MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2001

Ryegate Wetland
Ryegate, Montana

Prepared for:

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

Prepared by:

WETLANDS WEST INC.
P.O. Box 6786
Bozeman, MT 59771

Under contract to:

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

July 2002

Project No: 130091.030

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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 (MDT) Ryegate wetland mitigation site. The wetland was constructed to mitigate wetland impacts associated with the MDT Lavina/Ryegate project in Watershed #10 of the Billings District. The project impacted 1.3 acres within the corridor of US Highway 12 between Lavina and Ryegate. Mitigation sites within the Lavina/Ryegate area total 2.9 acres **(Appendix C**).

The Ryegate site is located in Golden Valley County approximately eight miles east of Ryegate, north of and adjacent to Highway 12, in Sections 4 and 5, Township 6 North, Range 21 East **(Figure 1)**. The elevation is approximately 3,500 feet above sea level. Originally this site was one five mitigation sites between the towns of Lavina and Ryegate, MT. The subject mitigation site, heretofore known as Ryegate, was originally one in a pair of mitigation sites (Lavina/Ryegate); however, for purposes of reporting and future monitoring, the two sites have been separated. The other mitigation sites in this area were not included in this assessment.

Construction was completed on the Ryegate and Lavina sites in 1987 creating two separate wetlands. Mitigation at the Lavina/Ryegate sites was accomplished through a combination of creation and enhancement of existing wetlands to expand acreage and increase overall functions and values. The Ryegate mitigation site is shown in **Figure 2, Appendix A**. The Ryegate site, like the Lavina site, was historically an oxbow of the Musselshell River **(Figure 2, Appendix A)**. The oxbow was separated from the main channel by transportation corridors (railroad and highway) as early as 1910.

The site was visited during the 2001 field season again in June 2002 to assess compliance with the US Army Corps of Engineers (COE) Section 404 requirements.

2.0 METHODS

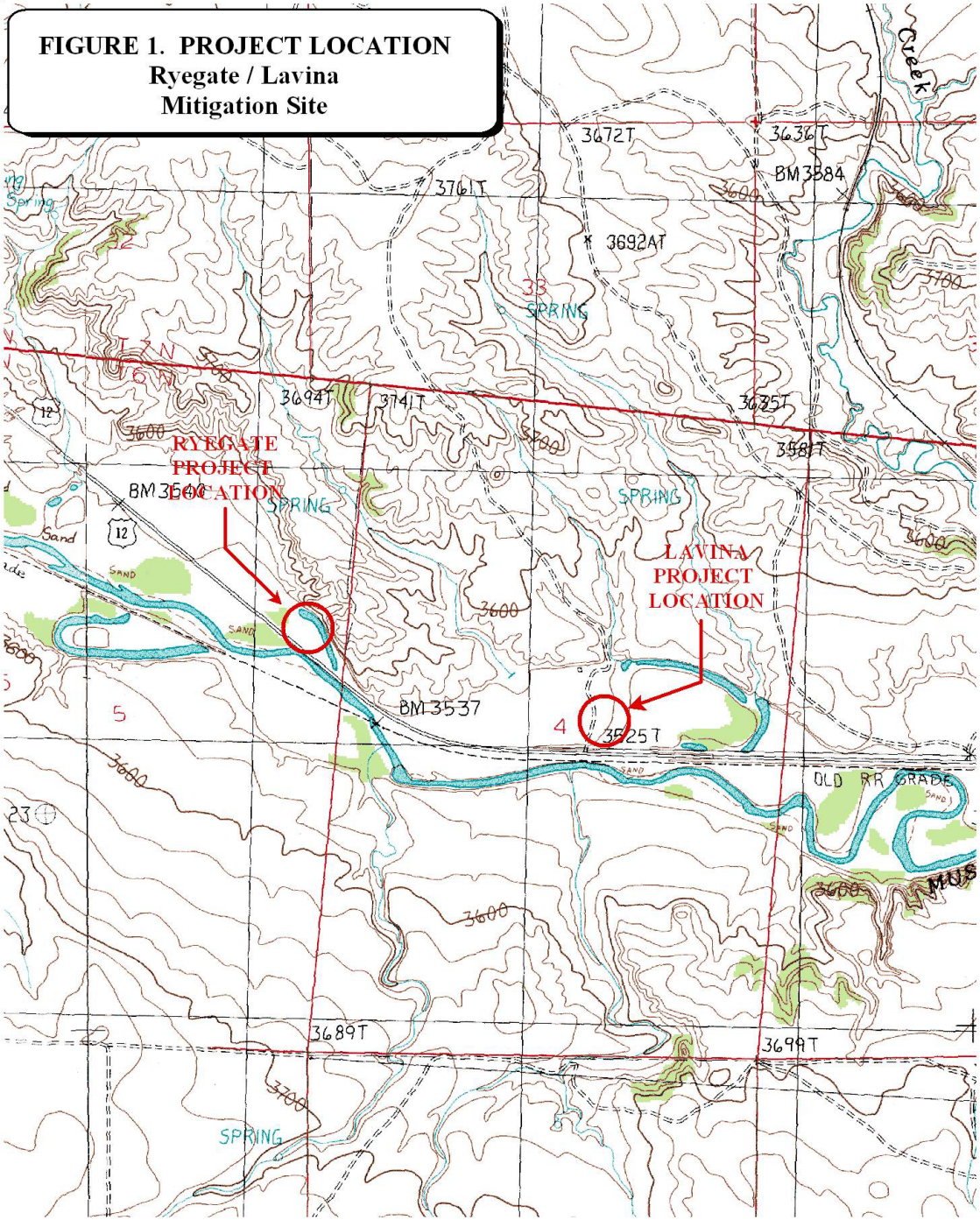
2.1 Monitoring Dates and Activities

The Ryegate wetland was monitored on August 13, 2001 and June 30, 2002. All information contained within the Wetland Mitigation Site Monitoring Form **(Appendix B)** was collected during August 2001 and certain aspects of the wetland were reexamined during June 2002. 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.

FIGURE 1. PROJECT LOCATION
Ryegate / Lavina
Mitigation Site



PROJECT #: 130091.030
DATE: APRIL 2001
LOCATION:
PROJECT MANAGER: B. DUTTON
DRAWN BY: B. NOECKER

LAND & WATER CONSULTING, INC.

1120 CEDAR PO BOX 8254 MISSOULA, MT 59807

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

2.3 Vegetation

General vegetation types were delineated on an aerial photograph during the site visits **(Figure 3, Appendix A)**. Coverage of the dominant species in each community type is listed on the monitoring form **(Appendix B)** and a comprehensive plant species list for the entire site was compiled. Observations from past years will be compared with new data to document vegetation changes over time. 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 **(Appendix B)**. The transect could be used to evaluate changes in vegetation composition over time, especially the establishment and increase of hydrophytic vegetation, if the MDT desires to continue monitoring. 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)**.

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 information was recorded on the Routine Wetland Delineation Forms **(Appendix B)**. The wetland/upland and open water boundary was 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 could be updated as new species are encountered. Observations from past years could be compared with any new data to determine if wildlife use is changing over time.

2.7 Birds

Bird observations were recorded during the site visit according to the established bird survey protocol **(Appendix D)**. A general, qualitative bird list has been compiled using these

observations. Observations will be compared between years in future studies. There are five (5) bluebird nesting boxes at the Ryegate wetland site.

2.8 Macroinvertebrates

One macroinvertebrate sample was collected during the 2001 site visit following the 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 Ryegate mitigation site in 2002 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. The remainder of the assessment was completed in the office **(Appendix B)**.

2.10 Photographs

Photographs were taken showing the current land use surrounding the 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; 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

No inlet or outlet structures were present at this site and bird boxes were examined for need of repair.

3.0 RESULTS

3.1 Hydrology

The source of hydrology for the Ryegate wetland is groundwater and surface water runoff. During the site visit the area was approximately 10% inundated. The average depth of water is less than one foot deep. Drift lines suggest that the water was 1-2 feet higher at some time earlier this season.

3.2 Vegetation

Vegetation species identified on the site are presented in **Table 1** and in the monitoring form **(Appendix B)**. Eight (8) dominant vegetation communities were mapped on the mitigation area map (**Figure 3, Appendix A**). The communities include: Type 1, *Agropyron smithii*/*Hordeum jubatum*; Type 2, *Typha latifolia;* Type 3, *Scirpus validus*; Type 4, *Juncus* spp.; Type 5, *Crepis runcinata/Cirsium* spp*./Equisetum arvense*; Type 6, *Agropyron smithii/Equisetum arvense*; Type 7, *Populus angustifolia*; and, Type 8, *Artemesia tridentata*. Dominant species within each community are listed on the monitoring form **(Appendix B)**. Approximately 70% of the site perimeter is developing wetland vegetation. The depth of water at the emergent vegetation/open water boundary is 0 feet.

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

Transect 1 Start	Upland Type 1 (18')	Wetland Type 4 (12')	Type 3 (11')	Type 2 (39')	Total 80'	End Transect 1

3.3 Soils

The Lavina/Ryegate area has not been mapped and classified by the NRCS. Soils were sampled by field personnel at one upland (SP-1) and one wetland location (SP-2) at the Ryegate mitigation site. Soils at SP-1 were a light, olive brown (2.5YR 5/3) sandy loam from 0-18 inches. Soils at SP-2 were black (10YR 2/1) sandy loams from 0-4 inches. Impenetrable gravels were encountered below four inches

3.4 Wetland Delineation

The delineated wetland boundary is depicted on **Figure 3, Appendix A**. The wetland boundary encompasses 2.22 acres of wetland which includes a shallow open-water area (0.07 AC <2 feet deep). The COE data forms are included in **Appendix B**. The open water/emergent vegetation boundary occurred at 0 feet.

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

Scientific Name	Common Name	Indicator status
Agropyron cristatum	Crested wheatgrass	NI
Agropyron smithii	western wheatgrass	FACU
Artemesia cana	silver sage	FACU
Artemesia tridentata	big sage	NI
Asclepias spp.	milkweed	FAC+-UPL
Bromus inermis	smooth brome	NI
Bromus japonicus	Japanese brome	FACU
Carex spp.	sedge	FACW-OBL
Chenopodium spp.	goosefoot	FACW-FACU
Cirsium spp.	thistle	FAC-UPL (UPL area)
Crepis runcinata	dandelion hawsbeard	FACU
Distichlis spicata	inland saltgrass	FAC+
Elaeagnus angustifolia	Russian olive	FAC
Elymus cinereus	basin wild-rye	FAC
Equisetum arvense	field horsetail	FAC
Grindelia integrifolia	Puget-sound gumweed	FACW
Hordeum jubatum	fox-tail barley	FAC+
Juncus spp.	rush	FAC-OBL
Koeleria macrantha	prairie junegrass	NI
Malva spp.	scarlet globemallow	NI
Melilotus officinalis	yellow sweetclover	FACU
Panicum capillare	witchgrass	FAC
Populus angustifolia	Narrow-leaf cottonwood	FACW
Populus deltoides	eastern cottonwood	FAC
Potentilla spp.	cinquefoil	(UPL. Area)
Rosa woodsii	Woods rose	FACU
Salix spp.	willow	FAC-OBL
Scirpus validus	soft-stem bulrush	OBL
Spergularia rubra	purple sandspurry	FAC-
Stipa comata	needleandthread	NI
Stipa viridula	green needlegrass	NI
Symphoricarpos albus	snowberry	FACU
Typha latifolia	Cattail	OBL
Vicia americana	American purple vetch	NI

3.5 Wildlife

Wildlife species are listed in **Table 2.** Activities and densities associated with these observations are included on the monitoring form in **Appendix B**. Wildlife observations were limited to deer tracks and an unidentified frog species. Four (4) bluebird boxes were located; 3 boxes were occupied by unknown avian species.

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

AMPHIBIANS
Northern Leopard Frogs (*Rana pipiens*)
BIRDS
Cliff Swallow (*Petrochelidon pyrrhonota*) Redtail hawk (*Buteo jamaicensis)* Rock Dove (*Columba livia*) Tree swallow (*Tachycineta bicolor)*
MAMMALS
White-tailed deer (*Odocoileus virginianus)*

3.6 Macroinvertebrates

The macroinvertebrate sampling results are included in **Appendix B**. Rhithron, Inc. summarized the results here: This bio-assessment method suggested sub-optimal biotic conditions at this site. Water quality appeared to be good, since the biotic index value was low, and abundant mayflies in 2 taxa were present. Taxa richness and midge taxa richness were good, but not as high as some other sites studied (Rhithron, Inc.).

3.7 Functional Assessment

Completed functional assessment forms are included in **Appendix B** and are summarized below in **Table 3**. The Ryegate wetland has been categorized as a Category II wetland as a result of the high wildlife habitat rating. Other high scores occurred in the food chain support, groundwater discharge/recharge, and the sediment/shoreline stabilization variables.

Table 3: ***Summary of 2001 Wetland Function/Value Ratings and Functional Points at Ryegate***

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 (1)
General Wildlife Habitat	High (.9)
General Fish/Aquatic Habitat	NA
Flood Attenuation	Moderate (.4)
Short and Long Term Surface Water Storage	Moderate (.7)
Sediment, Nutrient, Toxicant Removal	High (1)
Sediment/Shoreline Stabilization	High (.8)
Production Export/Food Chain Support	High (1)
Groundwater Discharge/Recharge	High (1)
Uniqueness	Moderate (.5)
Recreation/Education Potential	Moderate (.3)
Actual Points/Possible Points	7.6/11
% of Possible Score Achieved	69%
Overall Category	II
Total Acreage of Assessed Wetlands within Easement	2.22 ac
Functional Units (acreage x actual points)	16.87 fu
Net Acreage Gain	2.22 ac
Net Functional Unit Gain	16.87 fu
Total Functional Unit "Gain"	16.87 fu

3.8 Photographs

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

3.9 Maintenance Needs/Recommendations

No bird boxes were in need of repair and no maintenance requirements were noted in the restricted outlet area.

3.10 Current Credit Summary

The net wetland acreage at the Ryegate site totals 2.22 acres and has no deep, open water habitat. This site was constructed as part of Site 5 mentioned in the MDT report included as **Appendix C**. The Lavina and Ryegate sites together comprise approximately four acres of wetland intended in part to mitigate for impacts of 1.3 acres of wetland for the Ryegate East road construction. Other created and/or enhanced wetlands within the general area may also be contributing to the mitigation goals (MDT, **Appendix C**) but were beyond the scope of this investigation.

The Ryegate wetland is categorized as a Category II wetland as a result of the high ratings in wildlife and MNHP Species Habitat. Other high scores occurred in the food chain support, groundwater discharge/recharge, and the sediment/shoreline stabilization variables. The site provides a functional unit gain of 16.87 points.

4.0 REFERENCES

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

Montana Department of Transportation. 1989, 1998. *Montana Wetland Monitoring Report DA Permit No. MT 2SB OXT 2 009336 Ryegate East F 14-4(1) 129.*

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

Appendix A

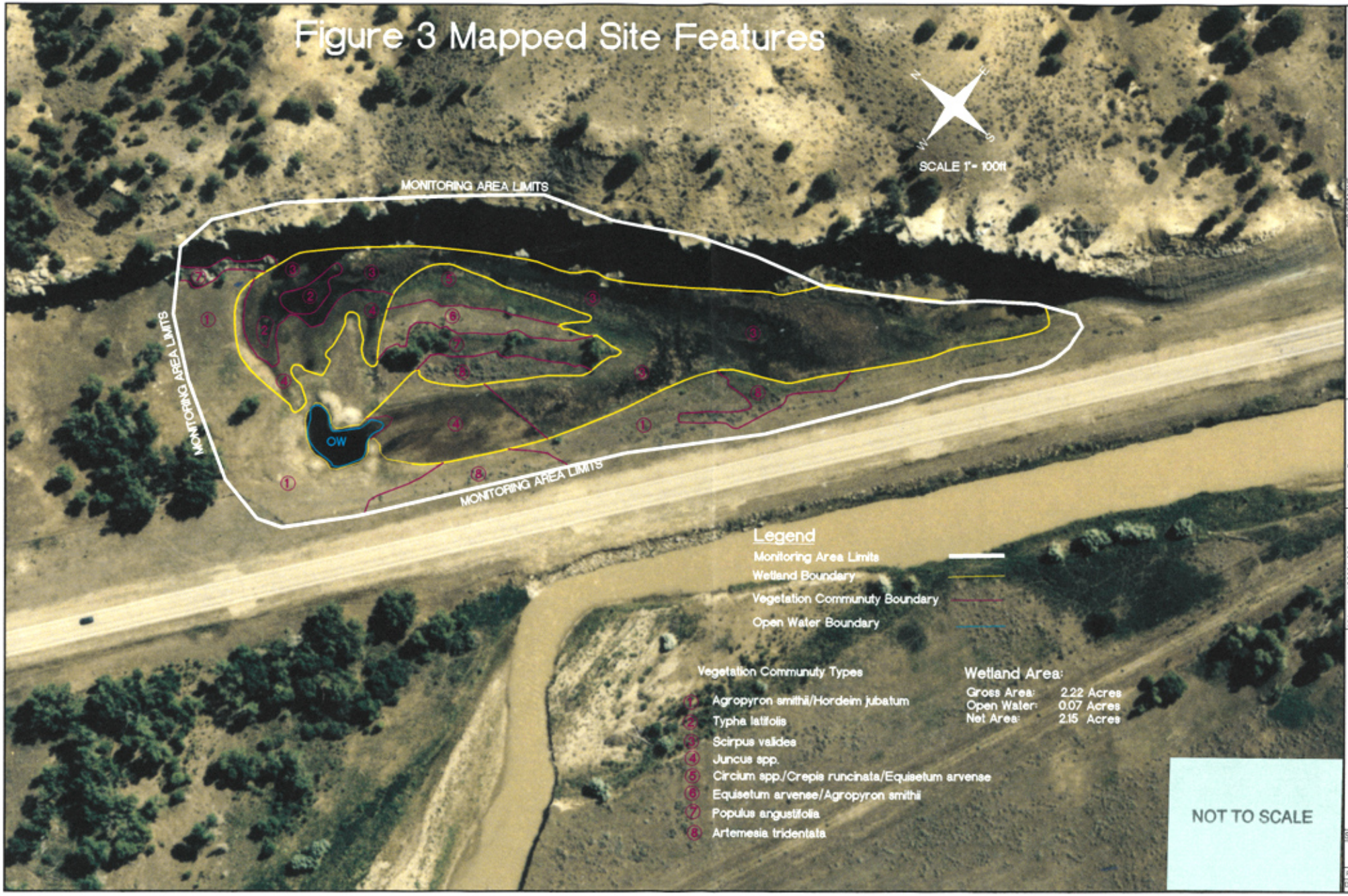
FIGURES 2 - 3

MDT Wetland Mitigation Monitoring
Ryegate Wetland
Ryegate, Montana

LAND & WATER

Figure 2 Monitoring Activity Locations

Figure 3 Mapped Site Features



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
COMPLETED 2001 MACROINVERTEBRATE SAMPLING RESULTS

MDT Wetland Mitigation Monitoring
Ryegate Wetland
Ryegate, Montana

LAND & WATER

Ryegate

LAND & WATER B-1

DRAFT - MDT WETLAND MITIGATION SITE MONITORING FORM

06-30-02-DSC

Project Name: Ryegate Project Number: 215-30 Assessment Date: 08/13/01
Location: Ryegate, MT MDT District: Five Milepost: —
Legal description: T____ R____ Section____ Time of Day: 10:00 am
Weather Conditions: Cloudy, 81° Person(s) conducting the assessment: Le Cain
Initial Evaluation Date: / / Visit #: 1 Monitoring Year: 2001
Size of evaluation area: 3 acres Land use surrounding wetland: Rangeland

HYDROLOGY

Surface Water
Inundation: Present ✓ Absent____ Average depths: 1' ft Range of depths: 0 - 2 ft
Assessment area under inundation: 10 %
Depth at emergent vegetation-open water boundary: 0 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.): _____

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: Drift lines suggest water was 1-2 feet higher this season.

VEGETATION COMMUNITIES

LAND & WATER B-2

Community No.: 1 Community Title (main species): AGSM/HOJU - UPL

Dominant Species	% Cover	Dominant Species	% Cover
AGSm (Agropyron smithii)	50		
HOJU (Hordeum jubatum)	25		
BRIN (Bromus inermis)	10		
MEOF (Melilotis officinalis)	10		
GRIN (Grindelia integrifolia)	10		

COMMENTS/PROBLEMS:

Community No.: 2 Community Title (main species): Typha latifolia - WL

Dominant Species	% Cover	Dominant Species	% Cover
Typha latifolia	90		
Scirpus sp. (validos)	5		
Juncus spp.	5		
Panicum capilare	5		
Carex spp. (LB add.)	unk		

COMMENTS/PROBLEMS: Fairly abrupt boundaries between #2 + #3 w/ some "fringe" overlap.

Community No.: 3 Community Title (main species): Scirpus valides - WL

Dominant Species	% Cover	Dominant Species	% Cover
Scirpus valides	90		
Typha (fringe)	5		
Juncus sp.	5		
Carex spp. (LB add)	unk		
Panicum capillare	trace		

COMMENTS/PROBLEMS:

Additional Activities Checklist:

✓ Record and map vegetative communities on air photo

VEGETATION COMMUNITIES

LAND & WATER B-3

Community No.: 4 Community Title (main species): Juncus spp. - UPL.

Dominant Species	% Cover	Dominant Species	% Cover
Juncus spp.	80		
Hordeum vulgare	10		
Spergularia rubra	10		

COMMENTS/PROBLEMS:

Community No.: 5 Community Title (main species): Crepis runcinata / Cirsium spp. / Equisetum arvense - UPL

Dominant Species	% Cover	Dominant Species	% Cover
Crepis runcinata	25		
Cirsium spp.	35		
Melilotus officinalis	10		
Potentilla sp.	5		
Equisetum arvense	25		

COMMENTS/PROBLEMS: Area appears to have a variable/transitional moisture regime. May have been affected by drought conditions in recent years.

Community No.: 6 Community Title (main species): Agropyron smithii / Equisetum arvense - UPL

Dominant Species	% Cover	Dominant Species	% Cover
A. smithii	50		
E. arvense	50		

COMMENTS/PROBLEMS: Same comment as for #5 above. Lacks sufficient hydro. to support wet veg.

Additional Activities Checklist:

✓ Record and map vegetative communities on air photo

VEGETATION COMMUNITIES

LAND & WATER B-4

Community No.: 7 Community Title (main species): Populus - UPL

Dominant Species	% Cover	Dominant Species	% Cover
P. angustifolia	50%		
A. shichii	20%		
Rosa woodsii	10%		
Artemesia tridentata	20%		

COMMENTS/PROBLEMS: Dry understory species, no hydro.

Community No.: 8 Community Title (main species): Artemesia - UPL

Dominant Species	% Cover	Dominant Species	% Cover
A. tridentata	75		
Agropyron cristatum	25		
Melilotis offianalis	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: Ryegate Date: 6-30-02 Examiner: DSC Transect # 1

Approx. transect length: 80' Compass Direction from Start (Upland): East

Vegetation type 1:	0-18' UPL	
Length of transect in this type:	08-18	feet
Species:		Cover:
Agropyron smithii		50%
Hordeum jubatum		50%
Kochia sp.		25%
Grindelia integrifolia		5%
Total Vegetative Cover:		130

Vegetation type ~~2~~:4	18 - 30 Transition WL	
Length of transect in this type:	12 ft.	feet
Species:		Cover:
Juncus spp.		80%
Hordeum jubatum		10%
Unk. Forb #1 w/ Flower (Collected)		10%
Total Vegetative Cover:		100

Vegetation type 3:	30-41 *(Standing H2O)	
Length of transect in this type:	11	feet
Species:		Cover:
Panicum capilare		80%
Juncus spp.		10%
Carex spp.		20%
Typha latifolia		trace
*Note: "Alkali flat" area, shallow standing water; Well saturated w/ good aerial cover but low plant density.		
Total Vegetative Cover:		110

Vegetation type ~~4~~:2	41-80 Cattail Marsh	
Length of transect in this type:	39	feet
Species:		Cover:
Typha latifolia		50%
Scirpus validus		50%
Carex spp.		10%
Total Vegetative Cover:		110

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 70 % 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:

There are numerous areas of alkali deposits. Islands are dominated by upland vegetation

Ryegate

COMPREHENSIVE VEGETATION LIST

LAND & WATER B-7

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
Hordeum jubatum	1, 4		
Agropyron smithii	1, 7, 6		
Grindelia integrifolia	1, 7		
Panicum capilare	1, 2		
Scirpus validus	2, 3		
Typha latifolia	2, 3		
Juncus spp.	2, 3, 4		
Artemesia tridentata	1, 7, 8		
Populus angustifolia	7		
A. cristatum	8		
Salix spp.	6		
Symphoricarpus alba	7		
Crepis runcinata	5		
Asclepias spp.	5		
Cirsium spp.	5		
Melilotis officiandis	All		
Bromus inermus (sp?)	1, 7		
Russian olive trees	7		
Populus deltoides	7		
Vicia americana	7		
Elymus cinereus	7		
Artemesia cana	7		
Chenopodium spp	7		
Distichlis spicata	7		
Potentilla spp. (UPL)	7, 5		
Stipa comata	7		
S. (green needlegrass)	7		
Bromus japonicus	7		
Woods Rose	7		
Prairie junegrass	1		
Scarlet globemallow	7		
Equisetum arvense	6		
Populus angustifolia	7		

COMMENTS/PROBLEMS: _____

PLANTED WOODY VEGETATION SURVIVAL

LAND & WATER B-8

Species	Number Originally Planted	Number Observed	Mortality Causes
NA			

COMMENTS/PROBLEMS: _____

WILDLIFE

LAND & WATER B-9

Ryegate – B

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
Redtail Hawk	1	✓							
pigeons	many	✓							
cliff swallows	many	✓							
tree swallows	4	✓							

Were man made nesting structures installed? Yes ✓ No____ Type:_____ How many? 4 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
Frogs	3				sited
Deer	—	✓			

Additional Activities Checklist:

✓ Macroinvertebrate sampling (if required)

COMMENTS/PROBLEMS: _____

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	5 16A	wetland view	E
B	6 15A	surrounding upland	W
C	7 14A	wetland buffer	N
D	8 11A	wetland view	N
E	9 9A	wetland view	W
F	10 10A	wetland view	S
G	13 A	begin trans (upL)	
H	12 A	end trans (wL)	

COMMENTS/PROBLEMS: Frames 1 & 2 are of soils at sample points 1 & 2. Frames 3 & 4 are of the beginning & end of the veg transects

B - camera mal function - photos retaken - #'s 1+2 not retaken

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
_____ Groundwater monitoring well locations

COMMENTS/PROBLEMS: _____

WETLAND DELINEATION

LAND & WATER B-11

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: 4 bluebird boxes on site. Boxes GPSed as 1, 3 & 4 are occupied by an unknown bird.

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

Project/Site: Ryegate Applicant/Owner: MDT Investigator: LeCoin, Wetlands West, Inc.	Date: 13 Aug 2001 County: Golden Valley 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: SCA1 Transect ID: W-1 Plot ID: SP-2

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. SCA1	H	OBL	9.		
2. Typha spp.	H	OBL	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-). 100%

Remarks: This is a enhanced/constructed 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: Area is not inundated now, but drift lines suggest it was earlier in the season

SOILS

Map Unit Name (Series and Phase): Survey not completed

Drainage Class: —

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	Black 10YR 2/1	Reddish yellow 5YR 6/6	75%/evident	gravelly loam
4-	B	10YR 2/1	—	—	gravel

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: Below 4" is impenetrable gravel

WETLAND DETERMINATION

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

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

Remarks: Depressional wetland with well developed emergent vegetation.

Approved by HQUSACE 3/92

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

Project/Site: Ryegate Applicant/Owner: MDT Investigator: LeCain, Wetlands West, Inc.	Date: 13 Aug 2001 County: Golden valley 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: AGSI Transect ID: UPland Plot ID: SP-1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. AGSI	H	FACU	9.		
2. GRIN	H	FACW	10.		
3. Kochia spp.	H	FACU	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 33%

Remarks: Area appears very dry

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 wetland hydrology

SOILS

Map Unit Name (Series and Phase): Soil survey not completed

Drainage Class: —

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.
0-3	A	Light olive brown 2.5Y5/3	—	—	sandy loam
3-18	B	2.5Y5/3	—	—	sandy loam

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: Soil profile is to dry to hold together. Pit was examined.

WETLAND DETERMINATION

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

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

Remarks: Area was very dry on this date

Approved by HQUSACE 3/92

Ryegatp

LAND & WATER B-16

Draft Field Data Collection Sheet for MDT Montana Wetland Assessment Form

1. CLASSIFICATION

Vegetated Cowardin Class	Estimated % of AA	Predominant Water Regime (CIRCLE)
Emergent	20%	PF (IE) SPF SF S TF IF
Aquatic Bed	1%	(PF) IE SPF SF S TF IF
Moss-Lichen	—	PF IE SPF SF S TF IF
Scrub-Shrub	20%	PF IE SPF SF S TF (IF)
Forested	20%	PF IE SPF SF S TF (IF)
Total Estimated % Vegetated	61%	

2. DISTURBANCE is: High (Moderate) Low Disturbed by 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.) NO

Fish observations? NO

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:

LAND & WATER B-17

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

1. Project Name: Rivers 2 2. Project #: Site 20 Control #: Task #30

3. Evaluation Date: Mo. 1 Day 23 Yr. 02 4. Evaluator(s): [illegible] 5. Wetlands/Site #(s) _____
8 13 01

6. Wetland Location(s): I. Legal: T 6 N or S; R 2 E or W; S 5 and 4 ; T ___ N or S; R ___ E or W; S _____
II. Approx. Stationing or Mileposts: 212

III. Watershed: 10040201 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)
1.9 (measured, e.g. by GPS [if applies])

9. Assessment area: (AA, tot., ac., see instructions on determining AA) _____ (visually estimated)
1.9 (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
Riverine	Palustrine	NA	EM	H	E	50%
	Palustrine	NA	SS	F/C	E	10%
	" "	NA	AB/UB	C	E	30%

(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 cleaning; contains few roads or buildings	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, cleaning, 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 cleaning, 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, cleaning, 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) _____

III. Provide brief descriptive summary of AA and surrounding land use/habitat: [illegible], agriculture

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 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			
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:

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 ih 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		
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:

14H Sediment/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 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 /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

- X Springs are known or observed
- X 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

i. **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) 2.22
A. Listed/Proposed T&E Species Habitat	L	0	1	
B. MT Natural Heritage Program Species Habitat	L	1	1	
C. General Wildlife Habitat	H	.9	1	
D. General Fish/Aquatic Habitat	NA	–	–	–
E. Flood Attenuation	M	.4	1	
F. Short and Long Term Surface Water Storage	M	.7	1	
G. Sediment/Nutrient/Toxicant Removal	H	1	1	
H. Sediment/Shoreline Stabilization	H	.8	1	
I. Production Export/Food Chain Support	H	1	1	
J. Groundwater Discharge/Recharge	H	1	1	
K. Uniqueness	M	.5	1	
L. Recreation/Education Potential	M	.3	1	
Totals:		7.6	11	16.872

69%

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)
- A Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; or
- X 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

Macro-invertebrate Sampling Results for Ryegate

Montana Department of Transportation		Project Name	Ryegate
Wetland Mitigation Monitoring Project		Project/task number	215-30
for		Date	8/13/2001
Land and Water Consulting		Field Personnel	Wetlands West
		Note	
2001		Rhithron Sample Identification	8
Coelenterata		*Hydra*	
Oligochaeta	Enchytraeidae	Enchytraeidae	
	Naididae	*Chaetogaster*	
		Nais elinguis	
		Nais variabilis	
		Ophidonais serpentina	
	Tubificidae	Tubificidae - immature	1
		Limnodrilus hoffmeisteri	
Hirudinea	Erpobdellidae	*Mooreobdella microstoma*	
		Nephelopsis	
	Glossiphoniidae	*Helobdella stagnalis*	1
		Helobdella	
		Glossiphonia	
Bivalvia	Sphaeriidae	*Sphaerium*	
Gastropoda	Lymnaeidae	*Fossaria*	
	Physidae	*Physa*	8
	Planorbidae	*Gyraulus*	
		Helisoma	
Crustacea	Cladocera	Cladocera	1
	Copepoda	Calanoida	1
		Cyclopoida	
	Ostracoda	Ostracoda	
	Amphipoda	*Gammarus*	
		Hyalella azteca	7
	Decapoda	*Orconectes*	
Acarina		Acari	4
Odonata	Aeshnidae	*Anax*	
	Libellulidae	Libellulidae-early instar	1
		Sympetrum	1
	Coenagrionidae	Coenagrionidae-early instar	88
		Enallagma	
	Lestidae	*Lestes*	
Ephemeroptera	Baetidae	*Callibaetis*	14
	Caenidae	*Caenis*	42
Hemiptera	Corixidae	Corixidae - immature	
		Hesperocorixa	
		Sigara	
		Trichocorixa	
	Nepidae	*Ranatra*	
	Notonectidae	*Notonecta*	6
Trichoptera	Hydroptilidae	Hydroptilidae - pupa	
	Leptoceridae	Leptoceridae - early instar	
		Mystacides	
		Ylodes	
Coleoptera	Chrysomelidae	Chrysomelidae	
	Curculionidae	*Bagous*	
	Dytiscidae	*Acilius*	
		Hydroporinae - early instar larvae	
		Hygrotus	
		Liodessus	
		Laccophilus	
		Neoporus	
	Elmidae	*Heterlimnius*	
	Haliplidae	*Haliplus*	2
		Peltodytes	10
	Hydrophilidae	*Berosus*	
		Helophorus	
		Hydrobius	
		Hydrochara	
		Laccobius	
		Tropisternus	

Diptera	Ceratopogoninae	*Bezzia/Palpomyia*	
		Dasyhelea	
	Chaoboridae	*Chaoborus*	
	Culicidae	*Anopheles*	
		Culex	
	Ephydridae	Ephydridae	
	Simuliidae	*Simulium*	
	Sciomyzidae	Sciomyzidae	
	Stratiomyidae	*Odontomyia*	
	Chironomidae	*Acricotopus*	1
		Chironomus	4
		Cladotanytarsus	
		Corynoneura	
		Cryptotendipes	
		Dicrotendipes	7
		Einfeldia	
		Endochironomus	
		Labrundinia	5
		Microtendipes	
		Orthocladius annectens	
		Parachironomus	
		Paramerina	
		Paratanytarsus	
		Phaenopsectra	
		Polypedilum	
		Procladius	
		Psectrocladius	
		Psectrotanypus	
		Pseudochironomus	
		Tanypus	
		Tanytarsus	25
		TOTAL	229
		grids	7

Total taxa	20
POET	2
Chironomidae taxa	5
Crustacea taxa + Mollusca taxa	2
% Chironomidae	18.34061135
Orthocladiinae/Chironomidae	2.380952381
%Amphipoda	3.056768559
%Crustacea + %Mollusca	6.550218341
HBI	6.895196507
%Dominant taxon	38.4279476
%Collector-Gatherers	48.0349345
%Filterers	0.436681223

Total taxa	3
POET	3
Chironomidae taxa	3
Crustacea taxa + Mollusca taxa	3
% Chironomidae	1
Orthocladiinae/Chironomidae	1
%Amphipoda	3
%Crustacea + %Mollusca	3
HBI	3
%Dominant taxon	3
%Collector-Gatherers	1
%Filterers	3
site score	30

Appendix C

1989 WETLAND MONITORING REPORT
SITE MAP OF THE LAVINA/RYEGATE MITIGATION PROJECTS

MDT Wetland Mitigation Monitoring
Ryegate Wetland
Ryegate, Montana

LAND & WATER

April 1989

LAND & WATER C-1

App M

Wetland Monitoring Report DA Permit No. MT 2SB OXT 2 009336
Ryegate-East F 14-4(1)129

Note

Special condition F. of the subject 404 permit required that Montana Department of Highway personnel monitor created and enhanced wetland areas on this project for a period of two years after construction.

General

In accordance with the terms and conditions of this permit, the Montana Department of Highways was authorized by the Secretary of the Army to place fill material in Careless Creek and in wetlands adjacent to the Musselshell River in conjunction with a highway construction project in Golden Valley County, Montana. The work took place in Sections 2, 3, and 5, Township 6 North, Range 20 East; Section 35, Township 7 North, Range 20 East; and Sections 4 and 5, Township 6 North, Range 21 East (see figure 1).

The proposed project involved placement of roadway fill on the westerly 7.1 miles of a 15.6 mile highway project on U.S. 12 east of Ryegate, Montana. Site 1 included realigning 700 feet of roadway 50 feet south of the Present Traveled Way (PTW), to make use of an abandoned railroad bed. This work destroyed 0.4 acre of wetlands, while over-excavation of the proposed roadside ditch created 1.6 acres of wetland. Site 2, 1.5 miles east of the project's west end, was also a realignment of 50 feet to the south. Wetland area filled at this location was 0.2 acre. A proposed realignment 2.7 miles east of the project's west end moved the road 50 to 80 feet north and took 0.2 acre of wetland. Obliteration of the PTW in this area (Site 3) created 0.3 acre of wetland. (Ryegate)

The new road crossing at Careless Creek, 3.3 miles from the project's west end, involved shifting the highway 60 feet north. The proposed two-span, prestressed concrete bridge at this location (Site 4) replaced an existing 115-foot timber structure, which was removed. (Lavina)

An alignment shift of 30 feet to the north at Site 5 resulted in the loss of 0.5 acre of existing wetland. Site 5 is at the downstream end of the 7.1 mile highway project. Some existing pond areas north of the PTW were sub-excavated, thereby enhancing wetland function. In addition, areas to the south and east of the pond sites were subexcavated creating 1.0 acre of wetlands.

In summary, the highway work on this project involved the filling of 1.3 acres of wetlands, while 2.9 acres were created. Some wetland enhancement was also accomplished (see figures 2-5).

Monitoring

Monitoring of created/enhanced wetland sites (1, 3, 5) by Highway Biologists, during a two year period, consisted of visits to the project area in August 1988 and April 1989.

The August 1988 monitoring effort involved visits to sites 1, 3, and 5 to determine if the proposed wetland construction had been accomplished according to permit specifications. Construction at sites 1 and 3 was as specified. Construction at site 5 was as specified, except that proposed wetland construction north of the existing pond site was replaced with an equal area of wetland construction east of the pond sites (refer to figure 5). Photos were taken of sites 1 and 5 and are included with this report as figures 6 and 7 respectively.

The April 1989 monitoring effort involved visits to sites 1, 3, and 5 to determine the extent of water inundation at the sites and if aquatic vegetation had been established (refer to figures 8-10 for 1989 site pictures).

Site 1 was only partially inundated, but the entire site exhibited saturated soils and scattered cattail/rush growth. Site 3 was not inundated, but did exhibit saturated soils and good cattail/rush establishment. Site 5 exhibited water inundation in all subexcavation areas and also a good cattail/rush growth encroachment.

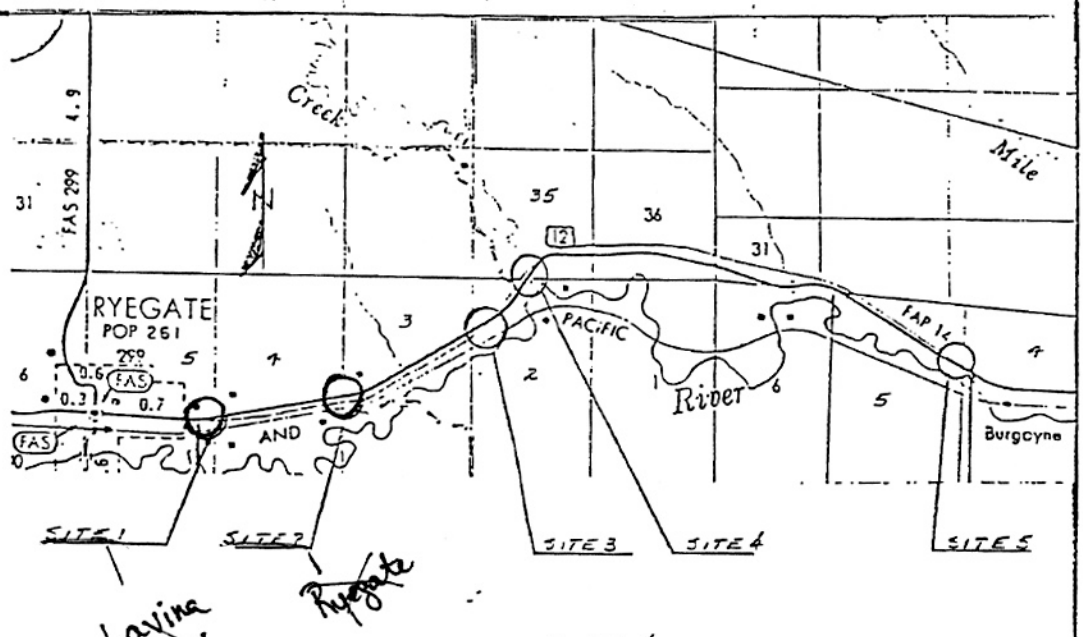
Conclusion

The entire wetland mitigation area of sites 1, 3, and 5 (2.9 acres) appear to meet the corps' three parameter method for wetland determinations. In general, all sites exhibit periodic or permanent water inundation, saturated/hydric soils, and obligate wetland vegetation encroachment.

It is also worth noting these sites will likely improve dramatically with normal precipitation conditions, considering their progress to date under some of the severest drought conditions in years.

JR/si/3v

LAND & WATER C-4



Lavina W.

Ryegate

SITE 1
LAT = 46° 18' ±
LONG = 109° 14' ±
T6N; R20E; SEC 5

SITE 2
LAT = 46° 18' ±
LONG = 109° 13' ±
T6N; R20E; SEC 3

SITE 3
LAT = 46° 19' ±
LONG = 109° 12' ±
T6N; R20E; SEC 2

SITE 4
LAT = 46° 19' ±
LONG = 109° 11' ±
T6N; R20E; SEC 2, 35

SITE 5
LAT = 46° 19' ±
LONG = 109° 07' ±
T6N; R20E; SEC. 5, 4

Figure 1. Site Map

PURPOSE: CONSTRUCTION OF FAP 14

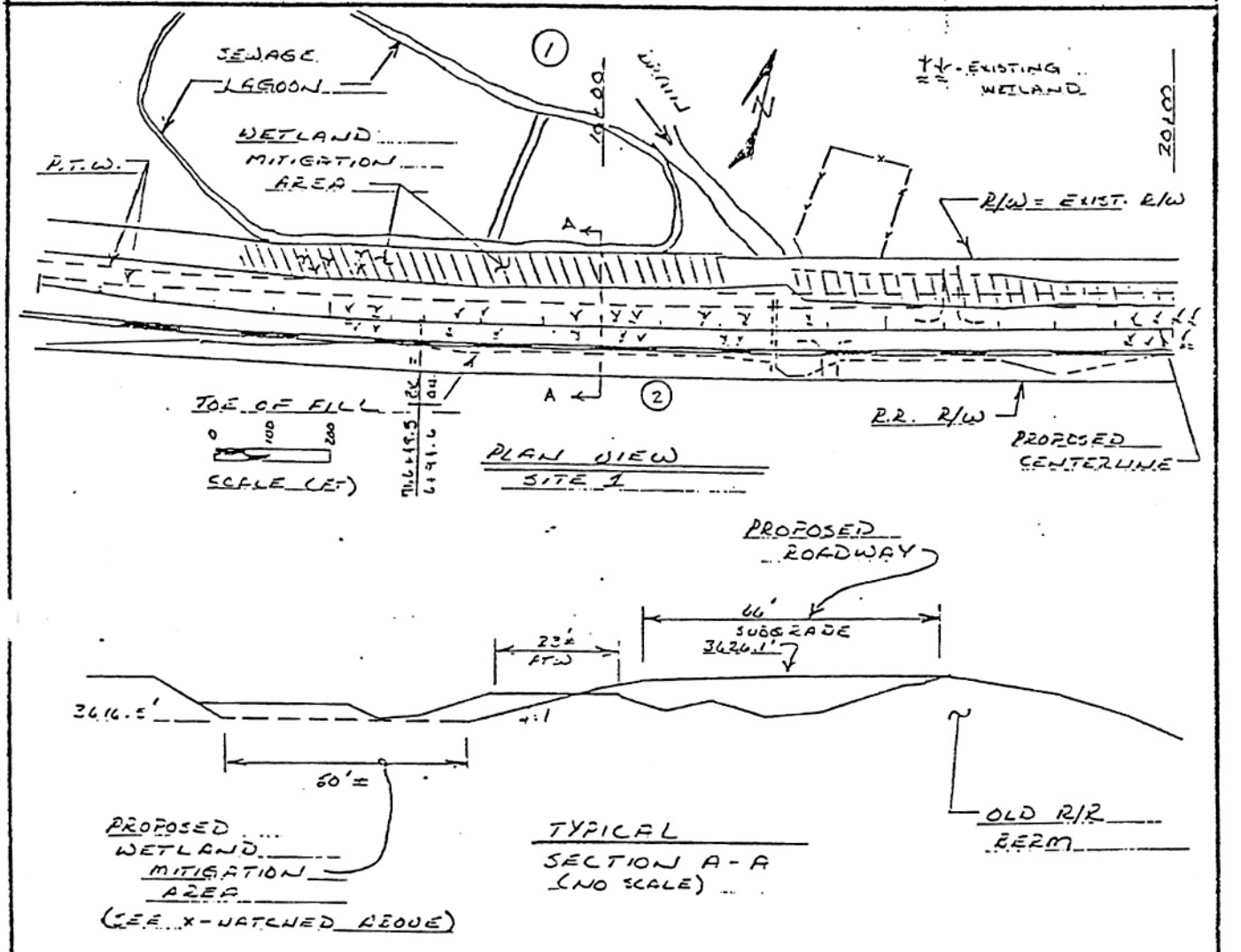
ADJACENT PROPERTY OWNERS
SEE SITE SHEETS

IN: WETLAND, CARELESS CR.

COUNTY OF: GOLDEN VALLEY STATE: MONT.

APPLICATION BY: MT DEPT. OF HIGHWAYS

SHEET 1 OF 6 DATE DEC. 86



QUANTITIES (STA. 762 TO 24+50

TOTAL WETLAND AREA = 0.4 ACRES

WETLANDS FILLED = 0.4 ACRES

WETLAND MITIGATED = 1.6 ACRES

Figure 2. Site 1.

PURPOSE: CONSTRUCTION OF FAP 14

ADJACENT PROPERTY OWNERS

(1) Robert R. & Emily M. Brunner; Ryegate, MT. 59074

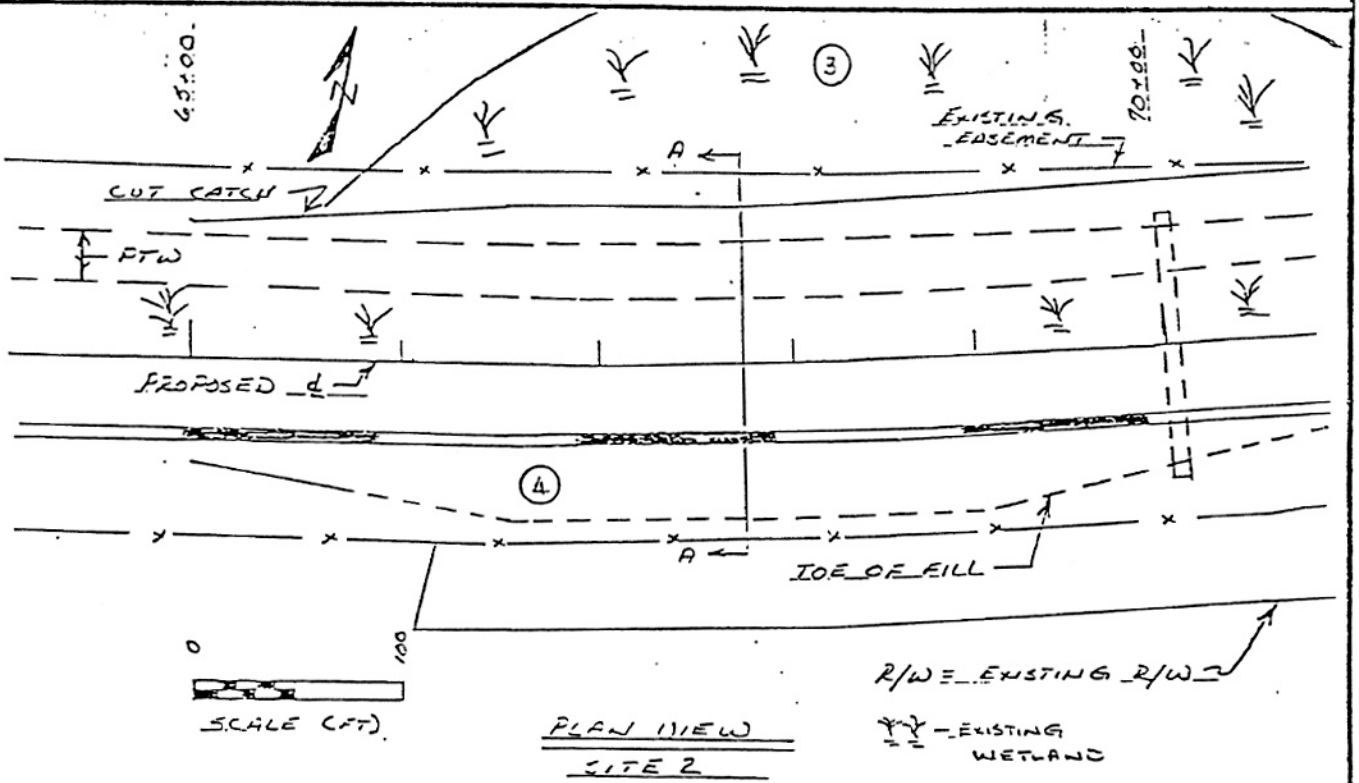
(2) State of MT; Dept. of Highways

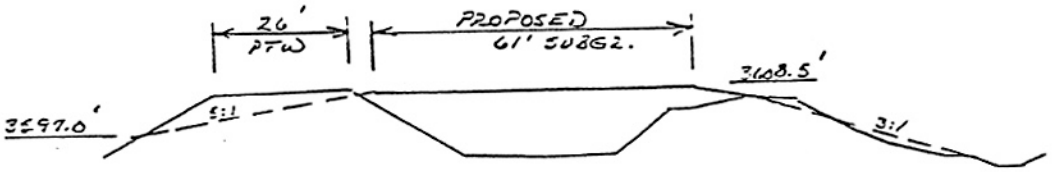
IN: WETLANDS

COUNTY OF: GOLDEN VALLEY STATE: MONT.

APPLICATION BY: MT. DEPT. OF HIGHWAYS

SHEET 2 OF 6 DATE DEC. 86





QUANTITIES

TOTAL WETLAND AREA = 0.4 AC

WETLANDS FILLED = 0.2 AC.

TYPICAL SECTION A-A (NO SCALE)

Figure 3. Site 2.

PURPOSE: CONSTRUCTION OF FAP 14

ADJACENT PROPERTY OWNERS

③ Emmy Lou Garfield ; Ryegate, MT. 59074

④ State of MT ; Dept. of Highways

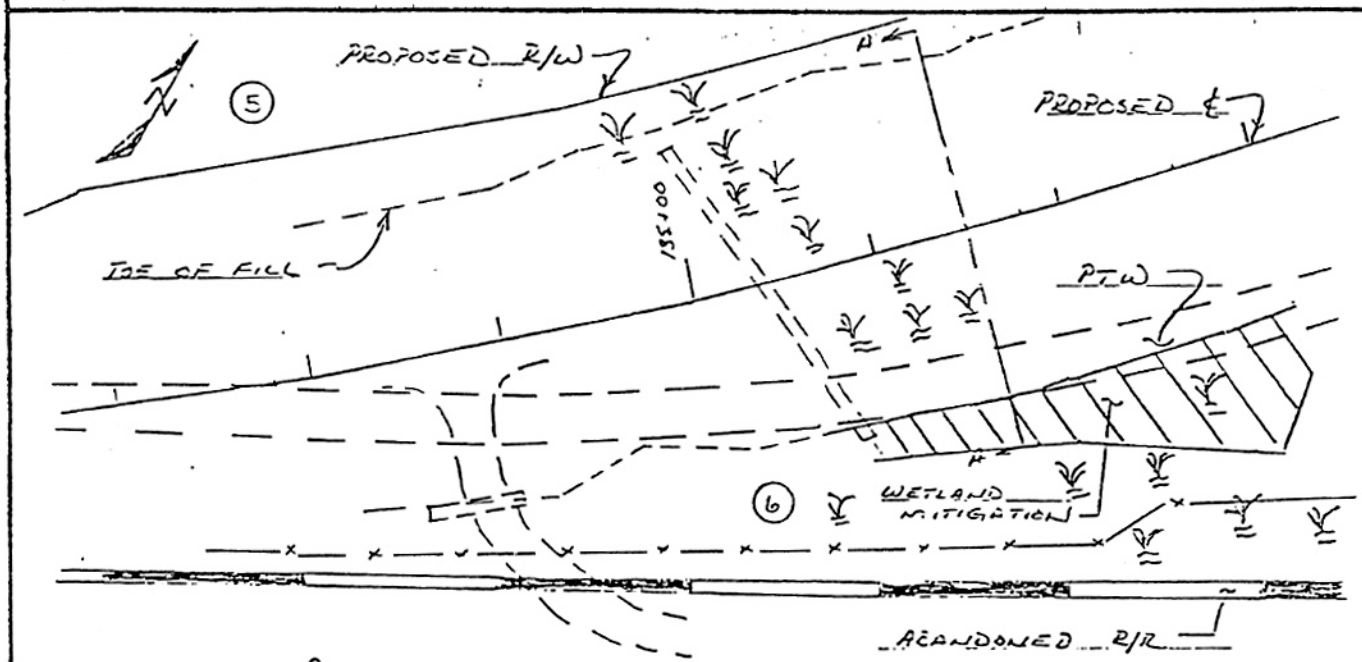
IN: WETLANDS

COUNTY OF: GOLDEN VALLEY STATE: MONT.

APPLICATION BY: MT. DEPT. OF HIGHWAYS

SHEET 3 OF 6 DATE DEC. 86

LAND & WATER C-7

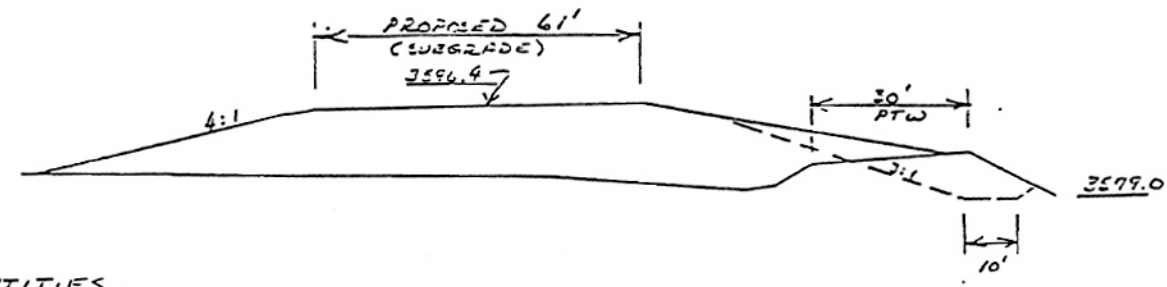


0 100

SCALE (FT)

PLAN VIEW
SITE 3

YY - EXISTING WETLAND



TYPICAL
SECTION A-A
(NO SCALE)

QUANTITIES

TOTAL WETLAND AREA = 0.4 AC.

WETLANDS FILLED = 0.2 AC.

WETLAND MITIGATED = 0.3 AC.

Figure 4. Site 3.

PURPOSE: CONSTRUCTION OF EAP 14

IN: WETLANDS

COUNTY OF: GOLDEN VALLEY STATE: MONT.

APPLICATION BY: MT. DEPT. OF HIGHWAYS

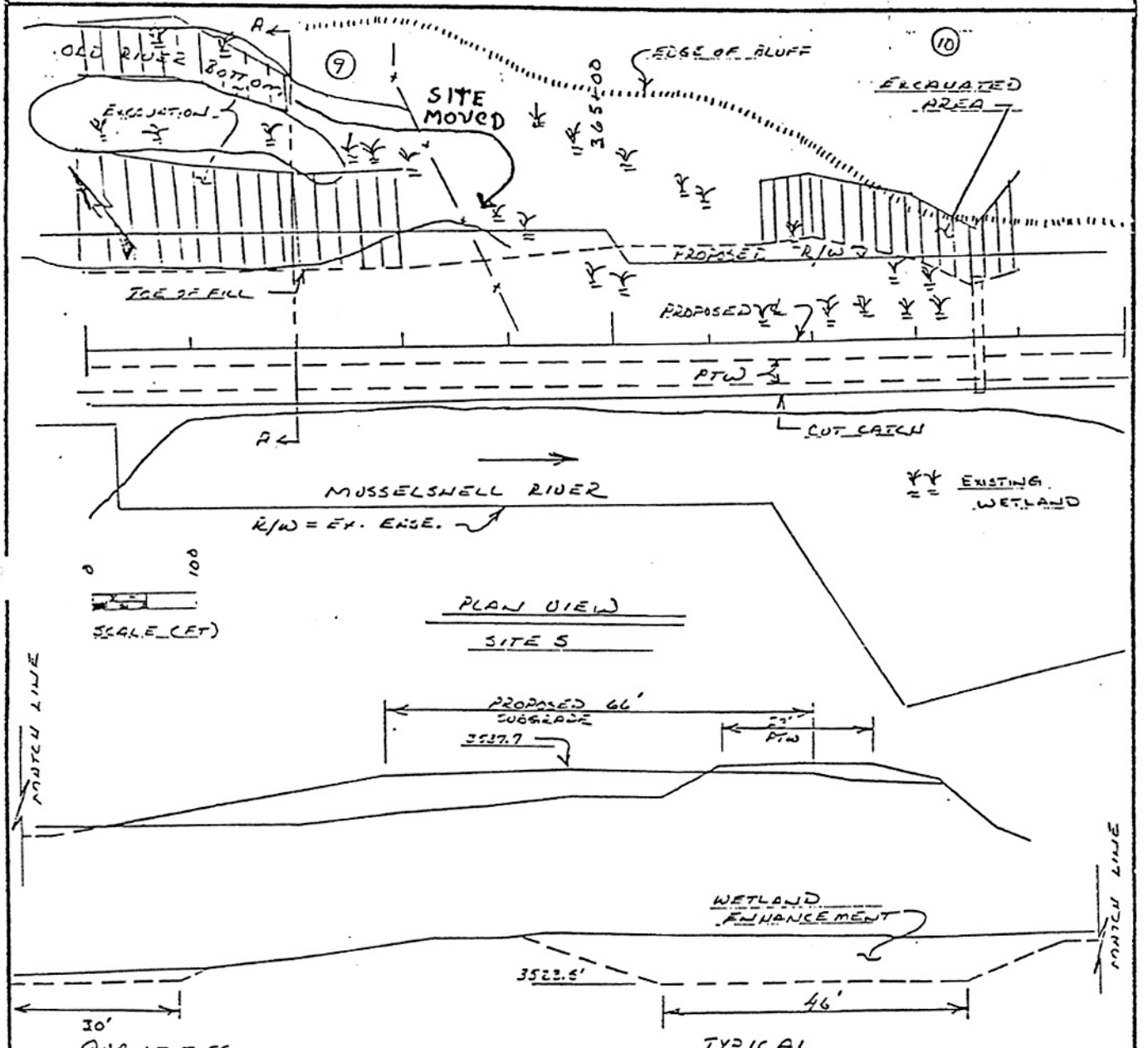
SHEET 4 OF 6 DATE DEC. 86

ADJACENT PROPERTY OWNERS

5 Emmy Lou Garfield; Ryegate, MT. 59074

6 State of MT; Dept. of Highways

LAND & WATER C-8



QUANTITIES

TOTAL WETLAND AREA = 2.4 ACRES
WETLANDS FILLED = 0.5 ACRES
WETLAND ENHANCEMENT = 1.0 ACRES

TYPICAL SECTION A-A (NO SCALE)

Figure 5. Site 5.

PURPOSE: CONSTRUCTION OF FAP 14

IN: WETLANDS

ADJACENT PROPERTY OWNERS

(9) Stella Sterling ; Ryegate, MT. 59074

(10) Ford C. Garfield ; Cushman, MT. 59023

COUNTY OF: GOLDEN VALLEY STATE: MONT.

APPLICATION BY: MT. DEPT. OF HIGHWAYS

SHEET 6 OF 6 DATE DEC. 86

LAND & WATER C-9

Lavina\Ryegate Wetland Sites

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Appendix D

BIRD SURVEY PROTOCOL
MACROINVERTEBRATE SAMPLING PROTOCOL
GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Ryegate Wetland
Ryegate, 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.

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

REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Ryegate Wetland
Ryegate, Montana

LAND & WATER

Photo point D, view North

Photo point F, view South

Photo point E, view South

Photo point A, view East

Photo point G, begin veg transect

Photo point H, end transect

Photo point C, wetland buffer; view North	Photo point B, upland use; view West

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