
**MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2007**

*Ridgeway Wetland Complex
Ekalaka, Montana*



Prepared for:

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

Prepared by:

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801 North Last Chance Gulch, Suite 101
Helena, MT 59601-3360

December 2007

PBS&J Project No: B43088.00 – 0412



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1.0 INTRODUCTION

This annual report summarizes methods and results of the sixth and final year of monitoring at the Montana Department of Transportation's (MDT) Ridgeway Complex mitigation site. The Ridgeway wetland complex was created by the Bureau of Land Management (BLM) and MDT 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. 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 1999) (**Appendix D**). Several construction designs were employed to create the impoundments (USDA 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**).

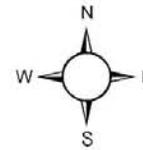
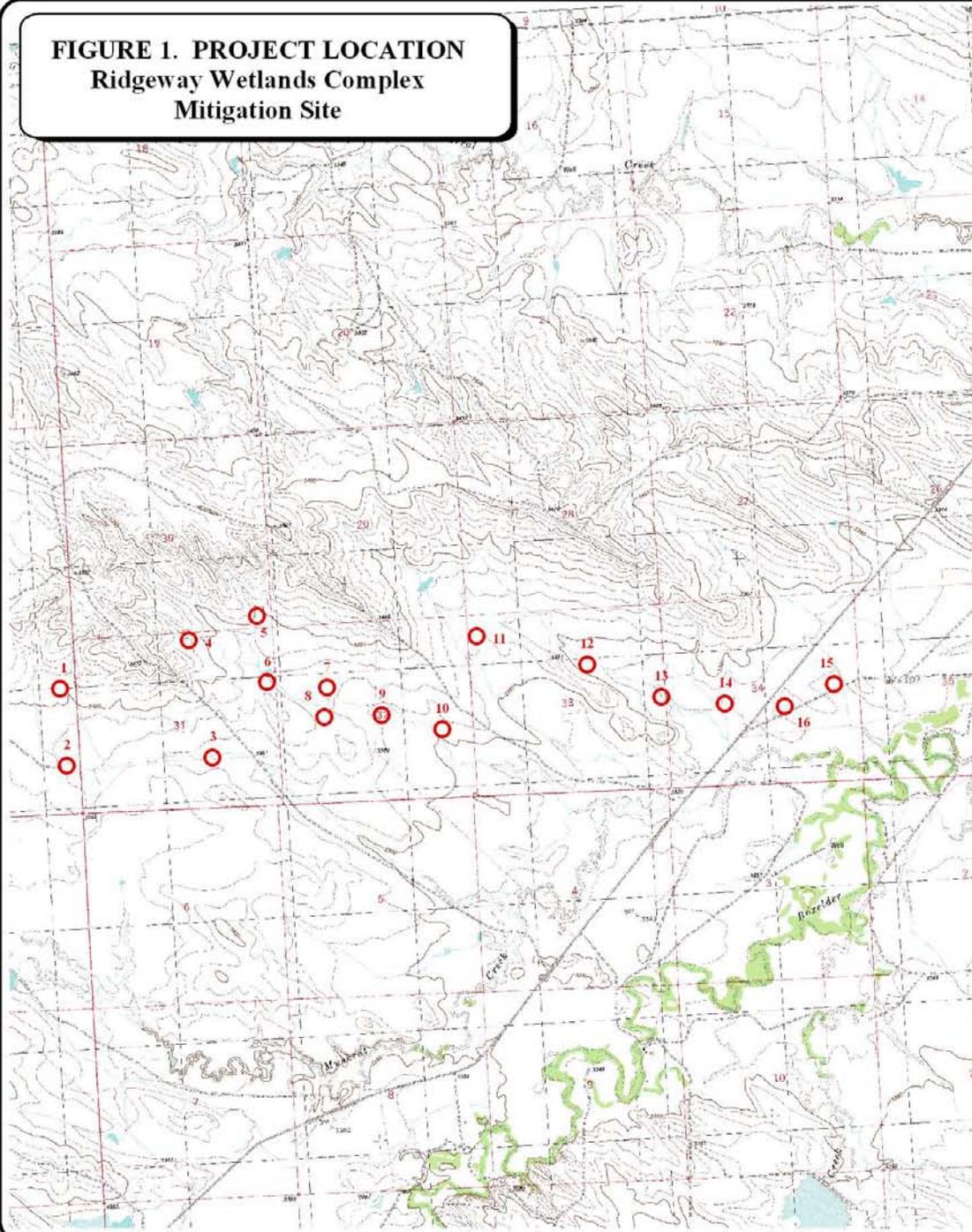
For this monitoring report, Wetland-9 (W-9) was sampled for the sixth season according to the full sampling protocol on July 17, 2007. Wetland 9 was chosen out of the sixteen constructed open-water impoundments because of its representative wetland qualities. The remainder of the fifteen sites, impoundments W-1 to W-8 and W-10 to W-16, were also monitored on July 17, 2007. All sites are shown on **Figure 1** and on **Figure 4** in **Appendix J**.

2.0 METHODS

2.1 Monitoring Dates and Activities

All sixteen wetland sites were investigated for wetland development on July 17, 2007. 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.

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

2.2 Hydrology

Wetland hydrology indicators for all sites were recorded using procedures outlined in the US Army Corps' (COE) 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Hydrology data were recorded on the **COE Routine Wetland Delineation Data Forms (W-9 in Appendix B; W-1 to W-8 and W-10 to W-16 in Appendix H)**. The boundary between emergent vegetation and open water for all sites was mapped onto 2007 aerial photographs (**W-9 on Figure 3 of Appendix A; W-1 to W-8 and W-10 to W-16 on Figures 3 in Appendix G**). There were no groundwater monitoring wells at the site. Precipitation data for 2007 were compared to the 1952 – current 2007 average (WRCC 2007).

2.3 Vegetation

General vegetation types for W-9 were delineated onto an aerial photograph during the site visit (**Figure 3 in Appendix A**). Coverage of the dominant species in each community type was listed on the Wetland Mitigation Site Monitoring Form (**Appendix B**). A comprehensive plant species list for the entire site was compiled and updated as new species were encountered. Woody species were not planted (and therefore not monitored) on this site due to its prairie environment.

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 in Appendix A**. Percent cover for each species was recorded on the vegetation transect data form (Wetland Mitigation Site Monitoring Form in **Appendix B**). The transect was used to evaluate changes in species composition over time, especially the establishment and increase of hydrophytic vegetation. Vegetation data at one wetland and one upland sample point were recorded onto the COE Routine Wetland Determination Data Forms (**Appendix B**).

The presence of emergent vegetation was noted on aerial photographs for Wetlands 1 to 8 and 10 to 16 (**Figures 3 in Appendix G**); photo and sample point locations are depicted on **Figures 2 in Appendix G**. At each wetland, vegetation data at one wetland sample point were recorded on COE Routine Wetland Delineation Data Forms (**Appendix H**). Photos showing representative vegetation were taken of Wetlands sites 1 to 8 and 10 to 16; the photos and a photograph log are included in **Appendix I**.

2.4 Soils

Soils were evaluated during the site visit at W-9 according to the procedure outlined in the 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Soil data were recorded for each wetland determination point on the COE Routine Wetland Delineation Data Form (**Appendix B**).

Soils were evaluated during the site visit at Wetlands 1 to 8 and 10 to 16 and data were recorded onto the COE Routine Wetland Delineation Data Forms (**Appendix H**).

2.5 Wetland Delineation

A wetland delineation for W-9 was conducted within the assessment area according to the 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Wetland and upland areas within the monitoring area were investigated for the presence of wetland hydrology, hydrophytic vegetation, and hydric soils. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: North Plains Region 4 (Reed 1988). The information was recorded on the COE Routine Wetland Delineation Forms (**Appendix B**). The wetland/upland boundary was used to calculate the wetland area (**Figure 3** in **Appendix A**).

A wetland delineation for Wetlands 1 to 8 and 10 to 16 was completed according to the 1987 Wetland Delineation Manual (Environmental Laboratory 1987) (**Figures 3** in **Appendix G**). Wetland and upland areas within the monitoring area were investigated for the presence of wetland hydrology, hydrophytic vegetation, and hydric soils. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: North Plains Region 4 (Reed 1988). The information was recorded on the COE Routine Wetland Delineation Forms (**Appendix H**). The wetland/upland boundary was used to calculate the wetland area (**Figures 3** in **Appendix G**).

2.6 Mammals, Reptiles, and Amphibians

Mammal, reptile, and amphibian species observations were recorded on the Wetland Mitigation Monitoring Form for W-9 during the site visit (**Appendix B**); observations of wildlife at all other wetland sites were also recorded. Indirect use indicators were also recorded including tracks, scat and burrows. A comprehensive wildlife species list for all sites was compiled.

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.

2.8 Macroinvertebrates

One macroinvertebrate sample was collected at W-9 during the site visit following the 2007 protocol (**Appendix F**). Samples were preserved as outlined in the Macroinvertebrate Sampling Protocol (**Appendix F**). The approximate location is indicated on **Figure 2** (**Appendix A**).

2.9 Functional Assessment

Functional assessments were completed for each wetland site using the 1999 MDT Montana Wetland Assessment Method (Berglund 1999) (**Appendix B**). Field data necessary for this assessment were collected on a condensed data sheet with the remainder of the assessment completed in the office. The Functional Assessment for W-9 is included in **Appendix B** while Functional Assessments for all other wetlands site are included in **Appendix H**.

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 (**Appendix C**). 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** in **Appendix A**.

The remaining wetland sites, 1 to 8 and 10 to 16, were photographed from two locations during the 2006 season (**Figures 2** in **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** in **Appendix J**).

2.11 GPS Data

During the 2002 monitoring season, survey points were collected using a resource grade Trimble, Geoplotter III hand-held GPS unit for all wetlands (**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 (**Figures 2** and **3** in **Appendices A** and **G**). Changes in the wetland boundary during 2007 were adjusted on the aerial photo by hand. Photo point location data at all other wetland sites were collected using GPS in 2001 (**Figures 2** in **Appendix G**).

2.12 Maintenance Needs

The conditions of the W-9 inlet and dike were examined during the monitoring visit for maintenance needs. Problems notes with other wetland dikes (wash-outs or breaches) were noted.

3.0 RESULTS

3.1 Hydrology

The source of hydrology at W-9 is an ephemeral drainage. During the July 17, 2007 site visit, 5% of the assessment area was open water with approximately 4 feet of standing water. The open water area is decreasing because the extent of hydrophytic vegetation is expanding. The main pond is vegetated with wetland species around the entire circumference and vegetation is expanding toward the center. The only control structure is the constructed dike; no outflow pipe is installed in the dam.

According to the Western Regional Climate Center (WRCC 2007), the Ridgeway 1S station annual mean January – July (1952 – 2007) precipitation was 9.17 inches; the 2007 total precipitation during this period was 12.62 inches or 138% of the mean. Precipitation in May 2007 (3.98 inches) was particularly high, and was 172% of the 55-year mean May precipitation total (2.31 inches).

3.2 Vegetation

Vegetation species identified on the W-9 site are presented in **Table 1** and in the **Monitoring Form (Appendix B)**. Eight dominant vegetation communities were mapped for the mitigation area (**Figure 3 in Appendix A**). The communities include: Type 1 - *Artemisia tridentata*/*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**).

Table 1: 2001-2007 vegetation species list for the Ridgeway Complex Wetland Mitigation Sites.

Scientific Name ¹	Region 4 (North Plains) Wetland Indicator status ²
<i>Agropyron smithii</i>	FACU
<i>Alisma plantago-aquatica</i>	OBL
<i>Alopecurus pratensis</i>	FACW
<i>Alopecurus aequalis</i>	OBL
<i>Artemesia 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</i> sp	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

¹ **Bolded** species indicate those documented within the analysis area for the first time in 2007.

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

Approximately 95% of the W-9 site has developed wetland vegetation. The site continues to increase in vegetation complexity. The vegetation transect results are detailed in the Monitoring Form (**Appendix B**) and mapped onto **Figure 3 (Appendix A)**. W-9 data are summarized in tabular format (**Table 2**) and graphically illustrated (**Chart 1**). The transect was lengthened in 2002 from 60 to 150 feet. The percent cover of hydrophytic species has increased along the transect as a result of the increase in emergent vegetation cover within the former open water zone in the southeast corner of the wetland (**Table 2** and **Chart 1**). This former open water zone has decreased by essentially 100% of its original size and is likely less than 12 inches deep.

Table 2: 2001-2007 transect data summary for W-9 for all years monitored.

Monitoring Year	2001	2002	2003	2004	2005	2006	2007
Transect Length (feet)	60	150	150	150	150	150	150
# Vegetation Community Transitions along Transect	2	5	5	5	5	3	
# Vegetation Communities along Transect	2	4	4	4	4	3	4
# Hydrophytic Vegetation Communities along Transect	1	3	3	3	2	2	
Total Vegetative Species	7	12	9	11	10	8	8
Total Hydrophytic Species	4	6	5	7	6	6	6
Total Upland Species	3	3	4	4	4	2	2
Estimated % Total Vegetative Cover	53	66	100	100	80	100	100
% Transect Length Comprised of Hydrophytic Vegetation Communities	33	82	82	82	62	82	90
% Transect Length Comprised of Upland Vegetation Communities	67	18	18	18	18	18	10
% Transect Length Comprised of Unvegetated Open Water	0	0	0	0	20	0	0
% Transect Length Comprised of Bare Substrate	0	0	0	0	0	0	0

Chart 1: Length of vegetation communities along Transect 1 at W-9 for each year monitored.

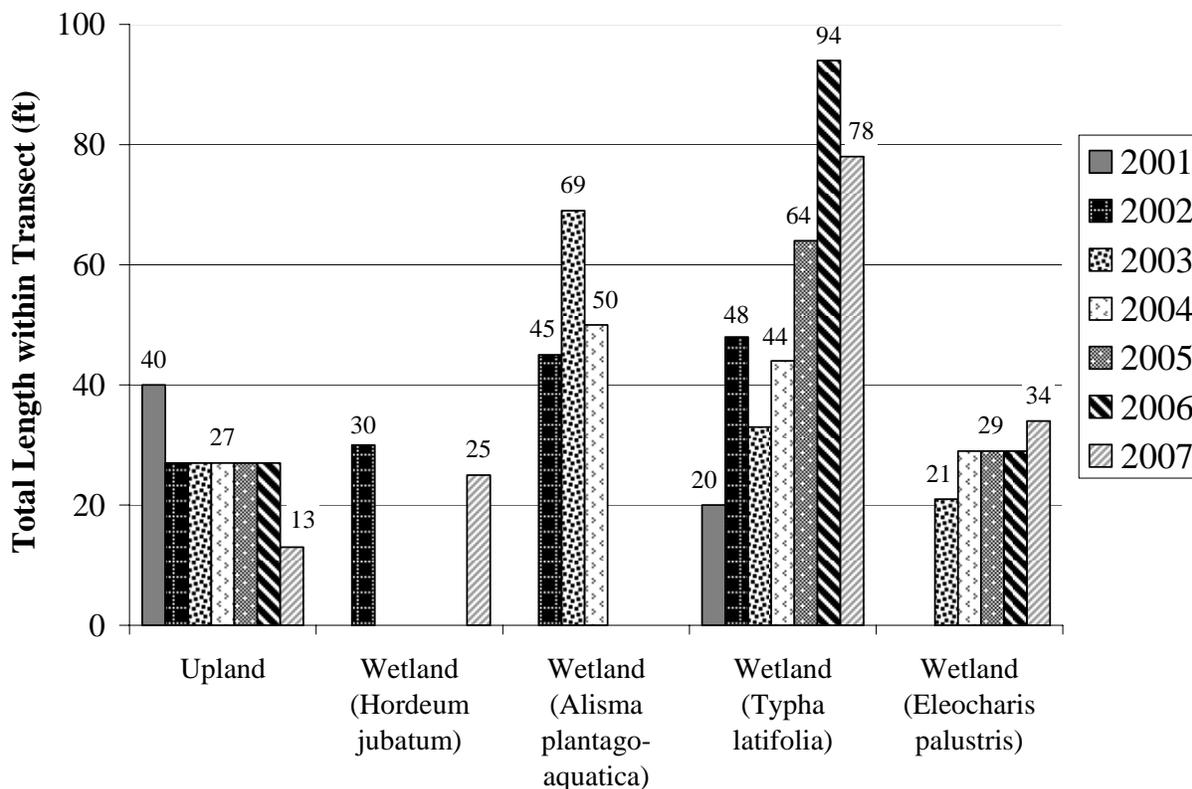
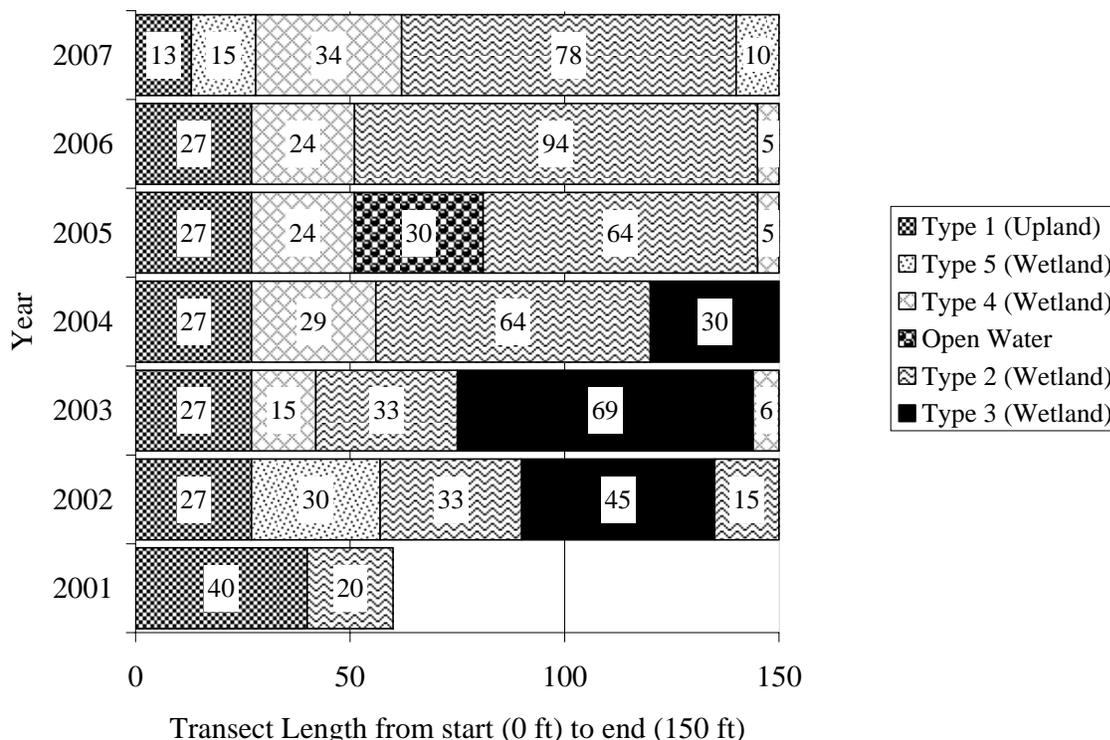


Chart 2: Transect maps showing vegetation types at W-9 from the start (0 feet) to the end (60 feet in 2001 and 150 feet in 2002-2007) of transect. Vegetation species within community types are not static across years.



3.3 Soils

The site was mapped as part of the Carter County Soil Survey (NRCS 2003). The dominant soils at W-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 dark gray to grayish brown (2.5Y4/1,4/2) silty clay from 0-4 inches and dark grayish brown from 4-10 inches deep. Strong brown (7.5YR 4/6) mottles were observed below 4 inches. The soil was saturated to the surface. Soil at SP-2 at a depth of 0-10 inches was a dark grayish brown (2.5Y 4/2) silty clay. No saturation was noted. Soil data for each sample point within the 15 other sites are included on the Monitoring Forms (**Appendix H**).

3.4 Wetland Delineation

The delineated wetland boundary at Wetland 9 is depicted on **Figure 3 (Appendix A)**. The 2007 gross wetland boundary encompassed 6.06 acres of total wetland area, a 7% increase since 2006, and included 0.32 acre of open-water habitat. The hydrophytic community has expanded into the open water pond and obligate species colonization and acreage has expanded within the inlet drainages. The W-9 COE Forms are included in **Appendix B**.

As of July 2007, the gross aquatic habitat area within the Ridgeway Complex, which includes open water and net wetland acreage, totaled 57.48 acres, a 4% increase since 2006 (**Tables 3 and 4**).

Table 3: 2007 wetland determination results for all Ridgeway Complex Wetland Mitigation Sites.

SITE	WETLAND DETERMINATION ¹			ACREAGE			COMMENTS
	Vegetation	Hydrology	Soils	Open Water ²	Net Wetland (acre)	Gross Wetland (acre) ³	
W-1	X	X	X	0.56	1.31	1.87	Net wetland area has increased 18% since 2006.
W-2	X	X	X	0.42	6.76	7.18	Net wetland vegetation increased 7% since 2006.
W-3	X	X	X	0.80	4.36	5.16	Net wetland area increased 26% since 2006.
W-4	X	X	X	0.40	0.82	1.22	Nets wetland area increased 44% since 2006.
W-5	X	X	X	0.51	2.18	2.69	Nets wetland area increased 34% since 2006.
W-6	X	X	X	0	7.34	7.34	Net wetland area has increased 9% since 2006.
W-7/8	X	X	X	1.32	3.85	5.17	Net wetland area 'decreased' 14% since 2006. In 2006 the net wetland area was overestimated given the extensive inundation observed; it was assumed at that time that the wetland acreage was likely overestimated given the difficulty of the assessment in a high-water year. The net wetland area observed in 2007 is a true line; the inundation boundary had stabilized and the boundary of the emergent vegetation communities was clearly discernable.
W-9	X	X	X	0.32	5.74	6.06	Net wetland area has increased 8% since 2006.
W-10	X	X	X	0.64	4.9	5.54	Net wetland area has increased 18% since 2006. Entire area north of the berm was completely inundated at the time of the survey, including the area adjacent to the berm and southwest of the pond. This wetland area was never included in the monitoring effort; given the whole area has become one wetland, it is now inadvertently included. The inlet stream was also inundated in the vicinity of the berm and water was observed in the streambed approximately half the distance to W-9.
W-11	X	X	X	0	0.16	0.16	Net wetland area has increased 128% since 2006 (somewhat misleading, 0.07 acre to 0.16 acre). Wetland is located adjacent to the berm, not within the excavated pond area.
W-12	X	X	X	0.65	4.86	5.51	Net wetland area has increased 15% since 2006.
W-13	X	X	X	0.51	3.73	4.24	Net wetland area has increased 7% since 2006.
W-14		X	X	1.26	0	1.26	Net wetland acreage is stable at 0 acre since 2006. Pond has been inundated for 2 years and it is likely that hydrophytic vegetation will begin to colonize the site between the 2007-2008 growing seasons.
W-15	X	X	X	1.42	0.23	1.65	Net wetland area has increased 100% since 2006 (0 acre to 0.23 acre).
W-16	X	X	X	1.5	0.93	2.43	Net wetland area has increased 100% since 2006 (0 acre to 0.93 acre).
TOTAL				10.31	47.17	57.48	Net Wetland increase 12% since 2006 (41.94 to 47.17 acres); Gross Wetland (total aquatic habitat) area increase 4% since 2006 (55.03 to 57.48 acres); and, open water decreased 21% (13.09 acres to 10.31 acres). In general, emergent vegetation is replacing open water habitat and colonizing areas that were inundated during the high water year of 2006.

¹ An 'X' indicates "Yes". ² Open water 0-6 feet deep, varies depending on siltation rate. ³ Includes open water and emergent wetland areas.

Table 4: 2003-2007 summary of wetland features for all Ridgeway Complex Wetland Mitigation Sites.

YEAR	AQUATIC HABITAT (acre)		
	Open Water	Net Wetland	Gross Wetland
2003	17.63	8.72	26.35
2004	13.19	15.44	28.07
2005	7.69	26.53	32.63
2006	13.09	41.94	55.03
2007	10.31	47.17	57.48

For each site wetland limits are illustrated on their corresponding **Figure 3** in **Appendix G**. The net wetland area within the Ridgeway Wetland Complex increased from 41.94 acres in 2006 to 47.17 acres in 2007; a 12% increase. Cumulatively, the complex is approximately 82% vegetated emergent wetland, and 18% open water. As of the 2007 field season, approximately 115% or 57.48 acres of the 50-acre wetland creation goal has been accomplished. There is only one site that has not converted to a wetland community, Site 14, however this site has been at full-pond for two years and it is expected that hydrophytic vegetation will colonize within the next year. Wetland 11 only had wetland vegetation adjacent to an upslope berm (0.16 acre) and no open water. The berm northeast of Wetland 11 may prevent water from the northeast drainage from flowing into the excavated area; this site may take more than one more year to develop wetland characteristics around the pond. The net wetland area within sites 4, 11, 15 and 16 was less than 1 acre (range 0.16 to 0.93 acre), however, wetland vegetation is colonizing several areas around the ponds and the total aquatic habitat, including open water, ranges from 1.22 to 2.43 acres. Net wetland vegetation acreage is expected to increase 100 to 200% within W-4, 15 and 16.

3.5 Wildlife

Wildlife species are listed in **Table 5**. Activities and densities associated with these observations are included on the **Monitoring Form (Appendix B)**. Northern leopard frogs, a Montana Heritage Program-listed sensitive species, have been observed in all sites (1-16). Leopard frogs are considered a “species of special concern” by the MTNHP due largely to their apparent extirpation from the portion of their historic distribution west of the Continental Divide. This species has been assigned the rank of S1 (critically imperiled) in intermountain valleys and S3 (rare occurrence and/or restricted range and/or vulnerable to extinction) in the Great Plains region (which includes the project area) by the MTNHP. Wildlife throughout the Ridgeway Complex, particularly avian species, has increased in diversity since monitoring began in 2001.

Table 5: 2001-2007 wildlife species observed on the Ridgeway Complex Wetland Mitigation Sites.¹

FISH	
Unknown Species [possibly Plains Killifish (<i>Fundulus zebrinus</i>)] – Wetland 13	
AMPHIBIAN and REPTILE	
northern leopard frog (<i>Rana pipiens</i>)	plains garter snake (<i>Thamnophis radix</i>)
Painted turtle (<i>Chrysemys picta</i>)	

¹ **Bolded** species were observed for the first time in 2007.

Table 5 (continued): 2001-2007 wildlife species observed on the Ridgeway Complex Wetland Mitigation Sites.¹

<p>BIRD</p> <p>American Avocet (<i>Recurvirostra americana</i>) American Bittern (<i>Botaurus lentiginos</i>) American Coot (<i>Fulica Americana</i>) American Robin (<i>Turdus migratorius</i>) American Wigeon (<i>Anas americana</i>) Barn Swallow (<i>Hirundo pyrrhonota</i>) Black Tern (<i>Chlidonias niger</i>) Blue-winged Teal (<i>Anas discors</i>) Bobolink (<i>Dolichonyx oryzivorus</i>) Canada Goose (<i>Branta canadensis</i>) Chestnut-collared Longspur (<i>Calcarius ornatus</i>) Cinnamon Teal (<i>Anas cyanoptera</i>) Long-billed Dowitcher (<i>Limnodromus scolopaceus</i>) Eared Grebe (<i>Podiceps nigricollis</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>) Horned Lark (<i>Eremophila alpestris</i>) Gray Partridge (<i>Perdix perdix</i>)</p>	<p>Greater Yellowlegs (<i>Tringa melanoleuca</i>) Killdeer (<i>Charadrius vociferous</i>) Lark Bunting (<i>Calamospiza melanocorys</i>) Lazuli Bunting (<i>Passerina amoena</i>) Mallard (<i>Anas platyrhynchos</i>) Marbled Godwit (<i>Limosa fedoa</i>) Meadowlark (<i>Sturnella neglecta</i>) Mourning Dove (<i>Zenaida macroura</i>) Northern Shoveler (<i>Anas clypeata</i>) Red-winged Blackbird (<i>Agelaius phoeniceus</i>) Sandpiper (<i>Calidris</i> sp.) Short-eared Owl (<i>Asio flammeus</i>) Spotted Sandpiper (<i>Actitis macularia</i>) Upland Sandpiper (<i>Bartramia longicauda</i>) Vesper Sparrow (<i>Poocetes gramineus</i>) Western Meadowlark (<i>Sturnella neglecta</i>) Willet (<i>Catoptrophorus semipalmatus</i>) Wilson’s Phalarope (<i>Phalaropus tricolor</i>) Willet (<i>Catoptrophorus semipalmatus</i>) Yellow-headed Blackbird (<i>Xanthocephalus xanthocephalus</i>)</p>
<p>MAMMAL</p> <p>Mule Deer (<i>Odocoileus hemionus</i>) Pronghorn (<i>Antilocarpa americana</i>) Red Fox (<i>Vulpes fulva</i>)</p>	<p>White-tailed deer (<i>Odocoileus virginianus</i>) White-tailed jackrabbit (<i>Lepus townsendii</i>)</p>

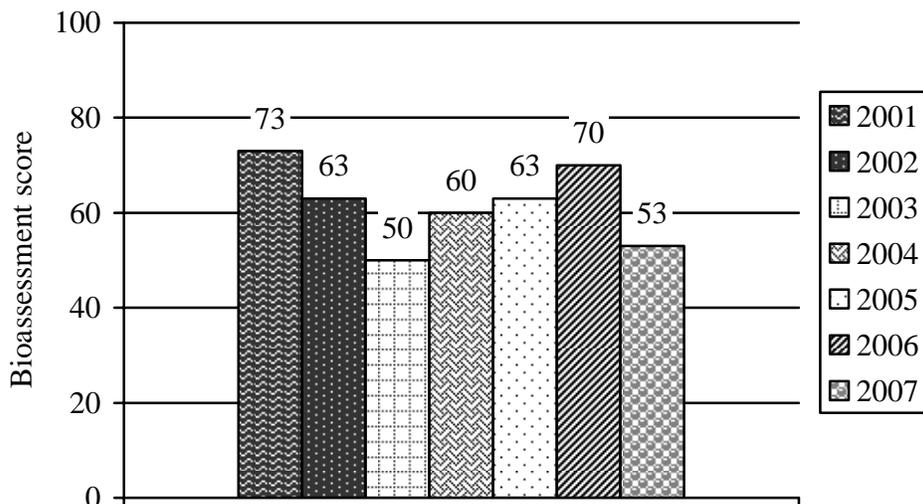
¹ **Bolded** species were observed for the first time in 2007.

3.6 Macroinvertebrates

Macroinvertebrate sampling results are provided in **Appendix F** and were summarized by Rhithron Associates, Inc. in the italicized sections below and in **Chart 3** (Bollman 2007):

Invertebrate diversity and abundance fell sharply between 2006 and 2007, resulting in a low bioassessment score; sub-optimal conditions are indicated. Two mayfly taxa were collected in 2007, suggesting that water quality may have been good. Habitat complexity, however, appears to have been limited. Benthic substrates and the water column were apparently the dominant habitats at the site.

Chart 3: Bioassessment scores from 2001-2007 at the Ridgeway W-9 Mitigation Site.



3.7 Functional Assessment

A completed Functional Assessment Form for W-9 is included in **Appendix B** and summarized in **Table 6**. Several parameter scores have increased as a result of observations since 2001: increase in structural diversity, wildlife usage, and vegetation coverage. Wetland 9 functional units have increased 221% (23.8 to 52.7 FU) since 2002 and acreage has increased 176% (3.45 to 6.06 acres). The actual functional points (8.7) are the same as in 2006, however the functional units increased from 49.16 to 52.70 because of the increase in acreage.

All wetlands (with the exception of W-14) were assessed in groups as determined by net wetland acreage for each site and percent of the wetland circumference with emergent vegetation. The total functional units for the Ridgeway Complex aquatic habitat acreage is 425.87 FU (**Table 7**), a gain of 11.8 FU since 2006. All wetlands are Class II sites as a result northern leopard frog observations in 2006 and/or 2007. Percent possible score varies across the groupings; W-4 and 16 achieved a 55% score, W-11 and 15, a 37% score, W-1, 3, 5, 7/8, 10, 12, and 13 scored 77%, and, W-2, 6, and 9 scored 74%. The range of scores is primarily the result of the emergent wetland vegetation acreage.

Table 6: Summary of 2001-2007 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	2006	2007
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)
MTNHP Species Habitat	High (1.0)	High (1.0)	High (1.0)	High (0.8)	High (1.0)	High (1.0)	High (1.0)
General Wildlife Habitat	High (0.9)	Mod (0.5)	Mod (0.5)	High (.9)	High (1.0)	High (1.0)	High (1.0)
General Fish/Aquatic Habitat	Mod (0.6)	NA	NA	NA	NA	NA	NA
Flood Attenuation	Mod (0.5)	Mod (0.5)	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)	High (1.0)	High (1.0)
Sediment, Nutrient, Toxicant Removal	High (1.0)	High (1.0)	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)	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)	High (0.8)	High (0.8)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	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)	Mod (0.4)	Mod (0.4)	Mod (0.4)	Mod (0.4)
Recreation/Education Potential	Low (0.1)	Low (0.1)	Low (0.5)	High (1.0)	High (1.0)	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	8.7/11	8.7/11
% of Possible Score Achieved	66%	62%	66%	75%	77%	79%	79%
Overall Category	II	II	II	II	II	II	II
Total Acreage of Assessed Wetlands within Easement	4.34¹	3.45	3.41	4.00	4.28	5.65	6.06
Functional Units (acreage x actual points)	34.33	23.80	25.88	32.80	36.40	49.16	52.7
Net Acreage Gain	4.34	3.45	3.41	4.00	4.28	5.72	6.06
Net Functional Unit Gain	34.33	23.81	25.88	32.80	36.40	49.16	52.7

¹ Overestimated acreage.

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 (W-1 to W-8 and W-10 to W-16) are included in **Appendix I**.

3.9 Maintenance Needs/Recommendations

No maintenance needs were observed for W-9. The breach is still present in the dam at W-16. Water moves freely between the excavated pond and a developing wetland area south of the berm. There is a breach around the east end of the W-13 dam, which is likely how fish species entered into this wetland. The berm northeast of the W-11 excavated pond may inhibit water from the northeast drainage from entering the site; there is a developing wetland adjacent to this berm. A similar situation exists for W-7; a berm to the northwest may prevent water from entering that side of the wetland. However, W-7 receives water from drainages to the west and wetland vegetation has colonized the entire perimeter of the wetland.

Table 7: Summary of 2007 wetland function/value ratings and functional points for all Ridgeway Complex Wetland Mitigation Sites.¹

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Wetland 4, 16	Wetland 11, 15	Wetlands 1, 3, 5, 7/8, 10, 12, 13	Wetlands 2, 6, 9
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)
MNHP Species Habitat	High (1.0)	High (1.0)	High (1.0)	High (1.0)
General Wildlife Habitat	Mod (0.7)	Mod (0.4)	High (0.9)	High (0.9)
General Fish/Aquatic Habitat	NA	NA	NA	NA
Flood Attenuation	Low (0.2)	Low (0.2)	Mod (0.5)	Mod (0.6)
Short and Long Term Surface Water Storage	Mod (0.4)	Mod (0.4)	High (0.8)	High (1.0)
Sediment/ Nutrient/ Toxicant Removal	High (1.0)	Mod (0.7)	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	High (1.0)	Low (0.3)	High (1.0)	High (1.0)
Production Export/Food Chain Support	Mod (0.4)	Low (0.3)	Mod (0.7)	High (0.8)
Groundwater Discharge/Recharge	NA	NA	High (1.0)	High (1.0)
Uniqueness	Mod (0.3)	Mod (0.3)	Mod (0.3)	Mod (0.3)
Recreation/Education Potential	Mod (0.3)	Low (0.1)	Mod (0.5)	Mod (0.6)
Actual Points/ Possible Points	5.5/10	3.7/10	7.7/11	8.1/11
% of Possible Score Achieved	55%	37%	77%	74%
Overall Category	II	II	II	II
Total Acreage of Assessed Wetlands within Easement	3.65	1.81	30.18	20.58
Functional Units (acreage x actual points)	20.08	6.70	232.39	166.70
Net Acreage Gain	3.65	1.81	30.18	20.50
Net Functional Unit Gain	20.08	6.70	232.39	166.70
Grand Total Functional Unit "Gain" for Ridgeway Complex Wetland	425.87			

¹ Site 14 is not included because it does not qualify as a wetland (lacks hydrophytic vegetation).

3.10 Current Credit Summary

The total aquatic habitat area within the Ridgeway Complex, which includes open water and net wetland acreage, is 57.48 acres, a 4% increase since 2006 (**Tables 3 and 4**). The net wetland area (total aquatic habitat minus unvegetated open water) increased from 41.94 acres in 2006 to 47.17 acres in 2007; a 12% increase. Cumulatively, the complex is approximately 82% vegetated emergent wetland, and 18% open water. As of the 2007 field season, approximately 114% (57.48 acres) of the overall 50-acre wetland creation goal had been accomplished.

There is only one site that had not converted to a wetland community as of the 2007 monitoring visit in July, Site 14, however this site has been at full-pond for two years and it is expected that hydrophytic vegetation will colonize within the next year. The berm northeast of Wetland 11 may prevent water from the northeast drainage from flowing into the excavated area. No emergent vegetation was observed within or adjacent to the excavated pond; however hydrophytic vegetation was observed adjacent to the berm (0.16 acre), suggesting that water is being captured and retained by the berm. A similar situation also occurs northwest of W-7; the berm northeast of W-7 retains water flow and wetland vegetation is colonizing the area immediately adjacent to the berm. However, W-7 receives a substantial amount of flow from drainages to the west, and therefore wetland vegetation had colonized the perimeter of the W-7 excavated pond.

The net wetland area within sites 4, 11, 15 and 16 was less than 1 acre (range 0.16 to 0.93 acre). Wetland vegetation is colonizing several areas around the excavated ponds of W-4, 15, and 16. The total aquatic habitat, including open water, for W-4, 15, and 16 ranges from 1.22 to 2.43 acres; net wetland vegetation acreage is expected to increase 100 to 200% within the next growing season.

Wetland 9 functional units have increased 221% (23.8 to 52.7 FU) since 2002 and acreage has increased 176% (3.45 to 6.06 acres). The actual functional points (8.7) are the same as 2006, however the FU increased from 49.16 to 52.7 because of the increase in acreage.

The total Functional Units for the Ridgeway Complex aquatic habitat acreage is 425.87 FU (**Table 7**), a gain of 11.8 FU since 2006. All wetlands are a Class II wetland as a result of observations of northern leopard frogs at each site in 2006 and/or 2007. Percent possible score did vary across the groupings; W-4 and 16 achieved a 55% score, W-11 and 15, a 37% score, W-1, 3, 5, 7/8, 10, 12, and 13 scored 77%, and, W-2, 6, and 9 scored 74%. The range of scores is primarily the result of the emergent wetland vegetation acreage.

4.0 REFERENCES

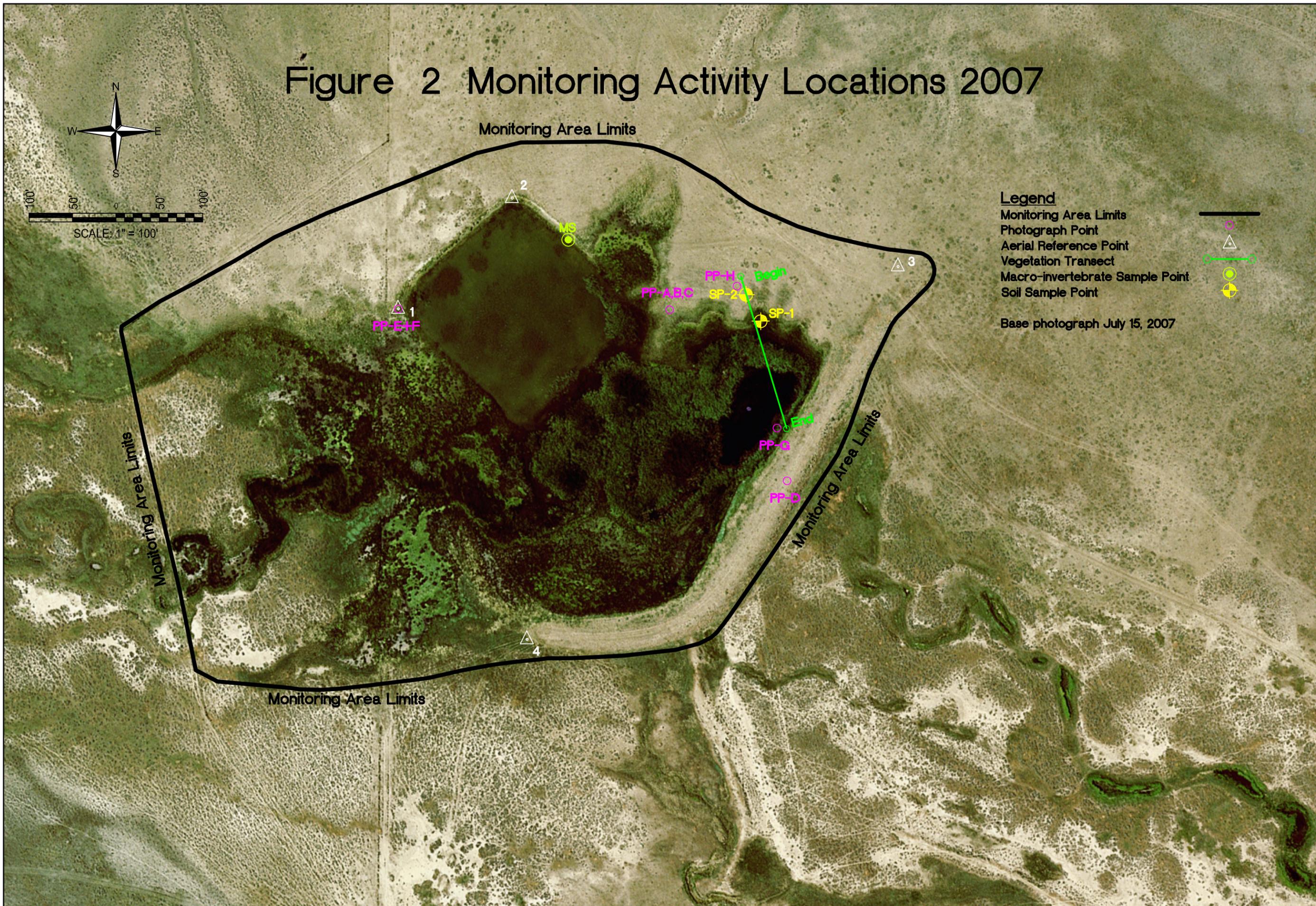
- Berglund, J. 1999. *MDT Montana Wetland Assessment Method*. May 25th. Prepared for Montana Department of Transportation and Morrison-Maierle, Inc., Helena, Montana. Prepared by Western EcoTech, Helena, Montana. 18 pp.
- Bollman, W. 2007. MDT Mitigated Wetland Monitoring Project – Aquatic Invertebrate Monitoring Summary 2001-2007. Rhithron Associates, Inc. Missoula, Montana.
- Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. U.S. Army Corps of Engineers, Washington, DC.
- Natural Resource Conservation Service (NRCS). 2003. *Soil Survey of Carter County, Montana*.
- Reed, P.B. 1988. *National list of plant species that occur in wetlands: North Plains (Region 4)*. Biological Report 88(26.4), May. U.S. Fish and Wildlife Service, Washington, D.C.
- Rau, L. 1999. Ridgeway Wetland Complex, Impoundment Size Letter. Bureau of Land Management, Miles City Field Office, Miles City, Montana.
- USDA Bureau of Land Management (USDA). 1990. Typical Water Retention Pit. Bureau of Land Management, Miles City Field Office, Miles City, Montana.
- USDA Bureau of Land Management (USDA). 1999. Ridgeway Wetland Complex Environmental Assessment. Bureau of Land Management, Miles City Field Office, Miles City, Montana.
- Western Regional Climate Center (WRCC). 2007. Ridgeway 1S Station:
<http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?mtridg>

Appendix A

WETLAND 9: 2007 FIGURES 2 & 3

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

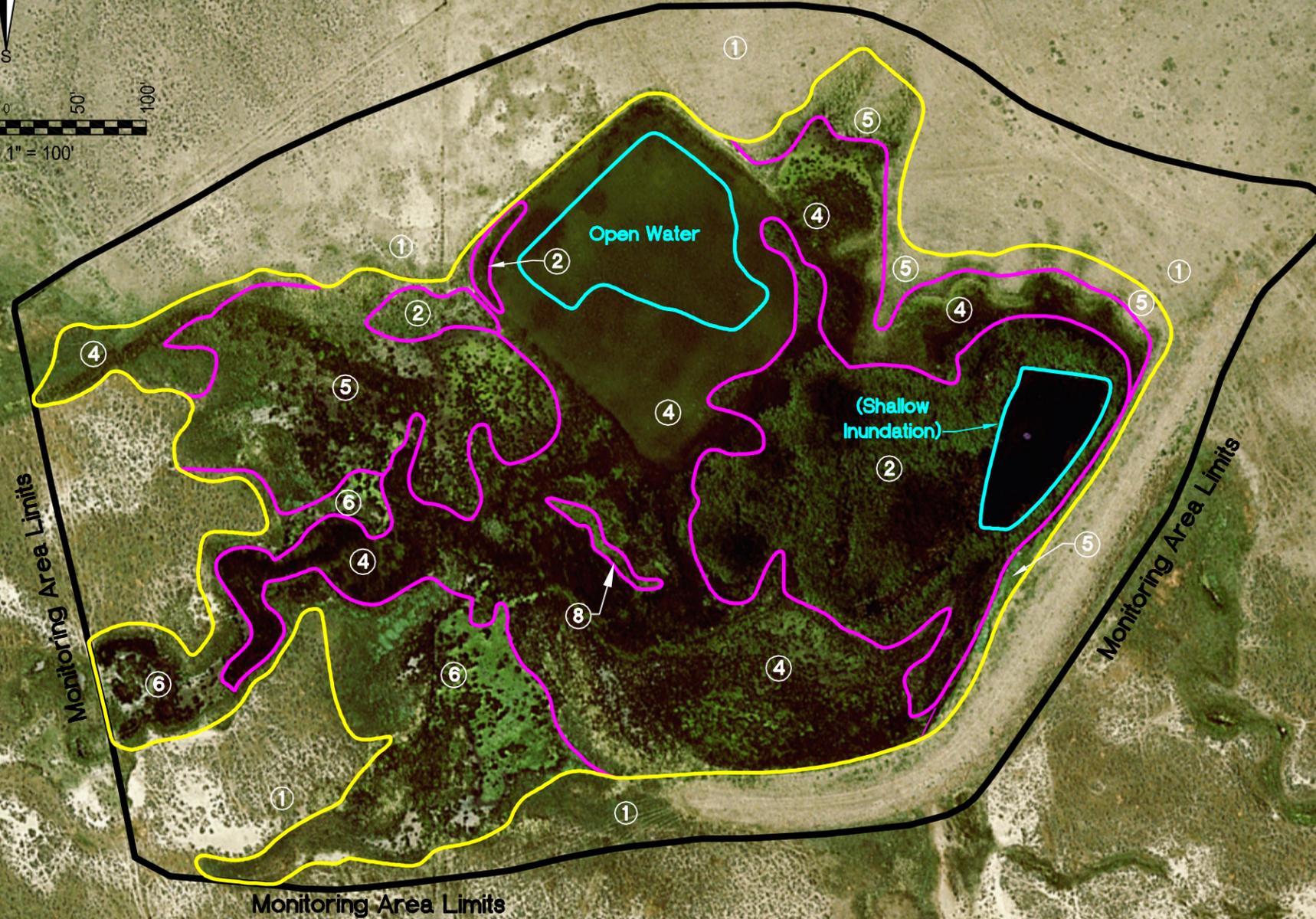
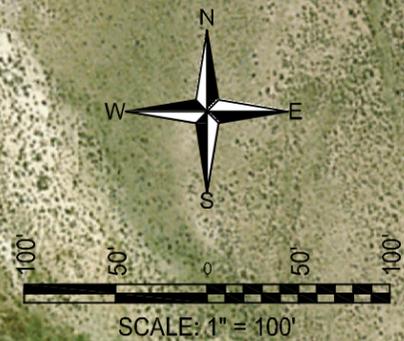
Figure 2 Monitoring Activity Locations 2007



PROJECT NAME MDT RIDGEWAY COMPLEX W-9 WETLAND MITIGATION	
DRAWING TITLE MONITORING ACTIVITY LOCATIONS 2007	
PROJ NO: B43088.00 0412W9	DRAWN: SH/JR
LOCATION: RIDGEWAY COMPLEX W-9	PROJ MGR: J. BERGLUND
SCALE: 1" = 100'	CHECKED: LB APPVD: JB
FILE NAME: 2007 W09BASE.dwg	
3810 Valley Commons Drive Suite 4 Bozeman, MT 59718 	
FIGURE 2 OF	
REV - Oct/29/2007	

Figure 3 Mapped Site Features 2007

Monitoring Area Limits



Legend

- Monitoring Area Limits
- Wetland Boundary
- Open Water Boundary
- Vegetation Community Boundary

Base photograph July 15, 2007

Gross Wetland Area - 6.06 Acres
 Open Water Area - 0.32 Acres
 Net Wetland Area - 5.74 Acres

Vegetation Types:

- ① *Artemisia tridentat/Artriplex argentea*
- ② *Typha latifolia*
- ③ *Alisma plantago-aquatica*
- ④ *Eleocharis palustris*
- ⑤ *Hordeum jubatum*
- ⑥ *Rumex crispus/Hordeum jubatum*
- ⑦ *Rumex crispus*
- ⑧ *Spartina gracilis*

PROJECT NAME MDT RIDGEWAY COMPLEX W-9 WETLAND MITIGATION	
DRAWING TITLE MAPPED SITE FEATURES 2007	
PROJ NO: B43088.00 0412W9	DRAWN: SH/JR
LOCATION: RIDGEWAY COMPLEX W-9	PROJ MGR: J. BERGLUND
SCALE: 1" = 100'	CHECKED: LB APPVD: JB
FILE NAME: 2007 W09BASE.dwg	
3810 Valley Commons Drive Suite 4 Bozeman, MT 59718	
FIGURE 3 OF	
REV - Nov/19/2007	

Appendix B

WETLAND 9:

2007 WETLAND MITIGATION SITE MONITORING FORM

2007 BIRD SURVEY FORMS

2007 COE WETLAND DELINEATION FORMS

2007 FUNCTIONAL ASSESSMENT FORMS

MDT Wetland Mitigation Monitoring

Ridgeway Wetland Complex

Ekalaka, Montana

PBS&J / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **Ridgeway #9** Project Number: **B43054.00-412**
 Assessment Date: **July 17, 2007** 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: **clear, 100deg** Time of Day: **11 AM**
 Initial Evaluation Date: **August 23, 2001** Monitoring Year: **6** # 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: **5%**
 Depth at emergent vegetation-open water boundary: **1-2 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	1 = 1-5%		
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	5 = > 50%		
OPENWATER	4 = 21-50%		
RUNCRI	+ = < 1%		

Comments / Problems: _____

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%		
ALIPLA	1 = 1-5%		

Comments / Problems: **salix not observed in 2007**

VEGETATION COMMUNITIES (continued)

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

Dominant Species	% Cover	Dominant Species	% Cover
HORJUB	5 = > 50%		
RUMCRI	1 = 1-5%		
BECSYZ	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	1 = 1-5%		
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: _____

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	many	<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"/>	
		<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 breach noted (WL-16 dam still has a breach and W-13 has a wash-out around the east side of the berm).**

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Ridgeway #9** Date: **July 17, 2007** Examiner: **LBacon/PBSJ**

Transect Number: **1** Approximate Transect Length: **150 feet** Compass Direction from Start (Upland): **150°**

Vegetation Type A: CT-5	
Length of transect in this type: 10 feet	
Plant Species	Cover
HORJUB	5 = > 50%
RUMCRI	+ = < 1%
BECSYZ	4 = 21-50%
Total Vegetative Cover:	50%

Vegetation Type B:	
Length of transect in this type:	
Plant Species	Cover
Total Vegetative Cover:	

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

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

MDT WETLAND MONITORING – VEGETATION 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): **100%**

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: **W-9 continues to expand to N and W.**

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, PBS&J</u>	Date: <u>7/17/07</u> County: <u>Carter</u> State: <u>MT</u>
Do Normal Circumstances exist on the site: <u> x </u> Yes <u> </u> No Is the site significantly disturbed (Atypical Situation)? <u> </u> Yes <u> x </u> No Is the area a potential Problem Area?: <u> </u> Yes <u> x </u> No (If needed, explain on reverse.)	Community ID: <u>Emergent</u> Transect ID: _____ Plot ID: <u>SP-1</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1 <i>Eleocharis palustis</i>	H	OBL		9		
2 <i>Rumex crispus</i>	H	FACW		10		
3 <i>Beckmannia syzigachne</i>	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%

Veg community continues to stabilize and mature. ELEPAL also dominant though not within soil pit area.

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks): <u> </u> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <u> </u> Other <u> </u> 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 checked="" type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u> NA </u> (in.) Depth to Free Water in Pit: <u> NA </u> (in.) Depth to Saturated Soil: <u> 0 </u> (in.)	
Remarks: Soil pit saturated to surface.	

SOILS

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

Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4	A	2.5Y 4/1, 4/2	7.5 YR 4/6	Common/distinct	silt clay
4-10	B	2.5Y 4/2	7.5 YR 4/6	Common/distinct	silt clay

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

Low-chroma with mottles.

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	
Hydric Soils Present?	<u>X</u>	Yes	<input type="checkbox"/>	No	

Remarks:
Wetland area continues to expand to east.

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, PBS&J</u>	Date: <u>7/17/07</u> County: <u>Carter</u> State: <u>MT</u>
Do Normal Circumstances exist on the site: <u> x </u> Yes <u> </u> No Is the site significantly disturbed (Atypical Situation)? <u> </u> Yes <u> x </u> No Is the area a potential Problem Area?: <u> </u> Yes <u> x </u> 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				11		
4				12		
5				13		
6				14		
7				15		
8				16		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 0/2

SP not within the wetland boundary.

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks): <u> </u> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <u> </u> Other <u> </u> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <u> </u> Inundated <u> </u> Saturated in Upper 12 Inches <u> </u> Water Marks <u> </u> Drift Lines <u> </u> Sediment Deposits <u> </u> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <u> </u> Oxidized Root Channels in Upper 12 Inches <u> </u> Water-Stained Leaves <u> </u> Local Soil Survey Data <u> </u> FAC-Neutral Test <u> </u> 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 (Series and Phase):	Bickerdyke Clay	Drainage Class: <u>well</u>
Taxonomy (Subgroup):	<u>Udorthentic Chromusterts</u>	Field Observations Confirm Mapped Type? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

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

Hydric Soil Indicators:

<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 type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

Hydric soils absent

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	<u>X</u>	No	Is this Sampling Point Within a Wetland? <table style="float:right; margin-left: 20px;"> <tr> <td>Yes</td> <td><u>X</u></td> <td>No</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Yes	<u>X</u>	No	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yes	<u>X</u>	No								
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>								
Wetland Hydrology Present?	<input type="checkbox"/> Yes	<u>X</u>	No							
Hydric Soils Present?	<input type="checkbox"/> Yes	<u>X</u>	No							

Remarks:

This side of WL remains an abrupt edge around the WL boundary; west side UPL area continues to convert to WL, particularly adjacent to intermittent stream fingers.

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, 2006 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.): _____

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 checked="" type="checkbox"/> Moderate								<input type="checkbox"/> Low			
Class Cover Distribution (all vegetated classes)	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input checked="" type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> Even			
Duration of Surface Water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12)	--	--	--	--	--	--	--	--	E	--	--	--	--	--	--	--	E	--	--	--
Moderate disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
High disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

Evidence of Wildlife Use from 14C(i)	Wildlife Habitat Features Rating from 14C(ii)			
	<input checked="" type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Substantial	1 (E)	--	--	--
Moderate	--	--	--	--
Low	--	--	--	--

Comments: Deer seen every year bedding in drier areas of high vegetation within the wetland; fox also observed some years (not in 2007); waterfowl present each year as well as Yellow-headed Blaackbirds.

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: warm water fish seen in W-13, however, no observations of fish in W-9 yet.

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

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

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

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

Estimated wetland area in AA subject to periodic flooding	<input type="checkbox"/> ≥ 10 acres			<input checked="" type="checkbox"/> <10, >2 acres			<input type="checkbox"/> ≤2 acres		
% of flooded wetland classified as forested, scrub/shrub, or both	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains no outlet or restricted outlet	--	--	--	--	--	.5 (M)	--	--	--
AA contains unrestricted outlet	--	--	--	--	--	--	--	--	--

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

Y N Comments: _____

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

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.

If no wetlands in the AA are subject to flooding or ponding, check NA above.

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

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

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

Comments: _____

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

Applies to wetlands with potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input.

If no wetlands in the AA are subject to such input, check NA above.

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

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
% cover of wetland vegetation in AA	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Evidence of flooding or ponding in AA	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
AA contains no or restricted outlet	1 (H)		--		--		--	
AA contains unrestricted outlet	--		--		--		--	

Comments: _____

14H. SEDIMENT/ShORELINE STABILIZATION NA (proceed to 14I)

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

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

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

Comments:

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

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

A	<input checked="" type="checkbox"/> Vegetated component >5 acres						<input type="checkbox"/> Vegetated component 1-5 acres						<input type="checkbox"/> Vegetated component <1 acre					
B	<input type="checkbox"/> High		<input checked="" type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input 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 checked="" 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 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	--	--	--	.8H	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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: Given the water levels appear to stay fairly stable every year since full-pond was reached, it is likely this wetland receives groundwater source of hydrology; W-7/8 and W-6 are upslope along the same drainage, and all of these wetlands have a well-developed wetland vegetation community and are flooded perennially.

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"/> Moderate	<input type="checkbox"/> High
Public ownership	1 (H)	--	--
Private ownership	--	--	--

Comments: hunting opportunities, general avian and ungulate observations

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	1.00	1	
G. Sediment/Nutrient/Toxicant Removal	H	1.00	1	
H. Sediment/Shoreline Stabilization	H	1.00	1	
I. Production Export/Food Chain Support	H	0.80	1	
J. Groundwater Discharge/Recharge	H	1.00	1	
K. Uniqueness	L	0.40	1	
L. Recreation/Education Potential	H	1.00	1	
Totals:		8.70	11.00	53
Percent of Total Possible Points:			79% (Actual / Possible) x 100 [rd to nearest whole #]	

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

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

I

 II

 III

 IV

Appendix C

WETLAND 9: 2007 REPRESENTATIVE PHOTOGRAPHS

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

Ridgeway Complex Wetland Mitigation Site 2007



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°



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



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

Ridgeway Complex Wetland Mitigation Site 2007
2007 Ridgeway Complex Wetland Mitigation Site



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

**1999 RIDGEWAY COMPLEX ENVIRONMENTAL ASSESSMENT
1990 BLM TYPICAL WATER RETENTION PIT PLANS
1999 IMPOUNDMENT SIZES**

*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.

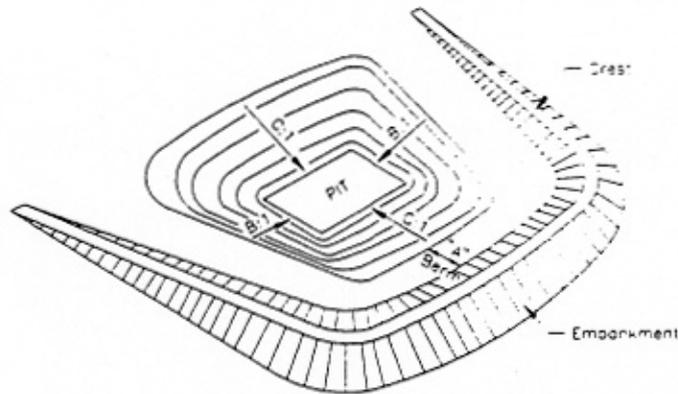
Land Uses: There are several Rights-of-Way in Section 34, some which are buried. If any digging takes place in this section, must coordinate with rights-of-way holders.

STIPULATIONS:

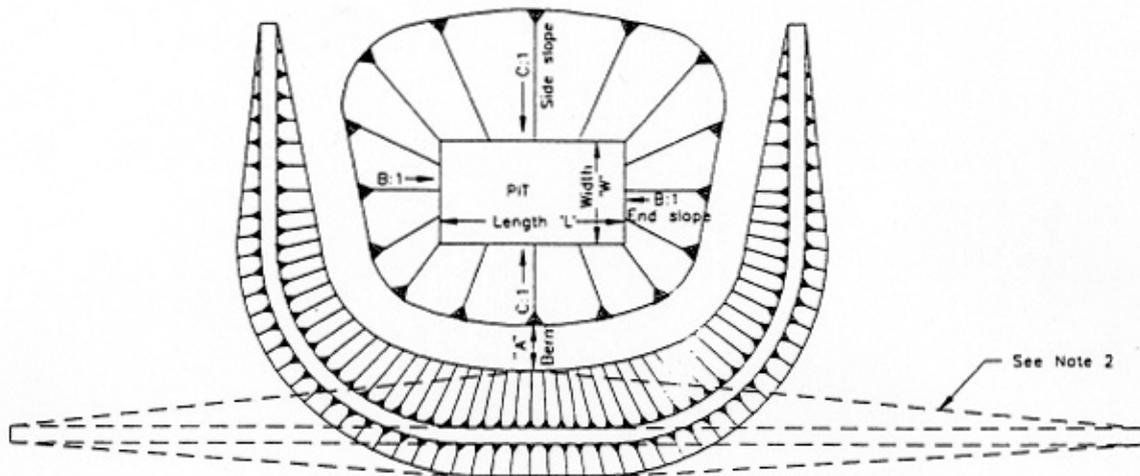
The contractor shall immediately bring to the attention of the BLM Field Manager any and all antiquities or other items of cultural or scientific interest, including but not limited to historic or prehistoric ruins, fossils, artifacts or burials discovered as a result of his operations, and shall leave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

LIST OF PREPARERS:

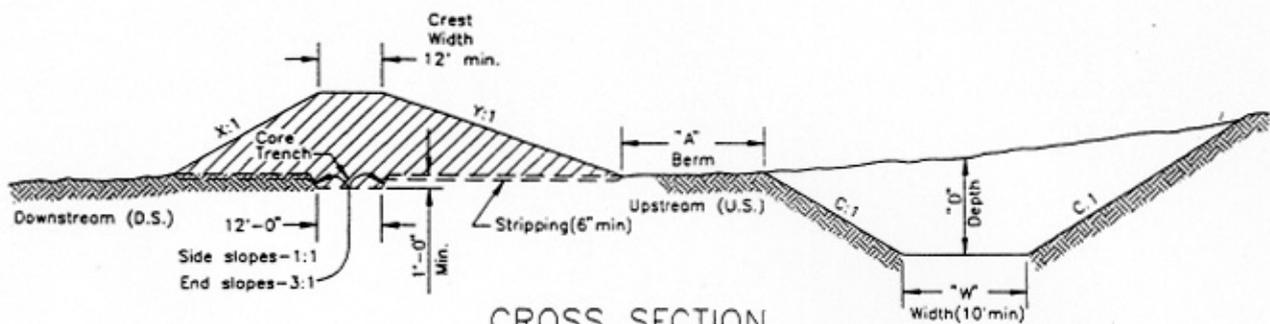
Miles City Field Office Personnel: Jeff Gustad, Rangeland Mgmt Spec; Ted Birnie, Archaeologist; Pam Wall, Realty Specialist; Robert Mitchell, Soil Scientist; Dan Bricco, Outdoor Recreation Planner; Larry Rau, Wildlife Biologist.



PERSPECTIVE VIEW



PLAN



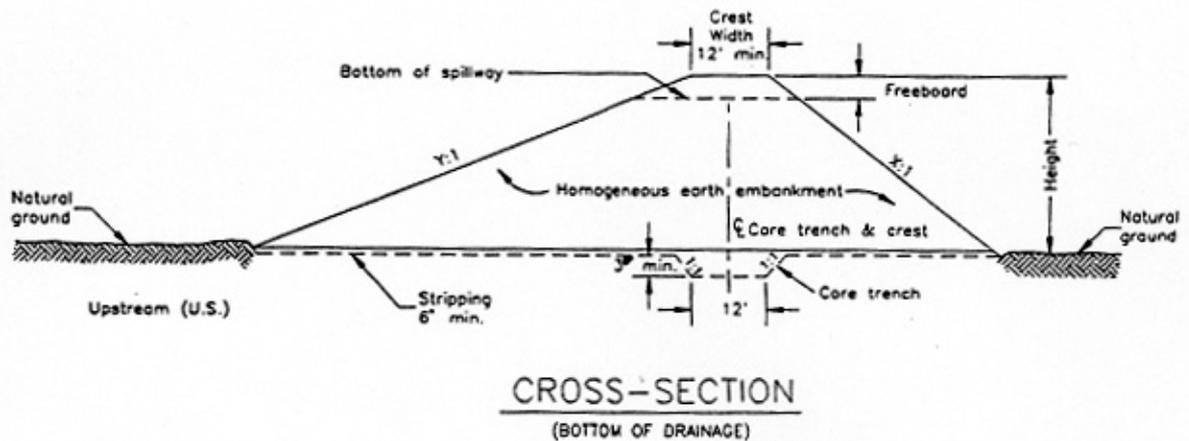
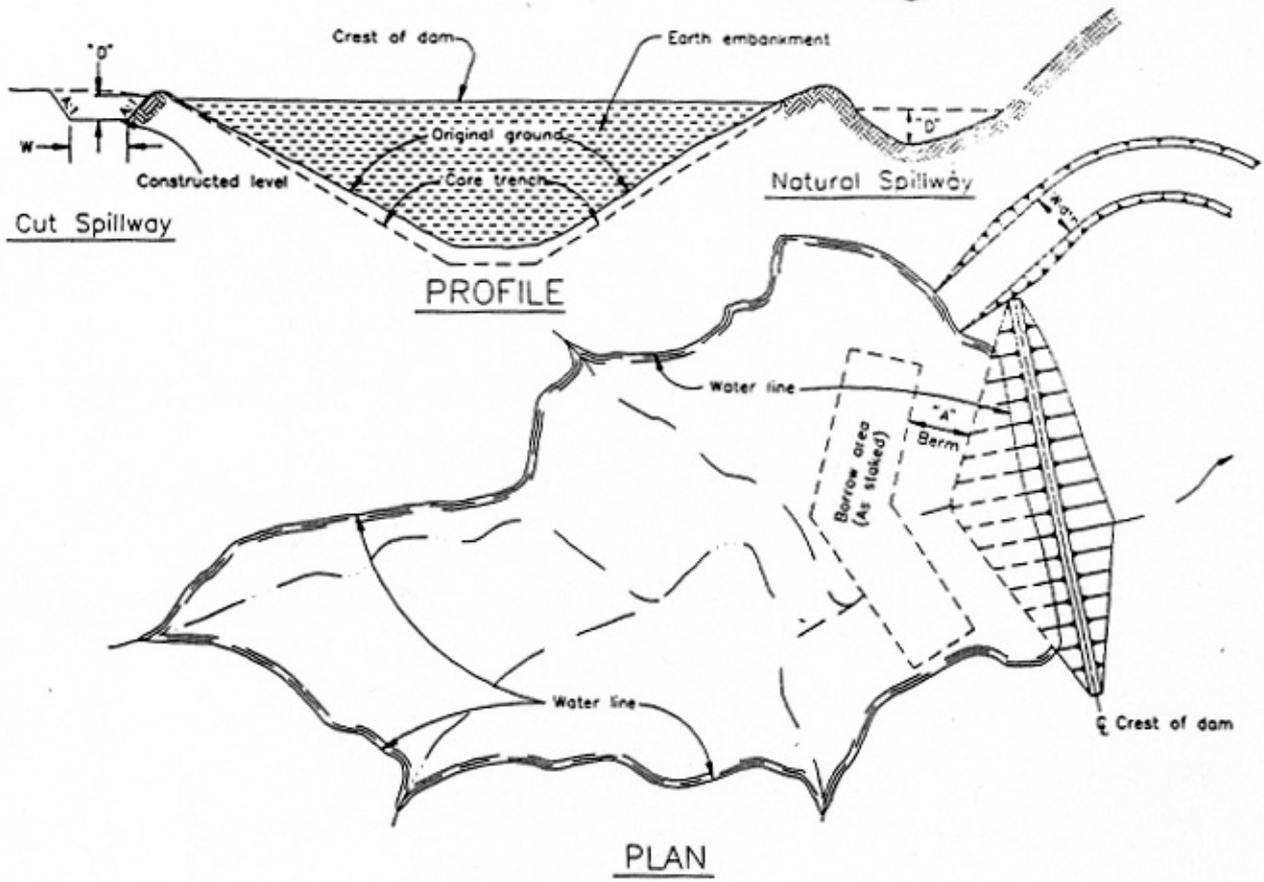
CROSS SECTION

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	
<h3 style="margin: 0;">TYPICAL MINOR RETENTION DAM</h3>	
DESIGNED	by others
REVIEWED	<i>[Signature]</i>
APPROVED	<i>[Signature]</i>
DRAWN	SCALE NONE
DATE	SHEET OF
DRAWING NO. 02291-2	

Jerry 6/28

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

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

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

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

Also included is the Environmental Analysis for this project.

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

Stay in touch -
Jerry Lan

RECEIVED

JUN 29 1999

ENVIRONMENTAL

Appendix E

BIRD SURVEY PROTOCOL GPS PROTOCOL

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

BIRD SURVEY PROTOCOL

This protocol was developed by the Montana Department of Transportation (MDT) to monitor bird use within their Wetland Mitigation Sites. Though each wetland mitigation site is vastly different, the bird survey data collection methods were standardized to order to increase repeatability. The protocol uses an "area search within a restricted time frame" to collect data on bird species, density, behavior, and habitat-type use.

Survey Area

Sites that can be entirely walked: Sites where the entire perimeter or area can be walked include, but are not limited to: small ponds, enhanced historic river channels, and wet meadows. If the wetland is not uncomfortably inundated, walk several meandering transects to sufficiently cover the wetland. Meandering transects can be used, even if a small portion of the area is inaccessible (e.g. cannot cross due to inundation). Use binoculars to identify the bird species, to count the number of individuals, and to identify their behavior and habitat type. Data can be recorded directly onto the bird survey form or into a field notebook. The number of meandering transects and their direction (or location) should be recorded in the field notebook and/or drawn onto the aerial photograph or topographic map. Meandering transects are not formal and should not be staked. Each site should be walked and surveyed to the fullest extent within the set time limit.

Sites than cannot be entirely walked: Sites where the entire perimeter or area cannot be walked include, but are not limited to: very large sites (i.e. perimeter of 2-3 miles), and large-bodied waters (i.e. reservoirs), where deep water habitat (> 6 feet) is close to shore. For large-bodied waters where only one area was graded to create or enhance the development of wetland, bird surveys should be walked along meandering transects within or around the graded area (see above.). For sites that cannot be walked, bird surveys should be conducted from many lookout posts, established at key vantage points. The general location of lookout posts should be recorded in the field notebook or drawn onto the aerial photograph or topographic map. Lookout post locations do not need to be staked. Both binoculars and spotting scopes may be used in order to accurately identify and count the birds. Depending upon the size of the open water, more time may be spent viewing the mitigation area from lookout posts than is spent traveling between posts.

Survey Time

Ideally, bird surveys should be conducted in the morning hours when bird activity is often greatest (i.e. sunrise to no later than 11:00 am). Surveys can be completed before 11am if all transects have been walked or all lookout posts have been viewed with no new bird activity observed. For some sites bird surveys may need to be performed in the late afternoon or evening due to traveling constraints or weather. The overall limiting time factor will be the number of budgeted hours for the project.

Data Recording

Bird Species List: Record each bird species observed onto the Bird Survey-Field Data Sheet (or field notebook). Record the bird's common name using the appropriate 4-letter code. The 4-letter code uses the first two letters of the first two word's of the bird's common name or if one name, the first four letters. For example, Mourning Dove is coded as MODO while Mallard is coded as MALL. If an unknown individual is observed, use the 4-letter protocol, but define your

BIRD SURVEY PROTOCOL (continued)

abbreviation at the bottom of the field data sheet. For example, unknown shorebird is UNSB; unknown brown bird is UNBR; unknown warbler is UNWA; and unknown waterfowl is 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 parenthesis; do not fill in the habitat column. For example, a flock of black, medium-sized birds could be coded as UNBB / FO (25).

Bird Density: For each observation record the actual or estimated number of individuals observed per species and per behavior. Totals can be tallied in the office and entered onto the Bird Survey-Field Data Sheet.

Bird Behavior: Bird behavior must be identified by what is known. When a species is observed, the behavior that is immediately exhibited is recorded. Only behaviors that have discreet descriptive terms should be used. The following terms are recommended: breeding pair (BP); foraging (F); flyover (FO); loafing (L), which is defined as sleeping, roosting, or floating with head tucked under wing; and nesting (N). If other behaviors that have a specific descriptive word are observed then it can be used and should later be added to the protocol. Descriptive words or phrases such as "migrating" or "living on site" are unknown behaviors.

Bird Species Habitat Use: When a species is observed, the habitat is also recorded. The following broad habitat categories are used:

- ◆ aquatic bed (AB), defined as rooted-floating, floating-leaved, or submergent vegetation.
- ◆ marsh (MA), defined as emergent (e.g. cattail, bulrush) vegetation with surface water.
- ◆ wet meadow (WM), defined as grasses, sedges, or rushes with little to no surface water.
- ◆ scrub-shrub (SS), defined as shrub covered wetland.
- ◆ forested (FO), defined as tree covered wetland.
- ◆ open water (OW), defined as unvegetated surface water.
- ◆ upland (UP), defined as the upland buffer.

Other categories can be used and defined on the data sheet and should later be added to the protocol.

Other Fields

Bird Visit: Each bird survey (i.e. spring, fall, and mid-season) should be completed on separate Bird Survey-Field Data Sheets.

Time: Record the start time and end time on the Bird Survey-Field Data Sheet.

Date: Record the date of the bird survey.

Weather: Record the weather conditions (i.e. temperature, wind, condition).

Notes: Note if a particular individual bird is using a constructed nest box and note the condition of constructed nest box(es). Also record any comments about the site, wildlife, wetland conditions, etc.

GPS MAPPING AND AERIAL PHOTO REFERENCING PROCEDURE

From 2001 through 2006, PBS&J mapped the vegetation community boundaries, photograph points, and other sampling locations in the field using the resource-grade Trimble GEO III GPS (Global Positioning System) unit. The data were collected with a minimum of three positions per feature using Course/Acquisition code. The collected data were then transferred to a personal computer (PC) and differentially corrected to the nearest operating Community Base Station. The corrected data were then exported to ACAD drawings in Montana State Plain Coordinates NAD 83 international feet.

The collected and processed Trimble Geo III GPS positions had a 68% accuracy of 7 feet except in isolated areas where accuracy fell to 12 feet. This is within the 1 to 5 meter range listed as the expected accuracy of the mapping grade Trimble GPS.

In 2007, some sites continued to be mapped using the Trimble GEO III GPS unit while most sites were mapped using the resource-grade Magellan MobileMapper Office GPS unit. The Magellan GPS unit has a comparable accuracy level to the Trimble Geo III unit.

Each year, MDT photographs each mitigation site from the air. These aerial photographs are not geo-referenced, but serve as a visual aid to map wetland development and vegetation communities, and to show approximate locations for various monitoring activities (i.e. photograph points, transects, or macroinvertebrate sampling). Reference points that are observable on the aerial photo (i.e. road, stream channel, or fence) were also marked with the GPS unit in order to better position the aerial photograph. This positioning did not remove any of the distortion inherent to all photos. All mapped features and community boundaries were reviewed by the wetland biologist, to increase the figure's accuracy.

Any relationship of features located to easement or property lines are not to be construed from these figures. These relationships can only be determined with a survey by a licensed surveyor.

Appendix F

WETLAND 9: 2007 MACROINVERTEBRATE SAMPLING PROTOCOL & DATA

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

AQUATIC INVERTEBRATE SAMPLING PROTOCOL

Equipment List

- D-frame sampling net with 1 mm mesh.
- 1-liter, wide-mouth, plastic sample jars provided by Rhithron Associates, Inc. (Quart sized, wide-mouthed canning jars can be substituted.)
- 95% ethanol (alternatively isopropyl alcohol).
- Pre-printed sample labels (printed on rite-in-the-rain paper); two labels per sample.
- Pencil.
- Clear packaging tape.
- 3-5 gallon plastic pail.
- Large tea strainer or framed screen.
- Cooler with ice for storing sample.

Site Selection

Select a site that is accessible with hip waders or rubber boots. If the substrate is too soft, place a wide board down to walk on. Choose a site that is representative of the overall condition of the wetland. Annual sampling should occur at the same site within the wetland.

Sampling Procedure

Wetland invertebrates (macroinvertebrates) inhabit the substrate, the water column, the stems and leaves of aquatic vegetation, and the water surface. At the given location, each habitat type is sampled and combined into a single 1-liter sample jar. Pre-cautions are made to minimize disturbing the sample site in order to maximize the number of animals collected.

Fill the pail with approximately 1 gallon of wetland water. Ideally, sample the water column from near-shore outward to a depth of 3 feet. Sample the water column using a long sweep of the net, keeping the net at about half the depth of the water. Sample the water surface with a long sweep of the net. Aquatic vegetation is sampled by pulling the net beneath the water surface, for at least a meter in distance. The substrate is sampled by pulling the net along the bottom, bumping it against the substrate several times as you pull. Be sure to place some muck, mud, and/or vegetation into the jar. After sampling a habitat, rinse the net in the bucket and look for insects, crustaceans, and other aquatic invertebrates. It is not necessary to sample habitats in any specific order, but all habitats, if present, are to be sampled. Habitats can be sampled more than once.

Fill about 1 cup of ethanol into the sample jar. Sieve the contents of the bucket through the straining device and pour or carefully scrape the contents of the strainer into the sample jar. Top off the jar with enough ethanol to cover all the material and leave as little headroom as possible. Alternatively, sampled materials can be lifted out of the net and put directly into the jar. Be sure to include some muck, mud, and/or vegetation into the jar. Each macroinvertebrate sampling site should have only one sampling jar.

Using pencil, complete two labels with the required information: project name, project number, date, collector's name, and habitats sampled. Do not complete the label with ink as it will dissolve in ethanol. For wetlands with at least two macroinvertebrate sampling sites, number the site consecutively followed by the total number of sites (e.g. Sample 2 of 3 sites). Place one label into the jar and seal the jar. Dry the jar off, if necessary, and tape the second label to the outside of the jar.

Photograph each macroinvertebrate sampling site.

Sample Handling/Delivery

In the field, keep sample jars cool by placing in a cooler with a small amount of ice.

Deliver samples to the PBS&J office in Missoula, where they will be inventoried and delivered to Rhithron Associates, Inc.

**MDT Mitigated Wetland Monitoring Project: Aquatic Invertebrate Monitoring
Summary 2001 – 2007**

Prepared for Post, Buckley, Schuh, and Jernigan (PBS&J)
Prepared by W.Bollman, Rhithron Associates, Inc.

INTRODUCTION

Aquatic invertebrate assemblages were collected at a number of mitigated wetlands throughout Montana. This report summarizes data generated from seven years of collection. Over all years of sampling, a total of 182 invertebrate samples were collected. Table 1 lists the currently monitored sites at which aquatic invertebrates were collected in 2007, and summarizes the sampling history of each.

METHODS

Sample processing

Aquatic invertebrate samples were collected at mitigated wetland sites in the summer months of 2001, 2002, 2003, 2004, 2005, 2006 and 2007 by personnel of PBS&J. Sampling procedures utilized were based on the protocols developed by the Montana Department of Environmental Quality (MT DEQ) for wetland sampling. Sampling consisted of D-frame net sweeps through emergent vegetation (when present), the water column, and over the water surface, and included disturbing and scraping substrates at each sampled site. These sample components were composited and preserved in ethanol at each wetland site. Samples were delivered to Rhithron Associates, Inc. for processing, taxonomic determinations, and data analysis.

Standard sorting protocols were applied to achieve representative subsamples of a minimum of 100 organisms. Caton sub-sampling devices (Caton 1991), divided into 30 grids, each approximately 5 cm by 6 cm, were used. Grid contents were examined under stereoscopic microscopes using 10x-30x magnification. All aquatic invertebrates from each selected grid were sorted from the substrate, and placed in 95% ethanol for subsequent identification. Grid selection, examination, and sorting continued until at least 100 organisms were sorted. A large/rare search was conducted to collect any taxa not found in the subsampling procedure.

Organisms were individually examined using 10x – 80x stereoscopic dissecting scopes (Leica S8E and S6E) and identified to the lowest practical taxonomic levels using appropriate published taxonomic references. Identification, counts, life stages, and information about the condition of specimens were recorded on bench sheets. To obtain accuracy in richness measures, organisms that could not be identified to the target level specified in MDEQ protocols were designated as “not unique” if other specimens from the same group could be taken to target levels. Organisms designated as “unique” were those that could be definitively distinguished from other organisms in the sample. Identified organisms were preserved in 95% ethanol in labeled vials, and archived at the Rhithron laboratory. Midges were morphotyped using 10x – 80x stereoscopic dissecting microscopes (Leica S8E and S6E) and representative specimens were slide mounted and examined at 200x – 1000x magnification using an Olympus BX 51 compound microscope. Slide mounted organisms were also archived at the Rhithron laboratory.

Quality assurance systems

Quality control procedures for initial sample processing and subsampling involved checking sorting efficiency. These checks were conducted on 96% of the samples by independent observers who microscopically re-examined 20% of sorted substrate from each sample. All organisms that were missed were counted and this number was added to the total number obtained in the original sort. Sorting efficiency was evaluated by applying the following calculation:

$$SE = \frac{n_1}{n_{1+2}} \times 100$$

where: SE is the sorting efficiency, expressed as a percentage, n_1 is the total number of specimens in the first sort, and n_{1+2} is the total number of specimens in the first and second sorts combined.

Quality control procedures for taxonomic determinations of invertebrates involved checking accuracy, precision and enumeration. At least 10% of samples are targeted for quality assurance procedures. For this project, three samples were randomly selected and all organisms re-identified and counted by an independent taxonomist. Taxa lists and enumerations were compared by calculating a Bray-Curtis similarity statistic (Bray and Curtis 1957) for each

selected sample. Routinely, discrepancies between the original identifications and the QC identifications are discussed among the taxonomists, and necessary rectifications to the data are made. Discrepancies that cannot be rectified by discussions are routinely sent out to taxonomic specialists for identification. However, taxonomic certainty for identifications in this project was high, and no external verifications were necessary.

Assessment

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 the 12 metrics were developed specifically for this project, since mitigated wetlands were not included in original criteria development.

Scoring criteria for wetland metrics were developed by generally following the tactic used by Stribling et al. (1995). Boxplots were generated using a statistical software package (Statistica™), and distributions, median values, ranges, and quartiles for each metric were examined. For the wetland sites, “optimal” scores were generally those that fell above the 75th percentile (for those metrics that decrease in value in response to stress) or below the 25th percentile (for metrics that respond to stress by an increase in value) of all scores. Additional scoring ranges were established by bisecting the range below the 75th percentile for decreasing scores (or above the 25th percentile for increasing scores) into “sub-optimal” and “poor” assessment categories. A score of 5, 3, or 1 was assigned to optimal, sub-optimal, and poor metric performance, respectively. In this way, metric values were translated into normalized metric scores, and scores for all metrics were summed to produce a total bioassessment score, which is expressed as a percentage of the maximum possible score (60). 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. Data from a total of 167 samples were used to develop criteria.

Several sites in this study supported aquatic fauna characteristic of lotic habitats rather than lentic wetland habitats; these sites were excluded from mitigated wetland scoring criteria development, and were evaluated with a metric battery specific to flowing water habitats. In 2007, the lotic sites were Camp Creek (2 sites), Cloud Ranch stream, Kleinschmidt stream, Jack Creek, and Woodson Creek-Ringling stream. Invertebrate assemblages at these sites were generally characteristic of montane or foothill stream conditions and were assessed using the tested metric battery developed for montane streams of Western Montana (Bollman 1998).

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. However, the nature of the action needed is not determined solely by the index score or impairment classification, 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 since our understanding of the interrelationships of natural environmental factors and anthropogenic disturbances is tentative. Thus, the further interpretive remarks accompanying the raw taxonomic and metric data in this summary are offered cautiously. Year-to-year comparisons depend on an assumption that specific sites were revisited in each year, and that equivalent sampling methods were utilized at each site revisit.

Bioassessment metrics - wetlands

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, %Orthocladiinae 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.

Summary metric values and scores for the 2007 samples are given in Tables 4a-4c and 5.

In 2007, thermal preference of the invertebrate assemblages was calculated when possible, using the tool developed by Brandt 2001.

Bioassessment metrics – lotic habitats

For sites supporting rheophilic invertebrate assemblages, bioassessment was based on a metric battery and scoring criteria developed for montane regions of Montana (MVFP index: Bollman 1998). The six metrics constituting the bioassessment index used for MVFP sites in this study were selected because, both individually and as an integrated metric battery, they are robust at distinguishing impaired sites from relatively unimpaired sites (Bollman 1998). They have been demonstrated to be more variable with anthropogenic disturbance than with natural environmental gradients (Bollman 1998). Each of the six metrics, and their expected responses to various stressors is described below.

1. Ephemeroptera (mayfly) taxa richness. The number of mayfly taxa declines as water quality diminishes. Impairments to water quality which have been demonstrated to adversely affect the ability of mayflies to flourish include elevated water temperatures, heavy metal contamination, increased turbidity, low or high pH, elevated specific conductance and toxic chemicals. Few mayfly species are able to tolerate certain disturbances to instream habitat, such as excessive sediment deposition.
2. Plecoptera (stonefly) taxa richness. Stoneflies are particularly susceptible to impairments that affect a stream on a reach-level scale, such as loss of riparian canopy, streambank instability, channelization, and alteration of morphological features such as pool frequency and function, riffle development and sinuosity. Just as all benthic organisms, they are also susceptible to smaller scale habitat loss, such as by sediment deposition, loss of interstitial spaces between substrate particles, or unstable substrate.
3. Trichoptera (caddisfly) taxa richness. Caddisfly taxa richness has been shown to decline when sediment deposition affects habitat. In addition, the presence of certain case-building caddisflies can indicate good retention of woody debris and lack of scouring flow conditions.
4. Number of sensitive taxa. Sensitive taxa are generally the first to disappear as anthropogenic disturbances increase. The list of sensitive taxa used here includes organisms sensitive to a wide range of disturbances, including warmer water temperatures, organic or nutrient pollution, toxic pollution, sediment deposition, substrate instability and others. Unimpaired streams of western Montana typically support at least four sensitive taxa (Bollman 1998).
5. Percent filter feeders. Filter-feeding organisms are a diverse group; they capture small particles of organic matter, or organically enriched sediment material, from the water column by means of a variety of adaptations, such as silken nets or hairy appendages. In forested montane streams, filterers are expected to occur in insignificant numbers. Their abundance increases when canopy cover is lost and when water temperatures increase and the accompanying growth of filamentous algae occurs. Some filtering organisms, specifically the Arctopsyche caddisflies (*Arctopsyche* spp. and *Parapsyche* spp.) build silken nets with large mesh sizes that capture small organisms such as chironomids and early-instar mayflies. Here they are considered predators, and, in this study, their abundance does not contribute to the percent filter feeders metric.
6. Percent tolerant taxa. Tolerant taxa are ubiquitous in stream sites, but when disturbance increases, their abundance increases proportionately. The list of taxa used here includes organisms tolerant of a wide range of disturbances, including warmer water temperatures, organic or nutrient pollution, toxic pollution, sediment deposition, substrate instability and others.

Table 1. Montana Department of Transportation Mitigated Wetlands Monitoring Project sites: sampling history. Only those sites monitored in 2007 are included. An asterisk (*) indicates lotic sites.

Site Identifier	2001	2002	2003	2004	2005	2006	2007
Roundup	+	+	+	+	+	+	+
Ridgeway	+	+	+	+	+	+	+
Hoskins Landing MS-1		+	+	+	+		+
Hoskins Landing MS-2							+
Peterson Ranch pond 1		+	+	+	+	+	+
Peterson Ranch pond 2		+		+	+	+	+
Peterson Ranch pond 4		+	+	+	+	+	+
Peterson Ranch pond 5		+	+	+	+	+	+
Camp Creek MS-1*		+	+	+	+	+	+
Camp Creek MS-2*						+	+
Kleinschmidt		+	+	+	+	+	+
Kleinschmidt – stream*			+	+	+	+	+
Cloud Ranch Pond				+	+		+
Cloud Ranch Stream*				+			+
Jack Creek – pond				+	+		+
Jack Creek – McKee*							+
Norem				+	+	+	+
Rock Creek Ranch					+	+	+
Wagner Marsh					+	+	+
Alkali Lake 1						+	+
Charley Creek							+
Woodson pond MI 1							+
Woodson stream MI 2*							+
Little Muddy Creek							+
Selkirk Ranch							+
DH Ranch							+

Table 2. Aquatic invertebrate metrics employed for wetland (lentic) invertebrate assemblages in the MDT mitigated wetlands study, 2001 – 2007.

Metric	Metric calculation	Expected response to degradation or impairment
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 by that taxon's modified Hilsenhoff Biotic Index (tolerance) 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 PBS&J and are included in the macroinvertebrate section of individual project monitoring reports. Summary tables for lentic (4a – 4c) and lotic (5) sites and project specific taxa listings and metrics reports are provided on the following pages.)

Quality Assurance

Table 3 gives the results of quality assurance procedures for sample sorting efficiency (SE) and Bray-Curtis similarity statistics for comparisons of taxonomic determinations and enumeration. Sorting efficiency averaged 97.54% for the project, and taxonomic similarity averaged 97.44%.

Table 3. Results of quality control procedures for subsampling and taxonomic and enumeration similarity.

Site name	SE	Bray-Curtis similarity
Roundup	100.00%	
Ridgeway	100.00%	
Hoskins Landing MS-1	100.00%	
Hoskins Landing MS-2	93.40%	
Peterson Ranch pond 1	100.0%	95.38%
Peterson Ranch pond 2	96.64%	
Peterson Ranch pond 4	91.66%	
Peterson Ranch pond 5	96.64%	
Camp Creek MS-1	100.00%	
Camp Creek MS-2	100.00%	96.94%
Kleinschmidt – pond	100.00%	
Kleinschmidt – stream	99.10%	
Cloud Ranch Pond	95.65%	
Cloud Ranch Stream	91.61%	
Jack Creek – pond	n.a.	
Jack Creek - McKee	96.49%	
Norem	100.00%	100.00%
Rock Creek Ranch	100.00%	
Wagner Marsh	100.00%	
Alkali Lake 1	98.04%	
Charley Creek	100.00%	
Woodson pond	91.37%	
Woodson stream	100.00%	
Little Muddy Creek	92.31%	
Selkirk Ranch	95.56%	
DH Ranch	100.00%	

Table 4a. Metric values and scores for wetland (lentic) sites in the MDT mitigated wetland study – 2007 sampling.

	ROUNDUP	RIDGEWAY	HOSKINS LANDING MS-1	HOSKINS LANDING MS-2	PETERSON RANCH 1	PETERSON RANCH 2	PETERSON RANCH 4	PETERSON RANCH 5
Total taxa	7	13	18	21	17	18	26	18
POET	0	2	3	5	2	0	6	4
Chironomidae taxa	5	5	2	8	8	12	12	6
Crustacea + Mollusca	1	2	5	4	4	5	4	4
% Chironomidae	7.62%	30.00%	18.75%	52.68%	36.45%	51.79%	42.59%	14.78%
Orthoclaadiinae/Chir	0.38	0.17	0.00	0.03	0.08	0.16	0.09	0.12
% Amphipoda	0.00%	10.00%	0.00%	0.00%	0.93%	0.00%	21.30%	1.74%
% Crustacea + % Mollusca	89.52%	15.00%	26.79%	8.04%	10.28%	43.75%	28.70%	37.39%
HBI	8.02	7.11	7.23	6.55	7.42	7.76	6.53	7.23
% Dominant taxon	89.52%	30.00%	17.86%	35.71%	39.25%	23.21%	17.59%	30.43%
% Collector-Gatherers	92.38%	70.00%	78.57%	82.14%	49.53%	71.43%	38.89%	26.96%
% Filterers	0.00%	0.00%	0.89%	6.25%	9.35%	3.57%	1.85%	5.22%
Total taxa	1	1	3	5	3	3	5	3
POET	1	1	3	5	1	1	5	5
Chironomidae taxa	3	3	1	5	5	5	3	3
Crustacea + Mollusca	1	1	3	3	3	3	1	3
% Chironomidae	5	3	3	1	3	1	1	5
Orthoclaadiinae/Chir	3	1	1	1	1	1	3	1
% Amphipoda	5	3	5	5	5	5	5	5
% Crustacea + % Mollusca	1	5	5	5	5	3	5	3
HBI	1	3	3	5	3	1	5	3
% Dominant taxon	1	5	5	3	3	5	1	5
% Collector-Gatherers	5	3	3	5	3	3	3	1
% Filterers	3	3	3	1	1	3	5	3
Total score	30	32	38	44	36	34	42	40
Percent of maximum score	50.00%	53.33%	63.33%	73.33%	60.00%	56.67%	70.00%	66.67%
Impairment classification	poor	sub-optimal	optimal	optimal	sub-optimal	sub-optimal	optimal	optimal

Table 4b. Metric values and scores for wetland (lentic) sites in the MDT mitigated wetland study – 2007 sampling.

	KLEIN-SCHMIDT POND	CLOUD RANCH POND	JACK CREEK POND	NOREM	ROCK CREEK RANCH	WAGNER MARSH	ALKALI LAKE 1	CHARLEY CREEK
Total taxa	25	13	9	6	18	11	9	13
POET	5	2	0	1	2	2	0	0
Chironomidae taxa	8	11	5	2	4	4	2	3
Crustacea + Mollusca	8	1	4	1	4	0	2	3
% Chironomidae	18.63%	81.54%	92.79%	31.58%	4.76%	11.39%	1.96%	27.17%
Orthoclaadiinae/Chir	0.53	0.38	0.03	0.00	0.60	0.44	0.50	0.68
% Amphipoda	10.78%	3.08%	0.00%	0.00%	17.14%	0.00%	0.00%	22.83%
%Crustacea + %Mollusca	36.27%	3.08%	7.21%	21.05%	23.81%	0.00%	61.76%	53.26%
HBI	7.35	7.22	9.73	6.63	6.33	7.28	8.07	6.88
%Dominant taxon	13.73%	18.46%	62.16%	26.32%	29.52%	45.57%	60.78%	29.35%
%Collector-Gatherers	53.92%	84.62%	70.27%	57.89%	29.52%	15.19%	70.59%	32.61%
%Filterers	11.76%	9.23%	0.90%	0.00%	0.95%	0.00%	0.00%	0.00%
Total taxa	5	1	1	1	3	1	1	1
POET	5	1	1	1	1	1	1	1
Chironomidae taxa	5	5	3	1	3	3	1	3
Crustacea + Mollusca	5	1	3	1	3	1	1	1
% Chironomidae	3	1	1	3	5	5	5	3
Orthoclaadiinae/Chir	5	3	1	1	5	3	5	5
% Amphipoda	3	5	5	5	3	5	5	3
%Crustacea + %Mollusca	3	5	5	5	5	5	3	3
HBI	3	3	1	5	5	3	1	5
%Dominant taxon	5	5	1	5	5	3	1	5
%Collector-Gatherers	3	5	3	3	1	1	3	1
%Filterers	1	1	3	3	3	3	3	3
Total score	46	36	28	34	42	34	30	34
Percent of maximum score	76.67%	60.00%	46.67%	56.67%	70.00%	56.67%	50.00%	56.67%
Impairment classification	optimal	sub-optimal	poor	sub-optimal	poor	sub-optimal	poor	sub-optimal

Table 4c. Metric values and scores for wetland (lentic) sites in the MDT mitigated wetland study – 2007 sampling.

	WOODSON POND	LITTLE MUDDY CREEK	SELKIRK RANCH	DH RANCH
Total taxa	12	2	16	8
POET	0	0	2	1
Chironomidae taxa	9	0	8	4
Crustacea + Mollusca	1	1	2	2
% Chironomidae	85.71%	0.00%	77.27%	27.50%
Orthocladinae/Chir	0.32	0.00	0.61	0.00
% Amphipoda	0.00%	0.00%	0.00%	0.00%
%Crustacea + %Mollusca	2.86%	75.00%	8.18%	64.17%
HBI	9.34	8.50	7.82	7.38
%Dominant taxon	33.33%	75.00%	46.36%	39.17%
%Collector-Gatherers	55.24%	75.00%	32.73%	27.50%
%Filterers	0.00%	0.00%	8.18%	17.50%
Total taxa	1	1	3	1
POET	1	1	1	1
Chironomidae taxa	5	1	5	3
Crustacea + Mollusca	1	1	1	1
% Chironomidae	1	5	1	3
Orthocladinae/Chir	3	1	5	1
% Amphipoda	5	5	5	5
%Crustacea + %Mollusca	5	1	5	1
HBI	1	1	1	3
%Dominant taxon	5	1	3	3
%Collector-Gatherers	3	3	1	1
%Filterers	3	3	1	1
Total score	34	24	32	24
Percent of maximum score	56.67%	40.00%	53.33%	40.00%
Impairment classification	sub-optimal	poor	sub-optimal	poor

Table 5. Metric values and scores for stream (lotic) sites in the MDT mitigated wetland study – 2007 sampling.

	CAMP CREEK MS-1	CAMP CREEK MS-2	KLEIN- SCHMIDT STREAM	CLOUD RANCH STREAM	JACK CREEK - MCKEE	WOODSON STREAM
E Richness	6	6	0	2	1	1
P Richness	0	0	0	2	0	0
T Richness	4	6	2	4	4	0
Pollution Sensitive Richness	3	4	0	1	0	0
Filterer Percent	4.85%	5.56%	7.14%	3.57%	2.83%	16.67%
Pollution Tolerant Percent	32.04%	34.26%	9.82%	14.29%	58.49%	8.33%
E Richness	3	3	0	1	0	0
P Richness	0	0	0	2	0	0
T Richness	2	3	1	2	2	0
Pollution Sensitive Richness	2	3	0	1	0	0
Filterer Percent	3	2	2	3	3	1
Pollution Tolerant Percent	1	1	2	1	0	2
Total score	11	12	5	10	5	3
Percent of maximum score	61.11%	66.67%	27.78%	55.56%	27.78%	16.67%
Impairment classification	slight	slight	moderate	slight	moderate	severe

LITERATURE CITED

- Bollman, W. 1998. Montana Valleys and Foothill Prairies Ecoregion. Master's Thesis. (M.S.) University of Montana. Missoula, Montana.
- Brandt, D. 2001. Temperature Preferences and Tolerances for 137 Common Idaho Macroinvertebrate Taxa. Report to the Idaho Department of Environmental Quality, Coeur d' Alene, Idaho.
- Bray, J. R. and J. T. Curtis. 1957. An ordination of upland forest communities of southern Wisconsin. Ecological Monographs 27: 325-349.
- Caton, L. W. 1991. Improving subsampling methods for the EPA's "Rapid Bioassessment" benthic protocols. Bulletin of the North American Benthological Society. 8(3): 317-319.
- 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: MDT07PBSJ
RAI No.: MDT07PBSJ015

RAI No.: MDT07PBSJ015

Sta. Name: Ridgeway

Client ID:

Date Coll.: 7/17/2007

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Hyalellidae							
<i>Hyalella</i> sp.	2	10.00%	Yes	Unknown		8	CG
Pisidiidae							
Pisidiidae	1	5.00%	Yes	Unknown		8	CG
Ephemeroptera							
Baetidae							
<i>Callibaetis</i> sp.	1	5.00%	Yes	Larva		9	CG
Caenidae							
<i>Caenis</i> sp.	6	30.00%	Yes	Larva		7	CG
Heteroptera							
Notonectidae							
<i>Notonecta</i> sp.	1	5.00%	Yes	Adult		5	PR
Coleoptera							
Halplidae							
<i>Halplus</i> sp.	1	5.00%	Yes	Larva		5	PH
<i>Peltodytes</i> sp.	1	5.00%	Yes	Larva		5	SH
Diptera							
Ceratopogonidae							
Ceratopogoninae	1	5.00%	Yes	Larva		6	PR
Chironomidae							
Chironomidae							
<i>Apedilum</i> sp.	1	5.00%	Yes	Larva		11	CG
<i>Cricotopus (Isocladius)</i> sp.	1	5.00%	Yes	Larva		7	SH
<i>Dicrotendipes</i> sp.	2	10.00%	Yes	Larva		8	CG
<i>Endochironomus</i> sp.	1	5.00%	Yes	Larva		10	SH
<i>Paratanytarsus</i> sp.	1	5.00%	Yes	Larva		6	CG
	Sample Count	20					

Metrics Report

Project ID: MDT07PBSJ
 RAI No.: MDT07PBSJ015
 Sta. Name: Ridgeway
 Client ID:
 STORET ID:
 Coll. Date: 7/17/2007

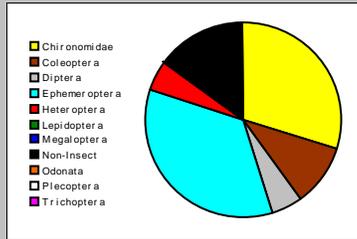
Abundance Measures

Sample Count: 20
 Sample Abundance: 20.00 100.00% of sample used

Coll. Procedure:
 Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	2	3	15.00%
Odonata			
Ephemeroptera	2	7	35.00%
Plecoptera			
Heteroptera	1	1	5.00%
Megaloptera			
Trichoptera			
Lepidoptera			
Coleoptera	2	2	10.00%
Diptera	1	1	5.00%
Chironomidae	5	6	30.00%

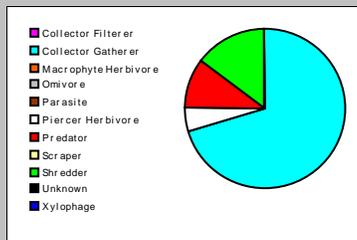


Dominant Taxa

Category	A	PRA
Caenis	6	30.00%
Hyalella	2	10.00%
Dicrotendipes	2	10.00%
Pisidiidae	1	5.00%
Peltodytes	1	5.00%
Paratanytarsus	1	5.00%
Notonecta	1	5.00%
Halipus	1	5.00%
Endochironomus	1	5.00%
Cricotopus (Isocladius)	1	5.00%
Ceratopogoninae	1	5.00%
Callibaetis	1	5.00%
Apedilum	1	5.00%

Functional Composition

Category	R	A	PRA
Predator	2	2	10.00%
Parasite			
Collector Gatherer	7	14	70.00%
Collector Filterer			
Macrophyte Herbivore			
Piercer Herbivore	1	1	5.00%
Xylophage			
Scraper			
Shredder	3	3	15.00%
Omnivore			
Unknown			

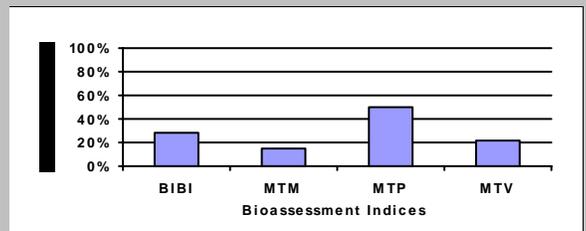


Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
<i>Composition</i>					
Taxa Richness	13	1	1		0
Non-Insect Percent	15.00%				
E Richness	2	1		1	
P Richness	0	1		0	
T Richness	0	1		0	
EPT Richness	2		0		0
EPT Percent	35.00%		2		0
Oligochaeta+Hirudinea Percent					
Baetidae/Ephemeroptera	0.143				
Hydropsychidae/Trichoptera	0.000				
<i>Dominance</i>					
Dominant Taxon Percent	30.00%		2		2
Dominant Taxa (2) Percent	40.00%				
Dominant Taxa (3) Percent	50.00%	3			
Dominant Taxa (10) Percent	85.00%				
<i>Diversity</i>					
Shannon H (log)	2.320				
Shannon H (log2)	3.346		3		
Margalef D	4.006				
Simpson D	0.089				
Evenness	0.089				
<i>Function</i>					
Predator Richness	2		0		
Predator Percent	10.00%	3			
Filterer Richness	0				
Filterer Percent	0.00%			3	
Collector Percent	70.00%		2		1
Scraper+Shredder Percent	15.00%		2		0
Scraper/Filterer	0.000				
Scraper/Scraper+Filterer	0.000				
<i>Habit</i>					
Burrower Richness	2				
Burrower Percent	15.00%				
Swimmer Richness	4				
Swimmer Percent	20.00%				
Clinger Richness	1	1			
Clinger Percent	5.00%				
<i>Characteristics</i>					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	4				
Hemoglobin Bearer Percent	25.00%				
Air Breather Richness	0				
Air Breather Percent	0.00%				
<i>Voltinism</i>					
Univoltine Richness	5				
Semivoltine Richness	2	1			
Multivoltine Percent	35.00%		3		
<i>Tolerance</i>					
Sediment Tolerant Richness	0				
Sediment Tolerant Percent	0.00%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	3.313				
Pollution Sensitive Richness	0	1			0
Pollution Tolerant Percent	60.00%	1			0
Hilsenhoff Biotic Index	7.105		0		0
Intolerant Percent	0.00%				
Supertolerant Percent	35.00%				
CTQa	94.000				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	14	28.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	15	50.00%	Moderate
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	4	22.22%	Moderate
MTM	Montana DEQ Mountains (Bukantis 1998)	3	14.29%	Severe

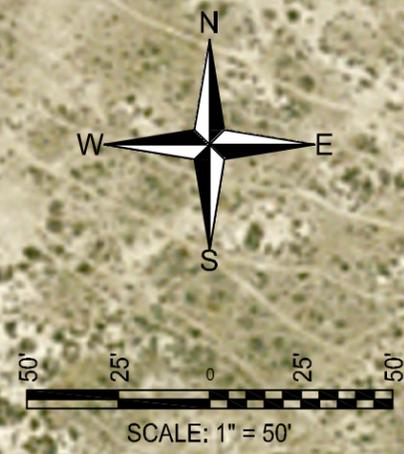


Appendix G

**WETLANDS 1 - 8 AND 10 - 16:
2007 FIGURES 2 & 3**

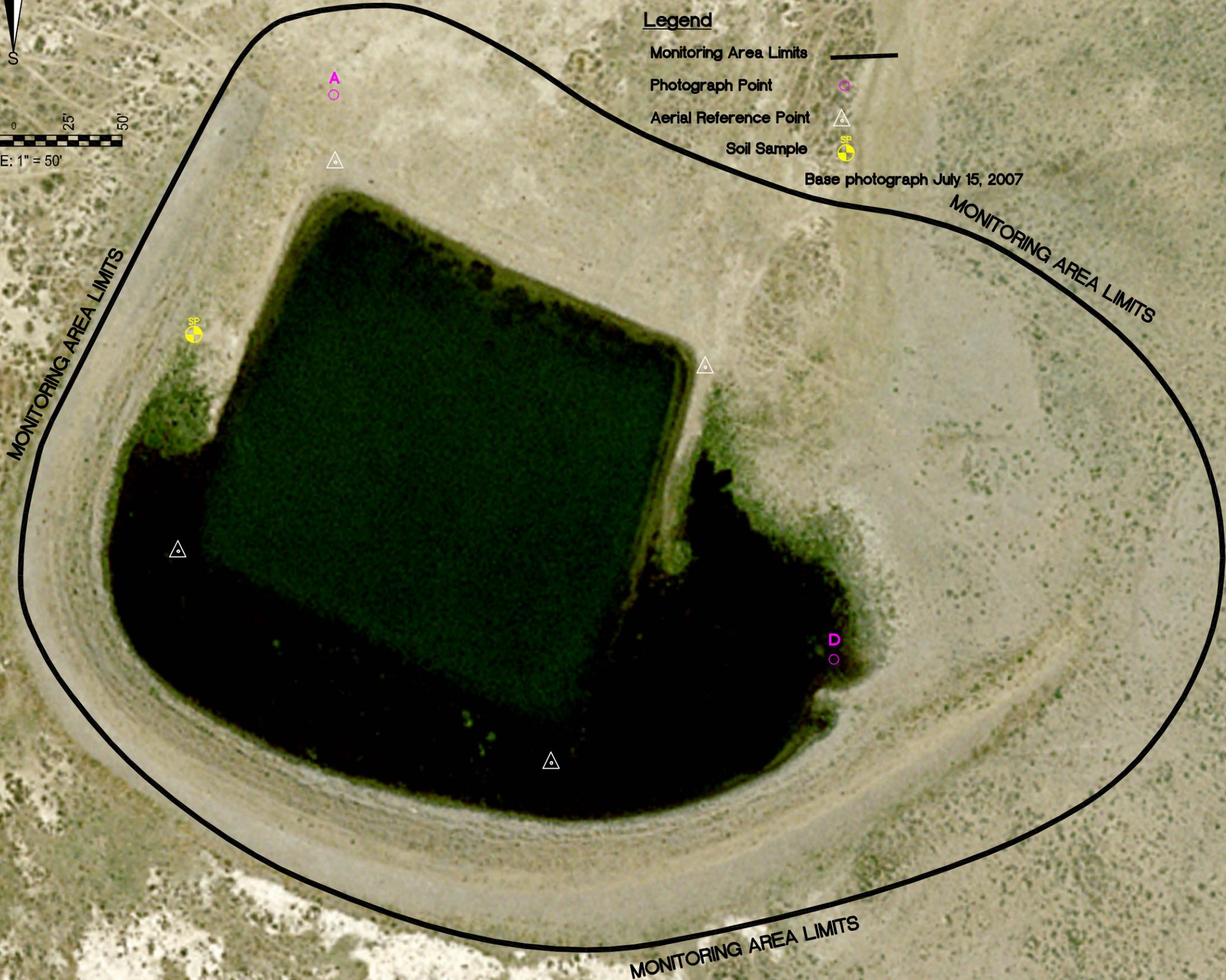
*MDT Wetland Mitigation Monitoring
Ridgeway Wetland Complex
Ekalaka, Montana*

Figure 2 Monitoring Activity Locations 2007



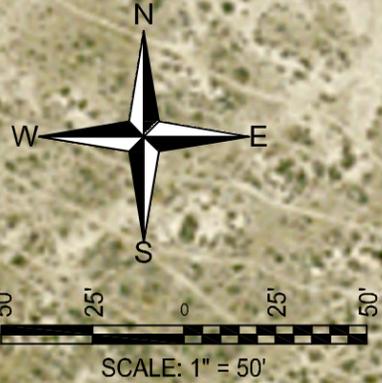
- Legend**
- Monitoring Area Limits ———
 - Photograph Point ○
 - Aerial Reference Point △
 - Soil Sample ○ SP

Base photograph July 15, 2007



PROJECT NAME		MDT RIDGEWAY COMPLEX W-1 WETLAND MITIGATION	
DRAWING TITLE		MONITORING ACTIVITY LOCATIONS 2007	
PROJ NO:	B43088.00 0412W1	DRAWN:	SH/JR
LOCATION:	RIDGEWAY COMPLEX W-1	PROJ MGR:	J. BERGLUND
SCALE:	1" = 50'	CHECKED:	LB
FILE NAME:	2007 W01BASE.dwg	APPVD:	JB
			
3810 Valley Commons Drive Suite 4 Bozeman, MT 59718			
FIGURE		2 OF	
REV -		Oct/19/2007	

Figure 3 Mapped Site Features 2007



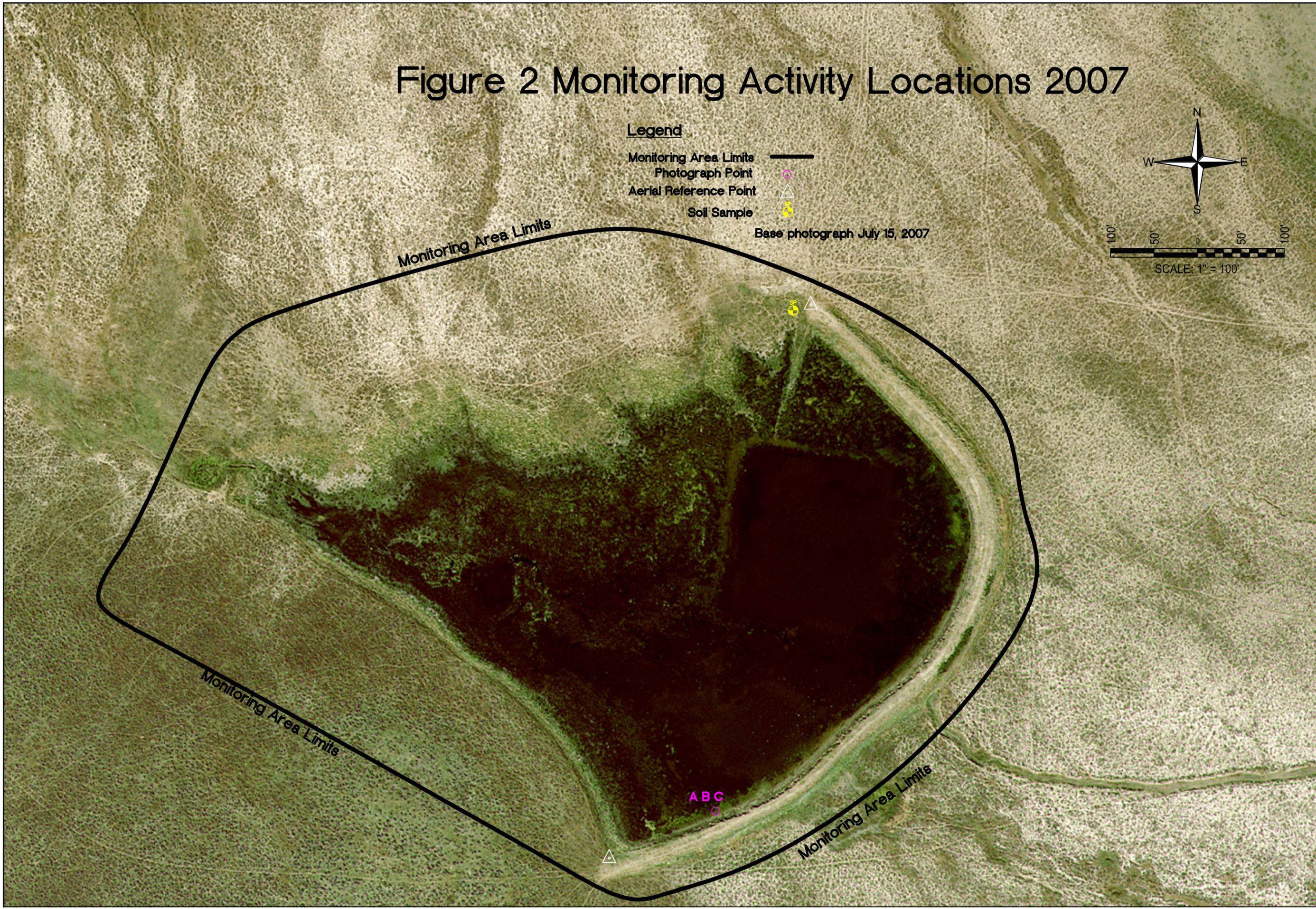
Legend
 Monitoring Area Limits ———
 Open Water Limits ———
 Wetland Limits ———
 Base photograph July 15, 2007

WETLAND AREAS
 Gross Wetland Area 1.87 Acres
 Open Water Area 0.56 Acres
 Net Wetland Area 1.31 Acres



		PROJECT NAME MDT RIDGEWAY COMPLEX W-1 WETLAND MITIGATION
3810 Valley Commons Drive Suite 4 Bozeman, MT 59718	PROJ NO: B43088.00 0412W1 LOCATION: RIDGEWAY CMPLX W-1 SCALE: 1" = 50' FILE NAME: 2007 W01BASE.dwg	DRAWING TITLE MAPPED SITE FEATURES 2007
DRAWN: SH/JR PROJ MGR: J. BERGLUND	CHECKED: LB APPVD: JB	
FIGURE 3 OF		
REV - Oct/19/2007		

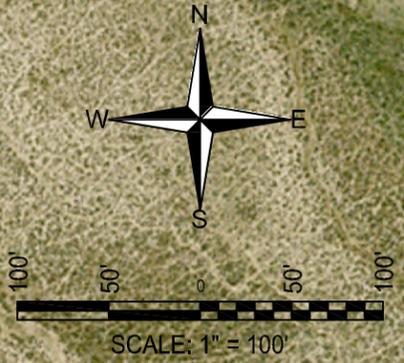
Figure 2 Monitoring Activity Locations 2007



Legend

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

Base photograph July 15, 2007

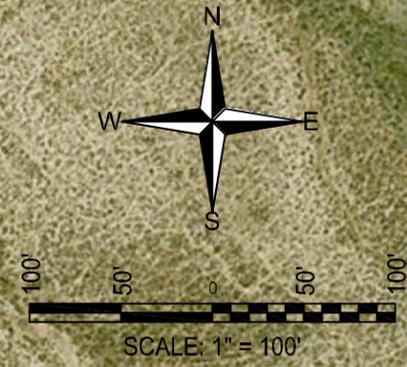


PROJECT NAME		MDT RIDGEWAY COMPLEX W-2 WETLAND MITIGATION	
DRAWING TITLE		MONITORING ACTIVITY LOCATIONS 2007	
PROJ NO:	B43088.00 0412W2	DRAWN:	SH/JR
LOCATION:	RIDGEWAY COMPLEX W-2	PROJ MGR:	J. BERGLUND
SCALE:	1" = 100'	CHECKED:	LB
FILE NAME:	2007 W02BASE.dwg	APPVD:	JB
3810 Valley Commons Drive Suite 4 Bozeman, MT 59718			
FIGURE		2 OF 2	
REV -	Oct/19/2007		

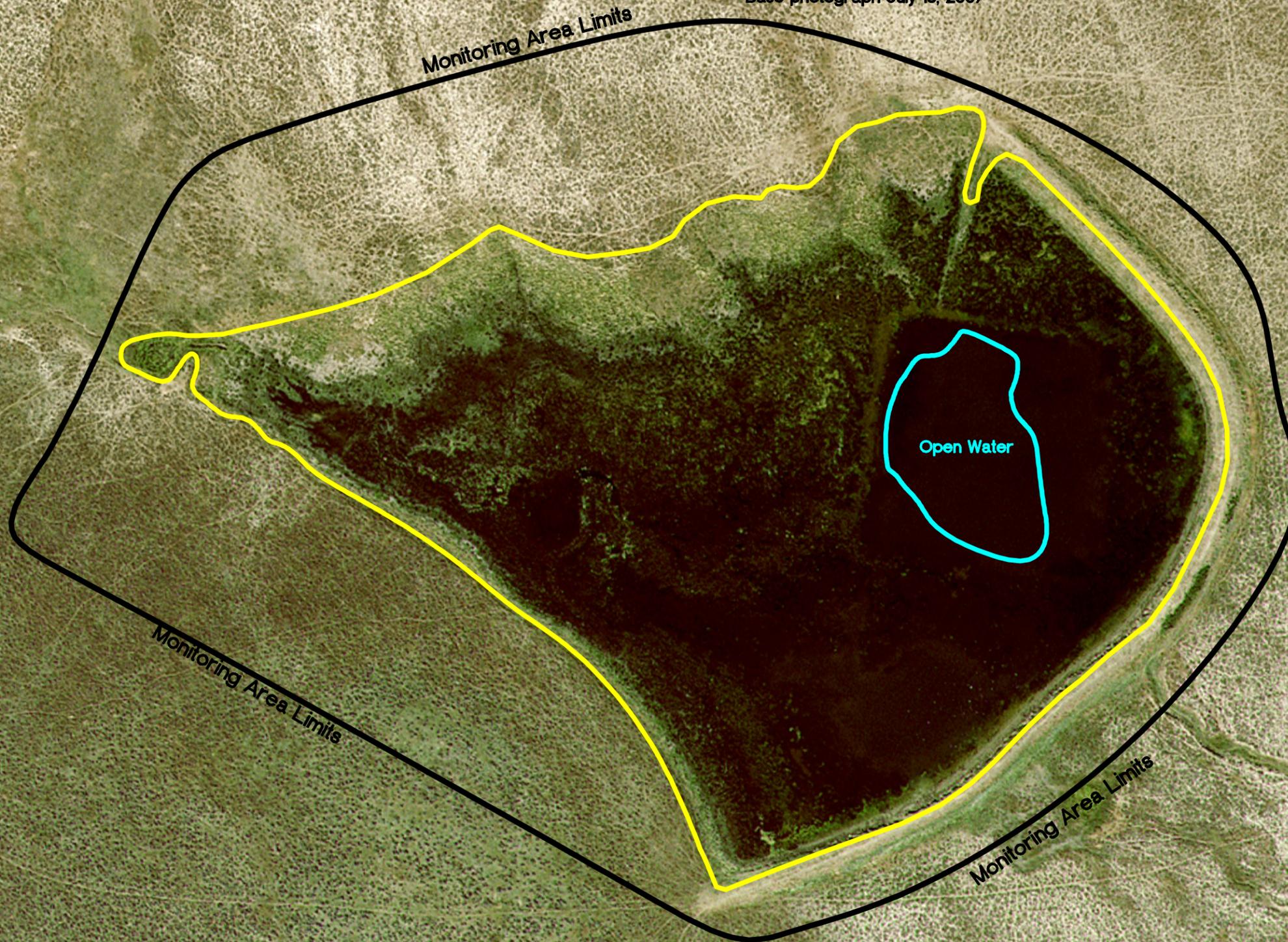
Figure 3 Mapped Site Features 2007

Legend

- Monitoring Area Limits 
- Open Water Limits 
- Wetland Limits 
- Base photograph July 15, 2007

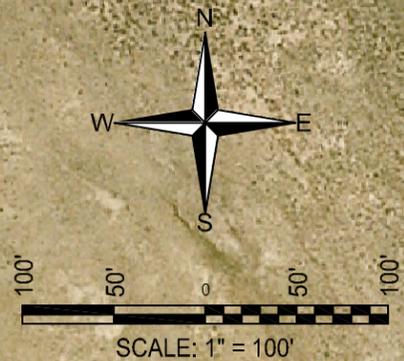


WETLAND AREAS
 Gross Wetland Area = 7.18 Acres
 Open Water Area = 0.42 Acres
 Net Wetland Area = 6.76 Acres



PROJECT NAME MDT RIDGEWAY COMPLEX W-2 WETLAND MITIGATION	
DRAWING TITLE MAPPED SITE FEATURES 2007	
PROJ NO: B43088.00 0412W2	DRAWN: SH/JR
LOCATION: RIDGEWAY COMPLEX W-2	PROJ MGR: J. BERGLUND
SCALE: 1" = 100'	CHECKED: LB / APPVD: JB
FILE NAME: 2007 W02BASE.dwg	
3810 Valley Commons Drive Suite 4 Bozeman, MT 59718	
	
FIGURE 3 OF	
REV - Oct/19/2007	

Figure 2 Monitoring Activity Locations 2007



Legend

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

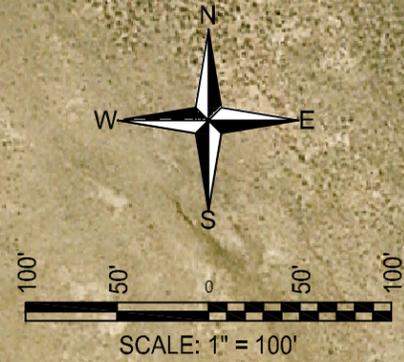
Base photograph July 15, 2007



<p>PROJECT NAME MDT RIDGEWAY COMPLEX W-3 WETLAND MITIGATION</p> <p>DRAWING TITLE MONITORING ACTIVITY LOCATIONS 2007</p>	<p>PROJ NO: B43088.00 0412W3</p> <p>LOCATION: RIDGEWAY CMPLX W-3</p> <p>SCALE: 1" = 100'</p> <p>FILE NAME: 2007 W03BASE.dwg</p>	<p>DRAWN: SH/JR</p> <p>PROJ MGR: J. BERGLUND</p> <p>CHECKED: LB</p> <p>APPVD: JB</p>	<p>FIGURE 2 OF</p> <p>REV -</p> <p>Oct/19/2007</p>
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Figure 3 Mapped Site Features 2007

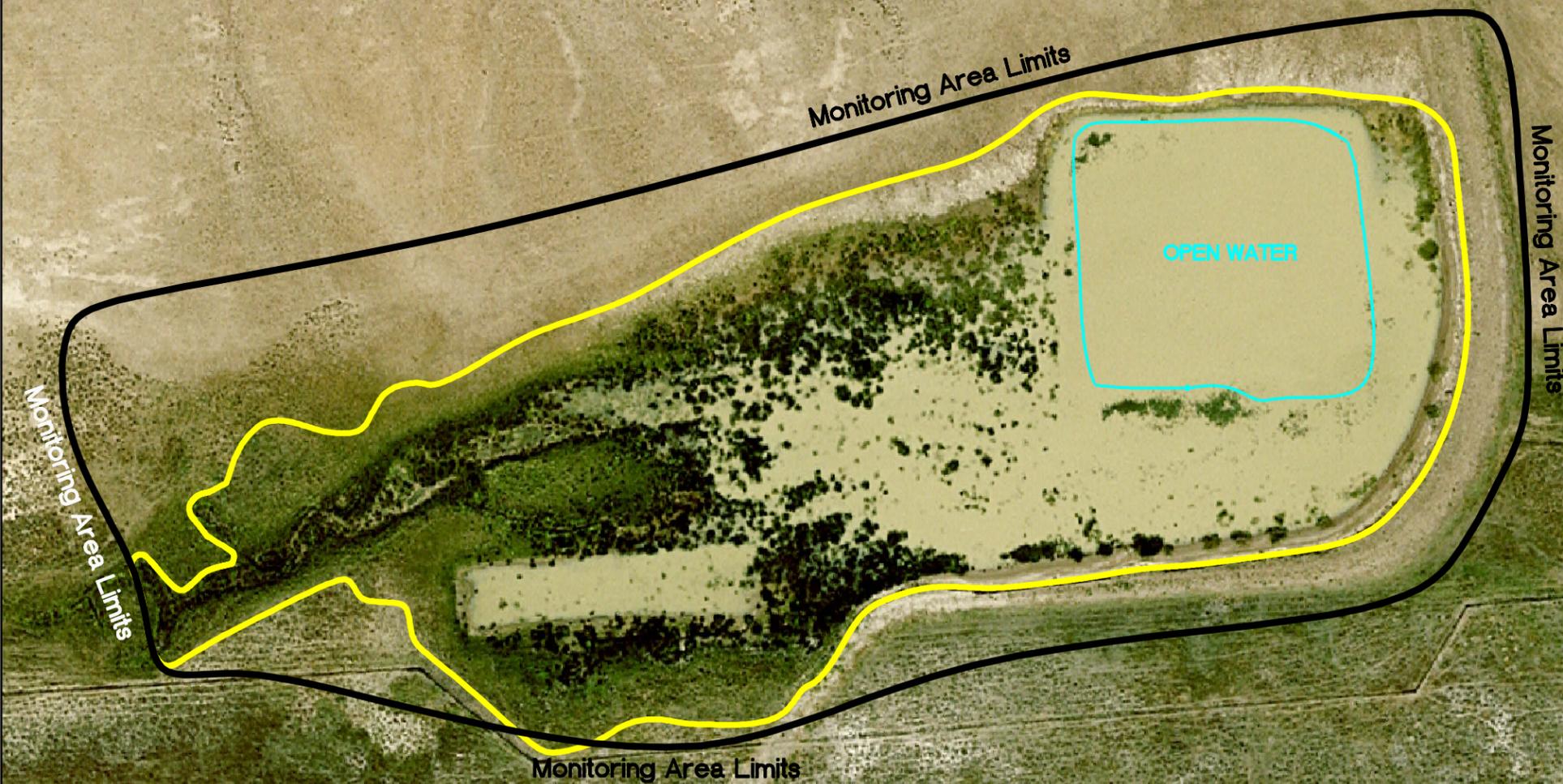


WETLAND AREAS (emergent)
 Gross Wetland Area = 5.16 Acres
 Open Water Area = 0.80 Acres
 Net Wetland Area = 4.36 Acres

Legend

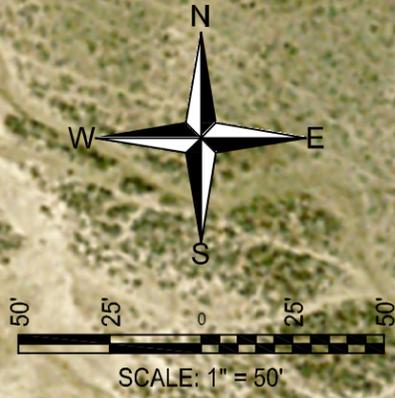
Monitoring Area Limits 
 Wetland Limits (emergent) 
 Open Water Limits 

Base photograph July 15, 2007



 3810 Valley Commons Drive Suite 4 Bozeman, MT 59718	PROJ NO: B43088.00 0412W3 LOCATION: RIDGEWAY CMPLX W-3 SCALE: 1" = 100' FILE NAME: 2007 W03BASE.dwg	DRAWN: SH/JR PROJ MGR: J. BERGLUND CHECKED: LB APPVD: JB	PROJECT NAME MDT RIDGEWAY COMPLEX W-3 WETLAND MITIGATION DRAWING TITLE MAPPED SITE FEATURES 2007
	FIGURE 3 OF REV - Nov/08/2007		

Figure 2 Monitoring Activity Locations 2007



Legend

- Monitoring Area Limits
- Photograph Point
- Aerial Reference Point
- Soil Sample
- Base photograph July 15, 2007



PROJ NO: B43088.00 0412W4 DRAWN: SH/JR

LOCATION: RIDGEWAY CMPLX W-4 PROJ MGR: J. BERGLUND

SCALE: 1" = 50' CHECKED: LB APPVD: JB

FILE NAME: 2007 W04BASE.dwg

PROJECT NAME
MDT RIDGEWAY COMPLEX W-4 WETLAND MITIGATION

DRAWING TITLE
MONITORING ACTIVITY LOCATIONS 2007

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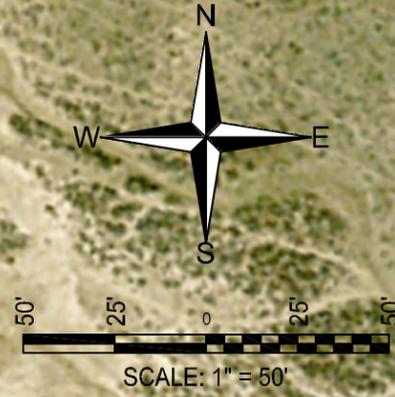


FIGURE

2 OF

REV -
Nov/08/2007

Figure 3 Mapped Site Features 2007



Legend

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

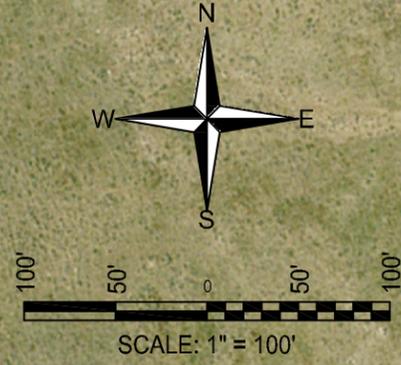
WETLAND AREA (emergent)
 Gross Wetland Area - 1.22 Acres
 Open Water Area - 0.40 Acres
 Net Wetland Area - 0.82 Acres

Base photograph July 15, 2007



		FIGURE 3 OF REV - Nov/08/2007
3810 Valley Commons Drive Suite 4 Bozeman, MT 59718	PROJ NO: B43088.00 0412W4 LOCATION: RIDGEWAY CMPLX W-4 SCALE: 1" = 50' FILE NAME: 2007 W04BASE.dwg	DRAWN: SH/JR PROJ MGR: J. BERGLUND CHECKED: LB APPVD: JB
PROJECT NAME MDT RIDGEWAY COMPLEX W-4 WETLAND MITIGATION		DRAWING TITLE MAPPED SITE FEATURES 2007

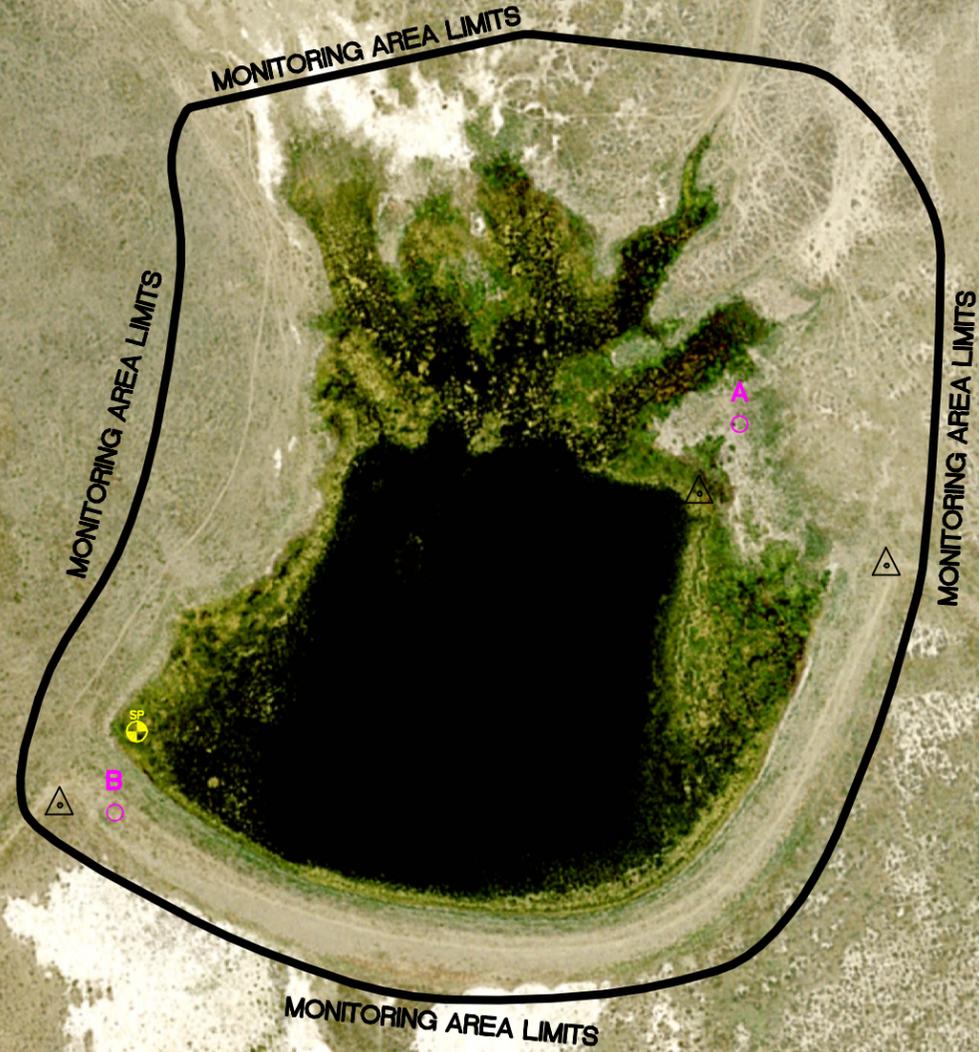
Figure 2 Monitoring Activity Locations 2007



Legend

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

Base photograph July 15, 2007



PROJ NO: B43088.00 0412W5 DRAWN: SH/JR

LOCATION: RIDGEWAY CMPLX W-5 PROJ MGR: J. BERGLUND

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

FILE NAME: 2007 W05BASE.dwg

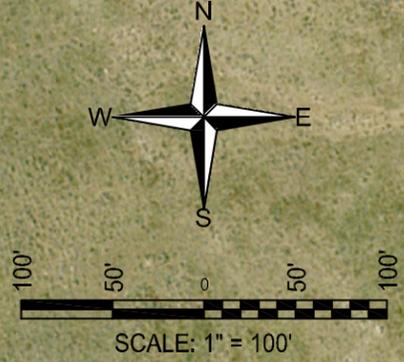
PROJECT NAME
MDT RIDGEWAY COMPLEX W-5 WETLAND MITIGATION

DRAWING TITLE
MONITORING ACTIVITY LOCATIONS 2007

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Figure 3 Mapped Site Features 2007

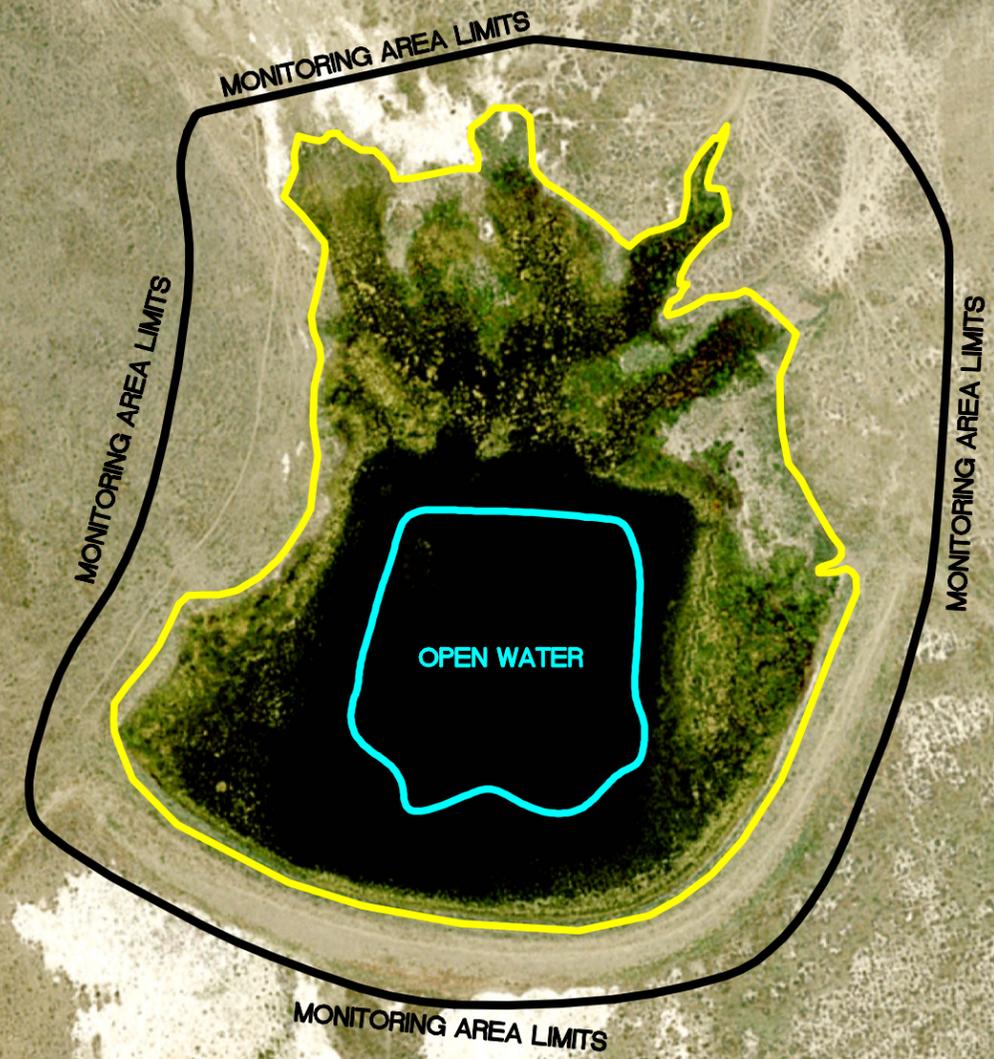


Legend

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

- WETLAND AREAS (emergent)**
- Gross Wetland Area - 2.69 Acres
 - Open Water Area - 0.51 Acres
 - Net Wetland Area - 2.18 Acres

Base photograph July 15, 2007



	3810 Valley Commons Drive Suite 4 Bozeman, MT 59718		PROJ NO: B43088.00 0412W5 LOCATION: RIDGEWAY CMPLX W-5 SCALE: 1" = 100' FILE NAME: 2007 W05BASE.dwg	DRAWN: SH/JR PROJ MGR: J. BERGLUND CHECKED: LB APPVD: JB	PROJECT NAME MDT RIDGEWAY COMPLEX W-5 WETLAND MITIGATION
	FIGURE <h1 style="font-size: 2em; margin: 0;">3</h1> OF		DRAWING TITLE MAPPED SITE FEATURES 2007		REV - Oct/19/2007

Figure 2 Monitoring Activity Locations 2007



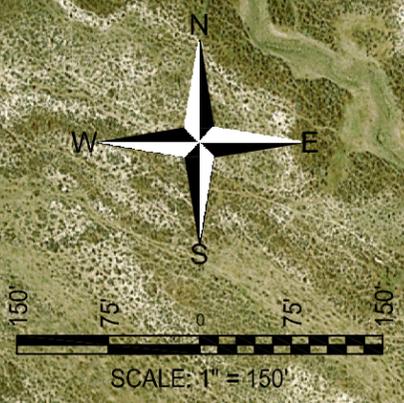
- Legend**
- Monitoring Area Limits ———
 - Photograph Point
 - Aerial Reference Point
 - Soil Sample
- Base photograph July 15, 2007



PROJECT NAME		MDT RIDGEWAY COMPLEX W-6 WETLAND MITIGATION	
DRAWING TITLE		MONITORING ACTIVITY LOCATIONS 2007	
PROJ NO:	B43088.00 0412W6	DRAWN:	SH/JR
LOCATION:	RIDGEWAY CMPLX W-6	PROJ MGR:	J. BERGLUND
SCALE:	1" = 150'	CHECKED:	LB
FILE NAME:	2007 W06BASE.dwg	APPVD:	JB
3810 Valley Commons Drive Suite 4 Bozeman, MT 59718			
FIGURE		2 OF 2	
REV -		Oct/09/2007	



Figure 3 Mapped Site Features 2007



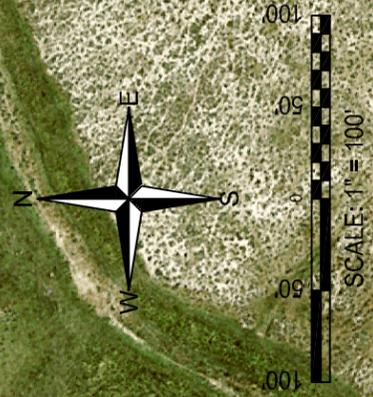
Legend
 Monitoring Area Limits ———
 Emergent Wetland Limits ———
 Base photograph July 15, 2007

WETLAND AREA (emergent)
 Gross Wetland Area -7.34 Acres
 Open Water Area -0.00 Acres
 Net Wetland Area -7.34 Acres



 3810 Valley Commons Drive Suite 4 Bozeman, MT 59718	PROJ NO: B43088.00 0412W6 LOCATION: RIDGEWAY CMPLX W-6 SCALE: 1" = 150' FILE NAME: 2007 W06BASE.dwg	DRAWN: SH/JR PROJ MGR: J. BERGLUND CHECKED: LB APPVD: JB	PROJECT NAME MDT RIDGEWAY COMPLEX W-6 WETLAND MITIGATION DRAWING TITLE MAPPED SITE FEATURES 2007
	FIGURE 3 OF REV - Oct/23/2007		

Figure 2 Monitoring Activity Locations 2007

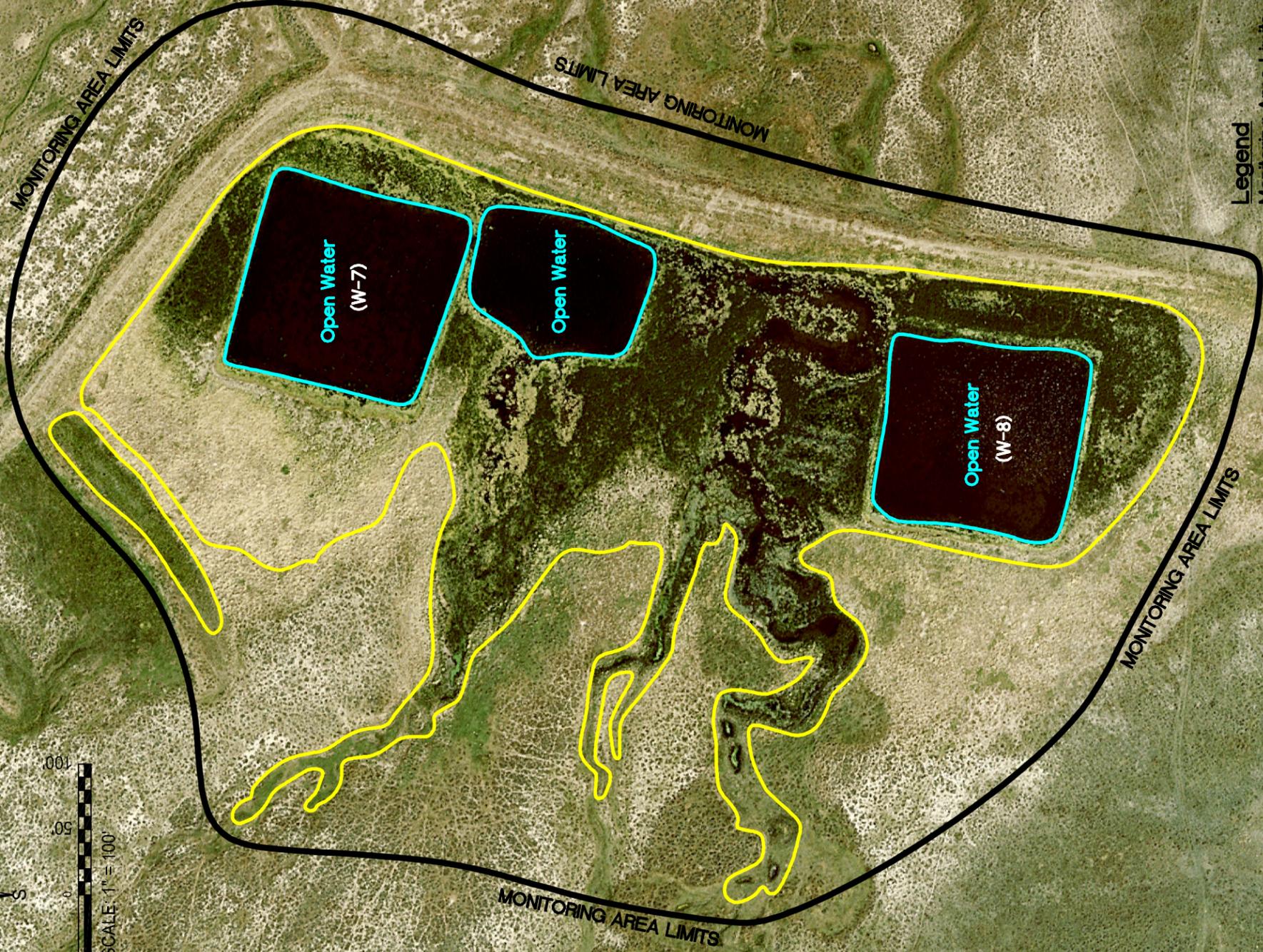
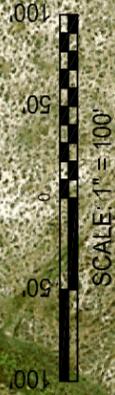
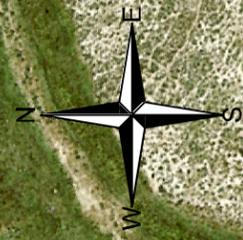


- Legend**
- Monitoring Area Limits
 - Photograph Point
 - Aerial Reference Point
 - Soil Sample

Base photograph July 15, 2007

	PROJECT NAME MDT RIDGEWAY COMPLEX W-7/W-8 WETLAND MITIGATION	
	PROJ NO: B43088.00 0412W7/8	DRAWN: SH/JR
	LOCATION: RIDGEWAY CMPLX W7/8	PROJ MGR: J. BERGLUND
	SCALE: 1" = 100'	CHECKED: LB APPVD: JB
3810 Valley Commons Drive Suite 4 Bozeman, MT 59718		DRAWING TITLE MONITORING ACTIVITY LOCATIONS 2007
FIGURE 2 OF	REV - Nov/20/2007	FILE NAME: 2007 W0708BASE.dwg

Figure 3 Mapped Site Features 2007

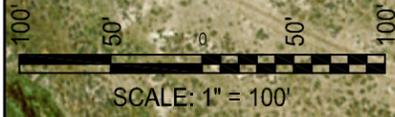
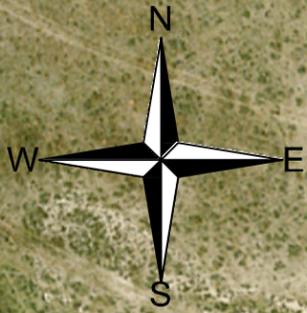


Legend

- Monitoring Area Limits
 - Wetland Limits
 - Open Water Limits
 - Gross Wetland Area
 - Open Water Area
 - Net Wetland Area (W-7 + W-8)
- 5.17 Acres
132 Acres
3.85 Acres

Base photograph July 15, 2007

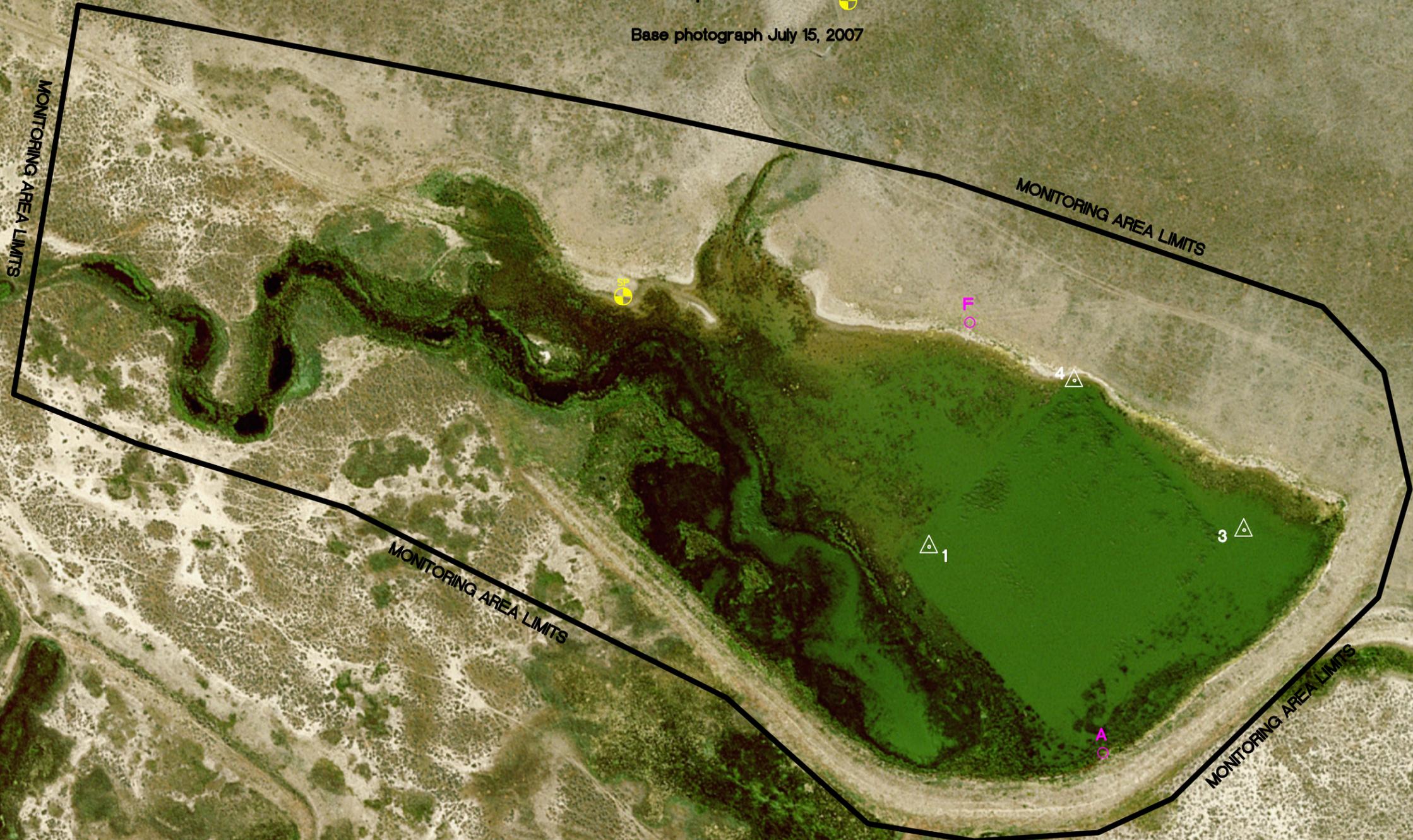
Figure 2 Monitoring Activity Locations 2007



Legend

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

Base photograph July 15, 2007



PROJECT NAME: MDT RIDGEWAY COMPLEX W-10 WETLAND MITIGATION
 DRAWING TITLE: MONITORING ACTIVITY LOCATIONS 2007

PROJ NO: B43088.00 0412W10 DRAWN: SH/JR

LOCATION: RIDGEWAY COMPLEX W-10 PROJ MGR: J. BERGLUND

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

FILE NAME: 2007 W10BASE.dwg

3810 Valley Commons Drive
 Suite 4
 Bozeman, MT 59718

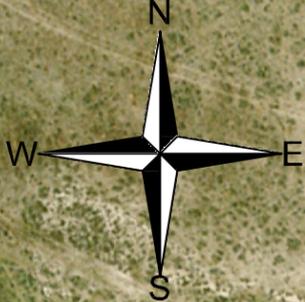


FIGURE

2 OF

REV -
 Nov/08/2007

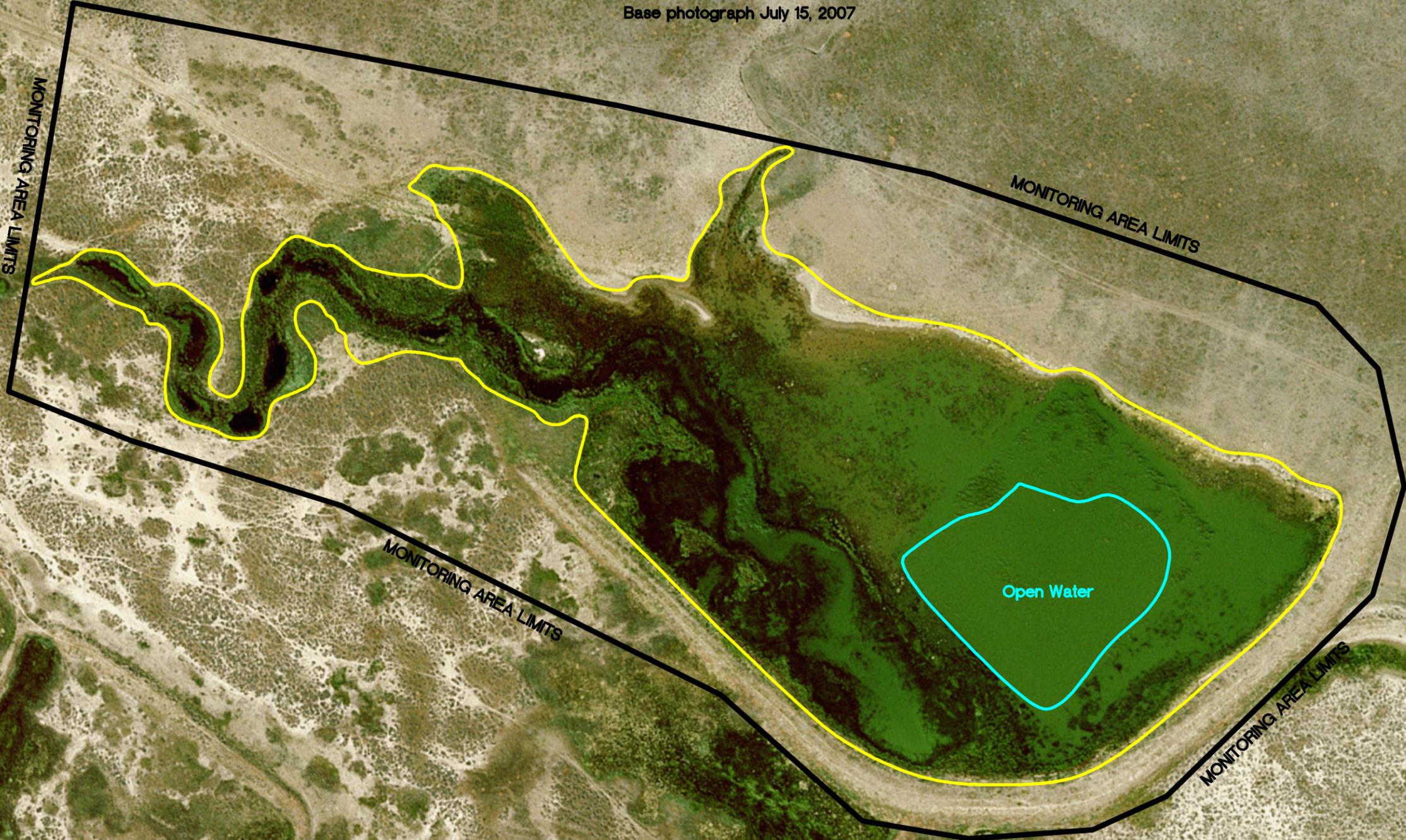
Figure 3 Mapped Site Features 2007



- Legend**
- Monitoring Area Limits
 - Open Water
 - Vegetation

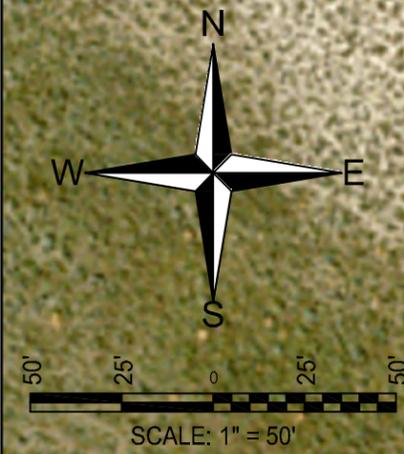
Base photograph July 15, 2007

Wetland Area	
Gross Wetland Area	5.54 Acres
Open Water Area	0.64 Acres
Net Wetland Area	4.90 Acres



	3810 Valley Commons Drive Suite 4 Bozeman, MT 59718	PROJ NO: B43088.00 0412W10	DRAWN: SH/JR	PROJECT NAME MDT RIDGEWAY COMPLEX W-10 WETLAND MITIGATION
	FIGURE 3 OF	LOCATION: RIDGEWAY COMPLEX W-10	PROJ MGR: J. BERGLUND	DRAWING TITLE MAPPED SITE FEATURES 2007
REV -	SCALE: 1" = 100'	CHECKED: LB	APPVD: JB	FILE NAME: 2007 W10BASE.dwg
Nov/08/2007				

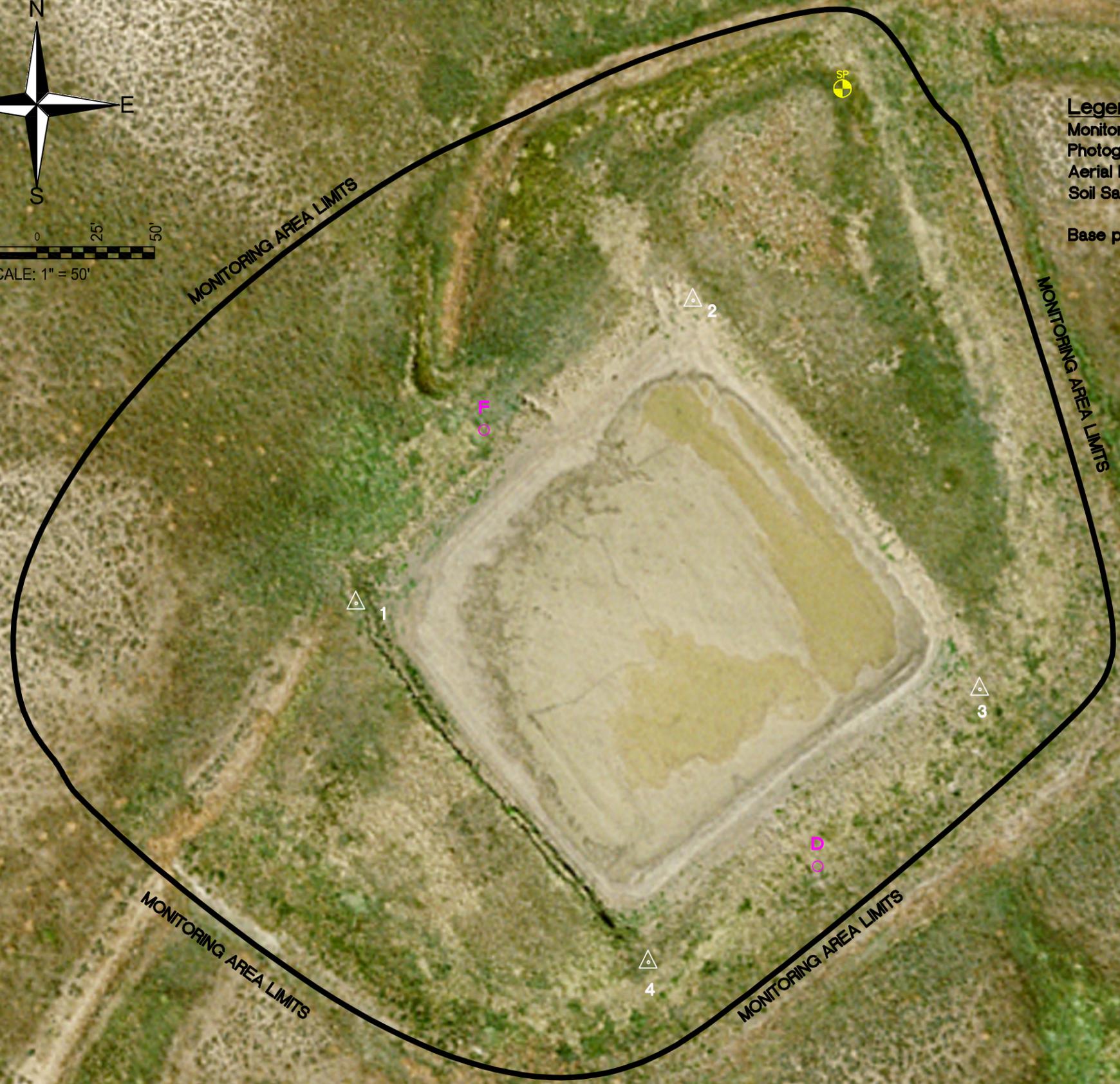
Figure 2 Monitoring Activity Locations 2007



Legend

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

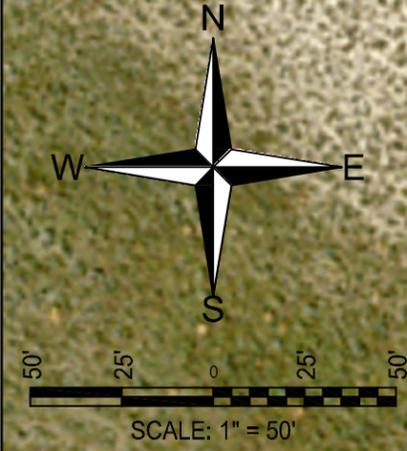
Base photograph July 15, 2007



PROJECT NAME MDT RIDGEWAY COMPLEX W-11 WETLAND MITIGATION	DRAWING TITLE MONITORING ACTIVITY LOCATIONS 2007	PROJ NO: B43088.00 0412W11 LOCATION: RIDGEWAY COMPLEX W-11 SCALE: 1" = 50' FILE NAME: 2007 W11BASE.dwg	DRAWN: SH/JR PROJ MGR: J. BERGLUND CHECKED: LB APPVD: JB
FIGURE 2 OF		REV - Oct/24/2007	

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Figure 3 Mapped Site Features 2007



MONITORING AREA LIMITS

- Legend**
- Monitoring Area Limits
 - Emergent Wetland Limits
 - Open Water Limits

Base photograph July 15, 2007

MONITORING AREA LIMITS

MONITORING AREA LIMITS

MONITORING AREA LIMITS

WETLAND AREAS	
Gross Wetland Area	0.16 Acres
Open Water Area	0.00 Acres
Net Wetland Area	0.16 Acres

(2' Deep Water)

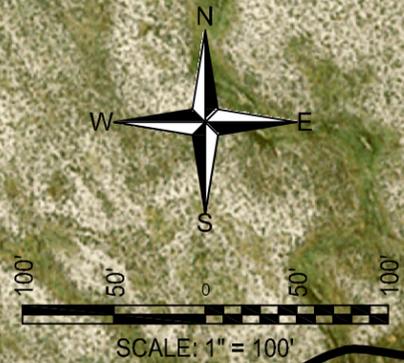
PROJ NO: B43088.00 0412W11	DRAWN: SH/JR
LOCATION: RIDGEWAY COMPLEX W-11	PROJ MGR: J. BERGLUND
SCALE: 1" = 50'	CHECKED: LB
FILE NAME: 2007 W11BASE.dwg	APPVD: JB

PROJECT NAME	MDT RIDGEWAY COMPLEX W-11 WETLAND MITIGATION
DRAWING TITLE	MAPPED SITE FEATURES 2007

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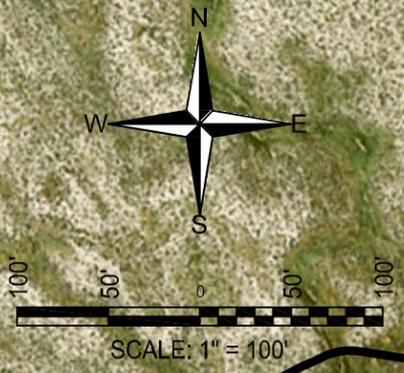
Figure 2 Monitoring Activity Locations 2007



Legend
 Monitoring Area Limits —————
 Photograph Point (pink circle with P)
 Aerial Reference Point (triangle with number)
 Soil Sample (yellow circle with G, pink circle with A)
 Base photograph July 15, 2007

 3810 Valley Commons Drive Suite 4 Bozeman, MT 59718	PROJ NO: B43088.00 0412W12 LOCATION: RIDGEWAY COMPLEX W-12 SCALE: 1" = 100' FILE NAME: 2007 W12BASE.dwg	DRAWN: SH/JR PROJ MGR: J. BERGLUND CHECKED: LB APPVD: JB	PROJECT NAME MDT RIDGEWAY COMPLEX W-12 WETLAND MITIGATION
	DRAWING TITLE MONITORING ACTIVITY LOCATIONS 2007		

Figure 3 Mapped Site Features 2007



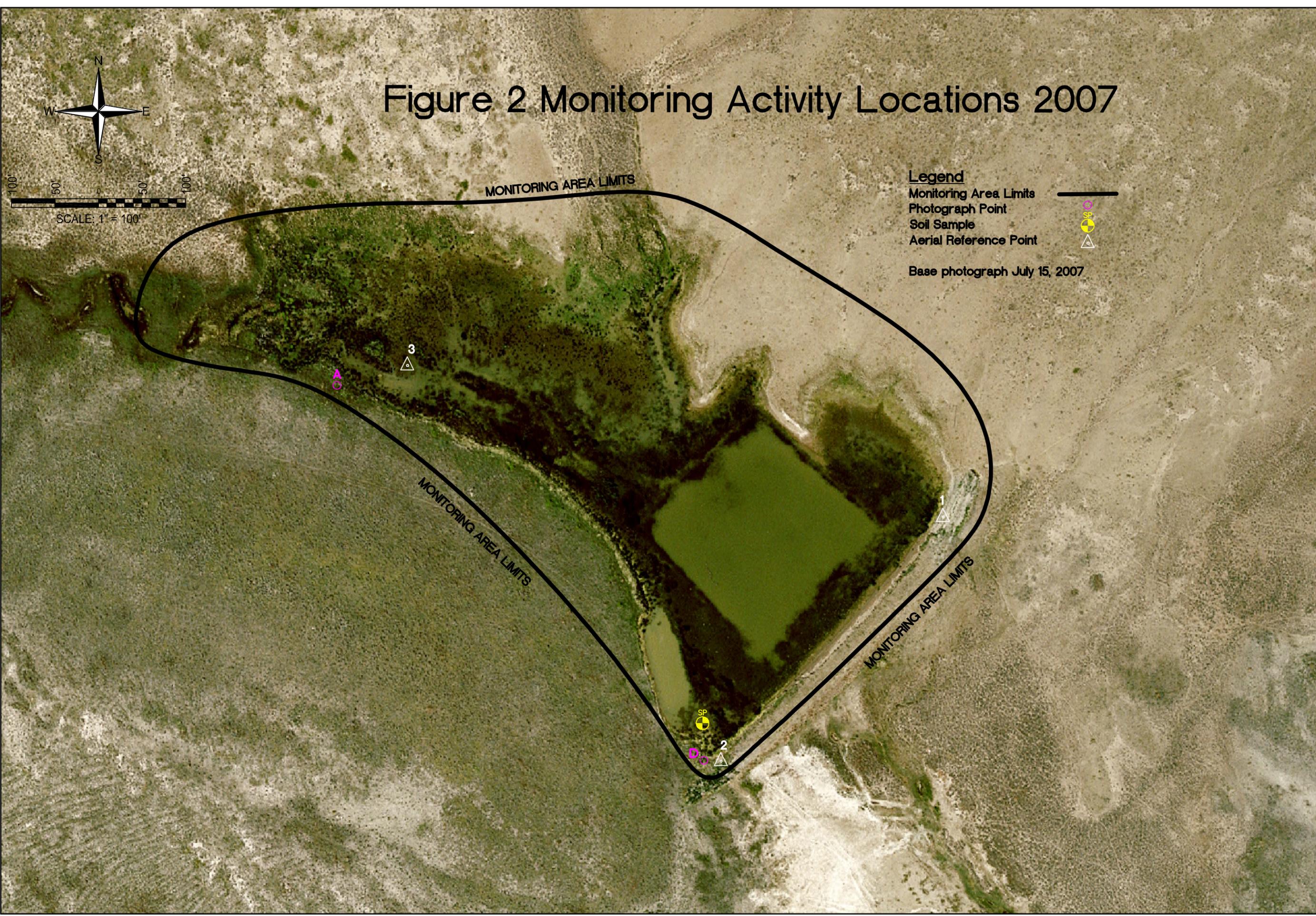
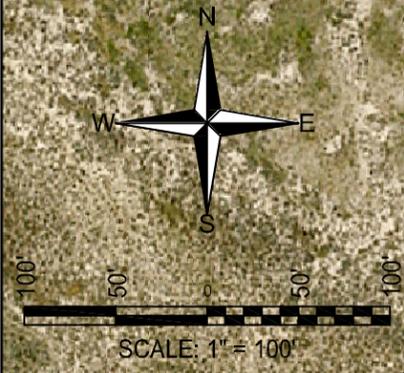
- Legend**
- Monitoring Area Limits
 - Emergent Wetland Limits
 - Open Water Limits

Base photograph July 15, 2007

WETLAND AREAS (emergent)
 Gross Wetland Area 5.51 Acres
 Open Water Area 0.65 Acres
 Net Wetland Area 4.86 Acres

	3810 Valley Commons Drive Suite 4 Bozeman, MT 59718	PROJ NO: B43088.00 0412W12	DRAWN: SH/JR	PROJECT NAME MDT RIDGEWAY COMPLEX W-12 WETLAND MITIGATION
	FIGURE 3 OF REV - Nov/08/2007	LOCATION: RIDGEWAY COMPLEX W-12	PROJ MGR: J. BERGLUND	DRAWING TITLE MAPPED SITE FEATURES 2007
	SCALE: 1" = 100'	CHECKED: LB	APPVD: JB	
	FILE NAME: 2007 W12BASE.dwg			

Figure 2 Monitoring Activity Locations 2007



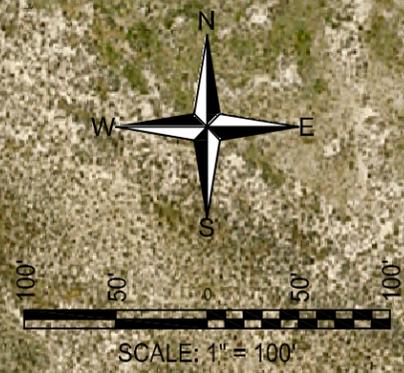
Legend

- Monitoring Area Limits
- Photograph Point
- Soil Sample S
- Aerial Reference Point 3

Base photograph July 15, 2007

	3810 Valley Commons Drive Suite 4 Bozeman, MT 59718	PROJ NO: B43088.00 0412W13 LOCATION: RIDGEWAY CMLPX W-13 SCALE: 1" = 100' FILE NAME: 2007 W13BASE.dwg	DRAWN: SH/JR PROJ MGR: J. BERGLUND CHECKED: LB APPVD: JB
FIGURE 2 OF		PROJECT NAME MDT RIDGEWAY COMPLEX W-13 WETLAND MITIGATION	
REV - Nov/08/2007		DRAWING TITLE MONITORING ACTIVITY LOCATIONS 2007	

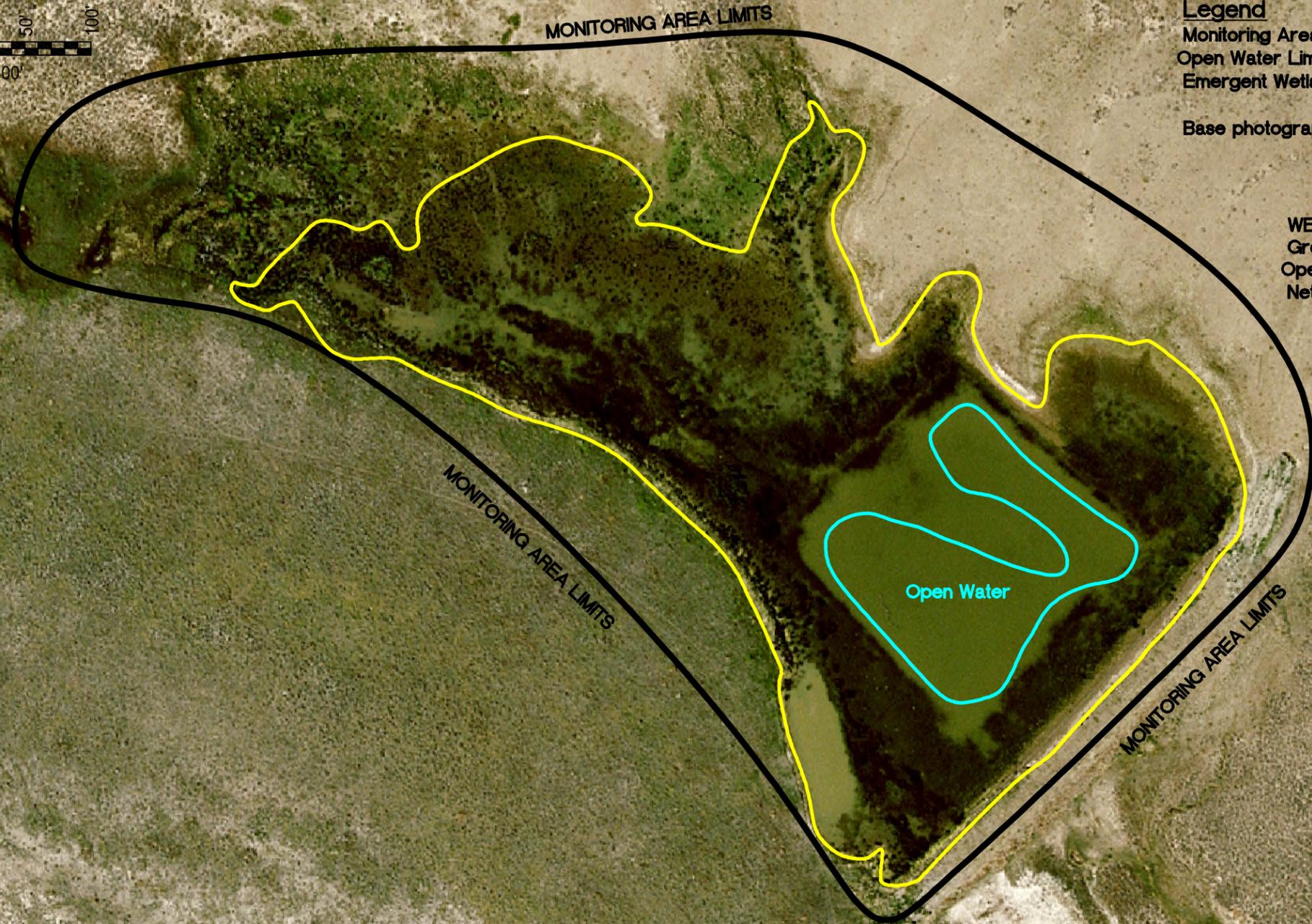
Figure 3 Mapped Site Features 2007



- Legend**
- Monitoring Area Limits ——
 - Open Water Limits ——
 - Emergent Wetland Limits ——

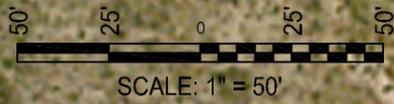
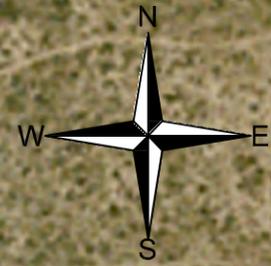
Base photograph July 15, 2007

WETLAND AREAS:
 Gross Wetland Area = 4.24 Acres
 Open Water = 0.51 Acres
 Net Wetland Area = 3.73 Acres



	PROJECT NAME MDT RIDGEWAY COMPLEX W-13 WETLAND MITIGATION	
	DRAWING TITLE MAPPED SITE FEATURES 2007	
	PROJ NO: B43088.00 0412W13	DRAWN: SH/JR
	LOCATION: RIDGEWAY COMPLEX W-13	PROJ MGR: J. BERGLUND
SCALE: 1" = 100'	CHECKED: LB	APPVD: JB
FILE NAME: 2007 W13BASE.dwg		
ADDRESS: 3810 Valley Commons Drive Suite 4 Bozeman, MT 59718		
FIGURE 3 OF		
REV - Oct/24/2007		

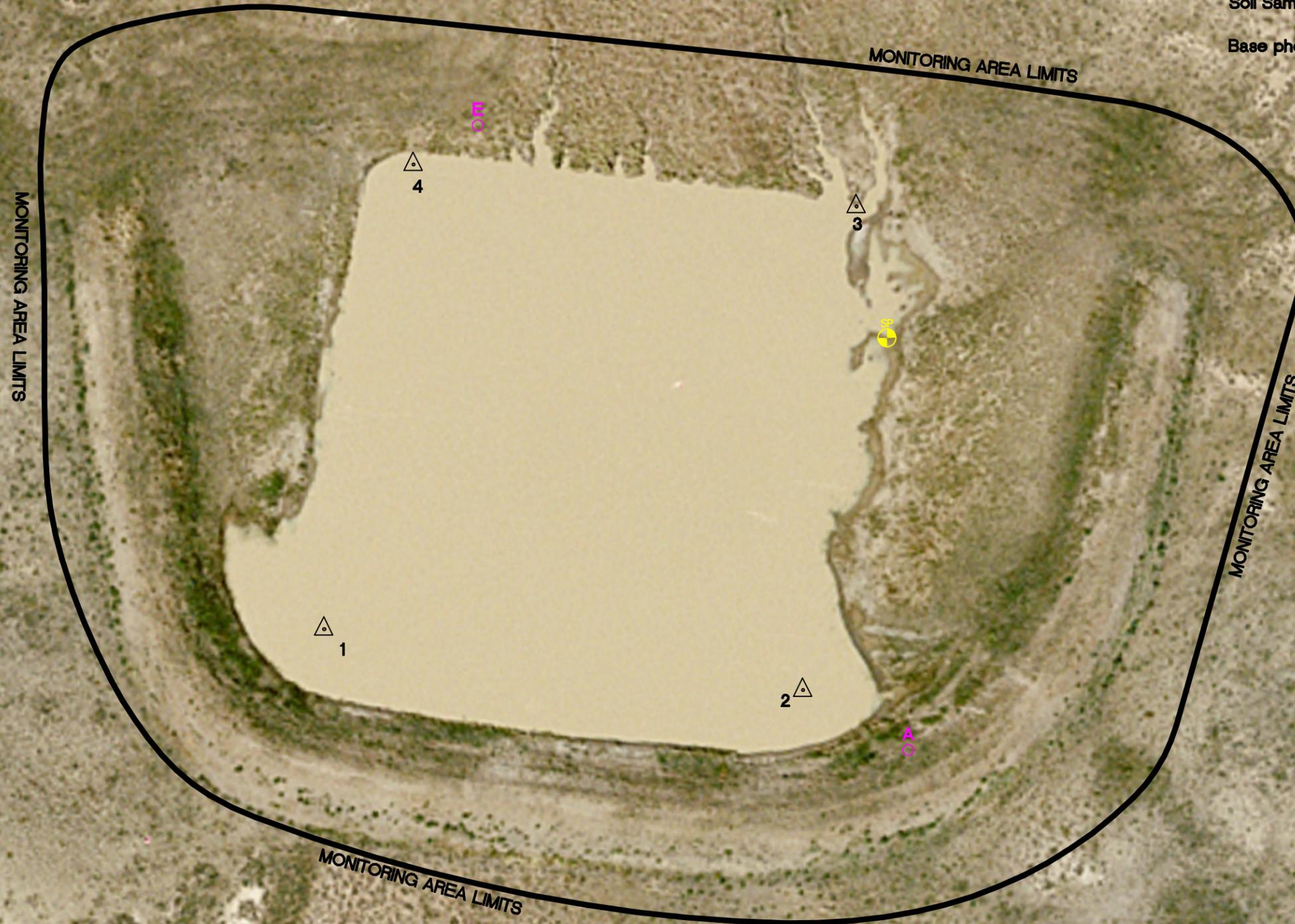
Figure 2 Monitoring Activity Locations 2007



Legend

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

Base photograph July 15, 2007

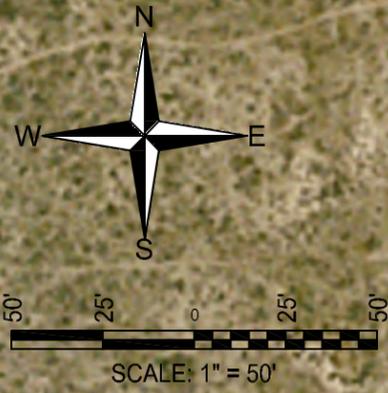


PROJECT NAME	MDT RIDGEWAY COMPLEX W-14 WETLAND MITIGATION	
DRAWING TITLE	MONITORING ACTIVITY LOCATIONS 2007	
PROJ NO:	B43088.00 0412W14	DRAWN: SH/JR
LOCATION:	RIDGEWAY COMPLEX W-14	PROJ MGR: J. BERGLUND
SCALE:	1" = 50'	CHECKED: LB / APPVD: JB
FILE NAME:	2007 W14BASE.dwg	

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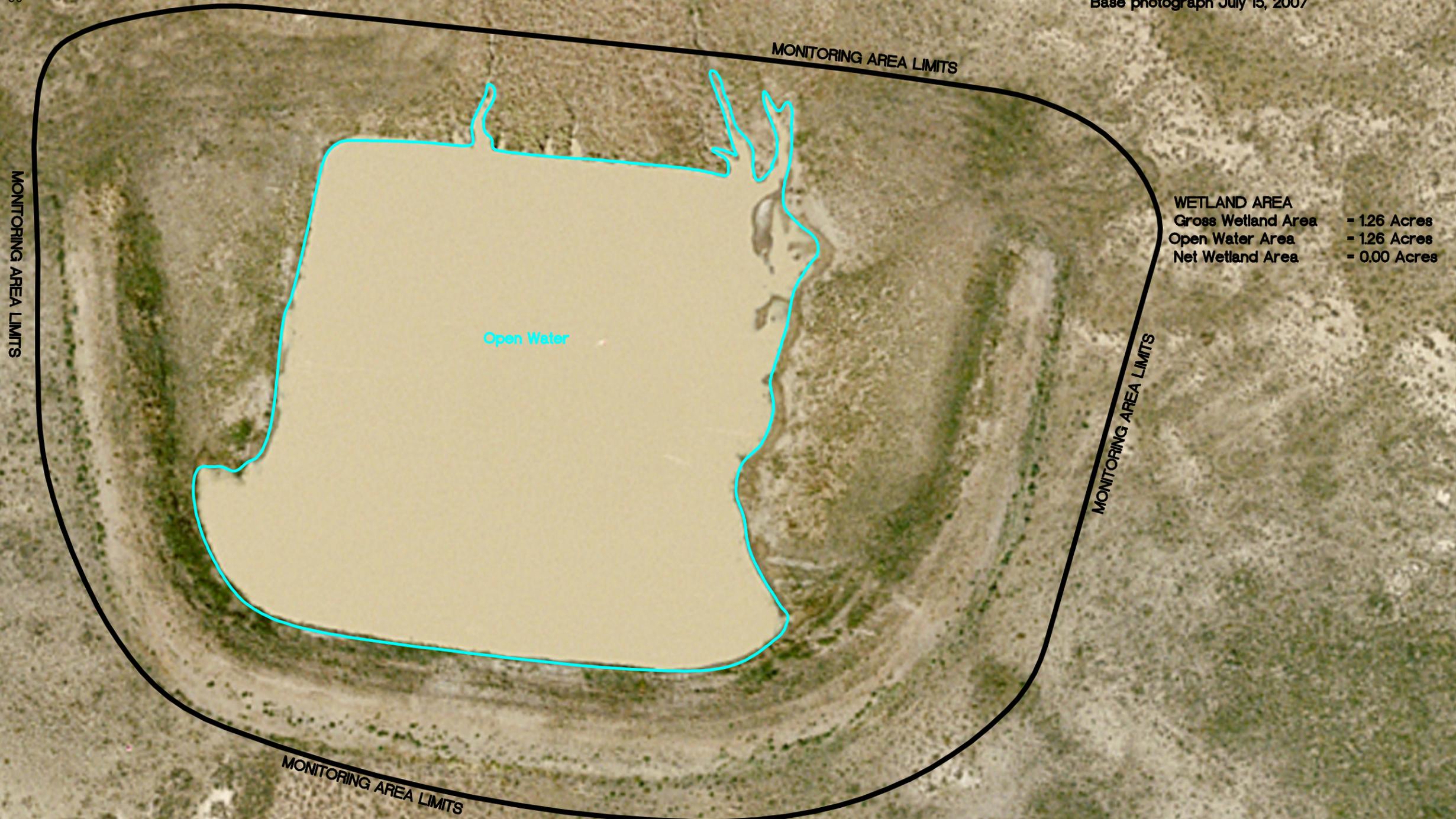


Figure 3 Mapped Site Features 2007



- Legend**
 Monitoring Area Limits 
 Open Water Limits 

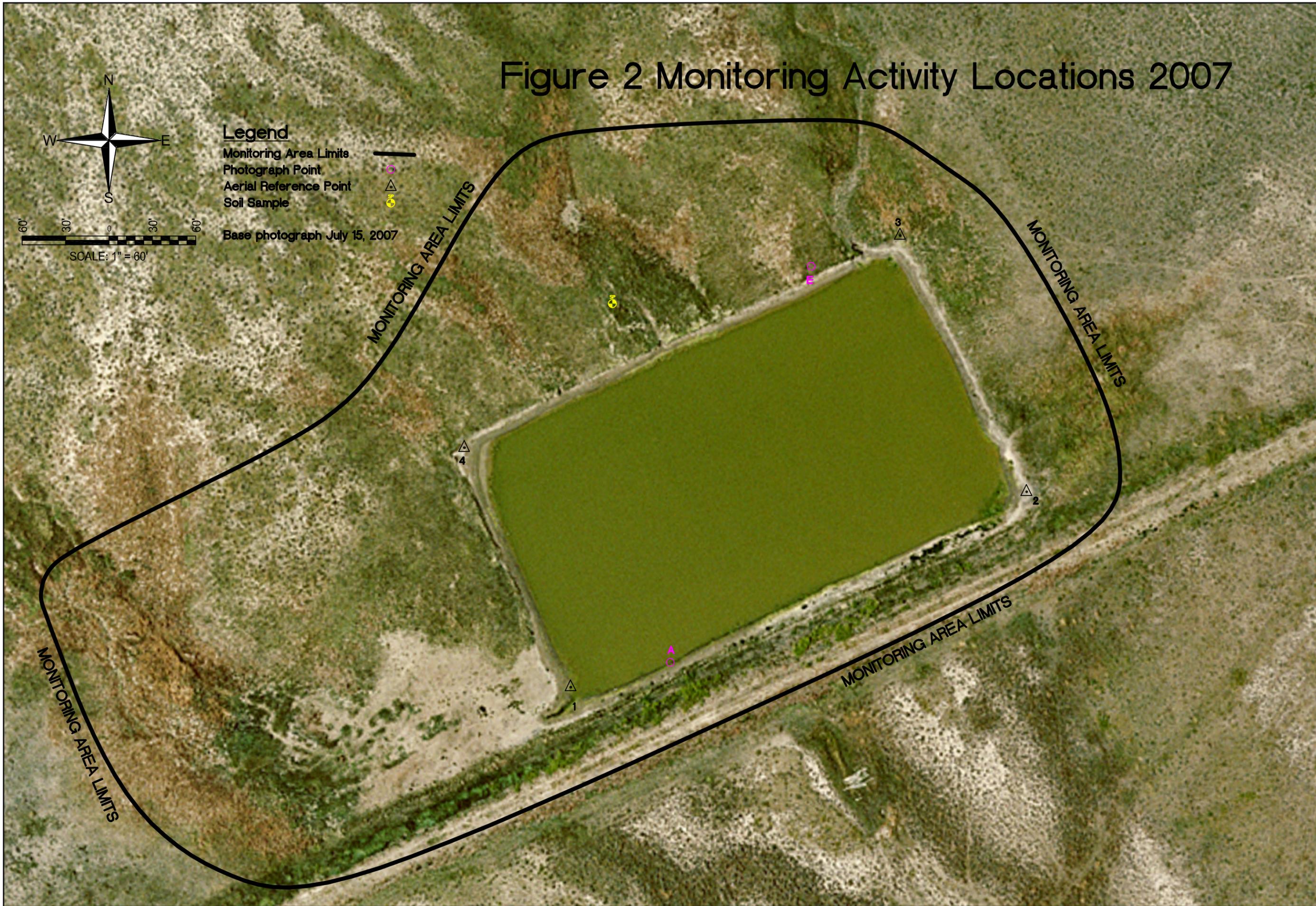
Base photograph July 15, 2007



- WETLAND AREA**
 Gross Wetland Area = 1.26 Acres
 Open Water Area = 1.26 Acres
 Net Wetland Area = 0.00 Acres

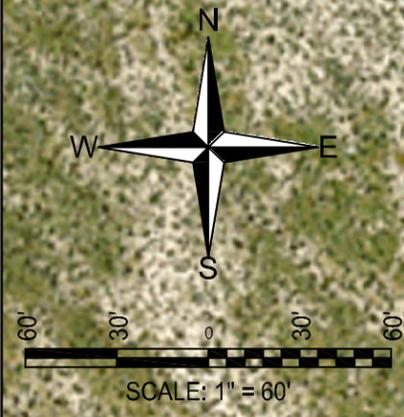
 3810 Valley Commons Drive Suite 4 Bozeman, MT 59718	PROJ NO: B43088.00 0412W14 LOCATION: RIDGEWAY CMLPX W-14 SCALE: 1" = 50' FILE NAME: 2007 W14BASE.dwg	DRAWN: SH/JR PROJ MGR: J. BERGLUND CHECKED: LB APPVD: JB	PROJECT NAME MDT RIDGEWAY COMPLEX W-14 WETLAND MITIGATION
	DRAWING TITLE MAPPED SITE FEATURES 2007		
FIGURE 3 OF			REV - Oct/24/2007

Figure 2 Monitoring Activity Locations 2007



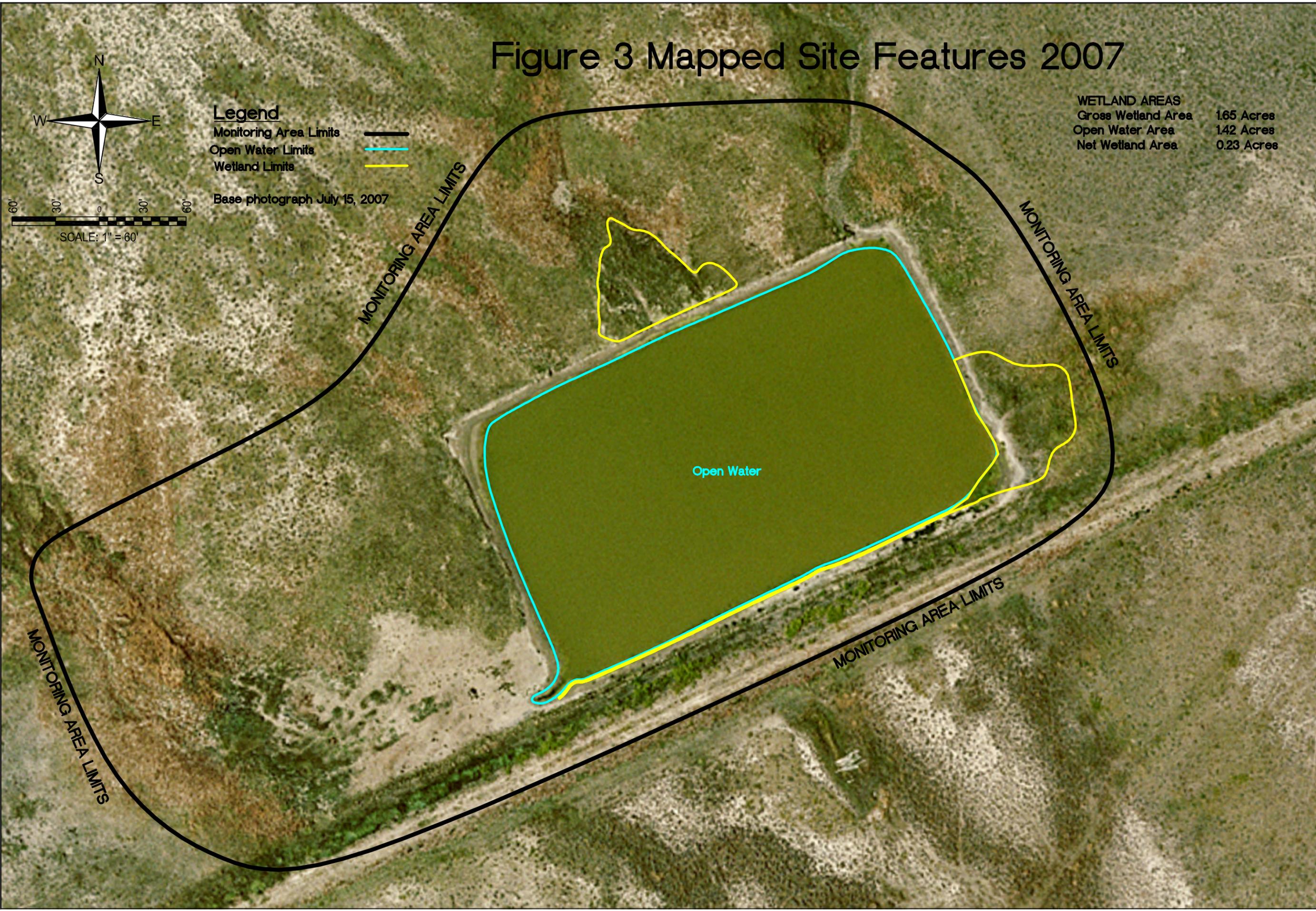
<p>3810 Valley Commons Drive Suite 4 Bozeman, MT 59718</p>	PROJ NO: B43088.00 0412W15 LOCATION: RIDGEWAY CMLPX W-15 SCALE: 1" = 60' FILE NAME: 2007 W15BASE.dwg	DRAWN: SH/JR PROJ MGR: J. BERGLUND CHECKED: LB APPVD: JB	PROJECT NAME MDT RIDGEWAY COMPLEX W-15 WETLAND MITIGATION DRAWING TITLE MONITORING ACTIVITY LOCATIONS 2007
	FIGURE 2 OF REV - Oct/26/2007		

Figure 3 Mapped Site Features 2007



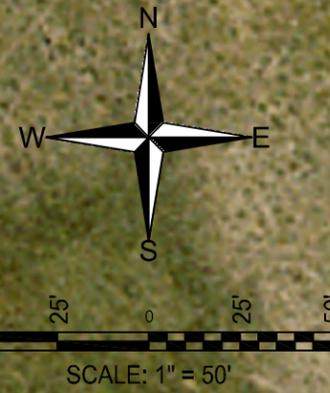
Legend
 Monitoring Area Limits ———
 Open Water Limits ———
 Wetland Limits ———
 Base photograph July 15, 2007

WETLAND AREAS
 Gross Wetland Area 1.65 Acres
 Open Water Area 1.42 Acres
 Net Wetland Area 0.23 Acres



PROJECT NAME MDT RIDGEWAY COMPLEX W-15 WETLAND MITIGATION	
DRAWING TITLE MAPPED SITE FEATURES 2007	
PROJ NO: B43088.00 0412W15	DRAWN: SH/JR
LOCATION: RIDGEWAY COMPLEX W-15	PROJ MGR: J. BERGLUND
SCALE: 1" = 60'	CHECKED: LB / APPVD: JB
FILE NAME: 2007 W15BASE.dwg	
3810 Valley Commons Drive Suite 4 Bozeman, MT 59718 	
FIGURE 3 OF	
REV - Nov/20/2007	

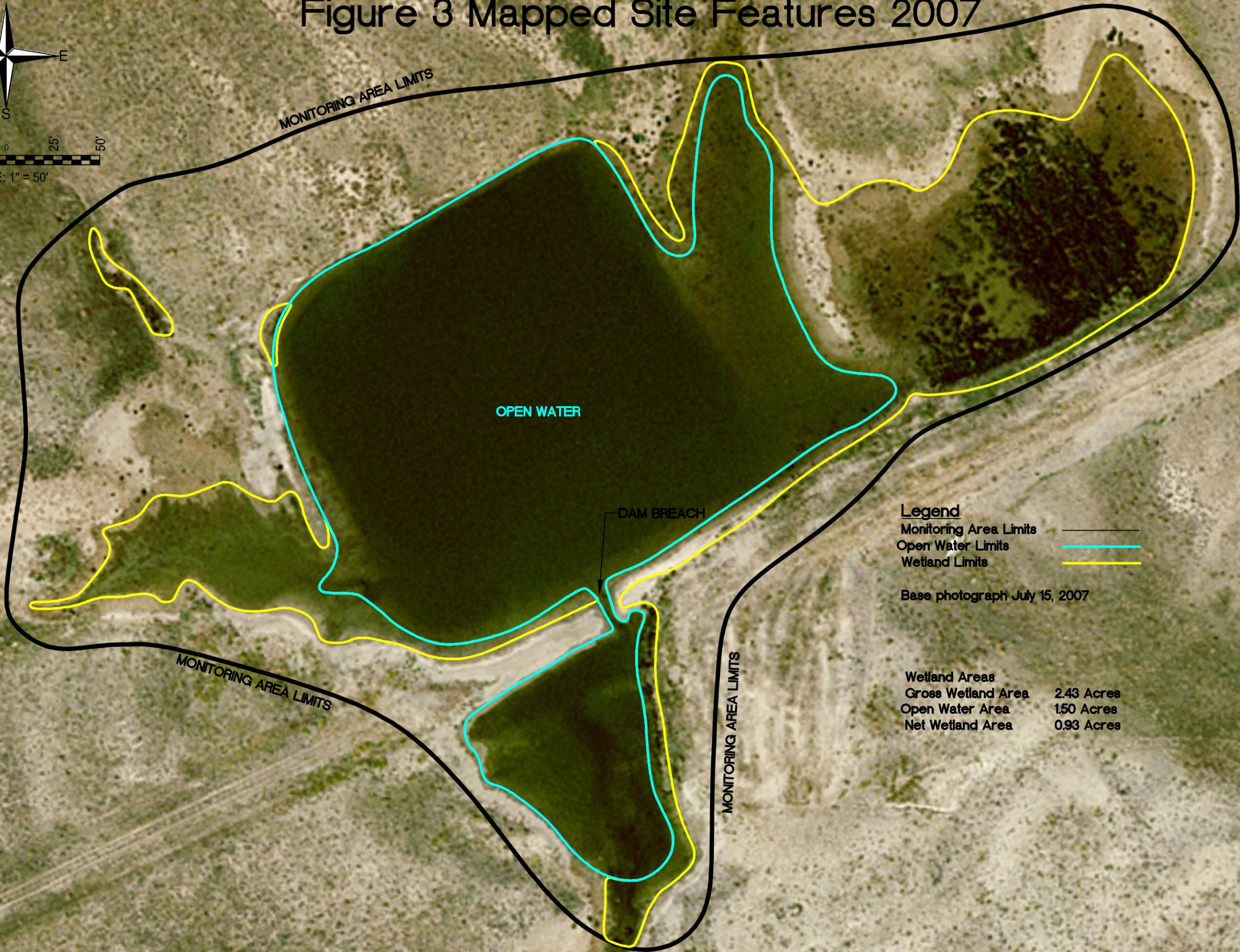
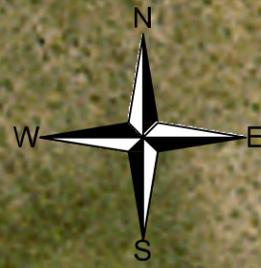
Figure 2 Monitoring Activity Locations 2007



Legend
 Monitoring Area Limits ———
 Photograph Point
 Aerial Reference Point
 Soil Sample
 Base photograph July 15, 2007

PROJECT NAME MDT RIDGEWAY COMPLEX W-16 WETLAND MITIGATION	PROJECT NO: B43088.00 0412W16	DRAWN: SH/JR	PROJECT TITLE MONITORING ACTIVITY LOCATIONS 2007
	LOCATION: RIDGEWAY COMPLEX W-16	PROJ MGR: J. BERGLUND	DRAWING TITLE
SCALE: 1" = 50'	FILE NAME: 2007 W16BASE.dwg	CHECKED: LB	APPVD: JB
3810 Valley Commons Drive Suite 4 Bozeman, MT 59718			
FIGURE 2 OF		REV - Nov/08/2007	

Figure 3 Mapped Site Features 2007



Legend

- Monitoring Area Limits
- Open Water Limits
- Wetland Limits

Base photograph July 15, 2007

Wetland Areas	
Gross Wetland Area	2.43 Acres
Open Water Area	1.50 Acres
Net Wetland Area	0.93 Acres

PROJ NO: B43088.00 0412W16 LOCATION: RIDGEWAY COMPLEX W-16 SCALE: 1" = 50' FILE NAME: 2007 W16BASE.dwg	DRAWN: SH/JR PROJ MGR: J. BERGLUND CHECKED: LB APPVD: JB	PROJECT NAME MDT RIDGEWAY COMPLEX W-16 WETLAND MITIGATION DRAWING TITLE MAPPED SITE FEATURES 2007
3810 Valley Commons Drive Suite 4 Bozeman, MT 59718		PBSJ
FIGURE 3 OF		
REV - Nov/08/2007		

Appendix H

**WETLANDS 1 - 8 AND 10 - 16:
2007 COE WETLAND DELINEATION DATA FORMS
2007 FUNCTIONAL ASSESSMENT FORMS**

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

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	
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-10	A	2.5 Y 4/2	7.5YR 3/4	Ig/dist	silt clay
Hydric Soil Indicators:					
<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		<u>X</u>	Yes	<input type="checkbox"/>	No
Hydric Soils Present?	<u>X</u>	Yes	<input type="checkbox"/>	No		<u>X</u>	Yes	<input type="checkbox"/>	No
Remarks:									
Wetland vegetation (ELEPAL) expanding in shallow-water areas.									

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	
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2	A	2.5 Y 4/1			silt loam
2-10	B	2.5 Y 4/2	7.5YR 5/8	Fine/faint	silt loam
Hydric Soil Indicators:					
<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)			
Hydric soils prevalent throughout this SP area.					

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
Remarks:									
Wetland expanded since 2006.									

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, PBSJ</u>	Date: <u>7/17/07</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	ELEPAL	H	OBL	10			
3	HORJUB	H	FACW	11			
4	Salix sp. (seedling)	H	FACW- 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 veg community developing around edge of pond and up drainage.

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>NA</u> (in.) Depth to Saturated Soil: <u>0"</u> (in.)	
Remarks: Wetland inundated and saturated beyond pond edges.	

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	
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4	A	2.5Y 4/1	7.5Y 4/6	Prom/small	silt clay
4-10	B	2.5Y 4/1,4/2			Silt clay
Hydric Soil Indicators:					
<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
Remarks:									
Wetland has expanded since 2006.									

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

Project/Site: <u>Ridgeway Complex</u> Applicant/Owner: <u>MDT</u> Investigator: <u>Lynn Bacon, Land & Water Consulting/PBSJ</u>	Date: <u>7/17/07</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	SAGCUN	H	OBL	10			
3	ELEACI	H	OBL	11			
4	HORJUB	H	FACW	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 has expanded since 2006.

HYDROLOGY

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

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	
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-3	A	2.5Y 4/1	7.5Y 4/6	prom/lg	silt clay w/ org streaking
3-10	B	2.5Y 4/2			silt clay w/ org streaking
Hydric Soil Indicators:					
<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

<table style="width:100%;"> <tr> <td>Hydrophytic Vegetation Present?</td> <td><input checked="" type="checkbox"/> Yes</td> <td><input type="checkbox"/> No</td> </tr> <tr> <td>Wetland Hydrology Present?</td> <td><input checked="" type="checkbox"/> Yes</td> <td><input type="checkbox"/> No</td> </tr> <tr> <td>Hydric Soils Present?</td> <td><input checked="" type="checkbox"/> Yes</td> <td><input type="checkbox"/> No</td> </tr> </table>	Hydrophytic Vegetation Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Wetland Hydrology Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Hydric Soils Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<table style="width:100%;"> <tr> <td>Is this Sampling Point Within a Wetland?</td> <td><input checked="" type="checkbox"/> Yes</td> <td><input type="checkbox"/> No</td> </tr> </table>	Is this Sampling Point Within a Wetland?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Hydrophytic Vegetation Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No											
Wetland Hydrology Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No											
Hydric Soils Present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No											
Is this Sampling Point Within a Wetland?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No											
Remarks:													
Wetland has expanded since 2006.													

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

Project/Site: <u>Ridgeway Complex</u>	Date: <u>7/17/07</u>
Applicant/Owner: <u>MDT</u>	County: <u>Carter</u>
Investigator: <u>Lynn Bacon, Land & 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-6</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 ALIPLA	H	OBL	9		
2 ELEPAL	H	OBL	10		
3 HORJUB	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 continues to infill 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 type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input checked="" type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>NA</u> (in.) Depth to Free Water in Pit: <u>NA</u> (in.) Depth to Saturated Soil: <u>0"</u> (in.)	
Remarks: Full pond, edges 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	
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-5	A	2.5 YR 4/2	7.5 YR 4/6	Many prom	silt clay
5-10	B	2.5 YR 4/1	7.5 YR 4/6	Many prom	silt clay
Hydric Soil Indicators:					
<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?	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No	Is this Sampling Point Within a Wetland?	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No
Wetland Hydrology Present?	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No					
Hydric Soils Present?	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No					
Remarks:									
Wetland has expanded since 2006.									

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

Project/Site: <u>Ridgeway Complex</u> Applicant/Owner: <u>MDT</u> Investigator: <u>Lynn Bacon, Land & Water Consulting/PBSJ</u>	Date: <u>7/17/07</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-7</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	HORJUB	H	FACW	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 line visible in 2007, where in 2006 the inundation line was mapped. The 2007 vegetation line acreage is less than the 2006 inundation line, which was expected.

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 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>3"</u> (in.)	
Remarks: In 2006, Wetland 7 and 8 were one large open water/wetland complex, including a wetland in the middle of the 7 and 8. The inundation line includes less acreage in 2007, and wetland vegetation has begun to grow beyond the excavation areas, but not to the extent the inundation line was mapped in 2006.	

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	
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-3	A	2.5Y 4/2	7.5YR 4/6	prom	Silt clay
3-10	B	2.5 Y	7.5YR 4/6	prom	Silt clay
Hydric Soil Indicators:					
<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					
Hydric Soils Present?	<u>X</u>	Yes	<input type="checkbox"/>	No					
Remarks:									
<p>(Same comment as W-7): Vegetation communities have increased since 2006, however acreage will be less as a result of less acreage of inundation, which was expected when the area was mapped in 2006 (vegetation under the high water levels could not be seen). Very positive note that wetland vegetation has expanded according to higher saturation levels in areas upslope of excavated pits and in general all around W-7 and 8 and in between.</p>									

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

Project/Site: <u>Ridgeway Complex</u> Applicant/Owner: <u>MDT</u> Investigator: <u>Lynn Bacon, Land & Water Consulting/PBSJ</u>	Date: <u>7/17/07</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	SPAGRA	H	FACW	10			
3	TYPLAT	H	OBL	11			
4	ALIPLA	H	OBL	12			
5	BECSYZ	H	OBL	13			
6				14			
7				15			
8				16			

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

Vegetation expanded beyond 2006 boundary as a result of inundation/saturation expansion in 2006 and 2007.

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>-</u> (in.) Depth to Saturated Soil: <u>0"</u> (in.)	
Remarks: Spring 2007 inundation limits representative of 2006 levels; cracked mud observed along eastern edge where water has receded, though vegetation communities expanding into these areas.	

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	
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-1	A	2.5Y 4/1	10YR 4/6	Prom/mod	silt clay
1-10	B	2.5Y 4/2	10YR 4/6	Prom/mod	silt clay
Hydric Soil Indicators:					
<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
Remarks:									
Wetland vegetation coverage increasing within outer limits of 2006 and spring 2007 inundation.									

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

Project/Site: <u>Ridgeway Complex</u>	Date: <u>7/17/07</u>
Applicant/Owner: <u>MDT</u>	County: <u>Carter</u>
Investigator: <u>Lynn Bacon, Land & 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-11</u>

VEGETATION

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

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 2/3 = 66%

Hordium observed around outer edge of pit, however hydrologic indicators not present in those areas. HORJUB may have colonized when water levels were higher in 2006. This species is often the first colonizer, so perhaps in 2008 OBL species will begin to colonize if water levels rise and saturate the 12" soil zone. Soil pit excavated adjacent to NE arm of berm in wetland pockets.

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 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 Secondary Indicators (2 or more required): <input checked="" 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>-</u> (in.)	

Remarks:

Excavated pit almost dry in 2007, though water marks are visible to ~20" below level ground surface. Soil pit is located in wetland pods adjacent to NE arm of berm where water must collect and not flow toward BLM excavated pit.

SOILS

Map Unit Name		Marvan Silty Clay		Drainage Class: <u>well</u>	
(Series and Phase):				Field Observations	
Taxonomy (Subgroup):				Confirm Mapped Type? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4	A	2.5Y4/1, 4/2	10YR 4/6	Prom mod	silt clay
4-10	B	2.5Y 4/2			Silt clay
Hydric Soil Indicators:					
<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 type="checkbox"/> Gleyed or Low-Chroma Colors		<input type="checkbox"/> Other (Explain in Remarks)			
Oxidized root channels observed.					

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
Remarks:									
HORJUB around circumference of BLM pit does not qualify as wetland because of lack of hydrologic indicators in those areas; however small pods adjacent to NE berm do qualify. The berm location NE of the pit appears to inhibit the flow of water to the excavated pit and areas surrounding the pit. May be a design flaw.									

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

Project/Site: <u>Ridgeway Complex</u> Applicant/Owner: <u>MDT</u> Investigator: <u>Lynn Bacon, Land & Water Consulting/PBSJ</u>	Date: <u>7/17/07</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-12</u>

VEGETATION

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

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 3/4=100%

Wetland vegetation community did not expand appreciably since 2006.

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks): <input type="checkbox"/> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available	Wetland Hydrology Indicators: Primary Indicators: <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input checked="" type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input checked="" type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Field Observations: Depth of Surface Water: <u>NA</u> (in.) Depth to Free Water in Pit: <u>NA</u> (in.) Depth to Saturated Soil: <u>0"</u> (in.)	
Remarks: Water levels higher than outer edge of vegetation along berm where expansion is limited. NE edge has room to expand, though water levels may not be high enough to allow this occurrence in 2007.	

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	
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-5	A	2.5Y 4/1	7.5YR 4/6	Prom, mod	silt clay
5-10	B	2.5Y 4/2			Silt clay
Hydric Soil Indicators:					
_____ Histosol		_____ Concretions		_____ High Organic Content in surface Layer in Sandy Soils	
_____ Histic Epipedon		_____ Sulfidic Odor		_____ Organic Streaking in Sandy Soils	
_____ Aquic Moisture Regime		_____ Reducing Conditions		_____ Listed on Local Hydric Soils List	
_____ Gleyed or Low-Chroma Colors		_____ Other (Explain in Remarks)		_____ Listed on National Hydric Soils List	

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X	Yes	No	Is this Sampling Point Within a Wetland?	X	Yes	No
Wetland Hydrology Present?	X	Yes	No		_____	_____	_____
Hydric Soils Present?	X	Yes	No		_____	_____	_____
Remarks:							
Vegetation community line appears to have stabilized after the high water levels of 2006 and spring of 2007. Expansion may continue to the NE if high water persists into the next few years.							

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

Project/Site: <u>Ridgeway Complex</u> Applicant/Owner: <u>MDT</u> Investigator: <u>Lynn Bacon, Land & Water Consulting/PBSJ</u>	Date: <u>7/17/07</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				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%

Outer limits of wetland vegetation community fairly stable since 2006, community is very mature and most of the wetland has in-filled with 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 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>NA</u> (in.) Depth to Saturated Soil: <u>0</u> (in.)	
Remarks: W-13 has a fairly stable water level with some opportunity to expand to the NE and up-drainage to the NW if these wet springs persist. Water has flowed around the NE end of the berm and created a trench 1-2 ft deep. Small fish fry found in trench puddles.	

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	
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-6	A	2.5Y 4/1			silt clay
6-10	B	2.5Y 4/2	2.5Y 4/2 7/4,6/4 chunks	Prom/lg	Silt clay
Hydric Soil Indicators:					
_____ Histosol		_____ Concretions		_____ High Organic Content in surface Layer in Sandy Soils	
_____ Histic Epipedon		_____ Sulfidic Odor		_____ Organic Streaking in Sandy Soils	
_____ Aquic Moisture Regime		_____ Reducing Conditions		_____ Listed on Local Hydric Soils List	
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors		_____ Other (Explain in Remarks)		_____ Listed on National Hydric Soils List	

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X	Yes	No	Is this Sampling Point Within a Wetland?	X	Yes	No
Wetland Hydrology Present?	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hydric Soils Present?	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Remarks:							
Wetland inundation and vegetation coverage appears stable since 2006; community is mature and most of the open water has been colonized with emergent vegetation.							

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

Project/Site: <u>Ridgeway Complex</u>	Date: <u>7/17/07</u>
Applicant/Owner: <u>MDT</u>	County: <u>Carter</u>
Investigator: <u>Lynn Bacon, Land & 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>Upland</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 AGRSMI	H	FACU	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-). 0/1 = 0%

Scattered HORJUB around perimeter, however not enough to qualify as a wetland plant community. This site will likely colonize this year given the full pond and 2 years of high water.

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 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 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> - </u> (in.) Depth to Free Water in Pit: <u> NA </u> (in.) Depth to Saturated Soil: <u> 0 </u> (in.)	
Remarks: Pit inundated again in 2007 and edges saturated.	

SOILS

Map Unit Name		Vaeda silty clay loam		Drainage Class: _____	
(Series and Phase):		_____		Field Observations	
Taxonomy (Subgroup):		_____		Confirm Mapped Type? ___ Yes <u>X</u> No	
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-3	A	2.5Y 4/2, 4/1	7.5YR 4/6	Prom/mod	silt clay
3-10	B	2.5Y 4/2			silt clay
Hydric Soil Indicators:					
_____ 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					
<u>X</u> Gleyed or Low-Chroma Colors					
Hydric soils given prolonged saturation and mottles.					

WETLAND DETERMINATION

<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:60%;">Hydrophytic Vegetation Present?</td> <td style="width:10%; text-align: center;">Yes</td> <td style="width:10%; text-align: center;"><u>X</u></td> <td style="width:10%; text-align: center;">No</td> <td rowspan="3" style="width:15%; vertical-align: middle; padding-left: 20px;">Is this Sampling Point Within a Wetland?</td> <td style="width:10%; text-align: center;">Yes</td> <td style="width:10%; text-align: center;"><u>X</u></td> <td style="width:10%; text-align: center;">No</td> </tr> <tr> <td>Wetland Hydrology Present?</td> <td style="text-align: center;"><u>X</u></td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>Hydric Soils Present?</td> <td style="text-align: center;"><u>X</u></td> <td style="text-align: center;">Yes</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> </tr> </table>	Hydrophytic Vegetation Present?	Yes	<u>X</u>	No	Is this Sampling Point Within a Wetland?	Yes	<u>X</u>	No	Wetland Hydrology Present?	<u>X</u>	Yes	_____	_____	_____	_____	Hydric Soils Present?	<u>X</u>	Yes	_____	_____	_____	_____	Remarks: The dominant vegetation is wheat grass with scattered Hordeum. Given the full pond condition and saturated edges the last 2 years, this site will likely convert to a wetland community type this year.
Hydrophytic Vegetation Present?	Yes	<u>X</u>	No	Is this Sampling Point Within a Wetland?		Yes	<u>X</u>	No															
Wetland Hydrology Present?	<u>X</u>	Yes	_____			_____	_____	_____															
Hydric Soils Present?	<u>X</u>	Yes	_____		_____	_____	_____																

SOILS

Map Unit Name		Vaeda silty clay loam		Drainage Class: _____	
(Series and Phase):		_____		Field Observations	
Taxonomy (Subgroup):		_____		Confirm Mapped Type? _____ Yes <input checked="" type="checkbox"/> No	
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-10	A	2.5Y 4/2, 4/1	7.5YR 4/6		silt clay
Hydric Soil Indicators:					
_____ 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		_____			
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors		_____			

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No	Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Wetland Hydrology Present?	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No	
Hydric Soils Present?	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No	
Remarks:					
Wetland vegetation is colonizing areas adjacent to the pit. By 2008 it is likely that the circumference will have dominant wetland vegetation.					

SOILS

Map Unit Name		Vaeda silty clay loam		Drainage Class: _____	
(Series and Phase):		_____		Field Observations	
Taxonomy (Subgroup):		_____		Confirm Mapped Type? ___ Yes <u>X</u> No	
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-1	A	2.5Y 4/2	7.5YR 4/6	Prom/com	Silt clay w/ organic streaking
1-3	A	2.5Y 4/2	7.5YR 4/6	Prom/com	Silt clay
3-10	B	2.5Y 4/2			Silt clay
Hydric Soil Indicators:					
_____ Histosol		_____ Concretions		_____ High Organic Content in surface Layer in Sandy Soils	
_____ Histic Epipedon		_____ Sulfidic Odor		_____ Organic Streaking in Sandy Soils	
_____ Aquic Moisture Regime		_____ Reducing Conditions		_____ Listed on Local Hydric Soils List	
_____ Gleyed or Low-Chroma Colors		_____ Other (Explain in Remarks)		_____ Listed on National Hydric Soils List	

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		_____	_____	_____
Remarks:							
Wetland plant communities beginning to colonize around the pit perimeter. By 2008 this site should be well established as a wetland.							

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	---	---	---	---	---	---	---

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
- 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.): Leopard Frogs have been seen at all sites.

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 checked="" type="checkbox"/> Moderate								<input type="checkbox"/> Low			
Class Cover Distribution (all vegetated classes)	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input checked="" type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> Even			
Duration of Surface Water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (see #12)	--	--	--	--	--	--	--	--	H	--	--	--	--	--	--	--	--	--	--	--
High disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

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

Comments: Avian species abundant in these wetlands.

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

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: *Note : Fish were observed in W-13, however it is unknown if this is an isolated situation or if these animals can survive the winter. W-13 has a breach around the end of the dam ; the fish were found in a puddle in this outflow breach (a trench essentially) and indicates this drainage must connect to the creek during periods of flooding.

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

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

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

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

Estimated wetland area in AA subject to periodic flooding	<input type="checkbox"/> ≥ 10 acres			<input checked="" type="checkbox"/> <10, >2 acres			<input type="checkbox"/> ≤2 acres		
% of flooded wetland classified as forested, scrub/shrub, or both	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains no outlet or restricted outlet	--	--	--	--	--	.5 (M)	--	--	--
AA contains unrestricted outlet	--	--	--	--	--	--	--	--	--

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

Y N **Comments:** _____

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

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.

If no wetlands in the AA are subject to flooding or ponding, check NA above.

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

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

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	<input type="checkbox"/> >5 acre feet			<input checked="" 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	--	--	--	.8 (H)	--	--	--	--	--
Wetlands in AA flood or pond < 5 out of 10 years	--	--	--	--	--	--	--	--	--

Comments: _____

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

Applies to wetlands with potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input.

If no wetlands in the AA are subject to such input, check NA above.

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

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
% cover of wetland vegetation in AA	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Evidence of flooding or ponding in AA	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
AA contains no or restricted outlet	1 (H)	--	--	--	--	--	--	--
AA contains unrestricted outlet	--	--	--	--	--	--	--	--

Comments: _____

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

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

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

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

Comments:

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

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

A	<input type="checkbox"/> Vegetated component >5 acres						<input checked="" type="checkbox"/> Vegetated component 1-5 acres						<input type="checkbox"/> Vegetated component <1 acre					
B	<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input checked="" type="checkbox"/> Moderate		<input 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 checked="" 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
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: These pond sites have been bank-full for several years; it is likely that the drainage upslope of these sites is a groundwater source for these wetlands.

14K. UNIQUENESS

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

Replacement Potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland or plant association listed as "S1" by the MTNHP.			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MTNHP.			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate.		
	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input checked="" type="checkbox"/> common	<input type="checkbox"/> abundant
Estimated Relative Abundance from #11									
Low disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (#12i)	--	--	--	--	--	--	--	.3L	--
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 type="checkbox"/> Low	<input checked="" type="checkbox"/> Moderate
Public ownership	--	.5(M)
Private ownership	--	--

Comments: High use by avian species.

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	0.9	1	
D. General Fish/Aquatic Habitat	NA		--	
E. Flood Attenuation	M	0.5	1	
F. Short and Long Term Surface Water Storage	H	0.8	1	
G. Sediment/Nutrient/Toxicant Removal	H	1.0	1	
H. Sediment/Shoreline Stabilization	H	1.0	1	
I. Production Export/Food Chain Support	M	0.7	1	
J. Groundwater Discharge/Recharge	H	1.0	1	
K. Uniqueness	M	0.3	1	
L. Recreation/Education Potential	M	0.5	1	
Totals:		7.7	11	232.39
Percent of Total Possible Points:			70% (Actual / Possible) x 100 [rd to nearest whole #]	

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

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

I
 II
 III
 IV

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
- 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.): R. pipiens observed.

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 checked="" type="checkbox"/> Moderate								<input type="checkbox"/> Low			
Class Cover Distribution (all vegetated classes)	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input checked="" type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> Even			
Duration of Surface Water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (see #12)	--	--	--	--	--	--	--	--	H	--	--	--	--	--	--	--	--	--	--	--
High disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

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

Comments: These wetlands are the largest within the Ridgeway Wetland Complex and support a high diversity of avian species.

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 checked="" type="checkbox"/> ≥ 10 acres			<input type="checkbox"/> <10, >2 acres			<input type="checkbox"/> ≤2 acres		
% of flooded wetland classified as forested, scrub/shrub, or both	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains no outlet or restricted outlet	--	--	.6 (M)	--	--	--	--	--	--
AA contains unrestricted outlet	--	--	--	--	--	--	--	--	--

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

Y N Comments: _____

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

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.

If no wetlands in the AA are subject to flooding or ponding, check NA above.

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

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

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

Comments: _____

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

Applies to wetlands with potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input.

If no wetlands in the AA are subject to such input, check NA above.

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

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
% cover of wetland vegetation in AA	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Evidence of flooding or ponding in AA	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
AA contains no or restricted outlet	1 (H)		--		--		--	
AA contains unrestricted outlet	--		--		--		--	

Comments: _____

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

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

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

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

Comments: Emergent vegetation very well developed.

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 checked="" type="checkbox"/> Vegetated component >5 acres						<input type="checkbox"/> Vegetated component 1-5 acres						<input type="checkbox"/> Vegetated component <1 acre					
B	<input type="checkbox"/> High		<input checked="" type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input 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 checked="" 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 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	--	--	--	.8H	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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: Has ponded water all year; it is likely these large wetlands receive hydrologic support from groundwater.

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)	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (#12i)	--	--	--	--	--	--	--	.3L	--
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 type="checkbox"/> Low	<input checked="" type="checkbox"/> Moderate	<input type="checkbox"/> High
Public ownership	--	.5(M)	--
Private ownership	--	--	--

Comments: _____

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	0.9	1	
D. General Fish/Aquatic Habitat	NA		--	
E. Flood Attenuation	M	0.60	1	
F. Short and Long Term Surface Water Storage	H	1.00	1	
G. Sediment/Nutrient/Toxicant Removal	H	1.00	1	
H. Sediment/Shoreline Stabilization	H	1.00	1	
I. Production Export/Food Chain Support	H	0.80	1	
J. Groundwater Discharge/Recharge	H	1.00	1	
K. Uniqueness	M	0.30	1	
L. Recreation/Education Potential	M	0.50	1	
Totals:		8.10	11.00	166.7
Percent of Total Possible Points:			74% (Actual / Possible) x 100 [rd to nearest whole #]	

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

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

I

 II

 III

 IV

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
- 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.): R. pipiens observed in all sites.

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 checked="" type="checkbox"/> Moderate								<input type="checkbox"/> Low			
Class Cover Distribution (all vegetated classes)	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input checked="" type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> Even			
Duration of Surface Water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (see #12)	--	--	--	--	--	--	--	--	H	--	--	--	--	--	--	--	--	--	--	--
High disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

Evidence of Wildlife Use from 14C(i)	Wildlife Habitat Features Rating from 14C(ii)			
	<input type="checkbox"/> Exceptional	<input checked="" type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Substantial	--	--	--	--
Moderate	--	.7 (M)	--	--
Low	--	--	--	--

Comments: These 2 wetlands are in the initial stages of an emergent vegetation expansion and waterfowl and shorebird use will expand accordingly.

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 type="checkbox"/> <10, >2 acres			<input checked="" type="checkbox"/> ≤2 acres		
% of flooded wetland classified as forested, scrub/shrub, or both	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains no outlet or restricted outlet	--	--	--	--	--	--	--	--	.2 (L)
AA contains unrestricted outlet	--	--	--	--	--	--	--	--	--

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

Y N Comments: _____

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

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.

If no wetlands in the AA are subject to flooding or ponding, check NA above.

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

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

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	<input type="checkbox"/> >5 acre feet			<input type="checkbox"/> <5, >1 acre feet			<input checked="" 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	--	--	--	--	--	--	.4 (M)	--	--
Wetlands in AA flood or pond < 5 out of 10 years	--	--	--	--	--	--	--	--	--

Comments: _____

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

Applies to wetlands with potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input.

If no wetlands in the AA are subject to such input, check NA above.

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

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
% cover of wetland vegetation in AA	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Evidence of flooding or ponding in AA	1 (H)	--	--	--	--	--	--	--
AA contains no or restricted outlet	--	--	--	--	--	--	--	--
AA contains unrestricted outlet	--	--	--	--	--	--	--	--

Comments: _____

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

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

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

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

Comments:

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

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

A	<input type="checkbox"/> Vegetated component >5 acres				<input type="checkbox"/> Vegetated component 1-5 acres				<input checked="" 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 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 checked="" type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N
P/P	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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	--
No Discharge/Recharge indicators present	--
Available Discharge/Recharge information inadequate to rate AA D/R potential	N/A (Unknown)

Comments: These 2 ponds have water all year, but it is unclear as to whether these sites collect groundwater.

14K. UNIQUENESS

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

Replacement Potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland or plant association listed as "S1" by the MTNHP.			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MTNHP.			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate.		
	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input checked="" type="checkbox"/> common	<input type="checkbox"/> abundant
Estimated Relative Abundance from #11									
Low disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (#12i)	--	--	--	--	--	--	--	.3L	--
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 type="checkbox"/> Low	<input checked="" type="checkbox"/> Moderate
Public ownership	--	.5(M)
Private ownership	--	--

Comments: These sites have the potential to attract wildlife; W-16 is adjacent to the road; W-4 is several miles up-drainage, but hunters use these lands routinely.

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	M	0.70	1	
D. General Fish/Aquatic Habitat	NA		--	
E. Flood Attenuation	L	0.20	1	
F. Short and Long Term Surface Water Storage	M	0.40	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	0.4	1	
J. Groundwater Discharge/Recharge	NA		--	
K. Uniqueness	M	0.30	1	
L. Recreation/Education Potential	M	0.50	1	
Totals:		5.50	10.00	20.08
Percent of Total Possible Points:			55% (Actual / Possible) x 100 [rd to nearest whole #]	

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

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

I
 II
 III
 IV

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
- 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.): R. pipiens have been observed in all sites.

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			
Class Cover Distribution (all vegetated classes)	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input checked="" type="checkbox"/> Even			
Duration of Surface Water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	H	--	--	--
High disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

Evidence of Wildlife Use from 14C(i)	Wildlife Habitat Features Rating from 14C(ii)			
	<input type="checkbox"/> Exceptional	<input checked="" type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Substantial	--	--	--	--
Moderate	--	--	--	--
Low	--	.4 (M)	--	--

Comments: Full pond at W-15, W-11 had very shallow water area, <0.1 acre, in 2007, but was full-pond in 2006. Wildlife use will likely be low until these sites are consistently flooded, the water clarity improves and aquatic vegetation develops.

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 type="checkbox"/> <10, >2 acres			<input checked="" type="checkbox"/> ≤2 acres		
% of flooded wetland classified as forested, scrub/shrub, or both	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains no outlet or restricted outlet	--	--	--	--	--	--	--	--	.2 (L)
AA contains unrestricted outlet	--	--	--	--	--	--	--	--	--

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

Y N Comments: _____

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

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.

If no wetlands in the AA are subject to flooding or ponding, check NA above.

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

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

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	<input checked="" type="checkbox"/> >5 acre feet			<input type="checkbox"/> <5, >1 acre feet			<input checked="" 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	--	--	--	--	--	--	.4 (M)	--	--
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 type="checkbox"/> ≥ 70%		<input checked="" type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
% cover of wetland vegetation in AA	<input type="checkbox"/> Yes <input type="checkbox"/> No		<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	
Evidence of flooding or ponding in AA	<input type="checkbox"/> Yes <input type="checkbox"/> No		<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	
AA contains no or restricted outlet	--	--	.7 (M)	--	--	--	--	--
AA contains unrestricted outlet	--	--	--	--	--	--	--	--

Comments: W-11 had very little inundation in 2007, but was flooded in 2006; W-15 was flooded in both years.

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 checked="" type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
≥ 65 %	--	--	--
35-64 %	--	--	--
< 35 %	.3 (L)	--	--

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 type="checkbox"/> Vegetated component 1-5 acres						<input checked="" 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 type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input checked="" 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 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 checked="" type="checkbox"/> N	
P/P	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.3L
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	--
No Discharge/Recharge indicators present	--
Available Discharge/Recharge information inadequate to rate AA D/R potential	N/A (Unknown)

Comments: Unknown.

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)	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (#12i)	--	--	--	--	--	--	--	.3L	--
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 type="checkbox"/> Low	<input type="checkbox"/> High
Public ownership	--	--
Private ownership	--	--

Comments: L 0.1

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	M	0.40	1	
D. General Fish/Aquatic Habitat	NA		--	
E. Flood Attenuation	L	0.20	1	
F. Short and Long Term Surface Water Storage	M	0.40	1	
G. Sediment/Nutrient/Toxicant Removal	M	0.70	1	
H. Sediment/Shoreline Stabilization	L	0.30	1	
I. Production Export/Food Chain Support	L	0.30	1	
J. Groundwater Discharge/Recharge	NA		--	
K. Uniqueness	M	0.30	1	
L. Recreation/Education Potential	L	0.10	1	
Totals:		3.70	10.00	6.7
Percent of Total Possible Points:			37% (Actual / Possible) x 100 [rd to nearest whole #]	

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

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

I
 II
 III
 IV

Appendix I

WETLANDS 1 - 8 AND 10 – 16: 2007 REPRESENTATIVE PHOTOGRAPHS

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

RIDGEWAY COMPLEX WETLAND MITIGATION SITE 2007



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



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



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



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



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

RIDGEWAY COMPLEX WETLAND MITIGATION SITE 2007



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



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



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



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



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



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

RIDGEWAY COMPLEX WETLAND MITIGATION SITE 2007



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



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



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



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



**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 2007



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



**WL#: 10 Location: F Description: Wetland view, point shifted to west because of inundation Original
Compass Reading: 126°**



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



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



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



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

RIDGEWAY COMPLEX WETLAND MITIGATION SITE 2007



**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°**



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



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

RIDGEWAY COMPLEX WETLAND MITIGATION SITE 2007



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



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

Appendix J

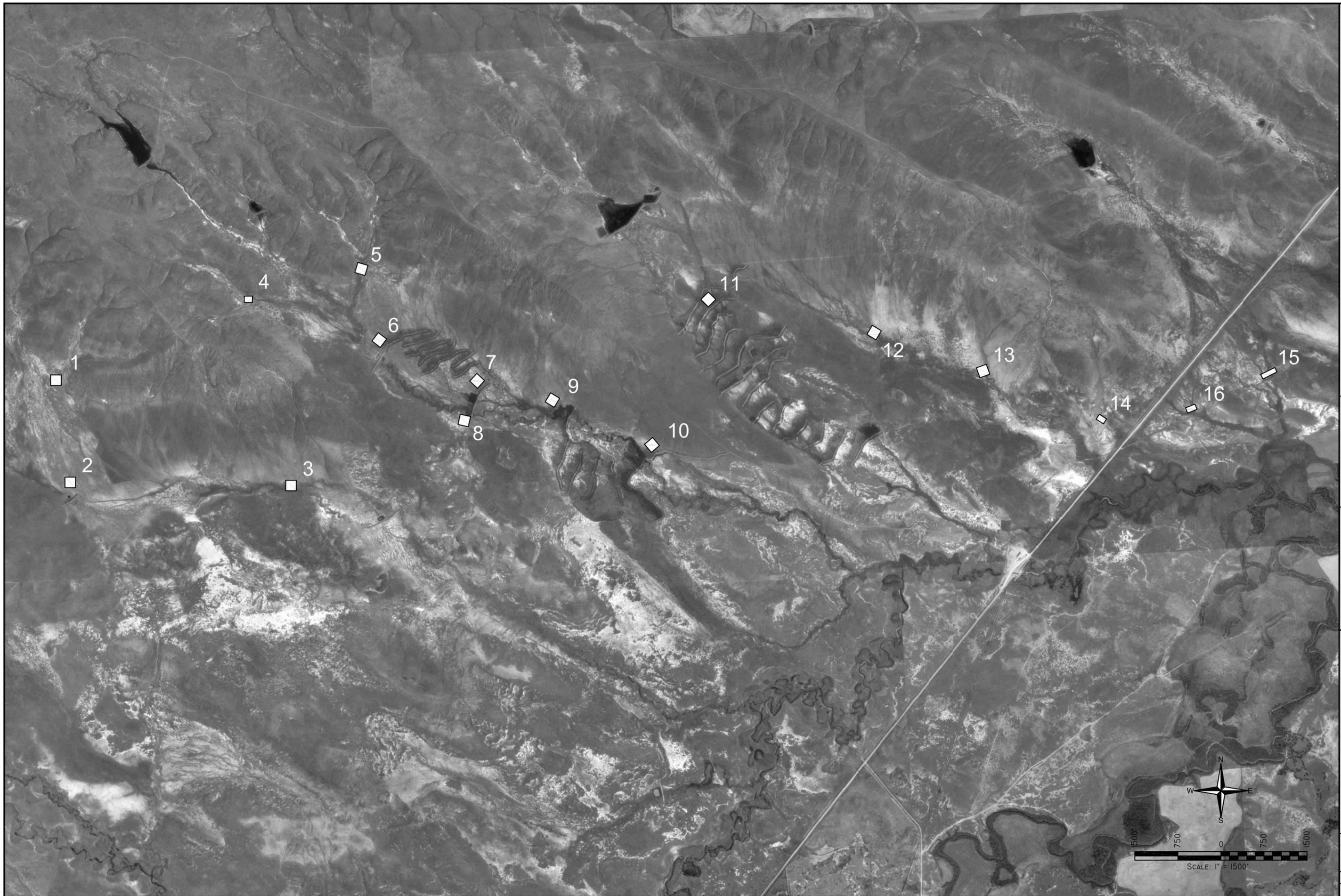
ALL WETLANDS:

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

MDT Wetland Mitigation Monitoring

Ridgeway Wetland Complex

Ekalaka, Montana



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

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