MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2001

Crackerbox Creek
Glendive, Montana

Prepared for:

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

Prepared by:

WETLANDS WEST INC.
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Bozeman, MT 59771

Compiled and Edited by:

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

July 2002

Project No: 130091.022

LAND & WATER

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1.0 INTRODUCTION

This report summarizes methods and results from the 2001 monitoring program at the Montana Department of Transportation's Crackerbox Creek mitigation site. The Crackerbox Creek wetland was constructed to mitigate wetland impacts resulting from reconstruction of the Crackerbox Creek bridge in watershed #15 of MDT District 4. The site is located in Dawson county approximately eight miles southwest of Glendive and ½ mile southeast of Highway 94 **(Figure 1).** The approximate legal description is: Section 31, Township 14 North, Range 54 East with the elevation at the site being approximately 2,206 feet above sea level.

This wetland was constructed in 1997 and designed to be approximately 1.2 acres in size (1.575 acres were delineated in 2001). The site is shown in **Figure 2, Appendix A**. It was designed to mitigate for specific wetland functions impacted by MDT roadway projects. These functions include: storm water retention, roadway runoff filtration, sediment and nutrient retention, water quality, groundwater recharge, waterfowl and wildlife habitats, and riparian restoration. The site was visited a final time in 2001 to assess compliance with the Army Corp's (COE) and other agencies' requirements.

2.0 METHODS

2.1 Monitoring Dates and Activities

The Crackerbox Creek wetland was monitored on August 24, 2001. The complete monitoring protocol was conducted during this visit; an early spring bird survey visit was not conducted. All information is contained within the Wetland Mitigation Site Monitoring Form **(Appendix B)**. 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; determine maintenance needs of any bird nesting structures; and, and inflow and outflow structures (non-engineering).

2.2 Hydrology

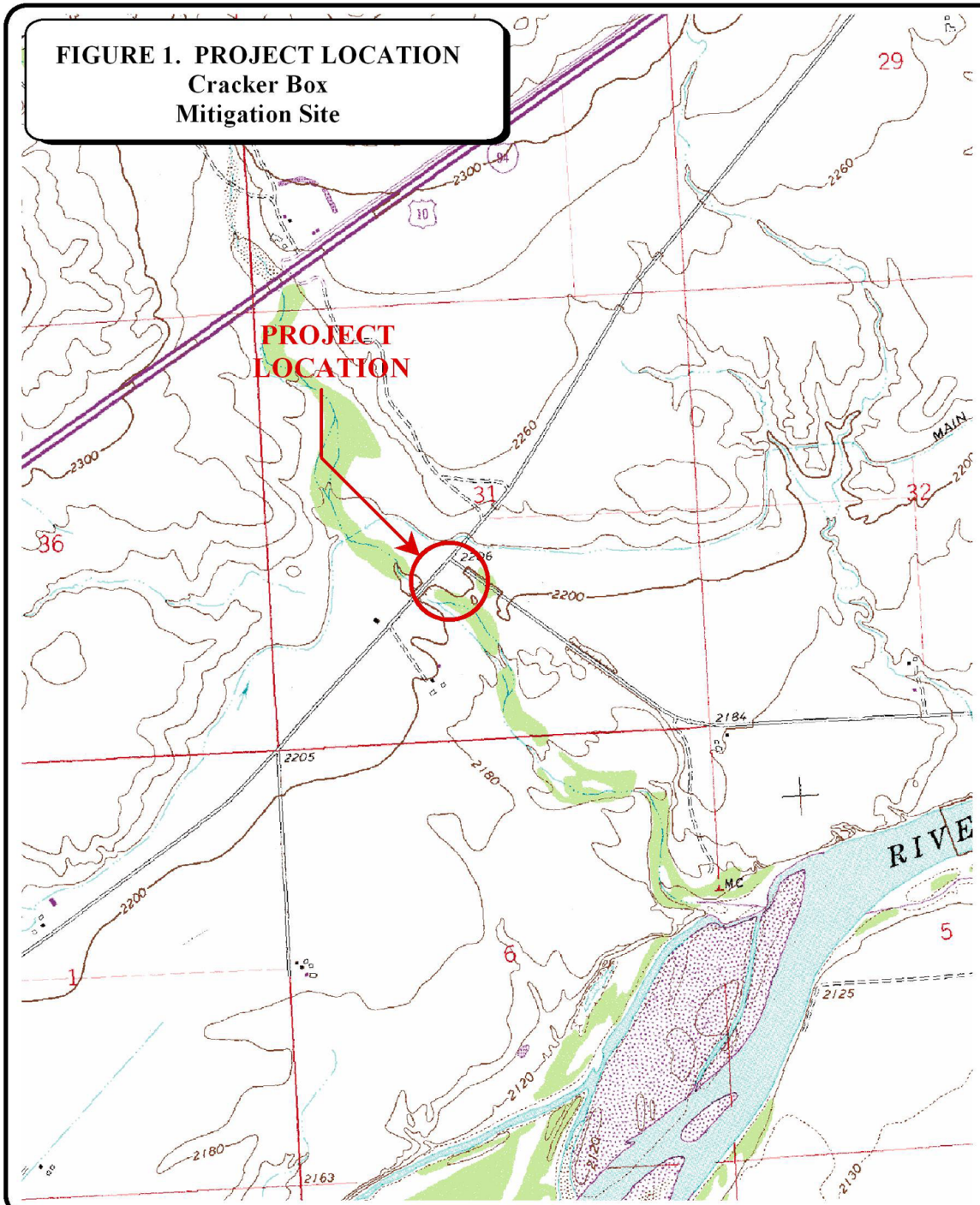
Wetland hydrology indicators were recorded using procedures outlined in the COE 1987 Wetland Delineation Manual. Hydrology data was recorded on the Routine Wetland Delineation Data Form **(Appendix B)** at each wetland determination point.

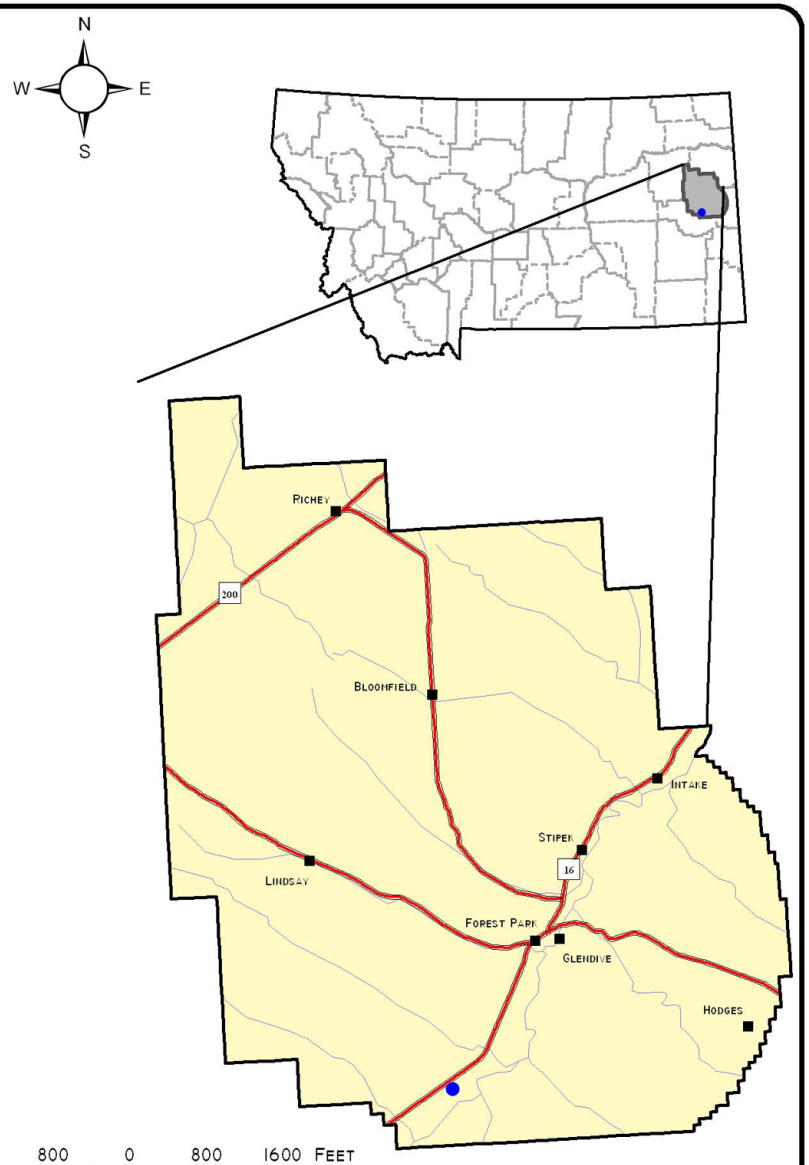
All additional hydrologic data were recorded on the mitigation site monitoring form **(Appendix B)**. There was no boundary separating emergent vegetation and open water at this site. There were no groundwater monitoring wells at the site.

2.3 Vegetation

General vegetation types were delineated on an aerial photograph during the site visit (**Figure 3, Appendix A**). Coverage of the dominant species in each community type is listed on the

FIGURE 1. PROJECT LOCATION
Cracker Box
Mitigation Site





PROJECT #: 130091.022
DATE: APRIL 2001
LOCATION:
PROJECT MANAGER: B. DUTTON
DRAWN BY: B. NOECKER

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

monitoring form (**Appendix B**). A comprehensive plant species list for the entire site was compiled. Woody species were not planted on this site.

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 site monitoring form **(Appendix B)**. Should the MDT wish, the transect could be used to evaluate changes in species composition over time, especially the establishment and increase of hydrophytic vegetation. Transect ends were marked with metal fence posts and their locations were 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)**.

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: North Plains Region 4 (Reed 1988). The information was recorded on the Routine Wetland Delineation Forms **(Appendix B)**. The wetland/upland boundary was used to calculate the wetland area; deeper, open water without emergent vegetation was not an issue at this site.

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 site was compiled and could be updated over time as new species are encountered. Observations over time could be compared with new data to determine if wildlife use is changing. No other site visits are planned for this site unless the MDT, or other relevant agencies, deems it necessary.

2.7 Birds

Bird observations were recorded during the site visit according to the established bird survey protocol **(Appendix C).** A general, qualitative bird list has been compiled using these observations. Observations could be compared between years if future studies occur. No bird nesting structures existed on site.

2.8 Macroinvertebrates

No macroinvertebrate samples were collected on the site.

2.9 Functional Assessment

A functional assessment form was completed for the Crackerbox Creek 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. Representative photographs are shown in **Appendix D**. The photo 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; and the jurisdictional wetland boundary. In addition, during the August 2001 monitoring season, survey points were collected at four landmarks recognizable on the air photo for purposes of line fitting to the topography.

2.12 Maintenance Needs

No inflow or outflow structures existed on the site; therefore, evaluation of the condition of structures, habitat enhancement structures or other mitigation related structures was unnecessary.

3.0 RESULTS

3.1 Hydrology

The source of hydrology for the Crackerbox Creek mitigation wetland is groundwater. During the August 24, 2001 site visit there were approximately 3-6 inches of surface water present throughout 30-50% of the assessment area. There was no deep-water habitat in the wetland; emergent vegetation was present throughout the site. There are no inflow or outflow control structures at the site. The road embankment defines the western and northern boundaries of the wetland.

According to the Western Regional Climate Center, Glendive yearly precipitation totals for 2000 (15.5 inches) and 2001 (16.5 inches) were 112 and 119 percent, respectively, of the total annual mean precipitation (13.9 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)**. Two (2) vegetation communities were mapped on the mitigation area map (**Figure 3, Appendix A**). The communities include: Type 1, *Bouteloua gracilis*; and, Type 2, *Juncus spp./Carex spp.* Dominant species within each community are listed on the monitoring form **(Appendix B)**. The dominant vegetation community throughout the entire wetland site is represented by Type 2, *Juncus/Carex*. The site is essentially surrounded by the upland Type 1, *Bouteloua gracilis* community and the road.

Table 1: ***2001 Crackerbox Creek Wetland Vegetation Species List.***

Scientific Name	Common Name	Indicator Status
Agropyron cristatum	crested wheatgrass	NI
Agropyron spp.	wheatgrass	FAC to UPL
Artemesia tridentata	big sage	NI
Artemisia cana	silver sage	FACU
Bouteloua gracilis	blue gramma-grass	NI
Carex aquatilis	water sedge	NI
Carex spp.	Sedge	FAC to UPL
Cirsium arvense	Canada thistle	FACU
Elaeagnus angustifolia	Russian olive	FAC-
Equisetum spp.	horsetail	FAC to OBL
Juncus balticus	Baltic rush	OBL
Juncus spp.	Rush	FAC to OBL
Panicum capillare	witchgrass	FAC
Poa pratensis	Kentucky bluegrass	FACU
Ranunculus spp.	buttercup	FAC to OBL
Typha latifolia	cattail	OBL
Vicia spp.	vetch	FACU to NI

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

Transect 1 Start	Upland Type 1 (20')	Wetland Type 2 (20')	Total 40'	End Transect 1

3.3 Soils

The site was mapped as part of the Dawson County Soil Survey. The dominant soils on the site are the non-hydric Banks (Bk; Typic Ustifluvents) and Cherry (Ct; Typic Ustifluvents), Havrelon (Typic Ustifluvents), and Trembles (Typic Ustifluvents) mapping unit.

The Banks soils are somewhat excessively drained, typical of low terraces and flood plains along major streams. This series is comprised of loamy fine sand, fine sandy loam, and fine sand. The Cherry series is a well drained, silty clay loam, with Havrelon silt loam, and Trembles fine sandy loam, generally found in low terraces and flood plains in intermittent stream drainages.

A soil pit (SP-1) excavated within the *Bouteloua* (upland) vegetation community revealed a dark grayish brown (10 YR 4/2) loamy sand throughout the profile from 0 to 18 inches. The soil pit within the *Juncus/Carex* community revealed a dark gray (Gley 4/N) loamy sand from 0 to 18 inches in depth.

3.4 Wetland Delineation

The delineated wetland boundary is depicted on **Figure 3, Appendix A**. The wetland boundary encompasses 1.6 acres of wetland and no open-water habitat. The COE data forms are included in **Appendix B**.

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**. Mammal observations were limited to deer tracks and scat; however, the site was visited during a very hot time of day and wildlife activity was likely very limited.

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

BIRDS Brewers blackbird (*Euphagus cyanocephalus)* Chipping sparrow (*Spizella passerine)* Tree swallow (*Tachycineta bicolor)* Western meadowlark (*Sturnella neglecta)*
MAMMALS White-tailed deer (*Odocoileus virginianus)*

3.6 Macroinvertebrates

No macroinvertebrate samples were collected on the site.

3.7 Functional Assessment

Completed functional assessment forms are included in **Appendix B** and summarized in **Table 3**. The wetland rated as a Category III with 50% of the total possible functional points. Considering the wetland has no open water and is not influenced by in-channel or overbank flows, the wetland rated a solid Category III. The highest scoring functions include: sediment and nutrient retention, groundwater discharge/recharge, and production export/food chain support.

Table 3: ***Summary of 2001 Wetlands Function/Value Ratings and Functional Points at the Crackerbox Creek Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2001
Listed/Proposed T&E Species Habitat	Low (0)
MNHP Species Habitat	Low (0)
General Wildlife Habitat	Moderate (0.7)
General Fish/Aquatic Habitat	NA
Flood Attenuation	NA
Short and Long Term Surface Water Storage	Moderate (0.7)
Sediment, Nutrient, Toxicant Removal	High (0.9)
Sediment/Shoreline Stabilization	NA
Production Export/Food Chain Support	High (0.8)
Groundwater Discharge/Recharge	High (1)
Uniqueness	Low (0.3)
Recreation/Education Potential	Low (0.1)
Actual Points/Possible Points	4.5/9
% of Possible Score Achieved	50%
Overall Category	III
Total Acreage of Assessed Wetlands within Easement	1.6 ac
Functional Units (acreage x actual points)	7.2 fu
Net Acreage Gain	1.6 ac
Net Functional Unit Gain	7.2 fu
Total Functional Unit "Gain"	7.2 fu

3.8 Photographs

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

3.9 Maintenance Needs/Recommendations

No maintenance is required at this site.

3.10 Current Credit Summary

The Crackerbox wetland had no deep, open-water habitat but did have surface water dispersed throughout the site with emergent vegetation throughout. This wetland was designed to be approximately 1.2 acres; however, the total wetland credit per the 2001 delineation is actually 1.6 acres. A total of 7.2 functional units are documented for the site.

4.0 REFERENCES

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 Plains (Region 4). Biological Report 88(26.4), 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 Dawson County, Montana.

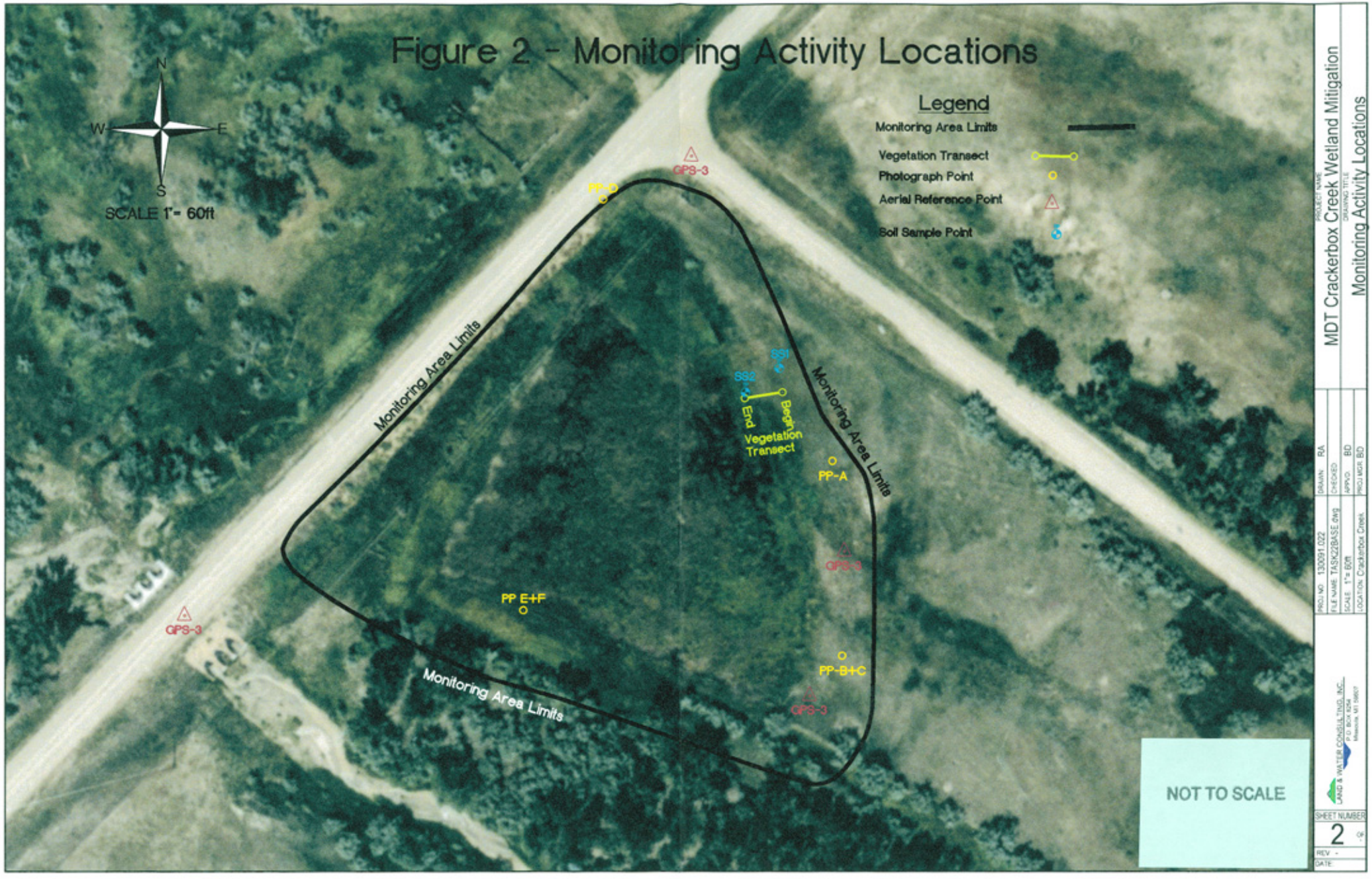
Appendix A

FIGURES 2 - 3

MDT Wetland Mitigation Monitoring
Crackerbox Creek
Glendive, Montana

LAND & WATER

Figure 2 - Monitoring Activity Locations



PROJECT NAME: MDT Crackerbox Creek Wetland Mitigation

DRAWING TITLE: Monitoring Activity Locations

PROJ NO: 130091.022 | DRAWN: RA
FILE NAME: TASK2/BASE.dwg | CHECKED: BD
SCALE: 1"= 60ft | APPVD: BD
LOCATION: Crackerbox Creek | PROJ MGR: BD

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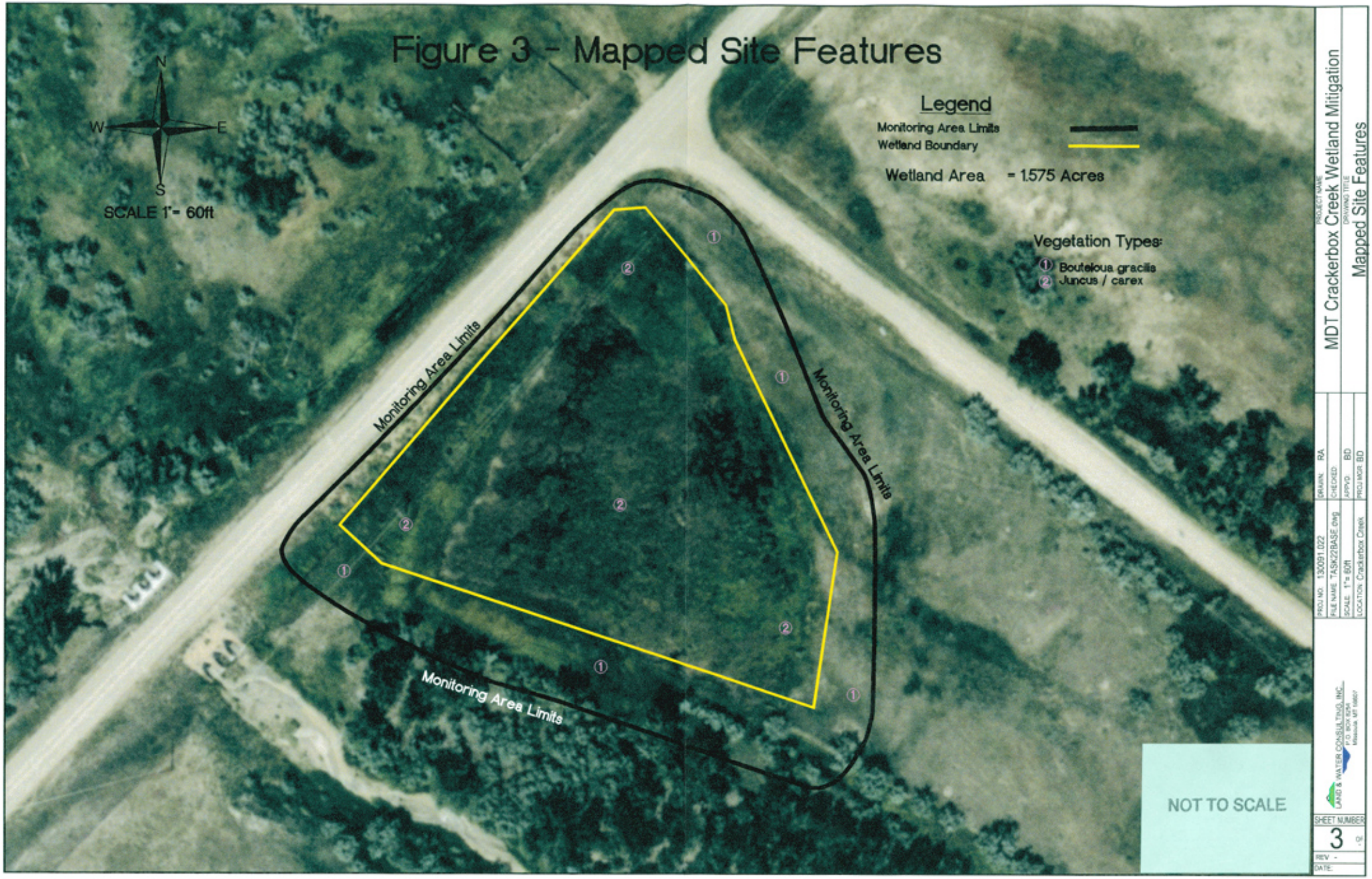
P.O. Box 8254
Missoula, MT 59807

SHEET NUMBER: 2

REV: -
DATE:

Figure 3 - Mapped Site Features



PROJECT NAME: MDT Crackerbox Creek Wetland Mitigation
DRAWING TITLE: Mapped Site Features

PROJ NO. 130091.022
FILE NAME TASK22BASE.dwg
SCALE 1"= 60ft
LOCATION Crackerbox Creek

DRAWN RA
CHECKED
APPVD BD
PROJ MGR BD

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

SHEET NUMBER 3
REV -
DATE:

Appendix B

COMPLETED 2001 WETLAND MITIGATION SITE MONITORING FORM
COMPLETED 2001 BIRD SURVEY FORMS
COMPLETED 2001 WETLAND DELINEATION FORMS
COMPLETED 2001 FIELD AND FULL FUNCTIONAL ASSESSMENT FORMS

MDT Wetland Mitigation Monitoring
Crackerbox Creek
Glendive, Montana

LAND & WATER

#215-22

LAND & WATER B-1

DRAFT - MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: Crackerbox cr. Project Number: 215-22 Assessment Date: 24/Aug 01
Location: Glendive MDT District: Five Milepost: —
Legal description: T___ R___ Section___ Time of Day: 2:00 pm
Weather Conditions: Clear, 80° Person(s) conducting the assessment: LeCain wetlands West Inc.
Initial Evaluation Date: 1 / 1 Visit #:___ Monitoring Year: 2001
Size of evaluation area: 1.2 acres Land use surrounding wetland: Agriculture

HYDROLOGY

Surface Water
Inundation: Present ✓ Absent___ Average depths:___ft Range of depths:___-___ft
Assessment area under inundation: 20%
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.):
No open water, about 3-6" of water over 30% of area.

Groundwater
Monitoring wells: Present___ Absent ✓
Record depth of water below ground surface

Well #	Depth	Well #	Depth	Well #	Depth

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: Emergent vegetation throughout the wetland. There is no open water.

VEGETATION COMMUNITIES

LAND & WATER B-2

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

Dominant Species	% Cover	Dominant Species	% Cover
Bouteloua gracilis	30	Silver sage	10
Poa pratensis	30		
Panicum capilare	20		
Agropyron spp.	10		
Vecia spp.	10		

COMMENTS/PROBLEMS:

Community No.: 2 Community Title (main species): Juncus / carex

Dominant Species	% Cover	Dominant Species	% Cover
Juncus spp.	70%		
Carex spp.	30%	Russian Olive	5%
Typha latifolia	10%	Ranunculus spp.	5%
Cirsium arvense	20%		
equisitum spp.	5%		

COMMENTS/PROBLEMS:

Community No.: ____ Community Title (main species): ____

Dominant Species	% Cover	Dominant Species	% Cover

COMMENTS/PROBLEMS:

Additional Activities Checklist:

____Record and map vegetative communities on air photo

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Crackerbox cr Date: 24 Aug 01 Examiner: LeCain, Wiki Transect # 1

Approx. transect length: 40 ft Compass Direction from Start (Upland): 50° —

Vegetation type 1:	BOGR	
Length of transect in this type:	20	feet
Species:		Cover:
Bouteloua gracilis		30%
Poa pratensis		30%
Panicum capilare		20%
Agropyron spp.		20%
Veccid spp.		10%
Silver sage		10%
Total Vegetative Cover:		120 %

Vegetation type 2:	Juncus	
Length of transect in this type:	20	feet
Species:		Cover:
Juncus spp.		70%
Carex spp.		30%
Typha latifolia		30%
Cirsium arvense		10%
Deschampsia cespitosa		10%
Total Vegetative Cover:		150

Vegetation type 3:		
Length of transect in this type:		feet
Species:		Cover:
Total Vegetative Cover:		

Vegetation type 4:		
Length of transect in this type:		feet
Species:		Cover:
Total Vegetative Cover:		

MDT WETLAND MONITORING – VEGETATION TRANSECT (back of form)

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

Indicator Class:
+ = Obligate
- = Facultative/Wet
0 = Facultative

Source:
P = Planted
V = Volunteer

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

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

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

Notes:

Crackerbox 8-24-01

WETLAND DELINEATION

LAND & WATER B-5

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: _____

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: _____

Crackerbox 8-24-01

PLANTED WOODY VEGETATION SURVIVAL LAND & WATER *B-6*

Species NA	Number Originally Planted	Number Observed	Mortality Causes

COMMENTS/PROBLEMS:

COMPREHENSIVE VEGETATION LIST

LAND & WATER B-7

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
Boutcloua gracilis	1		
Poa protensis	1		
Panicum capilare	1		
Agropyron spp.	1		
Agropyron cristatum	1		
Veccia spp.	1		
Silver Sage	1		
Juncus spp.	2		
Juncus balticus	2		
Carex spp.	2		
Carex aquatilus	2		
Typha latifolia	2		
Cirsium arvense	2		
Equisitum spp.	2		
Russion Olive	2, 1		
Ranunculus spp.	2		

COMMENTS/PROBLEMS: _____

Creekbox 5-24-01

WILDLIFE

LAND & WATER B-8

BIRDS

Species	Number Observed	Nesting or Breeding Activity	Likely Breeding Resident	Likely Migrating	Species	Number Observed	Nesting or Breeding Activity	Likely Breeding Resident	Likely Migrating
Tree Swallow	5								
Chipping Sparrow	1								
W. Meadowlark	3								
Brewers Blackbird	10								

Were man made nesting structures installed? Yes____ No✓ Type:_____ How many?_____ Are the nesting structures being utilized? Yes____ No____ Do the nesting structures need repairs? Yes____ No____

MAMMALS AND HERPTILES

Species	Number Observed	Indirect indication of use			
		Tracks	Scat	Burrows	Other
Deer	—	✓	✓		

Additional Activities Checklist:

_____Macroinvertebrate sampling (if required)

COMMENTS/PROBLEMS: This was a very hot time of day with limited wildlife activity

PHOTOGRAPHS

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

- ✓ 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

Location	Photo Frame #	Photograph Description	Compass Reading
A	15A	wetland view	N
B	16A	upland use	S
C	17A	wetland buffer	W
D	13A	wetland view	W
E	18A	wetland view	S
F	19A	wetland view	E
G	14A	vegetation transect begin	50°
H	20A	vegetation transect end	

COMMENTS/PROBLEMS: 20A SP-1, 21A SP-2,

GPS SURVEYING

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

Checklist:

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

COMMENTS/PROBLEMS:

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

Project/Site: Cracker box cr.
Applicant/Owner: MDT
Investigator: LeCain Wetlands West, Inc.

Date: 24 Aug 01
County: Dawson
State: MT

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: Juncus
Transect ID: W-1
Plot ID: SP-2

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Juncus spp.	H	obl
2. Carex spp.	H	obl
3. Typha latifolia	H	obl
4. Cirsium arvense	H	FACU+
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

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

Remarks: Very well developed emergent vegetation.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)
Depth to Free Water in Pit: 4" (in.)
Depth to Saturated Soil: 0" (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
✓ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
✓ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks:

SOILS

Map Unit Name (Series and Phase): (Ct) Cherry, Haverton, & Trembles well drained / (Bk) Banks Loamy fine sand series — Drainage Class: excessively well drained

Taxonomy (Subgroup): _____ Field Observations Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-18	A	GL1 4/N	—	—	Loamy sand

Hydric Soil Indicators:

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

Remarks: Gleyed soil (likely more of Ct series in this area, with Bk also.)

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Yes) No (Circle)

Remarks: Well developed depressional wetland

Approved by HQUSACE 3/92

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

Project/Site: Crockerbox cr.
Applicant/Owner: MDT
Investigator: LeCain, Wetlands West, Inc.

Date: 24 Aug 01
County: Dawson
State: MT

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on reverse.)

Community ID: BOGR
Transect ID: UP-1
Plot ID: SP-1

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. BOGR	H	—
2. Panicum capilare	H	FAC
3. Poa protensis	H	FACu
4. Agropyron cristatum	H	—
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

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

Remarks: Upland site surrounding wetland

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: NA (in.)
Depth to Free Water in Pit: NA (in.)
Depth to Saturated Soil: NA (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
___ Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: No evidence

SOILS

Map Unit Name (Series and Phase): (Ct) Cherry, Harreton, Trembles (Bk) Bonk series, Loamy fine sand

Drainage Class: excessively well drained / well drained

Taxonomy (Subgroup): _____

Field Observations Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4	A	10YR 4/2	—	—	Loamy sand
4-18	B	dark grayish brown 10YR 4/2	—	—	loamy sand

Hydric Soil Indicators:

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

Remarks:

Not hydric (like more of the Bk in this upl. site.)

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

Is this Sampling Point Within a Wetland? (Circle) Yes (No)

Remarks:

Approved by HQUSACE 3/92

Draft Field Data Collection Sheet for MDT Montana Wetland Assessment Form

1. CLASSIFICATION

Vegetated Cowardin Class	Estimated % of AA	Predominant Water Regime (CIRCLE)
Emergent	90%	(PF) IE SPF SF S TF IF
Aquatic Bed	—	PF IE SPF SF S TF IF
Moss-Lichen	10%	PF (IE) SPF SF S TF IF
Scrub-Shrub	10%	PF (IE) SPF SF S TF IF
Forested	—	PF IE SPF SF S TF IF
Total Estimated % Vegetated	110%	

2. DISTURBANCE is: High Moderate (Low)

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: _____

4. VERTEBRATES

Evidence of or potential for T&E or MNHP species use? (For general wildlife use, see separate form.) _____

_____

_____

_____

_____

Fish observations? _____

5. OTHERS

Do wetlands have potential to receive ~~excess~~ sediments, nutrients, or toxicants? (Y) N From: Surrounding agriculture

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: Cracker Six 2. Project #: Site 22 Control #: 22

3. Evaluation Date: Mo. 1 Day 11 Yr. 02 4. Evaluator(s): [illegible] 5. Wetlands/Site #(s)

6. Wetland Location(s): I. Legal: T 14 (N) or S; R 54 (E) or W; S 31 ; T ___ N or S; R ___ E or W; S ___ ;
II. Approx. Stationing or Mileposts:

III. Watershed: 10100004 GPS Reference No. (if applies):
Other Location Information:

7. a. Evaluating Agency: Wetlands West
b. Purpose of Evaluation:
1. ___ Wetlands potentially affected by MDT project
2. ___ Mitigation wetlands; pre-construction
3. X Mitigation wetlands; post-construction
4. ___ Other

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

9. Assessment area: (AA, lot., ac., see instructions on determining AA) ___ (visually estimated)
1.6 (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.)

HGM Class	System	Subsystem	Class	Water Regime	Modifier	% of AA
Depressional	Palustrine		EM	H / G	E	100

(Abbreviations: System: Palustrine (P)/ Subsyst.: 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)/ Subsyst.: Limnetic (2)/ Classes: RB, UB, AB/ Subsystem: Littoral (4)/ Classes: RB, UB, AB, US, EM/ System: Riverine (R)/ Subsyst.: 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), Farmed (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
AA 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	high disturbance

Comments: (types of disturbance, intensity, season, etc.):
II. Prominent weedy, alien, & introduced species (including those not domesticated, feral): (list) canada thistle
III. Provide brief descriptive summary of AA and surrounding land use/habitat:
secondary access 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:

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 in14A 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):

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

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

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

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			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even (uneven in pictures)			
Duration of surface water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	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: assessed during hottest time of day, may have bad sitings

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 excectional (E), high (H), moderate (M), or low (L) quality rating

Duration of surface water in AA	Permanent / Perennial			Seasonal / Intermittent			Temporary / Ephemeral		
Cover - % of waterbody in AA containing cover objects such as submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation, etc.	>25%	10–25%	<10%	>25%	10–25%	<10%	>25%	10–25%	<10%
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)

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

14F. 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		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ≥ **5 out of 10 years**	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:

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.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding or ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1 (H)	.8 (H)	.7 (M)	.5 (M)	.5 (M)	.4 (M)	.3 (L)	.2 (L)
AA contains **unrestricted outlet**	.9 (H)	.7 (M)	.6 (M)	.4 (M)	.4 (M)	.3 (L)	.2 (L)	.1 (L)

Comments:

diment/Shoreline Stabilization: (applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the line 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 /A= 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					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1H	.9H	.9H	.8H	.8H	.7M	.9H	.8H	.8H	.7M	.7M	.6M	.7M	.6M	.6M	.4M	.4M	.3L
S/I	.9H	.8H	.8H	.7M	.7M	.6M	.8H	.7M	.7M	.6M	.6M	.5M	.6M	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.7M	.7M	.6M	.6M	.5M	.7M	.6M	.6M	.5M	.5M	.4M	.5M	.4M	.4M	.2L	.2L	.1L

Comments:

14J. 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
- ___ Other

II. Recharge Indicators
- ___ Permeable substrate present without underlying impeding layer
- ___ Wetland contains inlet but no outlet
- ___ 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		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
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:

FUNCTION & VALUE SUMMARY & OVERALL RATING

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units; (Actual Points x Estimated AA Acreage) 1.6 AC
A. Listed/Proposed T&E Species Habitat	L	0	1	
B. MT Natural Heritage Program Species Habitat	L	0	1	
C. General Wildlife Habitat	M	.7	1	
D. General Fish/Aquatic Habitat	NA	NA	—	
E. Flood Attenuation	NA	NA	—	
F. Short and Long Term Surface Water Storage	M	.7	1	
G. Sediment/Nutrient/Toxicant Removal	H	.9	1	
H. Sediment/Shoreline Stabilization	NA	NA	—	
I. Production Export/Food Chain Support	H	.8	1	
J. Groundwater Discharge/Recharge	H	1.0	1	
K. Uniqueness	L	.3	1	
L. Recreation/Education Potential	L	.1	1	
Totals:		4.5	9	7.2

4.5/9 = .50 x 100 = 50%

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

Category I Wetland: (Must satisfy one of the following criteria; if does not meet criteria, go to Category II)
- ___ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; or
- ___ Score of 1 functional point for Uniqueness; or
- ___ Score of 1 functional point for Flood Attenuation and answer to Question 14E.ii is "yes"; or
- ___ Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
- ___ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; or
- ___ Score of .9 or 1 functional point for General Wildlife Habitat; or
- ___ Score of .9 or 1 functional point for General Fish/Aquatic Habitat; or
- ___ "High" to "Exceptional" ratings for both General Wildlife Habitat and General Fish/Aquatic Habitat; or
- ___ Score of .9 functional point for Uniqueness; or
- ___ Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

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

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if does not satisfy criteria go to Category III)
- ___ "Low" rating for Uniqueness; and
- ___ "Low" rating for Production Export/Food Chain Support; and
- ___ Total actual functional points < 30% (round to nearest whole #) of total possible functional points

Appendix C

BIRD SURVEY PROTOCOL
GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Crackerbox Creek
Glendive, Montana

LAND & WATER

BIRD SURVEY PROTOCOL

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

Species Use within the Mitigation Wetland: Survey Method

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

Sites that can be circumambulated or walked throughout.

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

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

Sites that cannot be circumambulated.

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

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

Species Use within the Mitigation Wetland: Data Recording

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

1. Bird Species List

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

2. Bird Density

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

3. Bird Behavior

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

4. Bird Species Habitat Use

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

GPS Mapping and Aerial Photo Referencing Procedure

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

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

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

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

Appendix D

REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Crackerbox Creek
Glendive, Montana

LAND & WATER

Photo point E, wetland buffer. View is NW.

Photo point F, wetland view North.

Photo point D, wetland view South.

Photo point C, wetland view NW.

Photo point A, wetland view West.

Photo point B, upland use; view East

	
Photo point G, Beginning veg. transect. In upland looking to upland.	Photo point H, veg. transect end in wetland looking to upland.