i. Is the AA a known rec./ed. site: (circle)  Y  N (If yes, rate as [circle] High [1] and go to ii; if no go to 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 strong potential for rec./ed. use?  Y  N

(If yes, go to ii, then proceed to iv; if no, then rate as [circle] Low [0.1])

iv. Rating (use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function.

Ownership	Disturbance at AA (#12i)		
	low	moderate	high
public ownership	1 (H)	.5 (M)	.2 (L)
private ownership	.7 (M)	.3 (L)	.1 (L)

Comments:

Not a "nice" place yet. Former sewage lagoons; Wildlife utilization 300  
Veg. cover not established yet. New site.

FUNCTION & VALUE SUMMARY & OVERALL RATING

Function & 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	1	
B. MT Natural Heritage Program Species Habitat	L	0	1	
C. General Wildlife Habitat	L	.3	1	
D. General Fish/Aquatic Habitat	NA	-	-	
E. Flood Attenuation	H	1	1	
F. Short and Long Term Surface Water Storage	H	.9	1	
G. Sediment/Nutrient/Toxicant Removal	M	.7	1	
H. Sediment/Shoreline Stabilization	NA	-	-	
I. Production Export/Food Chain Support	M	.6	1	
J. Groundwater Discharge/Recharge	L	.1	1	
Uniqueness	L	.2	1	
L. Recreation/Education Potential	L	.2	1	
Totals:		3.9	10	72.21 fu

39%

OVERALL ANALYSIS AREA (AA) RATING: (Circle appropriate category based on the criteria outlined below) I II **III** IV

<p><b>Category I Wetland:</b> (Must satisfy one of the following criteria; if does not meet criteria, go to Category II)</p> <p><input type="checkbox"/> Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; or</p> <p><input type="checkbox"/> Score of 1 functional point for Uniqueness; or</p> <p><input type="checkbox"/> Score of 1 functional point for Flood Attenuation and answer to Question 14E.ii is "yes"; or</p> <p><input type="checkbox"/> Total actual functional points &gt; 80% (round to nearest whole #) of total possible functional points.</p>
<p><b>Category II Wetland:</b> (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)</p> <p><input type="checkbox"/> Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; or</p> <p><input type="checkbox"/> Score of .9 or 1 functional point for General Wildlife Habitat; or</p> <p><input type="checkbox"/> Score of .9 or 1 functional point for General Fish/Aquatic Habitat; or</p> <p><input type="checkbox"/> "High" to "Exceptional" ratings for both General Wildlife Habitat and General Fish/Aquatic Habitat; or</p> <p><input type="checkbox"/> Score of .9 functional point for Uniqueness; or</p> <p><input type="checkbox"/> Total Actual Functional Points &gt; 65% (round to nearest whole #) of total possible functional points.</p>
<p><b>Category III Wetland:</b> (Criteria for Categories I, II or IV not satisfied)</p>
<p><b>Category IV Wetland:</b> (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if does not satisfy criteria go to Category III)</p> <p><input type="checkbox"/> "Low" rating for Uniqueness; and</p> <p><input type="checkbox"/> "Low" rating for Production Export/Food Chain Support; and</p> <p><input type="checkbox"/> Total actual functional points &lt; 30% (round to nearest whole #) of total possible functional points</p>

**Macro-invertebrate Sampling Results  
for Roundup Wetland**



Montana Department of Transportation Wetland Mitigation Monitoring Project for Land and Water Consulting	Project Name Project/task number Date Field Personnel Note	Roundup 215-31 8/14/2001 Wetlands West
2001	Rhithron Sample Identification	19
Coelenterata	<i>Hydra</i>	
Oligochaeta	Enchytraeic Enchytraeidae Naididae <i>Chaetogaster</i> <i>Nais elinguis</i> <i>Nais variabilis</i> <i>Ophidonais serpentina</i> Tubificidae Tubificidae - immature <i>Limnodrilus hoffmeisteri</i>	
Hirudinea	Erpobdellid <i>Mooreobdella microstoma</i> <i>Nephelopsis</i> Glossiphoniidae <i>Helobdella stagnalis</i> <i>Helobdella</i> <i>Glossiphonia</i>	
Bivalvia	Sphaeriid <i>Sphaerium</i>	
Gastropoda	Lymnaeid <i>Fossaria</i> Physidae <i>Physa</i> Planorbidae <i>Cyraulus</i> <i>Helisoma</i>	
Crustacea	Cladocer Cladocera Copepoda Calanoida Cyclopoida Ostracoda Ostracoda Amphipoda <i>Gammarus</i> <i>Hyaella azteca</i> Decapoda <i>Orconectes</i>	26  1
Acarina	Acari	
Odonata	Aeshnids <i>Anax</i> Libellulidae Libellulidae-early instar <i>Sympetrum</i> Coenagrionidae Coenagrionidae-early instar <i>Enallagma</i> Lestidae <i>Lestes</i>	
Ephemeroptera	Baetid <i>Callibaetis</i>	2
Hemiptera	Caenidae <i>Caenis</i> Corixid: Corixidae - immature <i>Hesperocorixa</i> <i>Sigara</i> <i>Trichocorixa</i> Nepidae <i>Ranatra</i>	6
Trichoptera	Notonectidae <i>Notonecta</i> Hydroptilid: Hydroptilidae - pupa Leptoceridae Leptoceridae - early instar <i>Mystacides</i> <i>Ylodes</i>	1
Coleoptera	Chrysomelid: Chrysomelidae Curculionidae <i>Bagous</i> Dytiscidae <i>Acilius</i> Hydroporinae - early instar larvae <i>Hygrotus</i> <i>Liodessus</i> <i>Laccophilus</i> <i>Neoporus</i> Elmidae <i>Heterlimnius</i> Haliplidae <i>Halipus</i> <i>Peltodytes</i> Hydrophilidae <i>Berosus</i> <i>Helophorus</i> <i>Hydrobius</i> <i>Hydrochara</i> <i>Laccobius</i> <i>Tropisternus</i>	3

Macro-invertebrate Sampling Results  
for Roundup Wetland

Diptera

Ceratopogonin	<i>Bezzia/Palpomyia</i>	
	<i>Dasyhelea</i>	
Chaoboridae	<i>Chaoborus</i>	
Culicidae	<i>Anopheles</i>	
	<i>Culex</i>	
Ephydriidae	Ephydriidae	
Simuliidae	<i>Simulium</i>	
Sciomyzidae	Sciomyzidae	
Stratiomyidae	<i>Odontomyia</i>	
Chironomidae	<i>Aricotopus</i>	
	<i>Chironomus</i>	88
	<i>Cladotanytarsus</i>	
	<i>Corynoneura</i>	
	<i>Cryptotendipes</i>	
	<i>Dicrotendipes</i>	
	<i>Einfeldia</i>	49
	<i>Endochironomus</i>	
	<i>Labrundinia</i>	
	<i>Microtendipes</i>	
	<i>Orthocladius annectens</i>	
	<i>Parachironomus</i>	
	<i>Paramerina</i>	
	<i>Paratanytarsus</i>	
	<i>Phaenopsectra</i>	
	<i>Polypedilum</i>	
	<i>Procladius</i>	
	<i>Psectrocladius</i>	
	<i>Psectrotanypus</i>	
	<i>Pseudochironomus</i>	
	<i>Tanytus</i>	83
	<i>Tanytarsus</i>	
	TOTAL	259
grids		13

Total taxa	9
POET	1
Chironomidae taxa	3
Crustacea taxa + Mollusca taxa	0
% Chironomidae	84.94208494
Orthoclaadiinae/Chironomidae	0
%Amphipoda	0
%Crustacea + %Mollusca	0
HBI	9.138996139
%Dominant taxon	33.97683398
%Collector-Gatherers	54.05405405
%Filterers	10.03861004

Total taxa	1
POET	1
Chironomidae taxa	3
Crustacea taxa + Mollusca taxa	1
% Chironomidae	1
Orthoclaadiinae/Chironomidae	1
%Amphipoda	3
%Crustacea + %Mollusca	3
HBI	1
%Dominant taxon	3
%Collector-Gatherers	3
%Filterers	1
site score	22

## **Appendix C**

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### **ROUNDUP EAST LAGOON WETLAND FINAL PLAN**

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*MDT Wetland Mitigation Monitoring  
Roundup Wetland  
Roundup, Montana*

**MONTANA DEPARTMENT OF TRANSPORTATION  
WETLAND MITIGATION PROJECT  
ROUNDUP SEWAGE LAGOONS  
MONITORING PLAN**

**Introduction:**

The Montana Department of Transportation (MDT) will be improving the U.S. Highway Route 12 corridor from the City of Roundup to a point approximately 12 miles east of the City. As a consequence of this roadway improvement project, approximately 3.5 acres of wetlands will be directly impacted with the placement of roadway fill and construction of the new road surface. Many of these wetlands are roadside ditches, but only 1.75 acres of these wetlands are considered jurisdictional as they are associated with remnant oxbow channels of the Musselshell River that were cutoff with construction of the Milwaukee Railroad and U.S. Highway Route 12.

The MDT in meeting Section 404 regulatory mitigation requirements, conducted an evaluation of a number of potential sites directly adjacent to the project corridor in an attempt to provide on-site wetland mitigation. It was during this evaluation, that the MDT Hydraulics unit contacted the City of Roundup concerning storm water runoff and flooding issues that needed to be addressed along the western end of the project within the northeastern section of the City. The City indicated that they were abandoning their sewage lagoons as they were getting ready to construct a new treatment facility. They suggested that MDT utilize the abandoned facility for a storm water detention basin. MDT personnel agreed to incorporate the abandoned lagoons into their storm water design, but also discussed the possibility of pursuing wetland mitigation within these same lagoons. The City of Roundup concurred with this proposal to develop wetlands within this potential eyesore to their community.

The City of Roundup's current sewage lagoon system is to be abandoned in mid -1998, due to the construction of a new treatment facility. The current system is a two celled treatment facility covering approximately 26 acres. The north cell is the smaller of the two cells at 10 acres, while the south cell covers 16 acres(see-attached maps). Due the site's location to the proposed project, it will serve as on-site mitigation for anticipated wetland impacts associated with the Roundup East project, and as a wetland reserve for the proposed 19 Km East of Roundup East road project.

The City of Roundup and MDT met with representatives of the Montana Department of Environmental Quality's Waste Water unit and U.S. Environmental Protection Agency to discuss plans of abandoning the lagoons and potential problems with utilizing the site as a wetland mitigation area. Concerns focused around the disposal of the sludge material within the south cell, groundwater contamination issues, and the question of a flow through or closed wetland system. At meetings held over the past several months, it was recommended by the EPA that the sludge be left in place within the south cell, but that it be mixed with and/or capped within a minimum 1 foot layer of topsoil. The plans would be revised to accommodate this specification. Material for capping or mixing should be readily available from the proposed roadway project.

As for the groundwater contamination issue, there were concerns from several regulatory agencies, particularly DEQ to determine if there was a problem emanating from the sewage lagoons via infiltration. Monitoring wells were installed at five (5) locations around the lagoon system, and data was submitted to the EPA and DEQ for their review and comment. Based upon review of these results, both the DEQ and EPA agreed that there is not a groundwater contamination problem associated with these lagoons, and that the sludge can be left in-place.

The proposed MDT U.S. Highway 12 (F14-5(9)170) Roundup East highway project has already received a Section 404 permit (No. 199890037) for impacting the 1.75 acres of jurisdictional wetlands associated with old meander loops of the Musselshell River. Although the Nationwide permit issued for this project did specify compensatory mitigation, the MDT in accordance with Executive Order #11990 and the MDT Interagency Wetlands Group agreement is meeting the national policy of "No Net Loss" of wetlands by providing mitigation for these impacts. The wetland credits developed at this location will provide mitigation for the Roundup East project, as well as the 19 Km East of Roundup East project, and will serve as a reserve for other MDT projects within Watershed # 10 - Musselshell River Drainage.

## II. Mitigation Plan:

The original wetland mitigation design for these cells included the segmentation of the south cell into a series of compartments for the treatment of storm water runoff and to maintain water levels during dry periods. This plan also called for the construction of a large number of circular and hexagonal islands as habitat enhancement for waterfowl throughout the site (See attached original plan sheet # 1). Since that time and after discussions with Montana Fish, Wildlife & Parks and other regulatory agencies, the plan has been revised to provide a more natural setting with the removal of portions of the dike separating the two cells and construction of fewer islands within the system (See attached plan sheet # 2). In addition, water from the new treatment facility would be diverted into the north cell of the system as needed to help fuel the development of the new wetland and to maintain a hydrologic cover over the sludge deposits left within the south cell.

The proposed mitigation plan contains a variety of concepts to improve the condition of the existing lagoons and to naturalize the man-made elements of the lagoons. Along the western perimeter of the north cell are car and truck bodies which were dumped into the former City of Roundup landfill many years ago. A dike will be constructed along the western edge of this cell to separate any potential problems that may occur from the landfill slumping and/or leaching into the wetland, as well as any truck or car bodies that may be along the western edge of the northern cell. The main dike separating the two lagoons will be breached at two locations on the east and west ends, leaving the remainder of the dike as an island between the north and south cells. The dike will be breached to a shallow level that will allow for vegetational development and water from the north cell to migrate into the south cell and vice a versa, but should not destroy the structural integrity of the dike. Islands will be constructed within both cells to accommodate waterfowl and the establishment of vegetational communities around them. The island designs will provide shallow water depths around the islands for loafing waterfowl and vegetation, while the island height will only be about 1 to 2 feet in profile.

Water to the system will enter through two methods. The first will be a drainage channel that will funnel storm water and roadway runoff from the northeastern section of the City of Roundup and U.S. highway Route 12 into the western end of the southern cell. The second method that will be utilized to maintain an adequate water supply within the system, is a discharge structure from the new sewage treatment facility that will dump treated wastewater into the wetland. This water discharge will be monitored to be shutoff when the water reaches a design elevation level. To maintain this level, a water control structure for regulating water levels within the system is to be installed at the southeastern corner of the site, but it is not being installed to facilitate a flow through system. The control structure is only to regulate water levels within the system to maintain an adequate hydrologic level for the establishment of wetland vegetation and for maintenance.

Water depths across the site vary due to the natural topography situated behind the constructed dike. The site was designed with an eye toward developing a hemi-marsh emergent wetland system with standing water depths no greater than 3 feet for the sole purpose of allowing hydrophytic vegetational community to develop. It was anticipated that with water depths greater than 3 feet up to the maximum 6.6 feet as allowed by Corps regulations, that emergent vegetative growth would be severely limited unless it was already established across the site. It is anticipated that with a full pool of standing water within the system it will cover approximately 24 acres of the site.

Overall, we are anticipating the development and creation of at least 24 acres of wetlands that will create a rather diverse vegetative community due to the variable topography across the bottoms of the different cells. In an effort to document that 24 acres of wetlands have developed, and that the site replicates functions and values of wetlands impacted by MDT transportation projects, we have developed the monitoring guidelines provided below. This plan essentially follows the guidelines within the Draft Wetland Compensatory Mitigation & Monitoring Guidelines for the U.S. Army Corps of Engineers Omaha District. It should be noted that the duration of this monitoring plan has not yet been identified by the U.S. Army Corps of Engineers or the MDT Interagency Wetland Group.

### **III. Monitoring Plan for the Wetland Community:**

#### **A. Vegetational community:**

- 1) Establish Transects across the site to monitor vegetative development and community diversity (Due to the unstable nature and health hazard associated with sludge accumulations within the southern cell, this is not practical ).
- 2) Develop plant species lists for each annual monitoring report.
- 3) Plot vegetative communities on as-built plans of the site, and determine areal coverage of vegetative community development through color aerial photographs each year.
- 4) Monitor and develop measures/controls to eradicate invasive weed species on the site.
- 5) Set up locations to photograph vegetative community development from the same spot each year for the duration of the monitoring requirements.

**B. Soils:**

- 1) Establish monitoring points for hydric soil development.
- 2) Monitor characteristic development of the oxidation/reduction potential.
- 3) Determine if anaerobic conditions are occurring within soil boring locations and/or inhibiting vegetative growth.
- 4) Monitor the deposition of sediment by measuring buildup at the storm water drainage ditch entrance with a staff gauge.

**C. Hydrology:**

- 1) Manage water levels through utilization of the control structure and gauges to determine the most beneficial wildlife/vegetative water levels.

**D. Water Quality:**

- 1) Monitor water temperatures at various locations within the site
- 2) Sample water (by the City of Roundup) to determine if effluent meets environmental discharge parameters detrimental to people and/or wildlife.
- 3) Monitor Dissolved oxygen, pH, salinity, turbidity & conductivity during monitoring visits.

**E. Wildlife Community:****1. Macro invertebrate Community:**

- a) Sample the macro-invertebrate community with dip nets and visual observations. Sampling with dip nets will require three(3) ten foot long sweeps through emergent and submergent aquatic vegetation at locations to be identified within the area of surface water inundation.
- b) Identify and classify invertebrates collected according to the Order, Family and species level of classification utilizing the most current identification keys.

**2. Birds:**

- a) Conduct pair counts, brood surveys and fall/spring staging counts during migration of waterfowl and shorebird species.
- b) Maintain a bird list of species observed during migration and field visits to the site.
- c) Monitor to determine if there is any breeding success occurring during the breeding season (broods, nests, etc.) via field observations on site visits.

**3. Mammals:**

- a) Identify mammalian species utilizing the site through visual observation, analysis of tracks and scat, location of dens and burrows, etc.

**4. Herpetiles:**

- a) Identify herpetile species utilizing the site through visual observation and collection of amphibians during aquatic invertebrate surveys.

**IV. Monitoring Reports:**

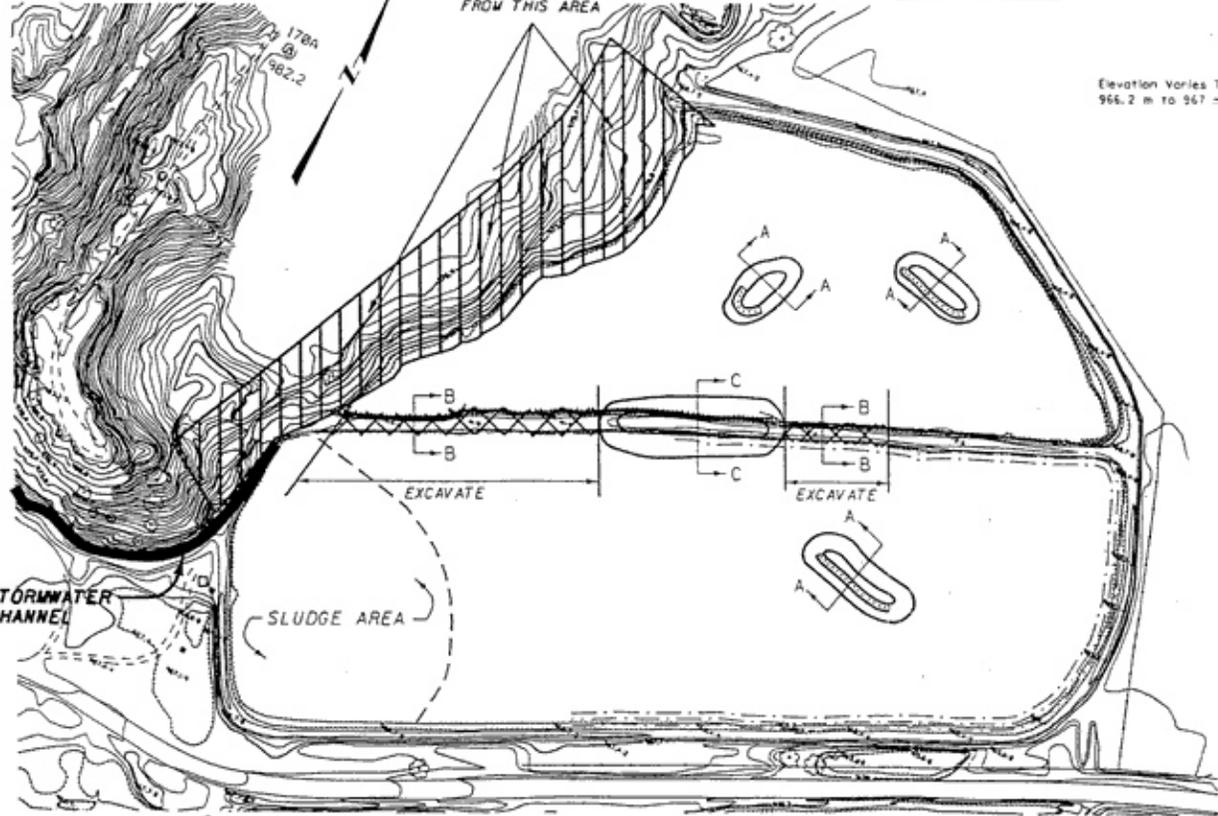
A) Yearly written reports will be prepared from information collected on-site over the course of the monitoring year. This report will include data collected from on-site visits by MDT staff biologists, interagency personnel and the City of Roundup. Scientific data collected from the monitoring events will be placed into tabular form to track progress of the site from year to year. Discussions on the functions and values being replicated and their development will be included as a separate section of the report. The report will include aerial photos and as-built site plans identifying the locations of monitoring transects, soil borings, staff gages, temperature sampling sites and any areas of concern identified (such as animal burrows, dike failures, erosion, etc.).

B) One field trip per year will be scheduled to accommodate members of the Army Corps of Engineers and the MDT Interagency Wetland Group as a field inspection to verify the development of the site.

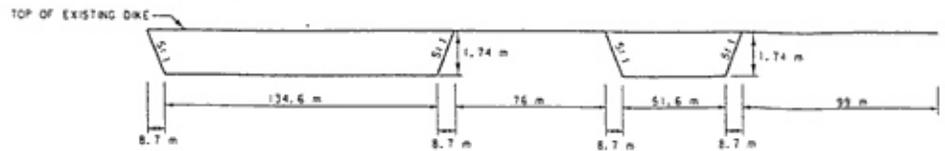
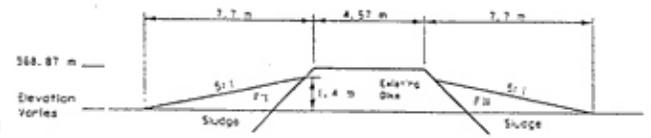
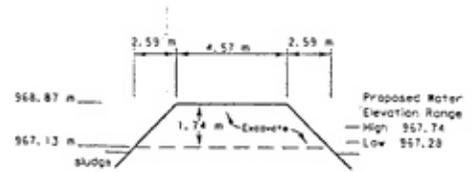
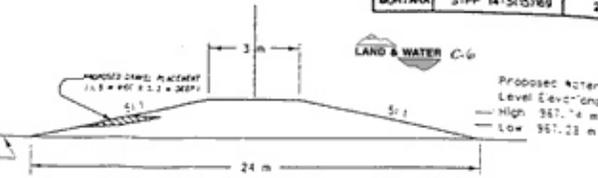
C) A presentation will be made to the MDT Interagency Wetland Group including, interim information and a slide presentation as to the development of the site for each year of the monitoring period.

# DETAIL

REMOVE HOUSEHOLD AND AUTOMOTIVE SCRAP/DEBRIS FROM THIS AREA



Elevation Varies Typical  
966.2 m to 967 m  
BOTTOM OF LAGOON



SCALE = 1/1250

ROUNDUP EAST  
LAGOON WETLAND

FINAL PLAN

MONTANA DEPARTMENT OF TRANSPORTATION

22031801/0611/09

15-520-34  
18 AND 1998  
BY 416  
GDT/BAK  
CADD

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## **Appendix D**

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**BIRD SURVEY PROTOCOL**

**GPS PROTOCOL**

**MACROINVERTEBRATE SAMPLING PROTOCOL**

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*MDT Wetland Mitigation Monitoring*

*Roundup Wetland*

*Roundup, 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.

# 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.

## **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 E

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### REPRESENTATIVE PHOTOGRAPHS

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*MDT Wetland Mitigation Monitoring*  
*Roundup Wetland*  
*Roundup, Montana*



Photo point A, view North



Photo point E, view South



Photo point F, view East



Photo point D, view West



Photo point C, buffer view East



Photo point B, upland use, view South



Photo point G, begin transect

Photo point H, end transect

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