MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2002

Wigeon Reservoir
Alzada, Montana

Prepared for:

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

Prepared by:

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

February 2003

Project No: 130091.028

LAND & WATER

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Completed 2002 Bird Survey Forms

Completed 2002 Wetland Delineation Forms

Completed 2002 Field and Functional Assessment Forms

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Appendix C: *Representative Photographs*

2002 Aerial Photograph

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Macroinvertebrate Sampling Protocol

GPS Protocol

1.0 INTRODUCTION

The Wigeon wetland was created to provide mitigation credits for wetland impacts associated with Montana Department of Transportation (MDT) roadway projects that have either been constructed in Watershed #16 in MDT District Five. The site is located in Carter County, Montana, approximately 22 miles directly north of Alzada **(Figure 1)** in Sections 23 and 26, Township 5 South, Range 59 East. Elevations range from approximately 3,169 to 3,175 feet above sea level.

Construction was completed on this site in October of 1997 with the goal of creating a reservoir to provide nesting and brood rearing habitat for waterfowl and other wildlife species. An impoundment was constructed to collect surface water runoff from an intermittent tributary of Prairie Dog Creek. The site boundary is illustrated on **Figure 2, Appendix A**.

This wetland was designed by the BLM in association with the MDT to provide specific wetland functions including: nesting and brood rearing habitat for waterfowl; water for wildlife habitat; increased habitat diversity; water storage and retention; and creating open water and emergent wetland types.

2.0 METHODS

2.1 Monitoring Dates and Activities

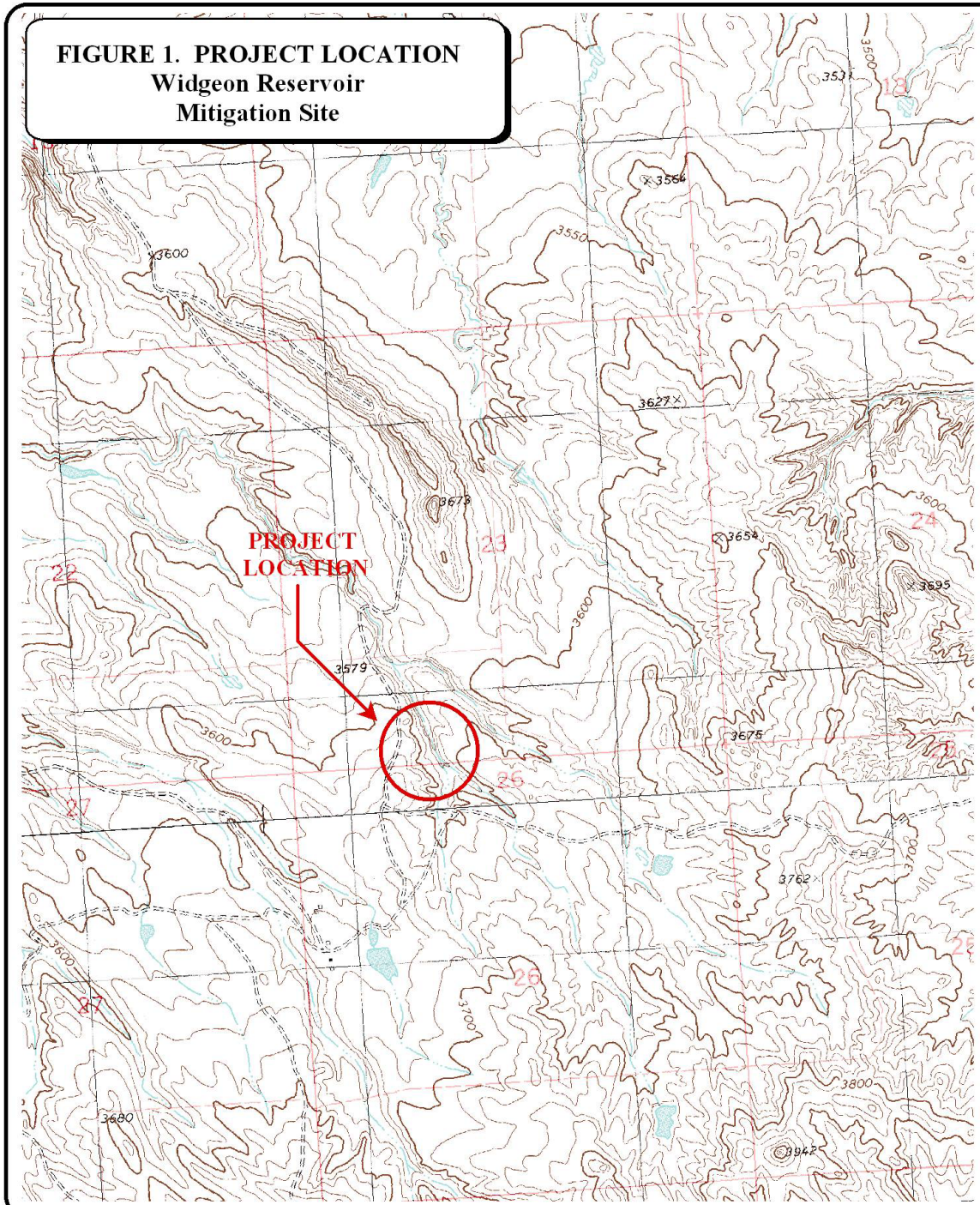
The site was visited once on August 10, 2002. All information within the Wetland Mitigation Site Monitoring Form **(Appendix B)** and macroinvertebrate samples were collected at this time. Activities and information conducted/collected included: wetland delineation; wetland/open water boundary mapping; vegetation community mapping; vegetation transects; soils data; hydrology data; bird and general wildlife use; photograph points; macroinvertebrate sampling; functional assessment; and assessment of the maintenance needs at inflow area and outflow structure.

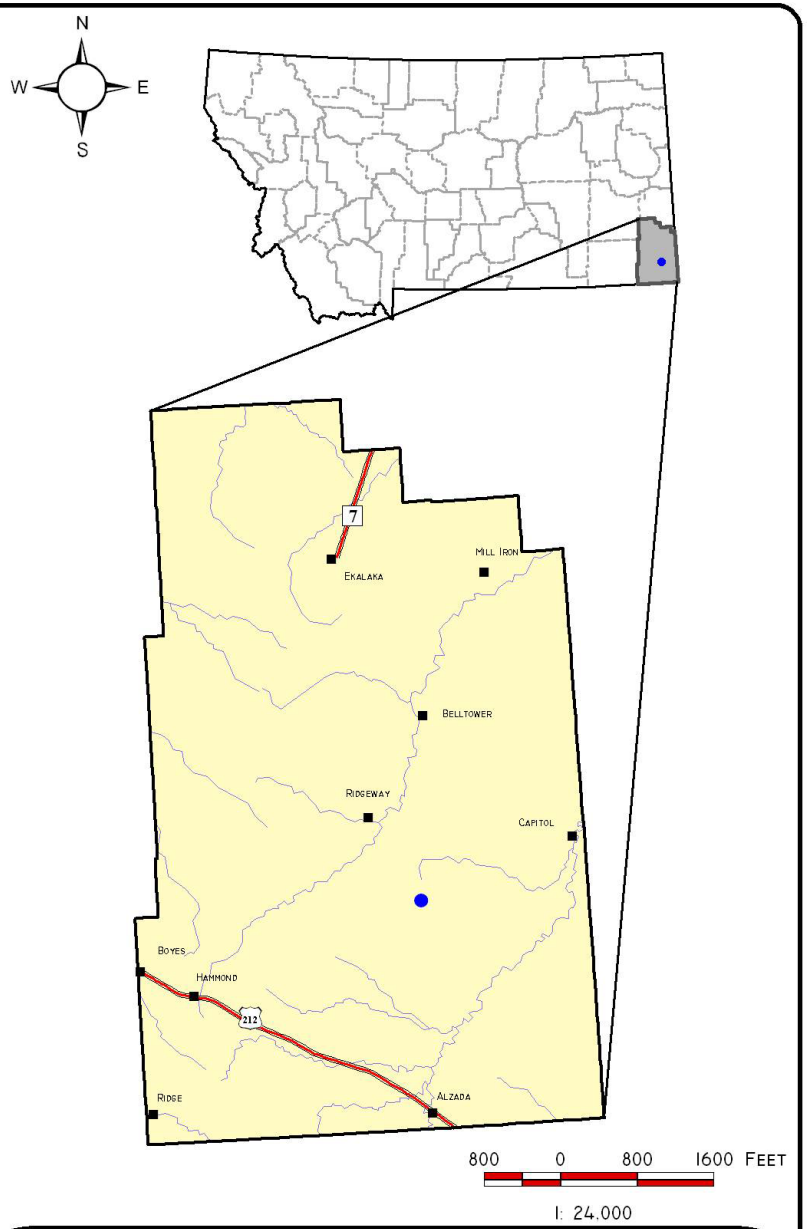
2.2 Hydrology

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

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

FIGURE 1. PROJECT LOCATION
Widgeon Reservoir
Mitigation Site





PROJECT #: 130091.028
DATE: APRIL 2001
LOCATION:
PROJECT MANAGER: B. DUTTON
DRAWN BY: B. NOECKER

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1120 CEDAR PO BOX 8254 MISSOULA, MT 59807

2.3 Vegetation

General vegetation types were delineated on an aerial photograph during the August site visit (**Figure 3, Appendix A)**. Coverage of the dominant species in each community type is listed on the monitoring form **(Appendix B)**. A comprehensive plant species list for the entire site was compiled in 2001 and has been updated with the new species encountered during the current season. Observations from past years will be compared with new data to document vegetation changes over time. Wigeon Reservoir is not fenced, and cattle have unrestricted access to the site. Woody species were not planted on this site.

One transect was established during the 2001 monitoring event to represent the range of vegetation conditions over time, especially the establishment and increase of hydrophytic vegetation. 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)**. Transect ends were marked with metal fence posts and their locations were recorded with the GPS unit during 2001. Photographs of the transect were taken from both ends during the 2002 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 area immediately adjacent to and including the reservoir according to the 1987 COE Wetland Delineation Manual. Wetland and upland areas within the monitoring area were investigated for the presence of wetland hydrology, hydrophytic vegetation and hydric soils. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: North Plains Region 4 (Reed 1988). The information was recorded on the COE Routine Wetland Delineation Forms **(Appendix B)**. The wetland/upland and open water boundaries were used to calculate the wetland area developed at the reservoir.

2.6 Mammals, Reptiles, and Amphibians

Mammal, reptile, and amphibian species observations were recorded on the wetland monitoring form during the site visit **(Appendix B)**. Indirect use indicators were also recorded including tracks, scat and burrows. A comprehensive wildlife species list for the entire site was compiled and will be updated as new species are encountered. Observations from past years will be compared with new data to determine if wildlife use is changing over time.

2.7 Birds

Bird observations were recorded during the site visit according to the established bird survey protocol **(Appendix D).** A general, qualitative bird list has been compiled using these observations. Observations will be compared between years in future studies.

2.8 Macroinvertebrates

One macroinvertebrate sample was collected during the 2002 site visit following the sampling 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 in 2002 for the Wigeon reservoir 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 monitoring area, and the vegetation transect. A description and compass direction for each photograph were recorded on the wetland monitoring form. The approximate locations of the photos 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 (Appendix D)**. Points collected included: the vegetation transect beginning and ending locations; photograph locations; and the jurisdictional wetland boundary. The wetland boundary was hand-drawn during the 2002 site visit using an aerial photograph.

2.12 Maintenance Needs

There are no inflow or outflow structures or nest boxes at this site. The only hydrologic control structure at the Wigeon wetland is the dike; no pipes or other outflow structures were installed to convey water through the dike or out of the reservoir.

3.0 RESULTS

3.1 Hydrology

Wigeon reservoir was 77% inundated during the site visit. Negligible emergent vegetation was growing within the open water at the time of investigation, in part as a result of the low water level (drought conditions) and in part because of grazing (see photos in **Appendix C**). Water depths were estimated to range between 1 and 6 feet deep throughout the reservoir. The open water boundary is depicted on **Figure 3, Appendix A**. The primary source of hydrology is an intermittent tributary of Prairie Dog Creek and the secondary source is likely groundwater. No problems with the dike were noted.

According to the Western Regional Climate Center (WRCC, 2002), the Ridgeway 1S station annual mean (1952 – 2001) precipitation is 13.39 inches; the average precipitation through the month of July is 9.29 inches. For the year 2002, precipitation through July was 5.44 inches or 59% of the mean, which illustrates the severity of the drought in this region.

3.2 Vegetation

Vegetation species identified on the site are presented in **Table 1** and in the monitoring form **(Appendix B)**. Three (3) major vegetation communities were mapped on the mitigation area map (**Figure 3, Appendix A)**. The communities include: Type 1, *Artemesia tridentata/ Bouteloua gracilis*; Type 2, *Hordeum jubatum*; and Type 3, *Typha latifolia/Eleocharis palustris*. Dominant species within each community are listed on the monitoring form **(Appendix B)**.

Table 1: ***2001 and 2002 Wigeon Reservoir Vegetation Species List***

Scientific Name	Common Name	Indicator Status
*Achillea millefolium***	common yarrow	FACU
*Agropyron cristatum**	crested wheatgrass	-
*Agropyron dasystachyum***	thick-spike wheatgrass	FAC
*Artemesia cana***	silver sagebrush	FACU
*Artemesia tridentate**	big sage	-
*Bouteloua gracilis**	blue gramma grass	-
*Carex spp.**	sedge	(unknown, likely FAC-OBL)
Carex utriculata	beaked sedge	OBL
*Chenopodium glaucum***	oak leaf goosefoot	FACW
*Eleocharis palustris***	creeping spikerush	OBL
*Festuca idahoensis**	Idaho fescue	- (in UPL*)
*Grindelia gracilifolia**	gumweed	FACW
*Hordeum jubatum**	fox-tail barley	FACW
*Juncus spp.**	rush	FAC-OBL
*Myosotis scorpioides***	true forget-me-not	OBL
*Najas flexilis***	water nymph	OBL
*Phleum pretense**	timothy grass	FACU
Sagittaria spp.**	arrow-head	OBL
Scirpus spp.**	bulrush	OBL
*Typha latifolia**	cattail	OBL
*Xanthium strumarium***	rough cocklebur	FAC

- : No indicator status or not included the list.
*denotes observed in 2002 in addition to previous years
**denotes observed in 2002 for the first time
No star indicates a species was observed in 2001, but not in 2002

The drainages on the south and east ends of the reservoir and an area on the east end of the dike had developed the *Typha* community as of 2001. However, in 2002, mature cattails were negligible because of severe grazing. *Eleocharis* and *Scirpus* species were noted in 2002, but growth was also minimal because of heavy grazing and trampling by cattle, and no *Carex* species were noted, perhaps because of drought die-back and grazing. Most of the new wetland plants could only be identified to the genus level due to grazing effects.

The vegetation transect results are detailed in the monitoring form **(Appendix B)** and are summarized below. The transect length was overestimated in 2001 and the upland communities were combined into one type. The wetland has not increased and in fact the vegetation was almost absent from the transect because of drought and grazing.

2001 Transect Data

Transect 1 Start	Upland Type 1 (20')	Upland Type 2 (25')	Wetland Type 3 (15')	Total 60'	End Transect 1

2002 Transect Data

Transect 1 Start	Upland Type 1 (24)	Wetland Type 2 (15')	Total 39'	End Transect 1

3.3 Soils

The site was mapped as part of the Carter County Soil Survey. The dominant soil on the site is the Moyerson-Orinoco complex (277D) a silty clay loam, and the Gerdrum-Absher (165C) complex (Typic Natriboralfs). The taxonomic classification of the 277D series components are Ustic Torriorthent and Ardic Ustorthent, respectively.

The Myerson-Orinoco (277D) is typical of sedimentary plains and hills and the Gerdrum-Absher complex (165C) is found in alluvial fans and stream terraces. Neither of these soil series are hydric or have hydric inclusions. Both soils types are poor for wetland plant establishment and have a high saline content.

Soil pit (SP) 1 was excavated within the wetland vegetation community. From 0-18 inches the soil was a weak red (2.5YR 4/2) clay loam with yellowish red (5YR 5/8) mottles (20-50%). The soil was not saturated; however, drift lines and water marks were evident. SP-2 was excavated in the upland community; from 0-18 inches the soil was a weak red (2.5 YR 4/2) loam; however, no mottles were observed.

3.4 Wetland Delineation

The delineated wetland boundary is depicted on **Figure 3, Appendix A**. The COE data forms are included in **Appendix B**.

The 8.09 acre gross "aquatic area" boundary encompasses 1.89 acres of emergent wetland and 6.2 acres of open water (estimated 1-6 feet depth). Credit should be considered for the shallow water habitat which is admittedly difficult to quantify in terms of "wetland" credit, but which does provide a valuable aquatic resource in this arid region of the state.

The gross aquatic area decreased 0.11 acre in 2002; this could be a function of different investigators between years. The emergent wetland area was 0.77 acre less in 2002 than in 2001; this decrease is likely the result of heavy grazing and drought in the region. During the time of investigation, wetland vegetation was not present or very scant around much of the reservoir circumference. In 2002, there was 1 acre more of open water than in 2001; again, this may be the result of different investigators between seasons and also a function of vegetation removal by cattle grazing into the shallow water.

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**. Leopard frogs, a "species of special concern" (S3) by the Montana Natural Heritage Program (MNHP) were observed in 2001; none were seen in 2002. Painted turtles and a plains garter snake were observed during the 2002 investigation (**Table 2**).

Table 2. ***Fish and Wildlife Species Observed on the Wigeon Reservoir Mitigation Site***

AMPHIBIANS AND REPTILES Plains garter snake (*Thamnophis radix*)** Painted turtle (*Chrysemys picta*)** Leopard frogs (*Rana pipiens)*[1]	
BIRDS Swallow (*Hirundo* spp.)** American wigeon *(Anas americanus)*** Redhead *(Aythya Americana)*** Earred grebes *(Podiceps nigricollis)***	Blue-winged teal (*Anas discors)* Killdeer *(Charadrius vociferous)* Mallards *(Anas platyrhynchos)** Meadow lark (*Sturnella neglecta)* Spotted sandpiper *(Actitis macularia)* Ruddy Duck (*Oxyura jamaicensis)*
MAMMALS (Cattle**) Deer (*Odocoileus spp.)* Raccoon (*Procyon lotor)*	

[1]Species of Special Concern by MNHP.
*denotes observed in 2002 in addition to previous years.
**denotes observed in 2002 for the first time.
No star indicates a species was observed in 2001, but not in 2002.

3.6 Macroinvertebrates

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

Bioassessment scores indicated a surprising regression of conditions at this site. The optimal classification in 2001 fell to poor in 2002. A marked decrease in the number of organisms present in the sample may have been due to differing sampling effort between the two years, but may have reflected worsened conditions. A precipitous drop in taxa richness in 2002 can be accounted for by the total loss of what had been a diverse midge fauna in the previous year. Again, this could be explained by a change in the sampling effort; alternatively, decreased availability of substrate habitats may have occurred in the interim.

3.7 Functional Assessment

Completed functional assessment forms are included in **Appendix B** and summarized below in **Table 3**. The wetland ranks as a Category II wetland due to the presence of the MNHP species of special concern, the leopard frog, during 2001. The diversity of wildlife that use the reservoir is high as evidenced by the diversity of waterfowl, amphibians and reptiles. However, because the disturbance is high due to grazing, ratings are suppressed in several categories, including uniqueness. The functional units totaled 58.24, a one-point increase over the 2001 assessment.

Table 3: ***Summary of 2001 and 2002 Wetland Function/Value Ratings and Functional Points at the Wigeon Reservoir Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2001	2002
Listed/Proposed T&E Species Habitat	Low (0)	Low (0)
MNHP Species Habitat	High (1)	High (1)
General Wildlife Habitat	Moderate (.5)	Moderate (.7)
General Fish/Aquatic Habitat	Moderate (.6)	Moderate (.6)
Flood Attenuation	Moderate (.5)	Moderate (.5)
Short and Long Term Surface Water Storage	High (1)	High (1)
Sediment, Nutrient, Toxicant Removal	Moderate (.7)	Moderate (.7)
Sediment/Shoreline Stabilization	Moderate (.7)	Moderate (.7)
Production Export/Food Chain Support	Moderate (.6)	Moderate (.6)
Groundwater Discharge/Recharge	High (1)	High (1)
Uniqueness	Low (.3)	Low (.2)
Recreation/Education Potential	Low (.1)	Low (.1)
Actual Points/Possible Points	7/12	7.2/12
% of Possible Score Achieved	58%	60%
Overall Category	II	II
Total Acreage of Assessed Wetlands within Easement	8.2 ac	8.09 ac
Functional Units (acreage x actual points)	57.4 fu	58.24 fu
Net Acreage Gain	8.2 ac	8.09 ac
Net Functional Unit Gain	57.4 fu	58.24 fu
Total Functional Unit "Gain"	57.4 fu	58.24 fu

3.8 Photographs

Representative photos taken from photo points and transect ends are included in **Appendix C.** A 2002 aerial photograph is provided in **Appendix C**.

3.9 Maintenance Needs/Recommendations

No observable problems were noted concerning the dike structure. Fencing the wetland while providing several watering access points for cattle is recommended to preserve the integrity of the wetland.

3.10 Current Credit Summary

The 8.09 acre wetland boundary encompasses 1.89 acres of wetland and 6.2 acres of open water (estimated 1-6 foot depth). During the 2001 site visit, the open water/vegetation boundary

occurred at 1 foot deep. Because of the drought continuance during the 2002 year and the heavy grazing and trampling, there was negligible vegetation growth within the open water around the circumference of the reservoir. Fencing the reservoir while leaving several watering access points and planting the protected areas with willows would likely result in a Category I wetland.

Credit should be considered for the 8.09 acres of shallow water habitat which is admittedly difficult to quantify in terms of "wetland" credit, but which does provide a valuable aquatic resource in this arid region of the state.

4.0 REFERENCES

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

Montana Dept. of Transportation. 1996. *MDT Biological Resources Report: Alzada South.* Helena, MT.

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 Carter County Area, Montana.*

Western Regional Climate Center, 1952-2002. Ridgeway 1S Station: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?mtridg.

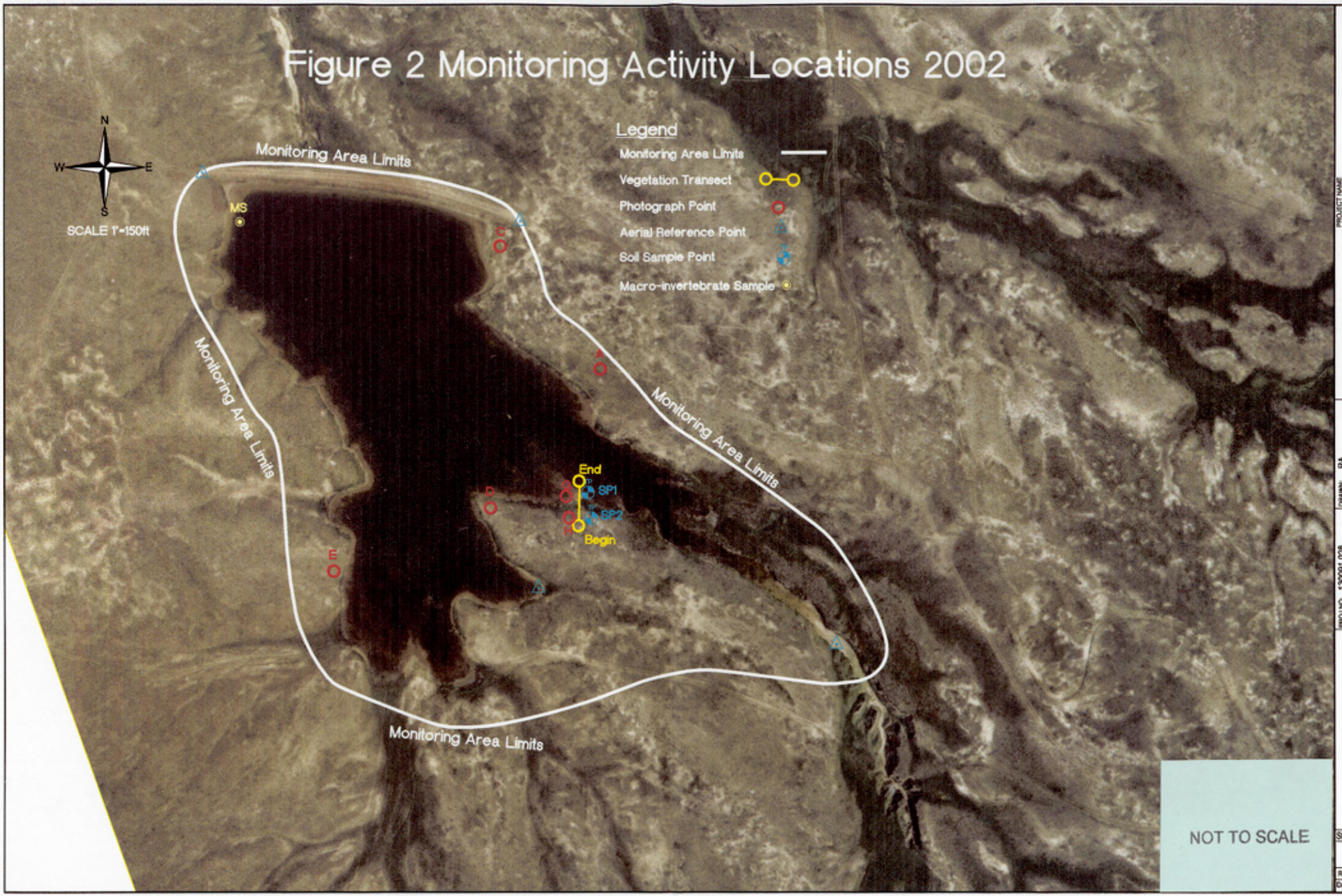
Appendix A

FIGURES 2 - 3

MDT Wetland Mitigation Monitoring
Wigeon Reservoir
Alzada, Montana

LAND & WATER

Figure 2 Monitoring Activity Locations 2002



PROJECT NAME: MDT Wigeon Reservoir Wetland Mitigation

DRAWING TITLE: Monitoring Activity Locations 2002

PROJ NO: 130091.028 | DRAWN: RA

FILE NAME: TASK28BASE.dwg | CHECKED:

SCALE: 1"= 150 ft | APP'D: BD

LOCATION: Wigeon Reservoir | PROJ MGR: BD

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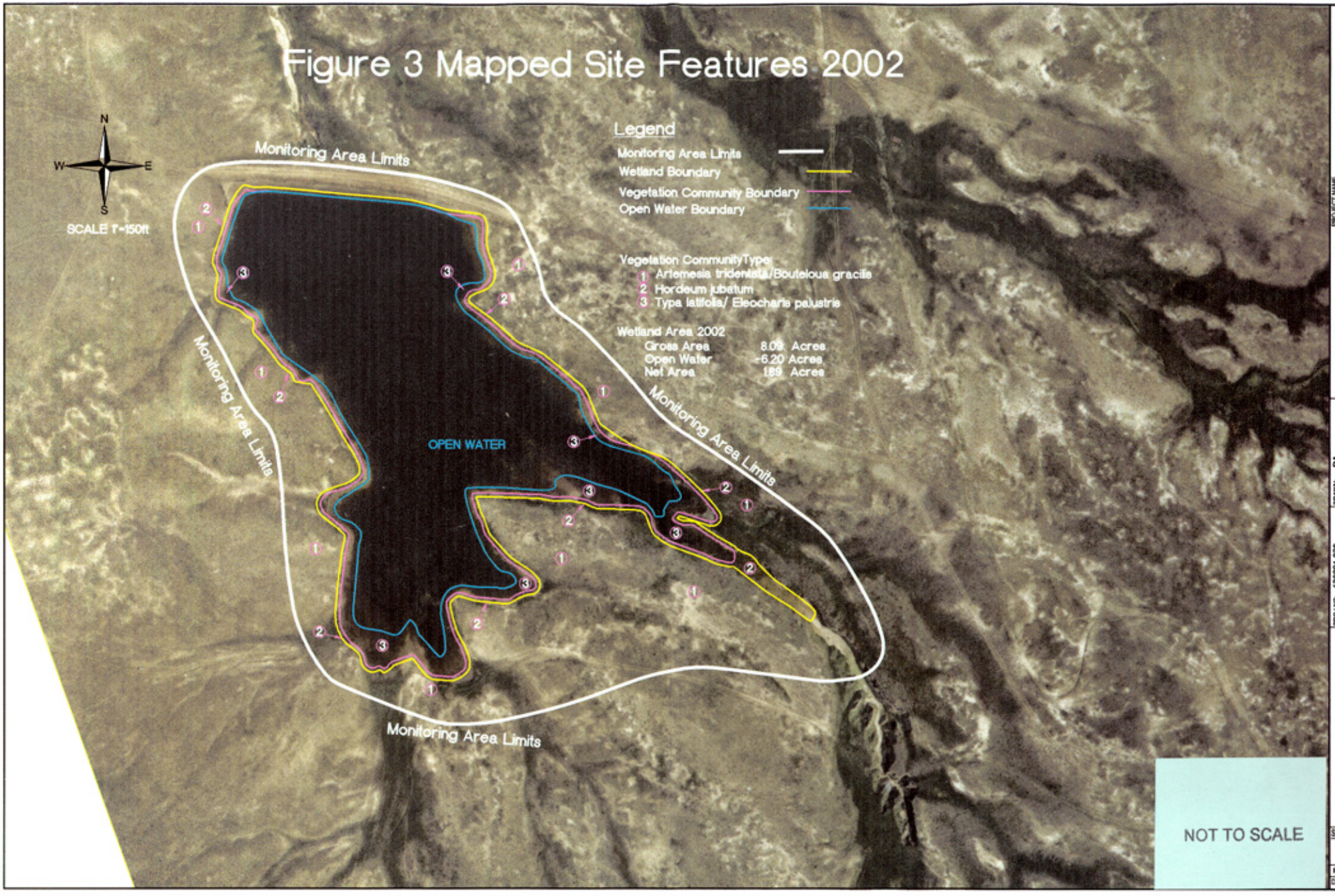
P.O. BOX 8254
Missoula, MT 59807

SHEET NUMBER 2 of

REV -

DATE: 12-09-02

Figure 3 Mapped Site Features 2002



PROJECT NAME: MDT Wigeon Reservoir Wetland Mitigation

DRAWING TITLE: Mapped Site Features 2002

PROJ NO: 130091.028
FILE NAME: TASK2/BASE.dwg
SCALE: 1"= 150 ft
LOCATION: Wigeon Reservoir

DRAWN: RA
CHECKED:
APPVD: BD
PROJ MGR: BD

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Missoula, MT 59807

SHEET NUMBER 3 OF -

REV: -
DATE: 12-09-02

Appendix B

COMPLETED 2002 WETLAND MITIGATION SITE MONITORING FORM
COMPLETED 2002 BIRD SURVEY FORMS
COMPLETED 2002 WETLAND DELINEATION FORMS
COMPLETED 2002 FIELD AND FUNCTIONAL ASSESSMENT FORMS
COMPLETED 2002 MACROINVERTEBRATE SAMPLING RESULTS

MDT Wetland Mitigation Monitoring
Wigeon Reservoir
Alzada, Montana

LAND & WATER

LWC / MDT WETLAND MITIGATION SITE MONITORING FORM

Project *Name:* Wigeon Project Number: 130091-028 Assessment Date: 8 / 10 / 02
Location: Alzada MDT District: 5 Milepost: -
Legal description: T 5 S, R 59 E Section 23, 26 Time of Day: 11 AM
Weather Conditions: few cloudy, slight breeze, mostly sunny Person(s) conducting the assessment: LB/LWC
Initial Evaluation Date: 8 / 10 / 02 Visit #: 2 Monitoring Year: 2002
Size of evaluation area: 8.1 acres Land use surrounding wetland: grazing land

HYDROLOGY

Surface Water Source: intermittent drainage
Inundation: Present X Absent Average depths: 3 ft Range of depths: 1 - 6 ft
Assessment area under inundation: 77%
Depth at emergent vegetation-open water boundary: 0-6" ft (water elevation very low and most emergent veg is exposed
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.): yes, drift lines, stained soil and veg, erosion

Groundwater
Monitoring wells: Present Absent X
Record depth of water below ground surface

Well #	Depth	Well #	Depth	Well #	Depth

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

COMMENTS/PROBLEMS:

VEGETATION COMMUNITIES

Community No.: 1 Community Title (main species): *Artemesia spp./Bouteloua gracilis*

Dominant Species	% Cover	Dominant Species	% Cover
Artemesia cana	10	*Agropyron cristatum*	10
Opuntia spp.	10	*Grindelia gracifolia*	10
Achillea millefolium	10	*Agropyron dasystachyum*	5
Bouteloua gracilis	25	*Artemesia tridentata*	5
Festuca idahoensis	15		

COMMENTS/PROBLEMS: _estimated percentages for upl

Community No.: 2 Community Title (main species): *Hordeum jubatum*

Dominant Species	% Cover	Dominant Species	% Cover
Hordeum jubatum	60		
Phleum pratense	20		
Grindelia gracifolia	10		
Xanthium strumarium	5		
Chenopodium glaucum	5		

COMMENTS/PROBLEMS:

Community No.: 3 Community Title (main species): *Typha latifolia/ Eleocharis palustris*

Dominant Species	% Cover	Dominant Species	% Cover
Typha latifolia	30	*Chenopodium glaucum*	20
Eleocharis palustris	15	*Juncus* spp. (grazed, unknown)	
Scirpus spp.	15		
Sagittaria spp.	5		
Carex utriculata (? none seen in 2002)	15?		

COMMENTS/PROBLEMS: This CT was severely grazed and dewatered from drought conditions; % cover estimated given 2001 %. Plants barely recognizable and without flowering parts.

Additional Activities Checklist:

X Record and map vegetative communities on air photo

COMPREHENSIVE VEGETATION LIST

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
*Achillea millefolium***	1		
*Agropyron cristatum**	1		
*Agropyron dasystachyum***	1		
*Artemesia cana***	1		
*Artemesia tridentate**	1		
*Bouteloua gracilis**	1		
*Carex spp.**	3		
Carex utriculata	3		
*Chenopodium glaucum***	2, 3		
*Eleocharis palustris***	3		
*Festuca idahoensis**	1		
*Grindelia gracifolia**	1		
*Hordeum jubatum**	1, 2		
*Juncus spp.**	2, 3		
*Myosotis scorpioides***	open water		
*Najas flexilis***	open water		
*Opuntia spp.***	1		
*Phleum pretense**	1, 2		
Sagittaria spp.**	3		
Scirpus spp.**	3		
*Typha latifolia**	3		
*Xanthium strumarium***	2		

*denotes observed in 2002 in addition to previous years
**denotes observed in 2002 for the first time
No star indicates a species was observed in 2001, but not in 2002

COMMENTS/PROBLEMS: _____

PLANTED WOODY VEGETATION SURVIVAL

Species	Number Originally Planted	Number Observed	Mortality Causes
none			

COMMENTS/PROBLEMS: ____None, but would add diversity if grazing could be controlled in the planted areas.

WILDLIFE

BIRDS

(Attach Bird Survey Field Forms)

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

MAMMALS AND HERPTILES

Species	Number Observed	Indirect indication of use			
		Tracks	Scat	Burrows	Other
painted turtles	>10				
plains garter snake (on edge of UPL)	1				

Additional Activities Checklist:
__X___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:

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

Location	Photo Frame #	Photograph Description	Compass Reading
A	16	wetland view	194
B		not retaken 2002	-
C	17	wetland buffer	280
D	15	wetland view	46
E	11	wetland view	0
F		no photo location for F	-
G	13	wetland transect end	10
H	14	UPL transect beginning	190

COMMENTS/PROBLEMS: _____

GPS SURVEYING

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

Checklist:

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

COMMENTS/PROBLEMS: ____Boundary hand-drawn 2002; photos reshoot at same locations.

WETLAND DELINEATION

(Attach Corps of Engineers delineation forms)

At each site conduct the items on the checklist below:
__X___Delineate wetlands according to the 1987 Army Corps manual.
__X___ Delineate wetland-upland boundary on the air photo
__*___ Survey wetland-upland boundary with a resource grade GPS survey

COMMENTS/PROBLEMS: _*hand-drawn 2002_____

FUNCTIONAL ASSESSMENT

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

COMMENTS/PROBLEMS: _____

MAINTENANCE

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

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

COMMENTS/PROBLEMS: _____

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Wigeon Date: 8/10/02 Examiner: LB/LWC Transect # 1

Approx. transect length: 39 feet Compass Direction from Start (Upland): 10 deg

Vegetation type A:	CT 1	
Length of transect in this type:	24	feet
Species:		Cover:
BOUGRA		45
ARTEM SPP (GRAZED)		5
OPUNTIA SPP.		<1
PHLPRA		25
(bare dirt/cow dung)		(20%)
		70%

Vegetation type B:	CT 3 & 2 transition	
Length of transect in this type:	15	feet
Species:		Cover:
HORJUB		80
CHEGLA.		<5
TYPLAT		<5
(CT 3 has been wiped out by grazing)		
	Total Vegetative Cover:	900%

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

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

MDT WETLAND MONITORING – VEGETATION TRANSECT (back of form)

Cover Estimate
+ = <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 ~<50* % 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:

* difficult to assess - because of the heavy grazing much of the vegetation has been removed, but sprigs of new growth and grazed stems are evident

BIRD SURVEY – FIELD DATA SHEET

LAND & WATER B-10

Page__1__of_1_
Date:8/10/02
Survey Time:11-4

SITE: Wigeon

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Anas americanas	>5	F	MA				
Anas platyrhynchos –F	1	F	MA				
Aythya americana	many	F	MA				
Hirundo spp.	many	F	FO				
Podiceps nigricollis	~5	F	MA				

Notes: ducks far out into the water, difficult to count and ID

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

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

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

Project/Site: Wigeon	Date: 8/10/02
Applicant/Owner: MDT	County: Carter
Investigator: LB/LWC	State: MT

Do Normal Circumstances exist on the site:	X	Yes		No	Community ID: Wetland (CT-2/3)
Is the site significantly disturbed (Atypical Situation)?		Yes	X	No	Transect ID:
Is the area a potential Problem Area?:		Yes	X	No	Plot ID: SP-1
(If needed, explain on reverse.)					

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Hordeum jubatum*	H	FACW	9			
2	*Chenopodium glaucum*	H	FACW	10			
3	*Typha latifolia*	H	OBL	11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 3/3

Plants severely grazed in area of SP and all around reservoir.

HYDROLOGY

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

No Recorded Data Available

Field Observations:

Depth of Surface Water: - (in.)

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

Depth to Saturated Soil: - (in.)

Wetland Hydrology Indicators:

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

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

Remarks:

Area of SP has no water or saturation because water levels have decreased since 2001.

SOILS

Map Unit Name (Series and Phase):	Moyerson-Orinoco (277D)-non-hydric	Drainage Class:	mod. well
Taxonomy (Subgroup):	NA	Field Observations Confirm Mapped Type?	X Yes ____ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-18	A	2.5YR 4/2	5YR 5/8	20-50%	clay loam

Hydric Soil Indicators:

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

hydric soil, though area has been dewatered because of drought.

WETLAND DETERMINATION

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

Remarks:

Wetland characteristics weak because of drought and grazing.

Approved by HQUSACE 2/92

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

Project/Site: Wigeon	Date: 8/10/02
Applicant/Owner: MDT	County: Carter
Investigator: LB/LWC	State: MT

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

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Bouteloua gracilis*	H	(UPL)	9			
2	*Artemesia spp. (dead stumps)*	H	(NO-FACU)	10			
3	*Opuntia spp.*	H	(UPL)	11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 0/3

clearly an upland site, heavily grazed

HYDROLOGY

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

___ No Recorded Data Available

Field Observations:

Depth of Surface Water: - (in.)

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

Depth to Saturated Soil: - (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 of hydrology

SOILS

Map Unit Name (Series and Phase):	Moyerson-Orinoco (277D)-non-hydric	Drainage Class:	mod. well
Taxonomy (Subgroup):	NA	Field Observations Confirm Mapped Type?	____ Yes X No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-18	A	2.5YR 4/2			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)

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	____	Yes	X	No
Wetland Hydrology Present?	____	Yes	X	No
Hydric Soils Present?	____	Yes	X	No

Is this Sampling Point Within a Wetland? ____ Yes X No

Remarks:

Upland SP area, upland veg is encroaching into what may have been WL in 2001.

Approved by HQUSACE 2/92

Field Data Sheet for 1999 MDT Wetland Assessment Form Site: Wigeon Date: 8/10/02 By: LB/LWC

Estimated AA Size (Circle Ac.): <1 1-5 (>5) **Brief Description:** grazing - rangeland in foothills

HGM Class (CIRCLE)	Cowardin Class	Est. % of AA	Predominant Water Regime (CIRCLE) – inlets
Mineral Soil Flats	Emergent	5	(Perm Flood) Int Exp Sem Perm Flood (Seas Flood) (Sat) Tem Flood Int Flood
Organic Soil Flats	Aquatic Bed	80	(Perm Flood) Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
Riverine (nonperennial)	Moss-Lichen		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
Riverine (upper perennial)	Scrub-Shrub		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
(Riverine (lower perennial))	Forested		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
(Lacustrine Fringe)	Unconsolidated Bottom	10	Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
Depression (closed)	Other:		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
Depression (open, groundwater)	Total Estimated **% Vegetated**	90	(could see aquatic veg way out into pond)
(Depression (open, surface water))			
Slope			
Organic Soil Flats			

↖ Em is grazed around pond edge

RELATIVE ABUNDANCE: rare (com.) abun. **DISTURBANCE is:** (High) Moderate Low heavy cattle grazing

HYDROLOGY: Max. acre-ft surf. water at wetlands in AA subject to inundation: <1 1-5 (>5) (if no flooding/ponding, go to groundwater* 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 (circle NA 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 (circle NA if not applicable)	(Perm / Peren)	Seas / Intermit	Temp / Ephem
% cover of wetland bank or shore by sp. with binding rootmasses	>65%	35-64%	<35%

Flood Attenuation: 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: surface outlet

HABITAT

Habitat for Listed or Proposed Threatened, Endangered, or Montana Natural Heritage Program S1, S2, or S3 Plants or Animals:

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

Primary or critical habitat (**list species**)	D S	T/E:	(D) S	MNHP: N leopard frogs (2001)
Secondary habitat (**list species**)	D S	T/E:	D S	MNHP:
Incidental habitat (**list species**)	D S	T/E:	D S	MNHP:
No usable habitat	D S	T/E:	D S	MNHP:

Wildlife observations?

Fish observations?

OTHERS

Do wetlands have potential to receive excess sediments, nutrients, or toxicants? (Y) N From: grazing, int. drainage

Potential to receive: (low to moderate levels) high levels On TMDL List? Y (N)

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: bird watching (ducks) – amphibs, school ed.

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

1. Project Name: Wigeon 2. Project #: 130091-028 Control #:

3. Evaluation Date: Mo. 8 Day 10 Yr. 02 4. Evaluator(s): VB/LWC 5. Wetlands/Site #(s)

6. Wetland Location(s): I. Legal: T 5 N or S R 21 E or W; S 23+23 ; T ___ N or S; R ___ E or W; S ___
II. Approx. Stationing or Mileposts:

III. Watershed: 10110202 GPS Reference No. (If applies): -
Other Location Information:

7. a. Evaluating Agency: LWC ;
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)
8.09 (measured, e.g. by GPS [if applies])

9. Assessment area: (AA, tot., ac., see instructions on determining AA) ___ (visually estimated)
8.09 (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
Lacustrine	Lacustrine	Limnetic	RB?	H	E	10
Lacustrine	Lacustrine	Littoral	EM, UB, AB	H	E	80
Riverine	Lacustrine (inlet streams) riverine	lower perennial	EM	J, C, B	1	5
Depression	Palustrine	(water edge to EM/upl boundary)	EM	J, C, B	1	5

(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 hyerological 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.): heavy grazing spring/summer - ? winter
II. Prominent weedy, alien, & introduced species (including those not domesticated, feral): (list) Chenopodium

III. Provide brief descriptive summary of AA and surrounding land use/habitat: foothill range land

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	N leopard (2001)
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.): WW during 2001 season

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]):
- X observations of abundant wildlife #'s or high species diversity (during any period)
- abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- X 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.
- X adequate adjacent upland food sources
- interviews with local biologists with knowledge of the AA

likely deer & raccoons (2001)
- painted turtles
- pl. garter snake
- several waterfowl / shore spp obs. (2001)

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 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: unknown spp. composition - assumed at least non-game ratio

---

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)	.5(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)	.5(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: Seasonally gauged 2002

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: difficult to assess – grazing has removed almost all visible (above ground) vegetation

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
- X Vegetation growing during dormant season/drought
- X Wetland occurs at the toe of a natural slope
- ___ Seeps are present at the wetland edge
- X AA permanently flooded during drought periods
- ___ Wetland contains an outlet, but no inlet
- ___ Other

II. Recharge Indicators

- ___ Permeable substrate present without underlying impeding layer
- X 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: X 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: hunting; scenic educ.

FUNCTION & VALUE SUMMARY & OVERALL RATING

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units; (Actual Points x Estimated AA Acreage) 8.09
A. Listed/Proposed T&E Species Habitat	L	0	1	
B. MT Natural Heritage Program Species Habitat	H	1	1	
C. General Wildlife Habitat	H	.9	1	
D. General Fish/Aquatic Habitat	M	.6	1	
E. Flood Attenuation	M	.5	1	
F. Short and Long Term Surface Water Storage	H	1	1	
G. Sediment/Nutrient/Toxicant Removal	M	.7	1	
H. Sediment/Shoreline Stabilization	M	.7	1	
I. Production Export/Food Chain Support	M	.6	1	
J. Groundwater Discharge/Recharge	H	1	1	
K. Uniqueness	L	.2	1	
L. Recreation/Education Potential	L	.2	1	
Totals:		7.2	12	58.24
		60%		

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)
- X 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

Montana Department of Transportation Wetland Mitigation Monitoring Project Rhithron Associates, Inc. for Land and Water Consulting 2001 and 2002		Project Name	Wigeon Reservoir	Wigeon
		Date	8/22/2001	8/10/2002
Coelenterata		*Hydra*		
Turbellaria		*Dugesia*		
Oligochaeta	Enchytraeidae	Enchytraeidae		
	Lumbriculidae	Lumbriculidae		
	Naididae	*Chaetogaster*		
		Nais elinguis		
		Nais variabilis	124	
		Ophidonais serpentina		
	Tubificidae	Tubificidae - immature		
		Limnodrilus hoffmeisteri		
Hirudinea		*Mooreobdella microstoma*		
		Nephelopsis		
		Helobdella stagnalis		
		Helobdella		
		Glossiphonia		
		Theromyzon		1
Bivalvia	Sphaeriidae	*Sphaerium*		
Gastropoda	Lymnaeidae	*Fossaria*		
	Physidae	*Physa*	4	12
	Planorbidae	*Gyraulus*	1	16
		Helisoma		
		Planorbella		
Crustacea	Cladocera	Cladocera	1	
	Copepoda	Calanoida	2	
		Cyclopoida	5	
	Ostracoda	Ostracoda	6	
	Amphipoda	*Gammarus*		
		Hyalella azteca	59	39
	Isopoda	*Caecidotea*		
	Decapoda	*Orconectes*		
Acarina		Acari		
Odonata	Aeshnidae	*Anax junius*		
	Libellulidae	Libellulidae-early instar	1	
		Sympetrum		
	Coenagrionidae	Coenagrionidae-early instar	14	34
		Enallagma		1
	Lestidae	*Lestes*		
Ephemeroptera	Baetidae	*Baetis tricaudatus*		
		Callibaetis	1	1
		Centroptilum		
	Caenidae	*Caenis*	7	
	Ephemerellidae	*Ephemerella*		
	Heptageniidae	*Cinygma*		
		Nixe		
	Leptophlebiidae	*Paraleptophlebia*		
	Ameletidae	*Ameletus*		
Homoptera	Corixidae	Corixidae - immature	1	1
		Corisella tarsalis		
		Hesperocorixa		
		Palmacorixa buenoi		
		Sigara		
		Trichocorixa		
	Nepidae	*Ranatra*		
	Notonectidae	*Notonecta*	3	5
Plecoptera	Chloroperlidae	*Sweltsa*		
	Perlodidae	*Skwala*		
Trichoptera	Brachycentridae	*Brachycentrus* - early instar		
	Hydroptilidae	Hydroptilidae - pupa		

		Hydroptila		
	Lepidostomatidae	*Lepidostoma*		
	Leptoceridae	Leptoceridae - early instar		
		Ceraclea		
		Mystacides		
		Nectopsyche		1
		Ylodes		
	Limnephilidae	*Psychoglypha subborealis*		
Coleoptera	Chysomelidae	Chrysomelidae		
	Curculionidae	*Bagous*		
	Dytiscidae	*Acilius*		
		Dytiscidae - early instar larvae		
		Hydroporinae - early instar larvae		
		Hygrotus		
		Liodessus		
		Laccophilus		2
		Neoporus		
		Oreodytes		
		Rhantus		
		Stichtotarsus		
	Elmidae	*Dubiraphia*		
		Heterlimnius		
		Lara avara		
		Optioservus		
		Zaitzevia		
	Haliplidae	*Haliplus*		
		Peltodytes		
	Hydrophilidae	Hydrophilidae - early instar larvae		
		Berosus		
		Helophorus		
		Hydrobius		
		Hydrochara		
		Laccobius		
		Tropisternus		
Diptera	Athericidae	*Atherix*		
	Ceratopogonidae	*Bezzia/Palpomyia*		
		Dasyhelea		
	Chaoboridae	*Chaoborus*		
	Culicidae	*Anopheles*		
		Culex		
	Dixidae	*Dixella*		
	Dolichopodidae	Dolichopodidae		
	Empididae	*Clinocera*		
	Ephydridae	Ephydridae		
	Muscidae	Muscidae		
	Pelecorhynchidae	*Glutops*		
	Psychodidae	*Pericoma*		
	Simuliidae	*Simulium*		
	Sciomyzidae	Sciomyzidae		
	Stratiomyidae	*Odontomyia*		
	Tabanidae	Tabanidae		
	Tipulidae	*Hexatoma*		
		Tipula		
	Chironomidae	*Ablabesmyia*		
		Acricotopus		
		Camptocladius		
		Chironomus		
		Cladotanytarsus		
		Corynoneura	1	
		Cricotopus Bicinctus Gr.		
		Cricotopus (Cricotopus) Gr.		
		Cricotopus nostococladius		
		Cryptotendipes		
		Diamesa		

		Dicrotendipes	7	
		Einfeldia		
		Endochironomus		
		Labrundinia		
		Micropsectra		
		Microtendipes	2	
		Odontomesa		
		Orthocladius annectens		
		Pagastia		
		Parachironomus		
		Paracladopelma		
		Paramerina	3	
		Parametriocnemus		
		Paratanytarsus		
		Paratendipes		
		Phaenopsectra		
		Polypedilum		
		Procladius		
		Psectrocladius elatus	1	
		Psectrocladius vernalis		
		Psectrotanypus	3	
		Pseudochironomus		
		Stichtochironomus		
		Tanypus		
		Tanytarsus	16	
		Theinemanniella		
		Tvetenia		
		Total	262	113
		Total taxa	21	11
		POET	4	4
		Chironomidae taxa	7	0
		Crustacea taxa + Mollusca taxa	7	3
		% Chironomidae	12.60%	0.00%
		Orthocladiinae/Chironomidae	0.06	#DIV/0!
		%Amphipoda	22.52%	34.51%
		%Crustacea + %Mollusca	29.77%	59.29%
		HBI	7.76	7.72
		%Dominant taxon	47.33%	34.51%
		%Collector-Gatherers	89.69%	46.90%
		%Filterers	0.38%	0.00%
		Scores (2002 criteria)		
		Total taxa	5	3
		POET	5	5
		Chironomidae taxa	5	1
		Crustacea taxa + Mollusca taxa	5	1
		% Chironomidae	5	5
		Orthocladiinae/Chironomidae	1	1
		%Amphipoda	3	1
		%Crustacea + %Mollusca	5	3
		HBI	1	1
		%Dominant taxon	3	3
		%Collector-Gatherers	5	1
		%Filterers	1	1
		Total score	44	26

Appendix C

REPRESENTATIVE PHOTOGRAPHS
2002 AERIAL PHOTOGRAPH

MDT Wetland Mitigation Monitoring
Wigeon Reservoir
Alzada, Montana

LAND & WATER

Location: A **Photo Frame:** 16 **Description:** Wetland view **Compass Reading:** 194°

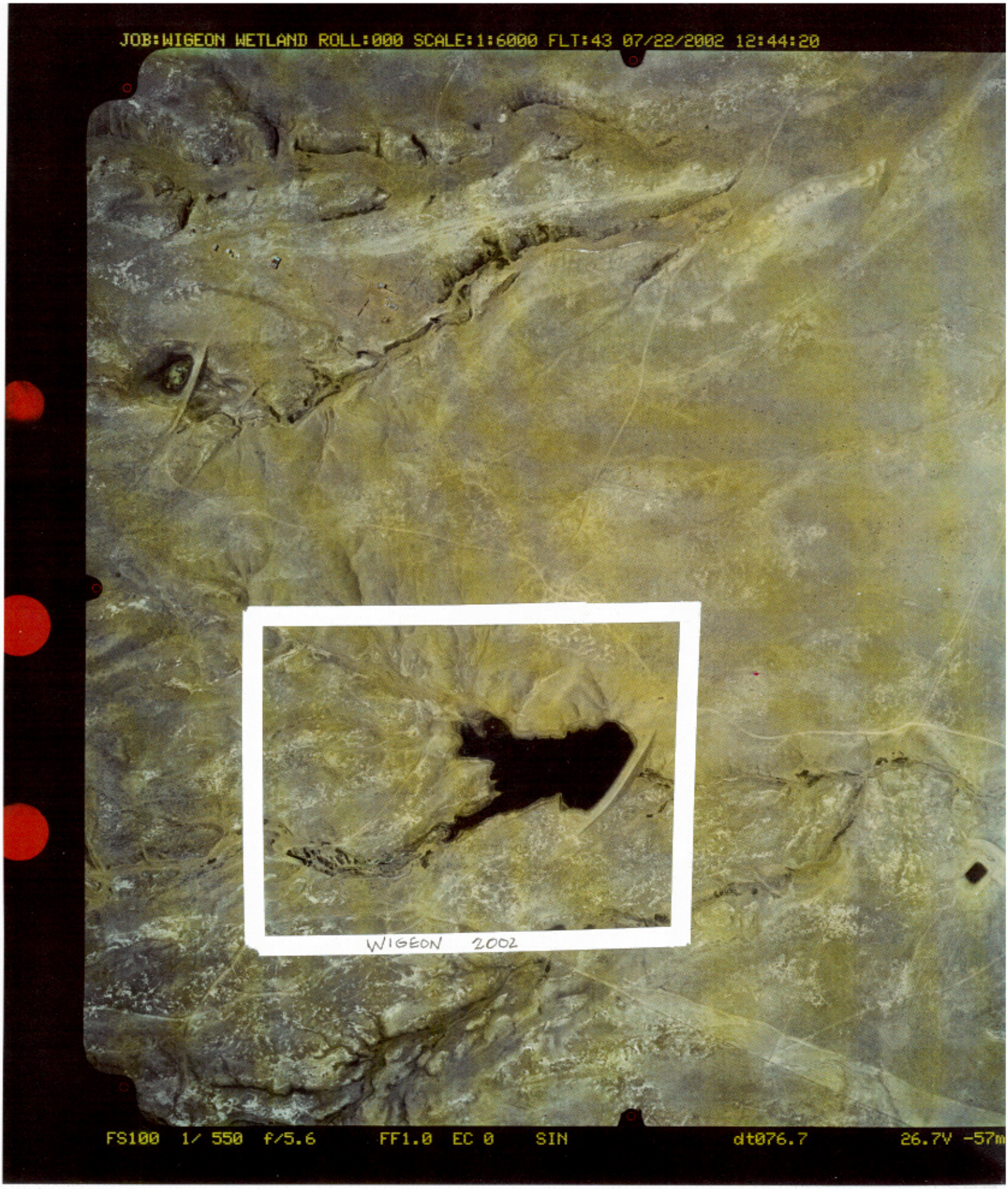
Location: C **Photo Frame:** 17 **Description:** Wetland buffer **Compass Reading:** 280°

Location: D **Photo Frame:** 15 **Description:** Wetland view **Compass Reading:** 46°

Location: E **Photo Frame:** 11 **Description:** Wetland view **Compass Reading:** 0°

Location: G **Photo Frame:** 13 **Description:** Upland transect end **Compass Reading:** 10°

Location: H **Photo Frame:** 16 **Description:** Wetland transect end **Compass Reading:** 190°


JOB:WIGEON WETLAND ROLL:000 SCALE:1:6000 FLT:43 07/22/2002 12:44:20
WIGEON 2002
FS100 1/ 550 f/5.6 FF1.0 EC 0 SIN dt076.7 26.7V -57m

Appendix D

BIRD SURVEY PROTOCOL
MACROINVERTEBRATE SAMPLING PROTOCOL
GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Wigeon Reservoir
Alzada, 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.