MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2001

Ridgeway Wetland Complex with Full Sampling of #9
Ekalaka, Montana

Prepared for:

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

Prepared by:

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Compiled and Edited by:

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

July 2002

Project No: 130091.025

LAND & WATER

MONTANA DEPARTMENT OF TRANSPORTATION

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1.0 INTRODUCTION

This annual report summarizes methods and results from the first year's monitoring program at the Montana Department of Transportation's Ridgeway Complex mitigation site. The Ridgeway wetland complex was created to provide wetland mitigation credits for MDT impacts in watershed #16 located in District 5. The sites, incorporating a complex of sixteen small to medium wetlands, are located in Carter County, Montana, in Section 36, Township 4 South, Range 57 East and Sections 31-35, Township 4 South, Range 58 East **(Figure 1)**. Elevations in the complex range from approximately 3,300 to 3,400 feet.

Eight wetlands were created in the summer of 2000 and an additional eight were completed in January of 2001 creating sixteen small to medium sized wetlands (**Figure 1**). Hydrophytic vegetation has not developed at the majority of these sites yet because the wetlands received water for the first time this year. The objective for the Ridgeway Complex was to maximize the surface acres of each individual project to create shallow waterfowl habitat.

For this monitoring report only a single, representative wetland (W-9) was sampled on August 23, 2001 according to the full, agreed upon sampling protocol. Wetland #9 was chosen out of the sixteen because of its wetland qualities; most of the other wetlands had not developed to the extent of wetland #9. All data sheets for wetland nine (W-9) are included as **Appendix B**. The remainder of the fifteen sites were located and are shown on **Figure 1.** GPS reference points were taken for aerial photo "fitting", and representative photos were taken at established points. These sites are each shown in **Appendix C** with aerial photos, site representative photos and associated photo logs.

2.0 METHODS

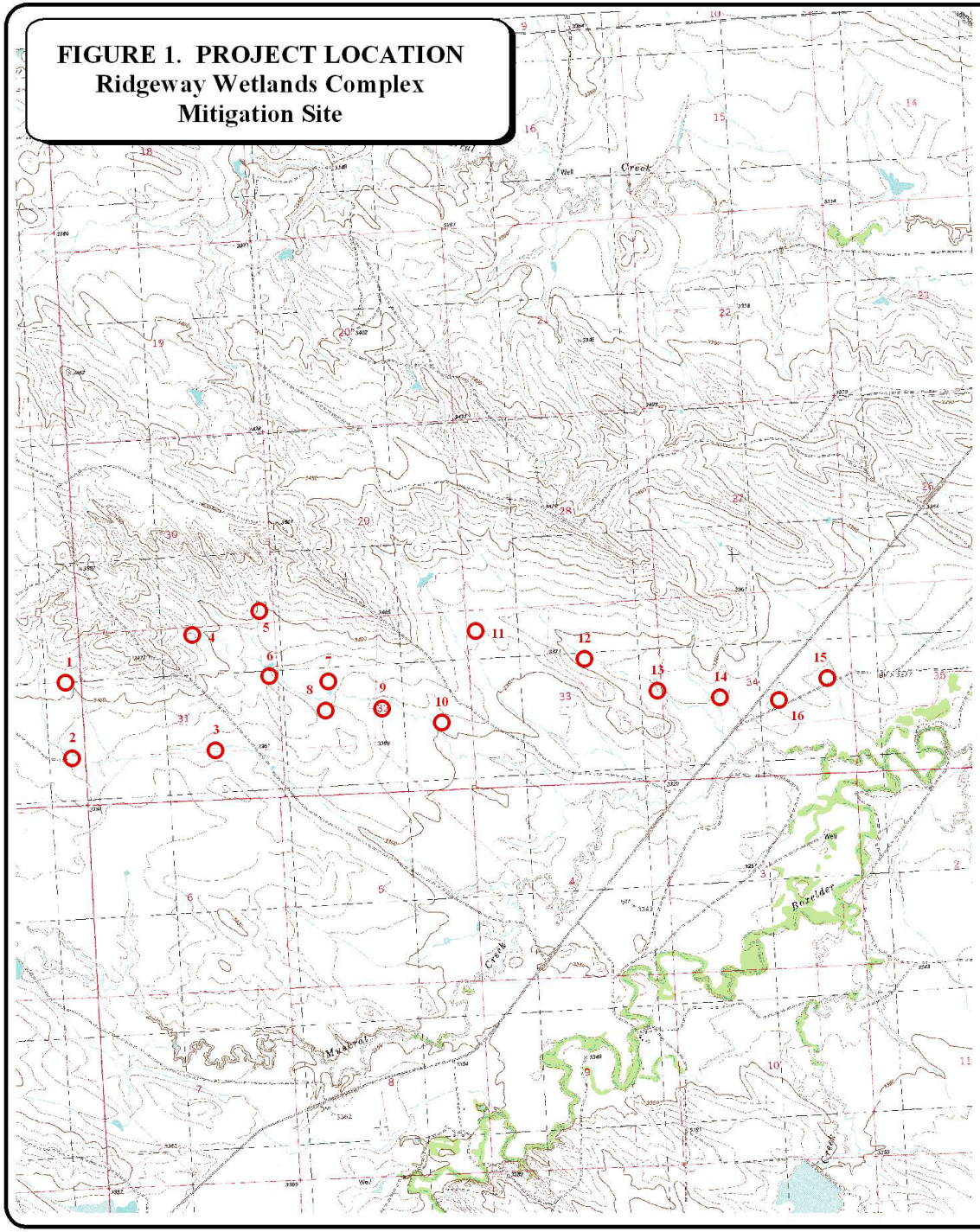
2.1 Monitoring Dates and Activities

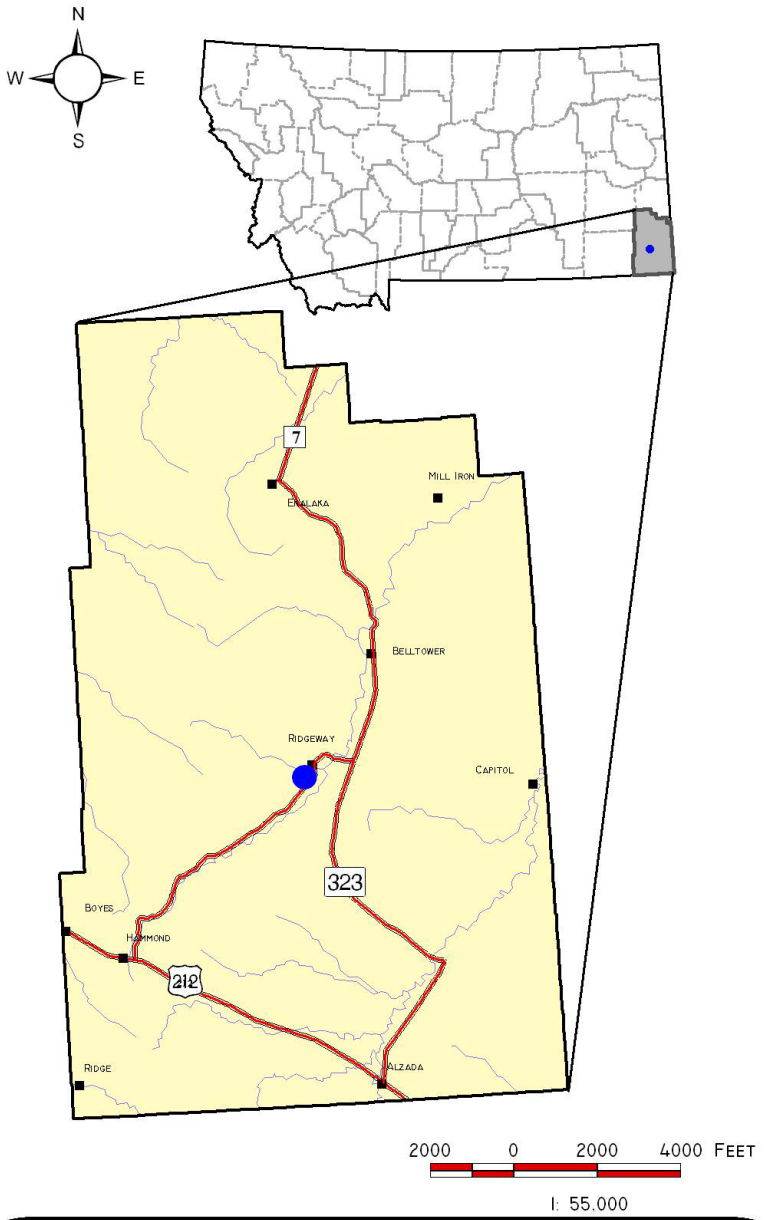
Ridgeway wetland #9 (W-9) was monitored on August 23, 2001. The complete monitoring protocol was conducted during this visit. All information contained within the Wetland Mitigation Site Monitoring Form **(Appendix B)** was collected at this time. Activities and information conducted/collected include: wetland delineation; wetland/open water boundary mapping; vegetation community mapping; vegetation transect; soils data; hydrology data; bird and general wildlife use; photograph points; GPS data points; functional assessment; and, assess maintenance needs of nesting structures and inflow and outflow devices. The photos of the other fifteen sites were taken on August 24, 2001.

2.2 Hydrology

Wetland hydrology indicators for W-9 were recorded using procedures outlined in the US Army Corps' (COE) 1987 Wetland Delineation Manual. Hydrology data was recorded on the Routine Wetland Delineation Data Form **(Appendix B)**.

FIGURE 1. PROJECT LOCATION
Ridgeway Wetlands Complex
Mitigation Site





PROJECT #: 130091.025
DATE: APRIL 2001
LOCATION:
PROJECT MANAGER: B. DUTTON
DRAWN BY: B. NOECKER

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1120 CEDAR PO BOX 8254 MISSOULA, MT 59807

Any additional hydrologic data were recorded on the mitigation site monitoring form **(Appendix B)**. The boundary between emergent vegetation and open water for W-9 only 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 visit (**Figure 3, Appendix A)**. Coverage of the dominant species in each community type is listed on the monitoring form **(Appendix B)**. A comprehensive plant species list for the entire site was compiled and will be updated as new species are encountered. Woody species were not planted on this site.

One transect was established at W-9 during the 2001 monitoring event to represent the range of current vegetation conditions at this wetland. The location of the transect is shown on **Figure 2, Appendix A**. Percent cover for each species was recorded on the vegetation transect data form **(Appendix B)**. The transect will be used to evaluate changes in species composition over time, especially the establishment and increase of hydrophytic vegetation.

Transect ends were marked with metal fence posts at W-9 and their locations were recorded with the GPS unit. Photos of the transect in W-9 were taken from both ends during the site visit **(Appendix E)**. Photos were taken of all other wetlands (W-1-8, 10-16); these photos, aerial photographs, and photograph logs are included as **Appendix C**.

2.4 Soils

Soils were evaluated during the site visit according to the procedure outlined in the 1987 Wetland Delineation Manual. Soil data were recorded for each wetland determination point on the Routine Wetland Delineation Data Form **(Appendix B)**.

2.5 Wetland Delineation

A wetland delineation was conducted within the assessment area according to the 1987 manual. Wetland and upland areas within the monitoring area were investigated for the presence of wetland hydrology, hydrophytic vegetation and hydric soils. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: North Plains Region 4 (Reed 1988). The information was recorded on the Routine Wetland Delineation Forms **(Appendix B)**. The wetland/upland boundary was used to calculate the wetland area.

2.6 Mammals, Reptiles, and Amphibians

Mammal, reptile, and amphibian species observations were recorded on the wetland monitoring form for W-9 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 for W-9 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 at W-9 during the site visit following the 2001 protocol **(Appendix D)**. Samples were preserved as outlined in the sampling procedure and sent to a laboratory for analysis. The approximate location is indicated on **Figure 2, Appendix A.**

2.9 Functional Assessment

A functional assessment form was completed for W-9 using the 1999 MDT Montana Wetland Assessment Method. Field data necessary for this assessment were collected on a condensed data sheet included in the mitigation site monitoring form **(Appendix B)**. The remainder of the assessment was completed in the office.

2.10 Photographs

Wetland #9 photos 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 was recorded on the wetland monitoring form. Each photo point was marked on the ground with a wooden stake and the location recorded with a resource grade GPS. The photos are shown in **Appendix E** for W-9; photo points are shown on **Figure 2, Appendix A**.

The remaining wetland sites (W-1-8, 10-16) were photographed using the same protocol. These photos, photo logs, and aerial photographs are included as **Appendix C**. 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, survey points at four landmarks recognizable on the air photo for purposes of line fitting to the topography; and the wetland boundary **(Appendix A, Figures 2 and 3)**.

GPS landmark data were collected at all wetland sites (W-1-8, 10-16); the locations of the GPS landmarks are indicated on the aerial photographs included as **Appendix C**.

2.12 Maintenance Needs

The conditions of the inflow area and dike ("outflow structure") were examined during the monitoring visit for maintenance needs.

3.0 RESULTS

3.1 Hydrology

The source of hydrology at W-9 is from an impounded intermittent stream and any storm water from within that drainage system. During the August 2001 visit, 70% of the assessment area was inundated with approximately 0-2 feet of standing water. Water depth was approximately one foot at the emergent vegetation open water boundary. The only control structure is the constructed dike; no outflow pipe was installed in the construction of the dam. Maximum water depth at the face of the dike was estimated at four feet.

According to the Western Regional Climate Center, Ekalaka yearly precipitation totals for 2000 (15.54 inches) and 2001 (15.68 inches) were 103 and 104 percent, respectively, of the total annual mean precipitation (15.08 inches) in this area.

3.2 Vegetation

Vegetation species identified on the site are presented in **Table 1** and in the monitoring form **(Appendix B)**. Two dominant vegetation communities were mapped for the mitigation area (**Figure 3, Appendix A**). The communities include: Type 1, *Festuca idahoensis*; and, Type 2, *Typha latifolia.* Dominant species within each community are listed on the monitoring form **(Appendix B)**. The dominant vegetation community throughout the entire wetland site is represented by Type 2 and the site is essentially surrounded by the Type 1 community. Approximately 50% of the site has developed wetland vegetation.

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

Scientific Name	Common Name	Indicator status
Bouteloua gracilis	blue gramma grass	NI
Bryophytes	moss	(OBL)*
Festuca idahoensis	Idaho fescue	FAC-UPL
Glyceria spp.	manna grass	NI
Grindelia gracilifolia	gumweed	NI
Juncus spp.	rush	FACW-OBL
Scirpus spp.	bulrush	FACW-OBL
Typha latifolia.	cattail	OBL

** found in wetland area*

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

Transect 1 Start	Upland Type 1 (40')	Wetland Type 2 (20')	Total 60'	End Transect 1

3.3 Soils

The site was mapped as part of the Carter County Soil Survey. The dominant soils at wetland 9 are the Bickerdyke clays. This soil type is typical of sedimentary plains. Bickerdyke is a non-hydric soil.

Soils were sampled at one wetland (SP-1) and one upland location (SP-2). Soils at SP-1 were light, brownish gray (10YR 6/2) clay loams from 0-5 inches, and dark grayish brown (10YR 4/2) clay loams from 5-18 inches. Soils at SP-2 were dark gray (10YR 4/1) clay loams from 0-18 inches.

3.4 Wetland Delineation

The delineated wetland boundary is depicted on **Figure 3, Appendix A**. The wetland boundary encompasses 4.345 acres of gross wetland area and 0.9 acres open-water habitat; the net wetland area is 3.443 acres. The COE data forms are included in **Appendix B**.

3.5 Wildlife

Wildlife species are listed in **Table 2.** Activities and densities associated with these observations area are included on the monitoring form in **Appendix B**. Wildlife observation included observation of deer tracks, scat and fifteen (15) leopard frogs. Given so many frogs were observed it is assumed that this pond is primary habitat for this S3 species.

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

AMPHIBIANS
Leopard frogs (*Rana pipiens*)
BIRDS
American wigeon (*Anas americana)* Blue winged teal (*Anas discors)* Cinnamon teal (*Anas cyanoptera)* Killdeer (*Charadrius vociferous)* Mallards *(Anas platyrhynchos)* Spotted sandpiper (*Actitis macularia)* Willet (*Catoptrophorus semipalmatus)*
MAMMALS
Cattle White-tailed deer (*Odocoileus virginianus)*

3.6 Macroinvertebrates

The macroinvertebrate sampling results are included in **Appendix B**. Rhithron, Inc. summarized the results. Bioassessment scores suggest sub-optimal biotic conditions at this site (Rhithron, Inc.). The low biotic index value implies good water quality, as does the presence of two mayfly taxa. Overall taxa richness is diminished compared to expectations, suggesting limited habitat

availability. Benthic habitats appear to be adequate, however, since the midge faunal richness is good.

3.7 Functional Assessment

Completed functional assessment forms are included in **Appendix B** and summarized below in **Table 3**. Wetland #9 rated as a Category II wetland its high function and value in the MTNHP species and wildlife habitat, short and long-term surface water storage, groundwater discharge/recharge, and sediment/nutrient/toxicant removal, and moderate non-game native fish habitat (*unknown, but likely that fish have been planted in these ponds according to the NRCS; this will be further investigated during subsequent monitoring years*), sediment/shoreline stabilization, and production export/food chain support. An improvement in the rating may be accomplished over time by increasing the vegetation's structural diversity which would in effect increase its uniqueness and flood attenuation potential.

Table 3: ***Summary of 2001 Wetland Function/Value Ratings and Functional Points at the Ridgeway W-9 Wetland Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2001
Listed/Proposed T&E Species Habitat	Low (0)
MNHP Species Habitat	High (1.0)
General Wildlife Habitat	High (0.9)
General Fish/Aquatic Habitat	Mod (0.6)
Flood Attenuation	Mod (0.5)
Short and Long Term Surface Water Storage	High (1.0)
Sediment, Nutrient, Toxicant Removal	High (1.0)
Sediment/Shoreline Stabilization	Mod (0.7)
Production Export/Food Chain Support	Mod (0.7)
Groundwater Discharge/Recharge	High (1.0)
Uniqueness	Mod (0.4)
Recreation/Education Potential	Low (0.1)
Actual Points/ Possible Points	7.9/12
% of Possible Score Achieved	66%
Overall Category	II
Total Acreage of Assessed Wetlands within Easement	4.345 ac
Functional Units (acreage x actual points)	34.33 fu
Net Acreage Gain	4.345 ac
Net Functional Unit Gain	34.33 fu
Total Functional Unit "Gain"	34.33 fu

3.8 Photographs

Representative photographs of W-9 taken from photo points and transect ends are included in **Appendix E.** All photos for the remaining wetlands (1-8, 10-16) are included as **Appendix C.**

3.9 Maintenance Needs/Recommendations

The dike and inlet area appeared to be functioning satisfactorily. No maintenance needs were apparent at the site.

3.10 Current Credit Summary

The gross wetland area of 4.345 acres includes 0.9 acres of open water. The open water habitat has an average depth of only one foot and should qualify as wetland acreage. Future monitoring will provide valuable information regarding the rate of hydrophytic vegetation encroachment into the open water habitat. Acreage of wetland development was not assessed at any of the other fifteen (15) ponds. Photographs of these 15 wetland sites will be retaken each year to monitor wetland development over time. Wetland development at these 15 sites may be assessed in future years by estimating wetland acreage from aerial photos or by using GPS during the final year of monitoring.

4.0 REFERENCES

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

Reed, P.B. 1988. National list of plant species that occur in wetlands: North Plains (Region 4). Biological Report 88(26.4), May 1988. U.S. Fish and Wildlife Service. Washington, D.C.

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

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

Appendix A

FIGURES 2 - 3

MDT Wetland Mitigation Monitoring
Ridgeway Wetland 9 (W-9)
Ekalaka, Montana

LAND & WATER

Figure 2 Monitoring Activity Locations

PROJECT NAME: MDT Ridgeway Complew W-1 Wetland Mitigation
DRAWING TITLE: Monitoring Activity Loications

PROJ NO: 130091.025 | DRAWN: RA
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SCALE: 1"= 50 ft | APPVD: BD
LOCATION: Ridgeway Complew W-1 | APPVD MGR: BD

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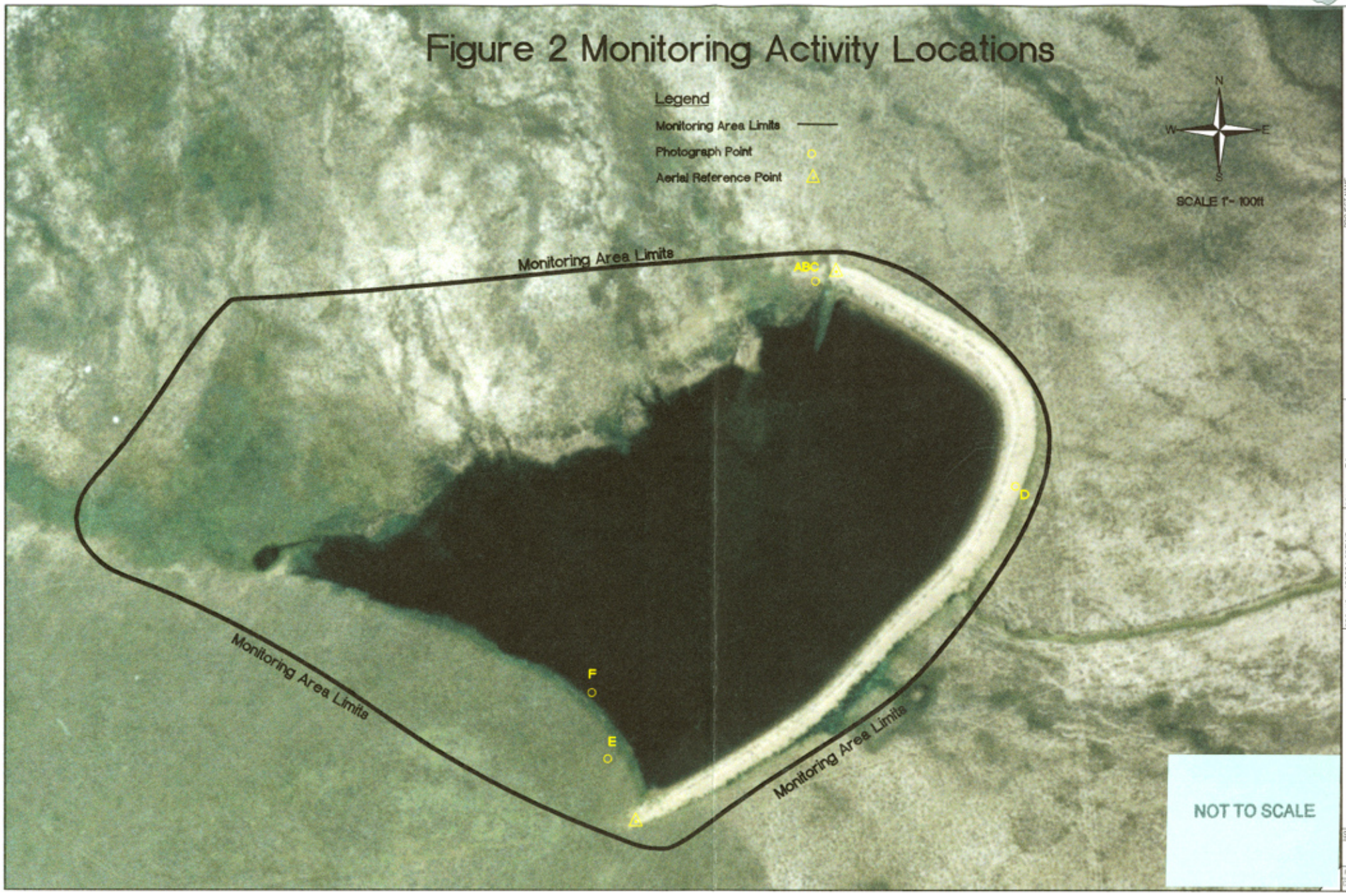
P.O. BOX 8254
Missoula, MT 59807

SHEET NUMBER: 2
REV: -
DATE:

Figure 2 Monitoring Activity Locations



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LOCATION: Ridgeway Complex W-2 | PROJ MGR: BD

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Missoula, MT 59807

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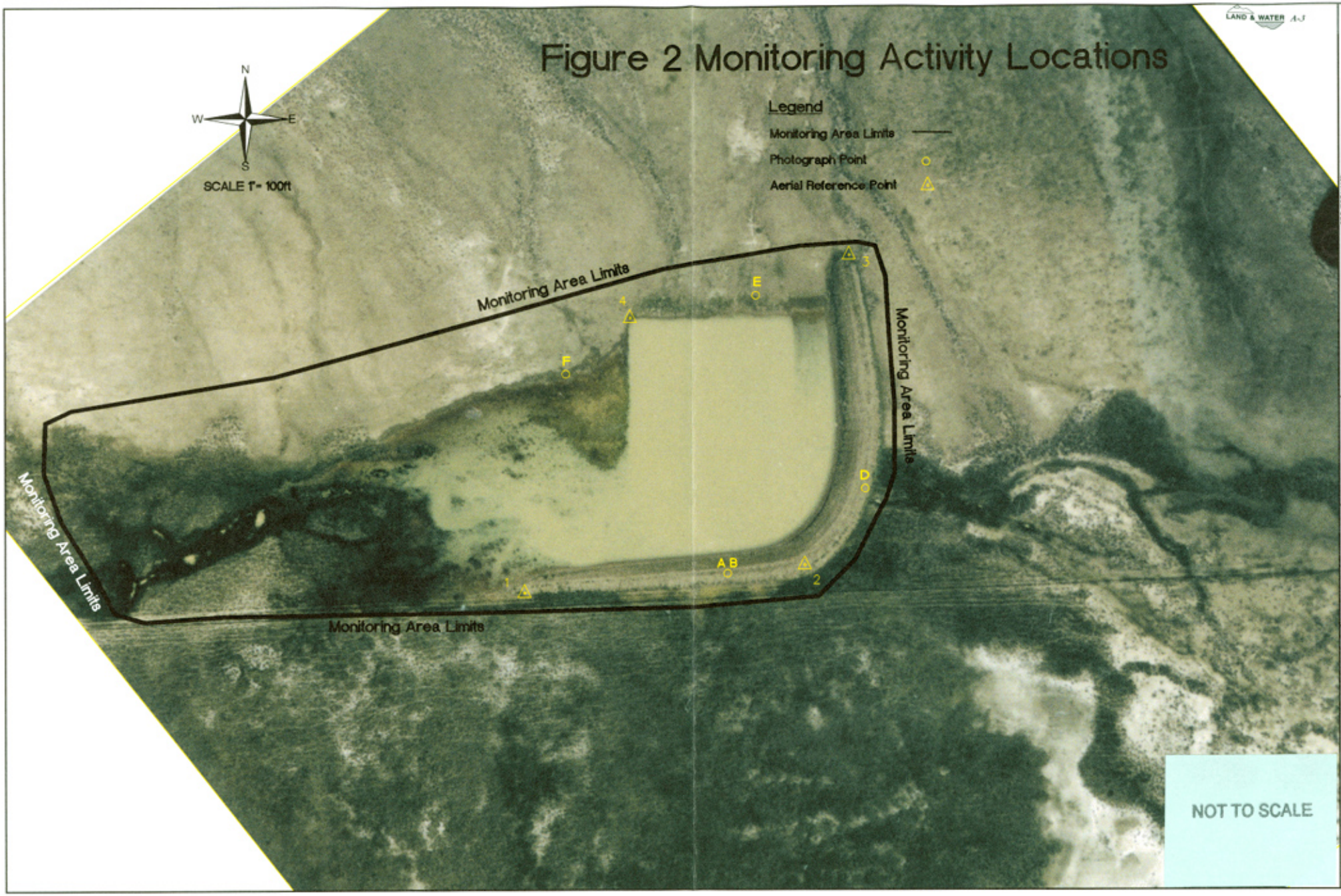
REV:
DATE:

Figure 2 Monitoring Activity Locations



LAND & WATER AJ

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DRAWING TITLE: Monitoring Activity Locations

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FILE NAME: TASK2SW3BASE.dwg | CHECKED:

SCALE: 1"=100 ft | APPVD: BD

LOCATION: Ridgeway Complex W-3 | APPVD: MGR BD

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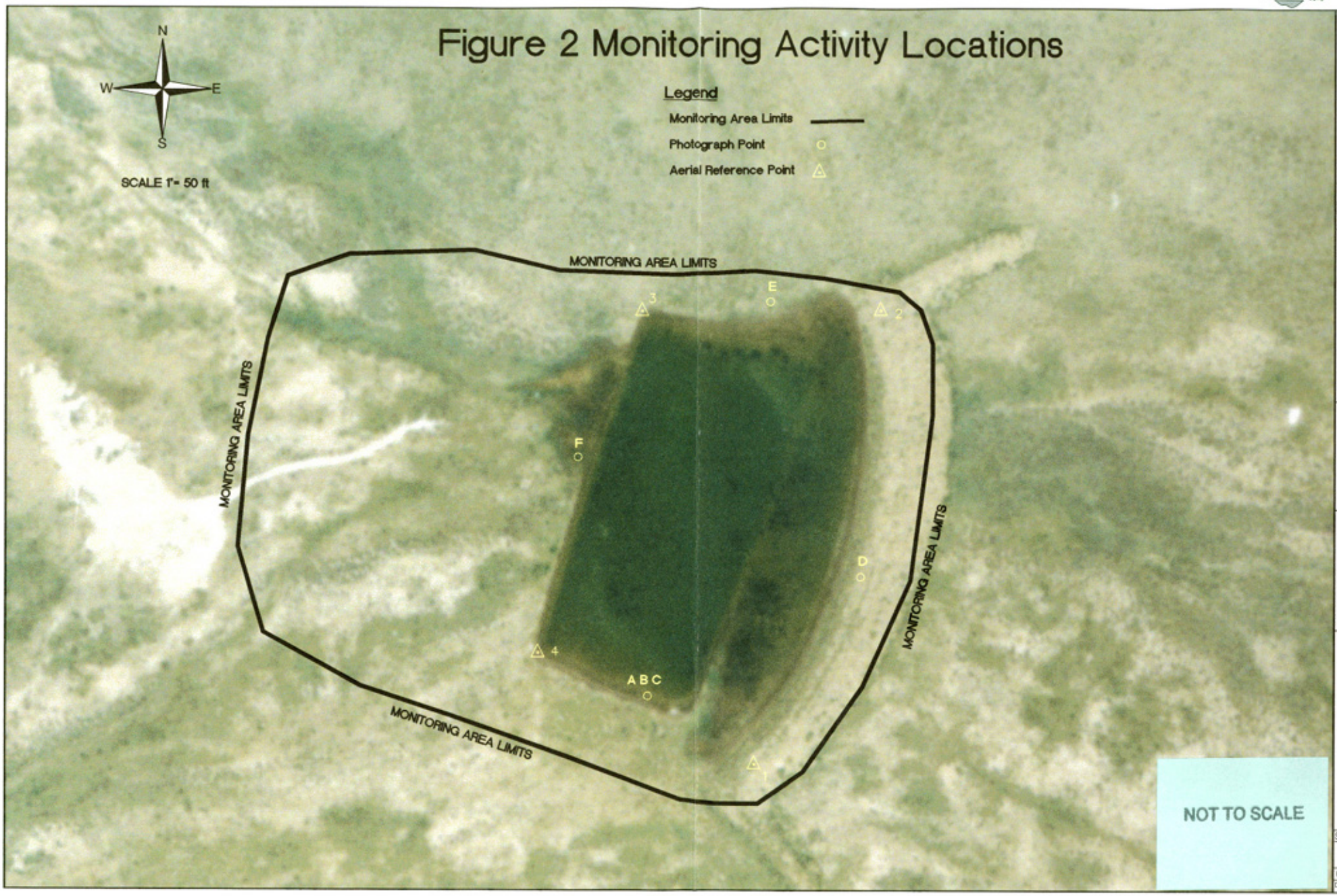
DATE:

Figure 2 Monitoring Activity Locations



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LOCATION: Ridgeway Complex W | PROJ MGR: BD

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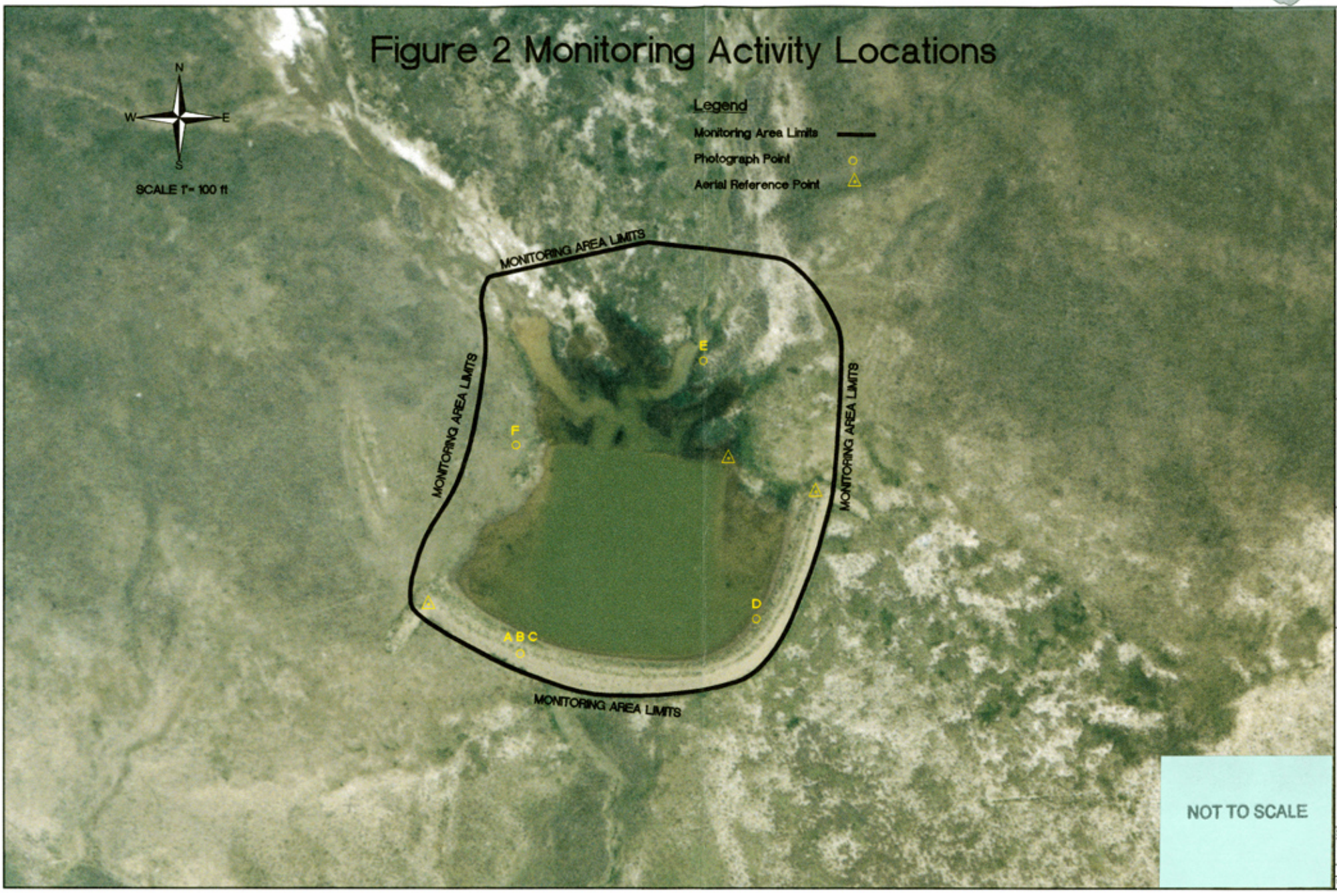
P.O. BOX 5294
Missoula MT 59807

SHEET NUMBER: 2
REV: -
DATE:

Figure 2 Monitoring Activity Locations



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Missoula MT 59807

SHEET NUMBER: 2
REV: -
DATE:

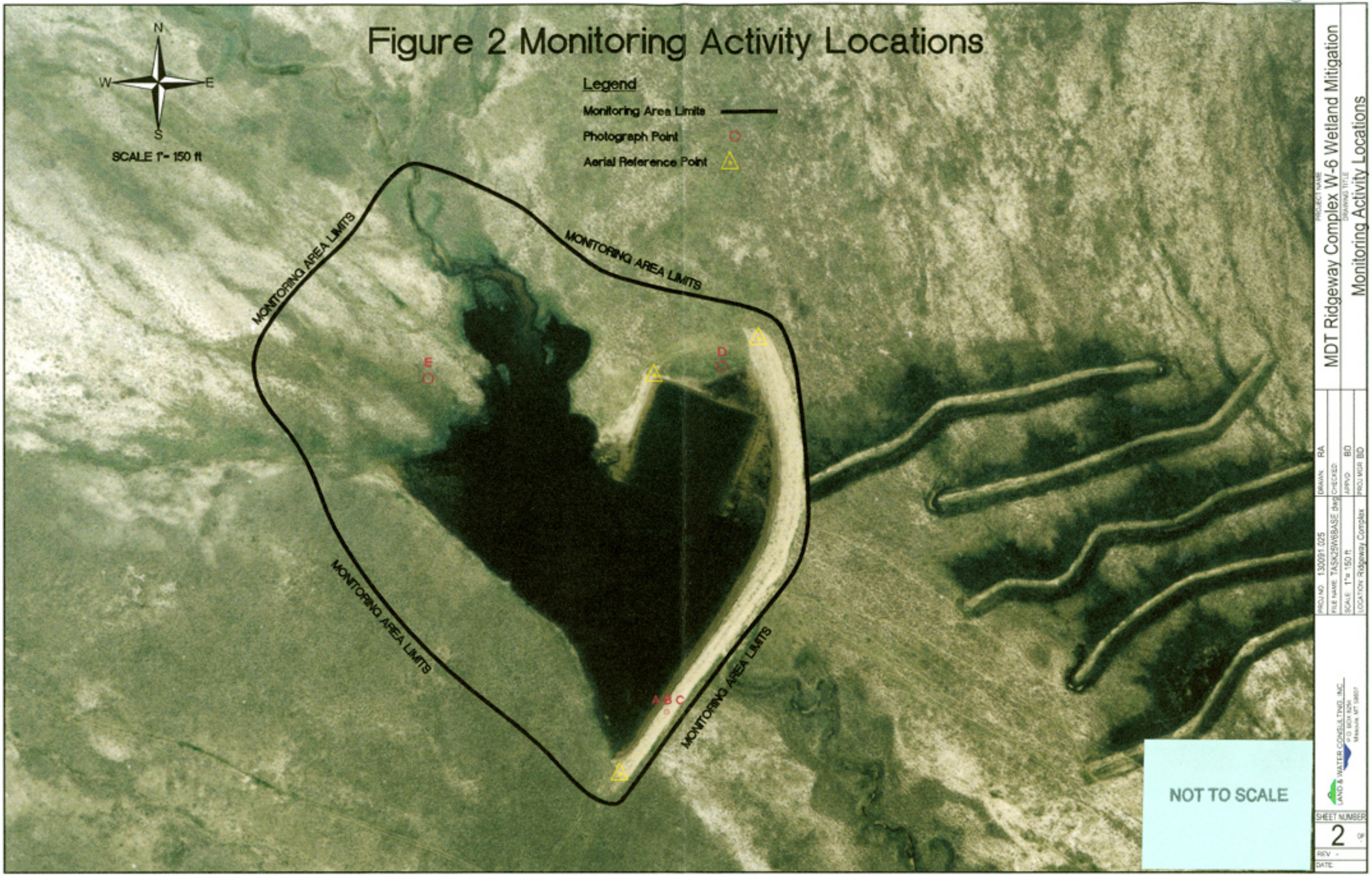
Figure 2 Monitoring Activity Locations
N
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SCALE 1"= 150 ft
Legend
Monitoring Area Limits
Photograph Point
Aerial Reference Point
MONITORING AREA LIMITS
MONITORING AREA LIMITS
MONITORING AREA LIMITS
MONITORING AREA LIMITS
E
D
A B C
NOT TO SCALE
PROJECT NAME
MDT Ridgeway Complex W-6 Wetland Mitigation
DRAWING TITLE
Monitoring Activity Locations
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CHECKED:
APPVD: BD
PROJ MGR: BD
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2
REV -
DATE:

Figure 2 Monitoring Activity Locations

PROJECT NAME: MDT Ridgeway Complex W7-8 Wetland Mitigation

DRAWING TITLE: Monitoring Activity Locations

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FILE NAME: TASK25W8BASE.dwg | CHECKED:
SCALE: 1"= 100ft | APPVD: BD
LOCATION: Ridgeway Complex | PROJ. MGR: BD

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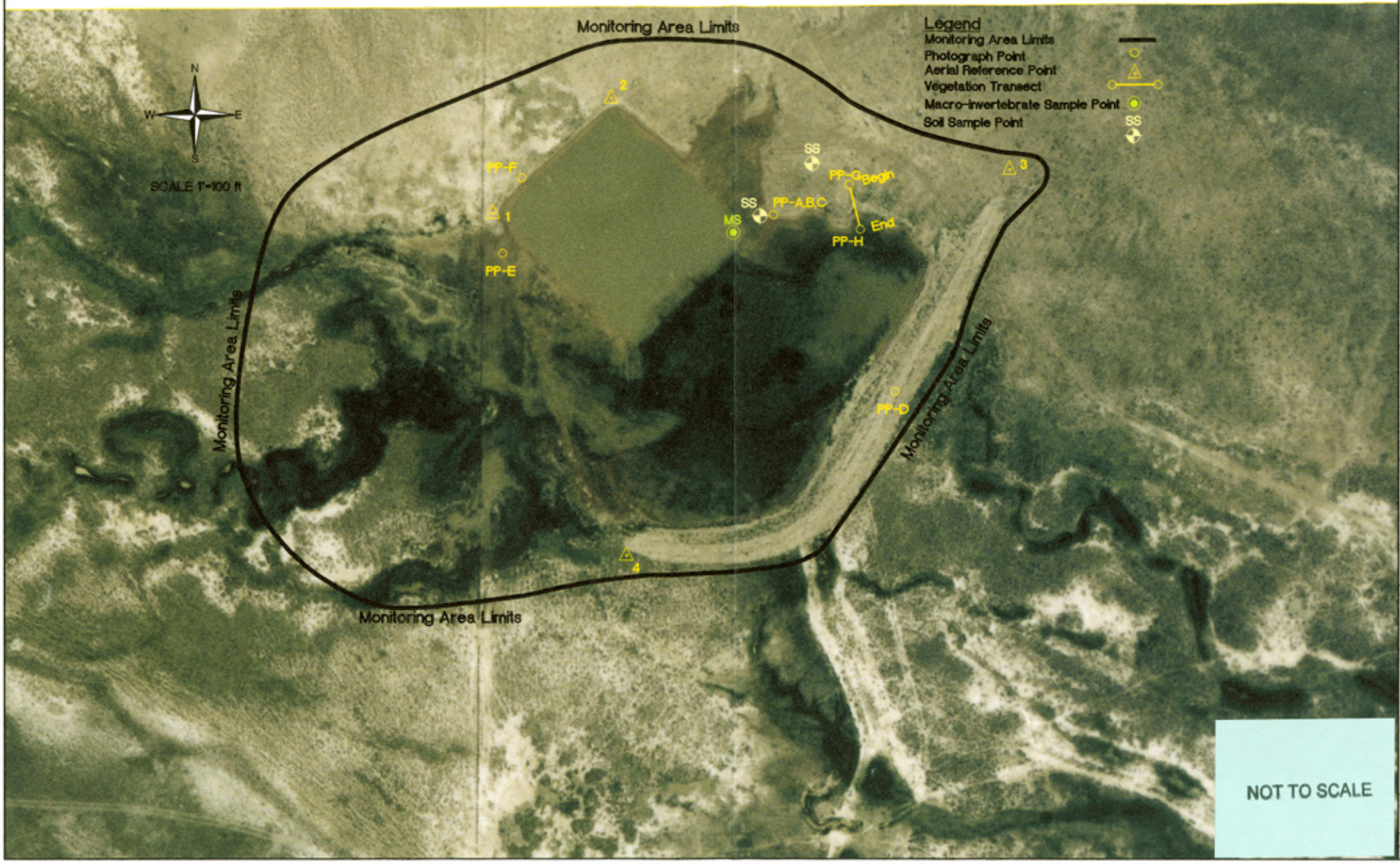
DATE:

Figure 2 Monitoring Activity Locations



LAND & WATER A-8

PROJECT NAME: MDT Ridgeway Complex W-9 Wetland Mitigation

DRAWING TITLE: Monitoring Activity Locations

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SCALE: 1"= 100ft | APPVD: BD

LOCATION: Ridgeway Complex | PROJ. MGR: BD

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DATE:

Figure 3 Mapped Site Features

LAND & WATER A-9

PROJECT NAME: MDT Ridgeway Complex W-9 Wetland Mitigation

DRAWING TITLE: Mapped Site Features

PROJ NO. 130091.025 | DRAWN RA
FILE NAME TASK2SWSBASE.DWG | CHECKED
SCALE 1"= 100ft | APPVD BD
LOCATION Ridgeway Complex | PROJ MGR BD

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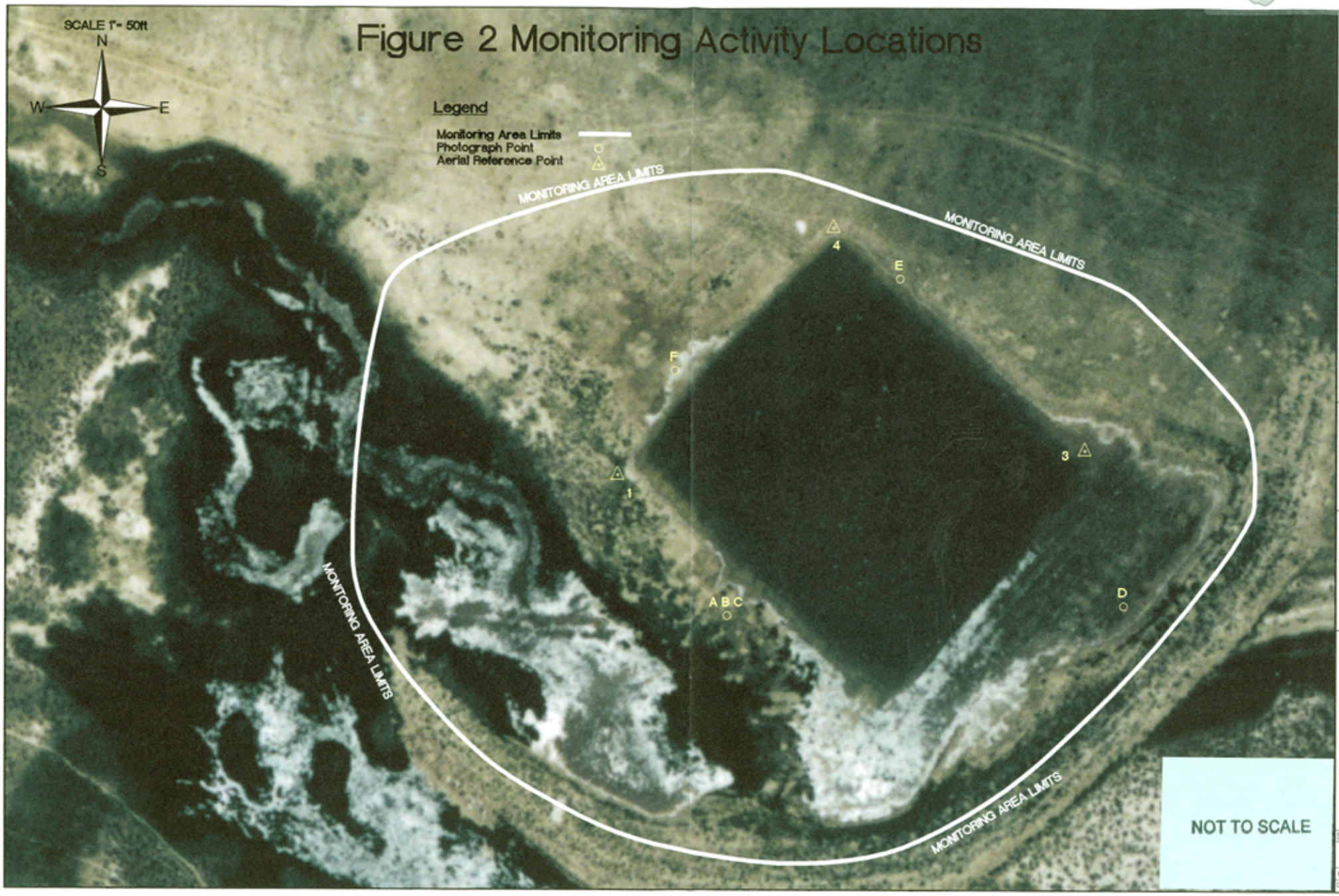
Figure 2 Monitoring Activity Locations



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LOCATION: Ridgeway Complex
DRAWN: RA
CHECKED:
APPVD: BD
PROJ MGR: BD

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Missoula MT 59807

SHEET NUMBER: 2
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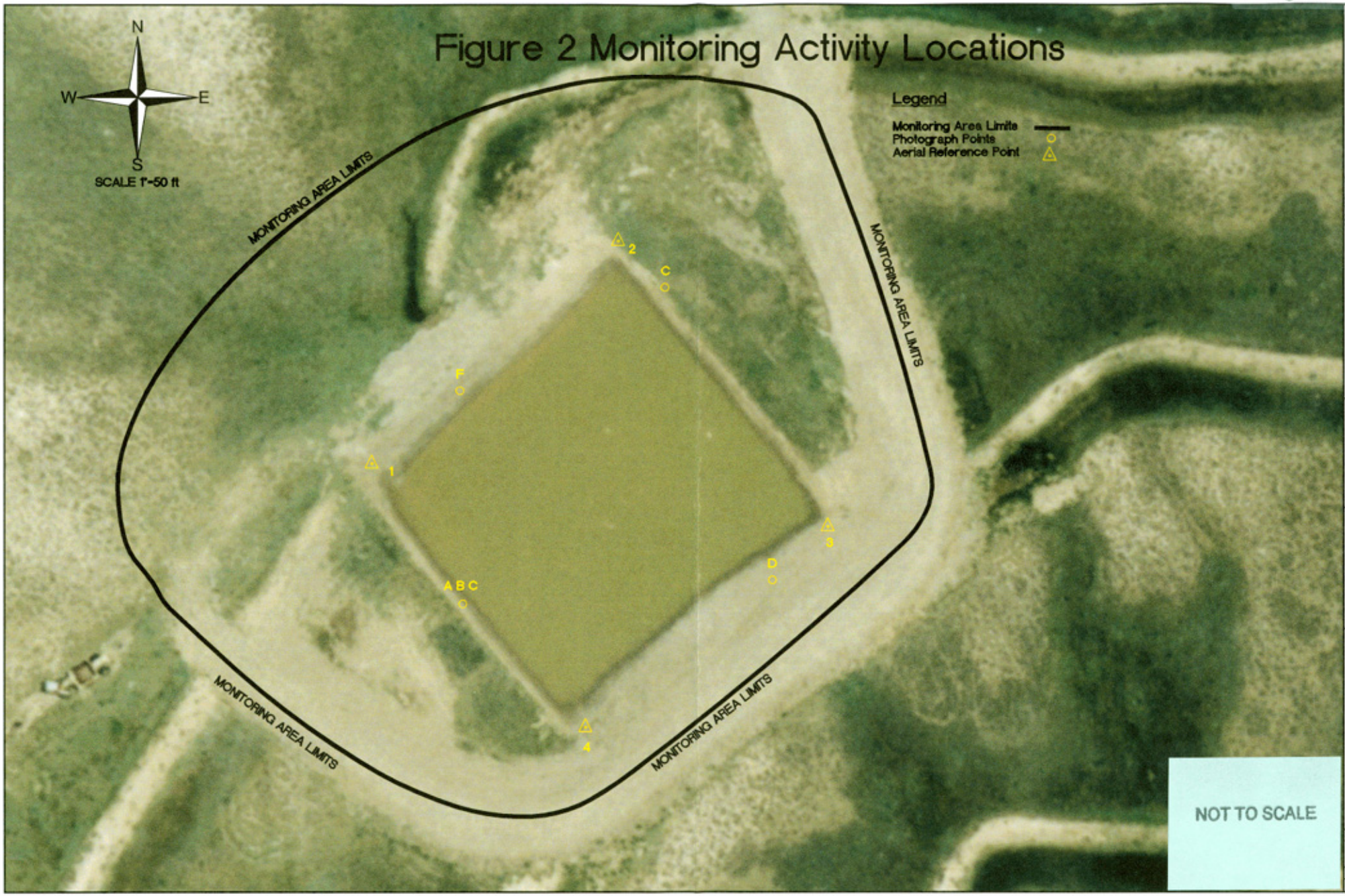
DATE:

Figure 2 Monitoring Activity Locations



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DRAWING TITLE: Monitoring Activity Locations

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LOCATION Ridgeway Complex | PROJ MGR BD

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P.O. BOX 8254
Missoula, MT 59807

SHEET NUMBER: 2

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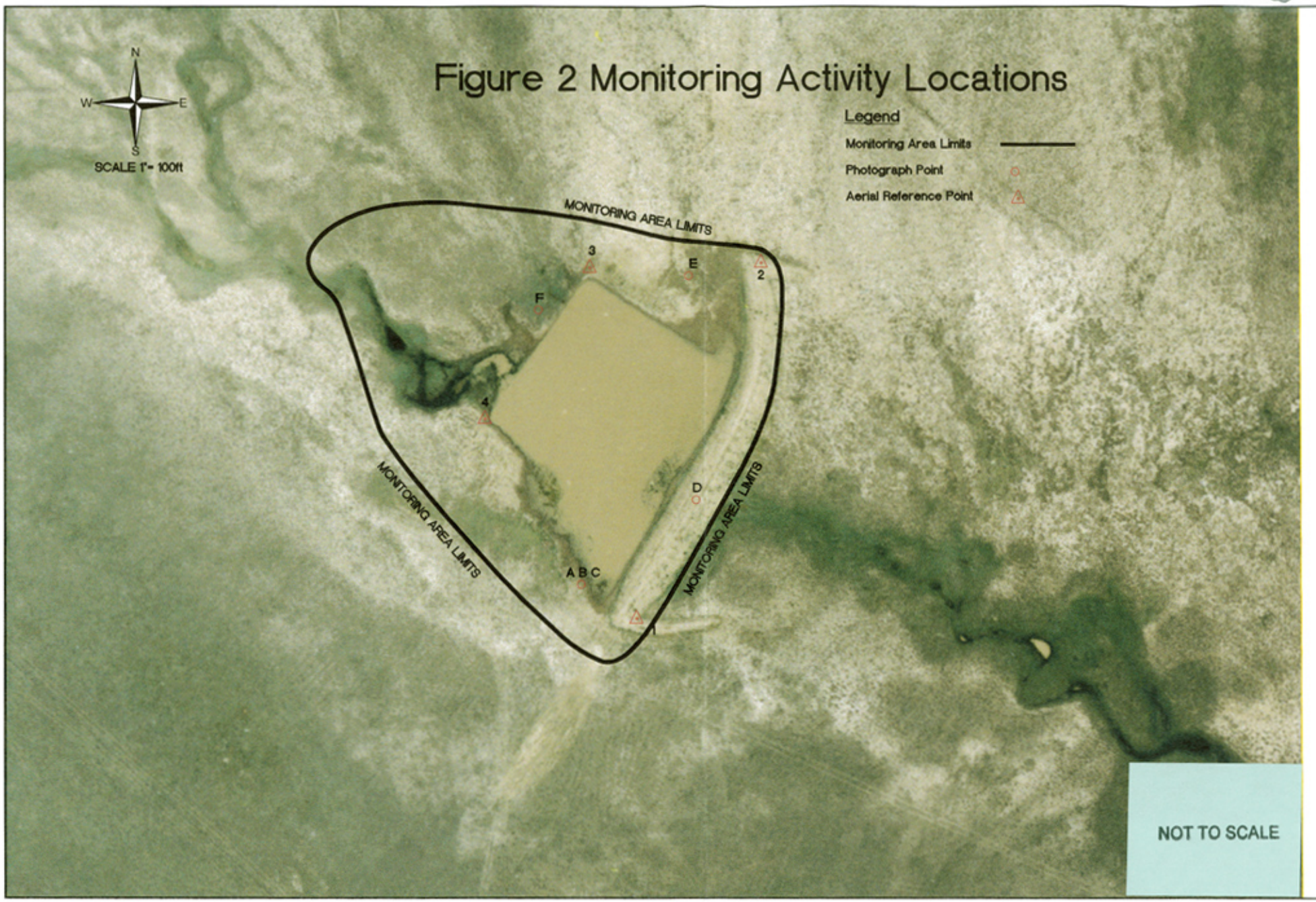
DATE

Figure 2 Monitoring Activity Locations



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DRAWING TITLE
Monitoring Activity Locations

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SCALE 1"= 100ft | APPVD BD
LOCATION Ridgeway Complex | PROJ MGR BD

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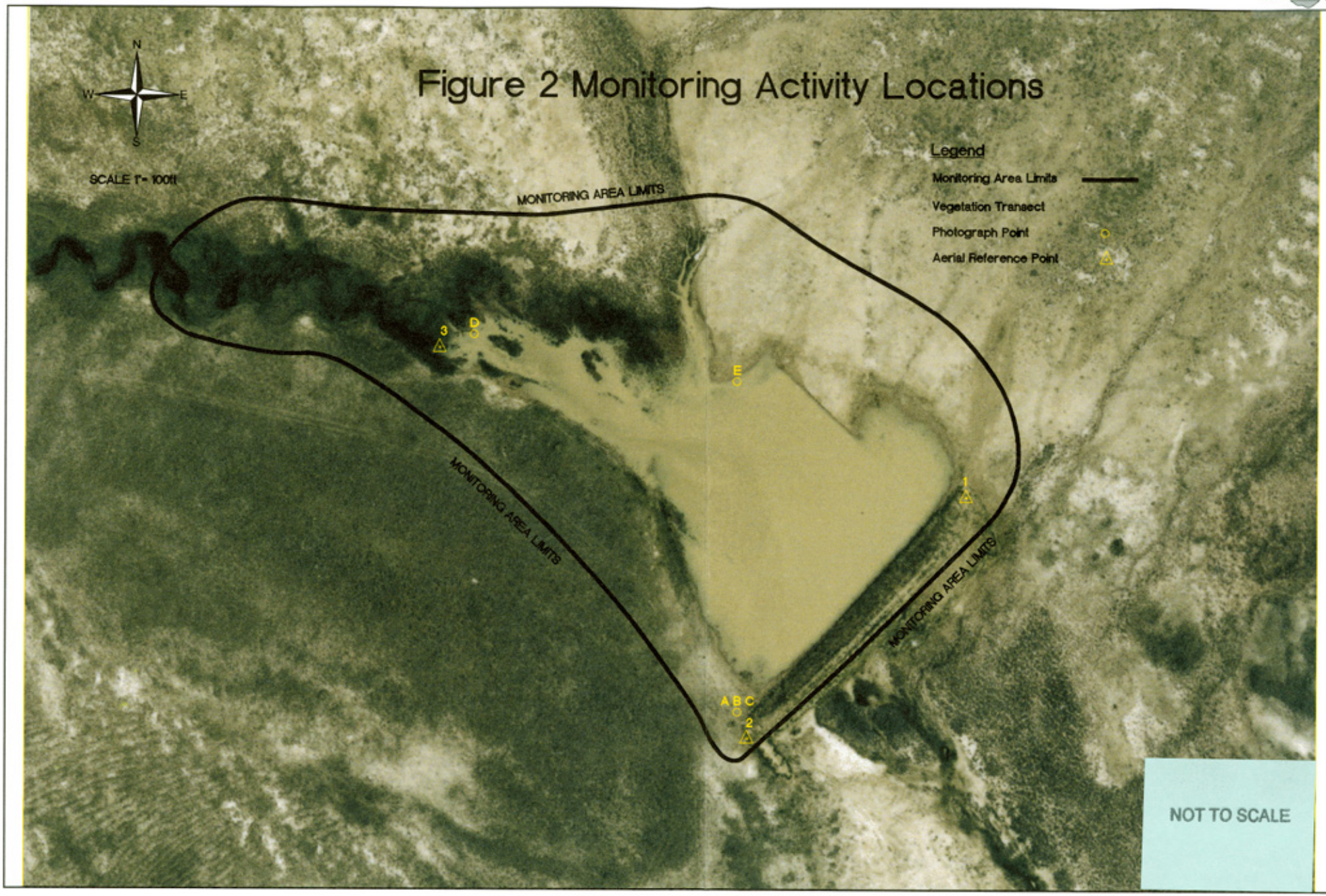
Figure 2 Monitoring Activity Locations



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LOCATION: PROJ MGR: Ridgeway Complex

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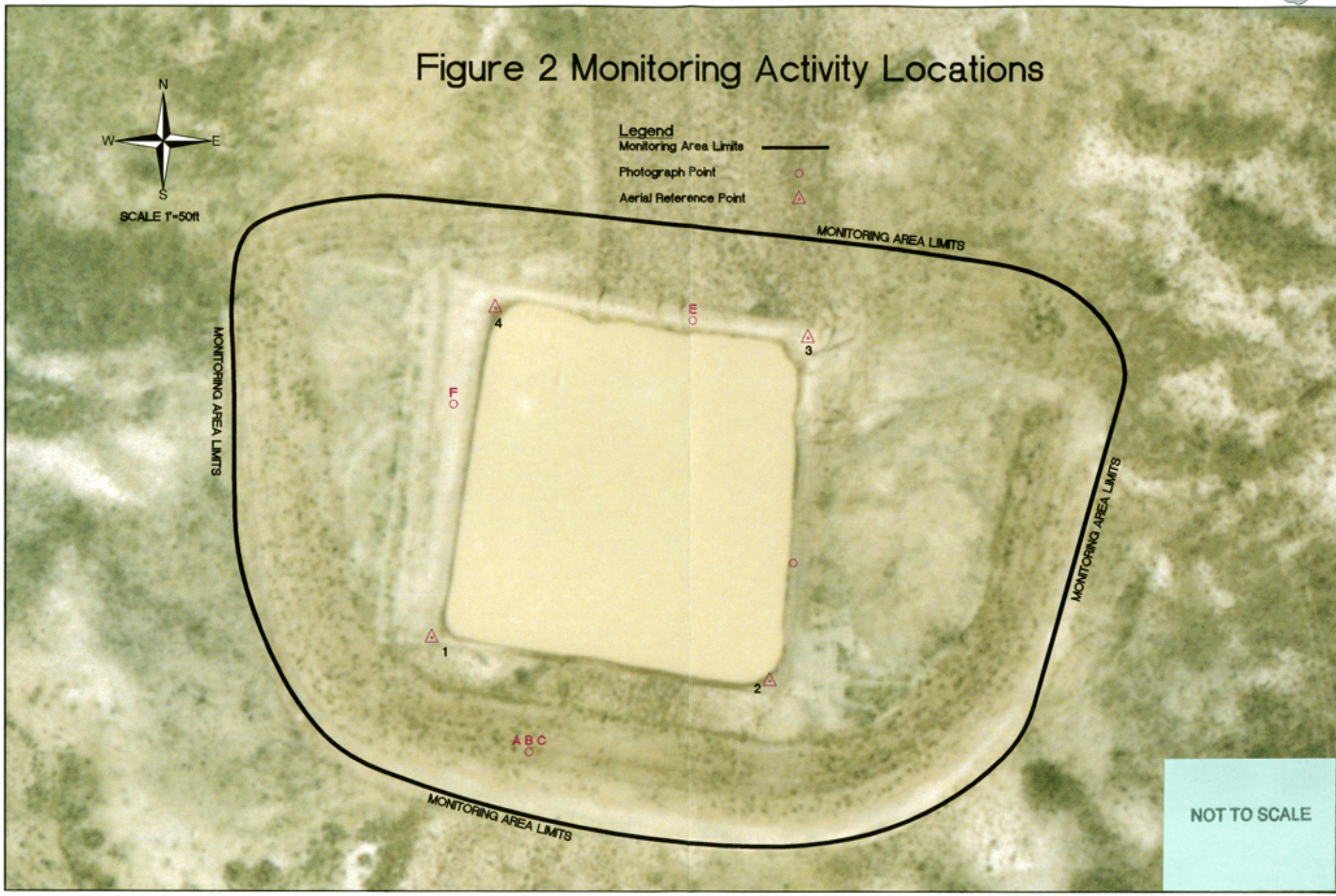
SHEET NUMBER: 2
REV: -
DATE:

Figure 2 Monitoring Activity Locations



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LOCATION: Ridgeway Complex | PROJ MGR: BD

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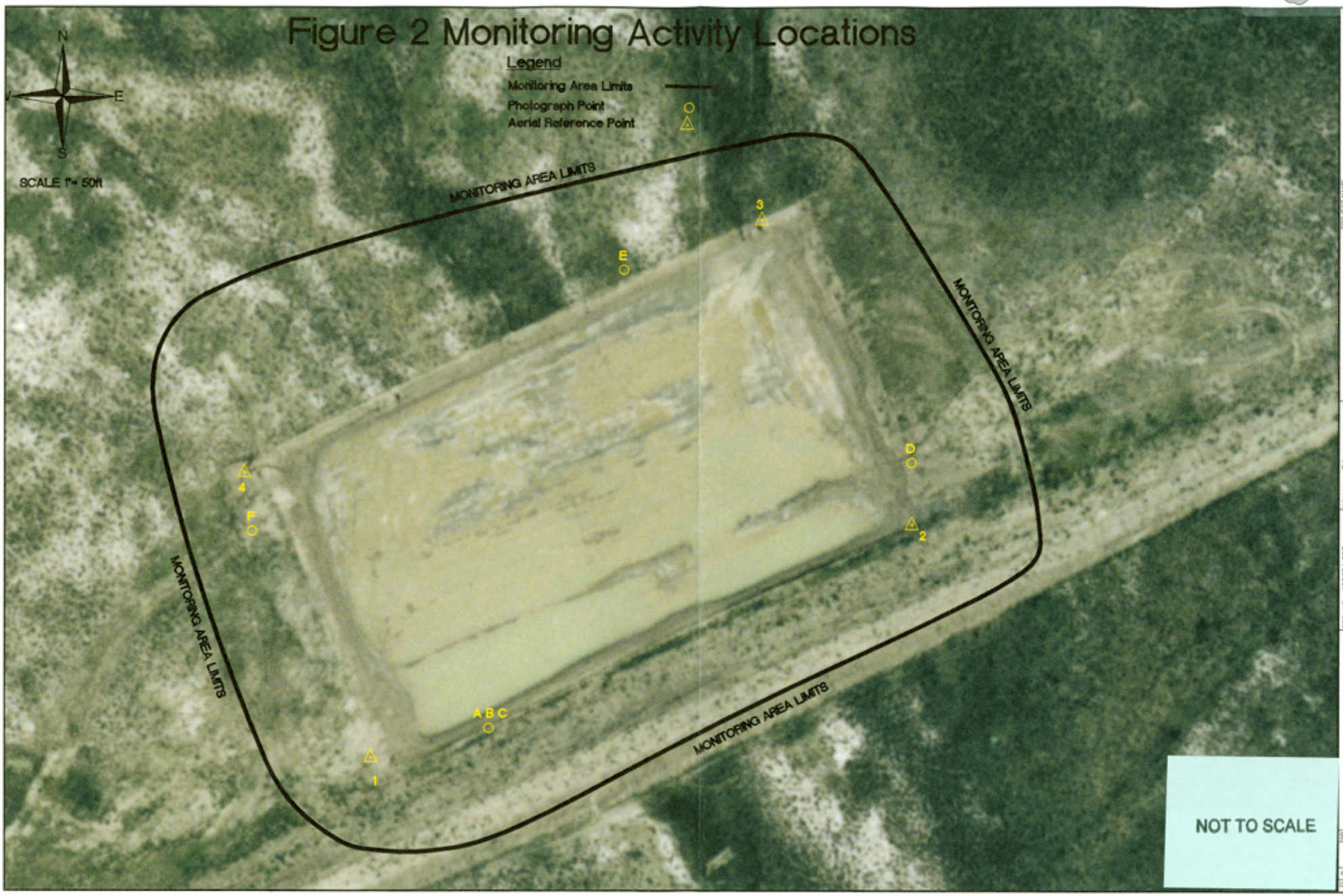
SHEET NUMBER: 2
REV: -
DATE:

Figure 2 Monitoring Activity Locations



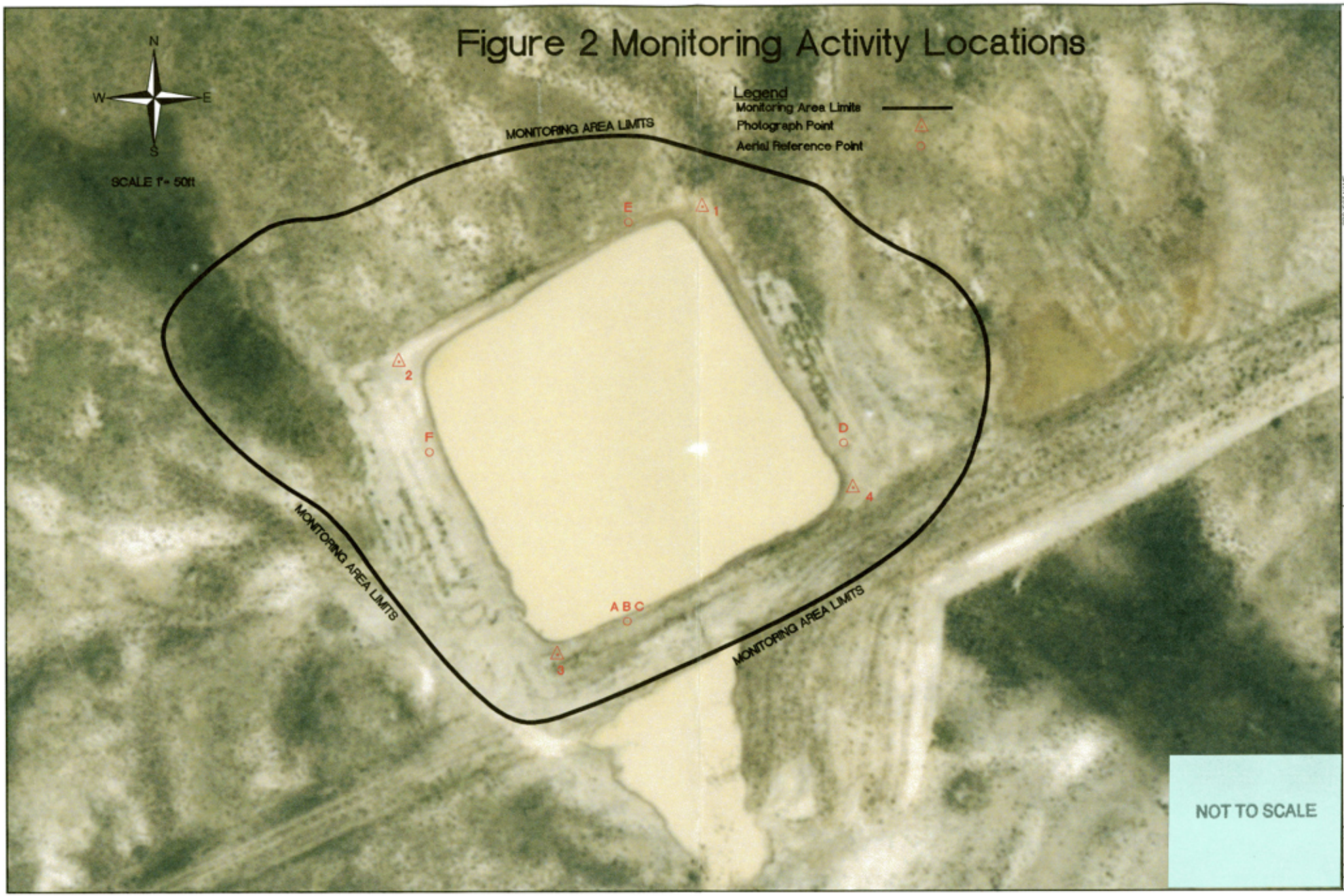
PROJECT NAME: MDT Ridgeway Complex W-15 Wetland Mitigation
DRAWING TITLE: Monitoring Activity Locations

PROJ NO: 1300911.025 | DRAWN: RA
FILE NAME: TASK2SW15BASE.dwg | CHECKED:
SCALE: 1" = 50ft | APPVD: BD
LOCATION: Ridgeway Complex | PROJ MGR: BD

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

SHEET NUMBER: 2
REV: -
DATE:

Figure 2 Monitoring Activity Locations



PROJECT NAME: MDT Ridgeway Complex W-16 Wetland Mitigation
DRAWING TITLE: Monitoring Activity Locations

PROJ NO: 13009.025 | DRAWN: RA
FILE NAME: TASK25W16BASE.dwg | CHKD:
SCALE: 1" = 50ft | APPVD: BD
LOCATION: Ridgeway Complex | PROJ MGR: BD

LAND & WATER CONSULTING, INC.
P.O. BOX 8744
Missoula, MT 59807

SHEET NUMBER: 2
REV: -
DATE:

Appendix B

COMPLETED 2001 WETLAND MITIGATION SITE MONITORING FORM (W-9)
COMPLETED 2001 BIRD SURVEY FORMS (W-9)
COMPLETED 2001 WETLAND DELINEATION FORMS (W-9)
COMPLETED 2001 FIELD AND FULL FUNCTIONAL ASSESSMENT FORMS (W-9)

MDT Wetland Mitigation Monitoring
Ridgeway Wetland (W-9)
Ekalaka, Montana

LAND & WATER

DRAFT - MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: Ridgeway, W-9 Project Number: 215-25 Assessment Date: 23 /Aug/ 2001
Location: Ridge Way MT MDT District: Five Milepost: NA
Legal description: T___ R___ Section___ Time of Day: 2:00 pm
Weather Conditions: Clear, Windy Person(s) conducting the assessment: LeCain, WWI
Initial Evaluation Date: 23 /Aug/ 01 Visit #: 1 Monitoring Year: 2001
Size of evaluation area: 1 acres Land use surrounding wetland: Rangeland

HYDROLOGY

Surface Water
Inundation: Present ✓ Absent___ Average depths: 2 ft Range of depths: 0 - 4 ft
Assessment area under inundation: 70%
Depth at emergent vegetation-open water boundary: 1 ft
If assessment area is not inundated are the soils saturated w/in 12" of surface: Yes___ 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: There are 16 small, constructed wetlands at this site. W-9 described in this monitoring form displayed the best development of wetland characteristics.

VEGETATION COMMUNITIES

LAND & WATER B-2

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

Dominant Species	% Cover	Dominant Species	% Cover
Festuca idahoensis	10%		
Bouteloua gracilis	10%		
Grindelia gracilifolia	10%		

COMMENTS/PROBLEMS: Dominated by cracked clay & bare earth

Community No.: 2 Community Title (main species): Typha spp

Dominant Species	% Cover	Dominant Species	% Cover
Typha spp.	80%	Scirpus spp.	10
Juncus spp.	30%		
Carex spp.	10%		
Glyceria spp.	10%		
Moss	10%		

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: Ridgeway W-9 Date: 23Aug01 Examiner: LeCain, WWI Transect # 1

Approx. transect length: 60 Ft Compass Direction from Start (Upland): 150°

Vegetation type 1: FEID	
Length of transect in this type: 40	feet
Species:	Cover:
Festuca idahoensis	10%
Grindelia gracilifolia	10%
Bouteloua gracilis	10%
Total Vegetative Cover:	30%

Vegetation type 2: Typha spp.	
Length of transect in this type: 20	feet
Species:	Cover:
Juncus spp.	50%
Typha spp.	70%
Carex spp.	30%
Glyceria spp.	10%
Total Vegetative Cover:	160%

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

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

Ridgeway 8/01 (#9)

MDT WETLAND MONITORING – VEGETATION TRANSECT (back of form) LAND & WATER B-4

Cover Estimate

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

 Ridgeway 6/01 (#4)

WETLAND DELINEATION

At each site conduct the items on the checklist below:

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

COMMENTS/PROBLEMS: _____

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: _____

Ridgeway 8/01 (#9)

COMPREHENSIVE VEGETATION LIST

LAND & WATER B-6

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
Festuca idahoensis	1		
Boutelua gracilis	1		
Grindelia gracilifolia	1		
Typha spp.	2		
Juncus spp.	2		
Glyceria spp.	2		
Moss	2		
Scirpus spp	2		

COMMENTS/PROBLEMS: _____

PLANTED WOODY VEGETATION SURVIVAL

LAND & WATER B-7

Species	Number Originally Planted	Number Observed	Mortality Causes
NA			

COMMENTS/PROBLEMS: _____

Ridgeway 8/01(#9)

LAND & WATER B-8

WILDLIFE

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
Mallards	3		✓						
Bl. Wg. teal	3		✓						
Am. Wigeon	5		✓						
Cinnamon Teal	2		✓						
willet	10		✓						
Sp. sandpiper	10		✓						
Killdeer	6		✓						

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

MAMMALS AND HERPTILES

Species	Number Observed	Indirect indication of use			
		Tracks	Scat	Burrows	Other
Leopard frogs	15				
Cattle		✓	✓		
deer		✓	✓		

Additional Activities Checklist:

✓ Macroinvertebrate sampling (if required)

COMMENTS/PROBLEMS: _____

Ridgeway 8/01 (#9)

LAND & WATER B-8

WILDLIFE

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
Mallards	3		✓						
Bl. Wg. teal	3		✓						
Am. wigeon	5		✓						
Cinnamon Teal	2		✓						
Willet	10		✓						
Sp. sandpiper	10		✓						
Killdeer	6		✓						

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

MAMMALS AND HERPTILES

Species	Number Observed	Indirect indication of use			
		Tracks	Scat	Burrows	Other
Leopard frogs	15				
Cattle		✓	✓		
deer		✓	✓		

Additional Activities Checklist:

__✓__ Macroinvertebrate sampling (if required)

COMMENTS/PROBLEMS: _____

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

Project/Site: Ridgeway, W-9
Applicant/Owner: MDT / BLM
Investigator: LeCain, Wetlands West, Inc

Date: 23 Aug 01
County: Carbon
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: FEID
Transect ID: W-9
Plot ID: SP-1

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. FEID	H	—
2. BOGR	H	—
3. GRGR	H	FACU
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

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

Remarks: Upland characteristic of land surrounding wetland

HYDROLOGY

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

Field Observations:

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

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

Remarks: No evidence of wetland hydrology

SOILS

Map Unit Name (Series and Phase): 96A Vanda silty clay loam

Drainage Class: Well drained

Taxonomy (Subgroup): _____

Field Observations Confirm Mapped Type? (Yes) No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-5	A	Light brownish gray 10YR 6/2	—	—	Clay loam
5-18	B	dark grayish brown 10YR 4/2	—	—	Clay 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: Not a hydric soil

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes (No)	(Circle)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	
Is this Sampling Point Within a Wetland?	Yes (No)	(Circle)

Remarks:

Approved by HQUSACE 3/92

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

Project/Site: Ridgeway, W-9
Applicant/Owner: MDT/BLM
Investigator: LeCain, Wetlands West, Inc.

Date: 23 Aug 01
County: Carter
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: TYLA
Transect ID: W-9
Plot ID: SP-2

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. TYLA	H	obl
2. Scirpus spp.	H	obl
3. Juncus spp.	H	obl
4. Glyceria spp.	H	
5.		
6.		
7.		
8.		

Dominant Plant Species	Stratum	Indicator
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

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

Remarks: Very well developed emergent vegetation

HYDROLOGY

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

Field Observations:

Depth of Surface Water: ____ (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:

SOILS

Map Unit Name (Series and Phase): 96A Vonda Silty clay loam

Drainage Class: Well drained

Taxonomy (Subgroup): _____

Field Observations Confirm Mapped Type? Yes (No)

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-18	A	dk gry 10YR4/1	Red 10R 4/6	40%/ evident	clay 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:

WETLAND DETERMINATION

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

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

Remarks: Very nicely developed depressional wetland. Abundant cover, vigorous aquaticbed.

Approved by HQUSACE 3/92

LAND & WATER B-14 Kidgeway 01

Draft Field Data Collection Sheet for MDT Montana Wetland Assessment Form

1. CLASSIFICATION

Vegetated Cowardin Class	Estimated % of AA	Predominant Water Regime (CIRCLE)
Emergent	40%	(PF) IE SPF SF S TF IF
Aquatic Bed	30%	(PF) IE SPF SF S TF IF
Moss-Lichen	30%	PF (IE) SPF SF S TF IF
Scrub-Shrub	—	PF IE SPF SF S TF IF
Forested	—	PF IE SPF SF S TF IF
Total Estimated % Vegetated	100%	

2. DISTURBANCE is: High Moderate (Low)

3. HYDROLOGY

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

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

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

Do any wetlands on site flood as a result of in-channel or overbank flow? (Y) N (if no, go to groundwater section below)

Estimated wetland area subject to periodic flooding (acres): ≥10 2-10 (<2)

Estimated % of flooded wetland classified SS, FO or both: ≥75 25-74 (<25)

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

4. VERTEBRATES

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

Fish observations? _____

5. OTHERS

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

Potential to receive: low to moderate levels high levels

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

List: _____

Is AA a known recreation / education site? Y (N) Type: _____

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

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

1. Project Name: Ridgeway #9   2. Project #: Site # 28   Control #: ______

3. Evaluation Date: Mo. 1 Day 11 Yr. 02   4. Evaluator(s): ______   5. Wetlands/Site #(s) # 28

6. Wetland Location(s): I. Legal: T 4 N or (S); R 58 (E) or W; S 32 ; T ___ N or S; R ___ E or W; S ______ ;
II. Approx. Stationing or Mileposts: See NRCS aerial 'sheet' for loc. of WL
III. Watershed: 10110202   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)
4.345 (measured, e.g. by GPS [if applies])

9. Assessment area: (AA, tot., ac., see instructions on determining AA) ______ (visually estimated)
4.345 (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
Depression	Palustrine		UB	H	Ex	30%
Depression	Palustrine		Em	C	Ex	70%

(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: One of 16+ 'ponds' in the area. W-9 is a representative site.

12. General condition of AA: ✓
I. Regarding disturbance: (use matrix below to determine [circle] appropriate response)

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

Comments: (types of disturbance, intensity, season, etc.):
II. Prominent weedy, alien, & introduced species (including those not domesticated, feral): (list) Ø recorded

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

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	Leopard frogs
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. deer
- __ adequate adjacent upland food sources
- __ interviews with local biologists with knowledge of the AA frogs

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: discussed these reservoirs w/ Wayne Hest (NRCS) Ekalaka and he said all of these were stocked - though shallow - some fish might survive up there

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

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

ii. Recharge Indicators

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

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

Criteria	*Functional Points and Rating*
AA is known Discharge/Recharge area or one or more indicators of D/R present	1 (H)
No Discharge/Recharge indicators present	.1 (L)
Available Discharge/Recharge information inadequate to rate AA D/R potential	N/A (Unknown)

Comments:

14K. Uniqueness:

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

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland or plant association listed as "S1" by the MNHP			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MNHP			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1 (H)	.9 (H)	.8 (H)	.8 (H)	.6 (M)	.5 (M)	.5 (M)	.4 (M)	.3 (L)
Moderate disturbance at AA (#12i)	.9 (H)	.8 (H)	.7 (M)	.7 (M)	.5 (M)	.4 (M)	.4 (M)	.3 (L)	.2 (L)
High disturbance at AA (#12i)	.8 (H)	.7 (M)	.6 (M)	.6 (M)	.4 (M)	.3 (L)	.3 (L)	.2 (L)	.1 (L)

Comments:

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

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

iii. Based on the location, diversity, size, and other site attributes, is there strong potential for rec./ed. use? Y (N)
(If yes, go to ii, then proceed to iv; if no, then rate as [circle] Low [0.1])

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

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

Comments:

FUNCTION & VALUE SUMMARY & OVERALL RATING

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units; (Actual Points x Estimated AA Acreage) 4.345
A. Listed/Proposed T&E Species Habitat	L	0	1	
B. MT Natural Heritage Program Species Habitat	H	1.0	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	H	1	1	
H. Sediment/Shoreline Stabilization	M	.7	1	
I. Production Export/Food Chain Support	M	.7	1	
J. Groundwater Discharge/Recharge	H	1	1	
K. Uniqueness	M	.4	1	
L. Recreation/Education Potential	L	.1	1	
Totals:		7.9	12	34.33

7.9/12 = 66%

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

Macro-Invertebrate Sampling Results for Ridgeway W-9

Montana Department of Transportation		Project Name	Ridgeway
Wetland Mitigation Monitoring Project		Project/task number	215-25
for		Date	8/23/2001
Land and Water Consulting		Field Personnel	Wetlands West
		Note	
2001		Rhithron Sample Identification	25
Coelenterata		*Hydra*	
Oligochaeta	Enchytraeida	Enchytraeidae	
	Naididae	*Chaetogaster*	
		Nais elinguis	
		Nais variabilis	
		Ophidonais serpentina	
	Tubificidae	Tubificidae - immature	
		Limnodrilus hoffmeisteri	
Hirudinea	Erpobdellida	*Mooreobdella microstoma*	
		Nephelopsis	
	Glossiphoniidae	*Helobdella stagnalis*	
		Helobdella	
		Glossiphonia	
Bivalvia	Sphaeriida	*Sphaerium*	
Gastropoda	Lymnaeida	*Fossaria*	3
	Physidae	*Physa*	
	Planorbidae	*Gyraulus*	
		Helisoma	
Crustacea	Cladocera	Cladocera	
	Copepoda	Calanoida	
		Cyclopoida	
	Ostracoda	Ostracoda	
	Amphipoda	*Gammarus*	
		Hyalella azteca	
	Decapoda	*Orconectes*	
Acarina		Acari	
Odonata	Aeshnidae	*Anax*	
	Libellulidae	Libellulidae-early instar	
		Sympetrum	4
	Coenagrionidae	Coenagrionidae-early instar	
		Enallagma	3
	Lestidae	*Lestes*	
Ephemeroptera	Baetidae	*Callibaetis*	24
	Caenidae	*Caenis*	11
Hemiptera	Corixidae	Corixidae - immature	1
		Hesperocorixa	
		Sigara	
		Trichocorixa	
	Nepidae	*Ranatra*	
	Notonectidae	*Notonecta*	16
Trichoptera	Hydroptilida	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*	
		Peltodytes	
	Hydrophilidae	*Berosus*	
		Helophorus	
		Hydrobius	
		Hydrochara	
		Laccobius	1
		Tropisternus	1

Diptera	Ceratopogoninae	*Bezzia/Palpomyia*	
		Dasyhelea	
	Chaoboridae	*Chaoborus*	
	Culicidae	*Anopheles*	
		Culex	
	Ephydridae	Ephydridae	
	Simuliidae	*Simulium*	
	Sciomyzidae	Sciomyzidae	
	Stratiomyidae	*Odontomyia*	
	Chironomidae	*Acricotopus*	
		Chironomus	
		Cladotanytarsus	4
		Corynoneura	
		Cryptotendipes	
		Dicrotendipes	
		Einfeldia	
		Endochironomus	2
		Labrundinia	
		Microtendipes	84
		Orthocladius annectens	39
		Parachironomus	
		Paramerina	8
		Paratanytarsus	3
		Phaenopsectra	
		Polypedilum	
		Procladius	
		Psectrocladius	
		Psectrotanypus	
		Pseudochironomus	
		Tanypus	
		Tanytarsus	1
		TOTAL	205
		grids	16

Total taxa	16
POET	2
Chironomidae taxa	7
Crustacea taxa + Mollusca taxa	1
% Chironomidae	68.7804878
Orthocladiinae/Chironomidae	27.65957447
%Amphipoda	0
%Crustacea + %Mollusca	1.463414634
HBI	6.453658537
%Dominant taxon	40.97560976
%Collector-Gatherers	80.48780488
%Filterers	1.951219512

Total taxa	3
POET	3
Chironomidae taxa	5
Crustacea taxa + Mollusca taxa	1
% Chironomidae	1
Orthocladiinae/Chironomidae	3
%Amphipoda	3
%Crustacea + %Mollusca	3
HBI	3
%Dominant taxon	3
%Collector-Gatherers	3
%Filterers	1

site score	32

Appendix C

WETLANDS 1-8 AND 10-16 REPRESENTATIVE PHOTOGRAPHS
AERIAL PHOTOS
PHOTOGRAPH LOGS

MDT Wetland Mitigation Monitoring
Ridgeway Wetland
Ekalaka, Montana

LAND & WATER

Photo point C, W-1 wetland buffer view East

Photo point D, W-1 view West

Photo point C, W-2 wetland buffer view South

Photo point F, W-2 view East

Photo point A, W-3 view North

Photo point F, W-3 view East

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

1-12-03 EK W-1

Location	Photo Frame #	Photograph Description	Compass Reading
A	7 18A	wetland view	S
B	8 17A	Upland use	N
C	9 16A	wetland buffer	E
D	10 15A	Wetland view	W
E	11 14A	wetland view	N
F	6 13A	wetland view	E
G			
H			

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:

_____ 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: _____

PHOTOGRAPHS

LAND & WATER C-3

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 a 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:

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

1-15-02 ES W-2

Location	Photo Frame #	Photograph Description	Compass Reading
A	~~18~~ 11A	wetland view	N
B	~~17~~ 8A	upland use	S
C	~~16~~ 7A	wetland buffer	S
D	~~15~~ 10A	wetland view	W
E	~~14~~ 9A	wetland view	S
F	~~13~~ 6A	wetland view	E
G			
H			

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:

- _____ 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: _____

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 a 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:

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

1-15-03 ES Ridgeway W-3

Location	Photo Frame #	Photograph Description	Compass Reading
A	2A	Wetland view	N
B	1A	Upland use	S
C	24A	Wetland buffer - No photo	W
D	22&23A	Wetland view	W
E	21A	Wetland view	S
F	20A	Wetland view	E
G			
H			

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:

_____ 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: _____

Photo point C, W-4 wetland buffer view West

Photo point D, W-4 view West

Photo point E, W-5 view South

Photo point F, W-5 view East

Photo point C, W-6 wetland buffer view West

Photo point E, W-6 view South

PHOTOGRAPHS

LAND & WATER C-6

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 a 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:

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

1-13-09 RK Ridge Way W-4

Location	Photo Frame #	Photograph/Description	Compass Reading
A	9 A	wetland view	N
B	8 A	Upland use	S
C	7 A	wetland buffer	W
D	6 A	wetland view	W
E	5 A	wetland view	S
F	4 A	wetland view	E
G			
H			

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:

- _____ 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: _____

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 a 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

1-15-02 2x Ridgeway W-5

Location	Photo Frame #	Photograph Description	Compass Reading
A	16 A	wetland view	N
B	15 A	upland use	S
C	14 A	wetland buffer	W
D	13 A	wetland view	W
E	12 A	wetland view	S
F	11 A	wetland view	E
G			
H			

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:

_____ 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: _____

PHOTOGRAPHS

LAND & WATER C-8

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 a 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

1-13-10 EK Ridgeway W-6

Location	Photo Frame #	Photograph Description	Compass Reading
A	22 23A	wetland view	N
B	21 22A	Upland use	S
C	20 21A	wetland buffer	W
D	19 20A	Wetland view	E
E	18 19A	Wetland view	S
F	17 18A	Wetland view	W
G			
H			

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:

_____ 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: _____

Photo point E, W-7 view South

Photo point F, W-7 view East

Photo point 8, W-8 upland view South

Photo point A, W-10 view North

Photo point C, W-10 wetland buffer view West

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 a 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:

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

1-15-02 W-7/8 Ridge way

Location	Photo Frame #	Photograph Description	Compass Reading
A	6 A	Wetland view	N
B	5 A	Upland use	S
C	4 A	Wetland buffer	W
D	3 A	wetland view	W
E	2 A	wetland view	S
F	1 A	wetland view	E
G			
H			

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:

- _____ 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: _____

PHOTOGRAPHS

LAND & WATER C-11

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 a 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:

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

1-15-02 ES W-10 Ridge wet

Location	Photo Frame #	Photograph Description	Compass Reading
A	~~22~~ 4A	wetland view	N
B	~~23~~ 3A	upland use	S
C	~~24~~ 2A	wetland buffer	W
D	~~19~~ 22A	wetland view	W
E	~~20~~ 21A	wetland view	S
F	~~21~~ 20A	wetland view	E
G			
H			

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:

- _____ 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: _____

Photo point D, W-11 view West

Photo point F, W-11 view East

Photo point A, W-12 view North

Photo point D, W-12 view West

Photo point A, W-13 view North

Photo point D, W-13 view East

PHOTOGRAPHS

LAND & WATER C-13

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 a 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

1-15-02.28 W-11 Ridgeway

Location	Photo Frame #	Photograph Description	Compass Reading
A	11 D	wetland view	N
B	10 A	Upland use	S
C	9 A	Wetland buffer	W
D	8 A	Wetland view	W
E	7 A	Wetland view	S
F	6 A	Wetland view	E
G			
H			

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:

- _____ 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: _____

PHOTOGRAPHS

LAND & WATER C-14

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 a 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

1-15-02 EK W-12 Ridgeway

Location	Photo Frame #	Photograph Description	Compass Reading
A	19A	Wetland view	N
B	18A	Upland use	S
C	17A	Wetland buffer	W
D	16A	Wetland view	W
E	15A	Wetland view	S
F	14A	Wetland view	E
G			
H			

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:

- _____ 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: _____

PHOTOGRAPHS

LAND & WATER C-15

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 a 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:

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

Ridgeway W-13

Location	Photo Frame #	Photograph Description	Compass Reading
A	2	wetland view	N
B	1	upland use	S
C	2 3	wetland buffer	W
D	2 2	wetland view	E
E	2 2 1	wetland view	S
F	21	Wetland view	W
G			
H			

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:

- _____ 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: _____

Photo point C, W-14 wetland buffer view West

Photo point E, W-14 view South

Photo point A, W-15 view North

Photo point E, W-15 view South

Photo point C, W-16 wetland buffer view West

Photo point E, W-16 view East

PHOTOGRAPHS

LAND & WATER C-17

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 a 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

1-15 02 CZ Ridgeway W-14

Location	Photo Frame #	Photograph Description	Compass Reading
A	9 A	Wetland view	N
B	8 A	Upland use	S
C	7 A	Wetland buffer	W
D	6 A	Wetland view	W
E	5 A	Wetland view	S
F	4 A	Wetland view	E
G			
H			

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:

_____ 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: _____

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 a 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

1-15 02 ES W-15 Ridgeway

Location	Photo Frame #	Photograph Description	Compass Reading
A	16A	wetland view	N
B	15A	upland use	S
C	14A	wetland buffer	W
D	13A	wetland view	W
E	12A	wetland view	S
F	11A	wetland view	E
G			
H			

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:

_____ 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: _____

PHOTOGRAPHS

LAND & WATER C-11

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

1-15 on 8x W-16 ridgeway

Location	Photo Frame #	Photograph Description	Compass Reading
A	23A	wetland view	N
B	22A	Upland use	S
C	21A	Wetland buffer	W
D	20A	wetland view	W
E	19A	wetland view	S
F	18A	wetland view	E
G			
H			

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:

- _____ 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: _____

Appendix D

BIRD SURVEY PROTOCOL
MACROINVERTEBRATE SAMPLING PROTOCOL
GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Ridgeway Wetland
Ekalaka, 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 OF W-9

MDT Wetland Mitigation Monitoring
Ridgeway Wetland
Ekalaka, Montana

LAND & WATER

Photo point A, view North

Photo point F, view South

Photo point D, view East

Photo point E, view West

Photo point C, buffer, view East

Photo point B, upland

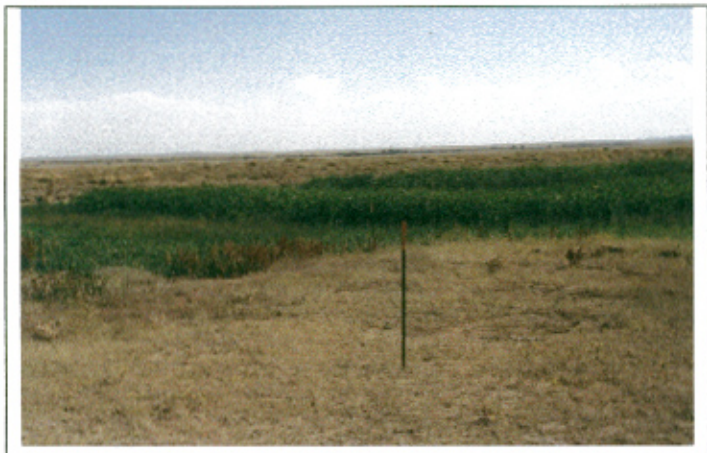


Photo point G, Begin transect	Photo point H, End transect