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**MONTANA DEPARTMENT OF TRANSPORTATION  
WETLAND MITIGATION MONITORING REPORT: YEAR 2005**

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*Ridgeway Wetland Complex  
Ekalaka, Montana*



Prepared for:

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

December 2005

Project No: B43054.00 - 0412

Prepared by:

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



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## 1.0 INTRODUCTION

This annual report summarizes methods and results of the fifth 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 acres for a potential total of 74.5 surface acres (Rau 1999, **Appendix D**).

For this monitoring report, Wetland #9 (W-9) was sampled for the fifth season according to the full sampling protocol on July 27, 2005. 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 2005 aerial photographs during the 2005 site visit.

## 2.0 METHODS

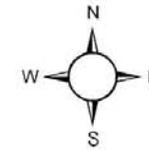
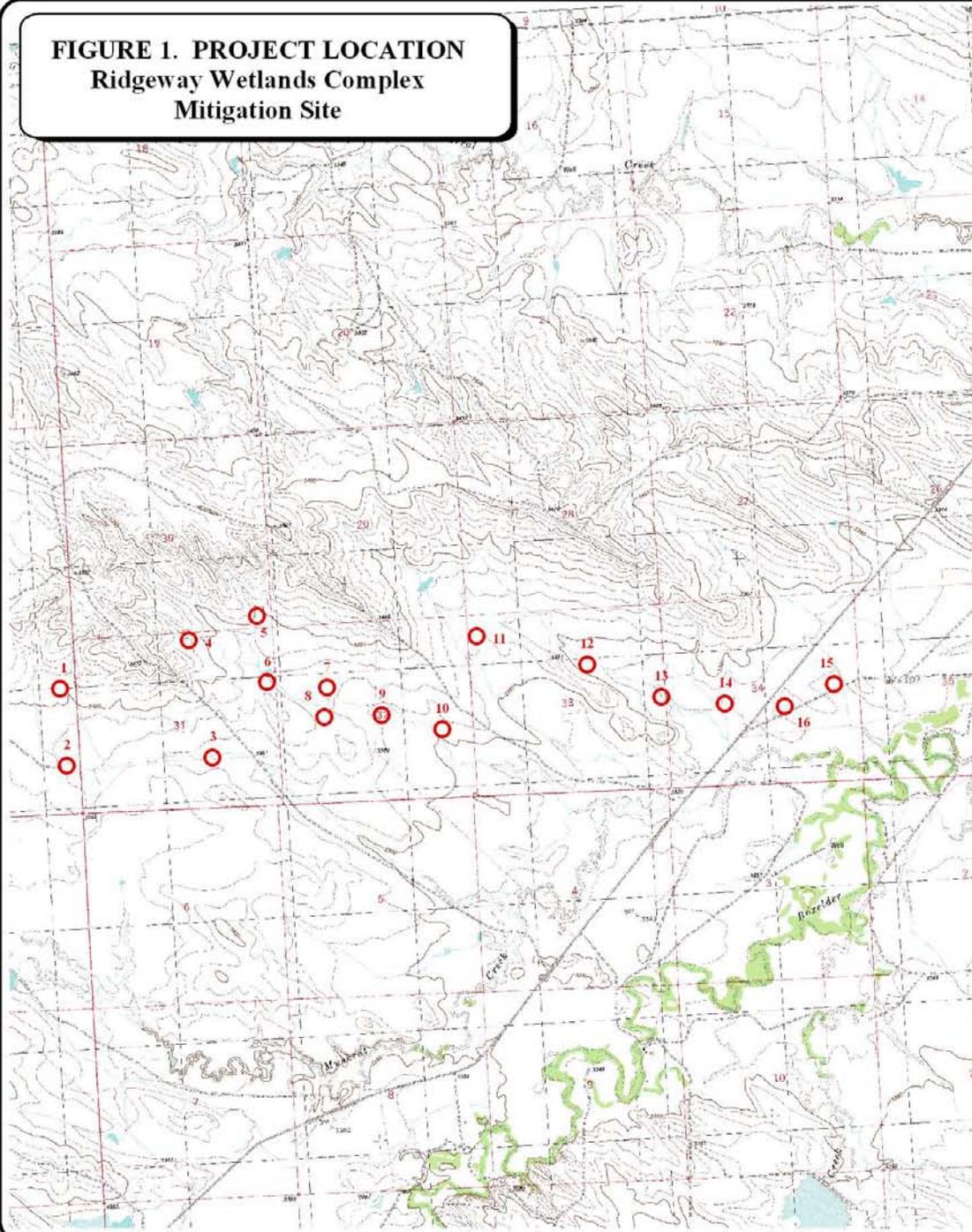
### 2.1 Monitoring Dates and Activities

All sixteen wetland sites were investigated for wetland development on July 27, 2005. 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 2005 aerial photograph (**Figure 3, Appendix A**). There are no groundwater monitoring wells at the site. Precipitation data for the year 2005 were compared to the 1952 – March 2005 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. 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 2005 aerial photographs for wetlands 1-8 and 10-16 (**Figure 3**); photo and sample point locations are depicted on **Figure 2 (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 for these sites are included in **Appendix H**.

### 2.5 Wetland Delineation

A wetland delineation for W-9 was conducted within the assessment area according to the Corps' 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, and is shown 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. 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 2005 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 27, 2005 site visit, 21% 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 – March 2005) precipitation was 13.25 inches; the average precipitation through the month of May (data for June and July, 2005 not available) was 4.86 inches. For the year 2005, precipitation through May (June and July data not available) was 5.41 inches or 111% of the mean. Drought conditions that have persisted for the last 6 years may be reversing.

### 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, *Artemisia tridentate/Atriplex argentea*; Type 2, *Typha latifolia*; Type 3, *Alisma plantago-aquatica*; Type 4, *Eleocharis palustris*; Type 5, *Hordeum jubatum*, Type 6, *Rumex crispus/Hordeum jubatum*, Type 7, *Rumex crispus*, and Type 8, *Spartina gracilis*. Dominant species within each community are listed on the monitoring form (**Appendix B**). Approximately 79% of the site has developed wetland vegetation. The site continues to increase in vegetation complexity.

**Table 1: 2001-2005 Ridgeway wetland vegetation species list.**

Scientific Name <sup>1</sup>	Region 4 (North Plains) Wetland Indicator status <sup>2</sup>
<i>Agropyron smithii</i>	FACU
<i>Alisma plantago-aquatica</i>	OBL
<i>Alopecurus pratensis</i>	FACW
<i>Alopecurus aequalis</i>	OBL
<i>Artemesia tridentata</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>Rumex crispus</i>	FACW
<i>Sagittaria cuneata</i>	OBL
<i>Salix sp</i>	FACW-OBL
<i>Scirpus heterochaetus</i>	OBL
<i>Scirpus maritimus</i>	OBL
<i>Spartina gracilis</i>	FACW
<i>Typha latifolia</i>	OBL
<i>Veronica peregrina</i>	OBL

<sup>1</sup> **Bolded** species indicate those documented within the analysis area for the first time in 2005.

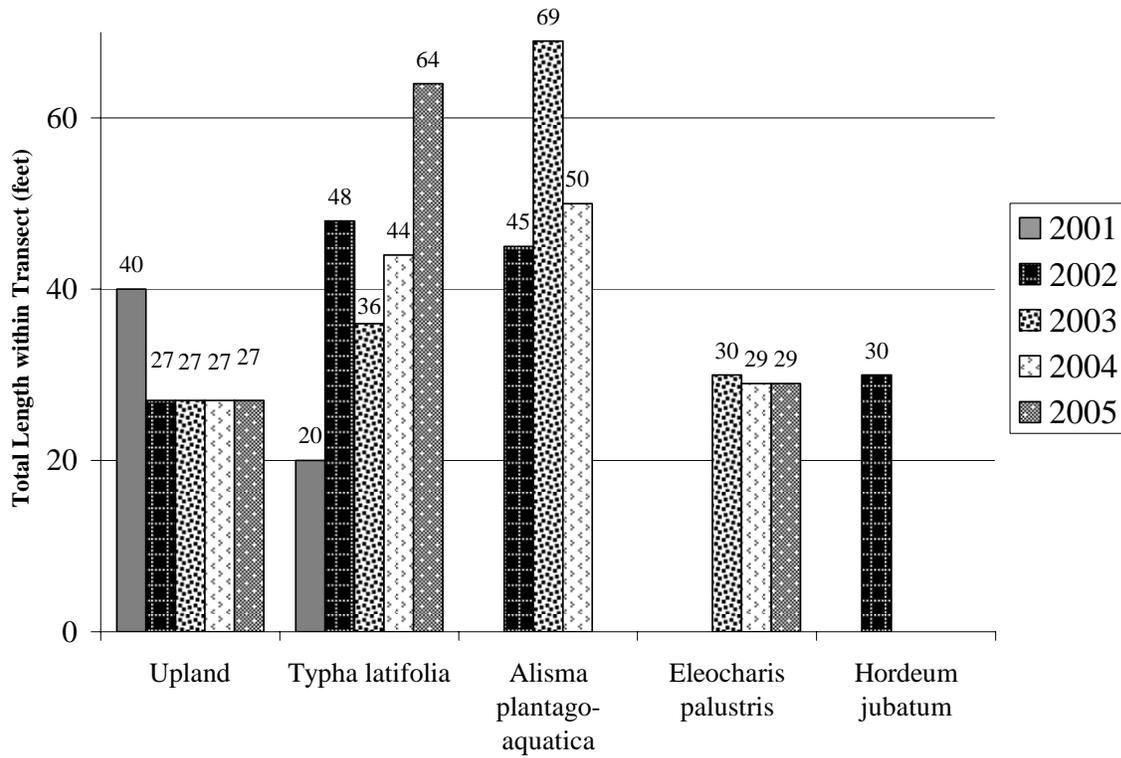
<sup>2</sup> Species either not included or classified as “non-indicator” in the National List of Plant Species that Occur in Wetlands: North Plains (Region 4); status in parentheses are probable and based on biologist's experience.

The vegetation transect results are detailed in the monitoring form (**Appendix B**) and are summarized below in **Table 2**, **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.

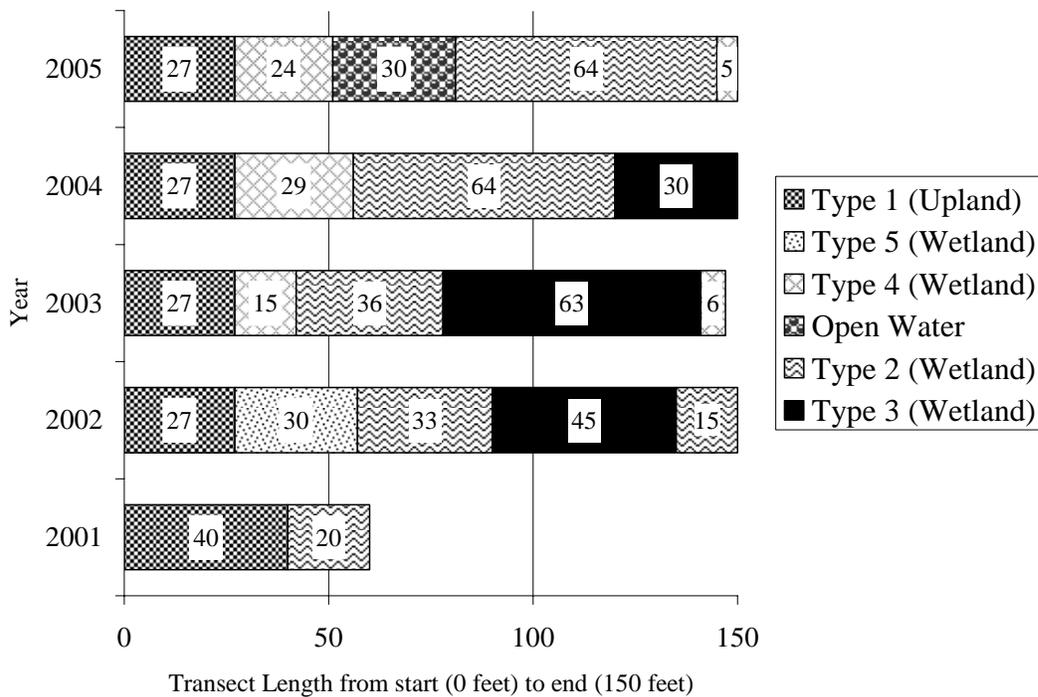
**Table 2: 2001-2005 transect data summary.**

Monitoring Year	2001	2002	2003	2004	2005
<b>Transect Length (feet)</b>	60	150	150	150	150
<b># Vegetation Community Transitions along Transect</b>	2	5	5	5	5
<b># Vegetation Communities along Transect</b>	2	4	4	4	4
<b># Hydrophytic Vegetation Communities along Transect</b>	1	3	3	3	2
<b>Total Vegetative Species</b>	7	12	9	11	10
<b>Total Hydrophytic Species</b>	4	6	5	7	6
<b>Total Upland Species</b>	3	3	4	4	4
<b>Estimated % Total Vegetative Cover</b>	53	66	78	89	65
<b>% Transect Length Comprised of Hydrophytic Vegetation Communities</b>	33	82	82	82	69
<b>% Transect Length Comprised of Upland Vegetation Communities</b>	67	18	18	18	13
<b>% Transect Length Comprised of Unvegetated Open Water</b>	0	0	0	0	20
<b>% Transect Length Comprised of Bare Substrate</b>	0	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 2002-2005). 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) (**Appendix B**). At SP-1 the soil was a black silty clay (10YR 2/1) at a depth of 10 inches. No saturation on the day of investigation was noted. 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 2005 wetland boundary encompassed 4.28 acres of gross wetland area including 0.88 acre of open-water habitat. The net wetland area was 3.4 acres; an increase of 0.34 acre. 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 five. In 2005, the number of undeveloped sites decreased to three: W-1, W-15 and W-16 (**Table 3**).

A lack of one or more of the three wetland parameters was observed at each of the undeveloped sites: W-1 had no hydrophytic vegetation but was >50% inundated and has hydric soils; W-15 and W-16 are beginning to consistently hold water, however no wetland vegetation or hydric soils have developed. In general, other constructed wetlands within the Ridgeway complex quickly develop hydric soils and wetland communities once the hydrology has developed.

As of July 2005, the gross wetland area, which includes open water and hydrophytic vegetation, totaled 32.63 acres, a 14% increase since 2004 (**Table 3 and 4**). Net emergent wetland area increased from 15.44 acres in 2004 to 26.53 acres in 2005; a 42% increase. As of the 2005 field season, approximately 65% of the 50-acre wetland creation goal had been accomplished.

### 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**. Many northern leopard frogs were observed and it is likely they are breeding and producing in Wetland 9. Adults and young American Coot and Yellow-headed Blackbirds were also observed.

**Table 3: 2005 wetland determination results for all Ridgeway wetland sites.**

SITE	WETLAND DETERMINATION <sup>1</sup>			ACREAGE			COMMENTS
	Vegetation	Hydrology	Soils	Open Water <sup>2</sup>	Net Wetland	Gross Wetland Area <sup>3</sup>	
W-1		X	X	0.56	0	0	Wetland vegetation has disappeared almost completely; as water levels stabilize colonization will occur rapidly as observed in other site wetlands.
W-2	X	X	X	0.83	5.28	6.11	Net wetland vegetation increased 50% since 2004.
W-3	X	X	X	0.74	3.25	4.02	Net wetland area increased 56% since 2004.
W-4	X	X	X	0.44	0.52	0.96	Net wetland area increased 40% since 2004.
W-5	X	X	X	0.50	0.8	1.3	Gross wetland area decreased slightly as a result of a more accurate base photo and drawing. Net area increased 14% since 2004.
W-6	X	X	X	0.28	6.44	6.72	Net wetland area has increased 54% since 2004.
W-7	X	X	X	0	0.44	0.44	Stable since 2004.
W-8	X	X	X	0	0.26	0.26	Net wetland area increased 19% since 2004.
W-9	X	X	X	0.88	3.4	4.28	Wetland comprised of >79% WL vegetation; borrow pit perimeter >90% vegetated. Wetland acreage increased 41% since 2003.
W-10	X	X	X	0.15	0.79	0.94	Net wetland area increased 80% since 2004. Drainage and associated wetland to west of excavated wetland has also increased (acreage not added to "W-10" pit wetland).
W-11	X	X	X	0	0.03	0.03	Vegetation and soil beginning to develop, water marks evident. Wetland in early stages of development.
W-12	X	X	X	1.19	1.46	1.82	Net wetland area increased 58% since 2004.
W-13	X	X	X	1.09	3.5	4.59	Net wetland area increased 50% since 2004.
W-14	X	X	X	0.14	0.27	0.27	Wetland acreage new since 2004.
W-15		X		0	0.09	0	Very scant amount of wetland vegetation; initial stages of wetland development. No hydric soil development.
W-16		X		0.89	0	0.89	Surface water present in pit; no WL vegetation.
<b>TOTAL</b>				<b>7.69</b>	<b>26.53</b>	<b>32.63</b>	

<sup>1</sup> X: Indicates "Yes".

<sup>2</sup> Open water 0-8 feet deep, varies depending on siltation rate.

<sup>3</sup> Includes open water and emergent wetland areas.

**Table 4: 2003-2005 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
2005	7.69	26.53	32.63

**Table 5: 2001-2005 wildlife species observed on the Ridgeway Complex Mitigation Site.**

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

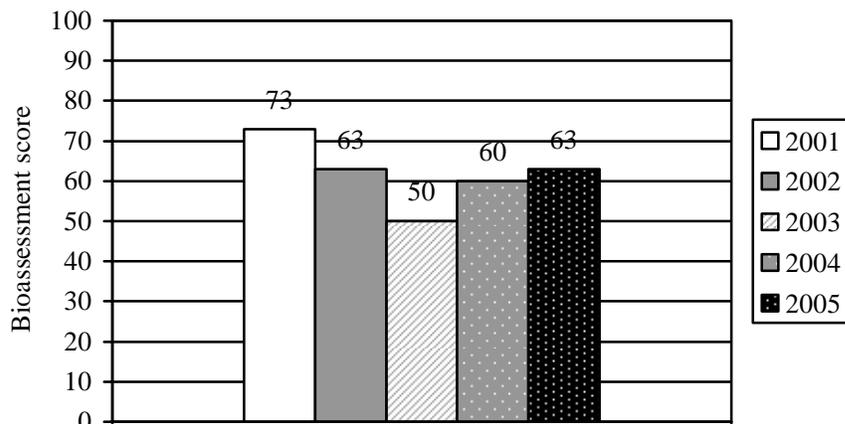
<sup>1</sup> **Bolded** species were observed in 2005.

### 3.6 Macroinvertebrates

Macroinvertebrate sampling results are provided in **Appendix F** and **Chart 3** and were summarized by Rhithron Associates in the italicized sections below (Bollman 2005).

*Although taxa richness was stable between 2004 and 2005, there was a loss of POET taxa in the period. These data suggest that water quality may have diminished between the 2 years. The dominant taxon in 2005 was the worm Nais sp., which was probably utilizing macrophyte surfaces for habitat. The water column, filamentous algae, and, to a limited degree, benthic substrates appeared to provide niches for invertebrates. Sub-optimal conditions were indicated by index performance.*

**Chart 3: Bioassessment scores from 2001-2005.**



### 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 14 percentage points to 77% since 2001; increasingly close to a Category I wetland each year.

### 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.

### 3.10 Current Credit Summary

The delineated wetland boundary at Wetland 9 is depicted on **Figure 3** in **Appendix A**. The 2005 wetland boundary encompassed 4.28 acres of gross wetland area including 0.88 acre of open-water habitat. The net emergent wetland area of W-9 was 3.4 acres, a 0.34-acre increase in cover since 2004. The communities continue to diversify and high density colonies of *Spartina* are developing, which wildlife (deer) use as cover. The hydrophytic vegetation adjacent to the borrow area has expanded to >90% of the perimeter. Functional units increased from 23.81 units in 2002 to 36.4 units in 2005. The COE and functional assessment forms are included in **Appendix B**.

The 2005 complex-wide gross wetland area was estimated at 32.63 acres, approximately 65% of the 50-acre goal. Total wetland acreage increased 11.09 acres since 2004 (see **Table 3** and **4**). Net emergent wetland area increased from 15.44 acres in 2004 to 26.53 acres in 2005.

**Table 6: Summary of 2001-2005 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	2005
Listed/Proposed T&E Species Habitat	Low (0)	Low (0)	Low (0)	Low (0)	Low (0)
MNHP Species Habitat	High (1.0)	High (1.0)	High (1.0)	High (0.8)	High (1.0)
General Wildlife Habitat	High (0.9)	Mod (0.5)	Mod (0.5)	High (.9)	High (1.0)
General Fish/Aquatic Habitat	Mod (0.6)	NA	NA	NA	NA
Flood Attenuation	Mod (0.5)	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)	High (0.9)
Sediment, Nutrient, Toxicant Removal	High (1.0)	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)	High (1.0)
Production Export/Food Chain Support	Mod (0.7)	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)	High (1.0)
Uniqueness	Mod (0.4)	Low (0.3)	Low (0.3)	Low (0.4)	Low (0.4)
Recreation/Education Potential	Low (0.1)	Low (0.1)	Low (0.5)	High (1.0)	High (1.0)
Actual Points/ Possible Points	7.9/12	6.9/11	7.3/11	8.2/11	8.5/11
% of Possible Score Achieved	66%	62%	66%	75%	77%
Overall Category	II	II	II	II	II
<b>Total Acreage of Assessed Wetlands within Easement</b>	<b>4.34<sup>1</sup></b>	<b>3.45</b>	<b>3.41</b>	<b>4.00</b>	<b>4.28</b>
<b>Functional Units (acreage x actual points)</b>	<b>34.33</b>	<b>23.80</b>	<b>25.88</b>	<b>32.80</b>	<b>36.40</b>
<b>Net Acreage Gain</b>	<b>4.34</b>	<b>3.45</b>	<b>3.41</b>	<b>4.00</b>	<b>4.28</b>
<b>Net Functional Unit Gain</b>	<b>34.33</b>	<b>23.81</b>	<b>25.88</b>	<b>32.80</b>	<b>36.40</b>
<b>Total Functional Unit "Gain"</b>	<b>34.33</b>	<b>23.81</b>	<b>25.88</b>	<b>32.80</b>	<b>36.4.</b>

<sup>1</sup> Overestimated acreage.

In 2003, seven of the constructed pond sites had not developed into wetlands; in 2004, the number of undeveloped sites decreased to five. As of 2005, only three of the 16 constructed sites are lacking in at least one of the wetland parameters. Ponding water was observed in all three of the undeveloped sites and it is expected that hydric soils and vegetation will develop within the next one to two years.

#### 4.0 REFERENCES

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- Western Regional Climate Center (WRCC). 2005. Ridgeway 1S Station:  
<http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?mtridg>

## **Appendix A**

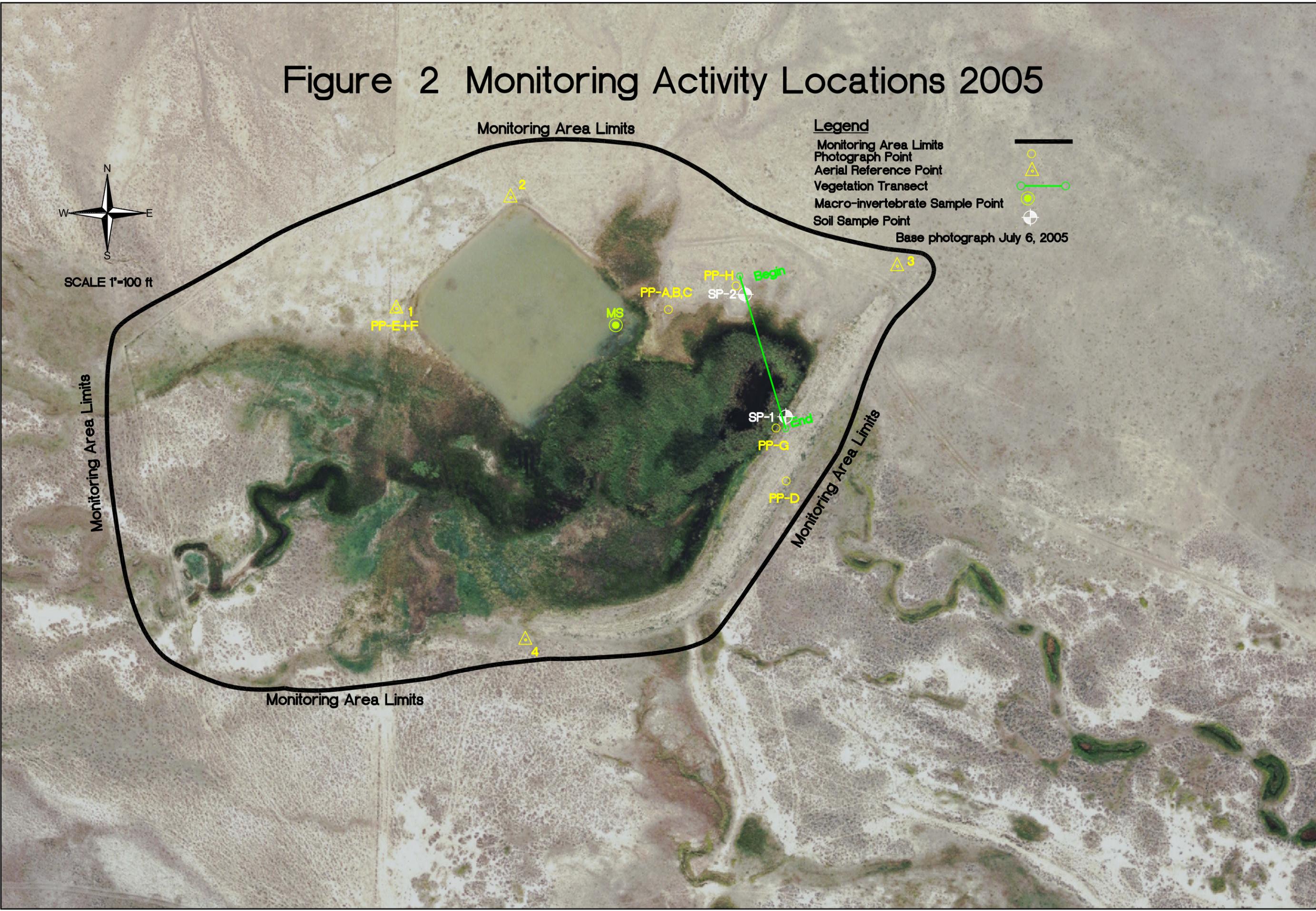
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### **WETLAND - 9: 2005 FIGURES 2 & 3**

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*MDT Wetland Mitigation Monitoring  
Ridgeway Wetland Complex  
Ekalaka, Montana*

# Figure 2 Monitoring Activity Locations 2005



**Legend**

- Monitoring Area Limits
- Photograph Point
- Aerial Reference Point
- Vegetation Transect
- Macro-invertebrate Sample Point
- Soil Sample Point +

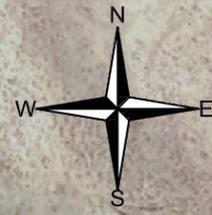
Base photograph July 6, 2005

N  
W E  
S

SCALE 1"=100 ft

PROJ NO: B43054.0412W9 LOCATION: Ridgeway Cmpkx W9 SCALE: 1"=100' FILE NAME: 2005 W09BASE.dwg	DRAWN: SH PROJ MGR: JB CHECKED: LB APPVD: JB	<b>MDT Ridgeway Complex W-9 Wetland Mitigation</b> Monitoring Activity Locations 2005
		SHEET <b>2</b> OF REV 01 Nov/12/2005

# Figure 3 Mapped Site Features 2005



SCALE 1"=100 ft

Monitoring Area Limits

### Legend

- Monitoring Area Limits
  - Wetland Boundary 2004
  - Open Water Boundary
  - Vegetation Community Boundary
- Base photograph July 6, 2005

Gross Wetland Area = 4.28 Acres  
 Open Water Area = 0.88 Acres  
 Net Wetland Area = 3.40 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
- ⑦ Rumex crispus
- ⑧ Spartina gracilis

Monitoring Area Limits

Monitoring Area Limits

UPL

OW

Monitoring Area Limits

PROJ NO: B43054.0412W9	DRAWN: SH	PROJECT NAME: MDT Ridgeway Complex W-9 Wetland Mitigation
LOCATION: Ridgeway Cmpkx W9	PROJ MGR: JB	DRAWING TITLE: Mapped Site Features 2005
SCALE: 1"=100'	CHECKED: LB	
FILE NAME: 2005 W09BASE.dwg	APPV'D: JB	



## **Appendix B**

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### **WETLAND - 9:**

**2005 WETLAND MITIGATION SITE MONITORING FORM**

**2005 BIRD SURVEY FORMS**

**2005 WETLAND DELINEATION FORMS**

**2005 FUNCTIONAL ASSESSMENT FORMS**

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*MDT Wetland Mitigation Monitoring  
Ridgeway Wetland Complex  
Ekalaka, Montana*

**LWC / MDT WETLAND MITIGATION SITE MONITORING FORM**

Project Name: **Ridgeway #9** Project Number: **B43054.00-412**  
 Assessment Date: **July 27, 2005** Person(s) conducting the assessment: **LBacon/PBSJ**  
 Location: **Ridgeway,MT** MDT District: **Glendive** Milepost:         
 Legal Description: T **4S** R **57E** Section **31-** **35** **36**  
 Weather Conditions: **partly cloudy, 70-80deg** Time of Day: **AM-PM**  
 Initial Evaluation Date: **August 23, 2001** Monitoring Year: **5** # Visits in Year: **1**  
 Size of evaluation area: **5 acres** Land use surrounding wetland: **grazing/rangeland**

**HYDROLOGY**

Surface Water Source: **stormwater**  
 Inundation: **Present** Average Depth: **3** Range of Depths: **0-4**  
 Percent of assessment area under inundation: **21%**  
 Depth at emergent vegetation-open water boundary: **1 feet**  
 If assessment area is not inundated then are the soils saturated within 12 inches of surface: **Yes**  
 Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc.):  
**erosion and inundation lines**

Groundwater Monitoring Wells: **Absent**  
 Record depth of water below ground surface (in feet):

Well Number	Depth	Well Number	Depth	Well Number	Depth

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

**COMMENTS / PROBLEMS:**

\_\_\_\_\_

## VEGETATION COMMUNITIES

Community Number: **1**

Community Title (main species): **Artemesia tridentata/Atriplex**

Dominant Species	% Cover	Dominant Species	% Cover
ATRARG	3 = 11-20%		
FESIDA	3 = 11-20%		
BOUGRA	1 = 1-5%		
GRISQU	2 = 6-10%		
ARTTRI	4 = 21-50%		
AGRSMI	3 = 11-20%		

Comments / Problems: \_\_\_\_\_

Community Number: **2**

Community Title (main species): **Typha latifolia**

Dominant Species	% Cover	Dominant Species	% Cover
RUMCRI	1 = 1-5%		
TYPLAT	5 = > 50%		
ELEPAL	2 = 6-10%		
SCIHET	1 = 1-5%		
ALIPLA	1 = 1-5%		

Comments / Problems: \_\_\_\_\_

Community Number: **3**

Community Title (main species): **Alisma-plantago-aquatica**

Dominant Species	% Cover	Dominant Species	% Cover
ALIPLAN	3 = 11-20%	BECSYZ	+ = < 1%
SAGCUN	+ = < 1%		
ELEPAL	4 = 21-50%		
OPENWATER	5 = > 50%		
RUNCRI	+ = < 1%		

Comments / Problems: **This CT has changed over time, but these species were once a componet of this CT.**

Community Number: **4**

Community Title (main species): **Eleocharis palustris**

Dominant Species	% Cover	Dominant Species	% Cover
RUMCRI	3 = 11-20%	TYPLAT	+ = < 1%
ELEPAL	5 = > 50%	ELEACI	1 = 1-5%
SPAGRA	1 = 1-5%	SCIMAR	+ = < 1%
HORJUB	1 = 1-5%	SALIXsp.	+ = < 1%
ALOAEQ			
ALIPLA	1 = 1-5%		

Comments / Problems: \_\_\_\_\_

**VEGETATION COMMUNITIES (continued)**

Community Number: **5**      Community Title (main species): **Hordeum jubatum**

Dominant Species	% Cover	Dominant Species	% Cover
HORJUB	5 = > 50%		
AGRSMI	1 = 1-5%		
RUMCRI	4 = 21-50%		

Comments / Problems: \_\_\_\_\_

Community Number: **6**      Community Title (main species): **Rumex crispus/Hordeum jubatum**

Dominant Species	% Cover	Dominant Species	% Cover
RUMCRI	4 = 21-50%		
HORJUB	4 = 21-50%		
ALOPRA	+ = < 1%		
SPAGRA	3 = 11-20%		
BECSYZ	3 = 11-20%		

Comments / Problems: **CT has colonized edge of CT 4**

Community Number: **7**      Community Title (main species): **Rumex crispus**

Dominant Species	% Cover	Dominant Species	% Cover
RUMCRI	5 = > 50%		

Comments / Problems: \_\_\_\_\_

Community Number: **8**      Community Title (main species): **Spartina gracilis**

Dominant Species	% Cover	Dominant Species	% Cover
SPAGRA	5 = > 50%		

Comments / Problems: \_\_\_\_\_

**VEGETATION COMMUNITIES (continued)**

Community Number: \_\_\_\_\_ Community Title (main species): \_\_\_\_\_

Dominant Species	% Cover	Dominant Species	% Cover

**Comments / Problems:** \_\_\_\_\_

Community Number: \_\_\_\_\_ Community Title (main species): \_\_\_\_\_

Dominant Species	% Cover	Dominant Species	% Cover

**Comments / Problems:** \_\_\_\_\_

Community Number: \_\_\_\_\_ Community Title (main species): \_\_\_\_\_

Dominant Species	% Cover	Dominant Species	% Cover

**Comments / Problems:** \_\_\_\_\_

Community Number: \_\_\_\_\_ Community Title (main species): \_\_\_\_\_

Dominant Species	% Cover	Dominant Species	% Cover

**Comments / Problems:** \_\_\_\_\_

**Additional Activities Checklist:**

- Record and map vegetative communities on aerial photograph.





## WILDLIFE

### Birds

Were man-made nesting structures installed? **No**

If yes, type of structure: \_\_\_\_\_ How many? \_\_\_\_\_

Are the nesting structures being used? **NA**

Do the nesting structures need repairs? \_\_\_\_\_

### Mammals and Herptiles

Mammal and Herptile Species	Number Observed	Indirect Indication of Use			
		Tracks	Scat	Burrows	Other
Northern leopard frog	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
plains garter snake	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

### Additional Activities Checklist:

**Yes** Macroinvertebrate Sampling (if required)

Comments / Problems: \_\_\_\_\_



## GPS SURVEYING

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

### GPS Checklist:

- Jurisdictional wetland boundary.
- 4-6 landmarks that are recognizable on the aerial photograph.
- Start and End points of vegetation transect(s).
- Photograph reference points.
- Groundwater monitoring well locations.

Comments / Problems: \_\_\_\_\_

## WETLAND DELINEATION

(attach COE delineation forms)

At each site conduct these checklist items:

- Delineate wetlands according to the 1987 Army COE manual.
  - Delineate wetland – upland boundary onto aerial photograph.
- Yes** Survey wetland – upland boundary with a resource grade GPS survey.

Comments / Problems: **WL boundary hand-drawn after 2002.**

## FUNCTIONAL ASSESSMENT

(Complete and attach full MDT Montana Wetland Assessment Method field forms.)  
(Also attach any completed abbreviated field forms, if used)

Comments / Problems: \_\_\_\_\_

## MAINTENANCE

Were man-made nesting structure installed at this site? **NA**

If yes, do they need to be repaired? **NA**

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

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

If yes, are the structures working properly and in good working order? **Yes**

If no, describe the problems below.

Comments / Problems: **Non-technical structure comments, drove over berm and no breaks noted (WL-16 dam has a break).**



## MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: \_\_\_\_\_ Date: \_\_\_\_\_ Examiner: \_\_\_\_\_

Transect Number: **cont.** Approximate Transect Length: \_\_\_\_\_ **feet** Compass Direction from Start (Upland): \_\_\_\_\_°

Vegetation Type E: <b>CT-2 (estimated length, very wet)</b>	
Length of transect in this type: 20 feet	
Plant Species	Cover
TYPLAT	5 = > 50%
ALIPLA	2 = 6-10%
Total Vegetative Cover:	100%

Vegetation Type F: <b>CT-4 (estimated length, very wet)</b>	
Length of transect in this type: 5 feet	
Plant Species	Cover
ELEPAL	5 = > 50%
RUMCRI	1 = 1-5%
ALIPLA	1 = 1-5%
BECSYZ	+ = < 1%
Total Vegetative Cover:	100%

Vegetation Type G:	
Length of transect in this type: _____ feet	
Plant Species	Cover
Total Vegetative Cover:	%

Vegetation Type H:	
Length of transect in this type: _____ feet	
Plant Species	Cover
Total Vegetative Cover:	%

**MDT WETLAND MONITORING – VEGETATION TRANSECT**

Site: \_\_\_\_\_ Date: \_\_\_\_\_ Examiner: \_\_\_\_\_

Transect Number: \_\_\_\_\_ Approximate Transect Length: \_\_\_\_\_ **feet** Compass Direction from Start (Upland): \_\_\_\_\_°

Vegetation Type I:	
Length of transect in this type: _____ feet	
<b>Plant Species</b>	<b>Cover</b>
Total Vegetative Cover:	%

Vegetation Type J:	
Length of transect in this type: _____ feet	
<b>Plant Species</b>	<b>Cover</b>
Total Vegetative Cover:	%

Vegetation Type K:	
Length of transect in this type: _____ feet	
<b>Plant Species</b>	<b>Cover</b>
Total Vegetative Cover:	%

Vegetation Type L:	
Length of transect in this type: _____ feet	
<b>Plant Species</b>	<b>Cover</b>
Total Vegetative Cover:	%

## MDT WETLAND MONITORING – VEGETATION TRANSECT

### Cover Estimate

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

### Indicator Class

+ = Obligate  
- = Facultative/Wet  
0 = Facultative

### Source

P = Planted  
V = Volunteer

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): 50%

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

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

Comments: \_\_\_\_\_





**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
<b>Profile Description:</b>					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
10	A	2.5Y 4/1	2.5YR 3/6	Common/distinct	silt clay
<b>Hydric Soil Indicators:</b>					
_____ 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			
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors		_____ Other (Explain in Remarks)			
Low-chroma with mottles.					

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present?	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No	Is this Sampling Point Within a Wetland? <span style="float:right; margin-right: 20px;"><input checked="" type="checkbox"/> Yes</span> <span style="float:right;"><input type="checkbox"/> No</span>
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 area increased since 2004, especially to northwest.					

Approved by HQUSACE 2/92

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

Project/Site: <u>Ridgeway Complex (#9)</u> Applicant/Owner: <u>MDT</u> Investigator: <u>Lynn Bacon, Land &amp; Water Consulting</u>	Date: <u>7/27/05</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>UPL</u> Transect ID: _____ Plot ID: <u>SP-2</u>

**VEGETATION**

Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	AGRSMI	H	FACU	9		
2	BROTEC	H	UPL	10		
3	CHEsp.	H	Unk.	11		
4	HORJUB	H	FACW	12		
5	GRISQU	H	FACU	13		
6				14		
7				15		
8				16		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-).      1/5=20%

SP not within the wetland boundary.

**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 type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input 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>NA</u> (in.)	
Remarks:  Area near transect upland end has no wetland hydrology.	

**SOILS**

Map Unit Name		Bickerdyke Clay		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	
<b>Profile Description:</b>					
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
<b>Hydric Soil Indicators:</b>					
<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? <u>  </u> Yes <u>X</u> No
<b>Remarks:</b>  This side of WL remains an abrupt edge around the WL boundary; west side UPL area is converting to WL, particularly adjacent to intermittent 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, 2005 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	1 (H)	---	---	---	---	---	---

If documented, list the source (e.g., observations, records, etc.): Many large and small frogs were observed this year; breeding.

**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
<b>Low</b> disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	E	--	--	--
<b>Moderate</b> disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>High</b> 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)	<b>Wildlife Habitat Features Rating from 14C(ii)</b>			
	<input checked="" type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Substantial	1 (E)	--	--	--
Moderate	--	--	--	--
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 <b>no outlet or restricted outlet</b>	--	--	--	--	--	.5 (M)	--	--	--
AA contains <b>unrestricted outlet</b>	--	--	--	--	--	--	--	--	--

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%	
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 <b>no or restricted outlet</b>	1 (H)	--	--	--	--	--	--	--
AA contains <b>unrestricted outlet</b>	--	--	--	--	--	--	--	--

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.		
Estimated Relative Abundance from #11	<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
Low disturbance at AA (#12i)	--	--	--	--	--	--	--	.4M	--
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	1.00	1	
C. General Wildlife Habitat	H	1.00	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	
<b>Totals:</b>		8.50	11.00	33
<b>Percent of Total Possible Points:</b>			77% (Actual / Possible) x 100 [rd to nearest whole #]	

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

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### **WETLAND - 9: 2005 REPRESENTATIVE PHOTOGRAPHS**

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*MDT Wetland Mitigation Monitoring  
Ridgeway Wetland Complex  
Ekalaka, Montana*

**RIDGEWAY WETLAND-9 SITE 2005**



**WL#: 9 Location: A Description:** Wetland view, east side of excavation **Compass Reading: 288°**



**WL#: 9 Location: B Description:** Wetland view, buffer in foreground **Compass Reading: 268°**



**WL#: 9 Location: C Description:** Wetland view, buffer in foreground **Compass Reading: 238°**



**WL#: 9 Location: D Description:** Wetland view, buffer in foreground **Compass Reading: 315°**

**RIDGEWAY WETLAND-9 SITE 2005**



**WL#: 9 Location: E Description: Wetland view  
Compass Reading: 80°**



**WL#: 9 Location: F Description: Wetland view  
Compass Reading: 116°**



**WL#: 9 Location: G Description: Wetland view from WL end of  
transect (same as D) Compass Reading: 170°**



**WL#: 9 Location: H Description: UPL veg transect end  
Compass Reading: 358°**

## **Appendix D**

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

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*MDT Wetland Mitigation Monitoring  
Ridgeway Wetland Complex  
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.

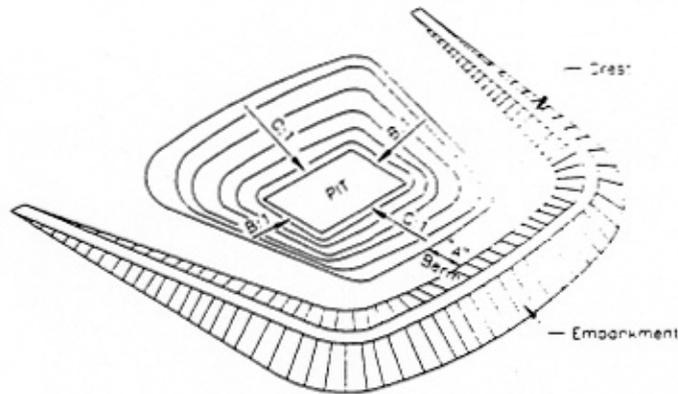
Land Uses: There are several Rights-of-Way in Section 34, some which are buried. If any digging takes place in this section, must coordinate with rights-of-way holders.

#### **STIPULATIONS:**

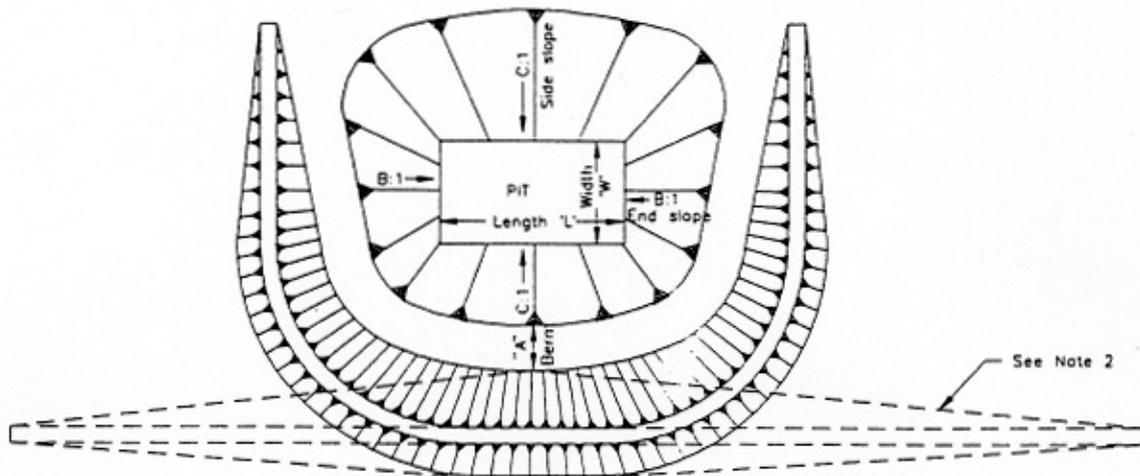
The contractor shall immediately bring to the attention of the BLM Field Manager any and all antiquities or other items of cultural or scientific interest, including but not limited to historic or prehistoric ruins, fossils, artifacts or burials discovered as a result of his operations, and shall leave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

#### **LIST OF PREPARERS:**

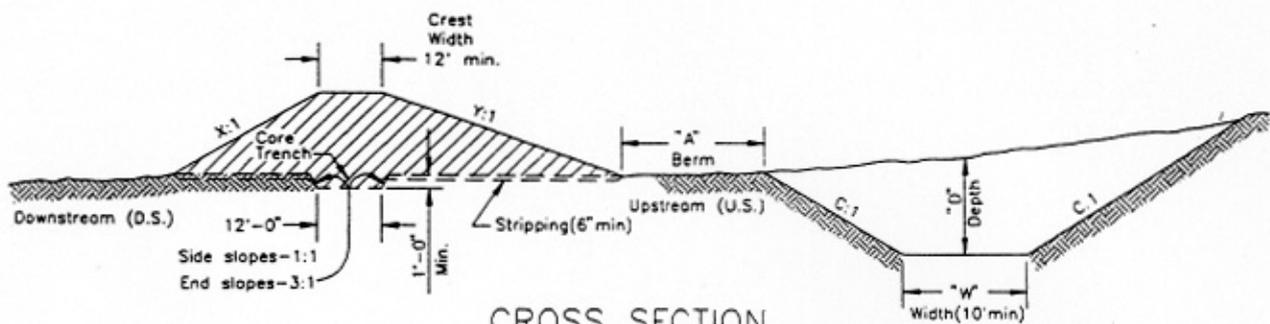
Miles City Field Office Personnel: Jeff Gustad, Rangeland Mgmt Spec; Ted Birnie, Archaeologist; Pam Wall, Realty Specialist; Robert Mitchell, Soil Scientist; Dan Bricco, Outdoor Recreation Planner; Larry Rau, Wildlife Biologist.



PERSPECTIVE VIEW



PLAN



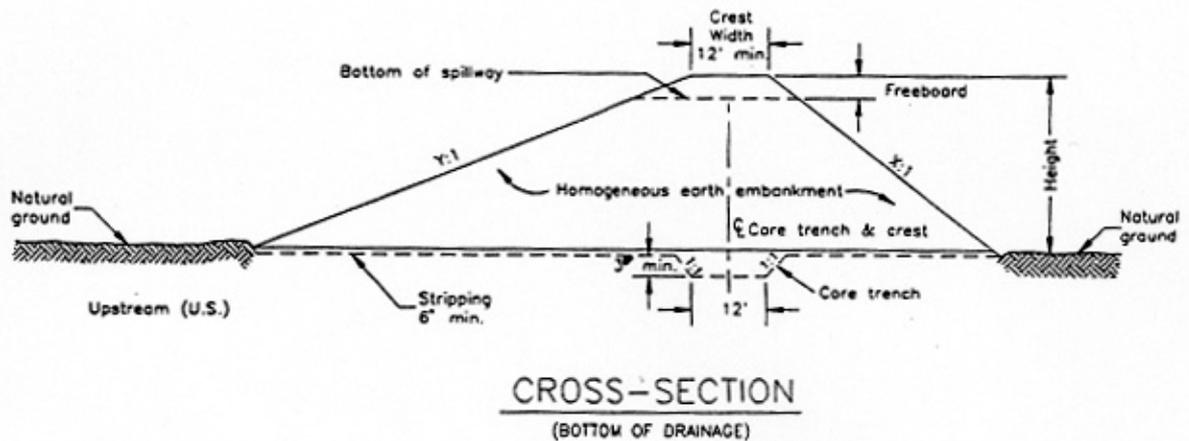
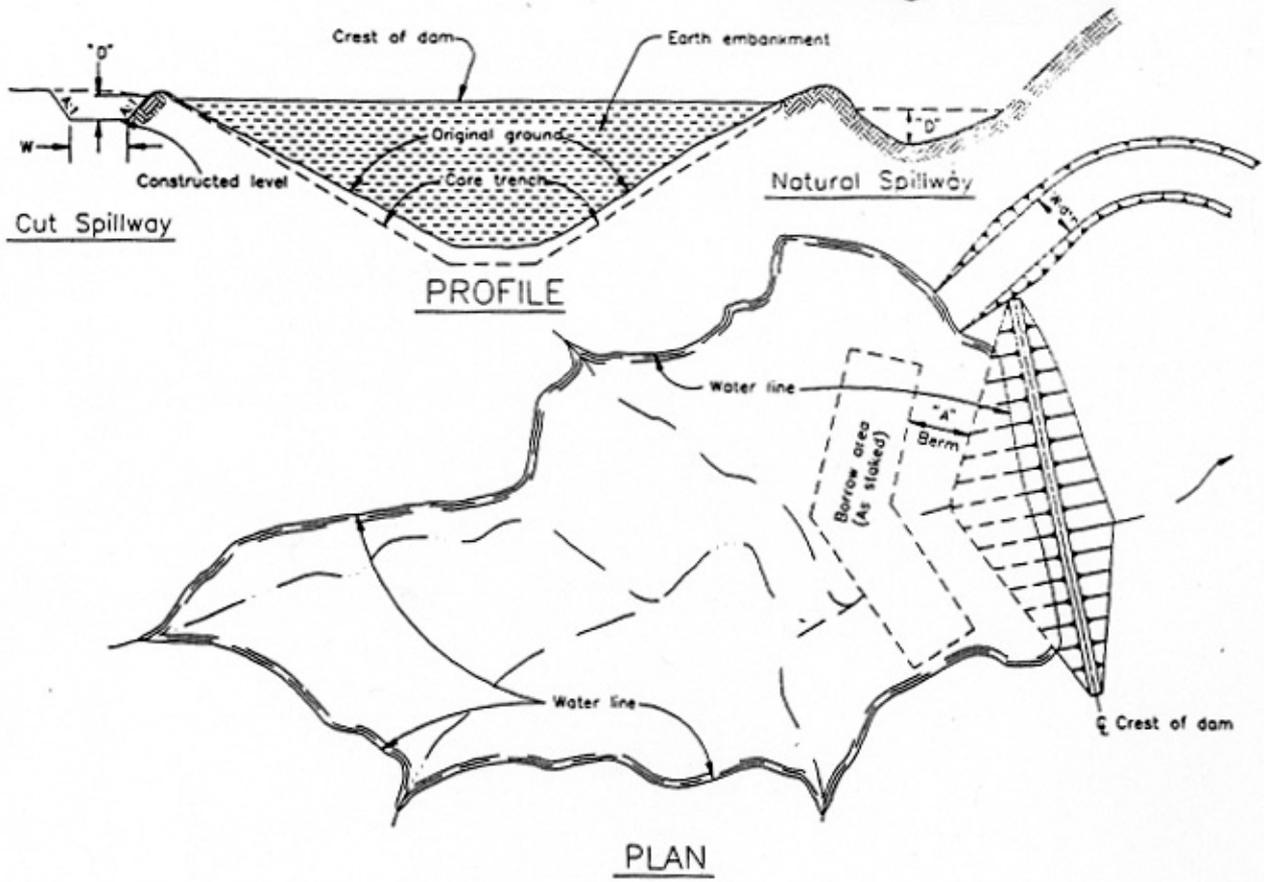
CROSS SECTION

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**

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### **BIRD SURVEY PROTOCOL GPS PROTOCOL**

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*MDT Wetland Mitigation Monitoring  
Ridgeway Wetland Complex  
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**

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### **WETLAND – 9: 2005 MACROINVERTEBRATE SAMPLING PROTOCOL & DATA**

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*MDT Wetland Mitigation Monitoring  
Ridgeway Wetland Complex  
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 out into the bucket, and look for insects, crustaceans, etc. If necessary, repeat the sampling process in a nearby location, and add the net contents to the bucket. Remember to sample all four environments.

Sieve the contents of the bucket through the straining device and pour or carefully scrape the contents of the strainer into the sample jar.

If you skip the bucket-and-sieve steps, simply lift handfuls of material out of the sampling net into the jars. In either case, please include some muck or mud and some vegetation in the jar. Often, you will have collected a large amount of vegetable material. If this is the case, lift out handfuls of material from the sieve into the jar, until the jar is about half full. Please limit material you include in the sample, so that there is only a single jar for each sample.

Top off the sample jar with enough ethanol to cover all the material in the jar. Leave as little headroom as possible.

It is not necessary to sample habitats in any specified order. Keep in mind that disturbing the habitats prior to sampling will chase off the animals you are trying to capture.

Complete the sample labels. Place one label inside the sample jar and tape the other label securely to the outside of the jar. Dry the jar before attaching the outer label if necessary. In some situations, it may be necessary to collect more than one sample at a site. If you take multiple samples from the same site, clearly indicate this by using individual sample numbers, along with the total number of samples collected at the site (e.g. Sample #3 of 5 total samples).

Photograph the sampled site.

### **Sample Handling/Shipping**

- In the field, keep collected samples cool by storing them in a cooler. Only a small amount of ice is necessary.
- Inventory all samples, preparing a list of all sites and enumerating all samples, before shipping or delivering to the laboratory.
- Deliver samples to Rhithron.

## **MDT Mitigated Wetland Monitoring Project**

### **Aquatic Invertebrate Monitoring Summary 2001 - 2005**

#### **METHODS**

Among other monitoring activities, aquatic invertebrate assemblages were collected at a number of mitigated wetlands throughout Montana. This report summarizes data generated from five years of collection. 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. In 2005, an additional 2 sites were added. Over all years of sampling, a total of 151 sites were sampled for invertebrates. Table 2 summarizes sites and sampling years.

The method employed to assess these wetlands is based on an index incorporating 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 (Statistica), 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, 2004, and 2005, and Kleinschmidt Creek, sampled in 2003, 2004, and 2005, were assessed using the tested metric battery developed for montane streams of Western Montana (Bollman 1998). Invertebrate assemblages at these sites were different from that of the other sites, and suggested montane or foothill stream conditions rather than wetland conditions. For the wetland sites, "optimal" scores were generally those that fell above the 75<sup>th</sup> percentile (for those metrics that decrease in value in response to stress) or below the 25<sup>th</sup> 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 75<sup>th</sup> percentile for decreasing scores (or above the 25<sup>th</sup> 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.

**Table 1.** Montana Department of Transportation Mitigated Wetlands Monitoring Project sites, 2001 – 2005.

2001	2002	2003	2004	2005
Beaverhead 1	Beaverhead 1	Beaverhead 1	Beaverhead 1	Beaverhead 1
Beaverhead 2	Beaverhead 2			
Beaverhead 3	Beaverhead 3		Beaverhead 3	Beaverhead 3
Beaverhead 4	Beaverhead 4	Beaverhead 4		
Beaverhead 5	Beaverhead 5	Beaverhead 5	Beaverhead 5	Beaverhead 5
Beaverhead 6	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	Big Spring
Vince Ames				
Ryegate				
Lavinia				
Stillwater	Stillwater	Stillwater	Stillwater	Stillwater
Roundup	Roundup	Roundup	Roundup	Roundup
Wigeon	Wigeon	Wigeon	Wigeon	Wigeon
Ridgeway	Ridgeway	Ridgeway	Ridgeway	Ridgeway
Musgrave – Rest. 1	Musgrave – Rest. 1			
Musgrave – Rest. 2	Musgrave – Rest. 2			
Musgrave – Enh. 1	Musgrave – Enh. 1			
Musgrave – Enh. 2				
	Hoskins Landing	Hoskins Landing	Hoskins Landing	Hoskins Landing
	Peterson - 1	Peterson – 1	Peterson – 1	Peterson – 1
	Peterson – 2		Peterson – 2	Peterson – 2
	Peterson – 4	Peterson – 4	Peterson – 4	Peterson – 4
	Peterson – 5	Peterson – 5	Peterson – 5	Peterson – 5
	Jack Johnson - main	Jack Johnson - main		
	Jack Johnson - SW	Jack Johnson - SW		
	Creston	Creston	Creston	Creston
	Lawrence Park			
	Perry Ranch			Perry Ranch
	SF Smith River	SF Smith River	SF Smith River	SF Smith River
	Camp Creek	Camp Creek	Camp Creek	Camp Creek
	Kleinschmidt	Kleinschmidt – pond	Kleinschmidt – pond	Kleinschmidt – pond
		Kleinschmidt – stream	Kleinschmidt – stream	Kleinschmidt – stream
		Ringling - Galt		
			Circle	
			Cloud Ranch Pond	Cloud Ranch Pond
			Cloud Ranch Stream	
			Colloid	Colloid
			Jack Creek	Jack Creek
			Norem	Norem
				Rock Creek Ranch
				Wagner Marsh

## Sample Processing

Aquatic invertebrate samples were collected at mitigation wetland sites in the summer months of 2001, 2002, 2003, 2004, and 2005 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 2 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.

Metric scoring criteria were re-examined each year as new data was added. For 2005, all 151 records were utilized. Ranges of individual metrics, as well as median metric values remained remarkably consistent over all 5 years of analysis. Since metric value distributions changed insignificantly with the addition of the 2005 data, no changes were made to scoring criteria this year. Summary metric values and scores for the 2005 samples are given in Tables 3a-3d.

**Table 2.** Aquatic invertebrate metrics employed in the MTDT mitigation wetland monitoring study, 2001-2005.

<b>Metric</b>	<b>Metric calculation</b>	<b>Expected response to degradation or impairment</b>
Total taxa	Count of unique taxa identified to lowest recommended taxonomic level	Decrease
POET	Count of unique Plecoptera, Trichoptera, Ephemeroptera, and Odonata taxa identified to lowest recommended taxonomic level	Decrease
Chironomidae taxa	Count of unique midge taxa identified to lowest recommended taxonomic level	Decrease
Crustacea taxa + Mollusca taxa	Count of unique Crustacea taxa and Mollusca taxa identified to lowest recommended taxonomic level	Decrease
% Chironomidae	Percent abundance of midges in the subsample	Increase
Orthoclaadiinae/Chironomidae	Number of individual midges in the sub-family Orthoclaadiinae / 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

## RESULTS

*(Note: Individual site discussions were removed from this report by Land & Water Consulting / PBS&J and are included in the Macro-Invertebrate sections of individual reports. Summary tables are provided on the following pages.)*

**Table 3a.** Metric values and scores for Montana Department of Transportation mitigated wetland sites in 2005.

	BEAVERHEAD #1	BEAVERHEAD #3	BEAVERHEAD #5	BEAVERHEAD #6	BIG SPRING CREEK	STILLWATER	ROUNDUP	WIDGEON
Total taxa	22	9	14	18	28	17	7	19
POET	2	0	0	2	4	4	0	0
Chironomidae taxa	7	4	4	4	9	5	3	11
Crustacea + Mollusca	4	3	1	4	7	5	2	4
% Chironomidae	59.80%	7.55%	50.00%	16.67%	33.65%	9.43%	22.22%	76.47%
Orthocladinae/Chir	0.197	0.625	0.059	0.067	0.457	0.500	0.000	0.205
% Amphipoda	1.96%	0.94%	0.00%	1.11%	18.27%	7.55%	0.00%	10.78%
% Crustacea + % Mollusca	10.78%	90.57%	2.94%	55.56%	33.65%	53.77%	72.65%	15.69%
HBI	7.71	7.88	7.88	7.98	7.55	7.28	8.33	8.25
% Dominant taxon	34.31%	76.42%	35.29%	25.56%	18.27%	33.02%	71.79%	44.12%
% Collector-Gatherers	56.86%	93.40%	47.06%	21.11%	70.19%	64.15%	82.05%	26.47%
% Filterers	0.00%	0.00%	0.00%	0.00%	0.96%	3.77%	0.00%	6.86%
Total taxa	5	1	1	3	5	3	1	3
POET	1	1	1	1	5	5	1	1
Chironomidae taxa	5	3	3	3	5	3	3	5
Crustacea + Mollusca	3	1	1	3	5	3	1	3
% Chironomidae	1	5	1	5	3	5	3	1
Orthocladinae/Chir	3	5	1	1	5	5	1	3
% Amphipoda	5	5	5	5	3	3	5	3
% Crustacea + % Mollusca	5	1	5	3	3	3	1	5
HBI	1	1	1	1	3	3	1	1
% Dominant taxon	3	1	3	5	5	5	1	3
% Collector-Gatherers	3	5	3	1	3	3	5	1
% Filterers	3	3	3	3	3	3	3	1
<b>Total score</b>	<b>38</b>	<b>32</b>	<b>28</b>	<b>34</b>	<b>48</b>	<b>44</b>	<b>26</b>	<b>30</b>
<b>Percent of maximum score</b>	<b>0.633333</b>	<b>0.533333</b>	<b>0.466667</b>	<b>0.566667</b>	<b>0.8</b>	<b>0.733333</b>	<b>0.433333</b>	<b>0.5</b>
<b>Impairment classification</b>	<b>sub-optimal</b>	<b>poor</b>	<b>poor</b>	<b>sub-optimal</b>	<b>optimal</b>	<b>optimal</b>	<b>poor</b>	<b>poor</b>

**Table 3b.** Metric values and scores for Montana Department of Transportation mitigated wetland sites in 2005.

	<b>RIDGEWAY</b>	<b>MUSGRAVE REST. 1</b>	<b>MUSGRAVE REST. 2</b>	<b>MUSGRAVE ENH. 1</b>	<b>HOSKINS LANDING</b>	<b>PETERSON RANCH 1</b>	<b>PETERSON RANCH 2</b>	<b>PETERSON RANCH 4</b>	<b>PETERSON RANCH 5</b>
<b>Total taxa</b>	19	19	23	19	27	29	16	25	16
POET	3	1	3	1	5	4	2	4	4
Chironomidae taxa	6	6	8	3	6	11	6	8	7
Crustacea + Mollusca	5	5	3	7	6	6	5	6	2
% Chironomidae	9.26%	14.55%	22.00%	2.80%	17.58%	17.48%	13.91%	24.55%	16.96%
Orthoclaadiinae/Chir	0.600	0.750	0.136	0.667	0.188	0.556	0.563	0.630	0.632
% Amphipoda	6.48%	3.64%	0.00%	0.93%	0.00%	0.97%	7.83%	1.82%	8.04%
% Crustacea + % Mollusca	22.22%	30.91%	38.00%	58.88%	27.47%	31.07%	72.17%	20.00%	8.93%
HBI	7.71	7.22	7.77	7.16	6.81	7.16	7.43	7.65	8.08
% Dominant taxon	53.70%	21.82%	35.00%	28.04%	14.29%	26.21%	33.04%	18.18%	31.25%
% Collector-Gatherers	68.52%	40.00%	15.00%	11.21%	31.87%	59.22%	28.70%	43.64%	68.75%
% Filterers	0.00%	0.00%	0.00%	2.80%	0.00%	4.85%	33.91%	5.45%	1.79%
<b>Total taxa</b>	3	3	5	3	5	5	3	5	3
POET	3	1	3	1	5	5	1	5	5
Chironomidae taxa	3	3	5	3	3	5	3	5	5
Crustacea + Mollusca	3	3	1	5	5	5	3	5	1
% Chironomidae	5	5	3	5	5	5	5	3	5
Orthoclaadiinae/Chir	5	5	1	5	3	5	5	5	5
% Amphipoda	3	5	5	5	5	5	3	5	3
% Crustacea + % Mollusca	5	5	3	3	5	5	1	5	5
HBI	1	3	1	3	5	3	3	1	1
% Dominant taxon	1	5	3	5	5	5	5	5	5
% Collector-Gatherers	3	1	1	1	1	3	1	1	3
% Filterers	3	3	3	3	3	3	1	3	3
<b>Total score</b>	<b>38</b>	<b>42</b>	<b>34</b>	<b>42</b>	<b>50</b>	<b>54</b>	<b>34</b>	<b>48</b>	<b>44</b>
<b>Percent of maximum score</b>	<b>0.633333</b>	<b>0.7</b>	<b>0.566667</b>	<b>0.7</b>	<b>0.833333</b>	<b>0.9</b>	<b>0.566667</b>	<b>0.8</b>	<b>0.733333</b>
<b>Impairment classification</b>	<b>sub-optimal</b>	<b>optimal</b>	<b>sub-optimal</b>	<b>optimal</b>	<b>optimal</b>	<b>optimal</b>	<b>sub-optimal</b>	<b>optimal</b>	<b>optimal</b>

**Table 3c.** Metric values and scores for Montana Department of Transportation mitigated wetland sites in 2005.

	CRESTON	PERRY RANCH	SOUTH FORK SMITH RIVER	CAMP CREEK	KLEINSCH MIDT POND	KLEINSCH MIDT STREAM	CLOUD RANCH POND	COLLOID	JACK CREEK
Total taxa	16	18	19	36	27	23	22	9	16
POET	0	0	4	14	6	5	2	1	1
Chironomidae taxa	4	8	6	13	6	9	11	4	9
Crustacea + Mollusca	6	4	5	0	2	3	3	1	4
% Chironomidae	27.62%	43.69%	21.67%	45.54%	8.85%	45.08%	37.50%	25.83%	29.41%
Orthoclaadiinae/Chir	0.931	0.622	0.192	0.804	0.200	0.473	0.256	0.000	0.467
% Amphipoda	0.00%	0.00%	29.17%	0.00%	5.31%	0.82%	0.00%	0.00%	0.98%
% Crustacea + % Mollusca	52.38%	38.83%	62.50%	0.00%	7.96%	3.28%	7.69%	67.50%	41.18%
HBI	7.52	7.31	7.54	5.06	7.40	5.83	6.96	8.53	7.39
% Dominant taxon	25.71%	25.24%	29.17%	18.81%	30.09%	32.79%	41.35%	67.50%	35.29%
% Collector-Gatherers	64.76%	47.57%	65.00%	47.52%	37.17%	50.82%	75.96%	88.33%	91.18%
% Filterers	6.67%	27.18%	8.33%	5.94%	0.88%	2.46%	2.88%	0.00%	2.94%
Total taxa	3	3	3	5	5	5	5	1	3
POET	1	1	5	5	5	5	1	1	1
Chironomidae taxa	3	5	3	5	3	5	5	3	5
Crustacea + Mollusca	5	3	3	1	1	1	1	1	3
% Chironomidae	3	1	3	1	5	1	3	3	3
Orthoclaadiinae/Chir	5	5	3	5	3	5	3	1	1
% Amphipoda	5	5	1	5	3	5	5	5	5
% Crustacea + % Mollusca	3	3	3	5	5	5	5	1	3
HBI	3	3	3	5	3	5	3	1	3
% Dominant taxon	5	5	5	5	5	5	3	1	3
% Collector-Gatherers	3	3	3	3	1	3	3	5	5
% Filterers	1	1	1	3	3	3	3	3	3
<b>Total score</b>	<b>40</b>	<b>38</b>	<b>36</b>	<b>48</b>	<b>42</b>	<b>48</b>	<b>40</b>	<b>26</b>	<b>38</b>
<b>Percent of maximum score</b>	<b>0.666667</b>	<b>0.633333</b>	<b>0.6</b>	<b>0.8</b>	<b>0.7</b>	<b>0.8</b>	<b>0.666667</b>	<b>0.433333</b>	<b>0.633333</b>
<b>Impairment classification</b>	<b>sub-optimal</b>	<b>sub-optimal</b>	<b>sub-optimal</b>	<b>optimal</b>	<b>optimal</b>	<b>optimal</b>	<b>sub-optimal</b>	<b>poor</b>	<b>sub-optimal</b>

**Table 3d.** Metric values and scores for Montana Department of Transportation mitigated wetland sites in 2005.

	NOREM	ROCK CREEK RANCH	WAGNER MARSH
Total taxa	4	24	23
POET	0	2	5
Chironomidae taxa	2	8	8
Crustacea + Mollusca	2	4	5
% Chironomidae	37.50%	22.00%	24.00%
Orthoclaadiinae/Chir	0.000	0.318	0.167
% Amphipoda	0.00%	3.00%	7.00%
% Crustacea + % Mollusca	62.50%	40.00%	19.00%
HBI	7.50	7.61	8.58
% Dominant taxon	56.25%	18.00%	38.00%
% Collector-Gatherers	6.25%	57.00%	40.00%
% Filterers	0.00%	0.00%	3.00%
Total taxa	1	5	5
POET	1	1	5
Chironomidae taxa	1	5	5
Crustacea + Mollusca	1	3	3
% Chironomidae	3	3	3
Orthoclaadiinae/Chir	1	3	1
% Amphipoda	5	5	3
% Crustacea + % Mollusca	3	3	5
HBI	3	1	1
% Dominant taxon	1	5	3
% Collector-Gatherers	1	3	1
% Filterers	3	3	3
<b>Total score</b>	<b>24</b>	<b>40</b>	<b>38</b>
<b>Percent of maximum score</b>	<b>0.4</b>	<b>0.666667</b>	<b>0.633333</b>
<b>Impairment classification</b>	<b>poor</b>	<b>sub-optimal</b>	<b>sub-optimal</b>

### **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.

McCune, B. and J.B. Grace. 2002. Analysis of Ecological Communities. MjM Software Design, Gleneden Beach, Oregon, USA.

McCune, B. and M.J. Mefford. 2002. PC-ORD. Multivariate Analysis of Ecological Data, Version 4. MjM Software Design, Gleneden Beach, Oregon, USA.

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.

# Taxa Listing

Project ID: MDT05LW  
RAI No.: MDT05LW023

RAI No.: MDT05LW023

Sta. Name: RIDGEWAY #9

Client ID:

Date Coll.:

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
<b>Non-Insect</b>							
Acari	2	1.85%	Yes	Unknown		5	PR
Lymnaeidae							
<i>Stagnicola</i> sp.	2	1.85%	Yes	Unknown		6	SC
Naididae							
Naididae	58	53.70%	Yes	Unknown		8	CG
Physidae							
Physidae	6	5.56%	Yes	Unknown		8	SC
Planorbidae							
<i>Gyraulus</i> sp.	3	2.78%	Yes	Unknown		8	SC
Planorbidae	6	5.56%	Yes	Immature	Immature	6	SC
Talitridae							
<i>Hyalella</i> sp.	7	6.48%	Yes	Unknown		8	CG
<b>Odonata</b>							
Coenagrionidae							
Coenagrionidae	2	1.85%	Yes	Larva	Damaged	7	PR
<b>Ephemeroptera</b>							
Baetidae							
Baetidae	4	3.70%	Yes	Larva	Damaged	4	CG
Caenidae							
Caenidae	1	0.93%	Yes	Larva	Damaged	7	CG
<b>Heteroptera</b>							
Corixidae							
Corixidae	2	1.85%	Yes	Larva	Larva	10	PH
Notonectidae							
Notonectidae	4	3.70%	Yes	Larva	Damaged	10	PR
<b>Coleoptera</b>							
Hydrophilidae							
Hydrophilidae	1	0.93%	Yes	Larva	Larva	5	PR
<b>Chironomidae</b>							
Chironomidae							
<i>Ablabesmyia</i> sp.	1	0.93%	Yes	Larva		8	CG
<i>Corynoneura</i> sp.	2	1.85%	Yes	Larva		7	CG
<i>Cricotopus (Isocladius)</i> sp.	3	2.78%	Yes	Larva		7	SH
<i>Endochironomus</i> sp.	2	1.85%	Yes	Larva		10	SH
<i>Parachironomus</i> sp.	1	0.93%	Yes	Larva		10	PR
<i>Psectrocladius</i> sp.	1	0.93%	Yes	Larva		8	CG
	<b>Sample Count</b>	<b>108</b>					

# Metrics Report

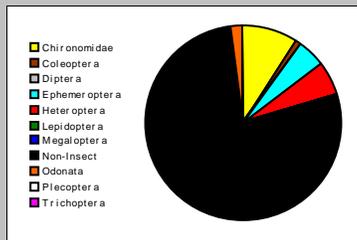
Project ID: MDT05LW  
 RAI No.: MDT05LW023  
 Sta. Name: RIDGEWAY #9  
 Client ID:  
 STORET ID  
 Coll. Date:

## Abundance Measures

Sample Count: 108  
 Sample Abundance: 115.71 93.33% of sample used  
 Total Abundance: 155.64  
 Coll. Procedure:  
 Sample Notes:

## Taxonomic Composition

Category	R	A	PRA
Non-Insect	7	84	77.78%
Odonata	1	2	1.85%
Ephemeroptera	2	5	4.63%
Plecoptera			
Heteroptera	2	6	5.56%
Megaloptera			
Trichoptera			
Lepidoptera			
Coleoptera	1	1	0.93%
Diptera			
Chironomidae	6	10	9.26%

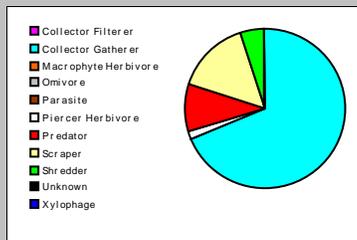


## Dominant Taxa

Category	A	PRA
Naididae	58	53.70%
Hyalella	7	6.48%
Planorbidae	6	5.56%
Physidae	6	5.56%
Notonectidae	4	3.70%
Baetidae	4	3.70%
Gyraulid	3	2.78%
Cricotopus (Isocladius)	3	2.78%
Staanicola	2	1.85%
Endochironomus	2	1.85%
Corvoneura	2	1.85%
Corixidae	2	1.85%
Coenagrionidae	2	1.85%
Acari	2	1.85%
Psectrocladius	1	0.93%

## Functional Composition

Category	R	A	PRA
Predator	5	10	9.26%
Parasite			
Collector Gatherer	7	74	68.52%
Collector Filterer			
Macrophyte Herbivore			
Piercer Herbivore	1	2	1.85%
Xylophage			
Scraper	4	17	15.74%
Shredder	2	5	4.63%
Omnivore			
Unknown			

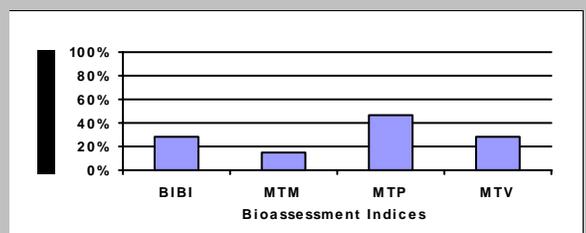


## Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
<i>Composition</i>					
Taxa Richness	19	1	2		1
Non-Insect Percent	77.78%				
E Richness	2	1		1	
P Richness	0	1		0	
T Richness	0	1		0	
EPT Richness	2		0		0
EPT Percent	4.63%		0		0
Oligochaeta+Hirudinea Percent	53.70%				
Baetidae/Ephemeroptera	0.800				
Hydropsychidae/Trichoptera	0.000				
<i>Dominance</i>					
Dominant Taxon Percent	53.70%		1		0
Dominant Taxa (2) Percent	60.19%				
Dominant Taxa (3) Percent	65.74%	3			
Dominant Taxa (10) Percent	87.96%				
<i>Diversity</i>					
Shannon H (loge)	1.936				
Shannon H (log2)	2.792		2		
Margalef D	3.844				
Simpson D	0.299				
Evenness	0.079				
<i>Function</i>					
Predator Richness	5		2		
Predator Percent	9.26%	1			
Filterer Richness	0				
Filterer Percent	0.00%			3	
Collector Percent	68.52%		2		2
Scraper+Shredder Percent	20.37%		2		0
Scraper/Filterer	0.000				
Scraper/Scraper+Filterer	0.000				
<i>Habit</i>					
Burrower Richness	0				
Burrower Percent	0.00%				
Swimmer Richness	1				
Swimmer Percent	1.85%				
Clinger Richness	1	1			
Clinger Percent	2.78%				
<i>Characteristics</i>					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	6				
Hemoglobin Bearer Percent	15.74%				
Air Breather Richness	1				
Air Breather Percent	0.93%				
<i>Voltinism</i>					
Univoltine Richness	10				
Semivoltine Richness	1	1			
Multivoltine Percent	14.81%		3		
<i>Tolerance</i>					
Sediment Tolerant Richness	3				
Sediment Tolerant Percent	10.19%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	4.442				
Pollution Sensitive Richness	0				
Pollution Tolerant Percent	23.15%		3		1
Hilsenhoff Biotic Index	7.713		0		0
Intolerant Percent	0.00%				
Supertolerant Percent	78.70%				
CTQa	102.462				

## Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	14	28.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	14	46.67%	Moderate
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	5	27.78%	Moderate
MTM	Montana DEQ Mountains (Bukantis 1998)	3	14.29%	Severe



## **Appendix G**

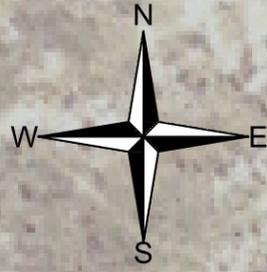
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**WETLANDS 1 - 8 AND 10 - 16:  
2005 FIGURES 2 & 3**

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*MDT Wetland Mitigation Monitoring  
Ridgeway Wetland Complex  
Ekalaka, Montana*

# Figure 2 Monitoring Activity Locations 2005

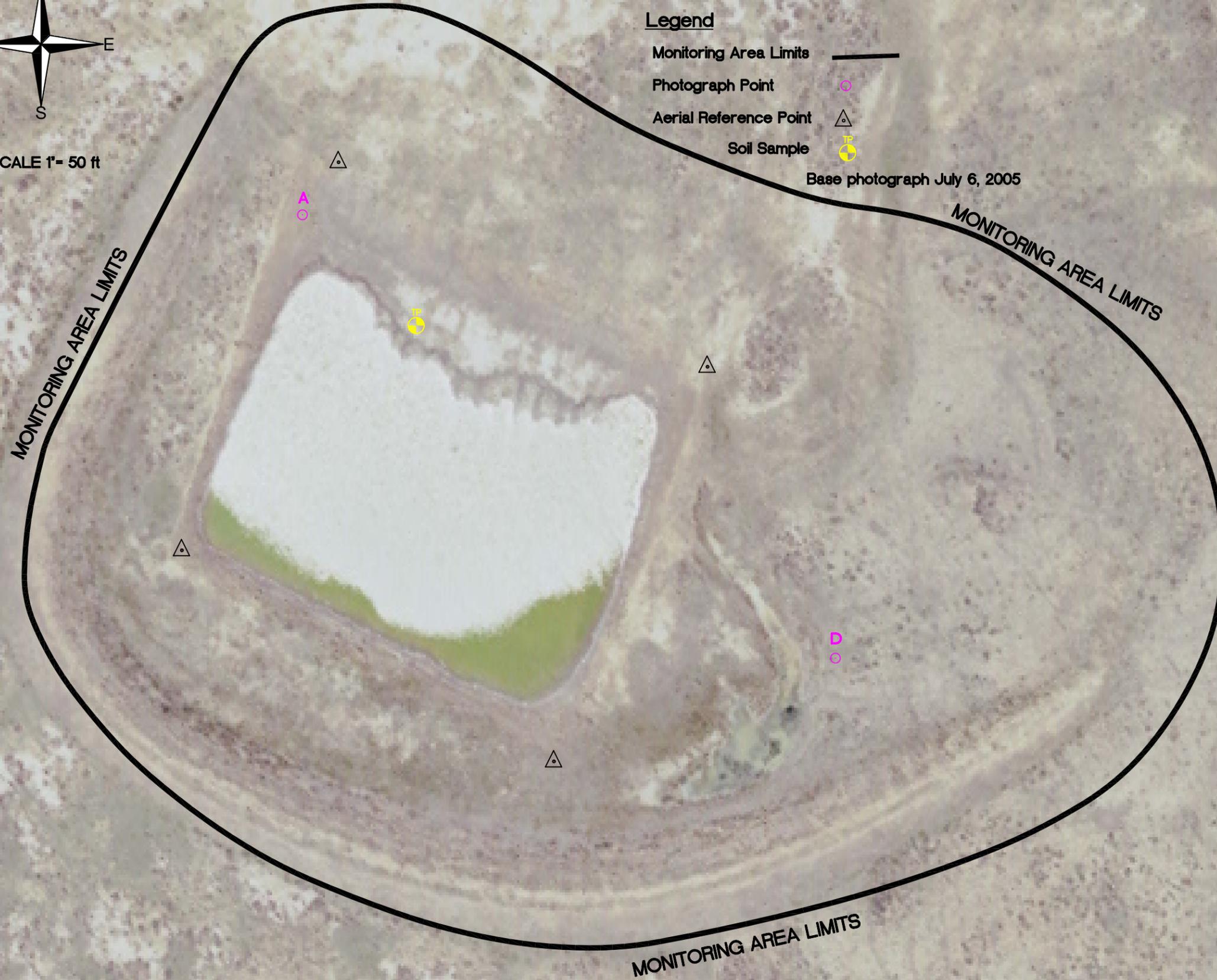


SCALE 1" = 50 ft

### Legend

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

Base photograph July 6, 2005



PROJECT NAME

MDT Ridgeway Complex W-1 Wetland Mitigation

DRAWING TITLE

Monitoring Activity Locations 2005

DRAWN: SH

PROJ NO: B43054.0412W1

PROJ MGR: JB

LOCATION: Ridgeway Cmpkx W-1

CHECKED: LB

SCALE: 1"=50'

APPVD: JB

FILE NAME: 2005 W01BASE.dwg



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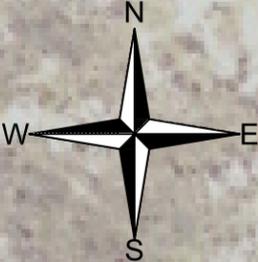
SHEET

2 OF

REV 01

Nov/12/2005

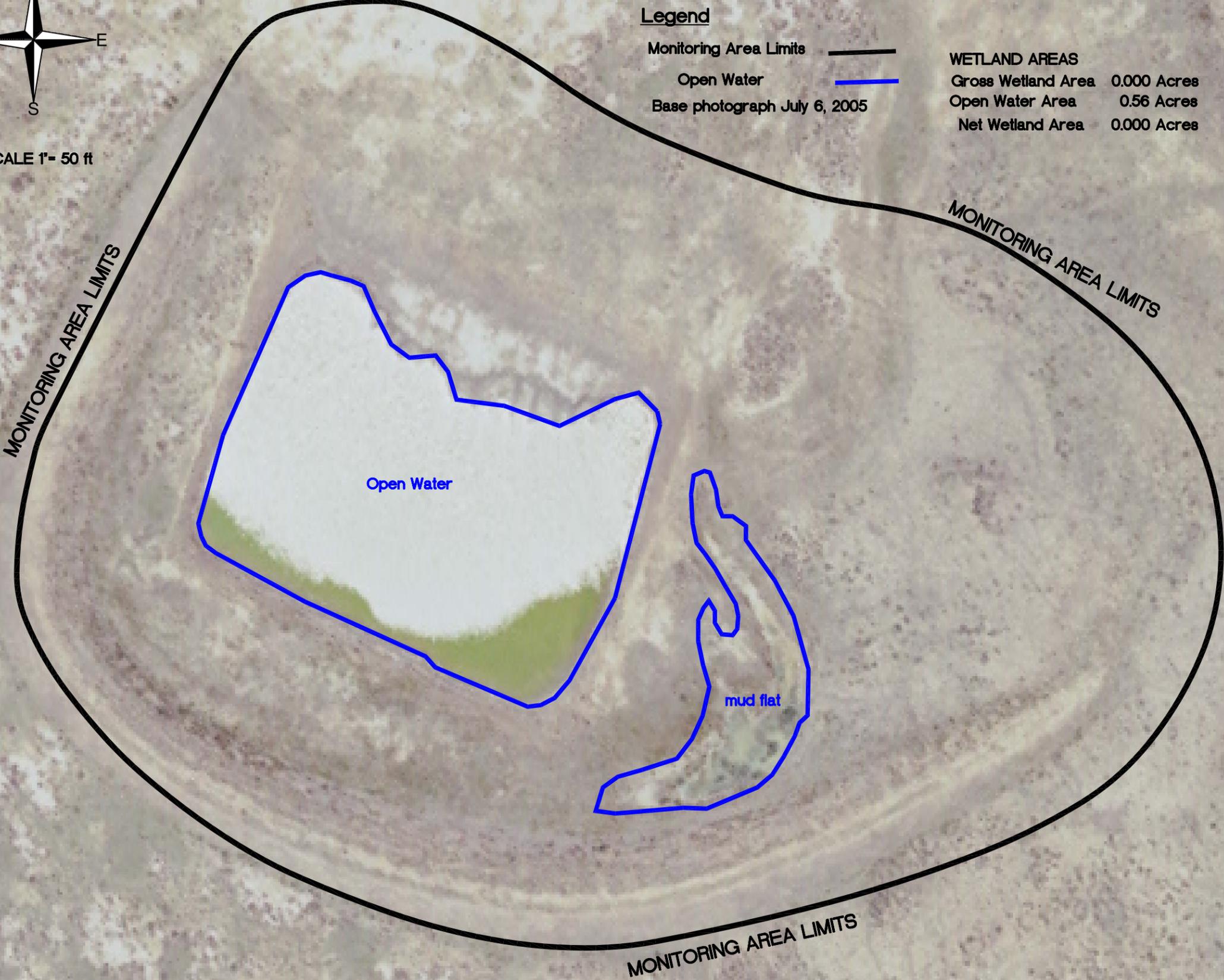
# Figure 3 Mapped Site Features 2005



SCALE 1" = 50 ft

**Legend**  
 Monitoring Area Limits ———  
 Open Water ———  
 Base photograph July 6, 2005

**WETLAND AREAS**  
 Gross Wetland Area 0.000 Acres  
 Open Water Area 0.56 Acres  
 Net Wetland Area 0.000 Acres



PROJECT NAME  
**MDT Ridgeway Complex W-1 Wetland Mitigation**

DRAWING TITLE  
**Mapped Site Features 2005**

PROJ NO: B43054.0412W1  
 LOCATION: Ridgeway Cmpkx W-1  
 SCALE: 1"=50'  
 FILE NAME: 2005 W01BASE.dwg

DRAWN: SH  
 PROJ MGR: JB  
 CHECKED: LB  
 APPVD: JB

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 Bozeman, MT 59771

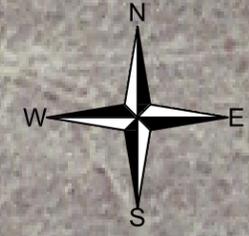
SHEET  
**3** OF  
 REV 01  
 Nov/12/2005

# Figure 2 Monitoring Activity Locations 2005

## Legend

- Monitoring Area Limits ———
- Photograph Point ○
- Aerial Reference Point △
- Soil Sample ●

Base photograph July 6, 2005



SCALE 1" = 100ft



PROJECT NAME

MDT Ridgeway Complex W-2 Wetland Mitigation

DRAWING TITLE

Monitoring Activity Locations 2005

PROJ NO: B43054.0412W2

DRAWN: SH

PROJ MGR: JB

SCALE: 1"=100'

CHECKED: LB

APPVD: JB

FILE NAME: 2005 W02BASE.dwg



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SHEET

2 OF

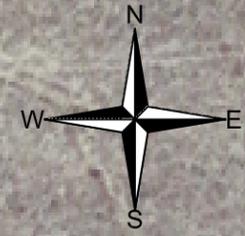
REV 01

Nov/18/2005

# Figure 3 Mapped Site Features 2005

## Legend

- Monitoring Area Limits ———
  - Open Water Limits ———
  - Wetland Limits ———
- Base photograph July 6, 2005



SCALE 1"= 100ft

### WETLAND AREAS

- Gross Wetland Area -6.11 Acres
- Open Water Area -0.83 Acres
- Net Wetland Area -5.28 Acres



PROJECT NAME  
**MDT Ridgeway Complex W-2 Wetland Mitigation**

DRAWING TITLE  
**Mapped Site Features 2005**

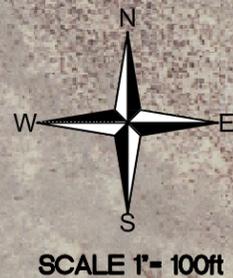
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 LOCATION: Ridgeway Cmpkx W-2  
 SCALE: 1"=100'  
 FILE NAME: 2005 W02BASE.dwg

DRAWN: SH  
 PROJ MGR: JB  
 CHECKED: LB  
 APPVD: JB



SHEET  
**3** OF  
 REV 01  
 Nov/18/2005

# Figure 2 Monitoring Activity Locations 2005



## Legend

- Monitoring Area Limits ———
- Photograph Point 
- Aerial Reference Point 
- Soil Sample 
- Base photograph July 6, 2005



PROJECT NAME <b>MDT Ridgeway Complex W-3 Wetland Mitigation</b>	
DRAWING TITLE <b>Monitoring Activity Locations 2005</b>	
PROJ NO: B43054.0412W3	DRAWN: SH
LOCATION: Ridgeway Cmplx W-3	PROJ MGR: JB
SCALE: 1"=100'	CHECKED: LB / APPVD: JB
FILE NAME: 2005 W03BASE.dwg	
	
SHEET	
<b>2</b> OF	
REV 01	
Nov/12/2005	

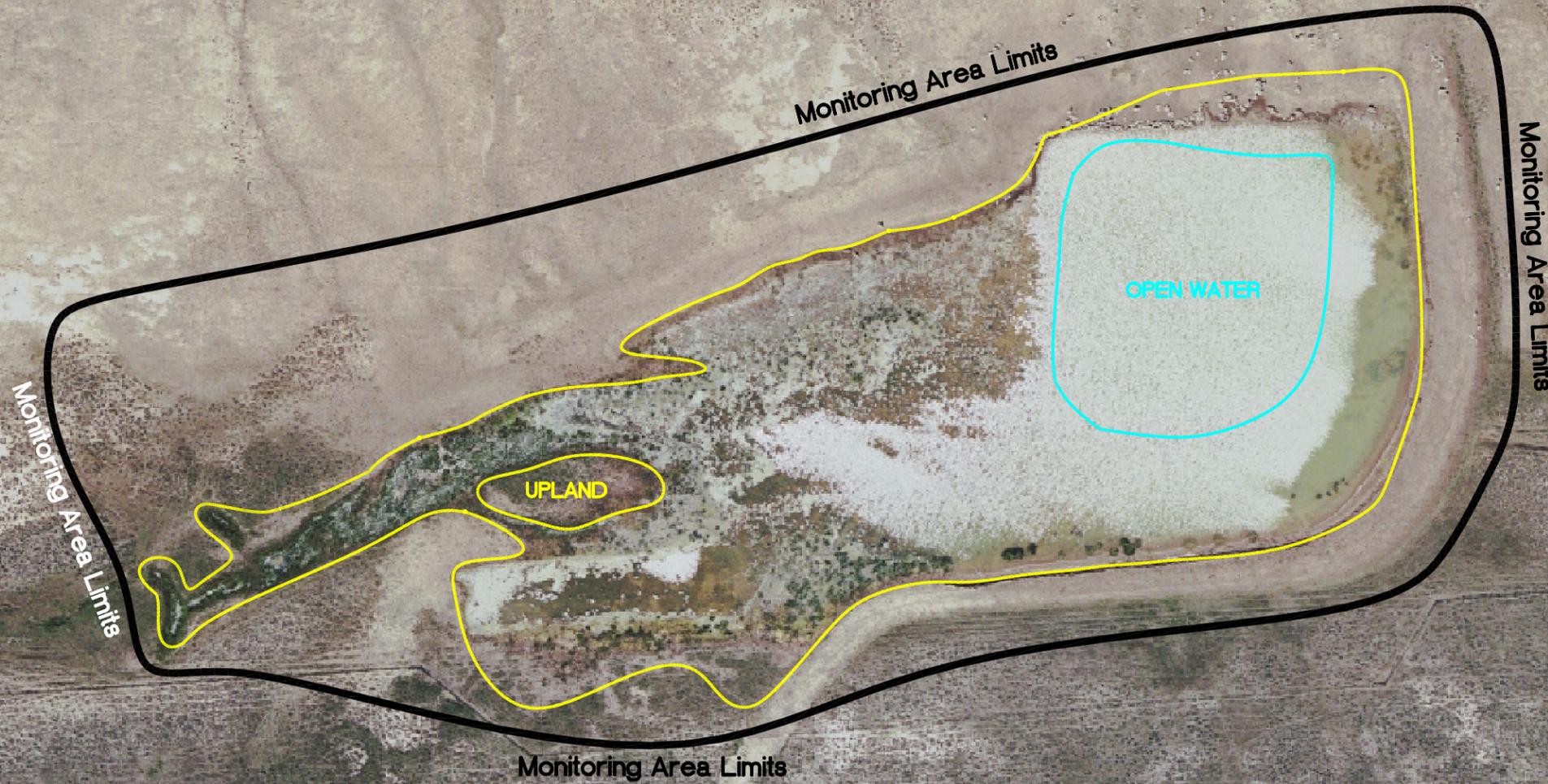
# Figure 3 Mapped Site Features 2005



**WETLAND AREAS (emergent)**  
 Gross Wetland Area = 4.02 Acres  
 Open Water Area = 0.74 Acres  
 Net Wetland Area = 3.28 Acres

### Legend

Monitoring Area Limits ———  
 Wetland Limits (emergent) ———  
 Open Water Limits ———  
 Base photograph July 6, 2005



PROJECT NAME  
**MDT Ridgeway Complex W-3 Wetland Mitigation**

DRAWING TITLE  
**Mapped Site Features 2005**

PROJ NO: B43054.0412W3  
 LOCATION: Ridgeway Cmpkx W-3  
 SCALE: 1"=100'  
 FILE NAME: 2005 W03BASE.dwg

DRAWN: SH  
 PROJ MGR: JB  
 CHECKED: LB  
 APPVD: JB



SHEET  
**3** OF  
 REV 01  
 Nov/12/2005

# Figure 2 Monitoring Activity Locations 2005



SCALE 1" = 50 ft

### Legend

- Monitoring Area Limits
  - Photograph Point
  - Aerial Reference Point
  - Soil Sample
- Base photograph July 6, 2005



PROJECT NAME

MDT Ridgeway Complex W-4 Wetland Mitigation

DRAWING TITLE

Monitoring Activity Locations 2005

DRAWN: SH

PROJ MGR: JB

CHECKED: LB

APPVD: JB

PROJ NO: B43054.0412W4

LOCATION: Ridgeway Cmpkx W-4

SCALE: 1"=50'

FILE NAME: 2005 W04BASE.dwg



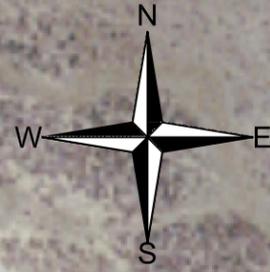
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Bozeman, MT 59771

SHEET

2 OF

REV 01  
Nov/12/2005

# Figure 3 Mapped Site Features 2005



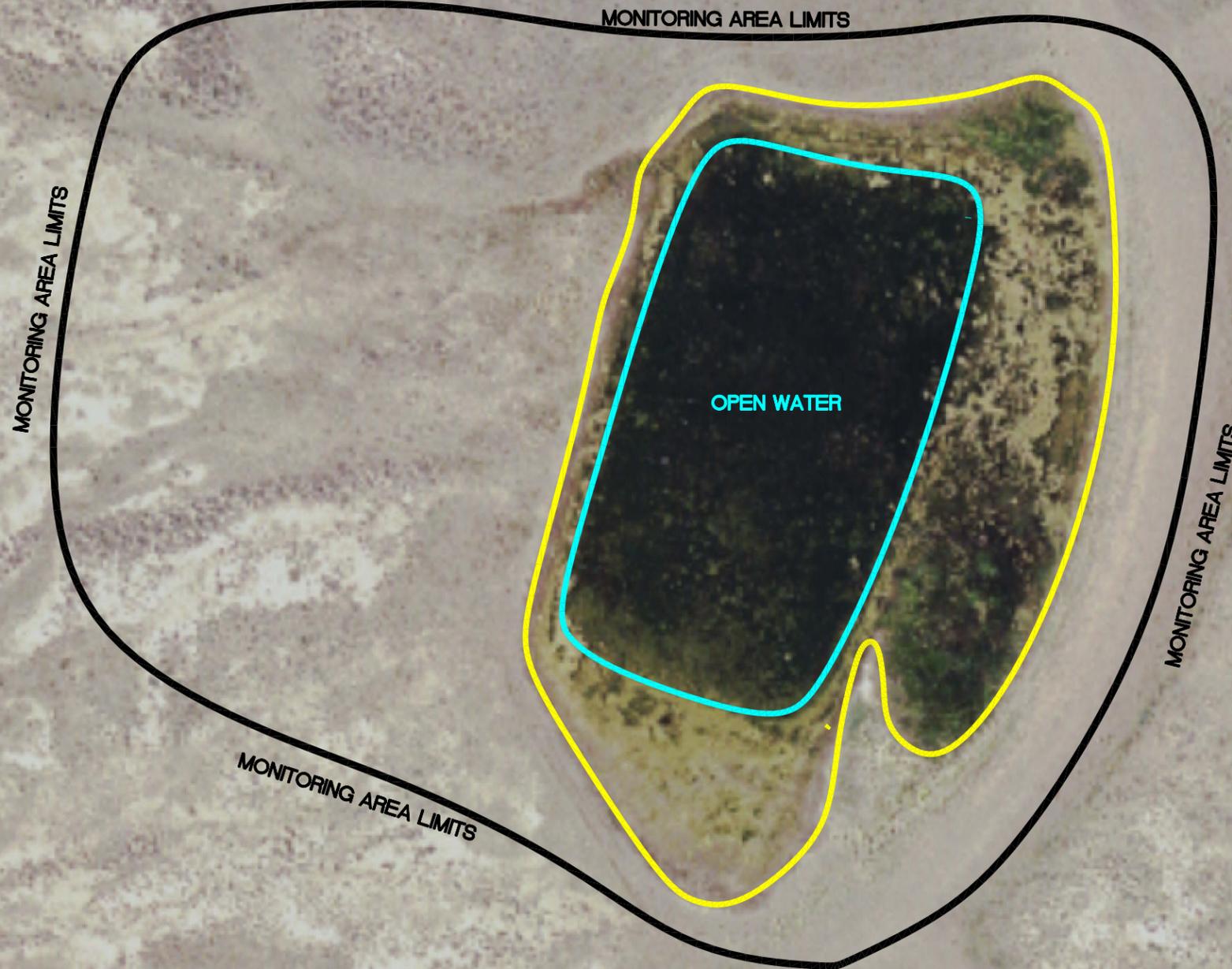
SCALE 1" = 50 ft

### Legend

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

WETLAND AREA (emergent)  
 Gross Wetland Area -0.96 Acres  
 Open Water Area -0.44 Acres  
 Net Wetland Area -0.52 Acres

Base photograph July 6, 2005



		PROJECT NAME <b>MDT Ridgeway Complex W-4 Wetland Mitigation</b>
PROJ NO: B43054.0412W4 LOCATION: Ridgeway Cmpkx W-4 SCALE: 1"=50' FILE NAME: 2005 W04BASE.dwg	DRAWN: SH PROJ MGR: JB CHECKED: LB APPVD: JB	DRAWING TITLE <b>Mapped Site Features 2005</b>
SHEET <span style="font-size: 2em; font-weight: bold;">3</span> OF REV 01 Nov/12/2005		

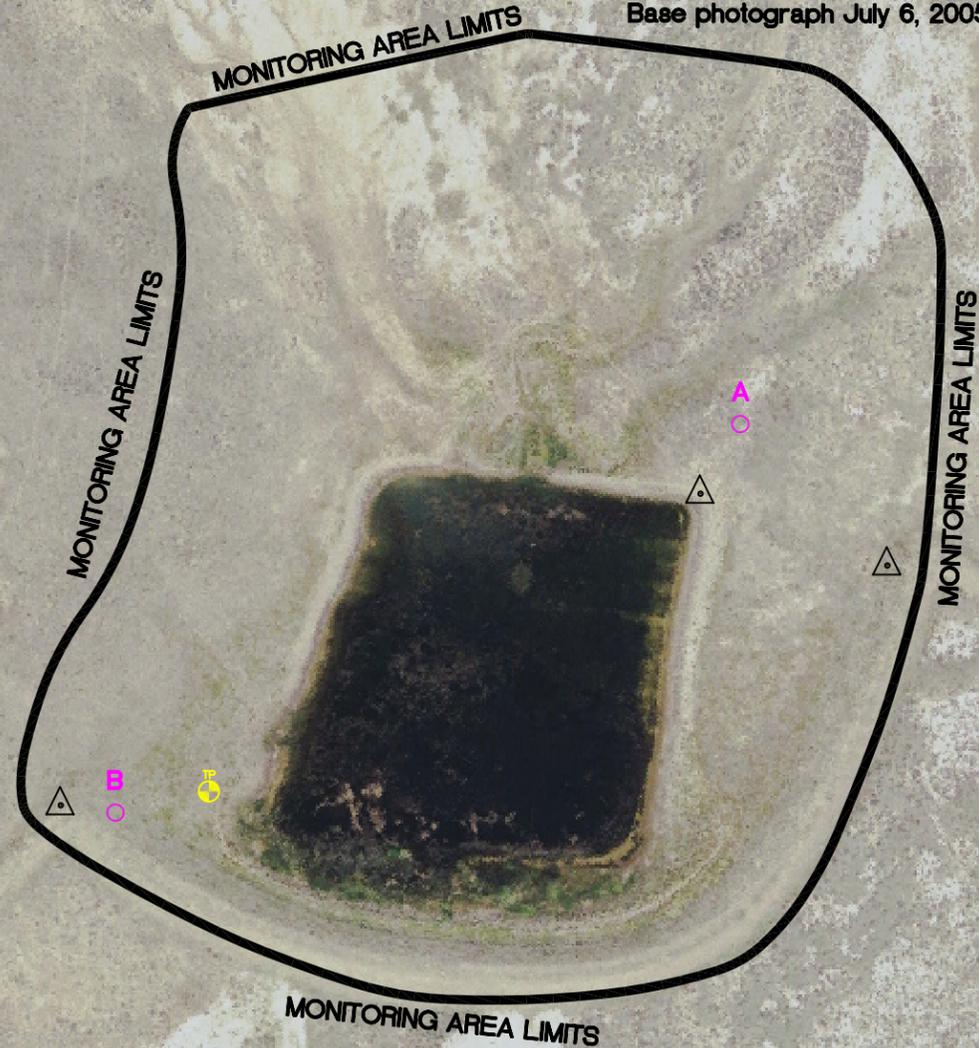
# Figure 2 Monitoring Activity Locations 2005



## Legend

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

Base photograph July 6, 2005



PROJECT NAME

MDT Ridgeway Complex W-5 Wetland Mitigation

DRAWING TITLE

Monitoring Activity Locations 2005

PROJ NO: B43054.0412W5

LOCATION: Ridgeway Cmplx W5

SCALE: 1"=100'

FILE NAME: 2005 W05BASE.dwg

DRAWN: SH

PROJ MGR: JB

CHECKED: LB

APPVD: JB

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SHEET

2

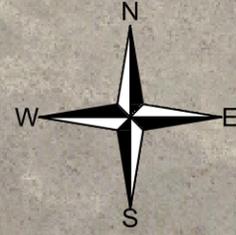
OF

REV 01

Nov/12/2005



# Figure 3 Mapped Site Features 2005

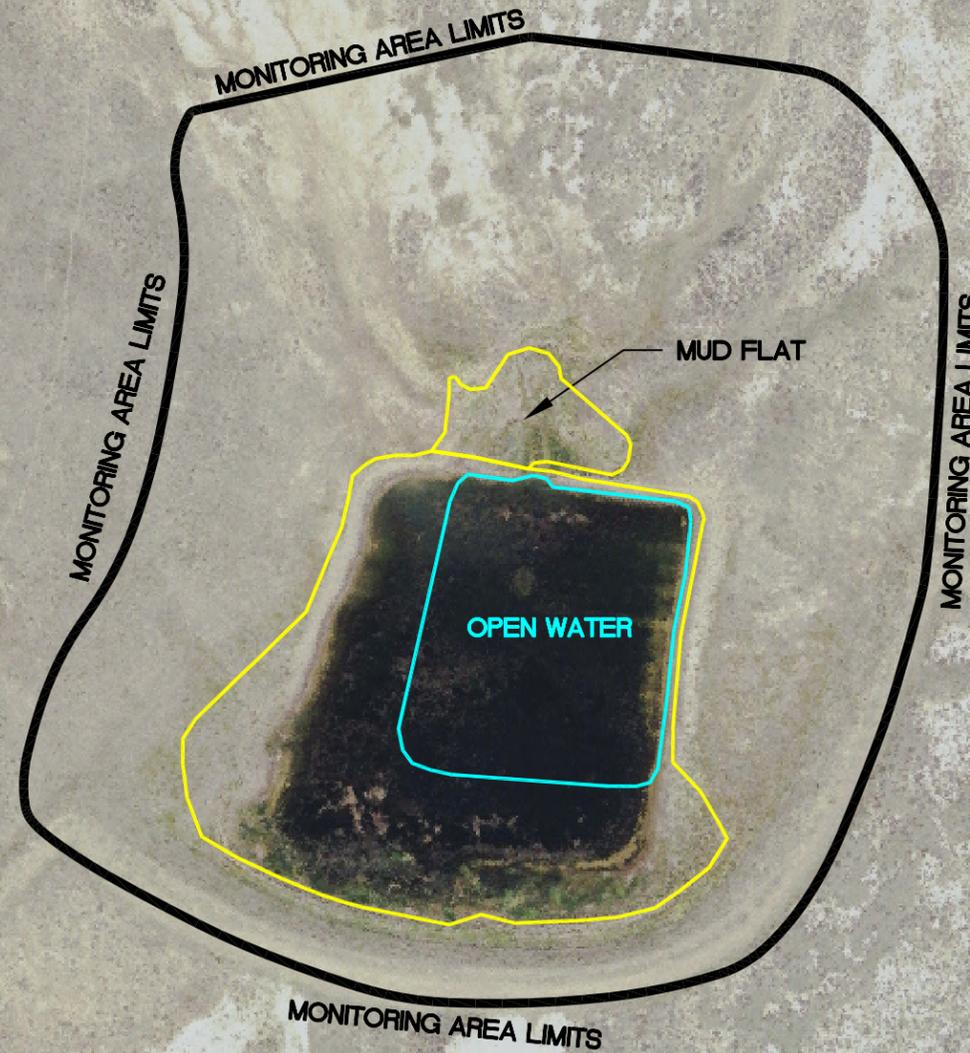


SCALE 1" = 100 ft

## Legend

Monitoring Area Limits ———  
 Open Water Limits ———  
 Emergent Wetland Limit ———  
 Base photograph July 6, 2005

WETLAND AREAS (emergent)  
 Gross Wetland Area -1.30 Acres  
 Open Water Area -0.50 Acres  
 Net Wetland Area -0.80 Acres



PROJECT NAME <b>MDT Ridgeway Complex W-5 Wetland Mitigation</b>	
DRAWING TITLE <b>Mapped Site Features 2005</b>	
PROJ NO: B43054.0412W5	DRAWN: SH
LOCATION: Ridgeway Cmpkx W5	PROJ MGR: JB
SCALE: 1"=100'	CHECKED: LB
FILE NAME: 2005 W05BASE.dwg	APPVD: JB
SHEET	
<b>3</b>	
OF	
REV 01	
Nov/12/2005	

# Figure 2 Monitoring Activity Locations 2005

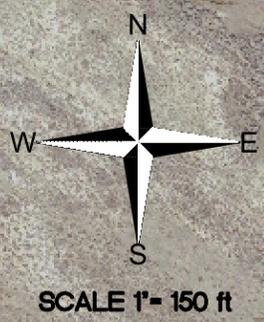


- Legend**
- Monitoring Area Limits
  - Photograph Point ○
  - Aerial Reference Point ◦
  - Soil Sample ●
- Base photograph July 6, 2005



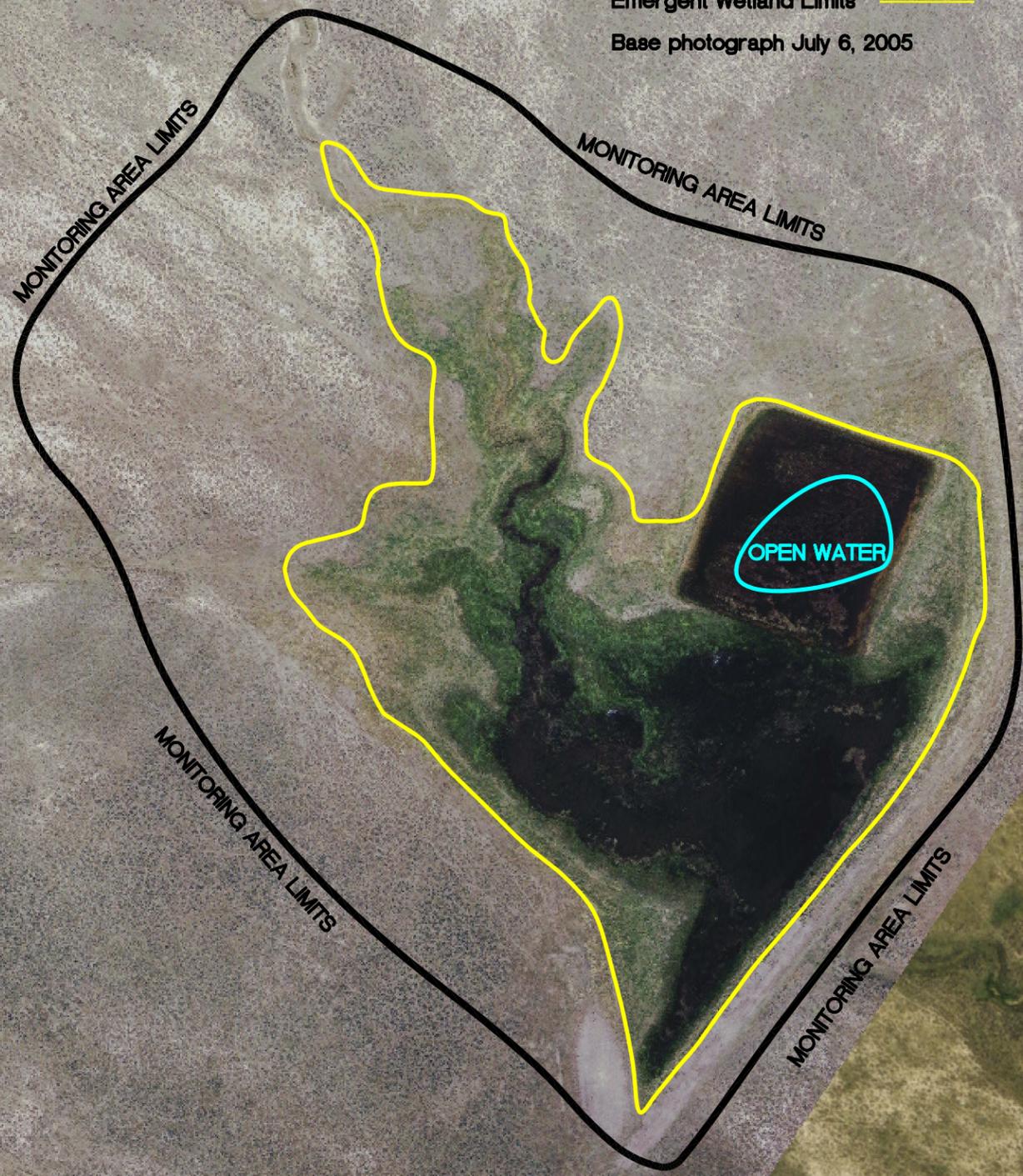
<p>LAND &amp; WATER CONSULTING A division of <b>FBSJ</b> P.O. BOX 1122 Bozeman, MT 59771</p>		<p>PROJECT NAME <b>MDT Ridgeway Complex W-6 Wetland Mitigation</b></p> <p>DRAWING TITLE <b>Monitoring Activity Locations 2005</b></p>
PROJ NO: B43054.0412W6	DRAWN: SH	PROJ MGR: JB
LOCATION: Ridgeway Cmplx W6	CHECKED: LB	APPVD: JB
SCALE: 1"=150'	FILE NAME: 2005 W06BASE.dwg	
<p>SHEET</p> <p style="font-size: 2em;"><b>2</b></p> <p>REV 01</p>	<p>OF</p> <p>Nov/12/2005</p>	

# Figure 3 Mapped Site Features 2005



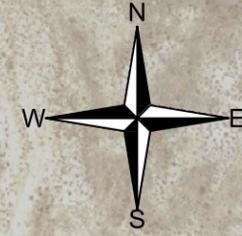
- Legend**
- Monitoring Area Limits
  - Open Water Limits
  - Emergent Wetland Limits
- Base photograph July 6, 2005

**WETLAND AREA (emergent)**  
 Gross Wetland Area -6.72 Acres  
 Open Water Area -0.28 Acres  
 Net Wetland Area -6.44 Acres



PROJ NO: B43054.0412W6 LOCATION: Ridgway Cmplx W6 SCALE: 1"=150' FILE NAME: 2005 W06BASE.dwg	DRAWN: SH PROJ MGR: JB CHECKED: LB APPVD: JB
PROJECT NAME <b>MDT Ridgeway Complex W-6 Wetland Mitigation</b>	
DRAWING TITLE <b>Mapped Site Features 2005</b>	
SHEET <b>3</b> OF	
REV 01 Nov/12/2005	

# Figure 2 Monitoring Activity Locations 2005



SCALE 1"= 100ft

## Legend

- Monitoring Area Limits
- Photograph Point
- Aerial Reference Point
- Soil Sample
- Base photograph July 6, 2005



PROJECT NAME

MDT Ridgeway Complex W-7/W-8 Wetland Mitigation

DRAWING TITLE

Monitoring Activity Locations 2005

PROJ NO: B43054.0412W7/8 DRAWN: SH

LOCATION: Ridgeway Cmpkx W7/8 PROJ MGR: JB

SCALE: 1"=100' CHECKED: LB APPVD: JB

FILE NAME: 2005 W0708BASE.dwg



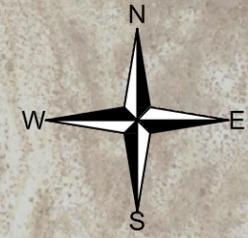
SHEET  
**2** OF  
REV 01  
Nov/12/2005

# Figure 3 Mapped Site Features 2005

MONITORING AREA LIMITS

## Legend

- Monitoring Area Limits
- Vegetation
- W-7 Net Wetland Area 0.44 Acres
- W-8 Net Wetland Area 0.26 Acres
- Base photograph July 6, 2005



SCALE 1"= 100ft

MONITORING AREA LIMITS

MONITORING AREA LIMITS

W-7

W-8

MONITORING AREA LIMITS

PROJECT NAME

MDT Ridgeway Complex W-7/W-8 Wetland Mitigation

DRAWING TITLE

Mapped Site Features 2005

PROJ NO: B43054.0412W7/8

LOCATION: Ridgeway Cmpkx W7/8

SCALE: 1"=100'

FILE NAME: 2005 W0708BASE.dwg

DRAWN: SH

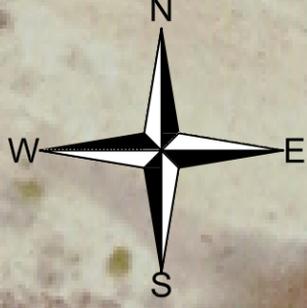
PROJ MGR: JB

CHECKED: LB

APPVD: JB



SCALE 1" = 50ft



# Figure 2 Monitoring Activity Locations 2005

## Legend

- Monitoring Area Limits 
- Photograph Point 
- Aerial Reference Point 
- Soil Sample 
- Base photograph July 6, 2005

MONITORING AREA LIMITS

MONITORING AREA LIMITS

MONITORING AREA LIMITS

MONITORING AREA LIMITS



PROJECT NAME

MDT Ridgeway Complex W-10 Wetland Mitigation

DRAWING TITLE

Monitoring Activity Locations 2005

DRAWN: SH

PROJ MGR: JB

PROJ NO: B43054.0412W10

LOCATION: Ridgeway Cmpkx W10

SCALE: 1"=50'

FILE NAME: 2005 W10BASE.dwg

CHECKED: LB

APPVD: JB



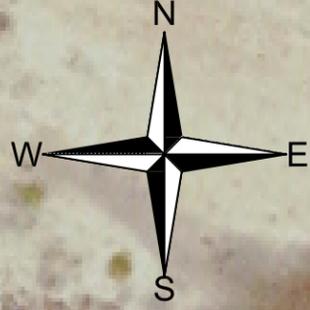
LAND & WATER CONSULTING  
P.O. BOX 1122  
Bozeman, MT 59771

SHEET

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REV 01  
Nov/12/2005

SCALE 1" = 50ft



# Figure 3 Mapped Site Features 2005

## Legend

- Monitoring Area Limits
- Open Water
- Vegetation
- Base photograph July 6, 2005

<b>Wetland Area</b>	
Gross Wetland Area	0.94 Acres
Open Water Area	0.15 Acres
Net Wetland Area	0.79 Acres



PROJECT NAME

MDT Ridgeway Complex W-10 Wetland Mitigation

DRAWING TITLE

Mapped Site Features 2005

DRAWN: SH

PROJ NO: B43054.0412W10

PROJ MGR: JB

LOCATION: Ridgeway Cmpkx W10

CHECKED: LB

SCALE: 1"=50'

APPVD: JB

FILE NAME: 2005 W10BASE.dwg



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 A division of **FBS**  
 P.O. BOX 1122  
 Bozeman, MT 59771

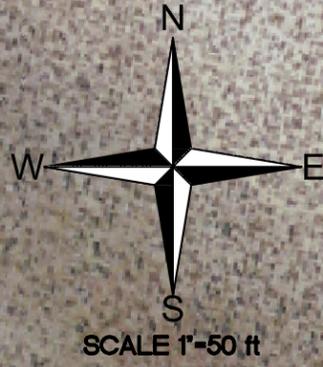
SHEET

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REV 01

Nov/12/2005

# Figure 2 Monitoring Activity Locations 2005

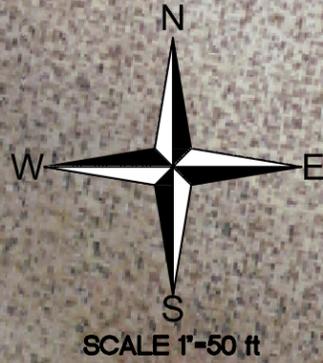


- Legend**
- Monitoring Area Limits
  - Photograph Points
  - Aerial Reference Point
  - Soil Sample
  - Base photograph July 6, 2005



PROJECT NAME <b>MDT Ridgeway Complex W-11 Wetland Mitigation</b>	
DRAWING TITLE <b>Monitoring Activity Locations 2005</b>	
PROJ NO: B43054.0412W11	DRAWN: SH
LOCATION: Ridgeway Cmpkx W11	PROJ MGR: JB
SCALE: 1"=50'	CHECKED: LB    APPVD: JB
FILE NAME: 2005 W11BASE.dwg	
SHEET <b>2</b> OF	
REV 01 Nov/12/2005	

# Figure 3 Mapped Site Features 2005



### Legend

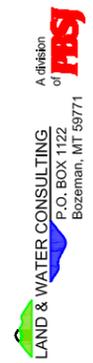
- Monitoring Area Limits
- Emergent Wetland Limits
- Base photograph July 6, 2005

### WETLAND AREAS

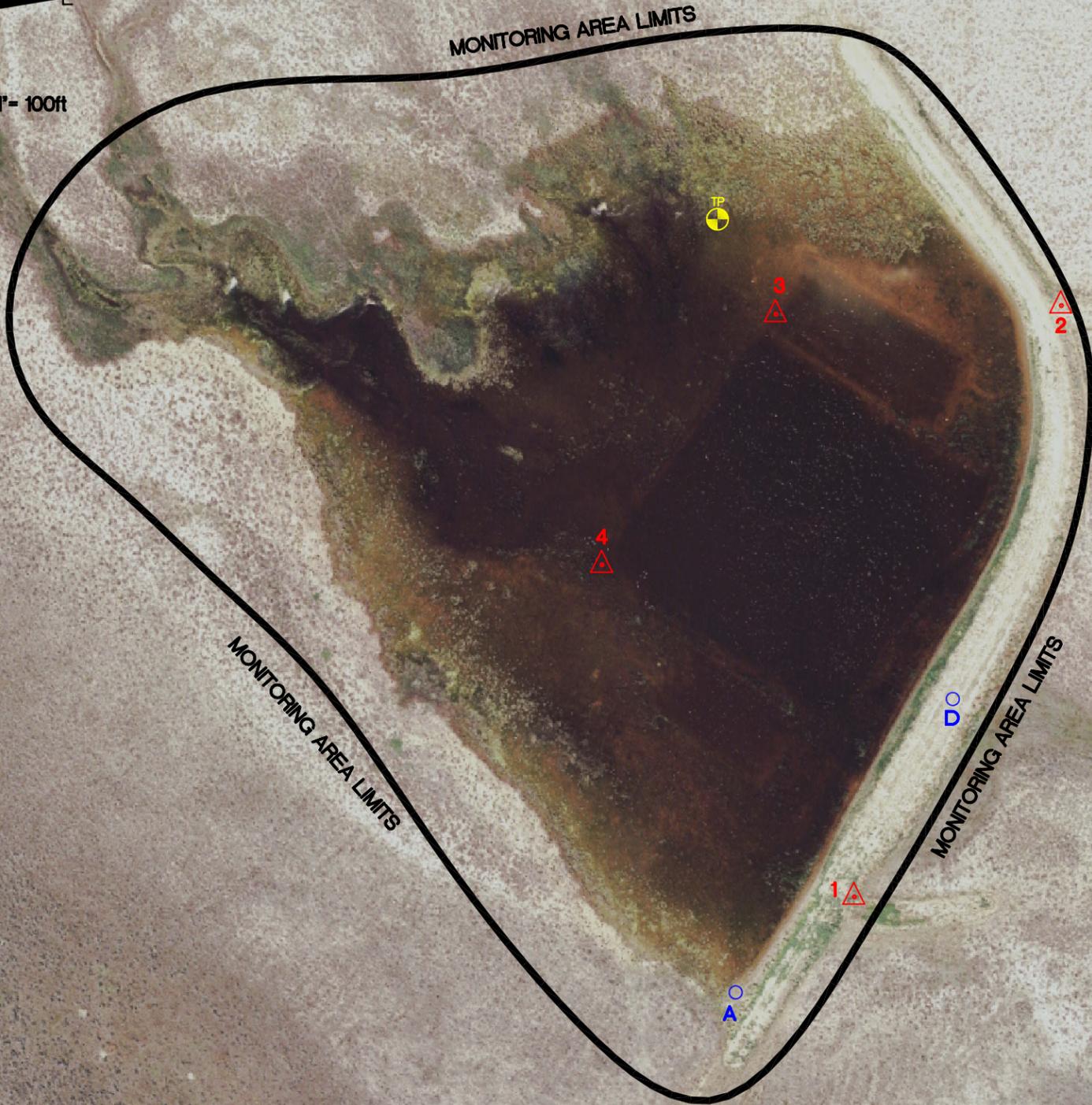
Gross Wetland Area	0.03 Acres
Open Water Area	0.00 Acres
Net Wetland Area	0.03 Acres



PROJECT NAME	MDT Ridgeway Complex W-11 Wetland Mitigation		
DRAWING TITLE	Mapped Site Features 2005		
PROJ NO:	B43054.0412W11	DRAWN:	SH
LOCATION:	Ridgeway Cmpkx W11	PROJ MGR:	JB
SCALE:	1"=50'	CHECKED:	LB
FILE NAME:	2005 W11BASE.dwg	APPVD:	JB



# Figure 2 Monitoring Activity Locations 2005



- Legend**
- Monitoring Area Limits
  - Photograph Point
  - Aerial Reference Point
  - Soil Sample
- Base photograph July 6, 2005

<p>PROJECT NAME <b>MDT Ridgeway Complex W-12 Wetland Mitigation</b></p>	
<p>DRAWING TITLE <b>Monitoring Activity Locations 2005</b></p>	
<p>PROJ NO: B43054.0412W12</p>	<p>DRAWN: SH</p>
<p>LOCATION: Ridgeway Cmpkx W12</p>	<p>PROJ MGR: JB</p>
<p>SCALE: 1"=100'</p>	<p>CHECKED: LB</p>
<p>FILE NAME: 2005 W12BASE.dwg</p>	<p>APPVD: JB</p>
<p>SHEET</p>	
<p><b>2</b> OF</p>	
<p>REV 01 Nov/14/2005</p>	

# Figure 3 Mapped Site Features 2005



### Legend

- Monitoring Area Limits
  - Emergent Wetland Limits
  - Open Water Limits
- Base photograph July 6, 2005

### WETLAND AREAS (emergent)

Gross Wetland Area	4.66 Acres
Open Water Area	1.19 Acres
Net Wetland Area	3.47 Acres

PROJECT NAME

MDT Ridgeway Complex W-12 Wetland Mitigation

DRAWING TITLE

Mapped Site Features 2005

PROJ NO: B43054.0412W12

LOCATION: Ridgeway Cmpkx W12

SCALE: 1"=100'

FILE NAME: 2005 W12BASE.dwg

DRAWN: SH

PROJ MGR: JB

CHECKED: LB

APPVD: JB



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Bozeman, MT 59771

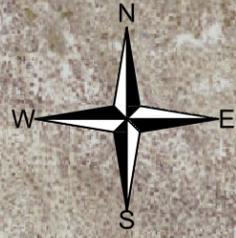
SHEET

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Nov/14/2005

# Figure 2 Monitoring Activity Locations 2005



SCALE 1"= 100ft

MONITORING AREA LIMITS

### Legend

Monitoring Area Limits 

Photograph Point 

Soil Sample 

Aerial Reference Point 

Base photograph July 6, 2005



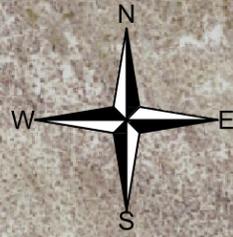
MONITORING AREA LIMITS

MONITORING AREA LIMITS

PROJECT NAME <b>MDT Ridgeway Complex W-13 Wetland Mitigation</b>	
DRAWING TITLE <b>Monitoring Activity Locations 2005</b>	
PROJ NO: B43054.0412W13	DRAWN: SH
LOCATION: Ridgeway Cmpkx W13	PROJ MGR: JB
SCALE: 1"=100'	CHECKED: LB
FILE NAME: 2005 W13BASE.dwg	APPVD: JB



# Figure 3 Mapped Site Features 2005



SCALE 1" = 100ft

### Legend

- Monitoring Area Limits
  - Open Water Limits
  - Emergent Wetland Limits
- Base photograph July 6, 2005

**WETLAND AREAS:**  
 Gross Wetland Area -4.59 Acres  
 Open Water -1.09 Acres  
 Net Wetland Area -3.50 Acres



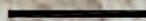
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LOCATION: Ridgeway Cmpkx W13	PROJ MGR: JB
SCALE: 1"=100'	CHECKED: LB
FILE NAME: 2005 W13BASE.dwg	APPVD: JB

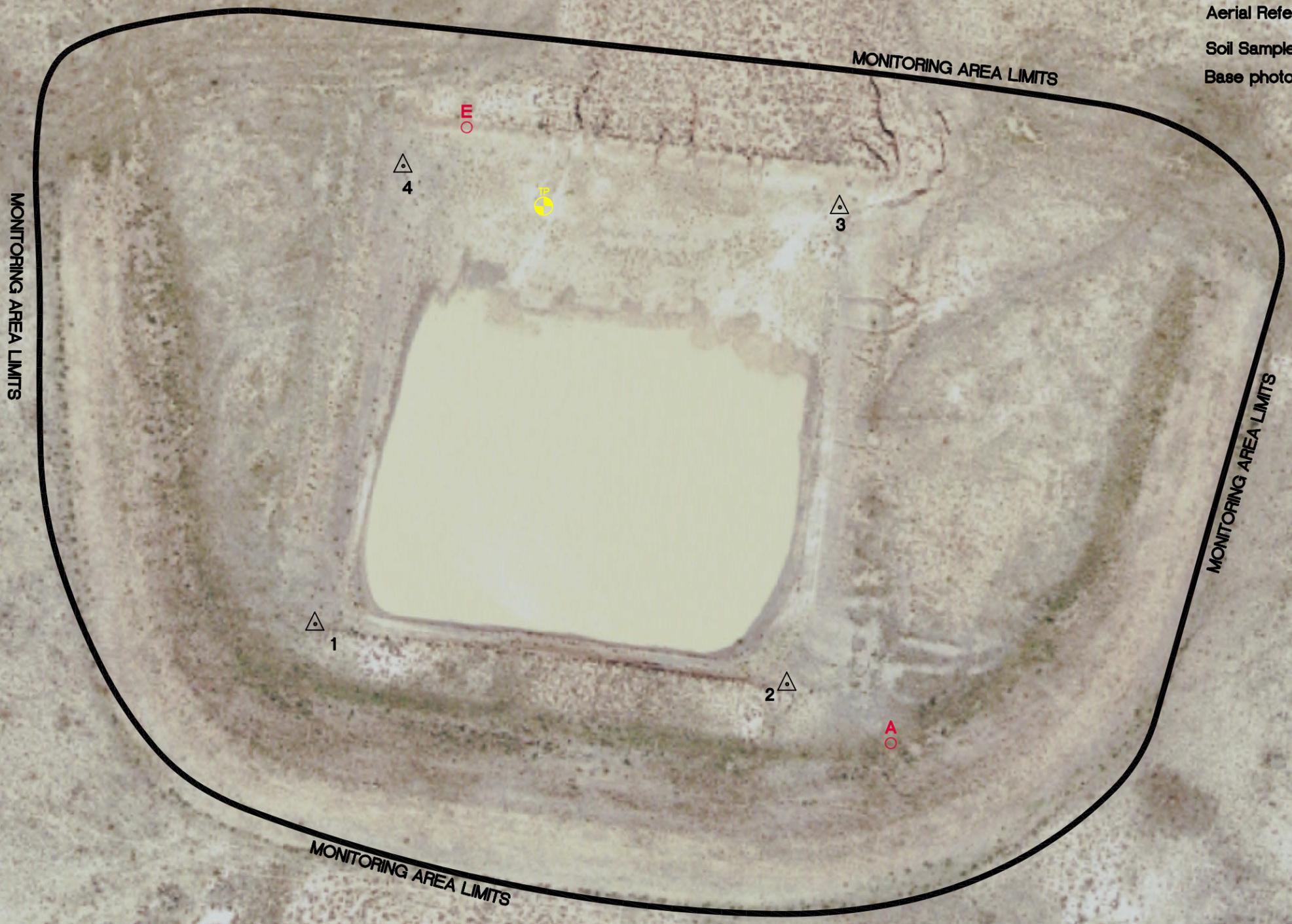
PROJECT NAME: MDT Ridgeway Complex W-13 Wetland Mitigation  
 DRAWING TITLE: Mapped Site Features 2005



# Figure 2 Monitoring Activity Locations 2005



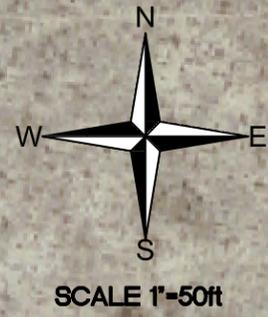
- Legend**
- Monitoring Area Limits 
  - Photograph Point 
  - Aerial Reference Point 
  - Soil Sample 
  - Base photograph July 6, 2005



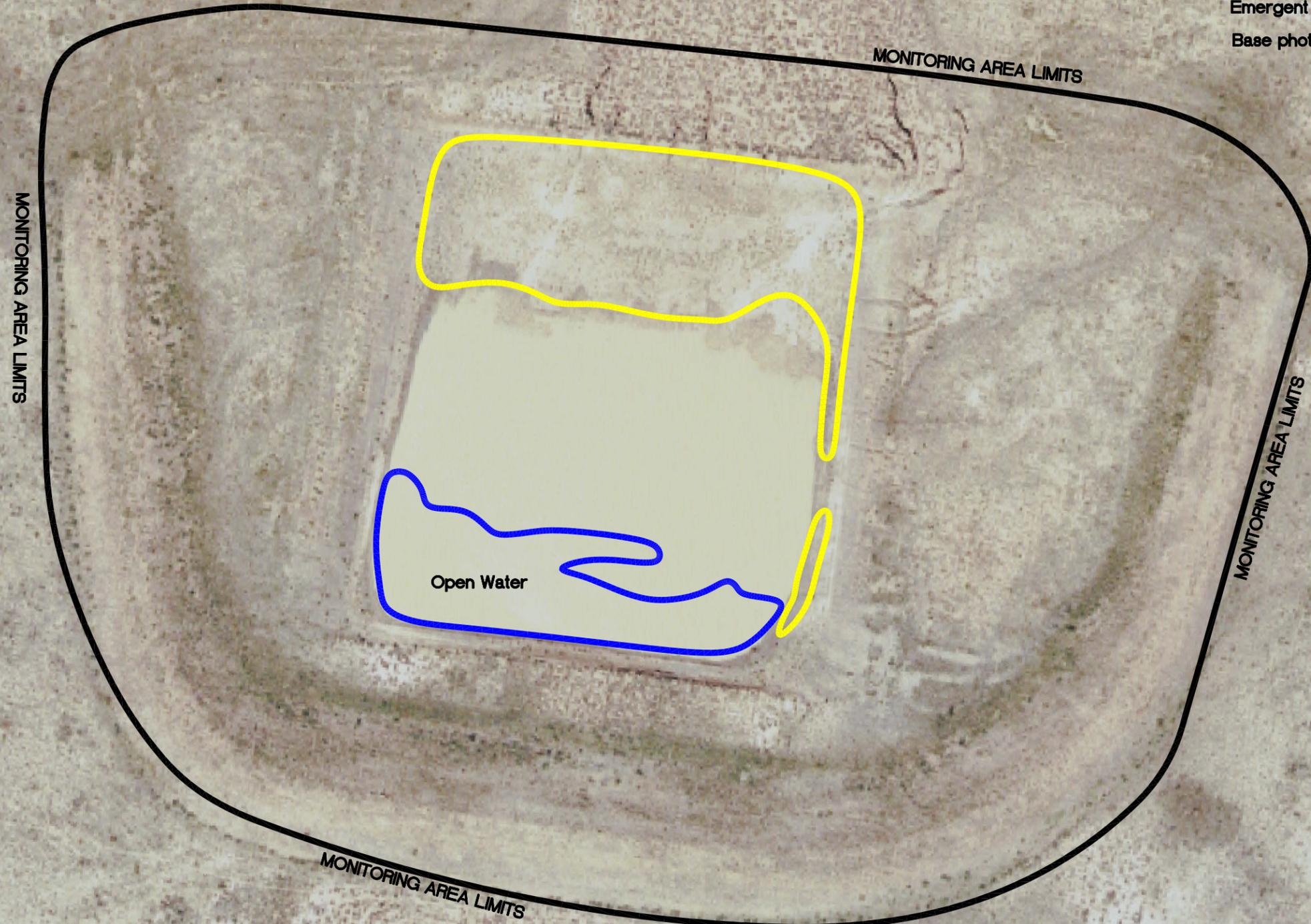
PROJECT NAME		MDT Ridgeway Complex W-14 Wetland Mitigation	
DRAWING TITLE		Monitoring Activity Locations 2005	
PROJ NO:	B43054.0412W14	DRAWN:	SH
LOCATION:	Ridgeway Cmpkx W14	PROJ MGR:	JB
SCALE:	1"=50'	CHECKED:	LB
FILE NAME:	2005 W14BASE.dwg	APPVD:	JB



# Figure 3 Mapped Site Features 2005



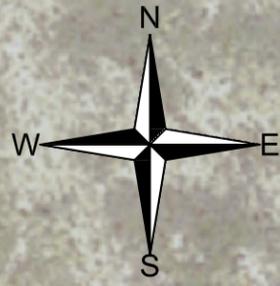
- Legend**
- Monitoring Area Limits
  - Open Water Limits
  - Emergent Wetland Limits
- Base photograph July 6, 2005



**WETLAND AREA**  
 Gross Wetland Area = 0.27 Acres  
 Open Water Area = 0.14 Acres  
 Net Wetland Area = 0.27 Acres

PROJECT NAME <b>MDT Ridgeway Complex W-14 Wetland Mitigation</b>	DRAWING TITLE <b>Mapped Site Features 2005</b>
PROJ NO: B43054.0412W14 LOCATION: Ridgeway Cmpkx W14 SCALE: 1"=50' FILE NAME: 2005 W14BASE.dwg	DRAWN: SH PROJ MGR: JB CHECKED: LB APPVD: JB
SHEET <span style="font-size: 2em; font-weight: bold;">3</span> OF	REV 01 Nov/14/2005

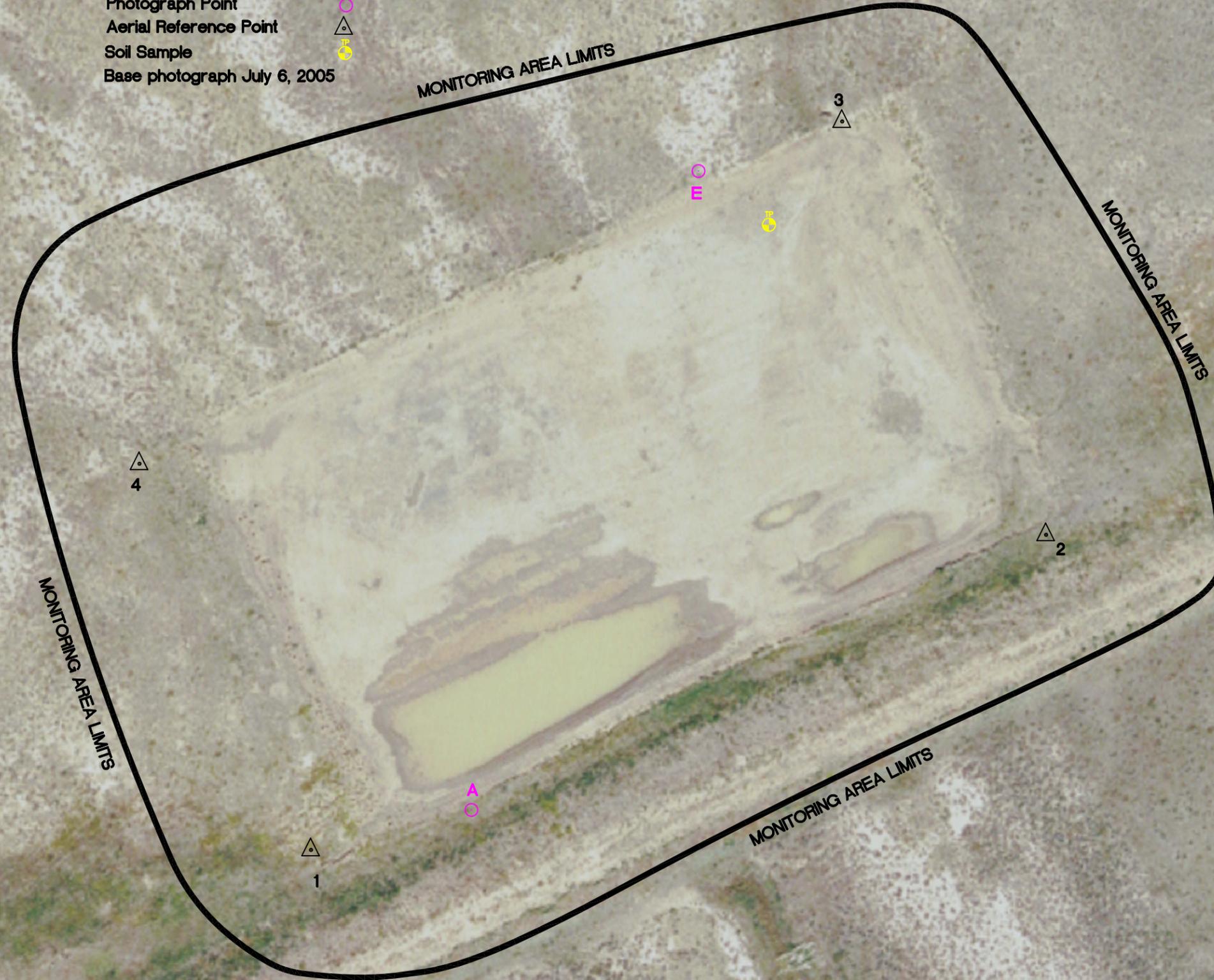
# Figure 2 Monitoring Activity Locations 2005



SCALE 1"= 50ft

## Legend

- Monitoring Area Limits 
  - Photograph Point 
  - Aerial Reference Point 
  - Soil Sample 
- Base photograph July 6, 2005



PROJECT NAME

MDT Ridgeway Complex W-15 Wetland Mitigation

DRAWING TITLE

Monitoring Activity Locations 2005

DRAWN: SH

PROJ NO: B43054.0412W15

DRAWN: SH

PROJ MGR: JB

CHECKED: LB

APPVD: JB

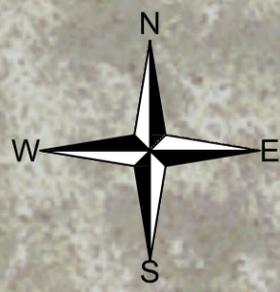
FILE NAME: 2005 W15BASE.dwg



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Nov/14/2005

# Figure 3 Mapped Site Features 2005



SCALE 1"= 50ft

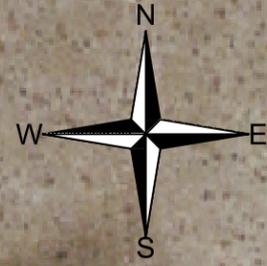
**Legend**  
 Monitoring Area Limits ———  
 Open Water Limits ———  
 Base photograph July 6, 2005

**WETLAND AREAS**  
 Gross Wetland Area 0.00 Acres  
 Open Water Area 0.09 Acres  
 Net Wetland Area 0.00 Acres



PROJECT NAME <b>MDT Ridgeway Complex W-15 Wetland Mitigation</b>		DRAWING TITLE <b>Mapped Site Features 2005</b>	
PROJ NO: B43054.0412W15	DRAWN: SH	PROJ MGR: JB	APPVD: JB
LOCATION: Ridgeway Cmpkx W15	CHECKED: LB	FILE NAME: 2005 W15BASE.dwg	
SCALE: 1"=50'	A division of <b>FBSJ</b> LAND & WATER CONSULTING P.O. BOX 1122 Bozeman, MT 59771		
SHEET <b>3</b> OF		REV 01 Nov/14/2005	

# Figure 2 Monitoring Activity Locations 2005



SCALE 1" = 50ft

### Legend

- Monitoring Area Limits
- Photograph Point
- Aerial Reference Point
- Soil Sample
- Base photograph July 6, 2005



PROJECT NAME

MDT Ridgeway Complex W-16 Wetland Mitigation

DRAWING TITLE

Monitoring Activity Locations 2005

DRAWN: SH

PROJ NO: B43054.0412W16

PROJ MGR: JB

LOCATION: Ridgeway Cmpkx W16

CHECKED: LB

SCALE: 1"=50'

APPVD: JB

FILE NAME: 2005 W16BASE.dwg



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Bozeman, MT 59771

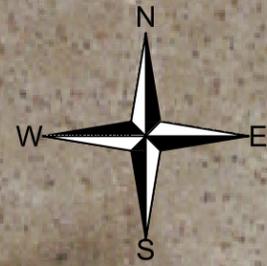
SHEET

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# Figure 3 Mapped Site Features 2005



SCALE 1" = 50ft

### Legend

Monitoring Area Limits

Open Water Limits

Base photograph July 6, 2005



### Wetland Areas

Gross Wetland Area 0.00 Acres  
 Open Water Area 0.89 Acres  
 Net Wetland Area 0.00 Acres

PROJECT NAME  
**MDT Ridgeway Complex W-16 Wetland Mitigation**  
 DRAWING TITLE  
**Mapped Site Features 2005**

PROJ NO: B43054.0412W16	DRAWN: SH
LOCATION: Ridgeway Cmpkx W16	PROJ MGR: JB
SCALE: 1"=50'	CHECKED: LB
FILE NAME: 2005 W16BASE.dwg	APPVD: JB



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## **Appendix H**

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### **WETLANDS 1 - 8 AND 10 - 16: 2005 WETLAND DELINEATION FORMS**

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*MDT Wetland Mitigation Monitoring  
Ridgeway Wetland Complex  
Ekalaka, Montana*









**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 &amp; Water Consulting/PBSJ</u>	Date: <u>7/27/05</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-3</u>

**VEGETATION**

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	ELEACI	H	OBL	9			
2	SAGCUN	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 expanding; aquatic veg on surface of a large portion of wetland.

**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 checked="" type="checkbox"/> Drift Lines <input checked="" 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>2"</u> (in.)  Depth to Saturated Soil: <u>0"</u> (in.)	
Remarks:  Wetland has areas of shallow and deep (~<4-6 ft) of surface water.	







**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 &amp; Water Consulting/PBSJ</u>	Date: <u>7/27/05</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-5</u>

**VEGETATION**

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	ELEPAL	H	OBL	9			
2	ALIPLA	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%

Aquatic vegetation in ~30% of wetland and wetland surrounded by emergent vegetation.

**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>6"</u> (in.)  Depth to Saturated Soil: <u>0"</u> (in.)	
Remarks:  Wetland completely inundated with ~50% of open water and the remaining is inundated and vegetated with aquatic and emergent veg.	







**ROUTINE WETLAND DETERMINATION**  
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Ridgeway Complex</u> Applicant/Owner: <u>MDT</u> Investigator: <u>Lynn Bacon, Land &amp; Water Consulting/PBSJ</u>	Date: <u>7/27/05</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?: (If needed, explain on reverse.) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Community ID: <u>Emergent</u> Transect ID: _____ Plot ID: <u>W-7</u>

**VEGETATION**

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	HORJUB	H	FACW	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%

> 30% WL veg cover.

**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	<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators:</b> <input 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 type="checkbox"/> Drainage Patterns in Wetlands <b>Secondary Indicators (2 or more required):</b> <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)
<b>Field Observations:</b>  Depth of Surface Water: <u>NA</u> (in.)  Depth to Free Water in Pit: <u>NA</u> (in.)  Depth to Saturated Soil: <u>&gt;6"</u> (in.)	
<b>Remarks:</b>  Soil saturated but not enough water to eliminate marginal wetland vegetation (yet).	



**ROUTINE WETLAND DETERMINATION**  
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Ridgeway Complex</u> Applicant/Owner: <u>MDT</u> Investigator: <u>Lynn Bacon, Land &amp; Water Consulting/PBSJ</u>	Date: <u>7/27/05</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-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	BECSYZ	H	OBL	12			
5	HORJUB	H	FACW	13			
6	ALIPLA	H	OBL	14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-).      6/6=100%

Vegetation community increasing in complexity.

**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	<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators:</b> <input 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 type="checkbox"/> Drainage Patterns in Wetlands <b>Secondary Indicators (2 or more required):</b> <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)
<b>Field Observations:</b>  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.)	
<b>Remarks:</b>  Excavted area is ~>50% inundated and margins are saturated.	

**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? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<b>Profile Description:</b>					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
10"	A	2.5Y 4/2	7.5YR 4/6		clay
<b>Hydric Soil Indicators:</b>					
<input type="checkbox"/> Histosol		<input type="checkbox"/> Concretions			
<input type="checkbox"/> Histic Epipedon		<input type="checkbox"/> High Organic Content in surface Layer in Sandy Soils			
<input type="checkbox"/> Sulfidic Odor		<input type="checkbox"/> Organic Streaking in Sandy Soils			
<input type="checkbox"/> Aquic Moisture Regime		<input type="checkbox"/> Listed on Local Hydric Soils List			
<input type="checkbox"/> Reducing Conditions		<input type="checkbox"/> Listed on National Hydric Soils List			
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors		<input type="checkbox"/> Other (Explain in Remarks)			

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present?	<u>X</u>	Yes	<input type="checkbox"/>	No	Is this Sampling Point Within a Wetland?	<u>X</u>	Yes	<input type="checkbox"/>	No
Wetland Hydrology Present?	<u>X</u>	Yes	<input type="checkbox"/>	No		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
Hydric Soils Present?	<u>X</u>	Yes	<input type="checkbox"/>	No		<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
<b>Remarks:</b>									
Wetland is in beginning stages of developing higher saturation levels and a more complex vegetation species community.									

**ROUTINE WETLAND DETERMINATION**  
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Ridgeway Complex</u> Applicant/Owner: <u>MDT</u> Investigator: <u>Lynn Bacon, Land &amp; Water Consulting/PBSJ</u>	Date: <u>7/27/05</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-10</u>

**VEGETATION**

#	Dominant Plant Species	Stratum	Indicator	#	Dominant Plant Species	Stratum	Indicator
1	ELEPAL	H	OBL	9			
2	HORJUB	H	FACW	10			
3	TYPLAT	H	OBL	11			
4	RUMCRI	H	FACW	12			
5	SAGCUN	H	OBL	13			
6	ALIPLA	H	OBL	14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-).    6/6=100%

Vegetation expanded since 2004. Area to west of primary excavation pit has also developed into a well-vegetated wetland.

**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	<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators:</b> <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input checked="" type="checkbox"/> Water Marks <input checked="" type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input checked="" type="checkbox"/> Drainage Patterns in Wetlands <b>Secondary Indicators (2 or more required):</b> <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)
<b>Field Observations:</b>  Depth of Surface Water: <u>NA</u> (in.)  Depth to Free Water in Pit: <u>2"</u> (in.)  Depth to Saturated Soil: <u>0"</u> (in.)	
<b>Remarks:</b>  Pond inundated and >30% vegetated. Wetland on west side is well saturated.	



**ROUTINE WETLAND DETERMINATION**  
(1987 COE Wetlands Delineation Manual)

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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-11</u>

**VEGETATION**

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	HORJUB	H	FACW	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%

Hordeum usually the pioneer species at this project site; likely site is in initial stages of development. Patch of Hordeum was 25' x 45'. At a cover of ~40% in that area.

**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	<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators:</b> <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input checked="" type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands <b>Secondary Indicators (2 or more required):</b> <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)
<b>Field Observations:</b>  Depth of Surface Water: <u>NA</u> (in.)  Depth to Free Water in Pit: <u>NA</u> (in.)  Depth to Saturated Soil: <u>NA</u> (in.)	
<b>Remarks:</b>  Bottom of excavated area continues to be dry; excavated pit likely not positioned well in landscape, but drought conditions likely exacerbates this problem.	



**ROUTINE WETLAND DETERMINATION**  
(1987 COE Wetlands Delineation Manual)

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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-12</u>

**VEGETATION**

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

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-).      4/4=100%

Wetland vegetation ~>60% of area; increased since 2004.

**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	<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators:</b> <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 <b>Secondary Indicators (2 or more required):</b> <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)
<b>Field Observations:</b>  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.)	
<b>Remarks:</b>  Majority of wetland is inundated; however ~<40 is open water without wetland vegetation.	

**SOILS**

Map Unit Name		Vaeda silty clay loam		Drainage Class: _____	
(Series and Phase):		_____		Field Observations	
Taxonomy (Subgroup):		_____		Confirm Mapped Type? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<b>Profile Description:</b>					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-6	A	2.5Y 5/2	7.5YR 4/6		silt clay
6-10	A	2.5Y 5/2	None		silt clay loam
<b>Hydric Soil Indicators:</b>					
_____ 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			
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors		_____ 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	No		_____	_____	_____
Hydric Soils Present?	X	Yes	No		_____	_____	_____
<b>Remarks:</b>							
Wetland continues to increase in size and wetland vegetation coverage.							

**ROUTINE WETLAND DETERMINATION**  
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Ridgeway Complex</u> Applicant/Owner: <u>MDT</u> Investigator: <u>Lynn Bacon, Land &amp; Water Consulting/PBSJ</u>	Date: <u>7/27/05</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-13</u>

**VEGETATION**

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	ELEPAL	H	OBL	9			
2	ELEACI	H	OBL	10			
3	LIMQU	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%

Vegetation increasing in complexity and coverage.

**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	<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators:</b> <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input checked="" type="checkbox"/> Water Marks <input checked="" type="checkbox"/> Drift Lines <input checked="" type="checkbox"/> Sediment Deposits <input checked="" type="checkbox"/> Drainage Patterns in Wetlands <b>Secondary Indicators (2 or more required):</b> <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)
<b>Field Observations:</b>  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.)	
<b>Remarks:</b>  Inundated and has a central pocket of open water. Water marks above current levels indicating higher levels earlier this year.	

**SOILS**

Map Unit Name		Vaeda silty clay loam		Drainage Class: _____	
(Series and Phase):		_____		Field Observations	
Taxonomy (Subgroup):		_____		Confirm Mapped Type? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<b>Profile Description:</b>					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
10"	A	2.5Y 4/1, 8/3	2.5Y 8/8	Lg/prom	silt clay
<b>Hydric Soil Indicators:</b>					
_____ 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	
<input checked="" type="checkbox"/>					

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present?	X	Yes	_____	No	Is this Sampling Point Within a Wetland? <span style="float:right; margin-right: 20px;"> <input checked="" type="checkbox"/> Yes                 </span> <span style="float:right;"> <input type="checkbox"/> No                 </span>
Wetland Hydrology Present?	X	Yes	_____	No	
Hydric Soils Present?	X	Yes	_____	No	
Remarks:					
Wetland continues expand and increase in WL vegetation complexity.					

**ROUTINE WETLAND DETERMINATION**  
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Ridgeway Complex</u>	Date: <u>7/27/05</u>
Applicant/Owner: <u>MDT</u>	County: <u>Carter</u>
Investigator: <u>Lynn Bacon, Land &amp; Water Consulting/PBSJ</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	HORJUB	H	FACW	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%

Hordeum is located on north side of excavation (where dry) and has colonized ~2/5 of surface area; very small pocket of ELEPAL near OW area.

**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	<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators:</b> <input 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 type="checkbox"/> Drainage Patterns in Wetlands <b>Secondary Indicators (2 or more required):</b> <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)
<b>Field Observations:</b>  Depth of Surface Water: <u>NA</u> (in.)  Depth to Free Water in Pit: <u>NA</u> (in.)  Depth to Saturated Soil: <u>&lt;12"</u> (in.)	
<b>Remarks:</b>  Surface water in ~1/5 of area, < 6" deep.	



**ROUTINE WETLAND DETERMINATION**  
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Ridgeway Complex</u> Applicant/Owner: <u>MDT</u> Investigator: <u>Lynn Bacon, Land &amp; Water Consulting/PBSJ</u>	Date: <u>7/27/05</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-15</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%

Very scant amount of WL veg, <5 sqft. Scant colony (<5% cover) of HORJUB in same area as small clumps of ELEPAL.

**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	<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators:</b> <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated in Upper 12 Inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands <b>Secondary Indicators (2 or more required):</b> <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)
<b>Field Observations:</b>  Depth of Surface Water: <u>NA</u> (in.)  Depth to Free Water in Pit: <u>NA</u> (in.)  Depth to Saturated Soil: <u>NA</u> (in.)	
<b>Remarks:</b>  Surface water in <5% of potential wetland area. In region of SP and scant vegetation there are no hydrology indicators. Given scattered WL vegetation location in the north side of basin, the soil may have been saturated earlier in the year but at this time no indicators present.	

**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	
<b>Profile Description:</b>					
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
<b>Hydric Soil Indicators:</b>					
_____ Histosol		_____ Concretions		_____ High Organic Content in surface Layer in Sandy Soils	
_____ Histic Epipedon		_____ Organic Streaking in Sandy Soils		_____ Listed on Local Hydric Soils List	
_____ Sulfidic Odor		_____ Listed on National Hydric Soils List		_____ Other (Explain in Remarks)	
_____ Aquic Moisture Regime		_____		_____	
_____ Reducing Conditions		_____		_____	
_____ Gleyed or Low-Chroma Colors		_____		_____	
Not a hydric soil.					

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present? (x) Yes No Wetland Hydrology Present? _____ Yes <u>X</u> No Hydric Soils Present? _____ Yes <u>X</u> No	Is this Sampling Point Within a Wetland? _____ Yes <u>X</u> No
Remarks:  Wetland not developing; however, a few sprigs of Eleocharis and Hordeum are encouraging.	

**ROUTINE WETLAND DETERMINATION**  
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Ridgeway Complex</u> Applicant/Owner: <u>MDT</u> Investigator: <u>Lynn Bacon, Land &amp; Water Consulting/PBSJ</u>	Date: <u>7/27/05</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?: (If needed, explain on reverse.) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Community ID: <u>Emergent</u> Transect ID: _____ 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): <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	<b>Wetland Hydrology Indicators:</b> <b>Primary Indicators:</b> <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 checked="" type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands <b>Secondary Indicators (2 or more required):</b> <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)
<b>Field Observations:</b>  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.)	
<b>Remarks:</b>  Full pond, likely shallow. <b>Breech in dam still there from 2004.</b>	

**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	
<b>Profile Description:</b>					
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
<b>Hydric Soil Indicators:</b>					
_____ Histosol		_____ Concretions		_____ High Organic Content in surface Layer in Sandy Soils	
_____ Histic Epipedon		_____ Organic Streaking in Sandy Soils		_____ Listed on Local Hydric Soils List	
_____ Sulfidic Odor		_____ Listed on National Hydric Soils List		_____ Other (Explain in Remarks)	
_____ Aquic Moisture Regime		_____			
_____ Reducing Conditions		_____			
_____ Gleyed or Low-Chroma Colors		_____			
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> </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;">_____</td> <td style="text-align: center;">Yes</td> <td style="text-align: center;"><u>X</u> 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: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> </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														
<p>Remarks:</p> <p>Wetland vegetation has not colonized this site; given the water level at this time of year there is a high probability that the soils will begin to convert to hydric soils and WL vegetation will begin to colonize by 2006.</p>																	

## **Appendix I**

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### **WETLANDS 1 - 8 AND 10 – 16: 2005 REPRESENTATIVE PHOTOGRAPHS**

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*MDT Wetland Mitigation Monitoring  
Ridgeway Wetland Complex  
Ekalaka, Montana*

**W-1-8, 10-16**  
**2005 PHOTOGRAPH LOG**

Wetland #	Photo Location	Photograph Description	Compass Reading
1	D	wetland view	234
1	A	wetland view	162
2	A	panoramic wetland view	48
2	B	panoramic wetland view	20
2	C	panoramic wetland view	342
3	A	wetland view	320
3	B	wetland view	58
4	B	wetland view	16
4	A	wetland view	230
5	A	wetland view	244
5	B	wetland view	50
6	A	wetland view	288
6	B	wetland view	28
7	F	wetland view	168
7	E	wetland view	54
8	A	wetland view	116
8	B	wetland view	160
10	F	wetland view	126
10	A	wetland view	0
11	D	wetland view	288
11	F	wetland view	100
12	A	wetland view	38
12	D	wetland view	270
13	D	wetland view (did not register in camera 2004)	120
13	A	wetland view	0
14	E	wetland view	180
14	A	wetland view	326
15	E	wetland view	216
15	A	wetland view	38
16	C	wetland view	270
16	E	wetland view	90

**RIDGEWAY COMPLEX WETLAND MITIGATION SITE 2005**



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



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



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

**RIDGEWAY COMPLEX WETLAND MITIGATION SITE 2005**



**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°**

**RIDGEWAY COMPLEX WETLAND MITIGATION SITE 2005**



**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°**



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



**WL#: 8 Location: B Description: Wetland view, buffer  
Compass Reading: 160°**

**RIDGEWAY COMPLEX WETLAND MITIGATION SITE 2005**



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



**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°**

**RIDGEWAY COMPLEX WETLAND MITIGATION SITE 2005**



**WL#: 13 Location: A Description: Wetland view  
Compass Reading: 120°**



**WL#: 13 Location: D Description: Wetland view  
Compass Reading: 0°**



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



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

**RIDGEWAY COMPLEX WETLAND MITIGATION SITE 2005**



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



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



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



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

## **Appendix J**

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**ALL WETLANDS:**

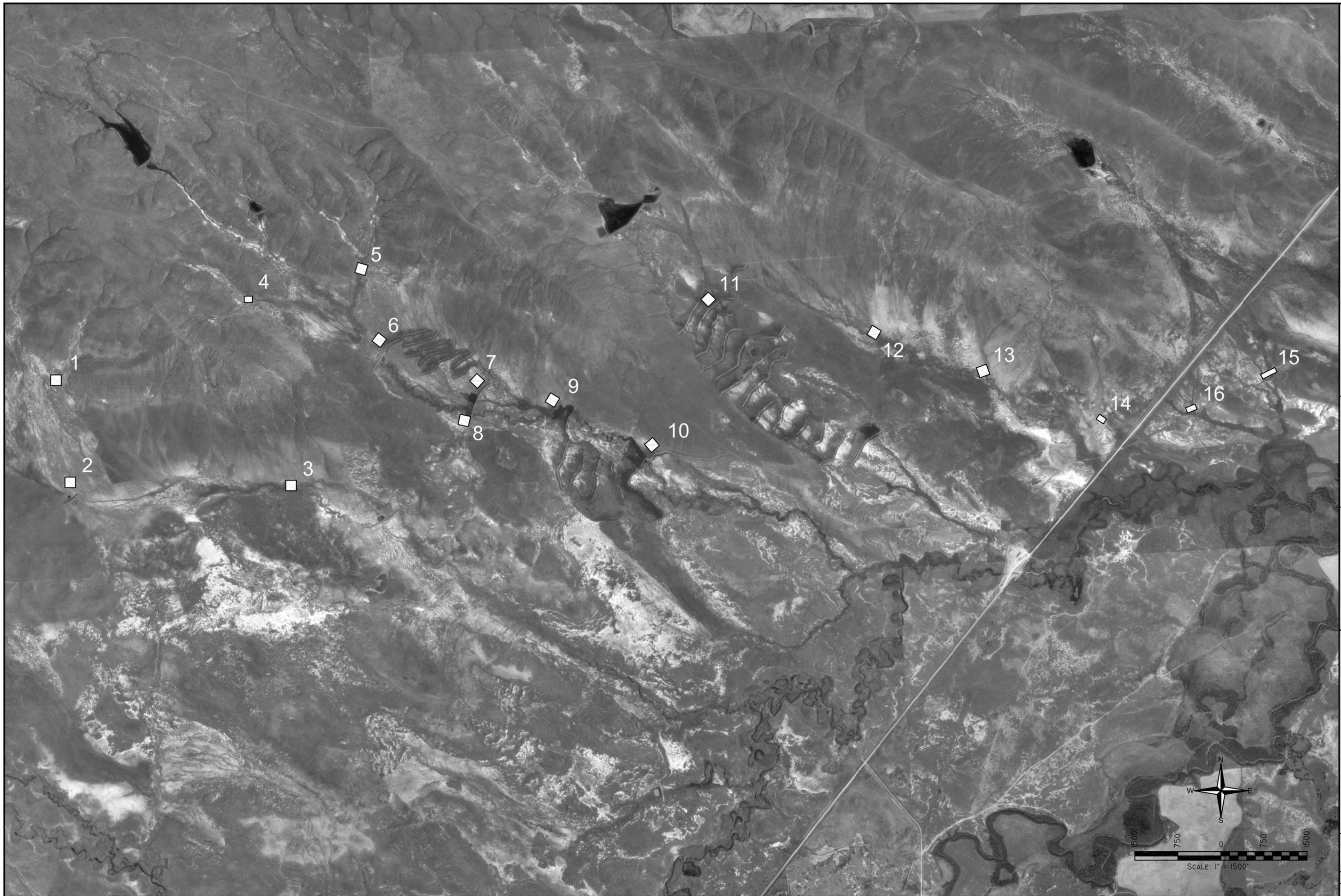
**FIGURE 4 - DIGITAL ORTHOPHOTO QUAD WETLAND  
LOCATIONS**

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*MDT Wetland Mitigation Monitoring*

*Ridgeway Wetland Complex*

*Ekalaka, Montana*



PROJECT NAME <b>MDT MITIGATION MONITORING</b>		DRAWN: SH
DRAWING TITLE <b>DOQ WETLAND LOCATIONS</b>		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 <b>4</b> OF		REV 02
LAND & WATER CONSULTING, INC. P.O. BOX 1122 Bozeman, MT 59771		DATE: 06/27/05