
**MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2004**

*Ridgeway Wetland Complex
Ekalaka, Montana*



Prepared for:

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

Prepared by:

LAND & WATER CONSULTING
~ A DIVISION OF **PBS&J**
P.O. Box 239
Helena, MT 59624

June 2005

Project No: B43054.00 - 0412



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1.0 INTRODUCTION

This annual report summarizes methods and results of the fourth year of monitoring at the Montana Department of Transportation's Ridgeway Complex mitigation site. The Ridgeway wetland complex was created to provide wetland mitigation credits to address impacts associated with MDT projects in Watershed #16 located in MDT District 4 (Glendive District). The complex, comprised of sixteen constructed impoundments, is 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 during the summer of 2000 and an additional eight were completed in January of 2001 (**Figure 1**). The objective for the Ridgeway Complex was to maximize the surface acres of each individual project to create 50 acres of shallow waterfowl habitat (USDA BLM 1999, **Appendix D**). Several construction designs were employed to create the impoundments (USDA BLM 1990); 15 of the 16 impoundments were originally intended to have a surface area of 3.5 acres and one impoundment (#3) 22 surface acres (Rau 1999).

For this monitoring report, Wetland #9 (W-9) was sampled for the fourth season according to the full sampling protocol on July 26, 2004. Wetland 9 was chosen out of the sixteen constructed open-water impoundments because of its representative wetland qualities. All data sheets for W-9 are included in **Appendix B**.

The remainder of the fifteen sites, impoundments 1-8, and 10-16, are shown on **Figure 1** and on **Figure 4 (Appendix I)**; data sheets are included in **Appendix H**. The wetland area at these sites was approximated and general wetland vegetation boundaries were recorded on aerial photographs during the 2004 site visit.

2.0 METHODS

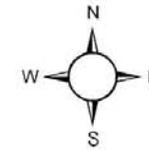
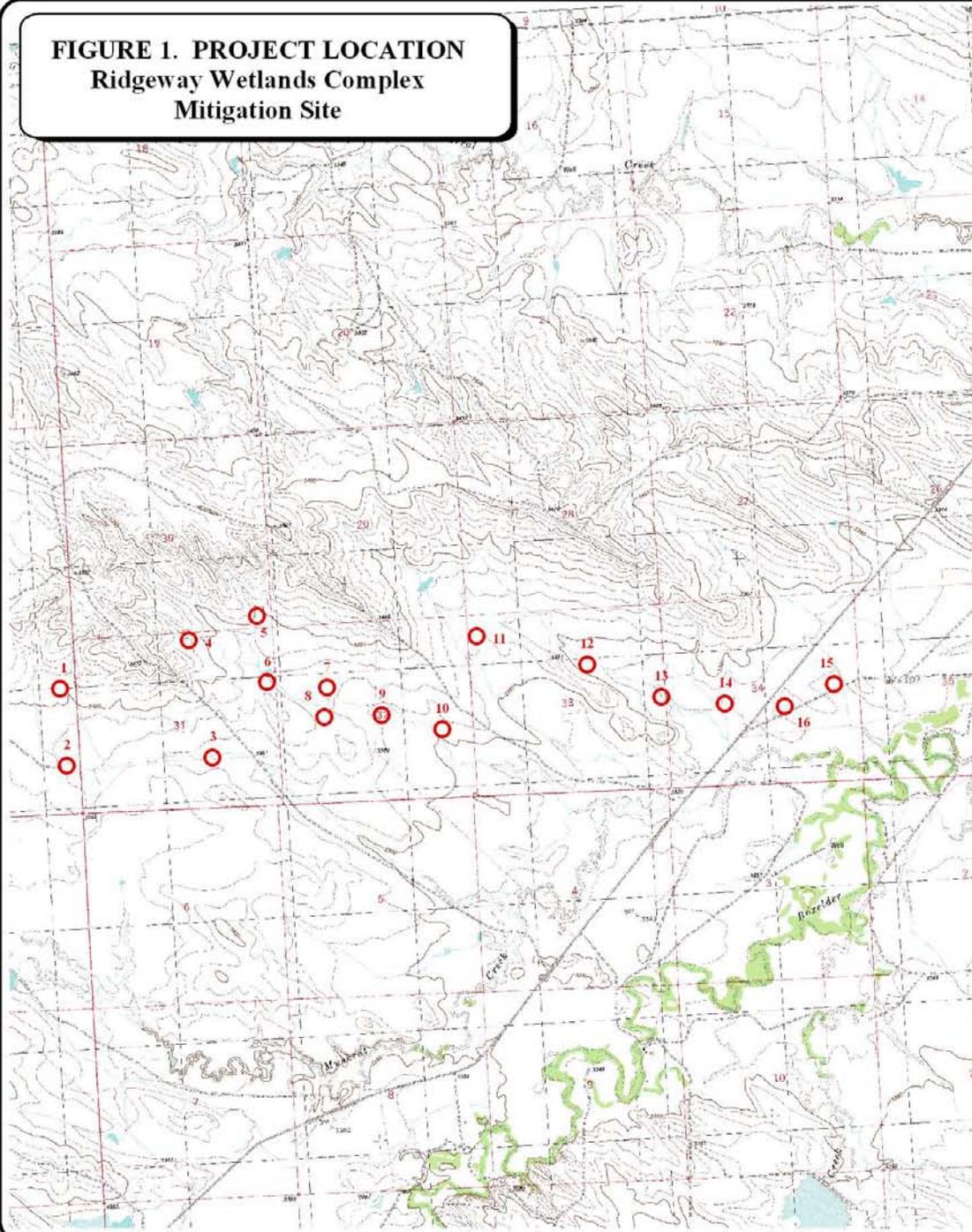
2.1 Monitoring Dates and Activities

All sixteen wetland sites were investigated for wetland development on July 26, 2004. The Wetland Mitigation Site Monitoring Form data (**Appendix B**) were collected for W-9 at this time. Activities and information collected included: wetland delineation; wetland/open water boundary mapping; vegetation community mapping; vegetation transect data; soils data; hydrology data; bird and general wildlife use; photograph points; GPS data points; functional assessment; and, maintenance needs of inflow and outflow structures.

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 were recorded on the Routine Wetland Delineation Data Form (**Appendix B**). Any additional hydrologic data were recorded on the mitigation site monitoring form (**Appendix B**). The boundary between emergent

FIGURE 1. PROJECT LOCATION
Ridgeway Wetlands Complex
Mitigation Site



1: 55,000

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



1120 CEDAR PO BOX 8254 MISSOULA, MT 59807

vegetation and open water for W-9 was mapped on the aerial photograph (**Figure 3, Appendix A**). There are no groundwater monitoring wells at the site. Precipitation data for the year 2004 were compared to the 1952-2004 average (WRCC 2005).

2.3 Vegetation

General vegetation types for W-9 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 transect was lengthened in 2002 because of the dewatering that had occurred in the wetland which resulted in both ends of the transect being outside of actively growing wetland vegetation. 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 were taken from both ends of the transect during the site visit (**Appendix C**).

The presence of emergent vegetation was noted on the aerial photographs for wetlands 1-8 and 10-16; photo and sample point locations are depicted on **Figure 2** and a **Figure 3** was compiled only for sites that had developed wetlands or had standing water (**Appendix G**). Photos showing representative vegetation were taken of wetlands sites W-1-8, 10-16; photos and a photograph log are included in **Appendix H**.

2.4 Soils

Soils were evaluated during the site visit at W-9 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**). A soil pit was excavated for all other wetland sites; COE data sheets are included in **Appendix H**.

2.5 Wetland Delineation

A wetland delineation for W-9 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. The wetland/upland boundary was estimated for each of the remaining wetland areas and recorded on **Figure 3 (Appendix A)**.

One sample point was established at each of wetlands 1-8 and 10-16 (**Figure 2, Appendix F**). The wetland/upland and open water boundaries were recorded on aerial photographs (**Figure 3, Appendix G**) and the areas calculated. COE data sheets are included in **Appendix H**.

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**); observations of wildlife at all other wetland sites were recorded in the field notebook. 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 E**). A general, qualitative bird list has been compiled using these observations by Land & Water and MDT personnel. 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; sampling protocol and results are included in **Appendix F**. 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. 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 were recorded on the wetland monitoring form. Photographs of W-9 are included in **Appendix C** and photo points are shown on **Figure 2, Appendix A**.

The remaining wetland sites (W-1-8, 10-16) were photographed from two (2) locations during the 2004 season; photograph locations are shown on **Figure 2 (Appendix G)**. The wetland

photos and photo logs are included in **Appendix H**. All photographs were taken using a digital camera.

Aerial photographs of each wetland site flown in 2004 are included in **Appendix I**. A digital orthophoto quad (DOQ) was downloaded from the Natural Resources Information System (NRIS) and each of the wetland locations were applied using a CAD system (**Figure 4, Appendix I**).

2.11 GPS Data

During the 2002 monitoring season, survey points were collected using a resource grade Trimble, Geoexplorer III hand-held GPS unit (**Appendix E**). Points collected included: the vegetation transect beginning and ending locations, survey points at three landmarks recognizable on the air photo for purposes of line fitting to the topography; and the wetland boundary (**Appendix A, Figures 2 and 3**). Changes in the wetland boundary during 2004 were adjusted on the aerial photo by hand. Photo point location data at all other wetland sites were collected using GPS in 2001 and are indicated on **Figure 2, Appendix G**.

2.12 Maintenance Needs

The conditions of the W-9 inlet and dike were examined during the monitoring visit for maintenance needs. The position of all wetland sites relative to drainage direction was examined on the ground and on the aerial photograph (**Figure 4, Appendix I**) for appropriateness and opportunities for improvement.

3.0 RESULTS

3.1 Hydrology

The source of hydrology at W-9 is an intermittent stream. During the July 26, 2004 site visit, 24% of the assessment area was inundated with approximately 0-4 feet of standing water. The emergent wetland area to the southeast of the open water had shallow inundation and was nearly 100% vegetated. The only control structure is the constructed dike; no outflow pipe is installed in the dam.

According to the Western Regional Climate Center (WRCC 2005), the Ridgeway 1S station annual mean (1952 – 2004) precipitation was 13.27 inches; the average precipitation through the month of July was 8.02 inches. For the year 2004, precipitation through July was 4.9 inches or 61% of the mean. Since 1999, precipitation has been below average except for 2003.

3.2 Vegetation

Vegetation species identified on the site are presented in **Table 1** and in the monitoring form (**Appendix B**). Four dominant vegetation communities were mapped for the mitigation area.

(Figure 3, Appendix A). The communities include: Type 1, *Artemesia tridentate/Atriplex argentea*; Type 2, *Typha latifolia*; Type 3, *Eleocharis palustris/Scirpus heterochaetus*; Type 4, *Eleocharis palustris*; Type 5, *Hordeum jubatum*, and Type 6, *Rumex crispus/Hordeum jubatum*. Dominant species within each community are listed on the monitoring form (Appendix B). One new community has developed since 2003, Type 6, within the intermittent streambeds. The community is comprised of sloughgrass (*Beckmannia syzigachne*) and alkali cordgrass (*Spartina gracilis*) along with foxtail (*Hordeum jubatum*) and curly dock (*Rumex crispus*). Approximately 76% of the site has developed wetland vegetation and there are five (5) wetland communities. Coverage of *Spartina gracilis* and *Beckmania syzigachne* has increased and created a mosaic of vegetation height, wildlife habitat and food sources.

The vegetation transect results are detailed in the monitoring form (Appendix B) and are summarized below in Table 2, the Figure 3, and Chart 1. The transect was lengthened in 2002 from 60 to 150 feet. The percent cover by hydrophytic species has not increased along the transect, however the number of wetland species has increased.

Table 1: 2001-2004 Ridgeway wetland vegetation species list.

Scientific Name ¹	Region 4 (North Plains) Wetland Indicator status ²
<i>Agropyron smithii</i>	FACU
<i>Alisma plantago-aquatica</i>	OBL
<i>Alopecurus pratensis</i>	FACW
<i>Alopecurus aequalis</i>	OBL
<i>Artemesia tridentate</i>	- (UPL)
<i>Atriplex argentea</i>	FACU
<i>Beckmannia syzigachne</i>	OBL
<i>Bouteloua gracilis</i>	- (UPL)
<i>Eleocharis acicularis</i>	OBL
<i>Eleocharis palustris</i>	OBL
<i>Festuca idahoensis</i>	- (UPL)
<i>Grindelia gracifolia</i>	- (UPL)
<i>Hordeum jubatum</i>	FACW
<i>Juncus sp.</i>	FACW-OBL
<i>Rumex crispus</i>	FACW
<i>Sagittaria cuneata</i>	OBL
<i>Scirpus heterochaetus</i>	OBL
<i>Spartina gracilis</i>	FACW
<i>Typha latifolia</i>	OBL
<i>Veronica peregrina</i>	OBL

¹ **Bolded** species indicate those documented within the analysis area for the first time in 2004.

² Species either not included or classified as “non-indicator” in the National List of Plant Species that Occur in Wetlands: North Plains (Region 4); status in parentheses are probable and based on biologist's experience.

Table 2: 2001-2004 transect data summary.

Monitoring Year	2001	2002	2003	2004
Transect Length (feet)	60	150	150	150
# Vegetation Community Transitions along Transect	2	5	5	5
# Vegetation Communities along Transect	2	4	4	4
# Hydrophytic Vegetation Communities along Transect	1	3	3	3
Total Vegetative Species	7	12	9	11
Total Hydrophytic Species	4	6	5	7
Total Upland Species	3	3	4	4
Estimated % Total Vegetative Cover	53	66	78	89
% Transect Length Comprised of Hydrophytic Vegetation Communities	33	82	82	82
% Transect Length Comprised of Upland Vegetation Communities	67	18	18	18
% Transect Length Comprised of Unvegetated Open Water	0	0	0	0
% Transect Length Comprised of Bare Substrate	0	0	0	0

Chart 1: Length of vegetation communities along Transect 1.

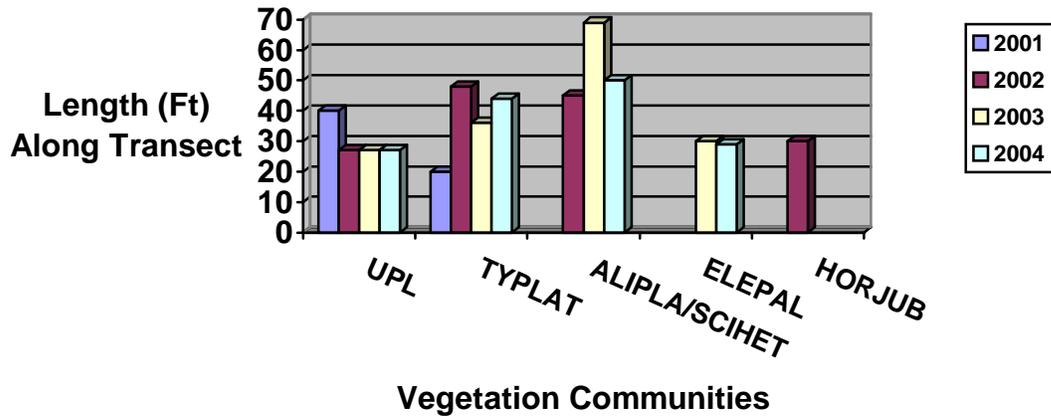
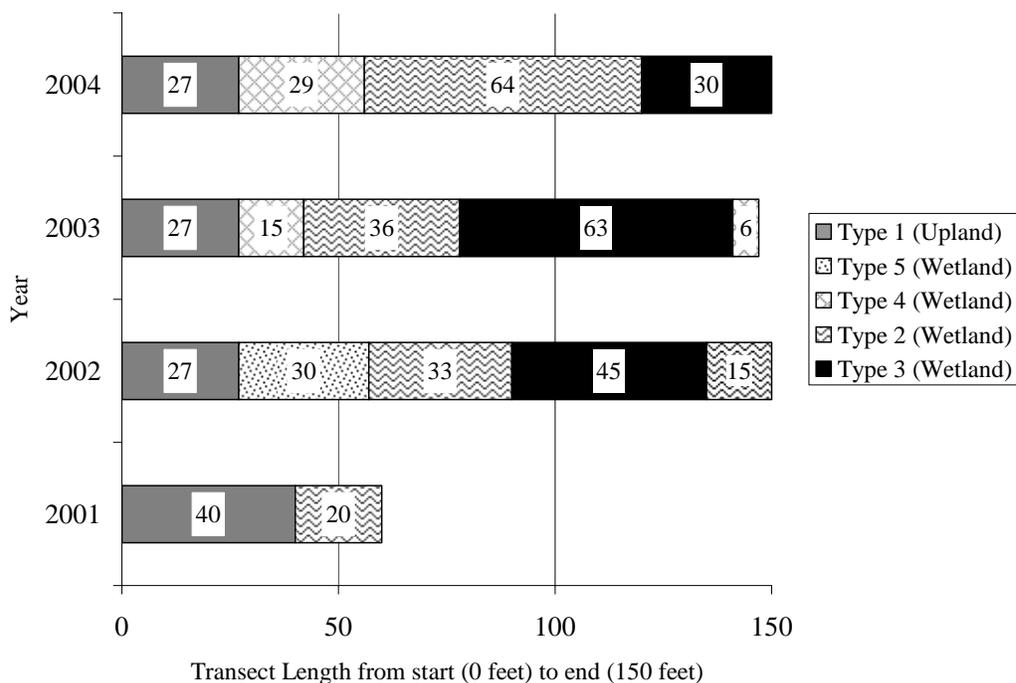


Chart 2: Transect maps showing vegetation types from the start (0 feet) to the end of transect (60 feet in 2001 and 150 feet in 2002-2004). The transect was lengthened after 2001. Vegetation species within community types are not static across years.



3.3 Soils

The site was mapped as part of the Carter County Soil Survey (NRCS 2003). 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). At SP-1 the soil was a silty clay dark gray (2.5Y 4/1) with dark yellowish brown (10YR 4/6) mottles at a depth of 10 inches. Saturation was noted at a depth of 5 inches. Soil at SP-2 at a depth of 10 inches was a dark grayish brown (2Y 4/2) silty clay. No saturation was noted.

Soil data for each sample point within the 15 other sites are included on the COE data sheets (**Appendix H**).

3.4 Wetland Delineation

The delineated wetland boundary at Wetland 9 is depicted on **Figure 3, Appendix A**. The 2004 wetland boundary encompassed 4.0 acres of gross wetland area including 0.94 acre of open-water habitat. The net wetland area was 3.06 acres; an increase of 0.53 acre (21%). The W-9 COE data forms are included in **Appendix B**.

In 2003, seven of the constructed pond sites had not developed into wetlands. In 2004, the number of undeveloped sites decreased to four: W-1, W-11, W-14, and W-15 (**Table 3**). A lack

Table 3: 2004 wetland determination results for all Ridgeway wetland sites.

SITE	WETLAND DETERMINATION ¹			ACREAGE			COMMENTS
	Vegetation	Hydrology	Soils	Open Water ²	Net Wetland	Gross Wetland Area ³	
W-1		X	X	0.53	0	0	Wetland vegetation <10% cover in horseshoe area and none in borrow area, does not qualify as a wetland community.
W-2	X	X	X	3.32	2.66	5.98	Wetland vegetation 100% of perimeter and increased ~245% since 2003.
W-3	X	X	X	1.44	1.72	3.16	Wetland vegetation increased 46% since 2003.
W-4	X	X	X	0.43	0.31	0.74	Wetland vegetation increased 83% since 2003.
W-5	X	X	X	0.94	0.69	1.63	Wetland vegetation increased 109% since 2003.
W-6	X	X	X	3.08	2.99	6.07	Wetland vegetation increased 2% since 2003, may be stabilizing. There is potential for WL veg to expand up drainage and into the open water area.
W-7	X	X	X	0	0.44	0.44	HORJUB covers ~30% of entire basin; early stages of development.
W-8	X	X	X	0	0.21	0.21	OBL hydrophytic vegetation developing.
W-9	X	X	X	0.94	3.06	4.0	Wetland comprised of >76% WL vegetation; borrow pit perimeter >50% vegetated. Wetland acreage increased 21% since 2003.
W-10	X	X	X	0.37	0.16	0.53	Wetland in initial stages of development.
W-11		X		0	0	0	Soil not saturated; no WL vegetation or hydric soil; hydrology indicator weak (water marks).
W-12	X	X	X	0.36	1.46	1.82	Improvement since 2003. Gross wetland area >50% vegetated with hydrophytic species; 90% of the gross WL boundary inundated which includes 0.36 acre of open water (no vegetation in that zone).
W-13	X	X	X	0.98	1.74	2.72	Wetland improving; ~65% vegetated and water covers nearly 100% of the site. [Note: 2003 report overestimated gross WL area by about 1.25 acres due to inaccurate photo interpretation, Table 4 adjusted.]
W-14		X		0.03	0	0	Very small puddles in base of pit; soil saturated and no wetland vegetation. This area continues to not show any signs of wetland development.
W-15		X		0	0	0	No surface water in borrow pit dry but soil saturated; no WL wetland vegetation or hydric soils.
W-16		X		0.77	0	0.77	Surface water present in pit; no WL vegetation.
TOTAL				13.19	15.44	28.07	

¹ X: Indicates "Yes".

² Open water 0-8 feet deep, varies depending on siltation rate.

³ Includes open water and emergent wetland areas.

of one or more of the three wetland parameters was observed at each of these sites: W-1 had no hydrophytic vegetation but was 50% inundated; W-11 and W-15 had no wetland vegetation, a lack of hydric soils and no open water or other hydrologic parameters; W-14 had no wetland vegetation or soils and a very small inundation area (puddle) was noted. The lack or near-lack of surface water at sites 11, 14, and 15 may in part be a result of the drought, but may also be the result of the construction methods and/or borrow pit and berm locations.

The total acreage of open water and wetland habitat was estimated at 28.7 acres, approximately 57% of the 50-acre goal. Total wetland acreage increased 1.72 acres since 2003 (**Table 3** and **4**; see **Table 3** comment regarding W-13). Net emergent wetland area increased from 8.72 acres in 2003 to 15.44 acres in 2004.

Table 4: 2003-2004 summary of wetland features for all Ridgeway wetland sites.

YEAR	WETLAND FEATURE (ACRES)		
	Open Water	Net Wetland	Gross Wetland Area
2003	17.63	8.72	26.35
2004	13.19	15.44	28.07

3.5 Wildlife

Wildlife species are listed in **Table 5**. Activities and densities associated with these observations are included on the monitoring form in **Appendix B**. Two new species were observed within the wetlands during the 2004 monitoring event: red fox and mule deer.

Table 5: 2001-2004 wildlife species observed on the Ridgeway Complex Mitigation Site.

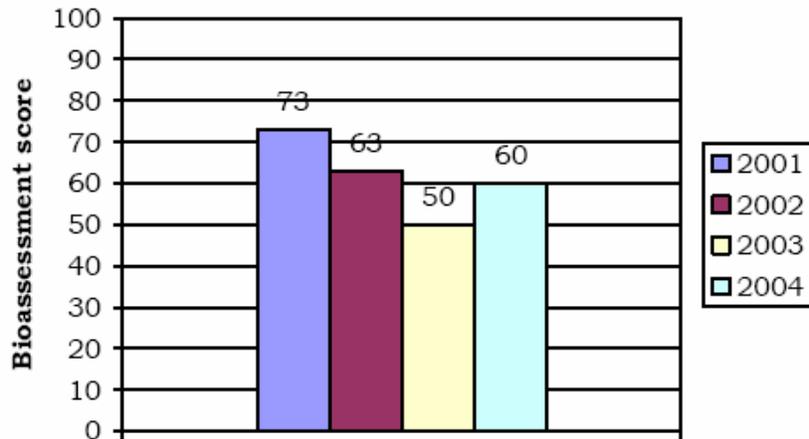
AMPHIBIANS and REPTILES	
northern leopard frog (<i>Rana pipiens</i>)	
plains garter snake (<i>Thamnophis radix</i>)	
BIRDS	
American Avocet (<i>Recurvirostra americana</i>)	Gray Partridge (<i>Perdix perdix</i>)
American Robin (<i>Turdus migratorius</i>)	Killdeer (<i>Charadrius vociferous</i>)
American Wigeon (<i>Anas americana</i>)	Mallard (<i>Anas platyrhynchos</i>)
Barn Swallow (<i>Hirundo pyrrhonota</i>)	Meadowlark (<i>Sturnella neglecta</i>)
Blue-winged Teal (<i>Anas discors</i>)	Mourning Dove (<i>Zenaidura macroura</i>)
Bobolink (<i>Dolichonyx oryzivorus</i>)	Red-winged Blackbird (<i>Agelaius phoeniceus</i>)
Canada Goose (<i>Branta canadensis</i>)	Short-eared Owl (<i>Asio flammeus</i>)
Cinnamon Teal (<i>Anas cyanoptera</i>)	Spotted sandpiper (<i>Actitis macularia</i>)
Ferruginous Hawk (<i>Buteo regalis</i>)	Upland Sanpiper (<i>Bartramia longicauda</i>)
Gadwall (<i>Anas strepera</i>)	Vesper Sparrow (<i>Pooecetes gramineus</i>)
Grasshopper Sparrow (<i>Ammodramus savannarum</i>)	Willet (<i>Catoptrophorus semipalmatus</i>)
Great Blue Heron (<i>Ardea herodias</i>)	Wilson's Phalarope (<i>Phalaropus tricolor</i>)
Greater Yellow Legs (<i>Tringa melanoleuca</i>)	Willet (<i>Catoptrophorus semipalmatus</i>)
Horned Lark (<i>Eremophila alpestris</i>)	Yellow-headed Blackbird (<i>Xanthocephalus xanthocephalus</i>)
MAMMALS	
Mule Deer (<i>Odocoileus hemionus</i>)	
Red Fox (<i>Vulpes fulva</i>)	
White-tailed deer (<i>Odocoileus virginianus</i>)	

¹ **Bolded** species were observed for the first time in 2004.

3.6 Macroinvertebrates

The 2004 sample produced many more organisms than the 2003 sample, suggesting improved habitat quality or better sampling technique (Bollman 2004, Appendix F). The mayflies present in the 2002 sample did not reappear in the 2003 sample, but were again present in 2004. The biotic index value in 2004 was similar to that of 2002, suggesting stable water quality conditions. Overall, sub-optimal conditions were indicated by metric scores calculated for the 2004 data, an improvement over poor conditions indicated by 2003 scores.

Chart 3: Bioassessment scores from 2001-2004.



3.7 Functional Assessment

A completed functional assessment form for W-9 is included in Appendix B and summarized below in Table 6. Several parameter scores were increased as a result of observations made over the last four years, namely the lack of disturbance within the wetland, perennial presence of surface water, and increase in wildlife usage. The percent possible score has increased 9 percentage points to 75%, very close to a Category I wetland. Functional units have increased 9 points since 2002.

3.8 Photographs

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

3.9 Maintenance Needs/Recommendations

No maintenance needs were observed for W-9. Three of the wetland sites had no open water at the time of the investigation: W-11, 14, and 15. This lack of surface water may in part be a result of the drought, but may also be the result of the construction methods and/or borrow pit and berm locations. A widening of the borrow pit area to enable a higher probability of runoff capture may be beneficial.

Table 6: Summary of 2001-2004 wetland function/value ratings and functional points at the Ridgeway W-9 mitigation site.

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2001	2002	2003	2004
Listed/Proposed T&E Species Habitat	Low (0)	Low (0)	Low (0)	Low (0)
MNHP Species Habitat	High (1.0)	High (1.0)	High (1.0)	High (0.8)
General Wildlife Habitat	High (0.9)	Mod (0.5)	Mod (0.5)	High (.9)
General Fish/Aquatic Habitat	Mod (0.6)	NA	NA	NA
Flood Attenuation	Mod (0.5)	Mod (0.5)	Mod (0.5)	Mod (0.5)
Short and Long Term Surface Water Storage	High (1.0)	High (0.9)	High (.9)	High (0.9)
Sediment, Nutrient, Toxicant Removal	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	Mod (0.7)	High (0.9)	High (.9)	High (1.0)
Production Export/Food Chain Support	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Mod (0.4)	Low (0.3)	Low (0.3)	Low (0.4)
Recreation/Education Potential	Low (0.1)	Low (0.1)	Low (0.5)	High (1.0)
Actual Points/ Possible Points	7.9/12	6.9/11	7.3/11	8.2/11
% of Possible Score Achieved	66%	62%	66%	75%
Overall Category	II	II	II	II
Total Acreage of Assessed Wetlands within Easement	4.34¹	3.45	3.41	4.00
Functional Units (acreage x actual points)	34.33	23.80	25.88	32.80
Net Acreage Gain	4.34	3.45	3.41	4.00
Net Functional Unit Gain	34.33	23.81	25.88	32.80
Total Functional Unit "Gain"	34.33	23.81	25.88	32.80

¹ Overestimated acreage.

3.10 Current Credit Summary

The delineated wetland boundary at Wetland 9 is depicted on **Figure 3, Appendix A**. The 2004 wetland boundary encompassed 4.0 acres of gross wetland area including 0.94 acre of open-water habitat. The net emergent wetland area of W-9 was 3.06 acres, a 21% increase in cover since 2003. Though no new wetland vegetation species were observed, the communities continue to diversify and are expanding to the west up the drainage. The hydrophytic vegetation adjacent to the borrow area has expanded to >50% of the perimeter. Functional units increased from 25.88 units in 2003 to 32.8 units in 2004. The COE and functional assessment forms are included in **Appendix B**.

The 2004 complex-wide gross wetland area was estimated at 28.7 acres, approximately 57% of the 50-acre goal. Total wetland acreage increased 1.72 acres since 2003 (see **Table 3** comment regarding W-13 and **Table 4**). However, net emergent wetland area increased from 8.72 acres in 2003 to 15.44 acres in 2004.

In 2003, seven of the constructed pond sites had not developed into wetlands. In 2004, the number of undeveloped sites decreased to four: W-1, W-11, W-14, and W-15. A lack of one or more of the three wetland parameters was observed at each of these sites. The lack or near-lack of surface water at sites 11, 14, and 15 may in part be a result of the drought, but may also be the

result of the construction methods and/or borrow pit and berm locations. A widening of the borrow pit area to enable a higher probability of runoff capture may be beneficial at these sites. Normal precipitation would also benefit all sites.

4.0 REFERENCES

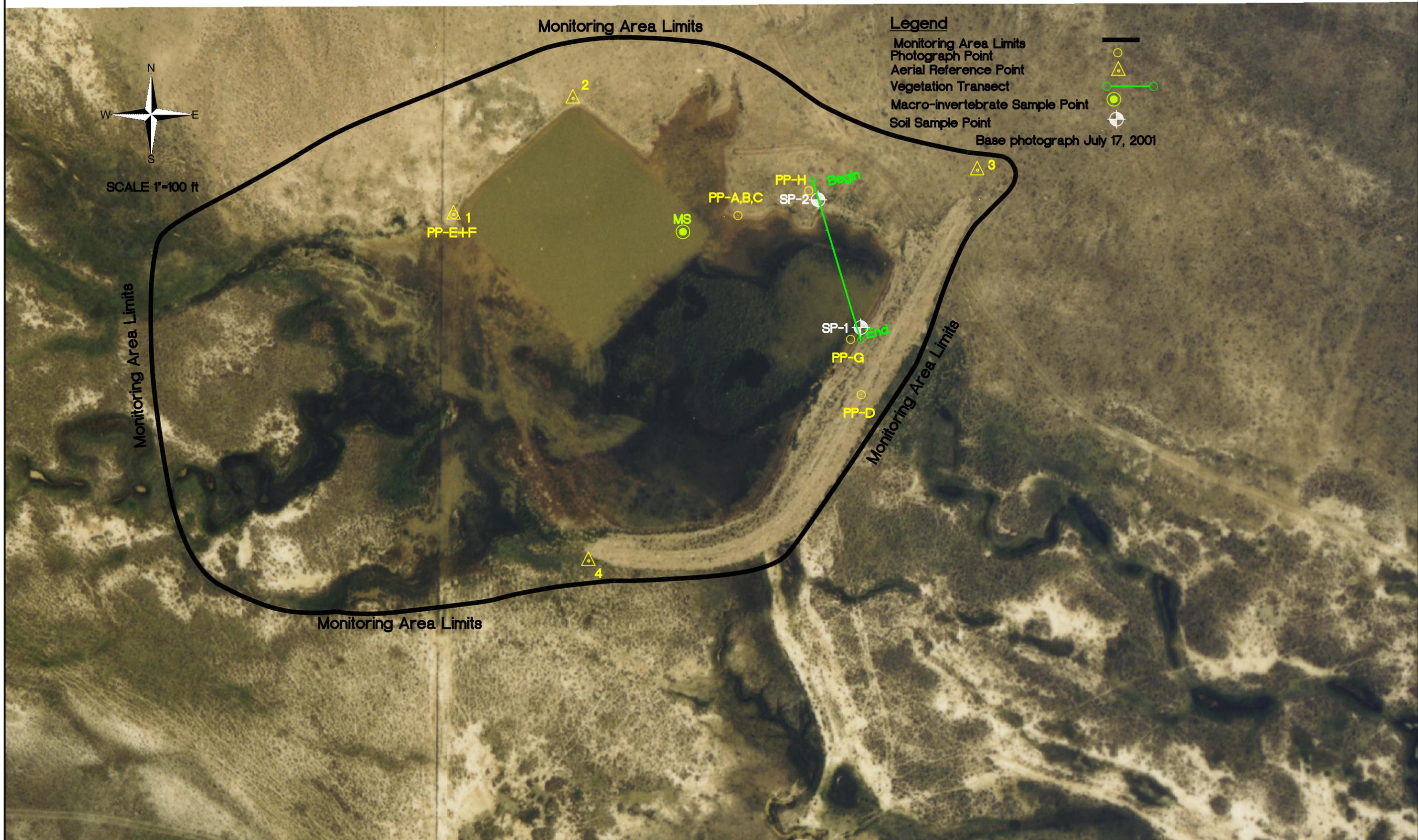
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Appendix A

WETLAND – 9: 2004 FIGURES 2 AND 3

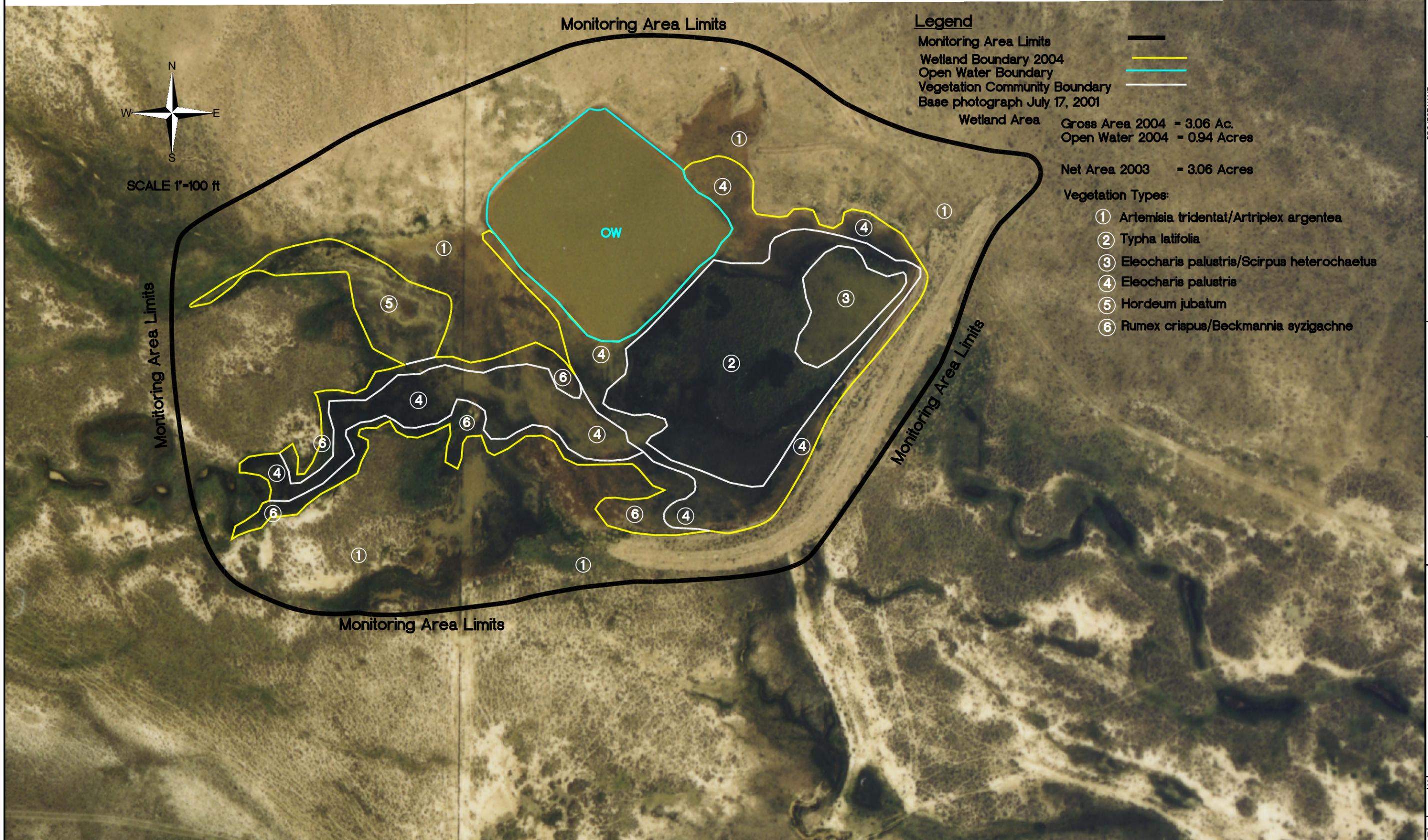
*MDT Wetland Mitigation Monitoring
Ridgeway Wetland 9 (W-9)
Ekalaka, Montana*

Figure 2 Monitoring Activity Locations 2004



PROJECT NAME		MDT Ridgeway Complex W-9 Wetland Mitigation	
DRAWING TITLE		Monitoring Activity Locations 2004	
PROJ NO:	330054.412 W9	DRAWN:	RA
FILE NAME:	W09BASE.dwg	CHECKED:	
SCALE:	1"= 100ft	APPVD:	BD
LOCATION:	Ridgeway Complex	PROJ MGR:	BD
SHEET NUMBER			
2 OF			
REV 02			
DATE: 06/27/05			

Figure 3 Mapped Site Features 2004



Legend

- Monitoring Area Limits
- Wetland Boundary 2004
- Open Water Boundary
- Vegetation Community Boundary
- Base photograph July 17, 2001



Wetland Area

Gross Area 2004 = 3.06 Ac.
 Open Water 2004 = 0.94 Acres
 Net Area 2003 = 3.06 Acres

Vegetation Types:

- ① Artemisia tridentat/Artriplex argentea
- ② Typha latifolia
- ③ Eleocharis palustris/Scirpus heterochaetus
- ④ Eleocharis palustris
- ⑤ Hordeum jubatum
- ⑥ Rumex crispus/Beckmannia syzigachne

PROJECT NAME		MDT Ridgeway Complex W-9 Wetland Mitigation	
DRAWING TITLE		Mapped Site Features 2004	
PROJ NO: 330054.412	DRAWN: RA	CHECKED: LB	APPROV: JB
FILE NAME: W09BASE.dwg	SCALE: 1"= 100ft	LOCATION: Ridgeway Complex	PROJ MGR: JB
SHEET NUMBER		3 OF	
REV 02		DATE: 06/27/05	

Appendix B

WETLAND - 9:

2004 WETLAND MITIGATION SITE MONITORING FORM

2004 BIRD SURVEY FORMS

2004 WETLAND DELINEATION FORMS

2004 FUNCTIONAL ASSESSMENT FORMS

MDT Wetland Mitigation Monitoring

Ridgeway Wetland (W-9)

Ekalaka, Montana

LWC / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: Ridgeway #9 Project Number: B43054-0412 Assessment Date: 7/26/04
 Location: Ridgeway, MT MDT District: #5 Milepost: NA
 Legal description: T_4S/4S_ R_58E/57E_ Section_31-35/36_ Time of Day: 6AM-8PM
 Weather Conditions: overcast, windy Person(s) conducting the assessment: LB/LWC
 Initial Evaluation Date: 23Aug2001 Visit #: 4 Monitoring Year: 2004
 Size of evaluation area: 5 AC Land use surrounding wetland : grazing rangeland

HYDROLOGY

Surface Water Source: intermittent drainage
 Inundation: Present Absent Average depths: 4 ft Range of depths: 0 - 4 ft
 Assessment area under inundation: 24 %
 Depth at emergent vegetation-open water boundary: 1 ft to 0"
 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.): water lines, drainage pattern

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.)
- NA GPS survey groundwater monitoring wells locations if present

COMMENTS/PROBLEMS: _____

VEGETATION COMMUNITIES

Community No.: 1 Community Title (main species): Artemesia tridentata /Atriplex argentea

Dominant Species	% Cover	Dominant Species	% Cover
<i>Atriplex argentea</i>	20	<i>Agropyron smithii</i>	20
<i>Festuca idahoensis</i>	15		
<i>Bouteloua gracilis</i>	5		
<i>Grindelia graciflora</i>	10		
<i>Artemesia tridentata</i>	30		

COMMENTS/PROBLEMS: _____

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

Dominant Species	% Cover	Dominant Species	% Cover
<i>Rumex crispus</i>	5		
<i>Typha latifolia</i>	75		
<i>Eleocharis palustris</i>	10		
<i>Scirpus heterochaetus</i>	5		
<i>Alisma plantago-aquatica</i>	5		

COMMENTS/PROBLEMS: communities continue to shift in composition since 2002

Community No.: 3 Community Title (main species): Alisma plantago-aquatica / Scirpus heterochaetus

Dominant Species	% Cover	Dominant Species	% Cover
<i>Scirpus heterochaetus</i>	0	<i>Rumex crispus</i>	0
<i>Alisma plantago-aquatica</i>	20	<i>Beckmannia syzigachne</i>	unknown
<i>Sagittaria cuneata</i>	unknown		
<i>Eleocharis palustris</i>	30		
Open water	50		

COMMENTS/PROBLEMS: area inundated w/ ~ 1' water, unable to traverse, BECSYZ may have fallen out of the CT

Additional Activities Checklist:

Record and map vegetative communities on air photo

VEGETATION COMMUNITIES (continued)

Community No.: 4 Community Title (main species): Eleocharis palustris

Dominant Species	% Cover	Dominant Species	% Cover
<i>Rumex crispus</i>	20	<i>Alisma plantago-aquatica</i>	5
<i>Eleocharis palustris</i>	65	<i>Typha latifolia</i>	<1
<i>Spartina gracilis</i>	<5		
<i>Hordeum jubatum</i>	<5		
<i>Alopecurus aequalis</i>	5		

COMMENTS/PROBLEMS:

Community No.: 5 Community Title (main species): Hordeum jubatum

Dominant Species	% Cover	Dominant Species	% Cover
<i>Hordeum jubatum</i>	95		
<i>Agropyron smithii</i>	5		

COMMENTS/PROBLEMS: _____

Community No.: 6 Community Title (main species): Rumex crispus/Hordeum jubatum

Dominant Species	% Cover	Dominant Species	% Cover
<i>Rumex crispus</i>	35		
<i>Hordeum jubatum</i>	35		
<i>Alopecurus pratensis</i>	<1		
<i>Spartina gracilis</i>	15		
<i>Beckmannia syzigachne</i>	15		

COMMENTS/PROBLEMS: _____ interesting community that is colonizing the edge of CT 4. _____

PHOTOGRAPHS

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

Checklist:

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

Location	Photo Frame #	Photograph Description	Compass Reading
A		not taken in 2003	288
B		wetland view, buffer in foreground	268
C		wetland view, buffer in foreground	238
D		(same as G; omitted)	
E		wetland view	80
F		wetland view	116
G		wetland view from WL end of transect	310
H		UPL veg transect end	358

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:

(2001,2002)

- Jurisdictional wetland boundary
- (2) 4-6 landmarks recognizable on the air photo
- Start and end points of vegetation transect(s)
- Photo reference points
- NA Groundwater monitoring well locations

COMMENTS/PROBLEMS: _____

WETLAND DELINEATION

(Attach Corps of Engineers delineation forms)

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

COMMENTS/PROBLEMS: _____

MAINTENANCE

Were man-made nesting structures installed at this site? YES___ NO_X___

If yes, do they need to be repaired? YES___ NO___

If yes, describe problems below and indicate if any actions were taken to remedy the problems.

Were man-made structures build or installed to impound water or control water flow into or out of the wetland?

YES___ NO_X___

If yes, are the structures working properly and in good working order? YES___ NO___

If no, describe the problems below.

COMMENTS/PROBLEMS:

SOILS

Map Unit Name (Series and Phase):		Bickerdyke Clay		Drainage Class:	well
Taxonomy (Subgroup):		Udorthentic Chromusterts		Field Observations	Confirm Mapped Type? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
10	A	2.5Y 4/1	10YR 4/6	Common/distinct	silt clay
Hydric Soil Indicators:					
_____ Histosol		_____ Concretions		_____ High Organic Content in surface Layer in Sandy Soils	
_____ Histic Epipedon		_____ Sulfidic Odor		_____ Organic Streaking in Sandy Soils	
_____ Aquic Moisture Regime		_____ Reducing Conditions		_____ Listed on Local Hydric Soils List	
_____ Gleyed or Low-Chroma Colors		_____ Other (Explain in Remarks)		_____ Listed on National Hydric Soils List	
Low-chroma with mottles.					

WETLAND DETERMINATION

<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:30%;">Hydrophytic Vegetation Present?</td> <td style="width:10%; text-align: center;">X</td> <td style="width:10%; text-align: center;">Yes</td> <td style="width:10%; text-align: center;">_____</td> <td style="width:10%; text-align: center;">No</td> </tr> <tr> <td>Wetland Hydrology Present?</td> <td style="text-align: center;">X</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">No</td> </tr> <tr> <td>Hydric Soils Present?</td> <td style="text-align: center;">X</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">No</td> </tr> <tr> <td> </td> <td style="text-align: center;">_____</td> <td style="text-align: center;"> </td> <td style="text-align: center;">_____</td> <td> </td> </tr> </table>	Hydrophytic Vegetation Present?	X	Yes	_____	No	Wetland Hydrology Present?	X	Yes	_____	No	Hydric Soils Present?	X	Yes	_____	No		_____		_____		<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:70%;">Is this Sampling Point Within a Wetland?</td> <td style="width:10%; text-align: center;">X</td> <td style="width:10%; text-align: center;">Yes</td> <td style="width:10%; text-align: center;">_____</td> <td style="width:10%; text-align: center;">No</td> </tr> <tr> <td> </td> <td style="text-align: center;">_____</td> <td style="text-align: center;"> </td> <td style="text-align: center;">_____</td> <td> </td> </tr> </table>	Is this Sampling Point Within a Wetland?	X	Yes	_____	No		_____		_____	
Hydrophytic Vegetation Present?	X	Yes	_____	No																											
Wetland Hydrology Present?	X	Yes	_____	No																											
Hydric Soils Present?	X	Yes	_____	No																											
	_____		_____																												
Is this Sampling Point Within a Wetland?	X	Yes	_____	No																											
	_____		_____																												
<p>Remarks:</p> <p>Wetland is undated in excavated area and has open water in area in front of dam. New veg spp. Continue to colonize further regions of wetland.</p>																															

Approved by HQUSACE 2/92

SOILS

Map Unit Name (Series and Phase):	Bickerdyke Clay	Drainage Class: <u>well</u>
Taxonomy (Subgroup):	<u>Udorthentic Chromusterts</u>	Field Observations Confirm Mapped Type? <u>X</u> Yes <u> </u> No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
10	A	2.5Y 4/2			silt clay

Hydric Soil Indicators:

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

Hydric soils absent

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes <u>X</u> No Wetland Hydrology Present? <u> </u> Yes <u>X</u> No Hydric Soils Present? <u> </u> Yes <u>X</u> No	Is this Sampling Point Within a Wetland? Yes <u>X</u> No
-------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------

Remarks:

This side of WL remains an abrupt edge around the WL boundary; west side UPL area is converting to WL, particularly adjacent to int. stream fingers.

Approved by HQUSACE 2/92

14A. HABITAT FOR FEDERALLY LISTED OR PROPOSED THREATENED OR ENDANGERED PLANTS AND ANIMALS

i. AA is Documented (D) or Suspected (S) to contain (check box):

- 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** (Based on the strongest habitat chosen in 14A(i) above, find the corresponding rating of High (H), Moderate (M), or Low (L) for this function.

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	---	---	---	---	---	0 (L)

If documented, list the source (e.g., observations, records, etc.): _____

14B. HABITAT FOR PLANTS AND ANIMALS RATED AS S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM.

Do not include species listed in 14A(i).

i. AA is Documented (D) or Suspected (S) to contain (check box):

- Primary or Critical habitat (list species) D S Rana pipiens (2001 observation)
- Secondary habitat (list species) D S _____
- Incidental habitat (list species) D S _____
- No usable habitat D S _____

iii. **Rating** (Based on the strongest habitat chosen in 14B(i) above, find the corresponding rating of High (H), Moderate (M), or Low (L) for this function.

Highest Habitat Level:	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	.8 (H)	---	---	---	---	---

If documented, list the source (e.g., observations, records, etc.): _____

14C. General Wildlife Habitat Rating

i. **Evidence of overall wildlife use in the AA:** (Check either substantial, moderate, or low)

Substantial (based on any of the following)

- 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)

- 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 AA

Moderate (based on any of the following)

- observations of scattered wildlife groups or individuals or relatively few species during peak periods
- common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- adequate adjacent upland food sources
- interviews with local biologists with knowledge of the AA

ii. **Wildlife Habitat Features** (Working from top to bottom, select appropriate AA attributes to determine the 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 in the AA (see #10). Duration of Surface Water: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; A = absent.

Structural Diversity (from #13)	<input type="checkbox"/> High								<input type="checkbox"/> Moderate								<input checked="" type="checkbox"/> Low			
	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input checked="" type="checkbox"/> Even			
Class Cover Distribution (all vegetated classes)																				
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 #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	E	--	--	--
Moderate disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
High disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

iii. **Rating** (Using 14C(i) and 14C(ii) above and the matrix below to arrive at the functional point and rating of exceptional (E), high (H), moderate (M), or low (L) for this function.)

Evidence of Wildlife Use from 14C(i)	Wildlife Habitat Features Rating from 14C(ii)			
	<input checked="" type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Substantial	--	--	--	--
Moderate	.9 (H)	--	--	--
Low	--	--	--	--

Comments: _____

14D. GENERAL FISH/AQUATIC HABITAT RATING NA (proceed to 14E)

If the AA is not or was not historically used by fish due to lack of habitat, excessive gradient, then check the NA box above.

Assess if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [e.g. fish use is precluded by perched culvert or other barrier, etc.]. If fish use occurs in the AA but is not desired from a resource management perspective (e.g. fish use within an irrigation canal), then Habitat Quality [14D(i)] below should be marked as "Low", applied accordingly in 14D(ii) below, and noted in the comments.

i. **Habitat Quality** (Pick the appropriate AA attributes in matrix to pick the exceptional (E), high (H), moderate (M), or low (L) quality rating.)

Duration of Surface Water in AA	<input type="checkbox"/> Permanent/Perennial			<input type="checkbox"/> Seasonal / Intermittent			<input type="checkbox"/> Temporary / Ephemeral		
Cover - % of waterbody in AA containing cover objects (e.g. submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation)	>25%	10-25%	<10%	>25%	10-25%	<10%	>25%	10-25%	<10%
Shading - >75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities	--	--	--	--	--	--	--	--	--
Shading - 50 to 75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--
Shading - < 50% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--

ii. **Modified Habitat Quality:** Is fish use of the AA precluded or significantly reduced by a culvert, dike, other man-made structure or activity or is the waterbody included on the 'MDEQ list of waterbodies in need of TMDL development' with 'Probable Impaired Uses' listed as cold or warm water fishery or aquatic life support?

Y N If yes, reduce the rating from 14D(i) by one level and check the modified habitat quality rating: E H M L

iii. **Rating** (Use the conclusions from 14D(i) and 14D(ii) above and the matrix below to pick the functional point and rating of exceptional (E), high (H), moderate (M), or low (L).)

Types of Fish Known or Suspected Within AA	Modified Habitat Quality from 14D(ii)			
	<input type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Native game fish	--	--	--	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: _____

14E. FLOOD ATTENUATION NA (proceed to 14G)

Applies only to wetlands subject to flooding via in-channel or overbank flow.

If wetlands in AA do not flooded from in-channel or overbank flow, check NA above.

i. **Rating** (Working from top to bottom, mark the appropriate attributes to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.)

Estimated wetland area in AA subject to periodic flooding	<input type="checkbox"/> ≥ 10 acres			<input checked="" type="checkbox"/> <10, >2 acres			<input type="checkbox"/> ≤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	--	--	--	--	--	.5 (M)	--	--	--
AA contains unrestricted outlet	--	--	--	--	--	--	--	--	--

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

Y N Comments: _____

14F. SHORT AND LONG TERM SURFACE WATER STORAGE NA (proceed to 14G)

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, check NA above.

i. **Rating** (Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.)

Abbreviations: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral.

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	<input checked="" type="checkbox"/> >5 acre feet			<input type="checkbox"/> <5, >1 acre feet			<input type="checkbox"/> ≤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	--	.9 (H)	--	--	--	--	--	--	--
Wetlands in AA flood or pond < 5 out of 10 years	--	--	--	--	--	--	--	--	--

Comments: _____

14G. SEDIMENT/NUTRIENT/TOXICANT RETENTION AND REMOVAL NA (proceed to 14H)

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, check NA above.

i. **Rating** (Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.)

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has 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 has 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.			
	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
% cover of wetland vegetation in AA	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Evidence of flooding or ponding in AA	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
AA contains no or restricted outlet	1 (H)	--	--	--	--	--	--	--
AA contains unrestricted outlet	--	--	--	--	--	--	--	--

Comments: _____

14H. SEDIMENT/Shoreline Stabilization NA (proceed to 14I)

Applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body that is subject to wave action. If this does not apply, check NA above.

i. **Rating** (Working from top to bottom, use the matrix below to arrive at the functional point and rating exceptional (E), high (H), moderate (M), or low (L) for this function.

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	Duration of Surface Water Adjacent to Rooted Vegetation		
	<input checked="" type="checkbox"/> Permanent / Perennial	<input type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
≥ 65 %	1 (H)	--	--
35-64 %	--	--	--
< 35 %	--	--	--

Comments:

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

i. **Rating** (Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function. A = acreage of vegetated component in the AA. B = structural diversity rating from #13. C = Yes (Y) or No (N) as to whether or not the AA contains a surface or subsurface outlet; P/P = permanent/perennial; S/I = seasonal/intermittent; T/E/A = temporary/ephemeral/absent.

A	<input type="checkbox"/> Vegetated component >5 acres						<input checked="" type="checkbox"/> Vegetated component 1-5 acres						<input type="checkbox"/> Vegetated component <1 acre						
B	<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input checked="" type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		
C	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	
P/P	--	--	--	--	--	--	--	--	--	--	--	.7M	--	--	--	--	--	--	--
S/I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments:

14J. GROUNDWATER DISCHARGE/RECHARGE (D/R) (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 slopes.
- 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 presents without underlying impeding layer.
- Wetland contains inlet but not outlet.
- Other

iii. **Rating:** Use the information from 14J(i) and 14J(ii) above and the table below to arrive at the functional point and rating of high (H) or low (L) for this function.

Criteria	Functional Point and Rating
AA has known Discharge/Recharge area or one or more indicators of D/R present	1 (H)
No Discharge/Recharge indicators present	--
Available Discharge/Recharge information inadequate to rate AA D/R potential	--

Comments:

14K. UNIQUENESS

i. **Rating** (Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) 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 MTNHP.			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MTNHP.			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate.		
	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input checked="" type="checkbox"/> common	<input type="checkbox"/> abundant
Estimated Relative Abundance from #11	--	--	--	--	--	--	--	.4M	--
Low disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--
High disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--

Comments:

14L. RECREATION / EDUCATION POTENTIAL

i. Is the AA a known recreational or educational site? Yes (Rate High (1.0), then proceed to 14L(ii) only] No [Proceed to 14L(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 a strong potential for recreational or educational use?

- Yes [Proceed to 14L (ii) and then 14L(iv).]
- No [Rate as low in 14L(iv)]

iv. **Rating** (Use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Ownership	Disturbance at AA from #12(i)	
	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> High
Public ownership	1 (H)	--
Private ownership	--	--

Comments: hunting opportunities, general avian and ungulate observatoins

FUNCTION, VALUE SUMMARY, AND OVERALL RATING

Function and Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	L	0.00	1	
B. MT Natural Heritage Program Species Habitat	H	0.80	1	
C. General Wildlife Habitat	H	0.90	1	
D. General Fish/Aquatic Habitat	NA		--	
E. Flood Attenuation	M	0.50	1	
F. Short and Long Term Surface Water Storage	H	0.90	1	
G. Sediment/Nutrient/Toxicant Removal	H	1.00	1	
H. Sediment/Shoreline Stabilization	H	1.00	1	
I. Production Export/Food Chain Support	M	0.70	1	
J. Groundwater Discharge/Recharge	H	1.00	1	
K. Uniqueness	L	0.40	1	
L. Recreation/Education Potential	H	1.00	1	
Totals:		8.20	11.00	33
Percent of Total Possible Points:			75% (Actual / Possible) x 100 [rd to nearest whole #]	

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

OVERALL ANALYSIS AREA (AA) RATING: (Check appropriate category based on the criteria outlined above.)

I

 II

 III

 IV

Appendix C

2004 WETLAND - 9: REPRESENTATIVE PHOTOGRAPHS

*MDT Wetland Mitigation Monitoring
Ridgeway Wetland
Ekalaka, Montana*

2004 RIDGEWAY COMPLEX – WETLAND 9



Location: B **Description:** Wetland view, buffer in foreground. **Compass Reading:** 268°



Location: C **Description:** Wetland view, buffer in foreground. **Compass Reading:** 238°



Location: E **Description:** Wetland view. **Compass Reading:** 80°



Location: F **Description:** Wetland view. **Compass Reading:** 116°



Location: G **Description:** Wetland view from WL end of transect (same as D). **Compass Reading:** 170°



Location: H **Description:** UPL veg transect end. **Compass Reading:** 358°

Appendix D

1999 RIDGEWAY COMPLEX ENVIRONMENTAL ASSESSMENT 1990 BLM TYPICAL WATER RETENTION PIT PLANS IMPOUNDMENT SIZES: L. RAU, BLM (1999)

*MDT Wetland Mitigation Monitoring
Ridgeway Wetland
Ekalaka, Montana*

RIDGEWAY WETLAND COMPLEX ENVIRONMENTAL ASSESSMENT

EA NUMBER MT-020-9-87

RIPS # 9777

GR#

PROPOSED ACTION/TITLE TYPE: Ridgeway Wetland Complex/Wildlife Project

LOCATION OF PROPOSED ACTION: T.4S., R.58E., Section 28-35

PREPARING OFFICE: Miles City Field Office, Miles City, MT

APPLICANT: L. Tauk, Richards, Steig

DATE OF PREPARATION: 2/24/99

CONFORMANCE WITH APPLICABLE LAND USE PLAN:

This proposed action is subject to the Powder River Resource Area R approved in 1985. The proposed action has been reviewed for conformance with this plan and its terms and conditions as required 43 CFR 1610.6.

PURPOSE AND NEED: A complex of small to medium-sized water impoundments will be constructed to enhance waterfowl habitat. This approach is to create many shallow wetlands in a relatively small a (5 sections) to maximize that habitats' potential to produce waterf and other wetland species.

PROPOSED ACTION: BLM proposes construction of a complex of wetlands (20-25 ponds) on a 5 section parcel of public lands. Objective will be to maximize the surface acres of each individual project to create shallow water waterfowl habitat. There will be about 5 different construction designs based on individual site characteristics. Existing dams will be repaired and modified, spreader dikes will be modified with pits dug in front of structure, and 2-3 different pit and fill structures will be designed to meet site characteristics.

ALTERNATIVE CONSIDERED BUT NOT ANALYZED IN DETAIL: No Action - the project would not be completed as planned. This is not within present BLM management consideration for the area and will not be considered further.

AFFECTED ENVIRONMENT:

Vegetation: Vegetation consists of Wyoming sagebrush, western wheatgrass and low sagebrush.

Soils: Soils in this area have developed in residuum and alluvium derived from the Cretaceous Pierre Shale. As a result, surface and

subsurface textures are commonly clay, silty clay loam, and clay loam. Slopes range up to 25 percent, but commonly average around 8 percent. Near drainages, slopes may be less than two percent. Upland soils are commonly shallow on summits and soil depths increase down slope to deep and very deep on the alluvial fans and flats.

The characteristics of the marine shale parent material dominates physical and chemical characteristics of the soils. Soluble salts, predominately sodium, are present in most soils of the area. Slope wash concentrates these salts in the lowest parts of the landscape, usually in or near drainages. Concentration of salts may result in a claypan area. Salts will effect vegetation population and composition.

Hydrology: Water in this area is affected by the physical and chemical characteristics of the Pierre Shale. This is commonly expressed in salt context and suspended solids. The shale is often unstable and subject to mass movement, exposing unprotected material, ultimately affecting water quality.

Recreation Opportunities: Most recreation opportunity is during hunting season and focuses on antelope and some deer hunting.

Wildlife Habitat: The most common big game species in the area is antelope. Mule deer and sage grouse use the area infrequently. Non-game species that frequent the Wyoming sagebrush, western wheatgrass, and low sagebrush habitats are well represented resulting from good rangeland conditions.

Riparian: There are no riparian values on the project area at this time.

ENVIRONMENTAL IMPACTS:

There would be no impacts to the following elements of the human environment: air quality; ACECs; cultural resources; farmlands, prime/unique; floodplains; Native American concerns; environmental justice; T&E species; wastes, hazardous/solid; water quality; wetlands/riparian; wild & scenic rivers; wilderness.

DESCRIPTION OF IMPACTS FROM PROPOSED ACTION:

Vegetation: Some native vegetation will be destroyed in the excavation process. All native vegetation impacted by flooding will be killed. Dryland habitats will transition into wetland, sub-irrigated type vegetation as the reservoirs reach equilibrium.

Cultural Resources: Survey is required.

Soils: Heavier textured soils in this area are highly susceptible to water erosion. Water flowing over the surface may form rills and gullies. When vegetation is removed, water erosion may result.

Hydrology: Until vegetation is re-established, water quality may be damaged. Suspended solids may increase as well as dissolved solids and salts of many forms. Ultimately as vegetation re-establishes, water quality will return to a natural state.

Recreational Opportunities/VRM: Hunting season recreational opportunities will be enhanced as waterfowl begin using the area. Wildlife viewing opportunity will be improved with the addition of many wetland obligate species and endemic species that will come to water.

Wildlife Species: Non-game wildlife that have very small home ranges and limited movement potential will be impacted by habitat flooding. With the creation of wetland habitats, the associated wetland wildlife species will benefit from the project. Avian and terrestrial predators will benefit from enhanced prey base.

Riparian Values: Riparian/wetland values will be greatly enhanced. Shorelines will rapidly develop into stands of sedge, rush, cattail/bubrush and wet-meadow grasses and forbs.

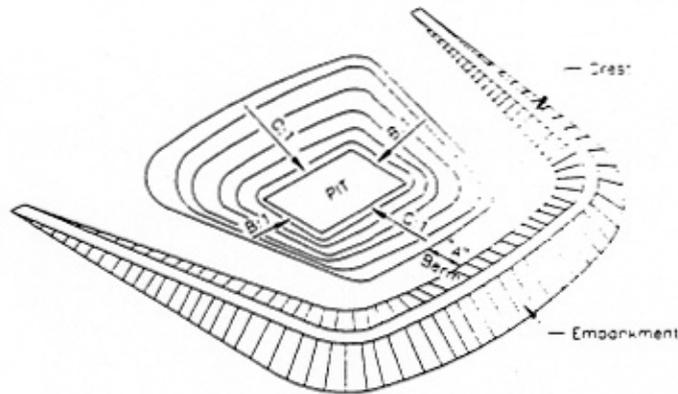
Land Uses: There are several Rights-of-Way in Section 34, some which are buried. If any digging takes place in this section, must coordinate with rights-of-way holders.

STIPULATIONS:

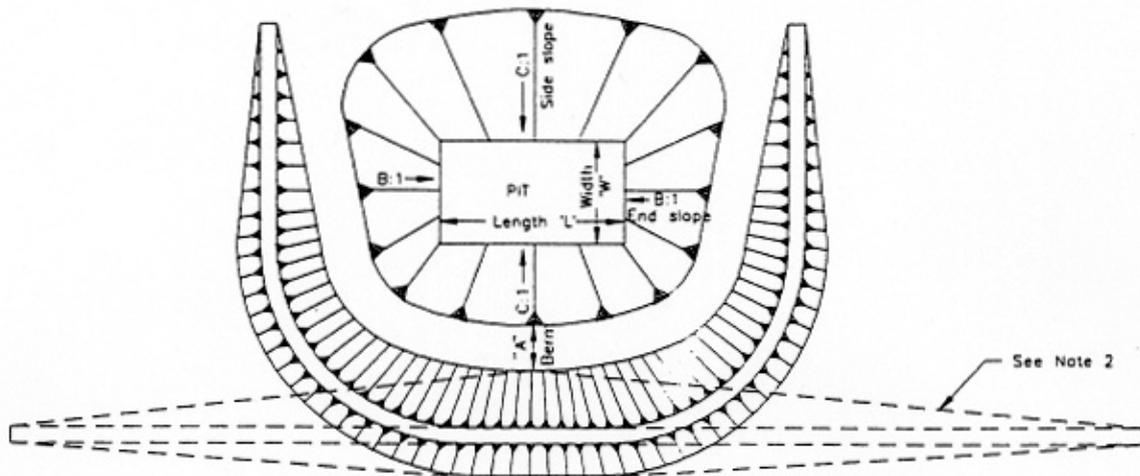
The contractor shall immediately bring to the attention of the BLM Field Manager any and all antiquities or other items of cultural or scientific interest, including but not limited to historic or prehistoric ruins, fossils, artifacts or burials discovered as a result of his operations, and shall leave such discoveries intact until told to proceed by the BLM Field Manager.

LIST OF PREPARERS:

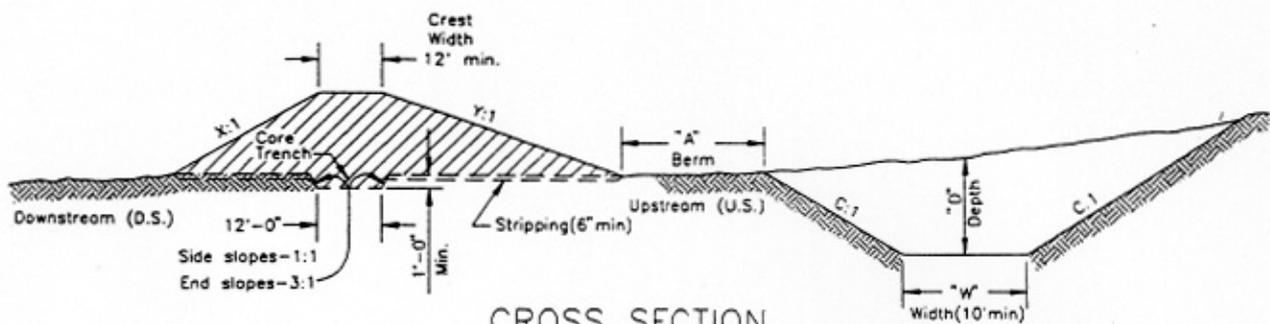
Miles City Field Office Personnel: Jeff Gustad, Rangeland Mgmt Spec; Ted Birnie, Archaeologist; Pam Wall, Realty Specialist; Robert Mitchell, Soil Scientist; Dan Bricco, Outdoor Recreation Planner; Larry Rau, Wildlife Biologist.



PERSPECTIVE VIEW



PLAN



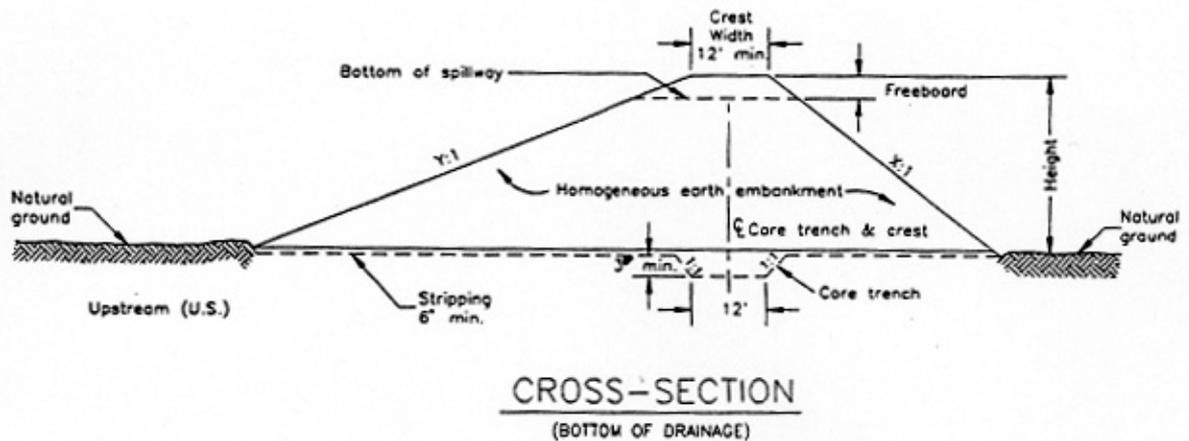
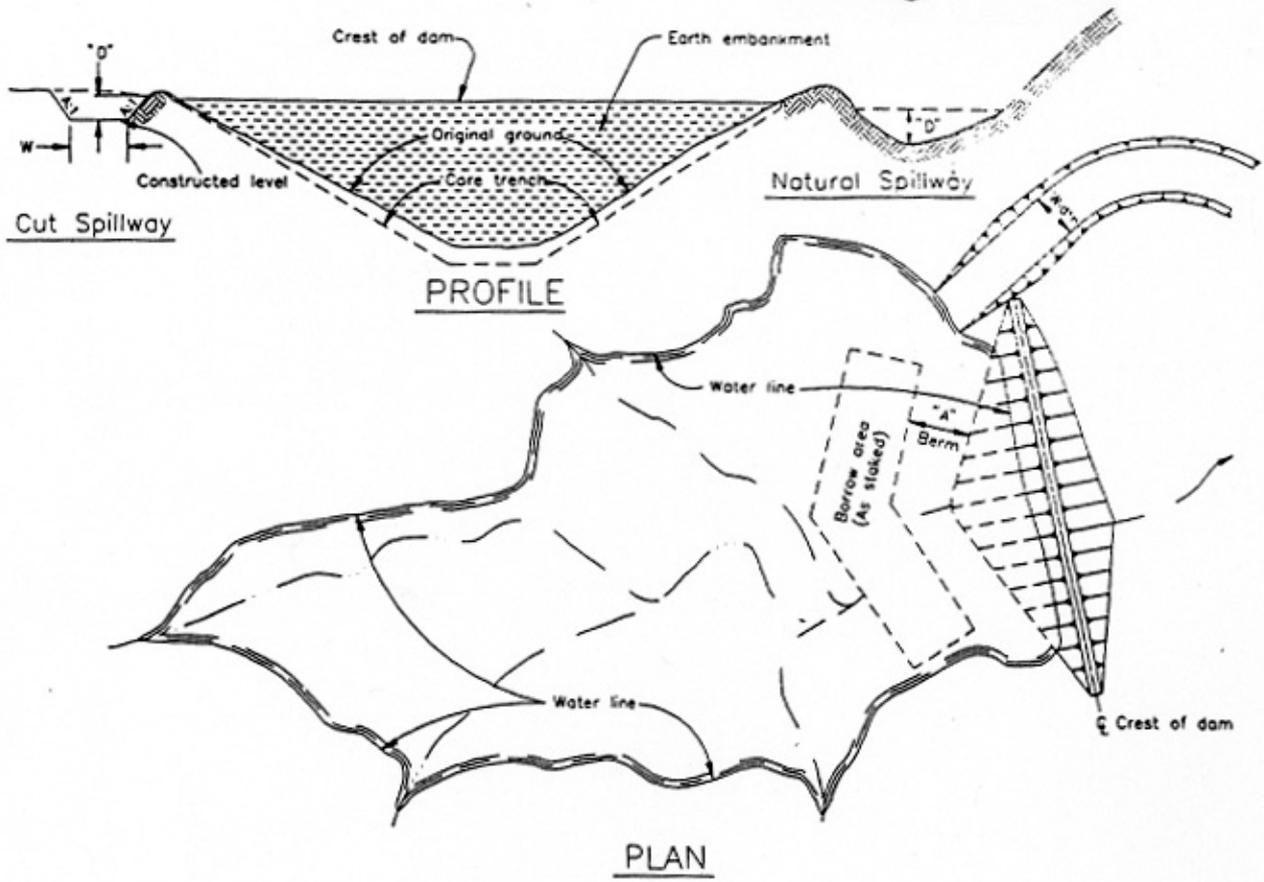
CROSS SECTION

NOTES:

1. Pit and embankment slopes and dimensions shall be as shown on the Work Data Sheet or as staked.
2. Embankment may be "U", "L", "C", or straight line shape. Construct as indicated in specifications or as staked.

ALWAYS THINK SAFETY

UNITED STATES DEPARTMENT OF THE INTERIOR	
BUREAU OF LAND MANAGEMENT	
DIVISION OF TECHNICAL SERVICES	SERVICE CENTER
TYPICAL WATER RETENTION PIT	
DESIGNED	by others
REVIEWED	<i>[Signature]</i>
APPROVED	<i>[Signature]</i>
DRAWN	SCALE NONE
DATE AUGUST 5, 1990	SHEET OF
DRAWING NO. 02291-1	



CROSS-SECTION
(BOTTOM OF DRAINAGE)

NOTES:

1. Embankment slopes and dimensions shall be as shown in specifications.
2. Berm with "A" minimum of 25' or as shown on the Work Data Sheet or as staked.
3. Freeboard as shown on the Work Data Sheet.

ALWAYS THINK SAFETY

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT DIVISION OF TECHNICAL SERVICES SERVICE CENTER	
TYPICAL MINOR RETENTION DAM	
DESIGNED	by others
REVIEWED	<i>[Signature]</i>
APPROVED	<i>[Signature]</i>
DRAWN	SCALE NONE
DATE	SHEET OF
DRAWING NO. 02291-2	

Jerry 6/28

Enclosed are some examples of typical pit/fill projects that will be applied on the Ridgway waterfowl project.

At this time, we have 15-17 separate projects that will incorporate one or a combination of these examples.

The basic idea, as explained in previous correspondence, is to create as much shallow water/wetlands using the topography to the best of our advantage. The fill material will come from the pit which will be designed for large surface, i.e. 200 x 200', and shallow depth, 6-8'.

The large dams will have more extensive & specific design. However, our engineering staff is waiting until we secure the water right before proceeding. We are expecting this documentation this summer.

Also included is the Environmental Analysis for this project.

Thanks for your help. Hopefully this info will help move things along.

Stay in touch -
Jerry Lan

RECEIVED

JUN 29 1999

ENVIRONMENTAL

Appendix E

BIRD SURVEY PROTOCOL GPS PROTOCOL

*MDT Wetland Mitigation Monitoring
Ridgeway Wetland
Ekalaka, Montana*

BIRD SURVEY PROTOCOL

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

Species Use within the Mitigation Wetland: Survey Method

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

Sites that can be circumambulated or walked throughout.

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

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

Sites that cannot be circumambulated.

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

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

Species Use within the Mitigation Wetland: Data Recording

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

1. Bird Species List

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

2. Bird Density

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

3. Bird Behavior

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

4. Bird Species Habitat Use

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

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 F

WETLAND – 9:

2004 MACROINVERTEBRATE SAMPLING PROTOCOL AND DATA

MDT Wetland Mitigation Monitoring

Ridgeway Wetland

Ekalaka, Montana

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 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.

MDT Wetland Mitigation Monitoring Project
Aquatic Invertebrate Monitoring
Summary 2001 - 2004

METHODS

Among other monitoring activities, aquatic invertebrate assemblages were collected at a number of mitigation wetlands throughout Montana. This report summarizes data generated from four years of collection.

The method employed to assess these wetlands is based on constructing an index using a battery of 12 bioassessment metrics or attributes (Table 1) tested and recommended by Stribling et al. (1995) in a report to the Montana Department of Health and Environmental Science. In that study, it was determined that some of the metrics were of limited use in some geographic regions, and for some wetland types. Despite that finding, all 12 metrics are used in this evaluation of mitigated wetlands, since detailed geographic information and wetland classifications were unavailable.

Scoring criteria for metrics were developed by generally following the tactic used by Stribling et al. Boxplots were generated using a statistical software package, and distributions, median values, ranges, and quartiles for each metric were examined. All sites in all years of sampling were used. Camp Creek, which was sampled in 2002, 2003, and 2004, was assessed using the tested metric battery developed for montane streams of Western Montana (Bollman 1998). The fauna at the Camp Creek site was different from that of the other sites, and suggested montane stream conditions rather than wetland conditions. For the wetlands, "optimal" scores were generally those that fell above the 75th percentile (for those metrics that decrease in value in response to stress) or below the 25th percentile (for metrics that respond to stress by an increase in value) of all scores. Additional scoring ranges were established by bisecting the range below the 75th percentile for decreasing scores (or above the 25th percentile for increasing scores) into "sub-optimal" and "poor" assessment categories. A score of 5, 3, or 1 was assigned to optimal, sub-optimal, and poor metric performance, respectively. In this way, metric values were translated into normalized metric scores, and scores for all metrics were summed to produce a total bioassessment score. Total bioassessment scores were classified according to a similar process, using the ranges and distributions of total scores for all sites studied in all years.

The purpose of constructing an index from biological attributes or metrics is to provide a means of integrating information to facilitate the determination of whether management action is needed. The nature of the action needed is not determined solely by the index score, however, but by consideration of an analysis of the component metrics, the taxonomic composition of the assemblages, and other issues. The diagnostic functions of the metrics and taxonomic data need more study; our understanding of the interrelationships of natural environmental factors and anthropogenic disturbances are tentative. Thus, the further interpretive remarks accompanying the raw taxonomic and metric data are offered cautiously.

Sample processing

Aquatic invertebrate samples were collected at mitigation wetland sites in the summer months of 2001, 2002, 2003, and 2004 by personnel of Land and Water Consulting, Inc. Sampling procedures utilized were based on the protocols developed by the Montana Department of Environmental Quality (MT DEQ). Sampling consisted of D-frame net sweeps through emergent vegetation (when present), the water column, over the water surface, and included disturbing and scraping substrates at each sampled sites. Samples were preserved in ethanol at each wetland site and subsequently delivered to Rhithron Associates, Inc. for processing, taxonomic determinations, and data analysis.

At Rhithron's laboratory, Caton subsamplers and stereomicroscopes with 10X magnification were used to randomly select a minimum of 100 organisms, when possible, from each sample. In some cases, the entire sample contained fewer than 100 organisms; in these cases, all organisms from the sample were taken. Taxa were identified in general accordance with the taxonomic resolution standards set out in the MT DEQ Standard Operating Procedures for Sampling and Sample Analysis (Bukantis 1998). All samples were re-identified by a second taxonomist for quality assurance purposes. The identified samples have been archived at Rhithron's laboratory. Taxonomic data and organism counts were entered into an Excel 2000 spreadsheet, and metrics were calculated and scored using spreadsheet formulae.

Bioassessment metrics

An index based on the performance of 12 metrics was constructed, as described above. Table 1 lists those metrics, describes their calculation and the expected response of each to increased degradation or impairment of the wetland.

In addition to the summed scores of each metric and the associated impairment classification described above, each individual metric informs the bioassessment to some degree. The four richness metrics (Total taxa, POET, Chironomidae taxa, and Crustacea taxa + Mollusca taxa) can be interpreted to express habitat complexity as well as water quality. Complex, diverse habitats consist of variable substrates, emergent vegetation, variable water depths and other factors, and are potential features of long-established stable wetlands with minimal human disturbance. In the study conducted by Stribling et al. (1995), all four richness metrics were found to be significantly associated with water quality parameters including conductance, salinity, and total dissolved solids.

Four composition metrics (%Chironomidae, %Orthoclaadiinae of Chironomidae, %Crustacea + %Mollusca, and %Amphipoda) measure the relative contributions of certain taxonomic groups that may have significant responses to habitat and/or water quality impacts. For example, amphipods have been demonstrated to increase in abundance in alkaline conditions. Short-lived, relatively mobile taxa such as chironomids dominate ephemeral environments; many are hemoglobin-bearers capable of tolerating de-oxygenated conditions.

Two tolerance metrics (the Hilsenhoff Biotic Index and %Dominant taxon) were included in the bioassessment battery. The HBI indicates the overall invertebrate assemblage tolerance to nutrient enrichment, warm water, and/or low dissolved oxygen conditions. The percent abundance of the dominant taxon has been demonstrated to be strongly associated with pH, conductance, salinity, total organic carbon, and total dissolved solids.

Two trophic measures (%Collector-gatherers and %Filterers) may be helpful in expressing functional integrity of the invertebrate assemblage, which can be impacted by poor water quality or habitat degradation. High proportions of filtering organisms suggest nutrient and/or organic enrichment, while abundant collectors suggest more positive functional conditions and well-developed wetland morphology. These organisms graze periphyton growing on stable surfaces such as macrophytes.

RESULTS

In 2001, 29 sites were sampled statewide. Nineteen of these sites were revisited in 2002, and 13 new sites were sampled. In 2003, 17 sites that had been visited in both 2001 and 2002 were re-sampled, and 11 sites sampled for the first time in 2001 were re-visited. In addition, 2 new sites were sampled. In 2004, 25 sites were re-visited, and 6 new sites were sampled. Thus, the 2004 database contains data for 122 sampling events at 50 unique sites. Table 2 summarizes sites and sampling years.

Metric scoring criteria were re-developed each year as new data was added. For 2004, all 122 records were utilized. Ranges of individual metrics, as well as median metric values remained remarkably consistent in each of the 4 years; minimal changes resulted from the addition of new data in 2004. The summary metric values and scores for the 2004 samples are given in Tables 3a-3d.

Literature cited

Bollman, W. 1998. Montana Valleys and Foothill Prairies Ecoregion. Master's Thesis. (M.S.) University of Montana. Missoula, Montana.

Bukantis, R. 1998. Rapid bioassessment macroinvertebrate protocols: Sampling and sample analysis SOP's. Working draft. Montana Department of Environmental Quality. Planning Prevention and Assistance Division. Helena, Montana.

Stribling, J.B., J. Lathrop-Davis, M.T. Barbour, J.S. White, and E.W. Leppo. 1995. Evaluation of environmental indicators for the wetlands of Montana: the multimetric approach using benthic macroinvertebrates. Report to the Montana Department of Health and Environmental Science. Helena, Montana.

Table 1. Aquatic invertebrate metrics employed in the MTDT mitigation wetland monitoring study, 2001- 2004.

Metric	Metric Calculation	Expected Response to Degradation or Impairment
Total taxa	Count of unique taxa identified to lowest recommended taxonomic level	Decrease
POET	Count unique Plecoptera, Trichoptera, Ephemeroptera, and Odonata taxa identified to lowest recommended taxonomic level	Decrease
Chironomidae taxa	Count unique midge taxa identified to lowest recommended taxonomic level	Decrease
Crustacea taxa + Mollusca taxa	Count unique Crustacea taxa and Mollusca taxa identified to lowest recommended taxonomic level	Decrease
% Chironomidae	Percent abundance of midges in the subsample	Increase
Orthocladiinae/Chironomidae	Number of individual midges in the sub-family Orthocladiinae / total number of midges in the subsample.	Decrease
%Amphipoda	Percent abundance of amphipods in the subsample	Increase
%Crustacea + %Mollusca	Percent abundance of crustaceans in the subsample plus percent abundance of molluscs in the subsample	Increase
HBI	Relative abundance of each taxon multiplied times that taxon's modified Hilsenhoff Biotic Index value. These numbers are summed over all taxa in the subsample.	Increase
%Dominant taxon	Percent abundance of the most abundant taxon in the subsample	Increase
%Collector-Gatherers	Percent abundance of organisms in the collector-gatherer functional group	Decrease
%Filterers	Percent abundance of organisms in the filterer functional group	Increase

Table 2. Montana Department of Transportation Mitigated Wetlands Monitoring Project sites. 2001 – 2004.

2001	2002	2003	2004
Beaverhead 1	Beaverhead 1	Beaverhead 1	Beaverhead 1
Beaverhead 2	Beaverhead 2		
Beaverhead 3	Beaverhead 3		Beaverhead 3
Beaverhead 4	Beaverhead 4	Beaverhead 4	
Beaverhead 5	Beaverhead 5	Beaverhead 5	Beaverhead 5
Beaverhead 6	Beaverhead 6	Beaverhead 6	Beaverhead 6
Big Sandy 1			
Big Sandy 2			
Big Sandy 3			
Big Sandy 4			
Johnson-Valier			
VIDA			
Cow Coulee	Cow Coulee	Cow Coulee	
Fourchette - Puffin	Fourchette - Puffin	Fourchette - Puffin	Fourchette - Puffin
Fourchette - Flashlight	Fourchette - Flashlight	Fourchette - Flashlight	Fourchette - Flashlight
Fourchette - Penguin	Fourchette - Penguin	Fourchette - Penguin	Fourchette - Penguin
Fourchette - Albatross	Fourchette - Albatross	Fourchette - Albatross	Fourchette - Albatross
Big Spring	Big Spring	Big Spring	Big Spring
Vince Ames			
Ryegate			
Lavinia			
Stillwater	Stillwater	Stillwater	Stillwater
Roundup	Roundup	Roundup	Roundup
Wigeon	Wigeon	Wigeon	Wigeon
Ridgeway	Ridgeway	Ridgeway	Ridgeway
Musgrave - Rest. 1			
Musgrave - Rest. 2			
Musgrave - Enh. 1			
Musgrave - Enh. 2			
	Hoskins Landing	Hoskins Landing	Hoskins Landing
	Peterson - 1	Peterson - 1	Peterson - 1
	Peterson - 2		Peterson - 2
	Peterson - 4	Peterson - 4	Peterson - 4
	Peterson - 5	Peterson - 5	Peterson - 5
	Jack Johnson - main	Jack Johnson - main	
	Jack Johnson - SW	Jack Johnson - SW	
	Creston	Creston	Creston
	Lawrence Park		
	Perry Ranch		
	SF Smith River	SF Smith River	SF Smith River
	Camp Creek	Camp Creek	Camp Creek
	Kleinschmidt	Kleinschmidt - pond	Kleinschmidt - pond
		Kleinschmidt - stream	Kleinschmidt - stream
		Ringling - Galt	
			Circle
			Cloud Ranch Pond
			Cloud Ranch Stream
			Colloid
			Jack Creek
			Norem

Table 3a.

	BEAVER HEAD #1	BEAVER HEAD #3	BEAVER HEAD #5	BEAVER HEAD #6	BIG SPRING CREEK	CIRCLE	CLOUD RANCH POND	CLOUD RANCH STREAM	COLLOID	CRESTON
Total taxa	27	12	21	18	25	16	16	20	8	18
POET	3	0	2	3	4	2	2	4	2	3
Chironomidae taxa	7	5	5	5	8	5	6	11	1	2
Crustacea + Mollusca	7	3	4	6	7	1	6	1	1	7
% Chironomidae	0.33636	0.18888	0.39285	0.57547	0.44329	0.55855	0.41666	0.84	0.09090	0.06087
Orthoclaadiinae/Chir	0.05405	0.35294	0.06818	0.36065	0.27907	0.69354	0.4	0.16666	0	0
%Amphipoda	0.03636	0	0.01785	0.05660	0.05154	0	0.00925	0	0	0
%Crustacea + %Mollusca	0.31818	0.73333	0.05357	0.12264	0.18556	0.03603	0.36111	0.01	0.09090	0.73913
HBI	7.97169	7.88888	8.36363	8.15789	7.61855	7.19090	7.32291	4.84	6	6.92173
%Dominant taxon	0.2	0.57777	0.23214	0.25471	0.23711	0.38738	0.13888	0.38	0.27272	0.37391
%Collector-Gatherers	0.40909	0.75555	0.51785	0.62264	0.78350	0.05405	0.67592	0.74	0.18181	0.29565
%Filterers	0.12727	0	0	0	0.01030	0.15315	0.09259	0.17	0	0.06087
Total taxa	5	1	5	3	5	3	3	3	1	3
POET	3	1	1	3	5	1	1	5	1	3
Chironomidae taxa	5	3	3	3	5	3	3	5	1	1
Crustacea + Mollusca	5	1	3	5	5	1	5	1	1	5
% Chironomidae	3	3	3	1	1	1	1	1	5	5
Orthoclaadiinae/Chir	1	3	1	3	3	5	3	1	1	1
%Amphipoda	5	5	5	3	3	5	5	5	5	5
%Crustacea + %Mollusca	5	1	5	5	5	5	3	5	5	1
HBI	1	1	1	1	1	3	3	5	5	3
%Dominant taxon	5	1	5	5	5	3	5	3	5	3
%Collector-Gatherers	1	3	3	3	3	1	3	3	1	1
%Filterers	1	3	3	3	3	1	1	1	3	1
	40	26	38	38	44	32	36	38	34	32
	0.666667	0.433333	0.633333	0.633333	0.733333	0.533333	0.6	0.633333	0.566667	0.533333
	sub-optimal	poor	sub-optimal	sub-optimal	optimal	sub-optimal	sub-optimal	sub-optimal	sub-optimal	sub-optimal

Table 3b.

	FOURCHETTE CREEK ALBATROSS RESERVOIR	FOURCHETTE CREEK FLASHLIGHT RESERVOIR	FOURCHETTE CREEK PENGUIN RESERVOIR	FOURCHETTE CREEK PUFFIN RESERVOIR	JACK CREEK	MDT CAMP CREEK	MDT HOSKINS LANDING	MDT KLEINSCHMIDT CREEK	MDT KLEINSCHMIDT POND
Total taxa	18	23	19	22	23	35	25	19	19
POET	3	5	4	3	5	12	4	4	6
Chironomidae taxa	6	9	6	4	8	14	4	6	4
Crustacea + Mollusca	3	4	5	8	7	1	6	2	4
% Chironomidae	0.135135	0.265306	0.066116	0.247934	0.352113	0.37963	0.036697	0.438776	0.047619
Orthocladinae/Chir	0.2	0.346154	0.625	0.3	0.52	0.585366	0.5	0.627907	0.8
%Amphipoda	0.126126	0.336735	0.578512	0.041322	0.028169	0	0.018349	0.010204	0.009524
%Crustacea + %Mollusca	0.684685	0.387755	0.77686	0.371901	0.380282	0.111111	0.541284	0.061224	0.190476
HBI	7.972973	7.216495	7.7	6.950413	7.647059	4.570093	6.59633	6.561224	6.67619
%Dominant taxon	0.495495	0.336735	0.561983	0.140496	0.15493	0.111111	0.366972	0.316327	0.552381
%Collector-Gatherers	0.873874	0.816327	0.702479	0.38843	0.394366	0.416667	0.091743	0.683673	0.114286
%Filterers	0	0.010204	0.132231	0.008264	0.042254	0.12037	0.018349	0.153061	0.047619
Total taxa									
POET	3	5	3	5	5	5	5	3	3
Chironomidae taxa	3	5	5	3	5	5	5	5	5
Crustacea + Mollusca	3	5	3	3	5	5	3	3	3
% Chironomidae	1	3	3	5	5	1	5	1	3
Orthocladinae/Chir	5	3	5	3	3	3	5	1	5
%Amphipoda	3	3	5	3	5	5	5	5	5
%Crustacea + %Mollusca	3	1	1	3	5	5	5	5	5
HBI	1	3	1	3	3	5	3	5	5
%Dominant taxon	1	3	1	3	1	5	5	5	5
%Collector-Gatherers	1	5	1	5	5	5	3	5	1
%Filterers	5	5	3	1	1	1	1	3	1
	3	3	1	3	3	1	3	1	3
	32	44	32	40	46	46	48	42	44
	0.533333	0.733333	0.533333	0.666667	0.766667	0.766667	0.8	0.7	0.733333
	sub-optimal	optimal	sub-optimal	optimal	optimal	optimal	optimal	optimal	optimal

Table 3d.

	ROUNDUP	SOUTH FORK SMITH RIVER	STILLWATER	WIGEON
Total taxa	9	20	23	16
POET	0	5	4	3
Chironomidae taxa	4	7	9	5
Crustacea + Mollusca	3	3	4	3
% Chironomidae	0.55	0.482143	0.466667	0.314815
Orthoclaadiinae/Chir	0.072727	0.055556	0.244898	0.647059
%Amphipoda	0	0.071429	0.12381	0.481481
%Crustacea + %Mollusca	0.42	0.116071	0.180952	0.574074
HBI	8.89	6.589286	6.47619	7.534653
%Dominant taxon	0.28	0.294643	0.133333	0.481481
%Collector-Gatherers	0.56	0.839286	0.628571	0.657407
%Filterers	0.14	0	0	0.083333
Total taxa				
POET	1	3	5	3
Chironomidae taxa	1	5	5	3
Crustacea + Mollusca	3	5	5	3
% Chironomidae	1	1	3	1
Orthoclaadiinae/Chir	1	1	1	3
%Amphipoda	1	1	3	5
%Crustacea + %Mollusca	5	3	3	1
HBI	3	5	5	3
%Dominant taxon	1	5	5	3
%Collector-Gatherers	5	5	5	3
%Filterers	3	5	3	3
	1	3	3	1
	26	42	46	32
	0.433333	0.7	0.766667	0.533333
	poor	optimal	optimal	Sub-optimal

Aquatic Invertebrate Taxonomic Data

Site Name RIDGEWAY

Date Collected

Order	Family	Taxon	Count	Percent	Unique	BI	FFG	
Amphipoda		Ostracoda	7	7.22%	Yes	8	CG	
	Talitridae							
Basommatophora		<i>Hyalella</i>	7	7.22%	Yes	8	CG	
	Physidae							
Diptera		Physidae	2	2.06%	Yes	8	SC	
	Chironomidae		<i>Ablabesmyia</i>	1	1.03%	Yes	8	CG
			<i>Apedilum</i>	16	16.49%	Yes	11	CG
			<i>Corynoneura</i>	1	1.03%	Yes	7	CG
			<i>Endochironomus</i>	3	3.09%	Yes	10	SH
			<i>Paratanytarsus</i>	7	7.22%	Yes	6	CG
			<i>Psectrocladius</i>	3	3.09%	Yes	8	CG
			<i>Tanytarsus</i>	19	19.59%	Yes	6	CF
Ephemeroptera	Baetidae							
		<i>Callibaetis</i>	3	3.09%	Yes	9	CG	
	Caenidae							
Heteroptera		<i>Caenis</i>	7	7.22%	Yes	7	CG	
	Corixidae		<i>Cenocorixa</i>	1	1.03%	Yes	8	PR
			Corixidae	2	2.06%	No	10	PH
			<i>Hesperocorixa</i>	4	4.12%	Yes	10	PH
	Notonectidae		<i>Notonecta</i>	8	8.25%	Yes	5	PR
Odonata	Coenagrionidae							
		Coenagrionidae	3	3.09%	Yes	7	PR	
	Libellulidae							
Trichoptera		Libellulidae	2	2.06%	Yes	9	PR	
	Leptoceridae							
Grand Total		<i>Ylodes</i>	1	1.03%	Yes	11	SH	
			97					

Aquatic Invertebrate Data Summary

Project ID: MDT04LW

STORE Station ID:

Station Name: RIDGEWAY

Activity ID:

Sample Date:

Sample type	
SUBSAMPLE TOTAL ORGANISMS	97
Portion of sample used	60.00%
Estimated number in total sample	162
Conversion factor	2,242
Estimated number in 1 square meter	217
Sampling effort	
Habitat type	
EPT abundance	11
Taxa richness	18
Number EPT taxa	3
Percent EPT	11.34%

DOMINANCE		
TAXON	ABUNDANCE	PERCENT
Tanytarsus	19	19.59%
Apedilum	16	16.49%
Notonecta	8	8.25%
Ostracoda	7	7.22%
Hyalieila	7	7.22%
SUPTOTAL 5 DOMINANTS	57	58.76%
Caenis	7	7.22%
Paratanytarsus	7	7.22%
Hesperocorixa	4	4.12%
Coenagrionidae	3	3.09%
Callibaetis	3	3.09%
TOTAL DOMINANTS	81	83.51%

TAXONOMIC COMPOSITION				TAXONOMIC RATIOS			
GROUP	PERCENT	ABUNDANCE	#TAXA	METRIC	VALUE		
Non-insect taxa	16.49%	16	3	EPT/Chironomidae	0.22		
Odonata	5.15%	5	2	Baetidae/Ephemeroptera	0.30		
Ephemeroptera	10.31%	10	2	Hydrosychidae/Trichopt	0.00		
Plecoptera	0.00%	0	0				
Heteroptera	15.46%	15	4				
Megaloptera	0.00%	0	0				
Trichoptera	1.03%	1	1				
Lepidoptera	0.00%	0	0				
Coleoptera	0.00%	0	0				
Diptera	0.00%	0	0				
Chironomidae	51.55%	50	7				

TOLERANCE/CONDITION INDICES		
Community Tolerance Quotient (CTQa)		101.45
Hilsenhoff Biotic Index		7.20

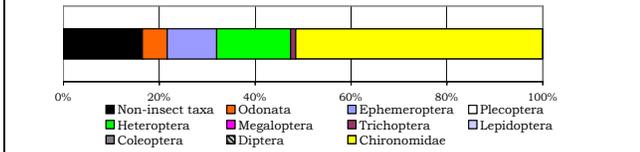
DIVERSITY		
Shannon H (log)		3.97
Shannon H (log2)		2.76
Margalef D		3.93
Simpson D		0.09
Evenness		0.15

VOLUNTINISM			
TYPE	ABUNDANCE	# TAXA	PERCENT
Multivoltine	60	9	61.86%
Univoltine	35	9	36.08%
Semivoltine	2	1	2.06%

TAXA CHARACTERS		
#TAXA		PERCENT
Tolerant	8	24.74%
Sensitive	0	0.00%
Clinger	1	19.59%

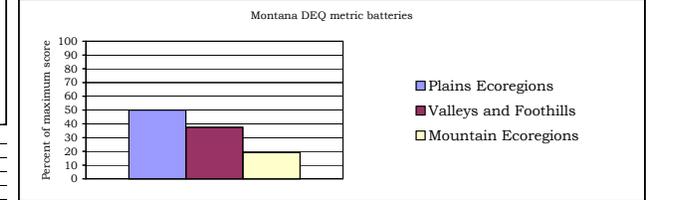
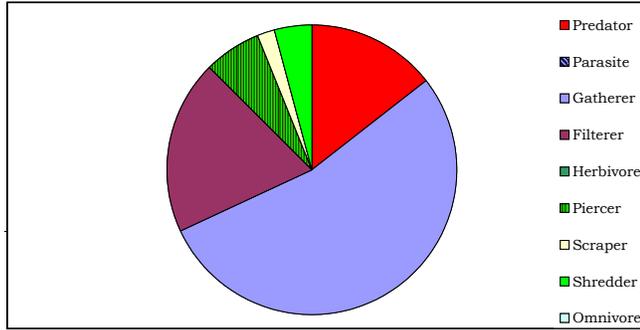
BIOASSESSMENT INDICES

B-IBI (Karr et al.)		
METRIC	VALUE	SCORE
Taxa richness	18	1
E richness	2	1
P richness	0	1
T richness	1	1
Long-lived	1	1
Sensitive richness	0	1
%tolerant	24.74%	3
%predators	14.43%	3
Clinger richness	1	1
%dominance (3)	44.33%	5
TOTAL SCORE	18	36%



FUNCTIONAL COMPOSITION				FUNCTIONAL RATIOS			
GROUP	PERCENT	ABUNDANCE	#TAXA	METRIC	VALUE		
Predator	14.43%	14	4	Scraper/Filterer	0.11		
Parasite	0.00%	0	0	Scraper/Scraper + Filtere	0.10		
Gatherer	53.61%	52	9				
Filterer	19.59%	19	1				
Herbivore	0.00%	0	0				
Piercer	6.19%	6	2				
Scraper	2.06%	2	1				
Shredder	4.12%	4	2				
Omnivore	0.00%	0	0				
Unknown	0.00%	0	0				

MONTANA DEQ INDICES (Bukantis 1998)				
METRIC	VALUE	Plains Ecoregions	Valleys and Foothills Ecoregions	Mountain Ecoregions
Taxa richness	18	2	1	0
EPT richness	3	1	0	0
Biotic Index	7.20	0	0	0
%Dominant taxon	19.59%	3	3	3
%Collectors	73.20%	2	2	1
%EPT	11.34%	1	0	0
Shannon Diversity	2.76	2		
%Scrapers +Shredder	6.19%	1	0	0
Predator taxa	4	2		
%Multivoltine	61.86%	1		
%H of T	0.00%		3	
TOTAL SCORES		15	9	4
PERCENT OF MAXIMUM		50.00	37.50	19.05
IMPAIRMENT CLASS		MODERATE	MODERATE	SEVERE



COMMUNITY TOLERANCES	
Sediment tolerant taxa	0
Percent sediment tolerant	0.00%
Sediment sensitive taxa	0
Percent sediment sensitive	0.00%
Metals tolerance index (McGuire)	3.02
Cold stenotherm taxa	0
Percent cold stenotherms	0.00%

Montana Valleys and Foothills revised index (Bollman 1998)			
Percent max.	16.67%	Impairment class	SEVERE
Montana Plains ecoregions metrics (Bramblett and Johnson 2002)			
Riffle		Pool	
EPT richness	3	E richness	2
Percent EPT	11.34%	T richness	1
Percent Oligochaetes and Leeches	0.00%	Percent EPT	11.34%
Percent 2 dominants	36.08%	Percent non-insect	16.49%
Filterer richness	1	Filterer richness	1
Percent intolerant	0.00%	Univoltine richness	9
Univoltine richness	9	Percent supertolerant	53.61%
Percent clingers	19.59%		
Swimmer richness	6		

HABITUS MEASURES	
Hemoglobin bearer richness	2
Percent hemoglobin bearers	11.34%
Air-breather richness	0
Percent air-breathers	0.00%
Burrower richness	0
Percent burrowers	0.00%
Swimmer richness	6
Percent swimmers	19.59%

Appendix G

WETLANDS 1 - 8 AND 10 - 16: 2004 FIGURE 2

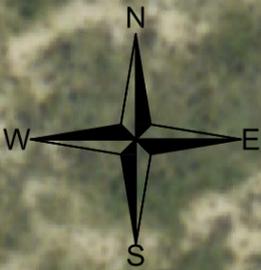
WETLANDS 1 - 8, 10, 12 - 14, AND 16: 2004 FIGURE 3

MDT Wetland Mitigation Monitoring

Ridgeway Wetland

Ekalaka, Montana

Figure 2 Monitoring Activity Locations 2004



SCALE 1"= 50 ft

- Legend**
- Monitoring Area Limits
 - Photograph Point
 - Aerial Reference Point
 - Soil Sample

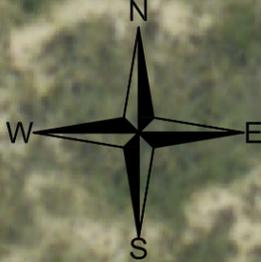
Base photograph July 17, 2001



PROJ NO: 330054.412 W1 FILE NAME: W01BASE.dwg SCALE: 1"= 50 ft LOCATION: Ridgeway Complex W-1	DRAWN: RA CHECKED: APPVD: BD PROJ MGR: BD	PROJECT NAME MDT Ridgeway Complex W-1 Wetland Mitigation DRAWING TITLE Monitoring Activity Locations 2004
SHEET NUMBER 2 OF REV 02 DATE: 06/27/05		



Figure 3 Mapped Site Features 2004



SCALE 1"= 50 ft

Legend

- Monitoring Area Limits
- Open Water
- Base photograph July 17, 2001

WETLAND AREAS

Gross Wetland	0.000 Acres
Open Water Area	0.53 Acres
Net Wetland	0.000 Acres

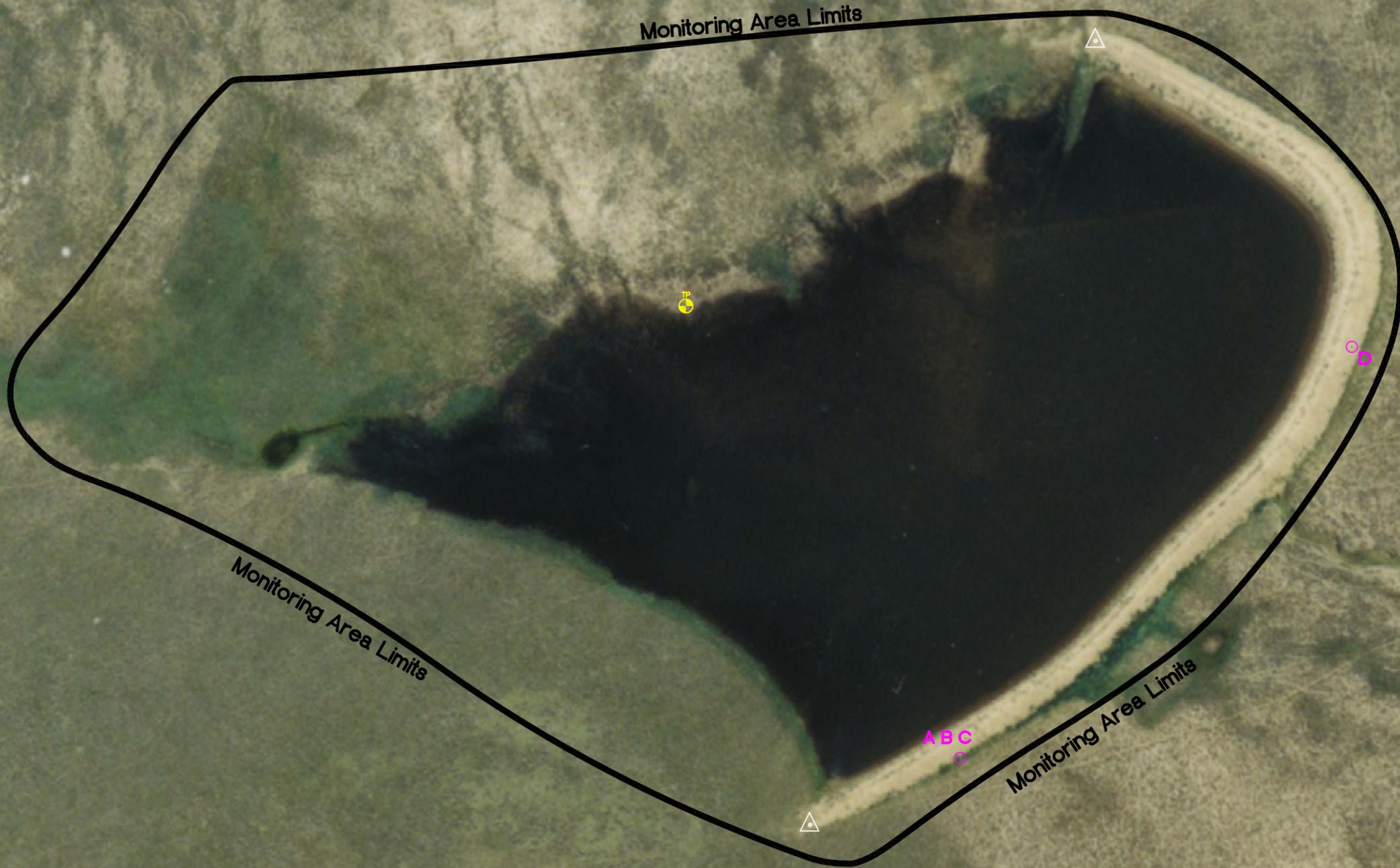
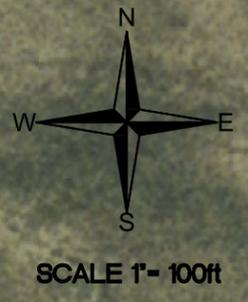


<p>PROJ NO: 330054.412 W1 FILE NAME: W01BASE.dwg SCALE: 1"= 50 ft LOCATION: Ridgeway Complex W-1</p>	<p>DRAWN: RA CHECKED: APPVD: BD PROJ MGR: BD</p>	<p>PROJECT NAME MDT Ridgeway Complex W-1 Wetland Mitigation</p> <p>DRAWING TITLE Mapped Site Features 2004</p>
<p>LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807</p>		<p>SHEET NUMBER 3 OF REV 02 DATE: 06/27/05</p>

Figure 2 Monitoring Activity Locations 2004

Legend

- Monitoring Area Limits 
 - Photograph Point 
 - Aerial Reference Point 
 - Soil Sample 
- Base photograph July 17, 2001



PROJECT NAME		MDT Ridgeway Complex W-2 Wetland Mitigation	
DRAWING TITLE		Monitoring Activity Locations 2004	
PROJ NO:	330054.412 W2	DRAWN:	RA
FILE NAME:	W02BASE.dwg	CHECKED:	
SCALE:	1"=100 ft	APPVD:	BD
LOCATION:	Ridgeway Complex W-2	PROJ MGR:	BD
			
SHEET NUMBER			
2 OF			
REV 02			
DATE: 06/27/05			

Figure 3 Mapped Site Features 2004

- Legend**
- Monitoring Area Limits ———
 - Open Water Limits ———
 - Wetland Limits ———
- Base photograph July 17, 2001

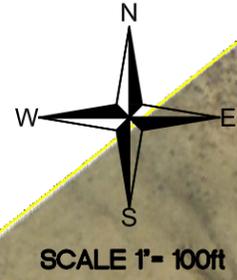


WETLAND AREAS
 Gross Wetland Area =5.98 Acres
 Open Water Area =3.32 Acres
 Net Wetland Area =2.66 Acres



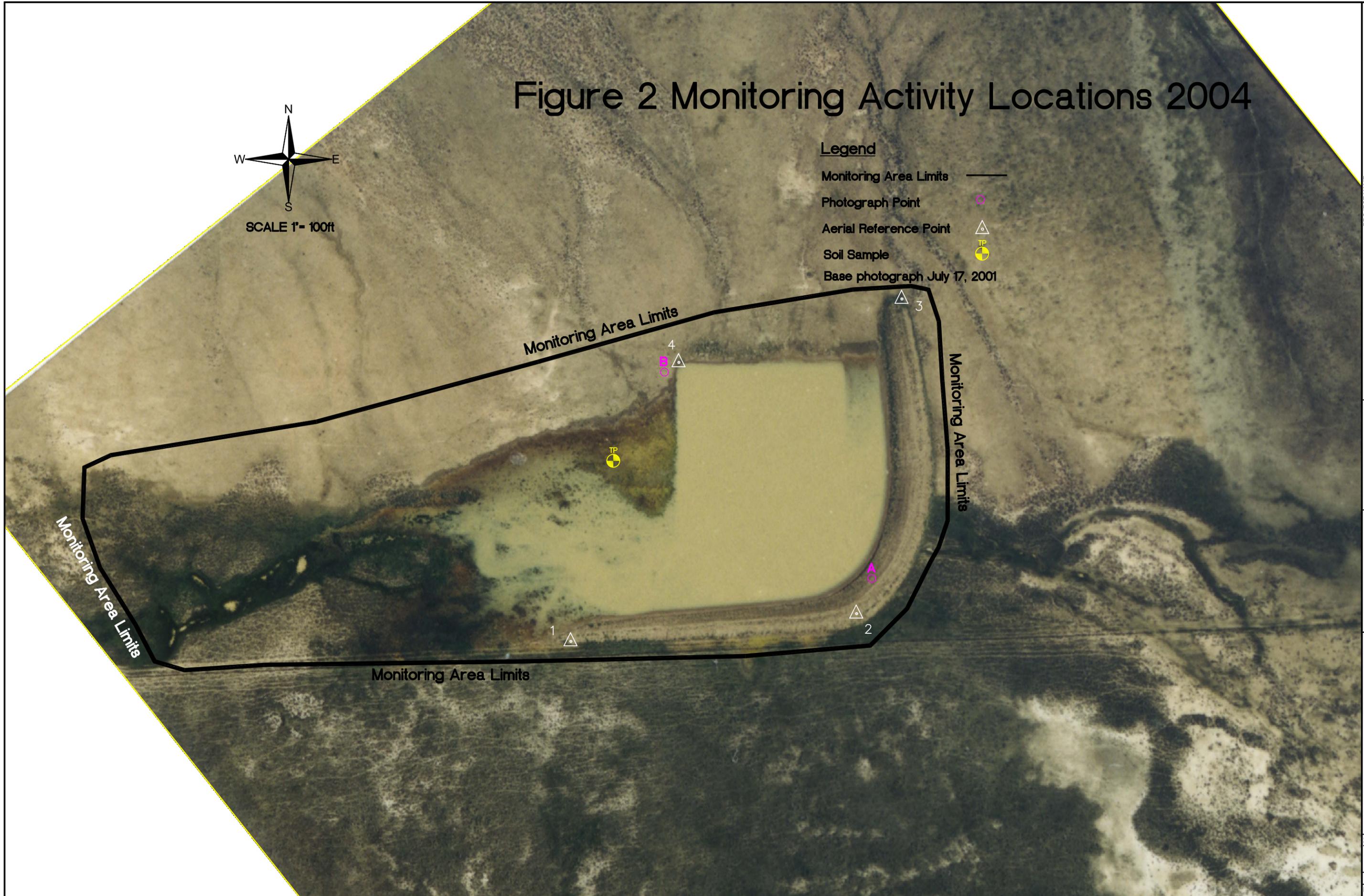
PROJECT NAME		MDT Ridgeway Complex W-2 Wetland Mitigation	
DRAWING TITLE		Mapped Site Features 2004	
PROJ NO:	330054.412 W2	DRAWN:	RA
FILE NAME:	W02BASE.dwg	CHECKED:	
SCALE:	1"=100 ft	APPVD:	BD
LOCATION:	Ridgeway Complex W-2	PROJ MGR:	BD
SHEET NUMBER		3 OF	
REV 02		DATE: 06/27/05	

Figure 2 Monitoring Activity Locations 2004



Legend

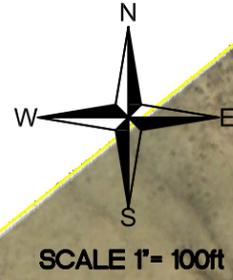
- Monitoring Area Limits
- Photograph Point
- Aerial Reference Point
- Soil Sample
- Base photograph July 17, 2001



PROJ NO: 330054.412 W3 FILE NAME: W03BASE.dwg SCALE: 1"=100 ft LOCATION: Ridgeway Complex W-3	DRAWN: RA CHECKED: APPVD: BD PROJ MGR: BD	PROJECT NAME MDT Ridgeway Complex W-3 Wetland Mitigation DRAWING TITLE Monitoring Activity Locations 2004
SHEET NUMBER 2 OF REV 02 DATE: 06/27/05		



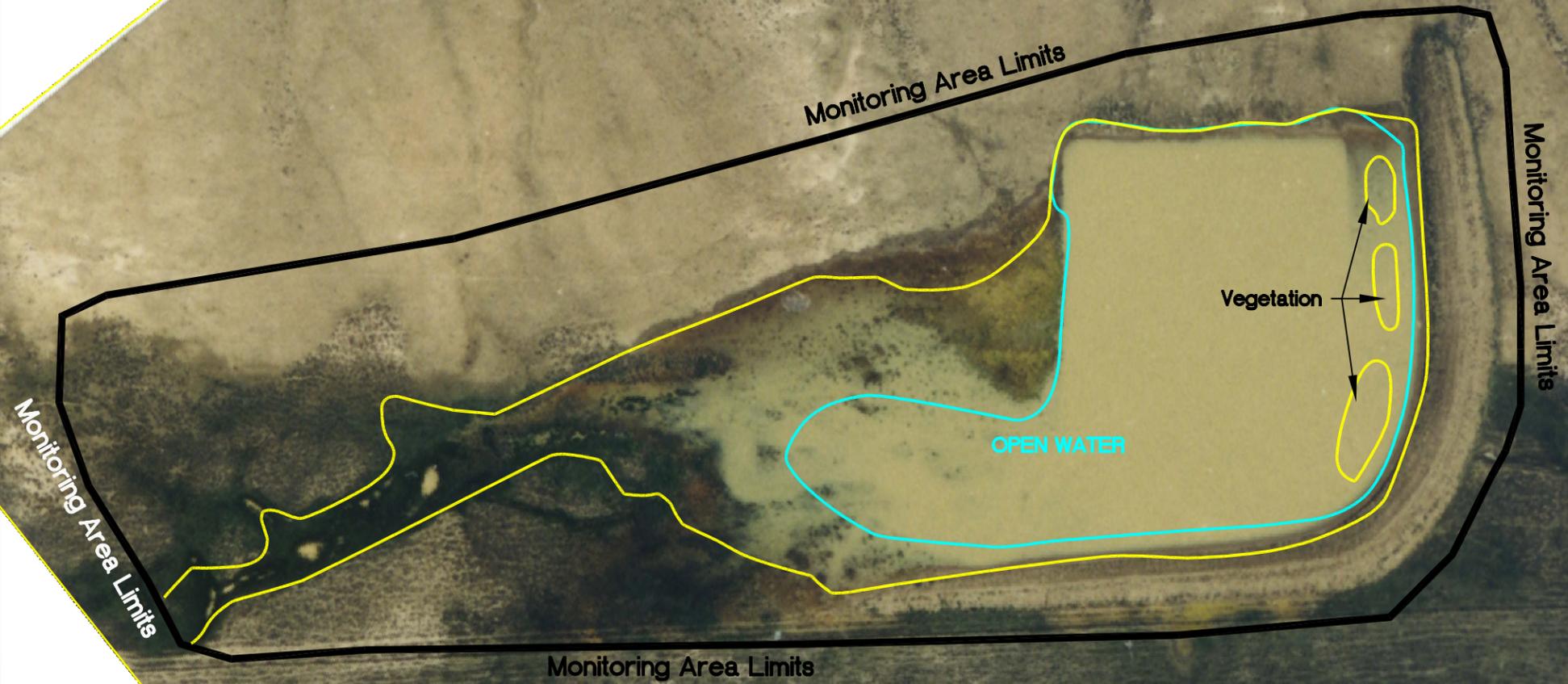
Figure 3 Mapped Site Features 2004



WETLAND AREAS (emergent)
 Gross Wetland Area -3.16 Acres
 Open Water Area -1.72 Acres
 Net Wetland Area -1.44 Acres

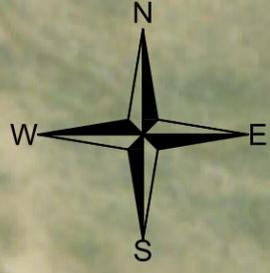
Legend

Monitoring Area Limits ———
 Wetland Limits (emergent) ———
 Open Water Limits ———
 Base photograph July 17, 2001



PROJECT NAME		MDT Ridgeway Complex W-3 Wetland Mitigation	
DRAWING TITLE		Mapped Site Features 2004	
PROJ NO:	330054.412 W3	DRAWN:	RA
FILE NAME:	W03BASE.dwg	CHECKED:	
SCALE:	1"=100 ft	APPVD:	BD
LOCATION:	Ridgeway Complex W-3	PROJ MGR:	BD
SHEET NUMBER			
3 OF			
REV 02			
DATE: 06/27/05			

Figure 2 Monitoring Activity Locations 2004



SCALE 1"= 50 ft

Legend

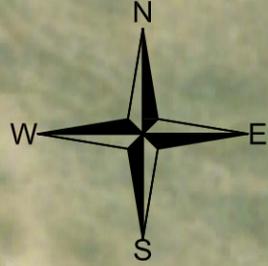
- Monitoring Area Limits
- Photograph Point ○
- Aerial Reference Point △
- Soil Sample TP
- Base photograph July 17, 2001



PROJ NO: 330054.412 W4 FILE NAME: W04BASE.dwg SCALE: 1"= 50 ft LOCATION: Ridgeway Complex W-4	DRAWN: RA CHECKED: APPVD: BD PROJ MGR: BD	PROJECT NAME MDT Ridgeway Complex W-4 Wetland Mitigation DRAWING TITLE Monitoring Activity Locations 2004
SHEET NUMBER <div style="text-align: center; font-size: 24pt; font-weight: bold;">2</div> OF .		REV 02 DATE: 06/27/05



Figure 3 Mapped Site Features 2004



SCALE 1"= 50 ft

Legend

- Monitoring Area Limits
- Open Water Limits
- Emergent Wetland Limit

WETLAND AREA (emergent)
 Gross Wetland Area =0.74 Acres
 Open Water Area =0.43 Acres
 Net Wetland Area =0.31 Acres

Base photograph July 17, 2001

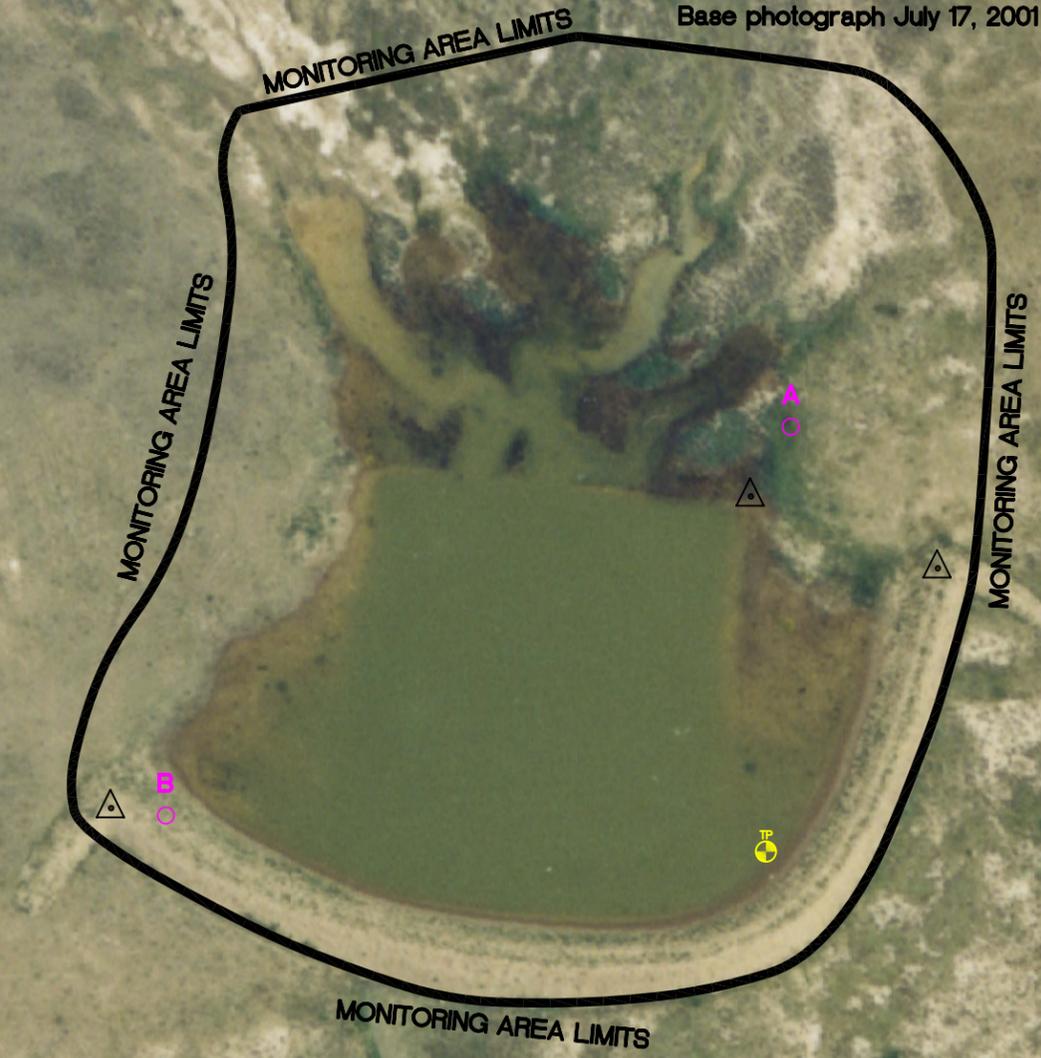


<p>PROJ NO: 330054.412 W4 FILE NAME: W04BASE.dwg SCALE: 1"= 50 ft LOCATION: Ridgeway Complex W-4</p>	<p>DRAWN: RA CHECKED: APPVD: BD PROJ MGR: BD</p>	<p>MDT Ridgeway Complex W-4 Wetland Mitigation Mapped Site Features 2004</p>
		<p>SHEET NUMBER 3 OF REV 02 DATE: 06/27/05</p>

Figure 2 Monitoring Activity Locations 2004



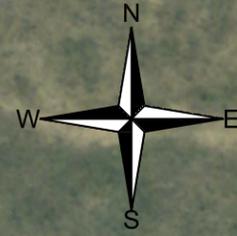
- Legend**
- Monitoring Area Limits
 - Photograph Point
 - Aerial Reference Point
 - Soil Sample
- Base photograph July 17, 2001



PROJ NO: 330054.412 W5 FILE NAME: W06BASE.dwg SCALE: 1" = 100ft LOCATION: Ridgeway Complex W5	DRAWN: RA CHECKED: APPVD: BD PROJ MGR: BD	PROJECT NAME MDT Ridgeway Complex W5 Wetland Mitigation DRAWING TITLE Monitoring Activity Locations 2004
SHEET NUMBER 2 OF REV 02 DATE: 06/27/05		



Figure 3 Mapped Site Features 2004

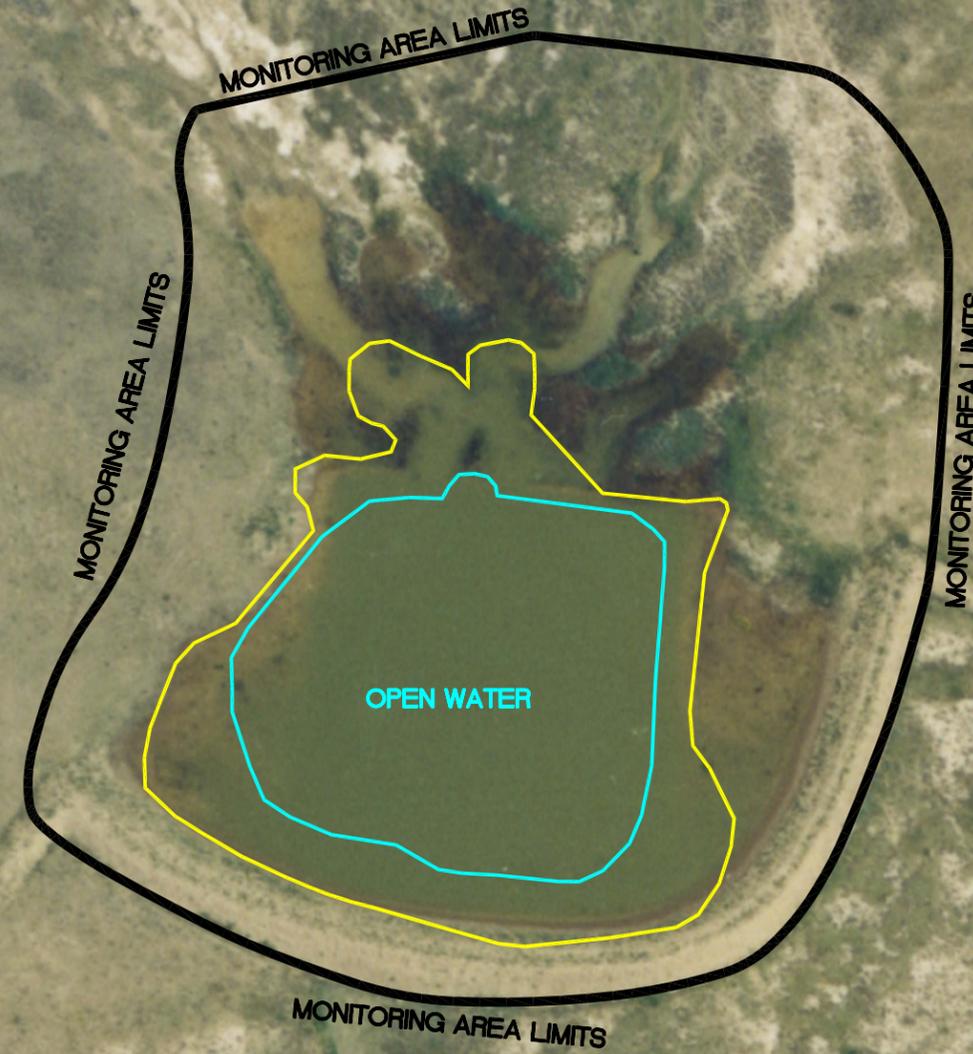


SCALE 1"= 100 ft

Legend

- Monitoring Area Limits
- Open Water Limits
- Emergent Wetland Limit
- Base photograph July 17, 2001

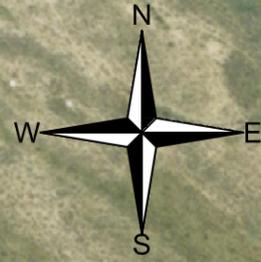
- WETLAND AREAS (emergent)**
- Gross Wetland Area =1.63 Acres
 - Open Water Area =0.94 Acres
 - Net Wetland Area =0.69 Acres



PROJ NO: 330054.412 W5 FILE NAME: W06BASE.dwg SCALE: 1"= 100ft LOCATION: Ridgeway Complex W5	DRAWN: RA CHECKED: APPVD: BD PROJ MGR: BD	PROJECT NAME MDT Ridgeway Complex W5 Wetland Mitigation DRAWING TITLE Mapped Site Features 2004
SHEET NUMBER 3 OF		
REV 02 DATE: 06/27/05		



Figure 2 Monitoring Activity Locations 2004



SCALE 1"= 150 ft

Legend

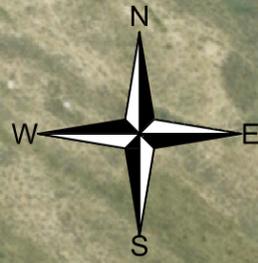
- Monitoring Area Limits
 - Photograph Point
 - Aerial Reference Point
 - Soil Sample
- Base photograph July 17, 2001



PROJ NO: 330054.412 W6 FILE NAME: W06BASE.dwg SCALE: 1"= 150 ft LOCATION: Ridgeway Complex	DRAWN: RA CHECKED: APPVD: BD PROJ MGR: BD	PROJECT NAME MDT Ridgeway Complex W-6 Wetland Mitigation DRAWING TITLE Monitoring Activity Locations 2004
SHEET NUMBER 2 OF REV 02 DATE: 06/27/05		



Figure 3 Mapped Site Features 2004

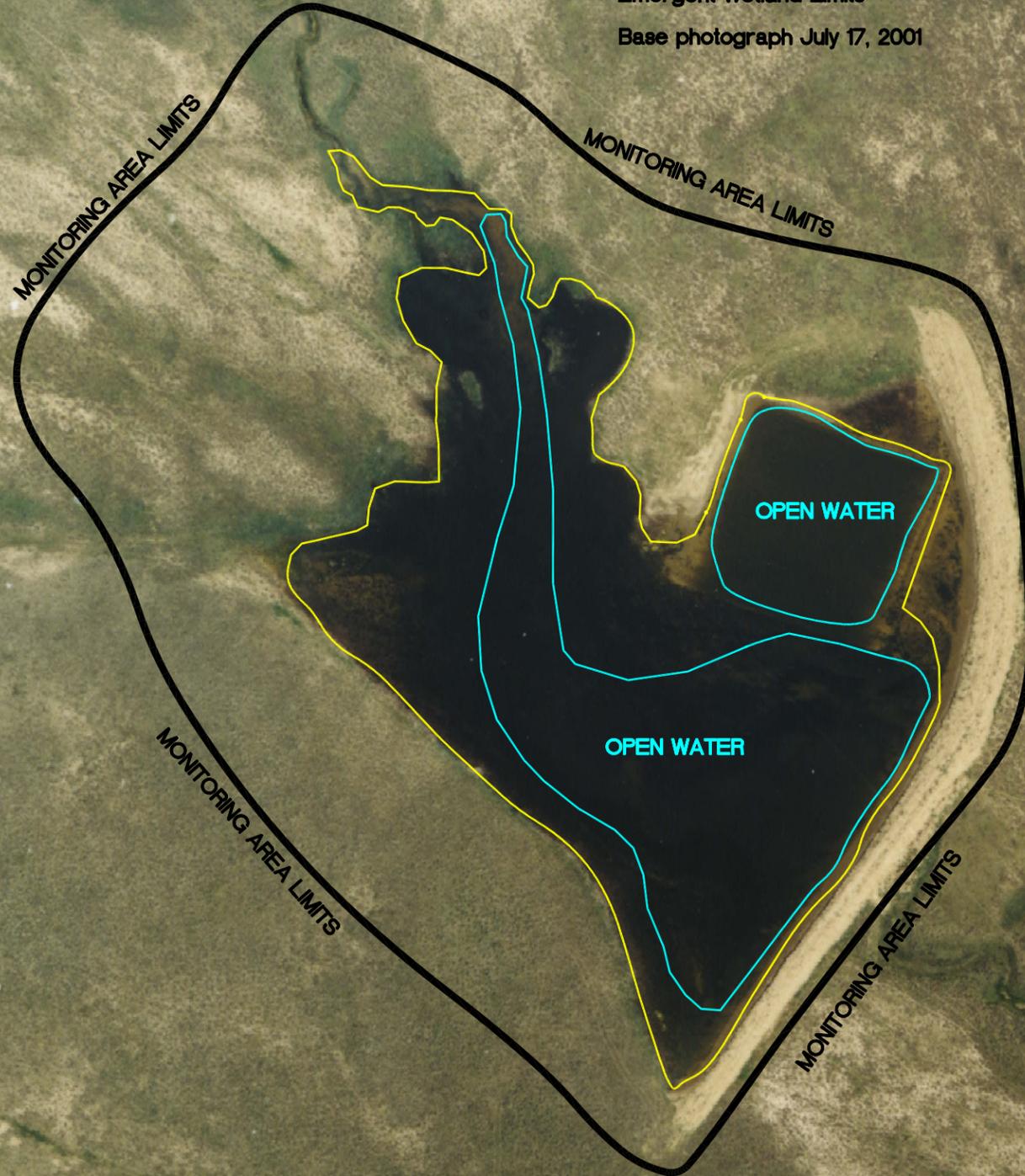


SCALE 1"= 150 ft

Legend

- Monitoring Area Limits
 - Open Water Limits
 - Emergent Wetland Limits
- Base photograph July 17, 2001

WETLAND AREA (emergent)
 Gross Wetland Area =6.07 Acres
 Open Water Area =3.08 Acres
 Net Wetland Area =2.99 Acres



PROJ NO: 330054.412 W6 FILE NAME: W06BASE.dwg SCALE: 1"= 150 ft LOCATION: Ridgeway Complex	DRAWN: RA CHECKED: APPVD: BD PROJ MGR: BD	PROJECT NAME MDT Ridgeway Complex W-6 Wetland Mitigation DRAWING TITLE Mapped Site Features 2004
		SHEET NUMBER 3 OF REV 02 DATE: 06/27/05

Figure 2 Monitoring Activity Locations 2004



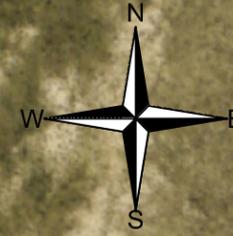
PROJECT NAME MDT Ridgeway Complex W-7 & W-8 Wetland Mitigation	
DRAWING TITLE Monitoring Activity Locations 2004	
PROJ NO: 330054.412 W7-8	DRAWN: RA
FILE NAME: W0708BASE.dwg	CHECKED:
SCALE: 1"= 100ft	APPVD: BD
LOCATION: Ridgeway Complex	PROJ MGR: BD
LAND & WATER CONSULTING, INC. P.O. BOX 8254 MISSOULA, MT 59807	
SHEET NUMBER 2 OF	
REV 02 DATE: 06/27/05	

Figure 3 Mapped Site Features 2004



Legend

- Monitoring Area Limits
- Vegetation
- W-7 Net Wetland 0.44 Acres
- W-8 Net Wetland 0.21 Acres
- Base photograph July 17, 2001

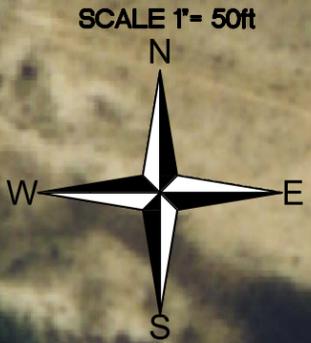


SCALE 1"= 100ft

PROJ NO: 330054.412 W7-8 FILE NAME: W0708BASE.dwg SCALE: 1"= 100ft LOCATION: Ridgeway Complex	DRAWN: RA CHECKED: APPVD: BD PROJ MGR: BD	PROJECT NAME MDT Ridgeway Complex W-7 & W-8 Wetland Mitigation DRAWING TITLE Mapped Site Features 2004
SHEET NUMBER <div style="text-align: center; font-size: 2em; font-weight: bold;">3</div> OF REV 02 DATE: 06/27/05		



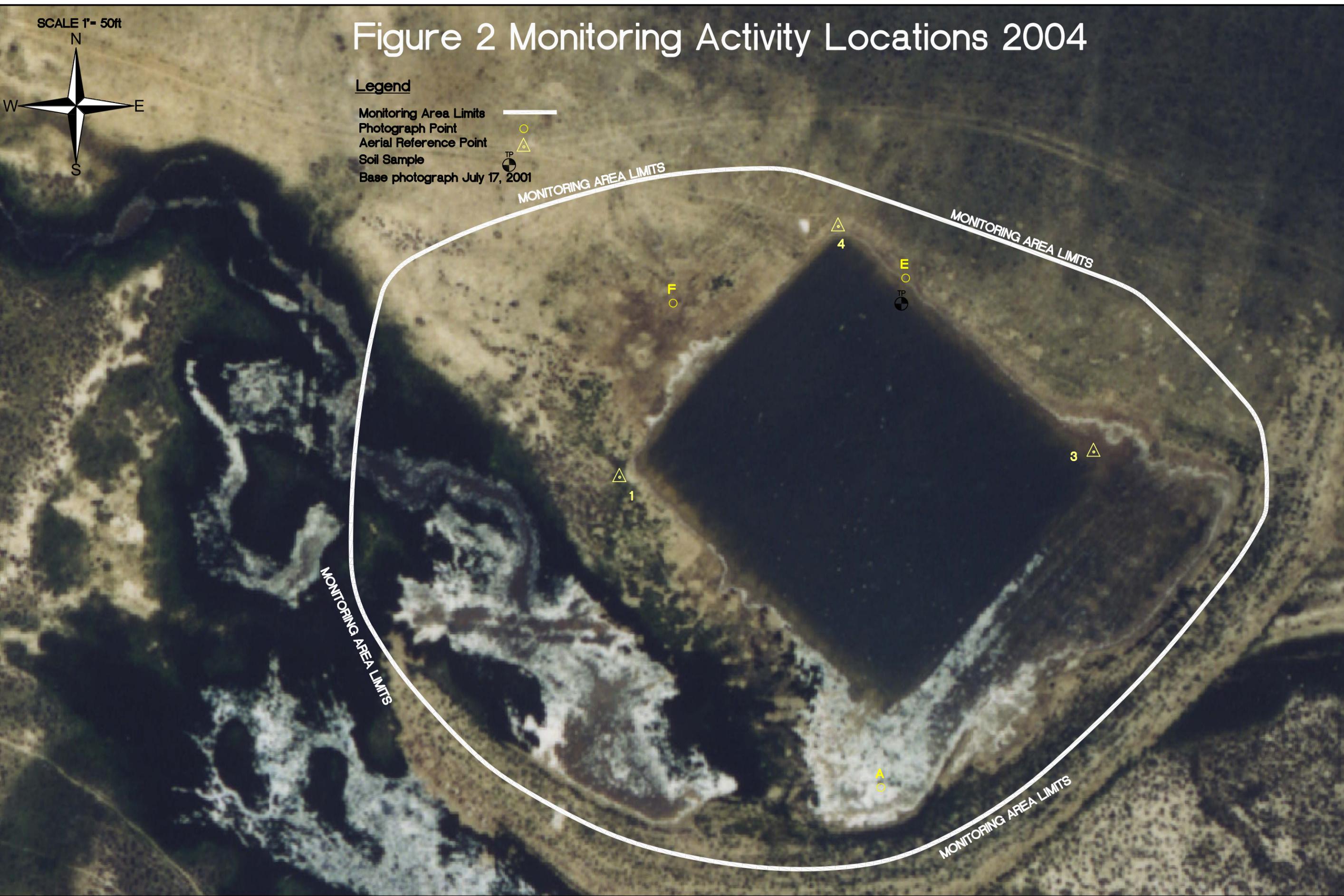
Figure 2 Monitoring Activity Locations 2004



SCALE 1"= 50ft

Legend

- Monitoring Area Limits
- Photograph Point
- Aerial Reference Point
- Soil Sample
- Base photograph July 17, 2001



<p>PROJ NO: 330054.412 W10 FILE NAME: W10BASE.dwg SCALE: 1"= 50ft LOCATION: Ridgeway Complex</p>	<p>DRAWN: RA/SH CHECKED: APPVD: BD PROJ MGR: BD</p>	<p>PROJECT NAME MDT Ridgeway Complex W-10 Wetland Mitigation</p> <p>DRAWING TITLE Monitoring Activity Locations 2004</p>
<p>SHEET NUMBER</p> <p style="font-size: 2em; font-weight: bold;">2</p> <p>OF</p>		
<p>REV 02 DATE: 06/27/05</p>		



SCALE 1"= 50ft

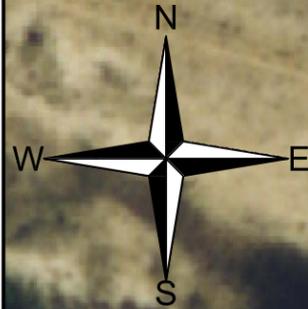
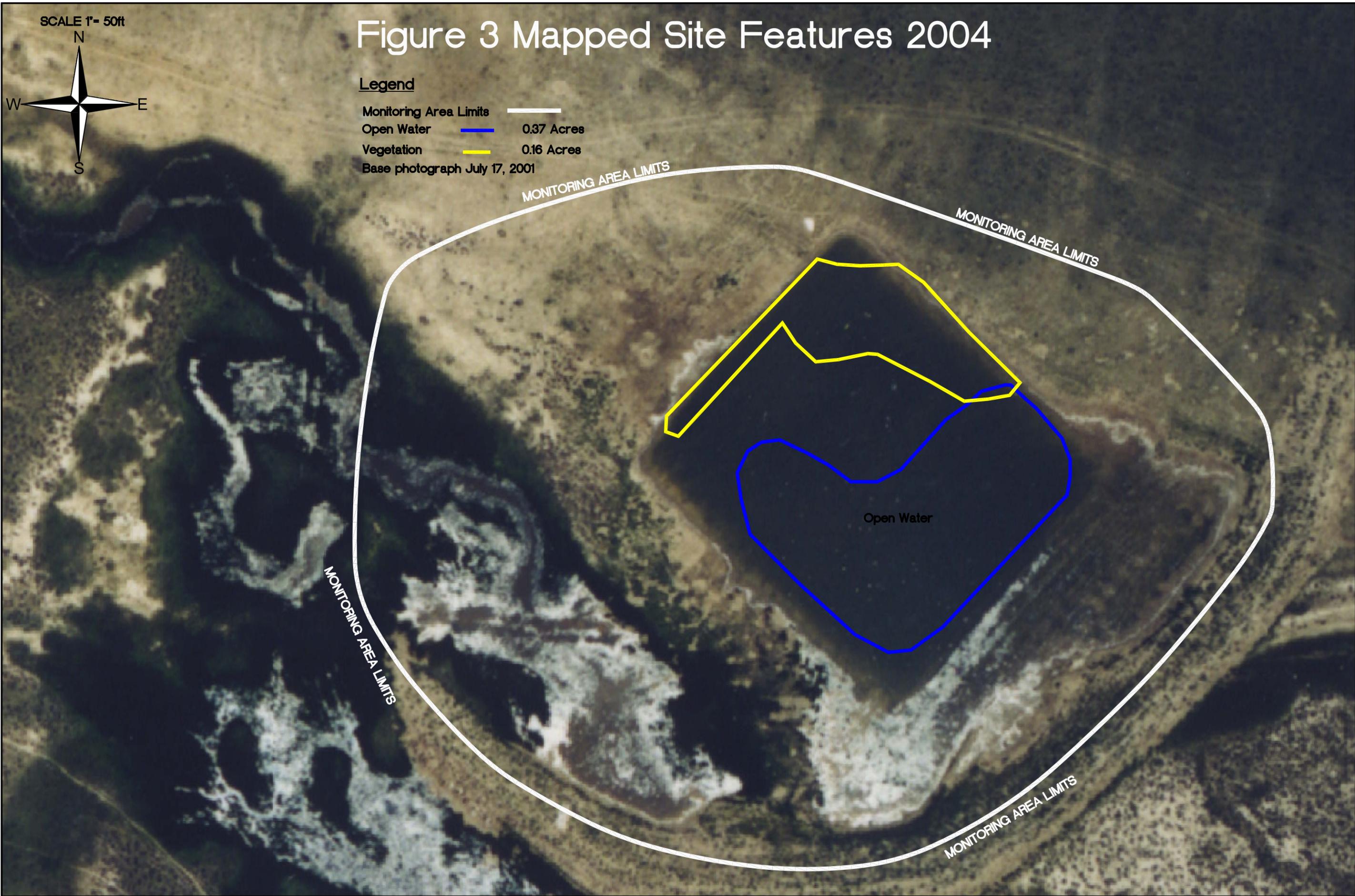


Figure 3 Mapped Site Features 2004

Legend

- Monitoring Area Limits
 - Open Water 0.37 Acres
 - Vegetation 0.16 Acres
- Base photograph July 17, 2001



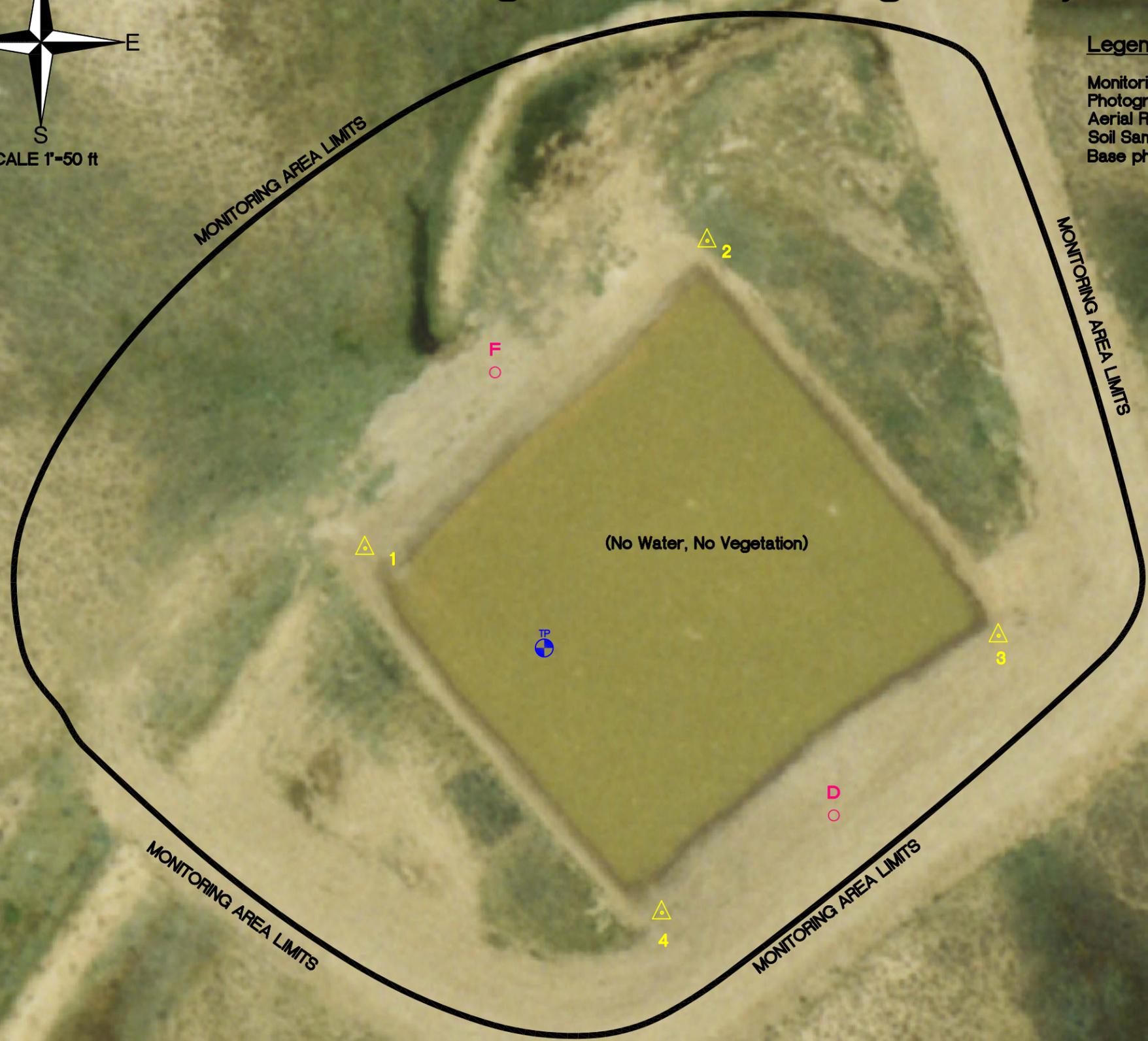
PROJ NO: 330054.412 W10 FILE NAME: W10BASE.dwg SCALE: 1"= 50ft LOCATION: Ridgeway Complex	DRAWN: RA/SH CHECKED: APPVD: BD PROJ MGR: BD	MDT Ridgeway Complex W-10 Wetland Mitigation Mapped Site Features 2004
<p>LAND & WATER CONSULTING, INC. P.O. BOX 8254 Missoula, MT 59807</p>		SHEET NUMBER <div style="font-size: 2em; font-weight: bold; display: inline-block;">3</div> OF REV 02 DATE: 06/27/05

Figure 2 Monitoring Activity Locations 2004



Legend

- Monitoring Area Limits
- Photograph Points ○
- Aerial Reference Point ⊕
- Soil Sample △
- Base photograph July 17, 2001



PROJ NO: 330054.412 W11 FILE NAME: W11BASE.dwg SCALE: 1"= 50ft LOCATION: Ridgeway Complex	DRAWN: RA CHECKED: APPVD: BD PROJ MGR: BD	PROJECT NAME MDT Ridgeway Complex W-11 Wetland Mitigation DRAWING TITLE Monitoring Activity Locations 2004
SHEET NUMBER <div style="text-align: center; font-size: 2em; font-weight: bold;">2</div> OF REV 02 DATE: 06/27/05		



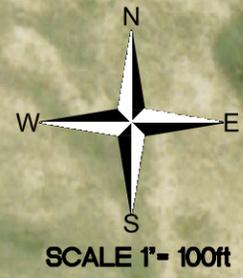
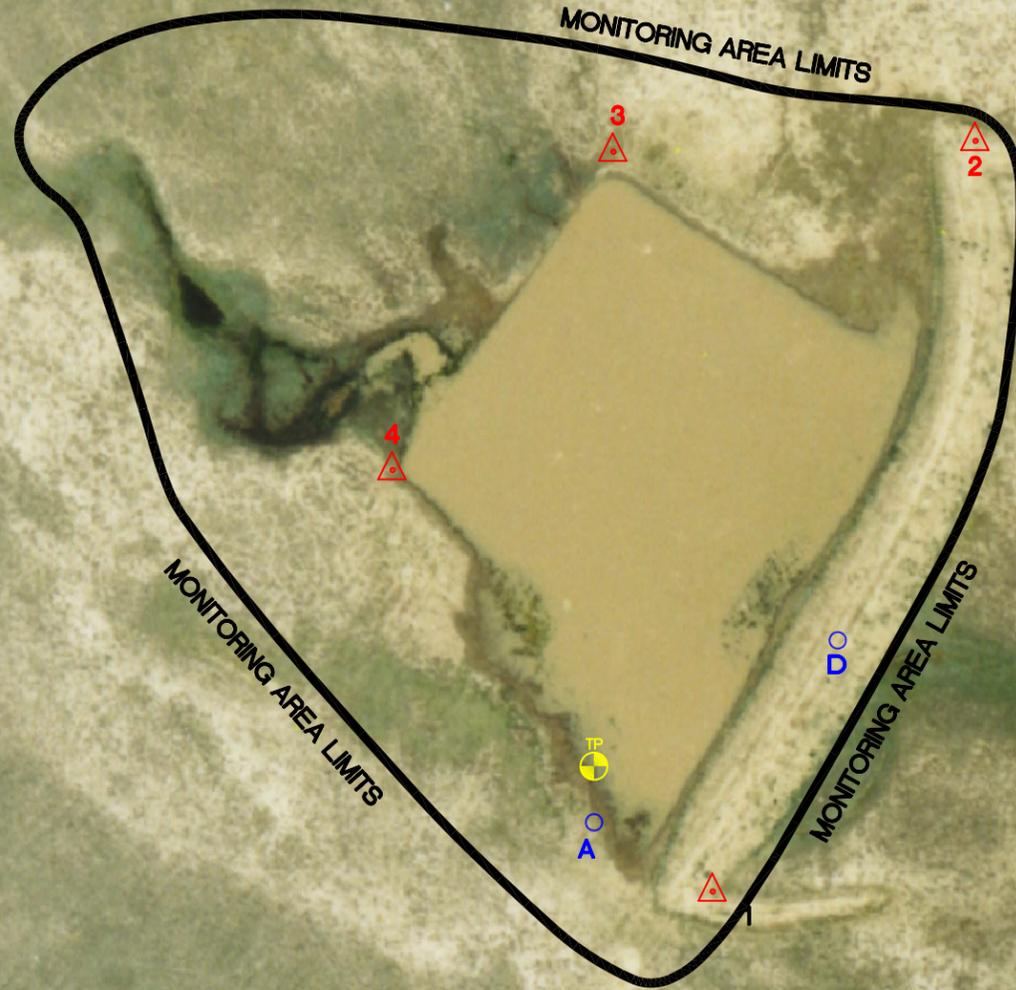


Figure 2 Monitoring Activity Locations 2004

Legend

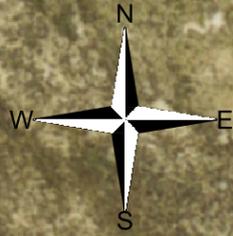
- Monitoring Area Limits
- Photograph Point
- Aerial Reference Point
- Soil Sample
- Base photograph July 17, 2001



PROJ NO: 330054.412 W12 FILE NAME: W12BASE.dwg SCALE: 1"= 100ft LOCATION: Ridgeway Complex	DRAWN: RA/SH CHECKED: APPVD: BD PROJ MGR: BD	PROJECT NAME MDT Ridgeway Complex W-12 Wetland Mitigation DRAWING TITLE Monitoring Activity Locations 2004
SHEET NUMBER <div style="text-align: center; font-size: 2em; font-weight: bold;">2</div> OF .		REV 02 DATE: 06/27/05



Figure 3 Mapped Site Features 2004



SCALE 1"= 100ft

Legend

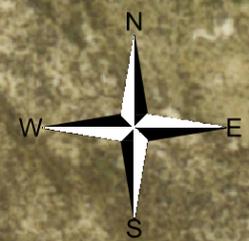
- Monitoring Area Limits
- Open Water Limits
- Emergent Wetland Limits
- Base photograph July 17, 2001

WETLAND AREAS:
 Gross Wetland Area -2.72 Acres
 Open Water -0.98 Acres
 Net Wetland Area -1.74 Acres



PROJ NO: 330054.412 W13 FILE NAME: W13BASE.dwg SCALE: 1"= 100ft LOCATION: Ridgeway Complex	DRAWN: RA/SH CHECKED: APPVD: BD PROJ MGR: BD	PROJECT NAME MDTRidgeway Complex W-13 Wetland Mitigation DRAWING TITLE Mapped Site Features 2004
		SHEET NUMBER 3 OF REV 02 DATE: 06/27/05

Figure 2 Monitoring Activity Locations 2004

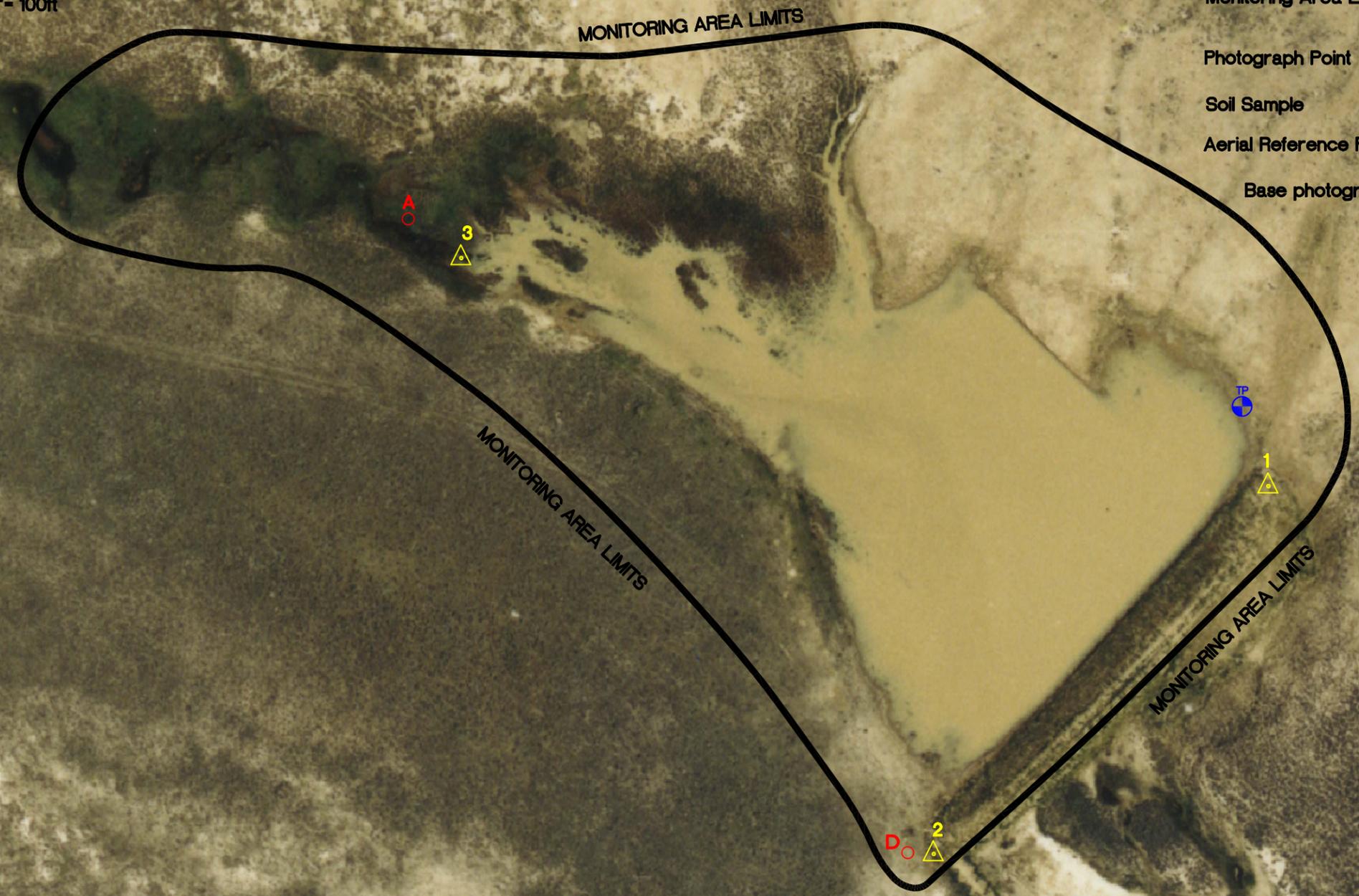


SCALE 1"= 100ft

Legend

- Monitoring Area Limits
- Photograph Point
- Soil Sample
- Aerial Reference Point

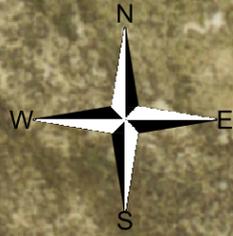
Base photograph July 17, 2001



PROJ NO: 330054.412 W13 FILE NAME: W13BASE.dwg SCALE: 1"= 100ft LOCATION: Ridgeway Complex	DRAWN: RA/SH CHECKED: APPVD: BD PROJ MGR: BD	PROJECT NAME MDTRidgeway Complex W-13 Wetland Mitigation DRAWING TITLE Monitoring Activity Locations 2004
SHEET NUMBER 2 OF REV 02 DATE: 06/27/05		



Figure 3 Mapped Site Features 2004



SCALE 1"= 100ft

Legend

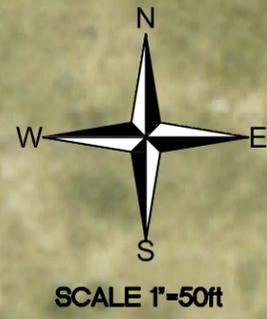
- Monitoring Area Limits
- Open Water Limits
- Emergent Wetland Limits
- Base photograph July 17, 2001

WETLAND AREAS:
 Gross Wetland Area -2.72 Acres
 Open Water -0.98 Acres
 Net Wetland Area -1.74 Acres

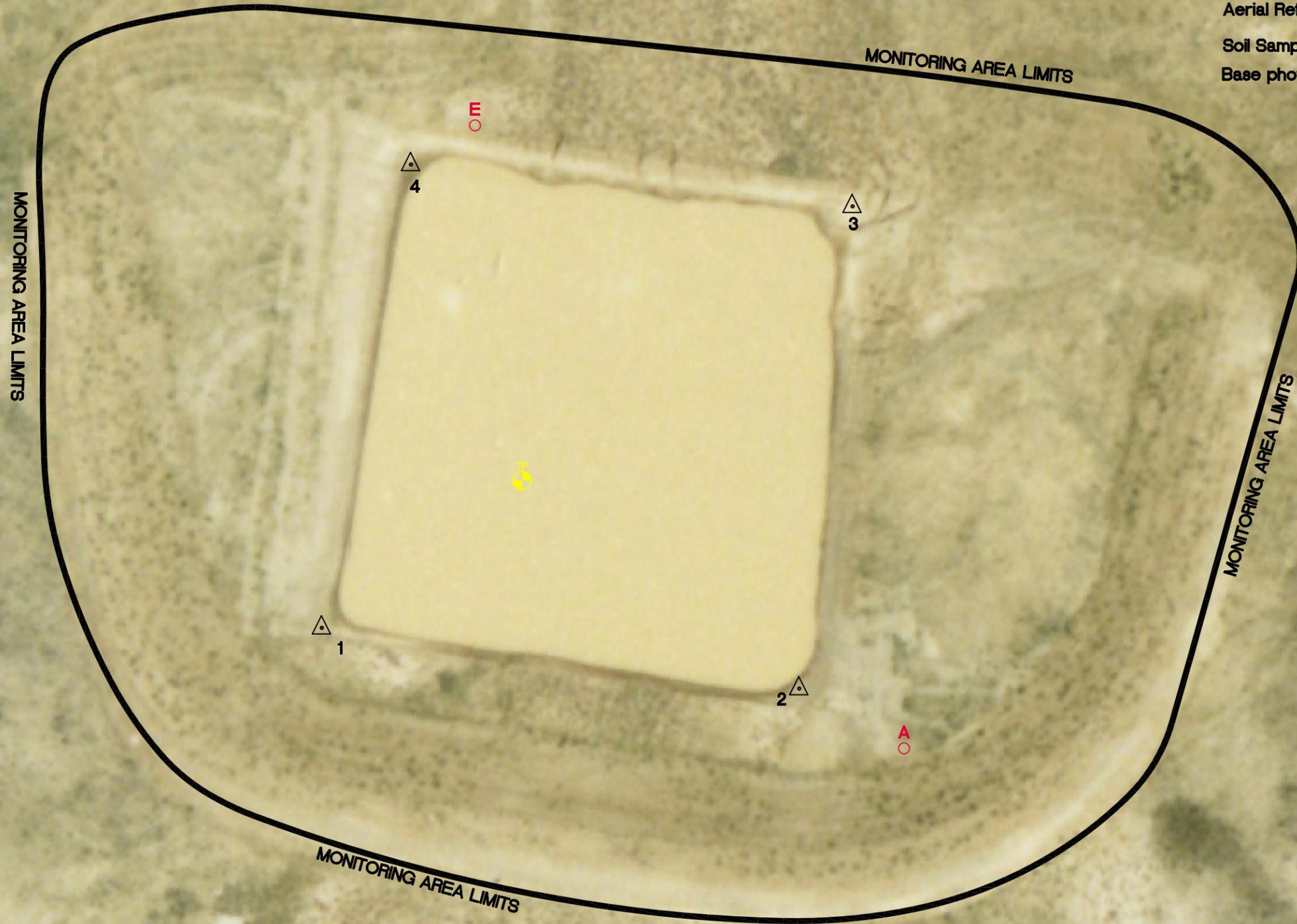


PROJ NO: 330054.412 W13 FILE NAME: W13BASE.dwg SCALE: 1"= 100ft LOCATION: Ridgeway Complex	DRAWN: RA/SH CHECKED: APPVD: BD PROJ MGR: BD	PROJECT NAME MDTRidgeway Complex W-13 Wetland Mitigation DRAWING TITLE Mapped Site Features 2004
		SHEET NUMBER 3 OF REV 02 DATE: 06/27/05

Figure 2 Monitoring Activity Locations 2004



- Legend**
- Monitoring Area Limits
 - Photograph Point ○
 - Aerial Reference Point △
 - Soil Sample ⊕
 - Base photograph July 17, 2001



PROJ NO: 330054.412 W14 FILE NAME: W14BASE.dwg SCALE: 1"=50ft LOCATION: Ridgeway Complex	DRAWN: RA/SH CHECKED: APPVD: BD PROJ MGR: BD	PROJECT NAME MDT Ridgeway Complex W-14 Wetland Mitigation DRAWING TITLE Monitoring Activity Locations 2004
SHEET NUMBER <div style="text-align: center; font-size: 24px; font-weight: bold;">2</div> OF REV 02 DATE: 06/27/05		



Figure 3 Mapped Site Features 2004

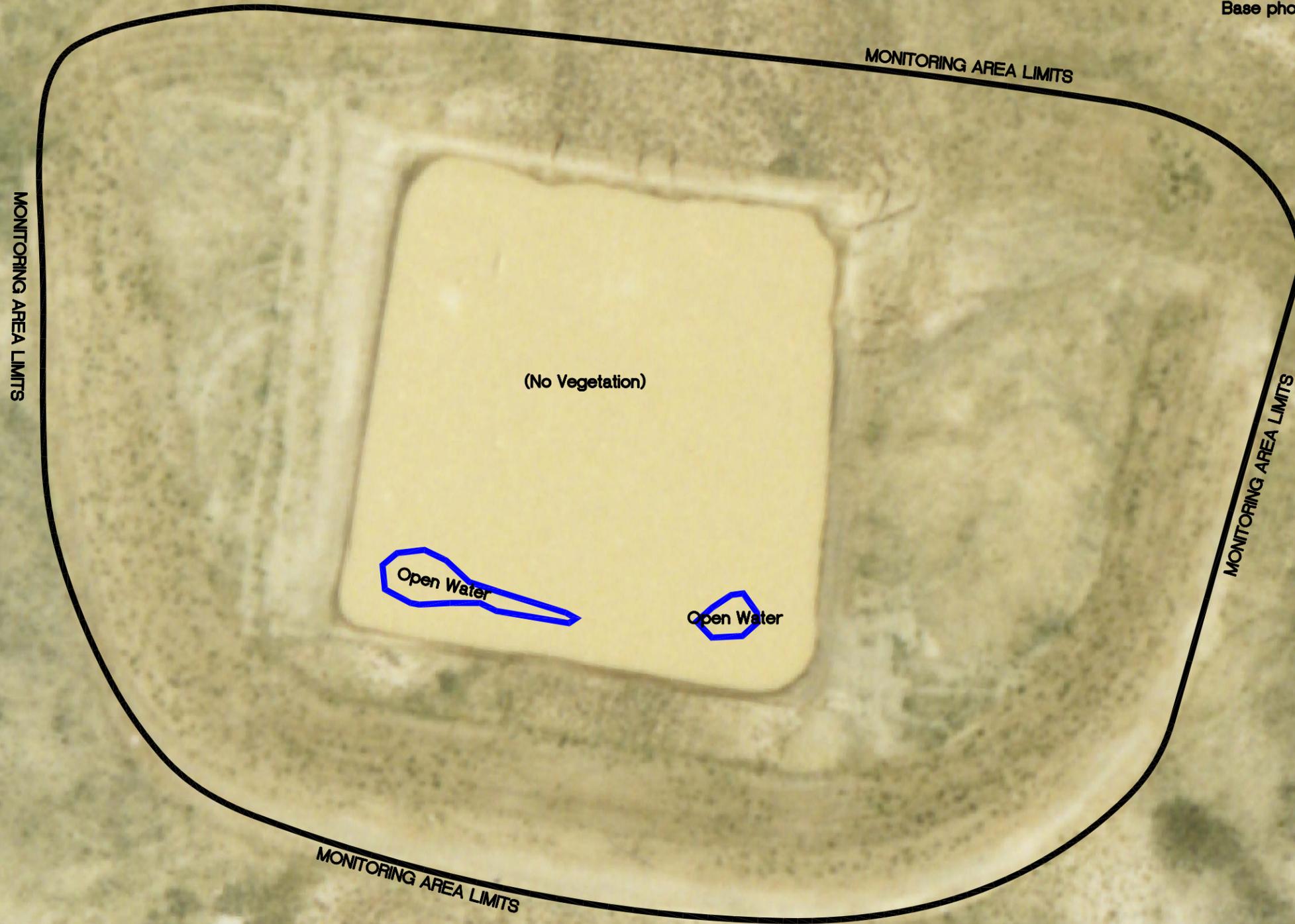


Legend

Monitoring Area Limits

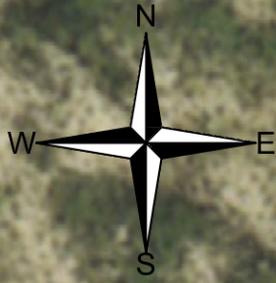
Open Water 0.03 Acres

Base photograph July 17, 2001



PROJECT NAME		MDT Ridgeway Complex W-14 Wetland Mitigation	
DRAWING TITLE		Mapped Site Features 2004	
PROJ NO:	330054.412 W14	DRAWN:	RA/SH
FILE NAME:	W14BASE.dwg	CHECKED:	
SCALE:	1" = 50ft	APPVD:	BD
LOCATION:	Ridgeway Complex	PROJ MGR:	BD
			
SHEET NUMBER		3 OF	
REV 02		DATE: 06/27/05	

Figure 2 Monitoring Activity Locations 2004



SCALE 1" = 50ft

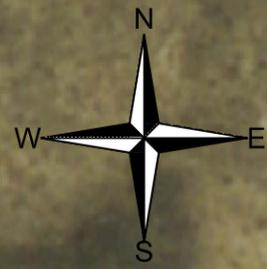
Legend

- Monitoring Area Limits 
- Photograph Point 
- Aerial Reference Point 
- Base photograph July 17, 2001



PROJECT NAME MDT Ridgeway Complex W-15 Wetland Mitigation		PROJ NO: 330054.412 W15	DRAWN: RA
DRAWING TITLE Monitoring Activity Locations 2004		FILE NAME: W15BASE.dwg	CHECKED:
		SCALE: 1" = 50ft	APPRVD: BD
		LOCATION: Ridgeway Complex	PROJ MGR: BD
		SHEET NUMBER	
		2 OF	
		REV 02	
		DATE: 06/27/05	

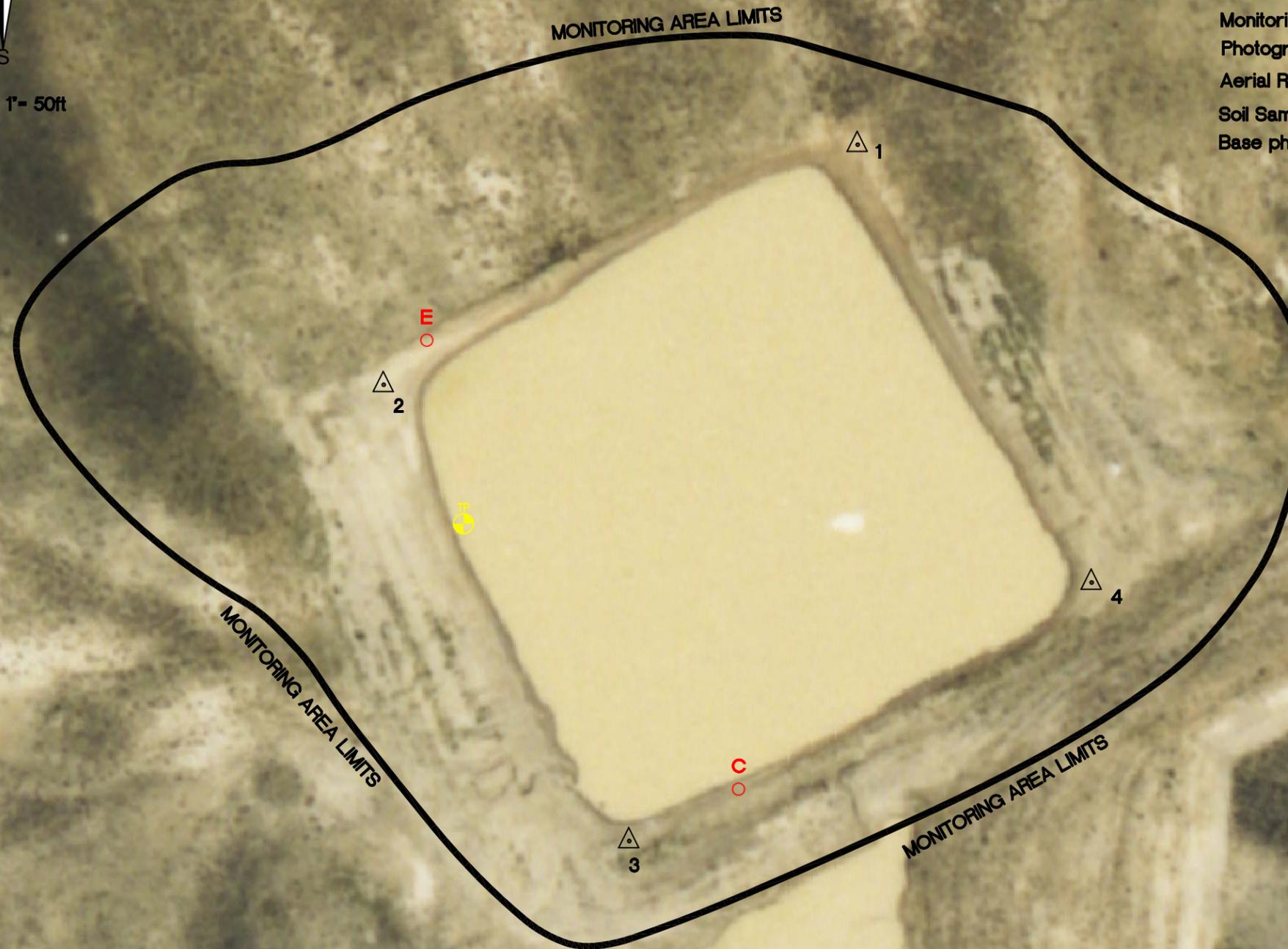
Figure 2 Monitoring Activity Locations 2004



SCALE 1" = 50ft

Legend

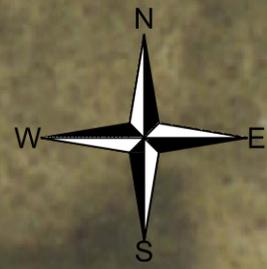
- Monitoring Area Limits
- Photograph Point
- Aerial Reference Point
- Soil Sample
- Base photograph July 17, 2001



PROJ NO: 330054.412 W16 FILE NAME: W16BASE.dwg SCALE: 1" = 50ft LOCATION: Ridgeway Complex	DRAWN: RA/SH CHECKED: APPVD: BD PROJ MGR: BD	PROJECT NAME MDT Ridgeway Complex W-16 Wetland Mitigation DRAWING TITLE Monitoring Activity Locations 2004
SHEET NUMBER 2 OF REV 02 DATE: 06/27/05		



Figure 3 Mapped Site Features 2004



SCALE 1"= 50ft

Legend

Monitoring Area Limits

Open Water Limits

Base photograph July 17, 2001



OPEN WATER
0.77 Acres
(No Vegetation)

MONITORING AREA LIMITS

MONITORING AREA LIMITS

MONITORING AREA LIMITS

PROJECT NAME		MDT Ridgeway Complex W-16 Wetland Mitigation	
DRAWING TITLE		Mapped Site Features 2004	
PROJ NO:	330054.412 W16	DRAWN:	RAVSH
FILE NAME:	W16BASE.dwg	CHECKED:	
SCALE:	1"= 50ft	APPVD:	BD
LOCATION:	Ridgeway Complex	PROJ MGR:	BD
			
SHEET NUMBER		3 OF	
REV 02		DATE: 06/27/05	

Appendix H

WETLANDS 1 - 8 AND 10 - 16: 2004 WETLAND DELINEATION FORMS

*MDT Wetland Mitigation Monitoring
Ridgeway Wetland
Ekalaka, Montana*

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Ridgeway Complex</u>	Date: <u>7/26/04</u>
Applicant/Owner: <u>MDT</u>	County: <u>Carter</u>
Investigator: <u>Lynn Bacon, Land & Water Consulting</u>	State: <u>MT</u>
Do Normal Circumstances exist on the site: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Emergent</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: _____
Is the area a potential Problem Area?: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>W-1</u>

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	ELEPAL	H	OBL	9			
2				10			
3				11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 1/1=100%

Though vegetation in this horseshoe area (where SP is) is all ELEPAL, there is only 10% cover, not enough to qualify as a wetland. No vegetation in the excavated area, though inundated.

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks): _____ Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs _____ Other _____ No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input checked="" type="checkbox"/> Water Marks _____ Drift Lines _____ Sediment Deposits <input checked="" type="checkbox"/> 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)
Field Observations: Depth of Surface Water: <u>NA</u> (in.) Depth to Free Water in Pit: <u>3"</u> (in.) Depth to Saturated Soil: <u>0</u> (in.)	

Remarks:
SP in horseshoe area in EM veg community. Excavated area inundated but no veg.

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

Project/Site: <u>Ridgeway Complex</u> Applicant/Owner: <u>MDT</u> Investigator: <u>Lynn Bacon, Land & Water Consulting</u>	Date: <u>7/26/04</u> County: <u>Carter</u> State: <u>MT</u>
Do Normal Circumstances exist on the site: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is the area a potential Problem Area?: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Community ID: <u>Emergent</u> Transect ID: _____ Plot ID: <u>W-2</u>

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	ELEPAL	H	OBL	9			
2	ALIPLA	H	OBL	10			
3	ELEACI	H	OBL	11			
4	ALOAEQ	H	OBL	12			
5	AGRSMI	H	FACU	13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 5/5 = 100%

Open-water area completely surrounded by wetland veg community and has increased since 2003.

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input checked="" type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input checked="" type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>NA</u> (in.) Depth to Free Water in Pit: <u>NA</u> (in.) Depth to Saturated Soil: <u>0"</u> (in.)	
Remarks: Approximately 95% of wetland is inundated.	

SOILS

Map Unit Name (Series and Phase):	Bickerdyke Clay (87A)	Drainage Class: <u>well</u>	Field Observations
Taxonomy (Subgroup):	<u>Udorthentic Chromusterts</u>	Confirm Mapped Type? <u>X</u> Yes <u> </u> No	

Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
10	A	2.5Y4/3	10YR 4/6	prom/mod	silt clay

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

This particular pit revealed marginal soil (4/3) matrix; hydric soils still developing and not unusual to see darker and heavier mottled soils at surface.

WETLAND DETERMINATION

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

Remarks:
Wetland continues to develop.

SOILS

Map Unit Name		Bickerdyke Clay (87A)		Drainage Class: <u>well</u>	
(Series and Phase):				Field Observations	
Taxonomy (Subgroup):		<u>Udorthentic Chromusterts</u>		Confirm Mapped Type? <u>X</u> Yes <u> </u> No	
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
10	A	2.5Y 4/3	10YR 5/6	faint/few	silt clay
Hydric Soil Indicators:					
<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input checked="" type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors		<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in surface Layer in Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)			
marginal soils, still developing					

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Remarks: Wetland continues to develop.	

Approved by HQUSACE 2/92

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

Project/Site: <u>Ridgeway Complex</u> Applicant/Owner: <u>MDT</u> Investigator: <u>Lynn Bacon, Land & Water Consulting</u>	Date: <u>7/26/04</u> County: <u>Carter</u> State: <u>MT</u>
Do Normal Circumstances exist on the site: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is the area a potential Problem Area?: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Community ID: <u>Emergent</u> Transect ID: _____ Plot ID: <u>W-4</u>

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	ELEPAL. (dominant)	H	OBL	9			
2	ELEACI	H	OBL	10			
3				11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 2/2=100%

Wetland veg community inundated on day of investigation; increase in veg community since 2003.

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input checked="" type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input checked="" type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>NA</u> (in.) Depth to Free Water in Pit: <u>8"</u> (in.) Depth to Saturated Soil: <u>0"</u> (in.)	
Remarks: Wetland inundated. Water crystal clear.	

SOILS

Map Unit Name (Series and Phase):	Bickerdyke Clay (87A)	Drainage Class: <u>well</u>	Field Observations
Taxonomy (Subgroup):	<u>Udorthentic Chromusterts</u>	Confirm Mapped Type? <u>X</u> Yes <u> </u> No	

Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
10"	A	2.5Y 5/2	2.5Y 5/6	faint mod	silt clay

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

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X	Yes	No	Is this Sampling Point Within a Wetland? X Yes No
Wetland Hydrology Present?	<u>X</u>	Yes	<u> </u> No	
Hydric Soils Present?	<u>X</u>	Yes	<u> </u> No	

Remarks:

Wetland continues to develop.

Approved by HQUSACE 2/92

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Ridgeway Complex</u>	Date: <u>7/26/04</u>
Applicant/Owner: <u>MDT</u>	County: <u>Carter</u>
Investigator: <u>Lynn Bacon, Land & Water Consulting</u>	State: <u>MT</u>
Do Normal Circumstances exist on the site: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Emergent</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: _____
Is the area a potential Problem Area?: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>W-8</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 ALIPLA	H	OBL	9		
2 ELEPAL	H	OBL	10		
3 ELEACI	H	OBL	11		
4			12		
5			13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 3/3=100%

Excavated area dry, 55% w/ vegetation cover, 50% of that is hydrophytic (diversity does not show in photo).

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks): _____ Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs _____ Other _____ No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: _____ Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input checked="" type="checkbox"/> 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)
Field Observations: Depth of Surface Water: <u>NA</u> (in.) Depth to Free Water in Pit: <u>NA</u> (in.) Depth to Saturated Soil: <u>0"</u> (in.)	
Remarks: Bottom of excavated area surface dry.	

SOILS

Map Unit Name (Series and Phase):	Bickerdyke Clay (87A)	Drainage Class: <u>well</u>	Field Observations
Taxonomy (Subgroup):	<u>Udorthentic Chromusterts</u>	Confirm Mapped Type? <u>X</u> Yes <u> </u> No	

Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
10"	A	5Y 4/1			clay

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

WETLAND DETERMINATION

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

Remarks:

Poorly developed "Wetland", very little water in W-8 while many of the created wetlands in the complex do have water. This area may require re-evaluation to increase stormwater collection.

Approved by HQUSACE 2/92

SOILS

Map Unit Name (Series and Phase):	Bickerdyke Clay (87A)	Drainage Class: <u>well</u>	Field Observations
Taxonomy (Subgroup):	<u>Udorthentic Chromusterts</u>	Confirm Mapped Type? <u>X</u> Yes <u> </u> No	

Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
10"	A	2.5Y 3/1, 5/3 (mostly)			silt clay

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

WETLAND DETERMINATION

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

Remarks:
 Wetland is beginning to develop.

Approved by HQUSACE 2/92

SOILS

Map Unit Name (Series and Phase):	Marvan Silty Clay	Drainage Class: <u>well</u>
Taxonomy (Subgroup):		Field Observations Confirm Mapped Type? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
10"	A	2.5Y 3/2			silt clay

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

No mottles, soil very dry

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
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Remarks:
 Wetland has not developed; may need to re-evaluate design to increase stormwater collection.

Approved by HQUSACE 2/92

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Ridgeway Complex</u>	Date: <u>7/26/04</u>
Applicant/Owner: <u>MDT</u>	County: <u>Carter</u>
Investigator: <u>Lynn Bacon, Land & Water Consulting</u>	State: <u>MT</u>
Do Normal Circumstances exist on the site: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Emergent</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: _____
Is the area a potential Problem Area?: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>W-12</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 <u>ELEPAL</u>	<u>H</u>	<u>OBL</u>	9 _____		
2 _____			10 _____		
3 _____			11 _____		
4 _____			12 _____		
5 _____			13 _____		
6 _____			14 _____		
7 _____			15 _____		
8 _____			16 _____		
Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). <u>1/1=100%</u>					
Wetland vegetation >50% of area.					

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks): _____ Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs _____ Other _____ No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input checked="" type="checkbox"/> Water Marks _____ Drift Lines _____ Sediment Deposits <input checked="" type="checkbox"/> 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)
Field Observations: Depth of Surface Water: <u>NA</u> (in.) Depth to Free Water in Pit: <u>1"</u> (in.) Depth to Saturated Soil: <u>0"</u> (in.)	
Remarks: Wetland ~90% inundated.	

SOILS

Map Unit Name (Series and Phase):	Vaeda silty clay loam	Drainage Class:	
Taxonomy (Subgroup):		Field Observations	
		Confirm Mapped Type?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
10"	A	2.5Y 4/1			silt clay

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

WETLAND DETERMINATION

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

Remarks:

Wetland improving and currently well-developed.

Approved by HQUSACE 2/92

SOILS

Map Unit Name (Series and Phase):	Vaeda silty clay loam	Drainage Class: _____
Taxonomy (Subgroup):	_____	Field Observations
		Confirm Mapped Type? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
10"	A	2.5Y 5/3	Gley 1 4/10Y	5%, fine	silt clay

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

hydric soil developing

WETLAND DETERMINATION

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

Remarks:

Wetland continues to improve, WL veg. becoming more diverse and extensive.

Approved by HQUSACE 2/92

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Ridgeway Complex</u>	Date: <u>7/26/04</u>
Applicant/Owner: <u>MDT</u>	County: <u>Carter</u>
Investigator: <u>Lynn Bacon, Land & Water Consulting</u>	State: <u>MT</u>
Do Normal Circumstances exist on the site: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Emergent</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: _____
Is the area a potential Problem Area?: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>W-14</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 none			9		
2			10		
3			11		
4			12		
5			13		
6			14		
7			15		
8			16		

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

no vegetation at all.

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks): _____ Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs _____ Other _____ No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: _____ Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input checked="" type="checkbox"/> 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)
Field Observations: Depth of Surface Water: <u>NA</u> (in.) Depth to Free Water in Pit: <u>NA</u> (in.) Depth to Saturated Soil: <u>6"</u> (in.)	
Remarks: No surface water.	

SOILS

Map Unit Name (Series and Phase):	Vaeda silty clay loam	Drainage Class: _____
Taxonomy (Subgroup):	_____	Field Observations
		Confirm Mapped Type? _____ Yes <input checked="" type="checkbox"/> No

Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
10"	A	2.5Y 4/2			silt clay

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

Yellow crumbly soil not in pit this year (only 1 pit, but seen in # 16). No mottles.

WETLAND DETERMINATION

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

Remarks:
 Wetland is not developing; area requires re-evaluation to improve stormwater collection.

Approved by HQUSACE 2/92

SOILS

Map Unit Name		Vaeda silty clay loam		Drainage Class: _____	
(Series and Phase):		_____		Field Observations	
Taxonomy (Subgroup):		_____		Confirm Mapped Type? _____ Yes <u>X</u> No	
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
10"	A	2.5Y 4/2			silt clay
Hydric Soil Indicators:					
_____ Histosol		_____ Concretions		_____ High Organic Content in surface Layer in Sandy Soils	
_____ Histic Epipedon		_____ Sulfidic Odor		_____ Organic Streaking in Sandy Soils	
_____ Aquic Moisture Regime		_____ Reducing Conditions		_____ Listed on Local Hydric Soils List	
_____ Gleyed or Low-Chroma Colors		_____ Other (Explain in Remarks)		_____ Listed on National Hydric Soils List	
Not a hydric soil.					

WETLAND DETERMINATION

<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:60%;">Hydrophytic Vegetation Present?</td> <td style="width:10%; text-align: center;">Yes</td> <td style="width:10%; text-align: center;"><u>X</u></td> <td style="width:10%; text-align: center;">No</td> </tr> <tr> <td>Wetland Hydrology Present?</td> <td style="text-align: center;"><u>X</u></td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">_____ No</td> </tr> <tr> <td>Hydric Soils Present?</td> <td style="text-align: center;">_____ Yes</td> <td style="text-align: center;"><u>X</u></td> <td style="text-align: center;">No</td> </tr> </table>	Hydrophytic Vegetation Present?	Yes	<u>X</u>	No	Wetland Hydrology Present?	<u>X</u>	Yes	_____ No	Hydric Soils Present?	_____ Yes	<u>X</u>	No	<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:60%;">Is this Sampling Point Within a Wetland?</td> <td style="width:10%; text-align: center;">_____ Yes</td> <td style="width:10%; text-align: center;"><u>X</u></td> <td style="width:10%; text-align: center;">_____ No</td> </tr> </table>	Is this Sampling Point Within a Wetland?	_____ Yes	<u>X</u>	_____ No
Hydrophytic Vegetation Present?	Yes	<u>X</u>	No														
Wetland Hydrology Present?	<u>X</u>	Yes	_____ No														
Hydric Soils Present?	_____ Yes	<u>X</u>	No														
Is this Sampling Point Within a Wetland?	_____ Yes	<u>X</u>	_____ No														
Remarks: Wetland is not developing; area requires re-evaluation to improve stormwater collection.																	

Approved by HQUSACE 2/92

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Ridgeway Complex</u>	Date: <u>7/26/04</u>
Applicant/Owner: <u>MDT</u>	County: <u>Carter</u>
Investigator: <u>Lynn Bacon, Land & Water Consulting</u>	State: <u>MT</u>
Do Normal Circumstances exist on the site: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Emergent</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Transect ID: _____
Is the area a potential Problem Area?: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>W-16</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 none			9		
2			10		
3			11		
4			12		
5			13		
6			14		
7			15		
8			16		

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

no vegetation

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks): _____ Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs _____ Other _____ No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input checked="" type="checkbox"/> Water Marks _____ Drift Lines <input checked="" type="checkbox"/> 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)
Field Observations: Depth of Surface Water: <u>NA</u> (in.) Depth to Free Water in Pit: <u>1"</u> (in.) Depth to Saturated Soil: <u>0"</u> (in.)	
Remarks: Surface water present, but may not have water often enough to promote wetland vegetation colonization.	

SOILS

Map Unit Name		Vaeda silty clay loam		Drainage Class: _____	
(Series and Phase):		_____		Field Observations	
Taxonomy (Subgroup):		_____		Confirm Mapped Type? _____ Yes <u>X</u> No	
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
10"	2.5Y 7/8				crumbly yellow silt/clay?
	5Y 8/4				(similar to what was obs. in # 14 2003).
Hydric Soil Indicators:					
_____ Histosol		_____ Concretions			
_____ Histic Epipedon		_____ High Organic Content in surface Layer in Sandy Soils			
_____ Sulfidic Odor		_____ Organic Streaking in Sandy Soils			
_____ Aquic Moisture Regime		_____ Listed on Local Hydric Soils List			
_____ Reducing Conditions		_____ Listed on National Hydric Soils List			
_____ Gleyed or Low-Chroma Colors		_____ Other (Explain in Remarks)			
Not a hydric soil.					

WETLAND DETERMINATION

<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:30%;">Hydrophytic Vegetation Present?</td> <td style="width:10%; text-align: center;">Yes</td> <td style="width:10%; text-align: center;"><u>X</u></td> <td style="width:10%; text-align: center;">No</td> <td></td> </tr> <tr> <td>Wetland Hydrology Present?</td> <td style="text-align: center;"><u>X</u></td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">No</td> </tr> <tr> <td>Hydric Soils Present?</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;"><u>X</u></td> <td style="text-align: center;">No</td> </tr> <tr> <td></td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> <td></td> <td></td> </tr> </table>	Hydrophytic Vegetation Present?	Yes	<u>X</u>	No		Wetland Hydrology Present?	<u>X</u>	Yes	_____	No	Hydric Soils Present?	_____	Yes	<u>X</u>	No		_____	_____			<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:70%;">Is this Sampling Point Within a Wetland?</td> <td style="width:10%; text-align: center;">Yes</td> <td style="width:10%; text-align: center;"><u>X</u></td> <td style="width:10%; text-align: center;">No</td> </tr> <tr> <td></td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> <td></td> </tr> </table>	Is this Sampling Point Within a Wetland?	Yes	<u>X</u>	No		_____	_____	
Hydrophytic Vegetation Present?	Yes	<u>X</u>	No																										
Wetland Hydrology Present?	<u>X</u>	Yes	_____	No																									
Hydric Soils Present?	_____	Yes	<u>X</u>	No																									
	_____	_____																											
Is this Sampling Point Within a Wetland?	Yes	<u>X</u>	No																										
	_____	_____																											
Remarks: Wetland is not developing; area requires re-evaluation to improve stormwater collection.																													

Approved by HQUSACE 2/92

Appendix I

2004 REPRESENTATIVE PHOTOGRAPHS: WETLANDS 1 - 8 AND 10 - 16

*MDT Wetland Mitigation Monitoring
Ridgeway Wetland
Ekalaka, Montana*

2004 RIDGEWAY COMPLEX – WETLAND 1 - 8 AND 10 - 16



**WL#: 1 Location: A Description: Wetland view.
Compass Reading: 162°**



**WL#: 1 Location: D Description: Wetland view.
Compass Reading: 234°**



**WL#: 2 Location: A Description: Panoramic wetland
view. Compass Reading: 48°**



**WL#: 2 Location: B Description: Panoramic wetland
view. Compass Reading: 20°**



**WL#: 2 Location: C Description: Panoramic wetland
view. Compass Reading: 342°**



WL#: 2 Description: Adjacent to dam.

2004 RIDGEWAY COMPLEX – WETLAND 1 - 8 AND 10 - 16



**WL#: 3 Location: A Description: Wetland view.
Compass Reading: 320°**



**WL#: 3 Location: B Description: Wetland view.
Compass Reading: 58°**



**WL#: 4 Location: A Description: Wetland view.
Compass Reading: 230°**



**WL#: 4 Location: B Description: Wetland view.
Compass Reading: 16°**



**WL#: 5 Location: A Description: Wetland view.
Compass Reading: 244°**



**WL#: 5 Location: B Description: Wetland view.
Compass Reading: 50°**

2004 RIDGEWAY COMPLEX – WETLAND 1 - 8 AND 10 - 16



**WL#: 6 Location: A Description: Wetland view.
Compass Reading: 288°**



**WL#: 6 Location: B Description: Wetland view; buffer
in foreground. Compass Reading: 28°**



**WL#: 7 Location: F Description: Wetland view.
Compass Reading: 168°**



**WL#: 7 Location: E Description: Wetland view.
Compass Reading: 54° in foreground. Compass Reading:
160°**



**WL#: 8 Location: A Description: Wetland view.
Compass Reading: 116°**



WL#: 8 Location: B Description: Wetland view, buffer.

2004 RIDGEWAY COMPLEX – WETLAND 1 - 8 AND 10 - 16



**WL#: 10 Location: A Description: Wetland view.
Compass Reading: 0°**



**WL#: 10 Location: F Description: Wetland view.
Compass Reading: 126°**



**WL#: 11 Location: D Description: Wetland view.
Compass Reading: 288°**



**WL#: 11 Location: F Description: Wetland view.
Compass Reading: 100°**



**WL#: 12 Location: A Description: Wetland view.
Compass Reading: 38°**



**WL#: 12 Location: D Description: Wetland view.
Compass Reading: 270°**

2004 RIDGEWAY COMPLEX – WETLAND 1 - 8 AND 10 - 16



**WL#: 13 Location: A Description: Wetland view.
Compass Reading: 1200°**



**WL#: 14 Location: A Description: Wetland view.
Compass Reading: 326°**



**WL#: 14 Location: E Description: Wetland view.
Compass Reading: 180°**



**WL#: 15 Location: A Description: Wetland view.
Compass Reading: 38°**



**WL#: 15 Location: E Description: Wetland view.
Compass Reading: 216°**

2004 RIDGEWAY COMPLEX – WETLAND 1 - 8 AND 10 - 16



**WL#: 16 Location: C Description: Wetland view
Compass Reading: 270°**

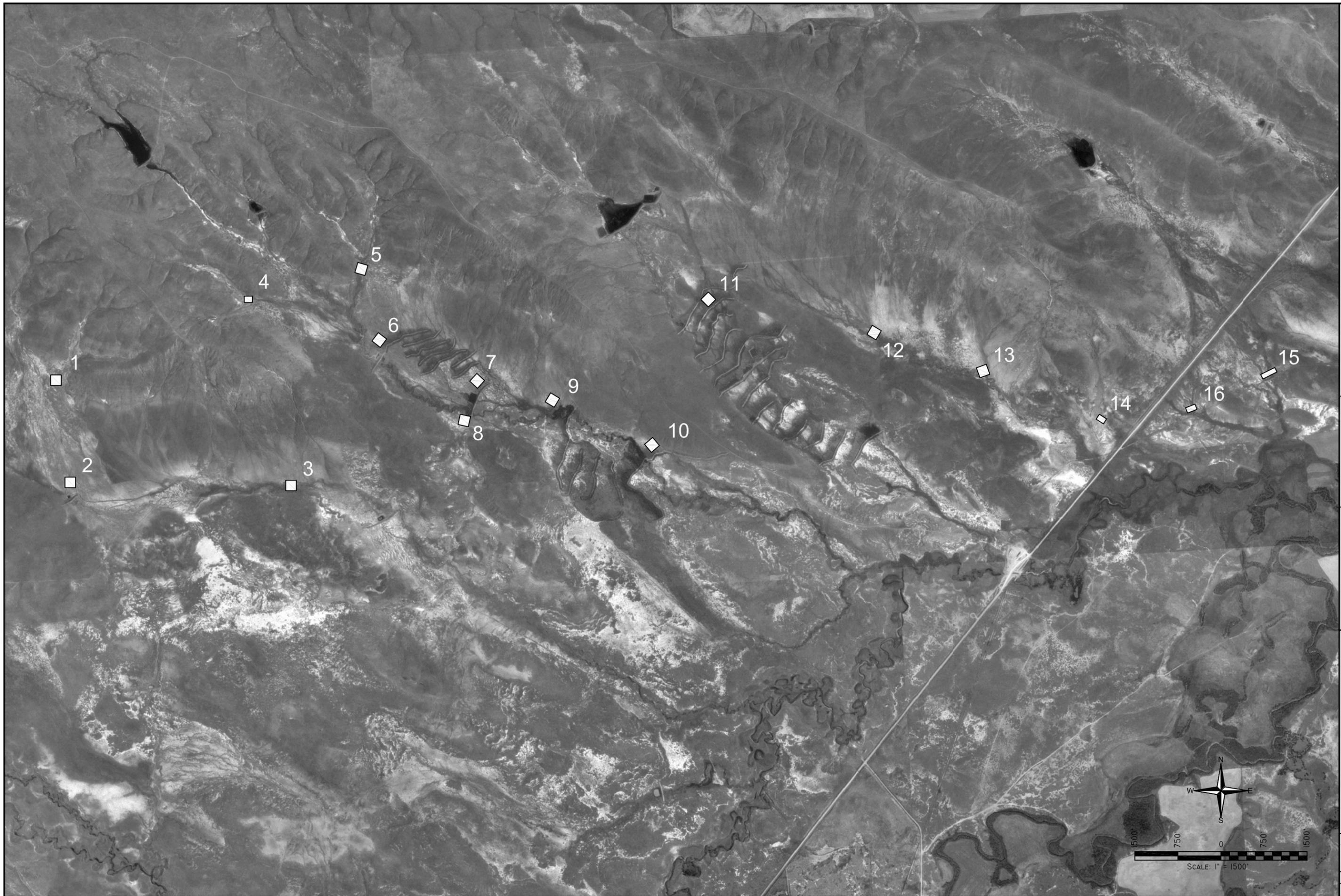


**WL#: 16 Location: E Description: Wetland view
Compass Reading: 90°**

Appendix J

**ALL WETLANDS:
FIGURE 4 DOQ WETLAND LOCATIONS
2004 AERIAL PHOTOGRAPHS**

*MDT Wetland Mitigation Monitoring
Ridgeway Wetland
Ekalaka, Montana*



PROJECT NAME MDT MITIGATION MONITORING		DRAWN: SH
DRAWING TITLE DOQ WETLAND LOCATIONS		CHECKED: LB
PROJ NO: 330054,0412	FILE NAME: Figure 4.dwg	APPVD: JB
SCALE: 1"=1500'	LOCATION: Ekalaka, MT	PROJ MGR: J.Bergland
		SHEET NUMBER
		4 OF
		REV 02
		DATE: 06/27/05

JOB: RIDGEWAY WETLANDS #1-3 ROLL: blank SCALE: 1:6000 FLT: 44 07/25/2004 12:58:53



Ridgeway Wetland #2



Ridgeway Wetland #1



#3

JOB:RIDGEMWAY WETLANDS #1-3 ROLL:blank SCALE:1:6000 FLT:44 07/25/2004 12:59:08

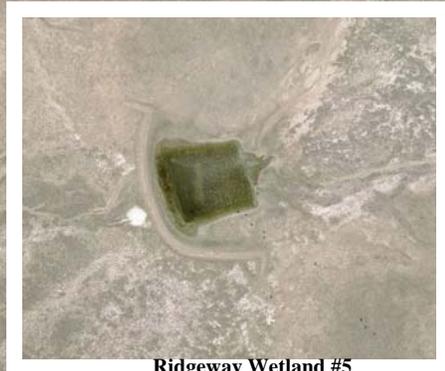


Ridgeway Wetland #3

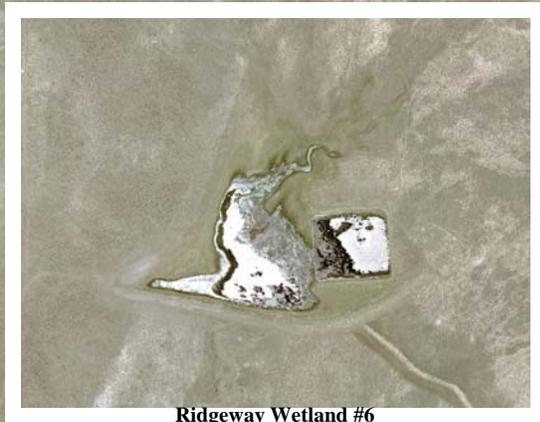
JOB: RIDGEWAY WETLANDS # 4-10 ROLL: blank SCALE: 1:6000 FLT: 44 07/25/2004 12:47:57



Ridgeway Wetland #4



Ridgeway Wetland #5



Ridgeway Wetland #6



Ridgeway Wetlands # 7 & 8

JOB: RIDGEWAY WETLANDS # 9-16 ROLL: blank SCALE: 1:6000 FLT: 44 07/25/2004 12:48:14



RidgeWay Wetlands #7 (Right) & 8 (Left)

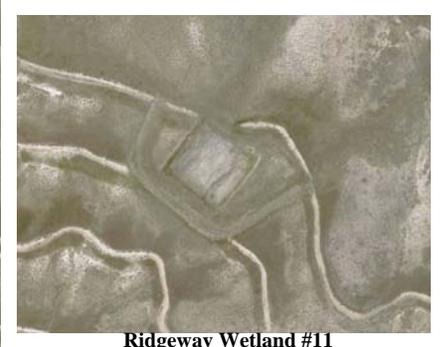


RidgeWay Wetland #9 (Full Monitoring)

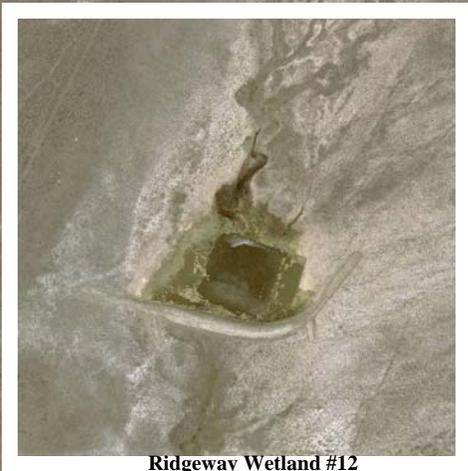


RidgeWay Wetland #10

JOB: RIDGEWAY WETLANDS #11-16... ROLL: blank SCALE: 1:6000 FLT: 44 07/25/2004 12:37:31



Ridgeway Wetland #11



Ridgeway Wetland #12

JOB: RIDGEWAY WETLANDS # 11-16_ ROLL: blank SCALE: 1:60000 FLT: 44 07/25/2004 12:37:48

WILD 1574 UAG-S
No. 13229 152.94



Ridgeway Wetland #13



Ridgeway Wetland #14

627-87

WILD 157A UAG-S
1613229 - 15794



Ridgeway Wetland #15



Ridgeway Wetland #16