MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2005

Beaverhead Gateway
Dillon, Montana

Prepared for:

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

Prepared by:

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

December 2005

Project No: B43054.00 - 0202

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1.0 INTRODUCTION

This report represents the fifth year of monitoring at the Beaverhead Gateway Ranch wetland mitigation site by Land & Water Consulting/PBS&J. The Beaverhead Gateway Ranch wetland mitigation site was developed to mitigate wetland impacts associated with Montana Department of Transportation (MDT) roadway projects in Watershed 6 located in the MDT Butte District. Some of these projects are completed and some have yet to be constructed. The mitigation site is located within a 196-acre conservation easement 13 miles northeast of Dillon and 14 miles southwest of Twin Bridges on Highway 41 (**Figure 1**). Elevations range from approximately 4825 to 4830 feet. The western portion of the site is in Beaverhead County and the eastern portion is in Madison County. MDT personnel monitored the site in 1998, 1999 and 2000.

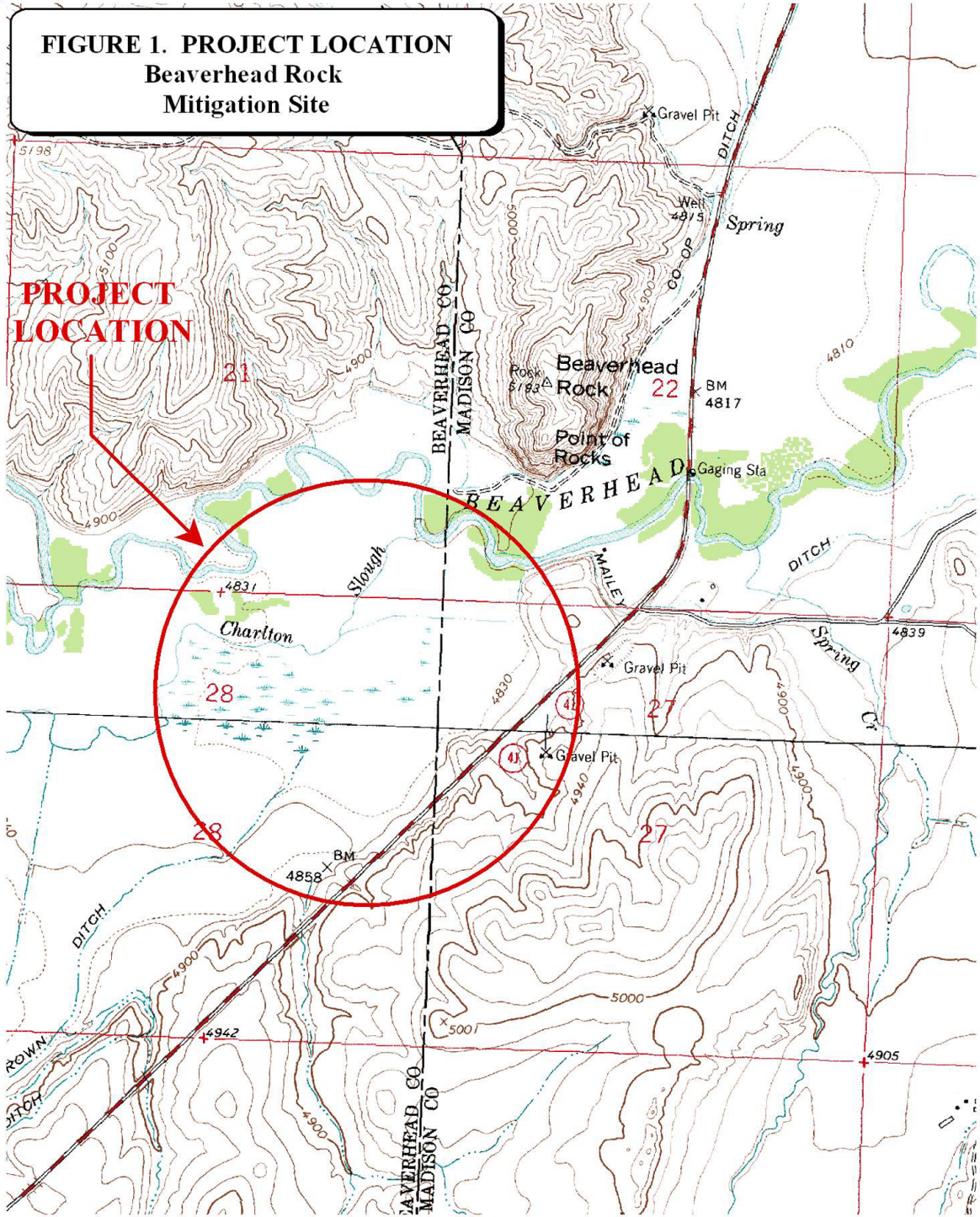
The approximate site boundary is illustrated on **Figure 2** (**Appendix A**), and the original site plans are included in **Appendix D**. The project is located adjacent to the Beaverhead River and Highway 41. Upwelling groundwater and springs with surface retention behind a constructed dike provides wetland hydrology. Precipitation and surface runoff provide minor contributions to wetland hydrology at this site. The site is in private ownership and occurs within a conservation easement. The wetland easement area is not fenced exclusively; however, portions of the easement are fenced for cattle management and the larger property containing the easement is fenced.

Construction was completed in 1997 with the goal of creating at least 52 acres of wetland. The site includes a dike constructed to retain storm water and groundwater collected in two prior-existing drainage ditch systems. A control structure was completed in the northwest portion of the impoundment located where the two former drainage ditches converged. This control structure can be used to adjust impoundment water levels. The impoundment was designed to inundate approximately 26 acres with water depths of 0 to 3 feet.

The site was designed to mitigate for specific wetland functions impacted by MDT roadway projects, including: storm water retention, roadway runoff filtration, sediment and nutrient retention, water quality, groundwater recharge, waterfowl and wildlife habitats and riparian restoration. In addition to creating 52 acres of new wetland, a primary goal is to use an ephemeral creek channel entering the southeastern quadrant of the site to capture storm water flows from nearby farmland and allow silts/suspended sediments to settle out within the wetland.

A pre-project construction wetland delineation documented 5.2 acres of wetlands at the site (Hackley 1997). The monitoring area is illustrated in **Figure 2** (**Appendix A**).

FIGURE 1. PROJECT LOCATION
Beaverhead Rock
Mitigation Site



800 0 800 1600 FEET

1: 24,000

PROJECT #: 130091.011
DATE: DECEMBER 2001
LOCATION:
PROJECT MANAGER: B. DUTTON
DRAWN BY: B. NOECKER

LAND & WATER CONSULTING, INC.

1120 CEDAR PO BOX 8254 MISSOULA, MT 59807

2.0 METHODS

2.1 Monitoring Dates and Activities

The site was visited on May 19 (spring season), July 15 (mid-season) and October 15, 2004 (fall season). The spring and fall visits were conducted to sample seasonal bird and other wildlife uses. Spring season monitoring is likely to detect migrant and early nesting activities for a variety of avian species (Carlson pers. comm.), as well as maximize the potential for amphibian detection. In Montana, most amphibian larval stages are present by early June (Werner pers. comm.).

The mid-season visit was conducted in July to document vegetation, soil, and hydrologic conditions used to map jurisdictional wetlands. All information contained on the Wetland Mitigation Site Monitoring Form (**Appendix B**) was collected at this time. Activities and information conducted/collected included: wetland delineation; wetland/open water aquatic habitat boundary mapping; vegetation community mapping; vegetation transect; soils data; hydrology data; bird and general wildlife use; photograph points; macroinvertebrate sampling; GPS data points; functional assessment; and (non-engineering) examination of dike structures.

2.2 Hydrology

Wetland hydrology indicators were recorded during the mid-season visit using procedures outlined in the COE 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Hydrology data were recorded on COE Routine Wetland Delineation Data Forms (**Appendix B**).

Additional hydrologic data were recorded on the mitigation site monitoring form (**Appendix B**). Although two deep remnant wells remain on the property in the wetland vicinity (which were not sampled), no groundwater monitoring wells were installed at the site; consequently, no groundwater monitoring was conducted. If present within 18 inches of the ground surface (soil pit depth for purposes of delineation), groundwater depths were documented on the routine wetland delineation data form at each data point.

2.3 Vegetation

General dominant species-based vegetation community types (e.g., *Alopecurus/Juncus*) were delineated on an aerial photograph during the mid-season visit. Standardized community mapping was not employed as many of these systems are geared towards climax vegetation and do not reflect yearly changes. Estimated percent cover of the dominant species in each community type was listed on the site monitoring form (**Appendix B**).

Two 10-foot wide belt transects established in 2001 were sampled during the mid-season monitoring event to represent the range of current vegetation conditions. Percent cover was estimated for each vegetative species within each successive vegetative community encountered within the "belt" using the following values: T (few plants); P (1-5%), 1 (5-15%); 2 (15-25%); 3 (25-35%); 4 (35-45%); 5 (45-55%) and so on to 9 (85-95%). The transect locations are illustrated on **Figure 2** (**Appendix A**). These transects are used to evaluate changes over time,

especially the establishment and increase of hydrophytic vegetation. The transect data were recorded on the mitigation site monitoring form, and photographs were taken from both ends of each transect looking along the transect path.

A comprehensive plant species list for the site was updated as new species were encountered. Ultimately, observations from past years will be compared with new data to document vegetation changes over time. Woody species were not planted at this mitigation site.

2.4 Soils

Soils were evaluated during the mid-season site visit using the hydric soils determination procedures outlined in the COE 1987 Wetland Delineation Manual. Soil data were recorded for each wetland determination point on the COE Routine Wetland Delineation Data Forms (**Appendix B**). The most current terminology used by NRCS was used to describe hydric soils (USDA 1998).

2.5 Wetland Delineation

Wetland delineation was conducted during the mid-season visit according to the 1987 COE Wetland Delineation Manual. Wetland and upland areas within the monitoring area were investigated for the presence of wetland hydrology, hydrophytic vegetation and hydric soils. The information was recorded on COE Routine Wetland Delineation Data Forms (**Appendix B**). The wetland/upland boundary was originally delineated on the aerial photo and recorded with a resource grade GPS unit in 2001 using procedures outlined in **Appendix E**. Modifications to these boundaries in 2005 were accomplished by hand-mapping onto the 2004 aerial photograph. The wetland/upland boundary in combination with the wetland/open water boundary was used to calculate the final wetland acreage. A pre-construction wetland delineation documented 5.2 acres of wetlands at the site (Hackley 1997).

2.6 Mammals, Reptiles, and Amphibians

Mammal, reptile, and amphibian species observations and other positive indicators of use, such as vocalizations, were recorded on the wetland monitoring and bird forms during the 2005 monitoring events. Indirect use indicators, including tracks, scat, burrows, eggshells, skins, bones, etc. were also recorded. Observations were recorded as the observer traversed the site while conducting other required activities. Direct sampling methods, such as snap traps, live traps, and pitfall traps, were not used.

2.7 Birds

Bird observations were also recorded during all three site visits. No formal census plots, spot mapping, point counts, or strip transects were conducted. Observations were recorded incidental to other monitoring activities and were categorized by species, activity code, and general habitat association. A comprehensive list of observed species was compiled including those observed by MDT personnel in recent years.

2.8 Macroinvertebrates

Macroinvertebrate samples were collected during the mid-season site visit at four separate locations (**Figure 2**). Macroinvertebrate sampling procedures are provided in **Appendix F**. Samples were preserved as outlined in the sampling procedure and sent to Rhithron Associates for analysis. In past years two additional samples were collected for a total of six, but in 2004 and 2005 there were two sites (Sites 2 and 4) with no water at which no samples were collected.

2.9 Functional Assessment

A functional assessment form was completed using the 1999 MDT Montana Wetland Assessment Method (**Appendix B**). Field data necessary for this assessment were collected during the mid-season visit. No pre-project functional assessment was conducted at this site.

2.10 Photographs

Photographs were taken illustrating current land uses surrounding the site, the upland buffer, the monitored area and the vegetation transects. Each photograph point location was recorded with a resource grade GPS in 2001. The location of photo points is shown on **Figure 2**, **Appendix A**. All photographs were taken using a digital camera.

2.11 GPS Data

During the 2001 monitoring season, point data were collected with a resource grade GPS unit at the vegetation transect beginning and ending locations and at all photograph locations. Wetland boundaries were also recorded with a resource grade GPS unit in 2001, but were modified via hand-mapping onto an aerial photograph in subsequent years. The method used to collect these points is described in the GPS protocol in **Appendix E**.

2.12 Maintenance Needs

Observations were made of existing structures and of erosion/sediment problems to identify maintenance needs. This did not constitute an engineering-level structural inspection, but rather a cursory examination. Current or future potential problems were documented on the monitoring form.

3.0 RESULTS

3.1 Hydrology

The main source of hydrology seems to be upwelling groundwater and “springs” evident along the constructed channels (ditch/berms) leading south and west from the main open water area (**Figure 3**). Water was observed upwelling from the bottom of these channels. These waters are retained behind a constructed dike. Another source of hydrology comes from the SE corner of

the site from irrigation return flow. Precipitation and surface runoff provide minor contributions to wetland hydrology at this site except during rare and extreme events.

Open water occurred across approximately 6.5 acres or 5% of the 118-acre wetland area (**Figure 3**) during the mid-season visit. Water depth at the open water/rooted vegetation boundary was approximately 1.5 feet. Inundation was observed during the mid-season visit across approximately another 5% of the wetland area which is similar to the last two years (2003 and 2004) but significantly less than in the two preceding years (2001 and 2002). Inundation was present throughout most of Community Type 2 (**Figure 3**), and portions of Type 8. Casual observations during the early season visit indicated complete inundation of Types 2 and 8 and more extensive inundation throughout Type 6.

Annual precipitation totals for 2004 and 2005 were 10.82 and 12.27 inches (to date), respectively, and exceeded the long term annual mean of 9.77 inches. Precipitation from January through July in 2005 was 8.34 inches, which exceeded the long-term January-July mean of 6.55 inches. Despite this, water levels in 2004 and 2005 at the site were lower than observed during past monitoring in 2001 and 2002, when annual precipitation totaled 6.82 and 9.17 inches, respectively. The reason for lower water levels over the past three years is not clear, but may be related to delayed effects of reduced precipitation from 1999 – 2003 during which annual precipitation levels were generally well below the long-term mean, allowing for greater influence of evapotranspiration, percolation, and leakage. Also, in 2004, the landowner dropped the water level by removing some stop logs in order to reduce wave action along the main dike and facilitate fabric and gravel installation. While this activity may have temporarily affected 2004 water levels, it is unlikely to have substantively affected 2005 levels. As requested by MDT, letters discussing water level management related to dike erosion issues are included in **Appendix D**.

Only one of six wetland sites documented on the Routine Wetland Determination forms (**Appendix B**) had groundwater within 18 inches of the surface on July 15, 2005. Casual observations at other locations on this date revealed groundwater within 18 inches of the surface in small areas of Community Types 2 and 6 (**Figure 3**). These groundwater depths seem low compared with the soil and vegetation indicators present and are similar to depths observed in 2004. Continued low groundwater depths could result in a decline in wetland vegetation. It is important to note that drought conditions have dominated for many years in recent time. Hydrologic conditions must be considered within this climatic context.

3.2 Vegetation

Ninety-seven plant species were identified at the site and are listed in **Table 1**. No new species were identified in 2005. The majority of these species were herbaceous. Few woody species were found within the monitoring area. One plant species of concern, Lemmon's Alkali Grass (*Puccinellia lemmonii*), was identified in past years and is ranked S1 by the Montana Natural Heritage Program. However, Lemmon's Alkali Grass was not observed in 2005. Four Wetland Community types (Type 2: *Scirpus*, Type 5: *Alopecurus/Juncus*, Type 6: *Alopecurus/Scirpus* and Type 8: *Potamogeton/Polygonum*) and three Upland Community Types (Type 3: *Hordeum/Kochia*, Type 4: *Muhlenbergia/Agropyron* and Type 7: *Sarcobatus/Elymus*) were

Table 1: ***2001-2005 Beaverhead Gateway vegetation species list.***

Scientific Name	Common Name	Region 9 (Northwest) Wetland Indicator
Agropyron cristatum	crested wheatgrass	--
Agropyron repens	quack grass	FACU
Agropyron smithii	western wheatgrass	FACU
Agropyron trachycaulum	slender wheatgrass	FAC
Agrostis stolonifera	redtop	FAC+
Alopecurus pratensis	meadow foxtail	FACW
Artemisia frigida	fringed sagewort	--
Artemisia spp.	sagebrush	--
Aster falcatus	leafy-bracted aster	FACU-
Aster hesperius	Siskiyou aster	OBL
Astragalus spp.	milkvetch	--
Bromus inermis	smooth brome	--
Bromus japonicus	Japanese brome	FACU
Bromus tectorum	cheatgrass	--
Calamagrostis neglecta	slim reedgrass	FACW
Cardaria draba	white top	--
*Carduus nutans**	musk thistle	--
Carex capillaries	hair-like sedge	FACW
Carex limnophila	pond sedge	FACW
Carex nebrascensis	Nebraska sedge	OBL
Carex praegracilis	clustered field sedge	FACW
*Carex torreyi**	Torrey's sedge	FAC
*Centaurea maculosa**	spotted knapweed	--
Chenopodium album	white goosefoot	FAC
Chenopodium rubrum	coastal-blite pigweed	FACW+
Chrysothamnus nauseosus	rubber rabbitbrush	--
Cirsium arvense	Canada thistle	FACU+
Cirsium undulatum	wavy-leaf thistle	FACU+
Cleome serrulata	Rocky Mountain bee plant	FACU
*Cornus stolonifera**	red-osier dogwood	FACW
Cynoglossum officinalis	hound's tongue	FACU
Dactylis glomerata	orchard grass	FACU
Descurainia sophia	tansy mustard	--
Distichlis spicata	saltgrass	FAC+
*Elaeagnus angustifolia**	Russian olive	FAC
*Eleocharis acicularis**	least spike rush	OBL
Eleocharis pauciflora	few-flowered spike rush	OBL
Elymus cinereus	big basin wild rye	FACU
Epilobium palustris	swamp willow-herb	OBL
Equisetum laevigatum	smooth scouring-rush	FACW
Festuca idahoensis	Idaho fescue	FACU
Festuca pratensis	meadow fescue	FACU+
Gentianella amarelle	northern gentian	FACW-
Glaux maritime	sea-milkwort	FACW+
Grindelia squarrosa	curly-cup gumweed	FACU
Habenaria dilatata	bog orchid	--
Haplopappus carthamoides	Columbia goldenweed	--
Helianthus nuttalli	Nuttall's sunflower	FACW-
*Helenium autumnale**	sneezeweed	FACW
Hippuris vulgaris	common mare's-tail	OBL
Hordeum jubatum	foxtail barley	FAC+
Iris missouriensis	Rocky Mountain iris	OBL
Iva axillaries	small-flower sumpweed	FAC
Juncus balticus	Baltic rush	FACW+
Juncus bufonius	toad rush	FACW+
Juncus ensifolius	three-stamen rush	FACW
Kochia scoparia	summer-cypress	FAC

Table 1 (continued): ***2001-2005 Beaverhead Gateway vegetation species list.***

Scientific Name	Common Name	Region 9 (Northwest) Wetland Indicator
Lactuca serriola	prickly lettuce	FAC-
Lepidium perfoliatum	clasping pepper-grass	FACU+
Lycopus asper	rough bugleweed	OBL
Medicago lupulina	black medic	FAC
Medicago sativa	alfalfa	--
Melilotus alba	white sweetclover	FACU
Melilotus officinalis	yellow sweetclover	FACU
*Mentha arvensis**	mint	FAC
Mimulus spp.*	monkey flower	OBL
Muhlenbergia asperifolia	alkali muhly	FACW
*Myosotis discolor**	forget-me-not	FACW
Phalaris arundinacea	canary reed grass	FACW
*Phleum pratense**	Timothy	FACU
Plantago eriopoda	saline plantain	FACW
Phlox longifolia	long-leaf phlox	--
*Phragmites australis**	common reed	FACW+
Poa pratensis	Kentucky bluegrass	FACU+
Poa sandbergii	Sandberg's bluegrass	--
*Polygonum amphibium**	water smartweed	OBL
Polygonum aviculare	prostrate knotweed	FACW+
*Populus trichocarpa**	cottonwood	FAC
Potamogeton spp.*	pondweed	OBL
Potentilla anserine	silverweed	OBL
*Potentilla fruticosa**	shrubby cinquefoil	FAC-
Puccinellia lemmonii	Lemmons alkali grass	FAC
Ranunculus populago	popular buttercup	FACW
Rorippa spp.*	watercress	OBL
*Rumex crispus**	curly dock	FACW
Salicornia spp.*	saltwort	--
*Salix bebbiana**	Bebb willow	FACW
Salix exigua	sandbar willow	OBL
Salsola kali	Russian thistle	FACU
Sarcobatus vermiculatus	greasewood	FACU+
*Scirpus acutus**	hard stem bulrush	OBL
Scirpus americanus	American bulrush	OBL
*Scirpus maritimus**	salt marsh bulrush	OBL
Scirpus pungens	three-square bulrush	OBL
Scirpus validus	soft-stem bulrush	OBL
Shepherdia spp.*	buffaloberry	--
Sisyrinchium angustifolium	western blue eyed grass	FACW-
Sonchus arvensis	field sowthistle	FAC-
Spartina gracilis	alkali cordgrass	FACW
Sporobolus cryptandrus	sand dropseed	FACU
Stipa comata	needle & thread grass	--
Suaeda intermedia	alkali seepweed	FAC
Tragopogon dubius	yellow salsify	--
Triglochin maritime	seaside arrowgrass	OBL
Typha latifolia	cattail	OBL
Urtica dioica	stinging nettle	FAC+
Zigadenus venenosus	meadow death camas	FAC

* - Plant species observed by Montana Department of Transportation.

identified and mapped at the mitigation area (**Figure 3**, **Appendix A**). Plant species observed within each of these communities are listed on the attached data form (**Appendix B**).

Type 8 is the wettest community type and occurred as an aquatic bed community in the shallower water areas (**Figure 3**). It was dominated by pondweed (*Potamogeton spp.*) and smartweed (*Polygonum spp.*). Type 2 is the next wettest and occurred mainly as a fringe around the border of shallow water areas dominated by bulrush (*Scirpus spp.*). Type 6 is the next wettest wetland vegetation type and occurred throughout the monitoring area on sites slightly higher than Type 2. The vegetation in Type 6 was highly variable from spot to spot due to small changes in soil properties, topography, and past disturbance. Vegetation in Type 6 was also highly variable since it was in transition from upland to wetland. Across much of this type, the vegetation was dominated by meadow foxtail (*Alopecurus pratensis*) and bulrush. However, small areas were dominated by other species.

Adjacent upland vegetation community types were mainly dominated by rangeland species with cropland along the southern border. Type 3 was located along dikes, spoil pile and or other highly disturbed soil materials and was dominated by weedy species such as foxtail barley (*Hordeum jubatum*), summer-cypress (*Kochia scoparia*) and Canada thistle (*Cirsium arvense*). Type 4 was mostly dominated by alkali muhly (*Muhlenbergia asperifolia*), slender wheatgrass (*Agropyron trachycaulum*) and western wheatgrass (*Agropyron smithii*). Type 7 was dominated by greasewood (*Sarcobatus vermiculatus*), basin wild rye (*Elymus cinereus*) and western wheatgrass.

Vegetation transect results are detailed in the attached data form (**Appendix B**), and are summarized in **Tables 2** and **3** and **Charts 1** to **4**. Vegetation transects results showed no change between each monitoring year.

Table 2: ***Transect 1 data summary.***

Monitoring Year	2001	2002	2003	2004	2005
Transect Length (feet)	1650	1650	1650	1650	1650
# Vegetation Community Transitions along Transect	5	5	5	5	5
# Vegetation Communities along Transect	4	4	4	4	4
# Hydrophytic Vegetation Communities along Transect	3	3	3	3	3
Total Vegetative Species	22	22	22	22	22
Total Hydrophytic Species	12	14	14	14	14
Total Upland Species	10	8	8	8	8
Estimated % Total Vegetative Cover	95	95	95	95	95
% Transect Length Comprised of Hydrophytic Vegetation Communities	98	98	98	98	98
% Transect Length Comprised of Upland Vegetation Communities	2	2	2	2	2
% Transect Length Comprised of Unvegetated Open Water	0	0	0	0	0
% Transect Length Comprised of Bare Substrate	0	0	0	0	0

Chart 1: ***Transect maps showing vegetation types for Transect 1 from start (0 feet) to end 1650 feet) for each year monitored.***

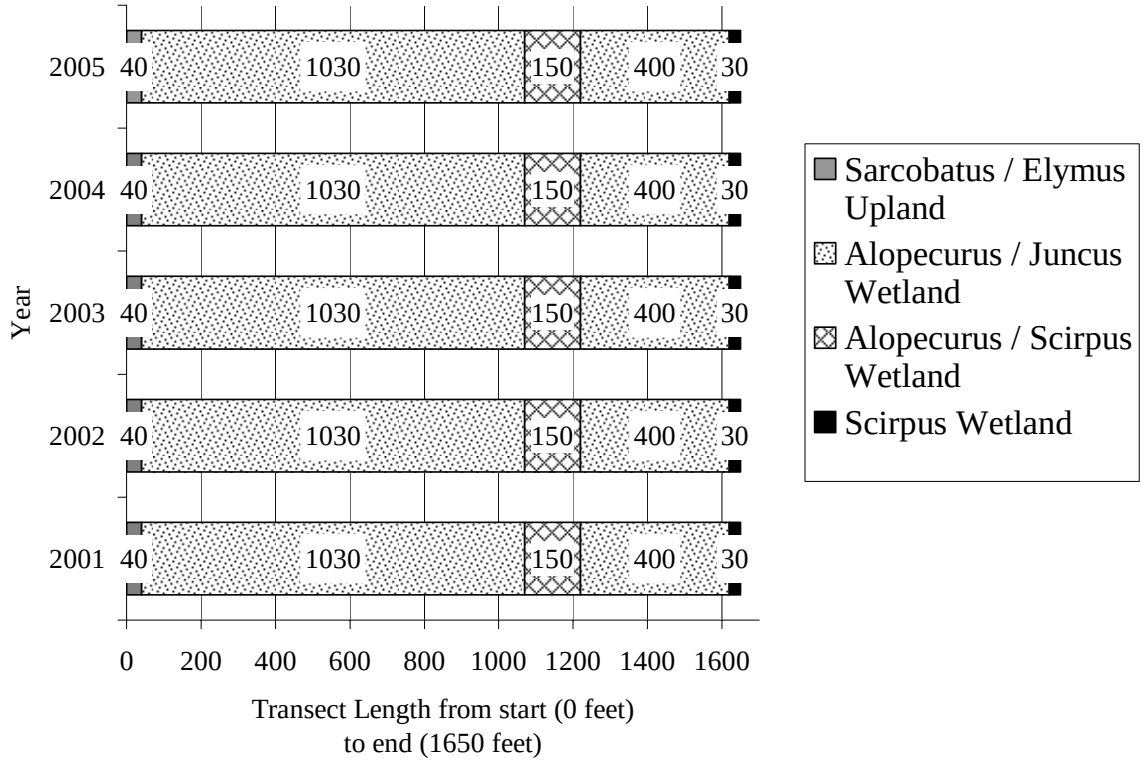


Chart 2: ***Length of vegetation community types within Transect 1 for each year monitored.***

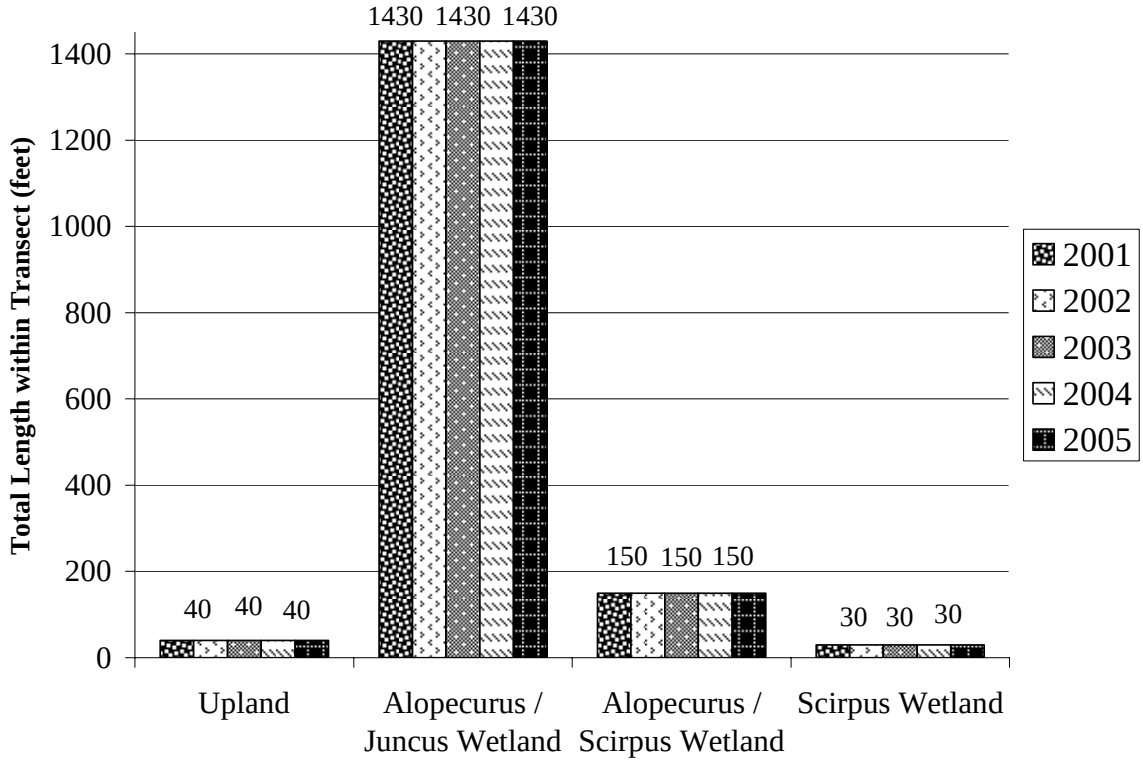


Table 3: ***Transect 2 data summary.***

Monitoring Year	2001	2002	2003	2004	2005
Transect Length (feet)	280	280	280	280	280
# Vegetation Community Transitions along Transect	4	4	4	4	4
# Vegetation Communities along Transect	4	4	4	4	4
# Hydrophytic Vegetation Communities along Transect	2	2	2	2	2
Total Vegetative Species	18	21	21	21	21
Total Hydrophytic Species	11	10	10	10	10
Total Upland Species	7	11	11	11	11
Estimated % Total Vegetative Cover	80	80	80	80	80
% Transect Length Comprised of Hydrophytic Vegetation Communities	43	43	43	43	43
% Transect Length Comprised of Upland Vegetation Communities	57	57	57	57	57
% Transect Length Comprised of Unvegetated Open Water	0	0	0	0	0
% Transect Length Comprised of Bare Substrate	0	0	0	0	0

Chart 3: ***Transect maps showing vegetation types for Transect 2 from start (0 feet) to end (280 feet) for each year monitored.***

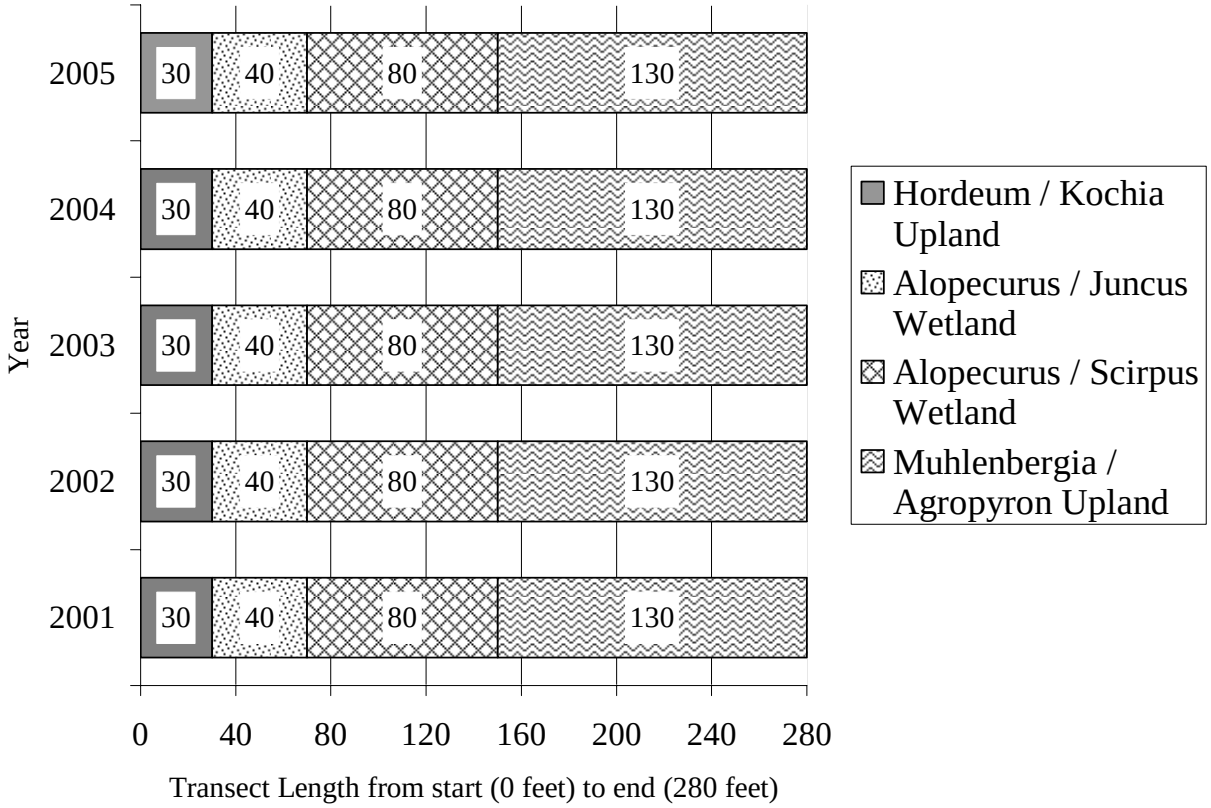
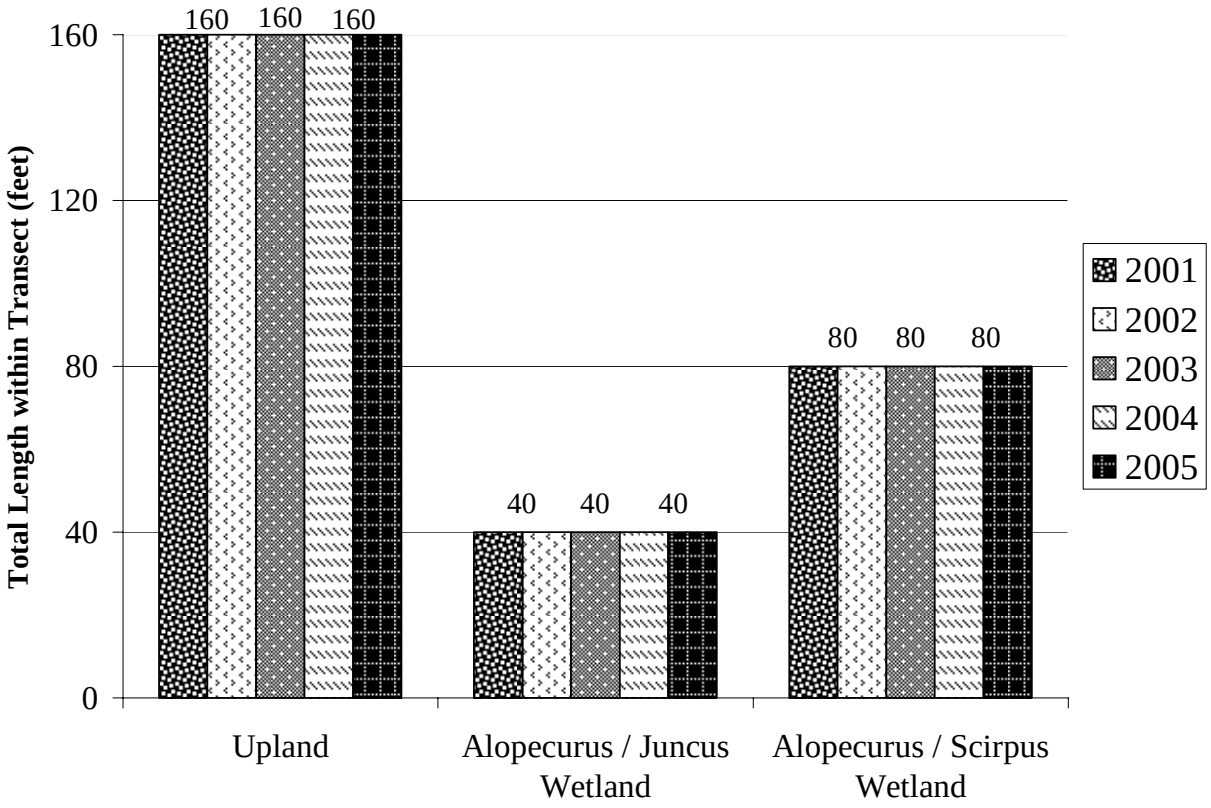


Chart 4: ***Length of vegetation community types within Transect 2.***



Noxious weeds at the site included spotted knapweed (*Centaurea maculosa*) and Canada thistle. Other weedy species included summer-cypress, hound's-tongue (*Cynoglossum officinalis*), curly-cup gumweed (*Grindelia squarrosa*), lambsquarters (*Chenopodium album*), whitetop (*Cardaria draba*) and quackgrass (*Agropyron repens*). In 2005, lambsquarters was much more conspicuous across the entire site than in past years, especially along the dike. No common reed (*Phragmites australis*) was observed at the site although it was present nearby along Highway 41. This is an extremely aggressive invader of wetlands and a serious concern at this site. Weed control and revegetation is needed at this site to prevent further spread and protect soil from wind and water erosion. Additional effort should be made to determine if common reed or other important weeds are present. One weedy species (lambsquarters) showed a dramatic increase this year. Lambsquarters was most common along road, dikes and other disturbed areas but also in wetland vegetation types on drier and more disturbed microsites. This increase could be due to generally drier conditions, increased disturbance from grazing or other factors.

3.3 Soils

The western two-thirds of the site are within Beaverhead County where soil survey information is not currently available. The eastern one-third of the site was mapped as part of the Madison County Soil Survey (USDA 1989). The soil in the eastern one-third of the site is mapped as Neen silty clay loam with randomly distributed soils that have a layer of organic material 4 to 20 inches thick at the surface (USDA 1989). Neen soils are not listed on the Montana NRCS Hydric Soil list. Soil characteristics at each wetland determination point were compared with

those of the Neen soil. The soils observed across most of the site did not generally match the Neen soil. The main portion of the site mapped during the Madison County soil survey is currently under water.

Wetland soils were similar to those observed in 2001-2004. Wetland soils observed during monitoring and documented on the Routine Wetland Determination form were mostly loams, silt loams or silty clay loams with very low chromas (0 or 1) within 2 inches of the surface. Mottles (redoximorphic features) were present in most profiles observed. Only one of four soil profiles described on the Routine Wetland Determination forms was saturated within 18 inches of the surface reflecting the time of year and the recent history of drought discussed above. Small areas were observed with thin organic surface layers and with mucky mineral surface layers.

3.4 Wetland Delineation

Wetland boundaries were similar in 2005 to those mapped in past years. These wetland boundaries continue to be located at distinct topographic and soil breaks that are not likely to change over time without a significant change in groundwater elevation or climate. Delineated wetland boundaries are illustrated on **Figure 3 in Appendix A**. Completed wetland delineation forms are included in **Appendix B**. Soils, vegetation, and hydrology are discussed in preceding sections.

Wetland conditions identified from monitoring from 2001 through 2005 are described in **Table 4**. Approximately 111.7 wetland acres and 6.5 open water acres occur within the 2005 monitoring area (**Figure 3**). The pre-construction wetland delineation reported 5.2 wetland and no open water acres. The net increase in wetland acres is 111.7 - 5.2 = 106.5 acres plus 6.5 acres of open water. Additional area may form with time and more normal precipitation around the low gradient portions of the current wetland area.

Table 4: ***Wetland conditions within the Beaverhead Gate Wetland Mitigation Site.***

Wetland Condition	Monitoring Area	Above Dike	Below Dike
Gross Wetland Area	118.2	97.9	20.3
Open Water Area	6.5	6.5	0.0
Net Wetland Area	**111.7**	**91.4**	**20.3**

3.5 Wildlife

Wildlife species, or evidence of wildlife, observed on the site during 2001-2005 monitoring efforts are listed in **Table 5**. The site receives substantial use by American white pelicans, trumpeter swans, black terns, sandhill cranes, and other species. Sandhill cranes are known breeders on the site (Urban pers. comm.). American white pelicans, trumpeter swans, and black terns are all considered species of concern by the MNHP relative to breeding locations. Of these three species, black terns are likely breeders on the site.

Table 5: ***Fish and Wildlife species observed at the Beaverhead Gateway Mitigation Site from 2001 to 2005[1].***

FISH	
None	
AMPHIBIANS	
None	
REPTILES	
Garter Snake (*Thamnophis* spp.)	
Painted Turtle	
BIRDS	
American White Pelican (*Pelecanus erythrorhynchos*)	**Horned Lark (*Eremophila alpestris*)**
American Crow (*Corvus brachyrhynchos*)	**Killdeer (*Charadrius vociferous*)**
American Coot (*Fulica americana*)	**Lesser Scaup (*Aythya affinis*)**
American Dipper (*Cinclus*)	**Long-billed Dowitcher (*Limnodromus scolopaceus*)**
Bald Eagle (*Haliaeetus leucocephalus*)	**Mallard (*Anas platyrhynchos*)**
Bank Swallow (*Riparia riparia*)	**Marsh Wren (*Cistothorus palustris*)**
Black-billed Magpie (*Pica pica*)	**Northern Harrier (*Circus cyaneus*)**
Black-necked Stilt (*Himantopus mexicanus*)	**Northern Pintail (*Anas acuta*)**
Black Tern (*Chlidonias niger*)	Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)
Blue-winged Teal (*Anas discors*)	**Northern Shoveler (*Anas clypeata*)**
Bullock's Oriole (*Icterus bullockii*)	**Raven (*Corvus corax*)**
Canada Goose (*Branta canadensis*)	Plover (*Charadrius spp*.)
Cinnamon Teal (*Anas cyanoptera*)	Red-head Duck (*Aythya americana*)
Cliff Swallow (*Petrochelidon pyrrhonota*)	Red-tail Hawk (*Buteo jamaicensis*)
Common Goldeneye (*Bucephala clangula*)	**Red-winged Blackbird (*Agelaius phoeniceus)***
Common Snipe (*Gallinago gallinago*)	**Sandhill Crane (*Grus canadensis*)**
Common Yellowthroat (*Geothlypis trichas*)	Sora (*Porzana carolina*)
Cowbird (*Molothrus ater*)	**Tree Swallow (*Tachycineta bicolor*)**
Eared Grebe (*Podiceps nigricollis*)	Trumpeter Swan (*Cygnus buccinator*)
Franklins Gull (*Larus pipixcan*)	Tundra Swan (*Cygnus columbianus*)
Forster's Tern (*Sterna forsteri*)	Vesper Sparrow (*Pooecetes gramineus*)
Gadwall (*Anas strepera*)	Western Bluebird (*Sialia mexicana*)
Great Blue Heron (*Ardea herodias*)	**Western Meadowlark (*Sturnella neglecta*)**
Hooded Merganser (*Lophodytes cucullatus*)	**Wilson's Phalarope (*Phalaropus tricolor*)**
	Yellow-headed Blackbird (*Xanthocephalus xanthocephalus)*
MAMMALS	
Coyote (*Canis latrans*)	Red Fox (*Vulpes vulpes*)
Mule Deer (*Odocoileus hemionus*)	Striped Skunk (*Mephitis mephitis*)
Muskrat (*Ondatra zibethicus*)	**White-tailed Deer (*Odocoileus virginianus*)**
Northern River Otter (*Lutra canadensis*)	

[1]**Bolded** species indicate those observed during 2005.

In 2005 there were more birds and bird species observed than in 2004. These changes may be due to the specific times and dates observations were made in 2004. The greatest number of birds observed at the site was about 449 compared with over 500 in 2001 and about 200 in 2003. Specific evidence observed, as well as activity codes pertaining to birds, is provided on the completed monitoring form in **Appendix B**.

This site provides habitat for a variety of wildlife species. Three mammal (coyote, white-tailed deer, muskrat), one reptile (painted turtle), and 29 bird species were noted at the mitigation site during the 2005 site visits. Many other wildlife species use the site but were not present during the monitoring visits. **Appendix D** includes a list of 81 bird species observed at the site by MDT biologists in recent years.

3.6 Macroinvertebrates

Complete results from the four macroinvertebrate sampling locations (**Figure 2**) are presented in **Appendix F.** Samples were not taken at locations 2 and 4 in 2005 due to a lack of water. The following analysis was provided by Rhithron Associates (Bollman 2005).

Beaverhead #1. The small fluctuations in total bioassessment score over the years of study suggest that conditions may be stable at this site. Scores indicated sub-optimal conditions in 4 of 5 years of study. The shift from a scud-and-snail assemblage to a benthic-oriented assemblage was apparent in the 2004 data, and apparently intensified in the meantime. Proportions of crustaceans and mollusks fell to 11% in the 2005 collection, and chironomids (60%) dominated the faunal groups. This finding, in addition to the relatively high taxa richness and diversity of midge taxa suggest that habitat complexity may be increasing at the site. Loss of several "sensitive" taxa in the POET group, however, suggests that water quality may have diminished between 2004 and 2005. The high proportion of hemoglobin-bearing taxa (Dicrotendipes sp., Apedilum sp., etc.) supports this hypothesis. Increased temperature and/or nutrient enrichment could account for water quality impairment here.

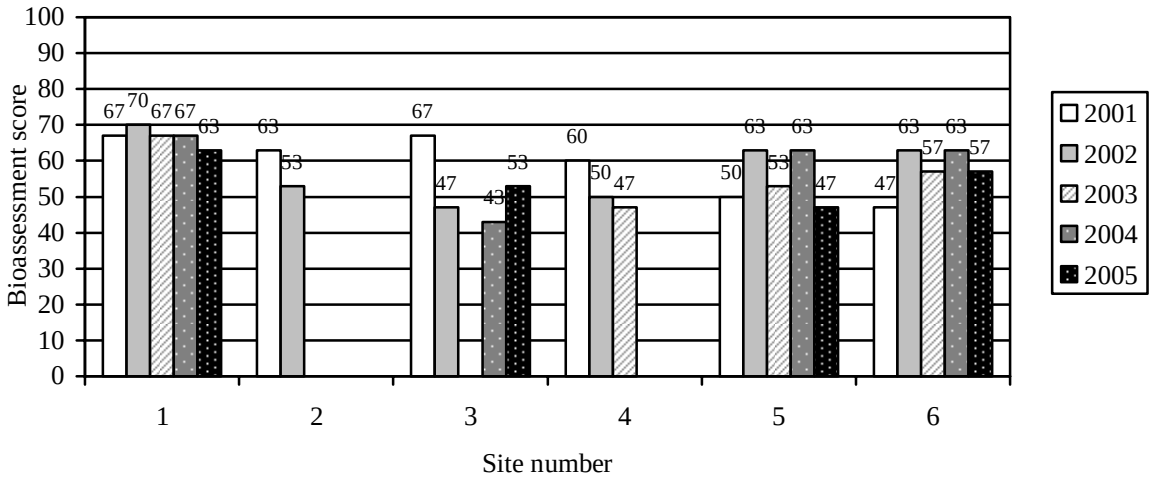
Beaverhead #3. Taxa richness continued to fall at this site; in 2005 the collected assemblage was made up of only 9 taxa. As in 2004, bioassessment scores indicate poor conditions, reflected in the dominance of tolerant organisms, low diversity, and high proportion of non-insect taxa. Dominance by microcrustacea (90% of sampled organisms in 2005) suggests that the site may suffer dewatering periodically. Monotonous habitats probably include substrate surfaces and the water column, with little contribution of macrophytes as colonization sites. Index scores continue to indicate poor conditions.

Beaverhead #5. In 2005, the invertebrate collection yielded very low abundance of animals at this site; only 34 were taken, too few for assessment to be reliable. Given adequate sampling effort, the finding suggests that aquatic habitats were limited. The taxonomic composition of the assemblage suggests that the water column and hypoxic substrate surfaces comprised the majority of available habitats. A few macrophyte surfaces may have added some complexity. Poor conditions are indicated by the performance of index metrics. Periodic dewatering cannot be ruled out.

Beaverhead #6. The invertebrate fauna collected at this site in 2005 suggests that macrophyte surfaces provided a large component of available habitats. Snails (Physa sp. and Gyraulus sp.) were the dominant taxa. Scrapers replaced shredders as the dominant functional group, suggesting that benthic habitats became less important in 2005, perhaps as a result of an increase in macrophyte density. Invertebrate taxa richness was relatively high and relatively stable over the studied years here.

Among Beaverhead Complex sites, Site #1 and Site #6 appear to represent the best conditions, with apparently higher macrophyte diversity accounting for higher invertebrate diversity. Other sites were depauperate and exhibited low invertebrate diversity.

Chart 5: ***Bioassessment scores for Beaverhead Gateway from 2001 to 2005.***



3.7 Functional Assessment

The functional assessment numbers for 2005 are similar to those from past years, although a slightly higher recreation/education score was afforded in 2004 and 2005 as the landowner clarified that permission has and can be granted for birding and scientific research. A completed functional assessment form is included in **Appendix B**. The Beaverhead Gateway mitigation site is currently rated as a Category II (high value) site, primarily due to high wildlife habitat, TE habitat, MNHP species habitat, surface water storage, sediment/nutrient removal, food chain support and groundwater discharge ratings. The site received a moderate fish habitat rating due to few fish and habitat deficiencies. The site received a low rating for sediment/shoreline stability due to a lack of plants with deep binding roots. The high turbidity along the shoreline suggests that wave action is eroding the shoreline, especially along the dike where new fill was placed in 2004 and vegetation is just establishing.

Based on functional assessment results (**Table 6)**, approximately 994 functional units have been created thus far at the Beaverhead Gateway mitigation site.

Table 6: ***Summary of 2005 wetland function/value ratings and functional points.***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2005
Listed/Proposed T&E Species Habitat	Mod (0.7)
MNHP Species Habitat	High (1.0)
General Wildlife Habitat	High (0.9)
General Fish/Aquatic Habitat	Mod (0.5)
Flood Attenuation	Mod (0.5)
Short and Long Term Surface Water Storage	High (1.0)
Sediment, Nutrient, Toxicant Removal	High (1.0)
Sediment/Shoreline Stabilization	Low (0.3)
Production Export/Food Chain Support	High (0.9)
Groundwater Discharge/Recharge	High (1.0)
Uniqueness	Mod (0.5)
Recreation/Education Potential	Mod (0.5)
Actual Points/Possible Points	8.8 / 12.0
% of Possible Score Achieved	73%
Overall Category	II
Total Acreage of Assessed Wetlands and Other Aquatic Habitats	**118.2**
Functional Units (acreage x actual points)	**1040.16**
Net Acreage Gain	**113**
Net Functional Unit Gain	**994.4**

3.8 Photographs

Representative photographs taken from photo-points and transect ends are presented in **Appendix C**.

3.9 Maintenance Needs/Recommendations

Weed control and revegetation of disturbed sites is still needed to prevent further weed spread, reduce the risk of new weeds invading, reduce wind and water erosion and reduce sediment input to surface waters. Several noxious weeds are present including Canada thistle, hound's-tongue, and spotted knapweed.

Spoil piles left from ditch excavation will continue to create a weed problem, a wind and water erosion hazard and a sedimentation source. This same issue applies to portions of the dike and other poorly vegetated sites. A possible remedy would entail chemically treating weeds and re-seeding the spoil piles with desirable grasses.

Dike erosion and sediment production from the poorly vegetated shoreline could be monitored more closely by installing permanent markers or by periodic surveys. MDT was monitoring erosion on the dike using bank pins from 1998-2001, but the pins are no longer present indicating that erosion has occurred (Urban pers. comm.). The dike was examined by a DNRC dam inspector in 2005, and the erosion was considered to be a maintenance issue, but not a dam safety concern (see letter in **Appendix D**). The DNRC recommended periodically adding fill to

the face of the dike where breaching is taking place and vertical slopes are developing. Fill was added to the face of the dike in 2004 to replace eroded material, but has not yet vegetated. Additional examples of potential solutions to erosion problems include shoreline reinforcement, off-shore wave protection, protected off-shore plantings, shoreline plantings, and placement of vegetated sod mats.

3.10 Current Credit Summary

At this time approximately 106.5 acres of wetland and 6.5 acres of open water creation have been accomplished compared with a goal of 52 acres. This includes portions of the monitoring area both above (net of 86.2 wetland acres and 6.5 open water acres) and below (20.3 wetland acres) the dike. MDT has opted not to purchase the credits that have developed below the dike (Urban pers. comm.). Consequently, available credit at the site (above the dike) is currently 92.7 acres, well in excess of the 52-acre goal.

4.0 REFERENCES

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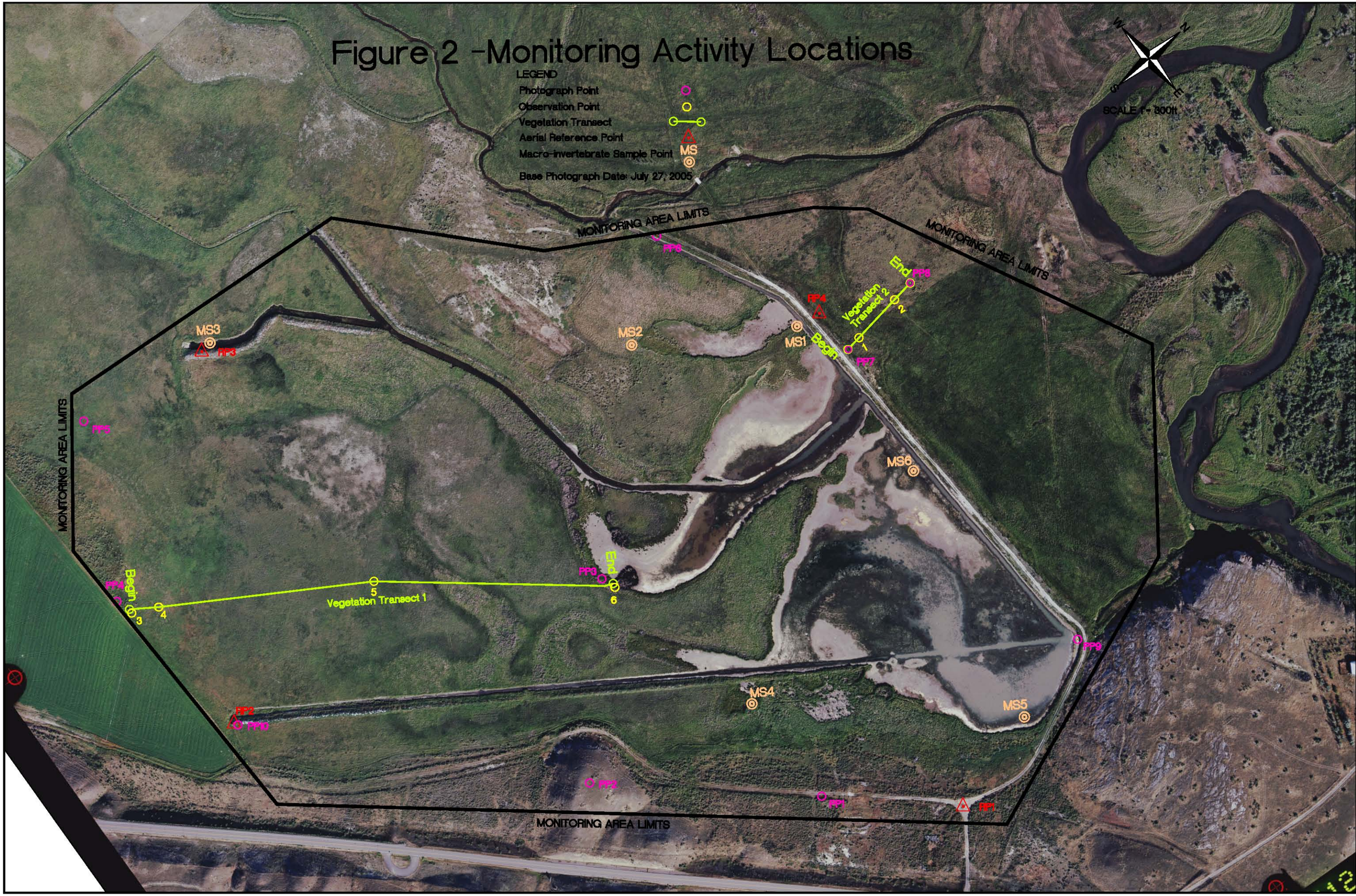
Appendix A

FIGURES 2 & 3

MDT Wetland Mitigation Monitoring
Beaverhead Gateway
Dillon, Montana

Figure 2 -Monitoring Activity Locations



PROJECT NAME
MDT Beaverhead Gateway Ranch Wetland Mitigation
DRAWING TITLE
Monitoring Activity Locations

PROJ NO: 130091.011	DRAWN: RA/LL
FILE NAME: TASK11BASE.dwg	CHECKED: JH
SCALE: 1"= 300ft.	APPVD: BD
LOCATION: Beaverhead Rock	PROJ MGR: BD

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

SHEET NUMBER
2 OF

REV
DATE: 11-4-05

Figure 3 - Mapped Site Features 2005

Vegetation Communities:

① Open Water
② Scirpus
③ Hordeum/Kochia-Upland
④ Muhlenbergia/Agropyron-Upland
⑤ Alopecurus/Juncus
⑥ Alopecurus/Scirpus
⑦ Sarcobatus/Elymus-Upland
⑧ Potamogeton/Polygonum-Aquatic

LEGEND
Monitoring Area Limits
Open Water Boundary
Wetland - Upland Boundary
Vegetation Community Boundary
Base Photograph Date: July 27, 2005

	Monitoring Area	Above Dike	Below Dike
Gross Wetland Area	118.2 Acres	97.9 Acres	20.3 Acres
Open Water Area	6.5 Acres	6.5 Acres	0.0 Acres
Net Wetland Area	111.7 Acres	91.4 Acres	20.3 Acres

SCALE 1"= 300ft

MONITORING AREA LIMITS
Upland
Dike Upland
Open Water

PROJECT NAME
MDT Beaverhead Ranch Wetland Mitigation
DRAWING TITLE
Mapped Site Features 2005

PROJ NO: B43054.202	DRAWN: LLL
LOCATION:	PROJ MGR: B.Dutton
SCALE: 1"= 300'	CHECKED: APPVD:
FILE NAME: L:\330054.202\Beaverhead\dwg\Mod2Beaverhead2005.dwg	

LAND & WATER CONSULTING
P.O. BOX 8254
Missoula, MT 59807
A division of PBS

FIGURE 3 OF
REV -
Dec/19/2005

Appendix B

2005 WETLAND MITIGATION SITE MONITORING FORM
2005 BIRD SURVEY FORM
2005 WETLAND DELINEATION FORMS
2005 FUNCTIONAL ASSESSMENT FORM

MDT Wetland Mitigation Monitoring
Beaverhead Gateway
Dillon, Montana

LWC / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: Beaverhead Rock Project Number: B43054.00-0202 Assessment Date: 7/15/05
Location: NE of Dillon MDT District: Butte Milepost:_____
Legal description: T_5S__ R_7W___ Section 21, 27, & 28 Time of Day: All
Weather Conditions: Clear Person(s) conducting the assessment: B. Dutton
Initial Evaluation Date:___/____/____ Visit #: 5 Monitoring Year: 2005
Size of evaluation area: 147 acres Land use surrounding wetland: Agriculture (crops & grazing)

Monitoring area includes wetland & upland.

HYDROLOGY

Surface Water Source:_____
Inundation**:** Present X Absent____ Average depths: 0.25 ft Range of depths: 0 - 4 ft
Assessment area under inundation:____%
Depth at emergent vegetation-open water boundary: 1.5 ft
If assessment area is not inundated are the soils saturated w/in 12" of surface**:** Yes____No_____
Other evidence of hydrology on site (drift lines, erosion, stained vegetation etc.): Drift lines, stained vegetation, drainage patterns, oxidized root channels.

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

Well #	Depth	Well #	Depth	Well #	Depth

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

COMMENTS/PROBLEMS: Site is large and variable. It's difficult to group areas into vegetation types that are narrowly defined without having hundreds of small polygons. Vegetation types as mapped have varying coverage of the indicator species.

VEGETATION COMMUNITIES

Community No.: 2 Community Title (main species): Scirpus

Dominant Species	% Cover	Dominant Species	% Cover
Scirpus americanus	9		
Scirpus acutus	P		

COMMENTS/PROBLEMS: Bullrush along shorelines- also occurs elsewhere than where shown on map but areas are too small to delineate.

NOTE: # 1 is open water on map.

Community No.: 3 Community Title (main species): Hordeum / Kochia

Dominant Species	% Cover	Dominant Species	% Cover
Hordeum jubatum	2	*Agropyron trachycaulum*	P
Kochia scoparia	2	*Distichlis spicata*	P
Cirsium arvense	1	*Suaeda intermedia*	P
Cardaria draba	P	*Descurainia sophia*	P
Chenopodium album	T		

COMMENTS/PROBLEMS: Weedy community on dikes. Species composition varies.

Community No.: 4 Community Title (main species): Muhlenbergia / Agropyron

Dominant Species	% Cover	Dominant Species	% Cover
Muhlenbergia asperifolia	5	*Suaeda intermedia*	T
Agropyron smithii	2	*Sarcobatus vermiculatus*	T
Hordeum jubatum	T	*Juncus balticus*	T
Elymus cinereus	P	*Agropyron trachycaulum*	P
Poa pratensis	T		

COMMENTS/PROBLEMS: Slightly higher mound above wetland area.

Additional Activities Checklist:

X Record and map vegetative communities on air photo

VEGETATION COMMUNITIES (continued)

Community No.: 5 Community Title (main species): Alopecurus / Juncus

Dominant Species	% Cover	Dominant Species	% Cover
Alopecurus pratensis	7	*Rumex crispus*	P
Triglochin maritima	P	*Agropyron trachycaulum*	P
Agrostis alba	1	*Carex limnophila*	T
Carex nebrascensis	1	*Muhlenbergia asperifolia*	P
Juncus balticus	1		

COMMENTS/PROBLEMS: This area is highly variable. It is dominated by these species but their coverage varies across this community type. Variation is in part due to the transition to wetland character.

Community No.: 6 Community Title (main species): Alopecurus / Scirpus

Dominant Species	% Cover	Dominant Species	% Cover
Alopecurus pratensis	5	*Carex limnophila*	T
Scirpus americanus	1	*Agropyron trachycaulum*	T
Scirpus acutus	P	*Scirpus pungens*	T
Juncus balticus	2	*Hordeum jubatum*	T
Triglochin maritima	1	*Chenopodium album*	T

COMMENTS/PROBLEMS: This community is also highly variable on a micro-site basis due to small topographic changes and due to increasing wetlands influence.

Community No.: 7 Community Title (main species): Sarcobatus / Elymus

Dominant Species	% Cover	Dominant Species	% Cover
Sarcobatus vermiculatus	3	*Juncus balticus*	T
Elymus cinereus	1	*Poa pratensis*	T
Hordeum jubatum	1		
Agropyron smithii	P		
Agropyron trachycaulum	1		

COMMENTS/PROBLEMS: Upland areas adjacent to wetland. Similar to 2001.

COMPREHENSIVE VEGETATION LIST

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
Agropyron cristatum		*Epilobium palustris*	
Agropyron repens		*Equisetum laevigatum*	
Agropyron smithii		*Festuca idahoensis*	
Agropyron trachycaulum		*Festuca pratensis*	
Agrostis stolonifera		*Gentianella amarelle*	
Alopecurus pratensis		*Glaux maritime*	
Artemisia frigida		*Grindelia squarrosa*	
Artemisia spp.		*Habenaria dilatata*	
Aster falcatus		*Haplopappus carthamoides*	
Aster hesperius		*Helianthus nuttalli*	
Astragalus spp.		*Hippuris vulgaris*	
Bromus inermis		*Hordeum jubatum*	
Bromus japonicus		*Iris missouriensis*	
Bromus tectorum		*Iva axillaries*	
Calamagrostis neglecta		*Juncus balticus*	
Cardaria draba		*Juncus bufonius*	
Carex capillaries		*Juncus ensifolius*	
Carex limnophila		*Kochia scoparia*	
Carex nebrascensis		*Lactuca serriola*	
Carex praegracilis		*Lepidium perfoliatum*	
Carex spp.		*Lycopus asper*	
Centaurea maculosa		*Medicago lupulina*	
Chenopodium album		*Medicago sativa*	
Chenopodium rubrum		*Melilotus alba*	
Chrysothamnus nauseosus		*Melilotus officinalis*	
Cirsium arvense		*Mentha arvensis*	
Cirsium undulatum		*Mimulus spp.*	
Cleome serrulata		*Muhlenbergia asperifolia*	
Cynoglossum officinale		*Phalaris arundinacea*	
Dactylis glomerata		*Phleum pratense*	
Descurainia sophia		*Phlox longifolia*	
Distichlis spicata		*Phragmites australis*	
Eleocharis acicularis		*Plantago eriopoda*	
Eleocharis pauciflora		*Poa pratensis*	
Elymus cinereus			

COMMENTS/PROBLEMS: No new species in 2005. Species list continued on the next page.

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
Poa sandbergii			
Polygonum aviculare			
Polygonum spp.			
Potentilla anserina			
Puccinellia lemmonii			
Ranunculus populago			
Rumex crispus			
Salicornia spp.			
Salix exigua			
Salsola kali			
Sarcobatus vermiculatus			
Scirpus acutus			
Scirpus americanus			
Scirpus maritimus			
Scirpus pungens			
Scirpus validus			
Sisyrinchium angustifolium			
Sonchus arvensis			
Spartina gracilis			
Sporobolus cryptandrus			
Stipa comata			
Suaeda intermedia			
Tragopogon dubius			
Triglochin maritima			
Typha latifolia			
Urtica dioica			
Zigadenus venenosus			

WILDLIFE

BIRDS

(Attach Bird Survey Field Forms)

Were man made nesting structures installed? Yes _X_ No____Type:_____ How many?_____ Are the nesting structures being utilized? Yes _X_ No____ Do the nesting structures need repairs? Yes____ No _X_

MAMMALS AND HERPTILES

Species	Number Observed	Indirect indication of use			
		Tracks	Scat	Burrows	Other
Whitetail deer	6	x	x		
Coyote	1	x			
Muskrat	1	x			
Painted Turtle	1				

Additional Activities Checklist:

_X_ Macroinvertebrate sampling (if required)

COMMENTS/PROBLEMS: _____

PHOTOGRAPHS

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

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

Location	Photo Frame #	Photograph Description	Compass Reading
1		Looking NE along fence and W. across mitigation site.	120 & 300
2		Panoramic looking from SW to NE.	270 – 45
3		Looking NE, emergent vegetation / open water and SW along transect.	45 & 225
4		Looking NE, upland vegetation.	45
5		Looking NE across site.	45
7		Looking E. along pond bank and N. along Transect # 2.	90 & 35
8		Looking S. along Transect # 2.	180
9		Looking SE along pond bank & W. along other bank.	150 & 270
10		Looking NE along spoil pile, weedy community.	45

COMMENTS/PROBLEMS: **Photo Point 7 did not come out**

GPS SURVEYING

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

Checklist:

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

COMMENTS/PROBLEMS: _____

WETLAND DELINEATION

(Attach Corps of Engineers delineation forms)

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

COMMENTS/PROBLEMS: Similar to 2004 and other past years.

FUNCTIONAL ASSESSMENT

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

COMMENTS/PROBLEMS: _____

MAINTENANCE

Were man-made nesting structures installed at this site? YES_X__ NO____
If yes, do they need to be repaired? YES____ NO__X__
If yes, describe problems below and indicate if any actions were taken to remedy the problems.

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

COMMENTS/PROBLEMS: Lots of weeds along excavation piles.

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Beaverhead Rock Date: 7/15/05 Examiner: B. Dutton Transect # 1

Approx. transect length: 1650 ft. Compass Direction from Start (Upland): 35^0

Vegetation type A:	Sarcobatus/Elymus	
Length of transect in this type:	40	feet
Species:		Cover:
Sarcobatus vermiculatus		4
Elymus cinereus		3
Agropyron trachycaulum		2
Poa pratensis		P
Juncus balticus		P
Hordeum jubatum		P
Phleum pratense		T
Total Vegetative Cover:		90%

Vegetation type B:	Alopecurus /Juncus	
Length of transect in this type:	1030	feet
Species:		Cover:
Alopecurus pratensis		3
Juncus balticus		3
Hordeum jubatum		P
Chenopodium album		1
Festuca pratensis		T
Aster falcatus		T
Muhlenbergia asperifolia		2
Plantago spp.		T
Agropyron smithii		T
Spartina gracilis		P
Agropyron trachycaulum		P
Carex limnophila		P
Total Vegetative Cover:		95%

Vegetation type C:	Alopecurus/Scirpus	
Length of transect in this type:	150	feet
Species:		Cover:
Alopecurus pratensis		3
Juncus balticus		2
Scirpus pungens		1
Muhlenbergia asperifolia		1
Carex limnophila		P
Hordeum jubatum		P
Spartina gracilis		P
Agropyron trachycaulum		P
Chenopodium album		3
Total Vegetative Cover:		100%

Vegetation type D:	Alopecurus /Juncus	
Length of transect in this type:	400	feet
Species:		Cover:
Juncus balticus		3
Triglochin maritima		3
Alopecurus pratensis		1
Hordeum jubatum		P
Agropyron trachycaulum		2
Carex limnophila		P
Scirpus pungens		P
Equisetum laevigatum		T
Agropyron smithii		T
Plantago spp.		T
Helenium autumnale		T
Total Vegetative Cover:		90%

MDT WETLAND MONITORING – VEGETATION TRANSECT (continued)

Site: Beaverhead Rock Date: 7/15/05 Examiner: B. Dutton Transect # 1

Approx. transect length: 1650 Compass Direction from Start (Upland): 35^0

Vegetation type E:	Scirpus	
Length of transect in this type:	30	feet
Species:		Cover:
Scirpus americanus		9
Scirpus acutus		P
	Total Vegetative Cover:	90%

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

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

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

MDT WETLAND MONITORING – VEGETATION TRANSECT (continued)

Site: Beaverhead Rock Date: 7/15/05 Examiner: B. Dutton Transect # 2

Approx. transect length: 280 ft. Compass Direction from Start (Upland): 350^0

Vegetation type A:	Hordeum/Kochia – dike upland	
Length of transect in this type:	30	feet
Species:		Cover:
Hordeum jubatum		2
Kochia scoparia		2
Cirsium arvense		P
Cardaria draba		T
Chenopodium album		2
Agropyron trachycaulum		P
Distichlis spicata		T
Suaeda intermedia		T
Total Vegetative Cover:		60%

Vegetation type B:	Alopecurus /Juncus	
Length of transect in this type:	40	feet
Species:		Cover:
Alopecurus pratensis		3
Juncus balticus		3
Hordeum jubatum		P
Chenopodium album		1
Festuca pratensis		T
Muhlenbergia asperifolia		2
Plantago spp.		T
Agropyron smithii		T
Spartina gracilis		P
Agropyron trachycaulum		P
Total Vegetative Cover:		95%

Vegetation type C:	Alopecurus/Scirpus – wetland	
Length of transect in this type:	80	feet
Species:		Cover:
Alopecurus pratensis		8
Agropyron trachycaulum		1
Juncus balticus		2
Carex nebrascensis		1
Rumex crispus		P
Habenaria dilatata		T
Total Vegetative Cover:		90%

Vegetation type D:	Muhlenbergia/Agropyron – upland	
Length of transect in this type:	130	feet
Species:		Cover:
Muhlenbergia asperifolia		6
Agropyron trachycaulum		2
Festuca idahoensis		P
Rumex crispus		P
Agropyron smithii		P
Hordeum jubatum		1
Juncus balticus		P
Poa pratensis		P
Elymus cinereus		T
Total Vegetative Cover:		90%

MDT WETLAND MONITORING – VEGETATION TRANSECT (back of form)

Cover Estimate

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

Indicator Class:

+ = Obligate
- = Facultative/Wet
0 = Facultative

Source:

P = Planted
V = Volunteer

Percent of perimeter _____ % developing wetland vegetation – excluding dam/berm structures.

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

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

Notes:

Similar to 2004 field season and past years – major transect breaks seem related to topographic, soil and groundwater
conditions that have remained relatively stable over the monitoring period.

BIRD SURVEY – FIELD DATA SHEET

Date: 5/19/05

SITE: Beaverhead Ranch (Spring)

Survey Time: 6:00-9:00

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
American coot	1	F	OW				
Bald eagle	1	FO					
blue-winged teal	1	F	OW, MA				
Canada goose	60	F, N	OW, MA				
cinnamon teal	20	F	OW, MA				
cliff swallow	50	F	OW, MA				
Forster's tern	2	F, L	MF, OW				
Gadwall	6	F	OW, MA				
Killdeer	12	F, N	UP				
lesser scaup	1	F	OW				
Mallard	32	F	OW, MA				
marsh wren	2	F	MA				
northern harrier	5	F	UP, MA				
northern pintail	12	F	OW, MA				
northern shoveler	12	F	OW, MA				
Pelican	24	L	OW				
Raven	6	F	MA				
red-winged blackbird	16	F, N	MA				
Sandhill crane	18	F	MA				
tree swallow	100	F	OW, MA				
Western meadowlark	8	F	UP				
Wilson's phalarope	30	F	OW, MA				
yellow-headed blackbird	30	F, N	MA				

Notes:
Windy off and on, partly cloudy
tree swallows are using bluebird nest boxes
Coyote tracks; deer tracks and pellets
One painted turtle
Site partially inundated

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

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

BIRD SURVEY – FIELD DATA SHEET

Date: 7/15/05

SITE: Beaverhead Ranch (Mid-season)

Survey Time: 7am-4pm

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
marsh hawk	4	F	UP, WM				
Canada goose	36	F,L	MA, MF, OW				
pelican	22	F,L	MF, OW				
American coot	10	F	OW				
Sandhill crane	12	F	UP, WM				
killdeer	30	F	MF				
Redwing blackbird	12	F	UP				
Mallard	10	F, L	OW				
Cinnamon teal	8	F	OW, MF				
meadowlark	10	F	UP				

Notes:
6 Deer plus tracks & scat
2 coyote
1 Muskrat plus tracks

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

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

BIRD SURVEY – FIELD DATA SHEET

Date: 10/15/05

SITE: Beaverhead Ranch

Survey Time: 9:30-11:30

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
American coot	10	F,L	OW				
American pelican	30	FO	OW				
black-billed magpie	4	F	WM				
Canada goose	34	F	OW				
common goldeneye	16	F,L	OW				
eared grebe	2	L	OW				
horned lark	3	FO	UP				
killdeer	12	F	MF				
long-billed dowitcher	6	F	MA				
mallard	16	F,L	OW				
Northern harrier	2	FO	WM				
meadowlark	10	F	UP				
raven	1	FO	MA				
Yellow-headed blackbird	2	L	MA				

Notes:
Coyote tracks
8 deer plus tracks and scat
2 birders? Humans with binocs – never near enough to talk to

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

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

DATA FORM

ROUTINE WETLAND DETERMINATION

(1987 COE Wetlands Delineation Manual)

Project/Site: Beaverhead Rock	Date: 7/15/05
Applicant/Owner: MDT	County: Beaverhead
Investigator: B. Dutton	State: MT

Do Normal Circumstances exist on the site:	X	Yes		No
Is the site significantly disturbed (Atypical Situation)?		Yes	X	No
Is the area a potential Problem Area?:		Yes	X	No
(If needed, explain on reverse.)				

Community ID:

Transect ID: T2

Plot ID: 1

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Alopecurus pratensis*	H	FACW	9			
2	*Agropyron trachycaulum*	H	FAC	10			
3	*Juncus balticus*	H	FACW+	11			
4	*Carex nebrascensis*	H	OBL	12			
5	*Rumex crispus**	H	FACW	13			
6	*Habenaria dilatata*	H	OBL	14			
7				15			
8				16			

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

Hydrophytic vegetation present, wetland plants.

HYDROLOGY

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

X No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: >18 (in.)

Depth to Saturated Soil: >18 (in.)

Wetland Hydrology Indicators:

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

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

Remarks:
Dry year.

SOILS

Map Unit Name (Series and Phase): Neen silty clay loam
Drainage Class: Somewhat poorly
Taxonomy (Subgroup): Aquic calciorthids
Field Observations
Confirm Mapped Type? ____ Yes X No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 – 2	O	10YR 4/2	-	-	Silt loam
2 – 12	A1	10 YR 2/0	-	-	Silt loam
12 – 18+	B2	10 YR 1/1	10 YR 6/6	Few/Faint	Very fine sandy loam

Hydric Soil Indicators:

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

Mucky mineral surface soil.

WETLAND DETERMINATION

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

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

Remarks:

Same conditions in past years.

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

Project/Site:	Beaverhead Rock			Date:	7/15/05
Applicant/Owner:	MDT			County:	Beaverhead
Investigator:	B. Dutton			State:	MT
Do Normal Circumstances exist on the site:	X	Yes	No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?		Yes	X No	Transect ID:	T2
Is the area a potential Problem Area?:		Yes	X No	Plot ID:	2
(If needed, explain on reverse.)					

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Agropyron trachycaulum*	H	FAC	9	*Elymus cinereus*	H	FACU
2	*Muhlenbergia asperifolia*	H	FACW	10			
3	*Festuca idahoensis*	H	FACU	11			
4	*Rumex crispus**	H	FACW	12			
5	*Agropyron smithii*	H	FACU	13			
6	*Hordeum jubatum*	H	FAC+	14			
7	*Juncus balticus*	H	FACW+	15			
8	*Poa pratensis*	H	FACU+	16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 5/9 = 55%

HYDROLOGY

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

x No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: >20 (in.)

Depth to Saturated Soil: >20 (in.)

Wetland Hydrology Indicators:

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

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

Remarks:

Dry year, no obvious hydrologic indicators.

SOILS

Map Unit Name (Series and Phase):	Neen silty clay loam	Drainage Class:	somewhat poorly
		Field Observations	
Taxonomy (Subgroup):	Aquic calciorthids	Confirm Mapped Type?	____ Yes __X__ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 – 4	A	10 YR 3/2	-	-	Silt loam
4 – 8	B1	10 YR 4/3	-	-	Silt loam
8 - 20	B2	10 YR 5/3	-	-	Silt loam

Hydric Soil Indicators:

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

Upland soil colors and features.

WETLAND DETERMINATION

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

Remarks:

Upland site, same conditions in past years.

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

Project/Site: Beaverhead Rock	Date: 7/15/05
Applicant/Owner: MDT	County: Beaverhead
Investigator: B. Dutton	State: MT

Do Normal Circumstances exist on the site:	x	Yes		No
Is the site significantly disturbed (Atypical Situation)?		Yes	x	No
Is the area a potential Problem Area?:		Yes	x	No
(If needed, explain on reverse.)				

Community ID:
Transect ID: T1
Plot ID: 3

VEGETATION

	Dominant Plant Species	Stratum	Indicator
1	*Sarcobatus vermiculatus*	*S*	*FACU+*
2	*Elymus cinereus*	*H*	*FACU*
3	*Poa pratensis*	*H*	*FACU+*
4	*Agropyron trachycaulum*	*H*	*FAC*
5	*Juncus balticus*	*H*	*FACW+*
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 2/5 = 40%

Upland vegetation.

HYDROLOGY

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

x No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: >18 (in.)

Depth to Saturated Soil: >18 (in.)

Wetland Hydrology Indicators:

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

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

Remarks:

No hydrologic indicators present.

SOILS

Map Unit Name (Series and Phase): Neen silty clay loam
Drainage Class: somewhat poorly
Taxonomy (Subgroup): Aquic calciorthids
Field Observations
Confirm Mapped Type? ____ Yes X No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 – 7	A1	10 YR 3/2	-	-	Loam
7 - 18	B1	10 YR 4/3	-	-	Loam

Hydric Soil Indicators:

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

Upland soils.

WETLAND DETERMINATION

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

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

Remarks:

Upland site on small mound above wetland. Same conditions in past years.

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

Project/Site:	Beaverhead Rock			Date:	7/15/05
Applicant/Owner:	MDT			County:	Beaverhead
Investigator:	B. Dutton			State:	MT
Do Normal Circumstances exist on the site:	x	Yes	No	Community ID:	
Is the site significantly disturbed (Atypical Situation)?		Yes	x No	Transect ID:	T1
Is the area a potential Problem Area?:		Yes	x No	Plot ID:	4
(If needed, explain on reverse.)					

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Alopecurus pratensis*	H	FACW	9			
2	*Hordeum jubatum*	H	FAC+	10			
3	*Equisetum laevigatum*	H	FACW	11			
4	*Muhlenbergia asperifolia*	H	FACW	12			
5	*Juncus balticus*	H	FACW+	13			
6	*Carex limnophila*	H	FACW	14			
7				15			
8				16			

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

Wetland vegetation present.

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- x No Recorded Data Available

Field Observations:

Depth of Surface Water: ____ (in.)

Depth to Free Water in Pit: >18 (in.)

Depth to Saturated Soil: >18 (in.)

Wetland Hydrology Indicators:

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

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

Remarks:

Secondary hydrologic indicators present. No water in pit, probably due to time of year and multi- year drought.

SOILS

Map Unit Name (Series and Phase): Neen silty clay loam

Drainage Class:

Field Observations

Taxonomy (Subgroup): Aquic calciorthids

Confirm Mapped Type? ____ Yes X No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 - 14	A1	10 YR 2/0	-	-	Loam
14 - 20	B1	10YR 2/1	10 YR 6/6	Few/Faint	Loam

Hydric Soil Indicators:

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

Hydric soil indicators present.

WETLAND DETERMINATION

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

Remarks:

Wetland probably will see indicators improve over time as it develops and more natural precipitation levels returns. Same conditions in past years.

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

Project/Site: Beaverhead Rock	Date: 7/15/05
Applicant/Owner: MDT	County: Beaverhead
Investigator: B. Dutton	State: MT

Do Normal Circumstances exist on the site:	X	Yes		No
Is the site significantly disturbed (Atypical Situation)?		Yes	X	No
Is the area a potential Problem Area?:		Yes	X	No
(If needed, explain on reverse.)				

Community ID:
Transect ID: T1
Plot ID: 5

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Juncus balticus*	H	FACW+	9			
2	*Spartina gracilis*	H	FACW	10			
3	*Alopecurus pratensis*	H	FACW	11			
4	*Chenopodium album*	H	FAC	12			
5	*Plantago eriopoda*	H	FACW	13			
6	*Carex limnophila*	H	FACW	14			
7	*Muhlenbergia asperifolia*	H	FACW	15			
8	*Agropyron trachycaulum*	H	FAC	16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 8/8 = 100%

Hydrophytic vegetation present.

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water: _____ (in.)

Depth to Free Water in Pit: >18 (in.)

Depth to Saturated Soil: >18 (in.)

Wetland Hydrology Indicators:

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

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

Remarks:

Dry part of year during multi-year drought cycle. Secondary hydrologic indicators present.

SOILS

Map Unit Name (Series and Phase): Neen silty clay loam
Drainage Class: _____
Taxonomy (Subgroup): Aquic calciorthids
Field Observations
Confirm Mapped Type? ____ Yes X No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 – 2	A1	10 YR 5/4	-		Loam
2 - 18	B1	10 YR 7/1	10 YR 6/6	Few/Faint	Silty clay loam

Hydric Soil Indicators:

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

Soil is developing hydric features, will likely get stronger with more normal rainfall.

WETLAND DETERMINATION

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

Remarks:

Soil and hydrology indicators are not very strong, but there, and are likely to improve with normal precipitation. Same conditions in past years.

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

Project/Site:	Beaverhead Rock	Date:	7/15/05
Applicant/Owner:	MDT	County:	Beaverhead
Investigator:	B. Dutton	State:	MT

Do Normal Circumstances exist on the site:	x	Yes		No	Community ID:
Is the site significantly disturbed (Atypical Situation)?		Yes	X	No	Transect ID: T1
Is the area a potential Problem Area?:		Yes	X	No	Plot ID: 6
(If needed, explain on reverse.)					

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Scirpus acutus**	H	OBL	9			
2	*Hordeum jubatum*	H	FAC+	10			
3	*Scirpus americanus*	H	OBL	11			
4		h		12			
5				13			
6				14			
7				15			
8				16			

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

Wetland vegetation present.

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other
- x No Recorded Data Available

Field Observations:

Depth of Surface Water: ____ (in.)

Depth to Free Water in Pit: 24 (in.)

Depth to Saturated Soil: 8 (in.)

Wetland Hydrology Indicators:

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

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

Remarks:

Wetland hydrology.

SOILS

Map Unit Name (Series and Phase):	Neen silty clay loam	Drainage Class:	
Taxonomy (Subgroup):	Aquic calciorthids	Field Observations Confirm Mapped Type?	____ Yes X No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 – 2	A1	10 YR 6/3	-	-	Silt loam
2 – 18	B1	10 YR 7/1	10 YR 7/4	-	Loam

Hydric Soil Indicators:

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

Thin surface layer of more recent deposition over very low chroma and high organic matter layer.

WETLAND DETERMINATION

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

Remarks:

Good wetland, same conditions in past years.

MDT MONTANA WETLAND ASSESSMENT FORM (revised May 25, 1999)

1. Project Name: Beaverhead Gateway **2. Project #:** B43054.00-0202 **Control #:** _____

3. Evaluation Date: 7/15/2005 **4. Evaluator(s):** Barry Dutton **5. Wetland / Site #(s):** Emergent Wetlands & Open Water

6. Wetland Location(s) i. T: 5 S **R:** 7 W **S:** 21, 27, & 28 **T:** __ N **R:** __ E **S:** _____

ii. Approx. Stationing / Mileposts: _____

iii. Watershed: 6 - Upper Missouri **GPS Reference No. (if applies):** _____

Other Location Information: _____

7. A. Evaluating Agency MDT

8. Wetland Size (total acres): _____ (visually estimated)
118 (measured, e.g. GPS)

B. Purpose of Evaluation:

- ☐ Wetlands potentially affected by MDT project
- ☐ Mitigation wetlands; pre-construction
- ☒ Mitigation wetlands; post-construction
- ☐ Other

9. Assessment Area (total acres): _____ (visually estimated)
118 (measured, e.g. GPS)

Comments: _____

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA

HGM CLASS [1]	SYSTEM [2]	SUBSYSTEM [2]	CLASS [2]	WATER REGIME [2]	MODIFIER [2]	% OF AA
Riverine	Riverine	Lower Perennial	Emergent Wetland	Temporarily Flooded	Diked	70
Riverine	Riverine	Lower Perennial	Aquatic Bed	Permanently Flooded	Diked	20
Riverine	Riverine	Lower Perennial	Unconsolidated Bottom	Permanently Flooded	Diked	10
---	---	---	---	---	---	

[1] = Smith et al. 1995. [2] = Cowardin et al. 1979.

Comments: _____

11. ESTIMATED RELATIVE ABUNDANCE (of similarly classified sites within the same Major Montana Watershed Basin)
Common Comments: _____

12. GENERAL CONDITION OF AA

i. Regarding Disturbance: (Use matrix below to select appropriate response.)

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

Comments: (types of disturbance, intensity, season, etc.) Moderate grazing and hay production.

ii. Prominent weedy, alien, & introduced species: whitetop, spotted knapweed, Eurasian milfoil, hound's-tongue, Canada thistle, curly cup gumweed, quackgrass, kochia, and lamb's-quarter.

iii. Briefly describe AA and surrounding land use / habitat: Constructed wetland where portions were formerly wetland. Includes open water and wetland vegetation dominated by herbaceous species. Surrounding land use is crops and grazing.

13. STRUCTURAL DIVERSITY (Based on 'Class' column of #10 above.)

Number of 'Cowardin' Vegetated Classes Present in AA	≥3 Vegetated Classes or ≥ 2 if one class is forested	2 Vegetated Classes or 1 if forested	≤ 1 Vegetated Class
Select Rating	---	Moderate	---

Comments: _____

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	Bald Eagle
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 & Rating	---	---	---	.7 (M)	---	---	---

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	Black Tern, Lemmons alkaligrass,.
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 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 & Rating	1 (H)	---	---	---	---	---	---

If documented, list the source (e.g., observations, records, etc.)**:** Black Terns and Lemmon's alkaligrass documented onsite. Forster's terns and trumpeter swans also observed (but not breeding).

14C. GENERAL WILDLIFE HABITAT RATING

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

☒ **Substantial** (based on any of the following)
- ☒ observations of abundant wildlife #s or high species diversity (during any period)
- ☒ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☒ presence of extremely limiting habitat features not available in the surrounding area
- ☒ interviews with local biologists with knowledge of the AA

☐ **Low** (based on any of the following)
- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interviews with local biologists with knowledge of AA

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

ii. Wildlife Habitat Features: Working from top to bottom, select the AA attribute 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)	☐**High**								☒**Moderate**								☐**Low**			
Class Cover Distribution (all vegetated classes)	☐**Even**				☐**Uneven**				☐**Even**				☒**Uneven**				☐**Even**			
Duration of Surface Water in ≥ 10% of AA	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**
Low disturbance at AA (see 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (see 12)	--	--	--	--	--	--	--	--	--	--	--	--	H	--	--	--	--	--	--	--
High disturbance at AA (see 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

iii. Rating: Use 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)			
	☐ **Exceptional**	☒ **High**	☐ **Moderate**	☐ **Low**
Substantial	--	.9 (H)	--	--
Moderate	--	--	--	--
Low	--	--	--	--

Comments: Numerous waterfowl and shorebirds observed.

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 or 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 determine the quality rating of exceptional (E), high (H), moderate (M), or low (L).

Duration of Surface Water in AA	☒**Permanent/Perennial**			☐**Seasonal / Intermittent**			☐**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.	--	--	M	--	--	--	--	--	--

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 arrive at 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)			
	☐ **Exceptional**	☐ **High**	☐ **Moderate**	☒ **Low**
Native game fish	--	--	--	.5 (M)
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: Unidentified minnows assumed to be native game fish.

14E. FLOOD ATTENUATION ☐ **NA** (proceed to 14F)

Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA do not flood from in-channel or overbank flow, then check NA.

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	☒ **≥ 10 acres**			☐ **<10, >2 acres**			☐ **≤2 acres**		
% of flooded wetland classified as forested, scrub/shrub, or both	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**
AA contains **no outlet or restricted outlet**	--	--	--	--	--	--	--	--	--
AA contains **unrestricted outlet**	--	--	.5 (M)	--	--	--	--	--	--

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:** Potentially flooded area is northeast of dike along river.

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, then 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.
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**.**	☒ **>5 acre feet**			☐ **<5, >1 acre feet**			☐ **≤1 acre foot**		
Duration of surface water at wetlands within the AA	**P/P**	**S/I**	**T/E**	**P/P**	**S/I**	**T/E**	**P/P**	**S/I**	**T/E**
Wetlands in AA flood or pond **≥ 5 out of 10 years**	1 (H)	--	--	--	--	--	--	--	--
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 the 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.			
% cover of wetland vegetation in AA	☒ **≥ 70%**		☐ **< 70%**		☐ **≥ 70%**		☐ **< 70%**	
Evidence of flooding or ponding in AA	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	1 (H)	--	--	--	--	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--

Comments: Most of the AA has a restricted outlet and is subject to agricultural run-off from cropland to the west.

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, then 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		
	☒Permanent / Perennial	☐Seasonal / Intermittent	☐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	☒ Vegetated component >5 acres						☐ Vegetated component 1-5 acres						☐ Vegetated component <1 acre					
B	☐ High		☒ Moderate		☐ Low		☐ High		☐ Moderate		☐ Low		☐ High		☐ Moderate		☐ Low	
C	☐Y	☐N	☒Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N
P/P	--	--	.9H	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S/I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments: _____

14J. GROUNDWATER DISCHARGE / RECHARGE (DR) (Check the indicators in i & ii below that apply to the AA.)

i. ☒ **Discharge Indicators**

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

ii. ☒ **Recharge Indicators**

- ☒ Permeable substrate presents without underlying impeding layer.
- ☐ Wetland contains inlet but not outlet.
- ☐ Other _____

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

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

Comments: _____

14K. UNIQUENESS

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

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

Comments: 0.5 assigned, over-riding calculated score as the landowner will grant permission for scientific study and birding.

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	moderate	0.70	1	
B. MT Natural Heritage Program Species Habitat	high	1.00	1	
C. General Wildlife Habitat	high	0.90	1	
D. General Fish/Aquatic Habitat	moderate	0.50	1	
E. Flood Attenuation	moderate	0.50	1	
F. Short and Long Term Surface Water Storage	high	1.00	1	
G. Sediment/Nutrient/Toxicant Removal	high	1.00	1	
H. Sediment/Shoreline Stabilization	low	0.30	1	
I. Production Export/Food Chain Support	high	0.90	1	
J. Groundwater Discharge/Recharge	high	1.00	1	
K. Uniqueness	moderate	0.50	1	
L. Recreation/Education Potential	moderate	0.50	1	
	Total:	**8.80**	**12.00**	____
	Percent of Total Possible Points:		**73%** (Actual / Possible) x 100 [rd to nearest whole #]	

Category I Wetland: (Must satisfy **one** of the following criteria. If not satisfied, proceed to Category II.)
- ☐ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
- ☐ Score of 1 functional point for Uniqueness; **or**
- ☐ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E(ii) is "yes"; **or**
- ☐ Percent of total Possible Points is > 80%.

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.)
- ☒ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
- ☒ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish/Aquatic Habitat; **or**
- ☐ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish / Aquatic Habitat; **or**
- ☐ Score of .9 functional point for Uniqueness; **or**
- ☒ Percent of total possible points is > 65%.

☐ **Category III Wetland:** (Criteria for Categories I, II, or IV not satisfied.)

Category IV Wetland: (Criteria for Categories I or II are not satisfied **and** all of the following criteria are met; If not satisfied, return to Category III.)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ "Low" rating for Production Export / Food Chain Support; **and**
- ☐ 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

REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Beaverhead Gateway
Dillon, Montana

BEAVERHEAD GATEWAY WETLAND MITIGATION SITE 2005

Photo Point No.1: View looking northeast along fence-line (60º).

Photo Point No. 1: View looking northwest across mitigation site. Upland to wetland vegetation transition (300º)

Photo Point No. 3: View looking southwest along the end of Transect 1, emergent wetland vegetation dominated by bulrush (225º).

Photo Pont No. 3: View looking northeast, open water and emergent wetland vegetation dominated by bulrush (45º).

Photo Point No. 4: View looking northeast along the beginning of Transect 1 (40º).

Photo Point No. 5: View looking northeast across mitigation site (45º).

BEAVERHEAD GATEWAY WETLAND MITIGATION SITE 2005

Photo Point No. 2: Panoramic view of mitigation site, southern half, 300º to 220º. Photo taken looking north to south.

Photo Point No. 2: Panoramic view of mitigation site, northern half, 40º to 300º. Photo taken looking north to south.

Photo Point No. 7: View looking north along the start of Transect 2 (350°).

Photo Point No. 8: View looking south from the end of Transect 2 (170°).

Photo Point No. 9: View looking west along dike shore and open water (270°).

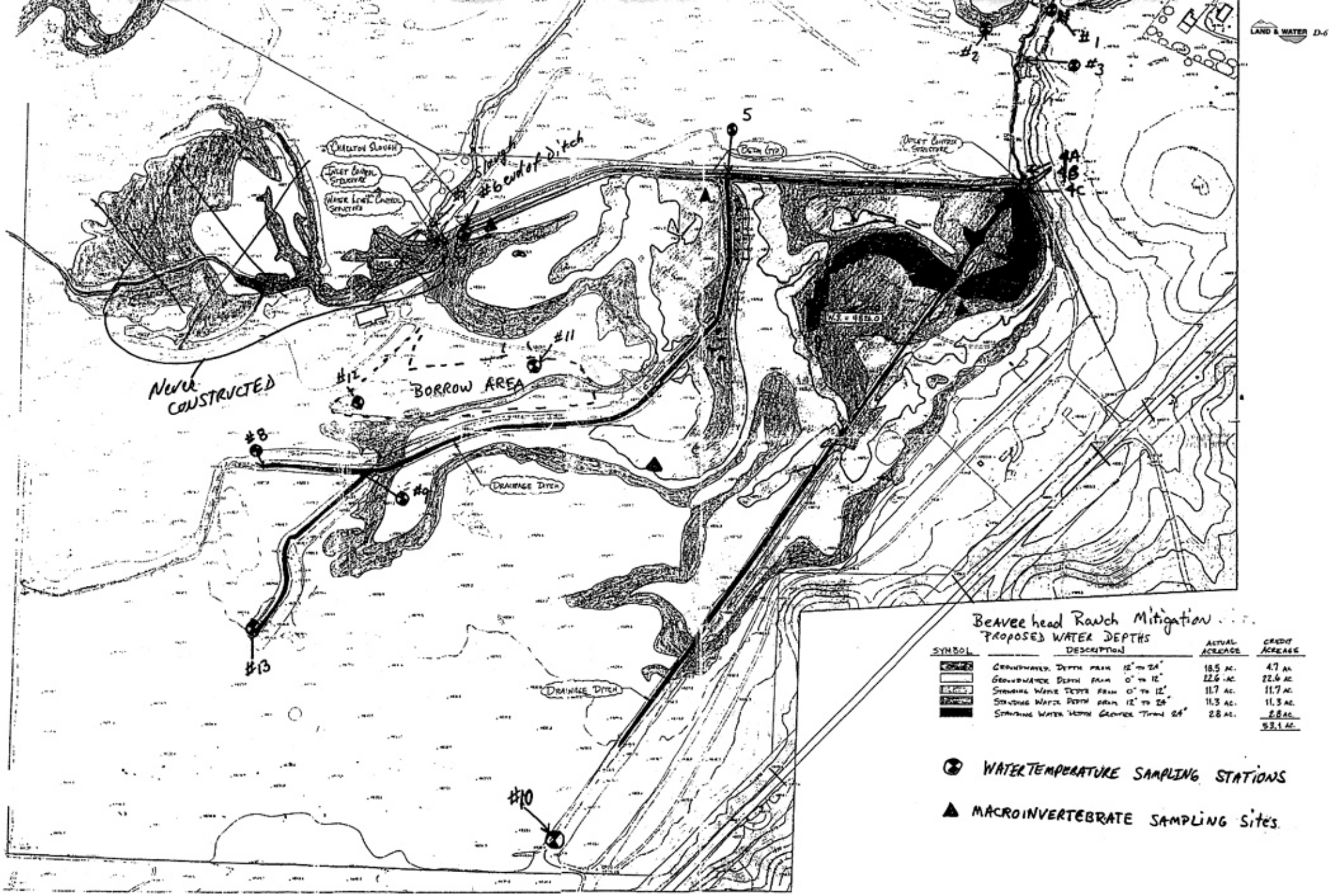
Photo Point No. 4: View looking northeast along the beginning of Transect 1 (40°).

Photo Point No. 10: View looking northeast along spoil pile dominated by a weedy plant community (45°).

Appendix D

ORIGINAL SITE PLAN
MDT BIRD OBSERVATIONS
LETTERS ADDRESSING SITE MANAGEMENT

MDT Wetland Mitigation Monitoring
Beaverhead Gateway
Dillon, Montana


LAND & WATER D-6
#1
#2
#3
5
Depth (typ)
Outlet Control Structure
1A
1B
1C
Creation Slough
Inlet Control Structure
Weir Level Control Structure
Slough #6 end of ditch
W.S. ELEV. 0.0
#11
#12
Never Constructed
Borrow Area
#8
#9
Drainage Ditch
#13
Drainage Ditch
#10
Beavee head Ranch Mitigation . . .
PROPOSED WATER DEPTHS
SYMBOL
DESCRIPTION
ACTUAL ACREAGE
CREDIT ACREAGE
Groundwater Depth from 12" to 24" 18.5 ac. 4.7 ac.
Groundwater Depth from 0" to 12" 22.6 ac. 22.6 ac.
Standing Water Depth from 0" to 12" 11.7 ac. 11.7 ac.
Standing Water Depth from 12" to 24" 11.3 ac. 11.3 ac.
Standing Water Depth Greater Than 24" 2.8 ac. 2.8 ac.
53.1 ac.
WATER TEMPERATURE SAMPLING STATIONS
MACROINVERTEBRATE SAMPLING Sites

BEAVERHEAD GATEWAY RANCH
WETLAND MITIGATION SITE
ACTIVE BIRD LIST 1997 to Present

(b) breeding

Waterfowl:
Tundra Swan
Trumpeter Swan
Blue-winged Teal (b)
Green-winged Teal
Cinnamon Teal (b)
Mallard Duck (b)
Pintail Duck (b)
Ruddy Duck (b?)
Greater Canada Geese (b)
Snow Geese
Northern Shoveller (b)
American Wigeon (b)
Redhead Duck (b)
Gadwall (b)
Bufflehead (b)
Common Goldeneye
Barrow's Goldeneye
Lesser Scaup
American Coot (b)
Western Grebe
Eared Grebe (b)
Double Crested Cormorants
Red-breasted Merganser
Common Merganser

Herons / Cranes:
Great Blue Heron
Black Crowned Night Heron
Sandhill Cranes (b)

Eagles / Hawks:
Golden Eagle
Red-Tailed Hawk
Merlin
American Kestrel
Northern Harrier
Rough-legged Hawk
Peregrine Falcon

Shorebirds:
American Avocet
Willet
Marbled Godwit
Wilson's Phalarope
Red Phalarope (b)
Common Snipe (b)
Solitary Sandpiper
Spotted Sandpiper (b)
Killdeer (b)
Greater Yellowlegs
Sanderlings
Lesser Yellowlegs
Long-billed Dowitcher

Gulls / Terns:
Franklin's Gull
Bonaparte's Gull
Common Tern
Black Tern (b?)

Swallows / Swifts:
Bank Swallows (b)
Cliff Swallows (b)
Violet-green Swallows (b)
Barn Swallows (b)

Upland Gamebirds:
Ring-necked Pheasant
Sage Grouse
Chukar
Hungarian Partridge (b)

Dippers:
American Dipper

Owls:
Short-eared owl

Crows / Ravens:
American Crow
Common Raven
Black-billed Magpie

Songbirds:
Red-winged Blackbird (b)
Yellow-headed blackbird (b)
Brewer's Blackbird
Vesper Sparrow (b)
Song Sparrow
Savannah Sparrow(b)
Western Bluebirds(b)
American Robin
American Goldfinch (b)
Brown-headed Cowbird
Western Meadowlark (b)
European Starling
Mourning Dove
Rock Dove
Spotted Towhee

Pelicans:
American White Pelican

June 21, 2002

Mr. James T. Harrison, Jr.
Attorney at Law
1330 Helena Avenue
P.O. Box 6876
Helena, MT 59604-6876

Subject: Beaverhead Gateway Ranch Site Visit of June 17, 2002

Dear Tom:

Joel Marshik, Lyle Manley and I enjoyed meeting with you and Mr. Peccia on June 17 and were encouraged that we are moving in the right direction. We discussed grazing and development of a grazing management plan, Mr. Peccia's concern regarding possible liability for fire passing through the easement property and causing harm to third parties, dike stability and erosion, weed control, the spoil piles, removal of debris, and closure of the on-site well.

I would like to briefly summarize our discussions of the 17th and propose a next step. If my recollection of our discussions is incorrect in any way, please advise.

Grazing and managed grazing strategy: we will meet on July 8, 2002 to further discuss this issue.

Fire: Mr. Peccia expressed concern about the possibility of liability arising from a fire event that passes through the easement area and then on to adjoining property on which damage occurs to property owned by a third party. I perceived that Mr. Peccia was concerned about a fire that was not started by either him (or his employees/agents) or personnel from MDT, but a fire caused by the actions of a third party or an act of God which simply passes through the easement property. It is my opinion that the risk imposed upon Mr. Peccia for liability under this scenario is remote. I am unaware of any court holding which designates a wetland, restored and monitored pursuant to federal law and regulations, a nuisance, or which states that the property owner, in so restoring and maintaining the wetland, could be held liable for any damages to third parties under any theory of law. Given this, and in the interest of continuing negotiations, Lyle Manley and I will investigate whether MDT would be willing to indemnify Mr. Peccia against such a remote risk. Under no circumstances can MDT enter into such an agreement if it could be interpreted that MDT somehow agrees to assume liability for damage to the property of third parties. Lyle and I will contact you after we have further investigated this issue.

Legal Services Unit
Phone: (406) 444-7277
Fax: (406) 444-7206

Web Page: www.mdt.state.mt.us
Road Report: (800) 226-7623
TTY: (800) 335-7592

Dike erosion: Significant erosion of the dike has occurred due to wind and wave action on the highly erodable material of which the dike is construction. In an area near the west end of the dike, vegetation has established. Along the rest of the dike, vegetation appears to be establishing slowly. Mr. Peccia discussed the possibility of utilizing additional rubber mat (terminology?) along the face of the dike and also lowering the water level to expose saturated soil at the eroded area of the dike so that vegetation may establish. As stated by Joel Marshik, additional matting should be installed and it may be possible to lower the water level for further establishment of vegetation and for flushing of the control mechanism. Additionally, due to the fractures along the face of the dike caused by erosion, further slumping of dike material may occur and should be closely monitored. Should further measures become necessary in the future to insure the stability of the dike, MDT is willing to discuss alternatives.

Weeds: Several patches of whitetop were noted during the tour. Mr. Peccia indicated that those weeds, and others noted by the Land & Water monitoring report, will be treated.

Spoil Piles: I have been advised that my initial statement to you and Mr. Peccia that MDT wanted the spoil piles removed was incorrect and I apologize for my misstatement. I have since learned that it was recommended that the spoil piles remain, but be manipulated to provide accessible habitat and passage for upland wildlife including weed eradication and establishment of native upland vegetation.

Debris: As noted during the site visit, the shop area still contains a significant amount of debris resulting from the demolition of the shop, fences and other structures. Mr. Peccia stated that he intends to dispose of the debris.

Well: Mr. Peccia stated that he would see to the closure of the well located on the easement area.

When the original agreement was negotiated, MDT was assured that the above-discussed items would be addressed as part of the development of the area. Negotiations on the additional purchase and trade to amend the original easement would be significantly furthered if Mr. Peccia would agree to discuss with MDT a methodology and timetable setting forth dates by which the above-discussed items will be addressed. Such a document should include methods and dates for: 1) installation of further erosion prevention measures on the dike; 2) weed control treatment; 3) habitat restoration and weed control on the spoil piles; 4) removal of debris from the old shop area; and 5) closure of the well. Additionally, as stated above, lowering the level of water to allow further vegetation establishment and flushing of the control structure may be appropriate. Please get back to me on whether Mr. Peccia would be agreeable to address these issues.

Additionally, Lyle Manley and I will get back to you regarding the possibility of a fire indemnification provision, and we look forward to discussing the grazing strategy with you on July 8. Please do not hesitate to contact me if I may be of further service.

Sincerely,

Robert M. Gentry
Attorney
MDT Legal Services
(406) 444-3237

Cc: Joel Marshik
Gordon Stockstad
Lyle Manley
Larry Urban

January 26, 2004

Bonnie Steg
Resources Section Supervisor
Environmental Services Bureau
Montana Department of Transportation
2701 Prospect Avenue
P.O. Box 201001
Helena, MT 59620-1001

Subject: STPX 0002 (624) CN# 3476
Beaverhead Gateway Ranch
U.S. Army Corps of Engineers
Restrictions

Bonnie Steg,

As I reply to your letter of January 21, 2004 please keep in mind that I am simply trying to state my positions and opinions with clarity. I would appreciate the full context of the Corps letter so that I can be sure to address their concerns, and would also appreciate knowing how many wetlands credits have been withdrawn from the wetland by the Department so I can evaluate how close I am to my contractual requirements. I would also like to know if the Corps has made a personal inspection of the dike or if they have made their determination from reading the Wetland Mitigation Monitoring Report.

You stated in your letter that the erosion on the dike, as indicated in previous letters and meetings, "is a re-occurring problem that needs to be addressed and corrected before the structure fails and repair costs escalate". I have discussed this issue many times before with the Department and I have tried to explain that the material on the front face of the dike is not structural. Until the erosion begins to affect the clay core the integrity of the dike is not compromised.

My objective has always been to create a natural wetland with a natural looking dike using vegetative cover for erosion protection. The material on the front face of the dike was intended to be sacrificial, and to provide a place for vegetation to establish. I have been monitoring the dike very closely, and vegetation has developed very nicely in most areas. The spot areas where some erosion has occurred are not, at this point, endangering the dike.

In very simple terms, there are two ways an earth fill dike or dam can fail. One is a slope failure and the other is a piping failure. A slope failure occurs when the weight of saturated soil exceeds the internal friction of the soil and a failure plane is created whereby the soil sloughs. This type of failure can be noted to a limited extent on the front face of the dike where erosion has resulted in a near vertical face in a few localized areas, but does not affect the structural portion of the dike. There are no slope failures on the downstream face of the dike, which is to be expected since the dike was built with very stable 6:1 slopes. For a piping failure the phreatic (water) surface must exit on the downstream face of the

dam in order for the dike material to be "piped" through the fill. Since the hydraulic head between the pond and the downstream water surface is only one to two feet, a piping failure is virtually impossible.

The only way that the dike could fail in my opinion would be for erosion to virtually wash away the entire dike. I have many years of experience in the design and analysis of earth fill dams (BLM, Los Angeles County Flood Control District, dam safety inspections for DNRC) and I can assure you that this dike is not in any danger of failing. Since I have stated this opinion many times I can only conclude you do not consider my opinion credible. Therefore I suggest you contact Michelle LeMieaux, Dam Safety Supervisor with the DNRC Dam Safety Bureau for an independent opinion. She is competent in slope stability analysis and dam safety.

You asked that I submit a plan and a schedule for corrective actions. Following is my proposed plan of action:

1) Immediately drop the water level of the pond. By dropping the water level of the pond any erosion of the dike will decline since wave action on the dike will be reduced. The contracted wetland was for 52 acres and the most recent Monitoring Reports prepared by Land and Water Consultants indicated 107 acres of wetland of additional wetland have been created, with additional acreage likely to form with additional time and more normal precipitation. The wetland should be well within the contracted acreage even with this drop in water level. I will remove dam boards and drop the water level on my next trip to the Beaverhead sometime in late January or early February.

2) Provide filter fabric and fill at selected locations. I will inspect and mark the locations where erosion is pronounced, and will cover these areas with filter fabric and gravel. This is cosmetic only, but I realize that you and the Corps will be looking for some action before allowing further credits to be withdrawn. Unless the area is wet and inaccessible I will have this done by May 15, 2004.

I am uncertain as to whether the MDT or the Corps will then inspect the dike and make a judgment as to whether it is to their satisfaction, or if it will then be subject to another personal opinion as to the safety of the dike. If that is the case I would like the Department and/or the Corps to specify what they will accept so I don't have to revisit the site with construction equipment. Contrary to your statement that repair costs would escalate if the structure fails the cost is not in the work, which is minor, but in moving material and equipment to and from the site. I need to know what "look" will appear to be safe to you so I can achieve that appearance.

I am uncomfortable with the awkward relations this has caused between the Department and myself. I again offer to the Department the following options:

a) The Department can take over management of the wetland and manage it any way they see fit. That way the MDT can prohibit grazing, fence in any manner you choose, riprap the dike face, lower or raise the water level to adjust the wetland credits, or whatever

is your pleasure. Since it is apparent we don't agree on management philosophy this is the best option in my opinion.

b) You can allow me to manage the wetland and just provide me with any requirements from the Corps that might jeopardize the credits, which I would take care of immediately. This is how our original agreement was structured and what I understand our agreement to be.

c) I can buy back the easement from the Department and the Department can use the money to fulfill their wetland obligations elsewhere.

Any of these options would be fine by me. The only option that is unacceptable is for the MDT to direct me on how to manage the wetland, but still have me take full responsibility whether or not your directives work. I have been in that position before and it is untenable. If you don't want to manage the wetland yourself, I am agreeable to having a third party manage the wetland according to your directives.

Since it appears unlikely that we will continue with negotiations on the additional wetland credits I would like resolution on all issues at this time. As Mr. Galt is aware, I don't like conflict, and since we will be operating under the original agreement I would like to firmly establish our respective responsibilities so we don't have any more disagreements.

I apologize for the tone of this letter, but you must understand that I have many years of experience in engineering and construction, as well as several other businesses, and have learned to make and trust my own decisions and judgments. I was able to acquire land, negotiate a contract, design the wetland, construct the wetland, and obtain wetland credits in approximately seven months. Now that the project is successful, with credits far in excess of the contract requirements, the Department seems to see a need to micromanage the wetland.

I am also disturbed that when I requested corrections to the Monitoring Report because of factual inaccuracies, you responded that since the accuracies did not affect the conclusions of the report it would not accomplish any purpose to correct them. As you recall, one of the inaccuracies in the report is on page 6 where it states: "Water levels should have been higher, but **the landowner lowered water levels to save the dike** in May 2002." I have no idea where that statement came from, but it is a complete falsehood.

If the Corps is relying on this information to make a judgment on the erosion of the dike, which I would be doing in their position, then I am upset that the record was not set straight. I believe this to be one of the inaccuracies where it does affect the conclusions of the report and the wetland credits. Your refusal to correct this statement may well have been a factor in the determination by the Corps to consider the dike unsafe.

I know this response goes beyond the scope of your letter on the erosion of the dike, but because of the distribution of your copies I feel compelled to state the background and reasoning behind my response. Also I need to know if the actions I propose are acceptable to you and the Corps, and which of the options on management you would like to pursue.

Perhaps an onsite visit with the Department and the Corps would be a good idea so we can be sure that any action taken will be approved. I am looking forward to your response. If you have questions please call me at 447-5000.

Sincerely,

Robert A. Peccia

Robert Peccia, P.E.

cc: Allen Steinle – Army Corps
Dave Galt – Director
Joel Marshik, P.E. – Chief Engineer
Dave Hill – Environmental Services
File

Dam Safety Program

Memo

To: Bonnie Steg, MDOT, Resources Section Supervisor, Environmental Services,

From: Michele Lemieux, P.E., Dam Safety Program Manager

CC: Timothy McNaboe, Wetland Engineer, Environmental Services
Bob Peccia, Robert Peccia and Associates

Date: Tuesday, August 02, 2005

Re: Beaverhead Gateway Ranch Wetlands Dike – Trip Report

On Tuesday, July 26, 2005 I visited the Beaverhead Gateway Ranch Wetlands Mitigation Project. The purpose of the visit was to evaluate the condition of the upstream face of the dike.

Erosion and beaching due to wave action is present at several locations. In general, the erosion is minor. There are 2 locations where the erosion is beginning to encroach on the crest of the dike: at station 18+00 and at station 13+00 (station locations approximated by pacing).

Erosion of the crest becomes a safety concern when the crest width is narrowed. An embankment with a narrow crest is more susceptible to failure from overtopping. In addition, upstream or downstream slope movement is more apt to cause a failure when the embankment has a narrow crest.

Although the erosion is slowly moving toward the crest of the dike, I consider this to be a maintenance issue and not a safety concern, for several reasons:

> First, the eroded areas are still 3 or more feet from the crest of the dike. The crest is very wide and both upstream and downstream slopes are gentle. It would take a considerable amount of additional erosion before the crest would become narrow enough to be a concern.
>
> Second, even with a narrow crest, the dike is not susceptible to failure. The reservoir is located offstream. It is unlikely that an extreme storm event could cause the reservoir level to rise to the point where the dike would be overtopped. In addition, the dike height is low, and the upstream and downstream slopes very gentle. Embankments with this configuration are very stable. Slope failure is unlikely.
>
> Third, the dike was constructed primarily with fat clays. Fat clays are generally non-erosive and resistant to failure.

I would recommend that the dike owner periodically add fill to the areas of the dike where beaching is taking place and vertical slopes are developing. The upstream face should be annually monitored, and a regular maintenance plan developed.

Figure 1. Erosion of upstream face, slowly moving toward crest of dike approximately 375 feet west of overflow structure. Note lack of vegetation on vertical slopes.

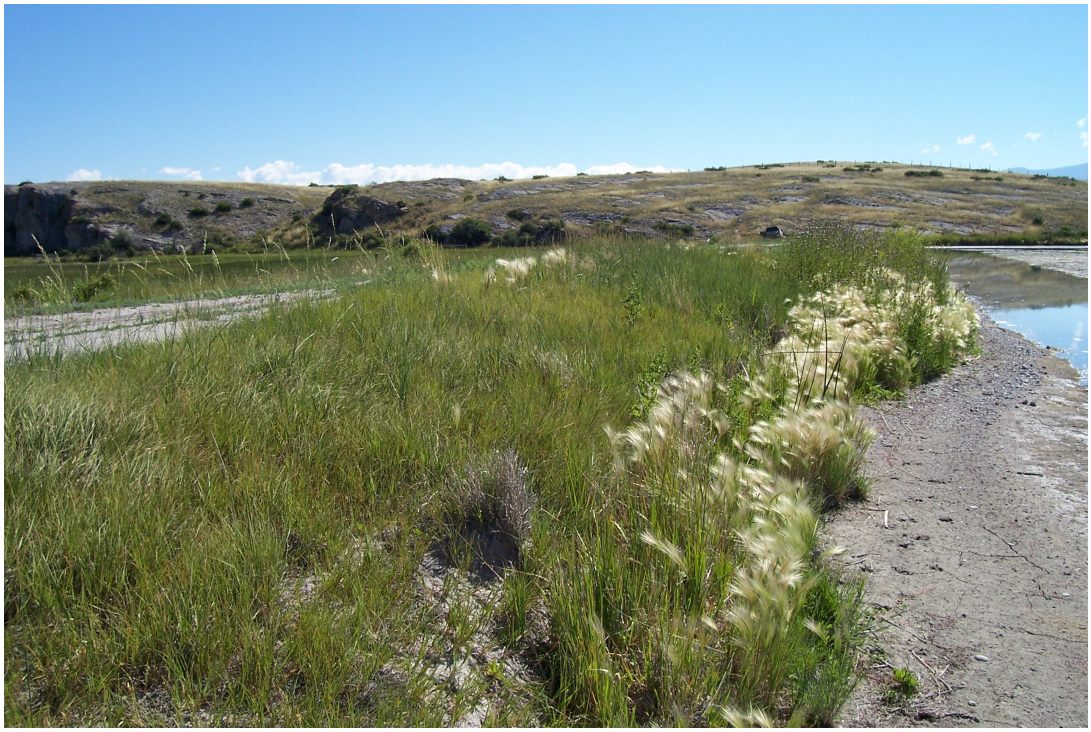


Figure 2. View of upstream face looking east. Note gentle slopes.

Figure 3. View of upstream face erosion approximately 870 feet west of overflow structure. Vegetation has a difficult time establishing on vertical slopes, so erosion will likely continue. Crest is still 3 feet away, and very wide in this location, so the erosion is not a threat to the safety and stability of the dam at this time.

Figure 4. Gentle downstream slopes make for a failure resistant structure.

Appendix E

BIRD SURVEY PROTOCOL
GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Beaverhead Gateway
Dillon, Montana

BIRD SURVEY PROTOCOL

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

Species Use within the Mitigation Wetland: Survey Method

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

Sites that can be circumambulated or walked throughout.

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

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

Sites that cannot be circumambulated.

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

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

Species Use within the Mitigation Wetland: Data Recording

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

1. Bird Species List

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

2. Bird Density

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

3. Bird Behavior

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

4. Bird Species Habitat Use

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

GPS MAPPING AND AERIAL PHOTO REFERENCING PROCEDURE

The wetland boundaries, photograph location points and sampling locations were field located with mapping grade Trimble Geo III GPS units. The data was collected with a minimum of three positions per feature using Course/Acquisition code. The collected data was then transferred to a PC and differentially corrected to the nearest operating Community Base Station. The corrected data was then exported to ACAD drawings in Montana State Plain Coordinates NAD 83 international feet.

The GPS positions collected and processed had a 68% accuracy of 7 feet except in isolated areas of Tasks .008 and .011, where it went to 12 feet. This is within the 1 to 5 meter range listed as the expected accuracy of the mapping grade Trimble GPS.

Aerial reference points were used to position the aerial photographs. This positioning did not remove the distortion inherent in all photos; this imagery is to be used as a visual aide only. The located wetland boundaries were given a final review by the wetland biologist and adjustments were made if necessary.

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

Appendix F

2005 MACROINVERTEBRATE SAMPLE PROTOCOL AND DATA ANALYSES

MDT Wetland Mitigation Monitoring
Beaverhead Gateway
Dillon, Montana

AQUATIC INVERTEBRATE SAMPLING PROTOCOL

Equipment List

- D-frame sampling net with 1 mm mesh. Wildco is a good source of these.
- Spare net.
- 1-liter plastic sample jars, wide-mouth. VWR has these: catalog #36319-707.
- 95% ethanol: Northwest Scientific in Billings carries this.

All these other things are generally available at hardware or sporting goods stores. Make the labels on an ink jet printer preferably.

- hip waders.
- pre-printed sample labels (printed on Rite-in-the-Rain or other coated paper, two labels per sample).
- pencil.
- plastic pail (3 or 5 gallon).
- large tea strainer or framed screen.
- towel.
- tape for affixing label to jar.
- cooler with ice for sample storage.

Site Selection

Select the sampling site with these considerations in mind:

- Select a site accessible with hip waders. If substrates are too soft, lay a wide board down to walk on.
- Determine a location that is representative of the overall condition of the wetland.

Sampling

Wetland invertebrates inhabit the substrate, the water column, the stems and leaves of aquatic vegetation, and the water surface. Your goal is to sweep the collecting net through each of these habitat types, and then to combine the resulting samples into the 1-liter sample jar.

Dip out about a gallon of water into the pail. Pour about a cup of ethanol into the sample jar. Fill out the top half of the sample labels, using pencil, since ink will dissolve in the ethanol.

Ideally, you can sample a swath of water column from near-shore outward to a depth of approximately 3 feet with a long sweep of the net, keeping the net at about half the depth of the water throughout the sweep. Sweep the water surface as well. Pull the net through a vegetated area, beneath the water surface, for at least a meter of distance.

Sample the substrate by pulling the net along the bottom, bumping it against the substrate several times as you pull.

This step is optional, but it gives you a chance to <u>see</u> that you've collected some invertebrates. Rinse the net out into the bucket, and look for insects, crustaceans, etc. If necessary, repeat the sampling process in a nearby location, and add the net contents to the bucket. Remember to sample all four environments.

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

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

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

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

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

Photograph the sampled site.

Sample Handling/Shipping

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

MDT Mitigated Wetland Monitoring Project

Aquatic Invertebrate Monitoring
Summary 2001 - 2005

METHODS

Among other monitoring activities, aquatic invertebrate assemblages were collected at a number of mitigated wetlands throughout Montana. This report summarizes data generated from five years of collection. In 2001, 29 sites were sampled statewide. Nineteen of these sites were revisited in 2002, and 13 new sites were sampled. In 2003, 17 sites that had been visited in both 2001 and 2002 were re-sampled, and 11 sites sampled for the first time in 2001 were re-visited. In addition, 2 new sites were sampled. In 2004, 25 sites were re-visited, and 6 new sites were sampled. In 2005, an additional 2 sites were added. Over all years of sampling, a total of 151 sites were sampled for invertebrates. Table 2 summarizes sites and sampling years.

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

Scoring criteria for metrics were developed by generally following the tactic used by Stribling et al. Boxplots were generated using a statistical software package (Statistica), and distributions, median values, ranges, and quartiles for each metric were examined. All sites in all years of sampling were used. Camp Creek, which was sampled in 2002, 2003, 2004, and 2005, and Kleinschmidt Creek, sampled in 2003, 2004, and 2005, were assessed using the tested metric battery developed for montane streams of Western Montana (Bollman 1998).Invertebrate assemblages at these sites were different from that of the other sites, and suggested montane or foothill stream conditions rather than wetland conditions. For the wetland sites, “optimal” scores were generally those that fell above the 75^{th} percentile (for those metrics that decrease in value in response to stress) or below the 25^{th} percentile (for metrics that respond to stress by an increase in value) of all scores. Additional scoring ranges were established by bisecting the range below the 75^{th} percentile for decreasing scores (or above the 25^{th} percentile for increasing scores) into “sub-optimal” and “poor” assessment categories. A score of 5, 3, or 1 was assigned to optimal, sub-optimal, and poor metric performance, respectively. In this way, metric values were translated into normalized metric scores, and scores for all metrics were summed to produce a total bioassessment score. Total bioassessment scores were classified according to a similar process, using the ranges and distributions of total scores for all sites studied in all years.

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

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

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

Sample Processing

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

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

Bioassessment Metrics

An index based on the performance of 12 metrics was constructed, as described above. Table 2 lists those metrics, describes their calculation and the expected response of each to increased degradation or impairment of the wetland.

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

Four composition metrics (%Chironomidae, %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.

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

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

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
Orthocladiinae/Chironomidae	Number of individual midges in the sub-family Orthocladiinae / total number of midges in the subsample.	Decrease
%Amphipoda	Percent abundance of amphipods in the subsample	Increase
%Crustacea + %Mollusca	Percent abundance of crustaceans in the subsample plus percent abundance of molluscs in the subsample	Increase
HBI	Relative abundance of each taxon multiplied times that taxon's modified Hilsenhoff Biotic Index value. These numbers are summed over all taxa in the subsample.	Increase
%Dominant taxon	Percent abundance of the most abundant taxon in the subsample	Increase
%Collector-Gatherers	Percent abundance of organisms in the collector-gatherer functional group	Decrease
%Filterers	Percent abundance of organisms in the filterer functional group	Increase

RESULTS

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

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

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

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

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

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

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

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

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

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Taxa Listing

Project ID: MDT05LW
RAI No.: MDT05LW009

RAI No.: MDT05LW009 **Sta. Name:** BEAVERHEAD 1
Client ID:
Date Coll.: 7/14/2005 **No. Jars:** 1 **STORET ID:**

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Acari	2	1.96%	Yes	Unknown		5	PR
Ostracoda	4	3.92%	Yes	Unknown		8	CG
Erpobdellidae							
Erpobdellidae	2	1.96%	Yes	Immature	Immature	8	PR
Naididae							
Naididae	3	2.94%	Yes	Unknown		8	CG
Physidae							
Physidae	3	2.94%	Yes	Unknown		8	SC
Planorbidae							
Gyraulus sp.	2	1.96%	Yes	Unknown		8	SC
Talitridae							
Hyalella sp.	2	1.96%	Yes	Unknown		8	CG
Ephemeroptera							
Caenidae							
Caenis sp.	4	3.92%	Yes	Larva		7	CG
Heteroptera							
Corixidae							
Corixidae	1	0.98%	No	Larva	Larva	10	PH
Hesperocorixa sp.	1	0.98%	Yes	Adult		10	PH
Sigara sp.	6	5.88%	Yes	Adult		5	PH
Notonectidae							
Notonecta sp.	2	1.96%	Yes	Adult		5	PR
Notonectidae	7	6.86%	No	Larva	Larva	10	PR
Trichoptera							
Limnephilidae							
Limnephilidae	1	0.98%	Yes	Pupa	Pupa	3	SH
Coleoptera							
Haliplidae							
Haliplus sp.	1	0.98%	Yes	Larva		5	PH
Chironomidae							
Chironomidae							
Apedilum sp.	6	5.88%	Yes	Larva		11	CG
Chironomus sp.	1	0.98%	Yes	Larva		10	CG
Cricotopus (Isocladius) sp.	12	11.76%	Yes	Larva		7	SH
Dicrotendipes sp.	35	34.31%	Yes	Larva		8	CG
Glyptotendipes sp.	3	2.94%	Yes	Larva		10	SH
Paratanytarsus sp.	3	2.94%	Yes	Larva		6	CG
Tanypus sp.	1	0.98%	Yes	Larva		10	PR
Sample Count	**102**						

Metrics Report

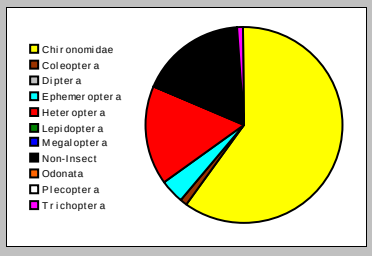
Project ID: MDT05LW
RAI No.: MDT05LW009
Sta. Name: BEAVERHEAD 1
Client ID:
STORET ID
Coll. Date: 7/14/2005

Abundance Measures

Sample Count:	102	
Sample Abundance:	109.29	93.33% of sample used
Total Abundance:	146.99	
Coll. Procedure:		
Sample Notes:		

Taxonomic Composition

Category	R	A	PRA
Non-Insect	7	18	17.65%
Odonata			
Ephemeroptera	1	4	3.92%
Plecoptera			
Heteroptera	3	17	16.67%
Megaloptera			
Trichoptera	1	1	0.98%
Lepidoptera			
Coleoptera	1	1	0.98%
Diptera			
Chironomidae	7	61	59.80%

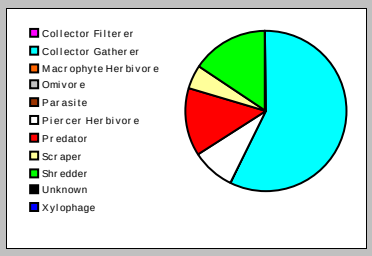


Dominant Taxa

Category	A	PRA
Dicrotendipes	35	34.31%
Cricotopus (Isocladius)	12	11.76%
Notonectidae	7	6.86%
Sigara	6	5.88%
Apedilum	6	5.88%
Ostracoda	4	3.92%
Caenis	4	3.92%
Physidae	3	2.94%
Paratanytarsus	3	2.94%
Naididae	3	2.94%
Glyptotendipes	3	2.94%
Notonecta	2	1.96%
Hyalella	2	1.96%
Erpobdellidae	2	1.96%
Acari	2	1.96%

Functional Composition

Category	R	A	PRA
Predator	4	14	13.73%
Parasite			
Collector Gatherer	8	58	56.86%
Collector Filterer			
Macrophyte Herbivore			
Piercer Herbivore	3	9	8.82%
Xylophage			
Scraper	2	5	4.90%
Shredder	3	16	15.69%
Omivore			
Unknown			

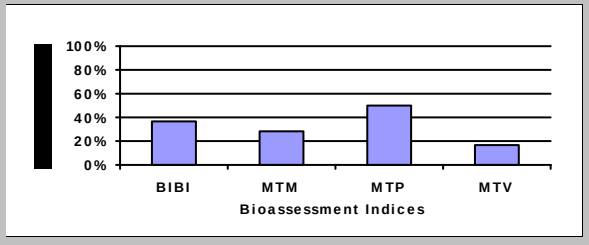


Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
Composition					
Taxa Richness	20	3	2		1
Non-Insect Percent	17.65%				
E Richness	1	1		0	
P Richness	0	1		0	
T Richness	1	1		0	
EPT Richness	2		0		0
EPT Percent	4.90%		0		0
Oligochaeta+Hirudinea Percent	4.90%				
Baetidae/Ephemeroptera	0.000				
Hydropsychidae/Trichoptera	0.000				
Dominance					
Dominant Taxon Percent	34.31%		2		2
Dominant Taxa (2) Percent	46.08%				
Dominant Taxa (3) Percent	52.94%	3			
Dominant Taxa (10) Percent	81.37%				
Diversity					
Shannon H (loge)	2.342				
Shannon H (log2)	3.378		3		
Margalef D	4.182				
Simpson D	0.165				
Evenness	0.077				
Function					
Predator Richness	4		2		
Predator Percent	13.73%	3			
Filterer Richness	0				
Filterer Percent	0.00%			3	
Collector Percent	56.86%		3		3
Scraper+Shredder Percent	20.59%		2		0
Scraper/Filterer	0.000				
Scraper/Scraper+Filterer	0.000				
Habit					
Burrower Richness	3				
Burrower Percent	38.24%				
Swimmer Richness	4				
Swimmer Percent	10.78%				
Clinger Richness	1	1			
Clinger Percent	11.76%				
Characteristics					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	7				
Hemoglobin Bearer Percent	55.88%				
Air Breather Richness	0				
Air Breather Percent	0.00%				
Voltinism					
Univoltine Richness	9				
Semivoltine Richness	1	1			
Multivoltine Percent	65.69%		1		
Tolerance					
Sediment Tolerant Richness	1				
Sediment Tolerant Percent	1.96%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	4.242				
Pollution Sensitive Richness	0	1		0	
Pollution Tolerant Percent	46.08%	3		0	
Hilsenhoff Biotic Index	7.667		0		0
Intolerant Percent	0.00%				
Supertolerant Percent	63.73%				
CTQa	101.077				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	18	36.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	15	50.00%	Moderate
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	3	16.67%	Severe
MTM	Montana DEQ Mountains (Bukantis 1998)	6	28.57%	Moderate



Taxa Listing

Project ID: MDT05LW
RAI No.: MDT05LW010

RAI No.: MDT05LW010 **Sta. Name:** BEAVERHEAD 3
Client ID:
Date Coll.: 7/14/2005 **No. Jars:** 1 **STORET ID:**

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Acari	1	0.95%	Yes	Unknown		5	PR
Copepoda	14	13.33%	Yes	Unknown		8	CG
Ostracoda	81	77.14%	Yes	Unknown		8	CG
Talitridae							
Hyalella sp.	1	0.95%	Yes	Unknown		8	CG
Coleoptera							
Dytiscidae							
Dytiscidae	1	0.95%	Yes	Larva	Larva	5	PR
Chironomidae							
Chironomidae							
Cricotopus (Cricotopus) sp.	3	2.86%	Yes	Larva		7	SH
Dicrotendipes sp.	1	0.95%	No	Larva	Larva	8	CG
Dicrotendipes sp.	1	0.95%	Yes	Larva		8	CG
Orthocladius sp.	1	0.95%	Yes	Larva		6	CG
Phaenopsectra sp.	1	0.95%	Yes	Larva		7	SC
Sample Count	**105**						

Metrics Report

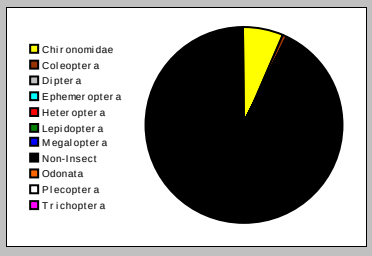
Project ID: MDT05LW
RAI No.: MDT05LW010
Sta. Name: BEAVERHEAD 3
Client ID:
STORET ID
Coll. Date: 7/14/2005

Abundance Measures

Sample Count:	105	
Sample Abundance:	12,600.00	0.83% of sample used
Total Abundance:	16,947.00	
Coll. Procedure:		
Sample Notes:		

Taxonomic Composition

Category	R	A	PRA
Non-Insect	4	97	92.38%
Odonata			
Ephemeroptera			
Plecoptera			
Heteroptera			
Megaloptera			
Trichoptera			
Lepidoptera			
Coleoptera	1	1	0.95%
Diptera			
Chironomidae	4	7	6.67%

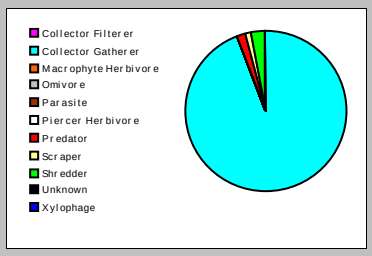


Dominant Taxa

Category	A	PRA
Ostracoda	81	77.14%
Copepoda	14	13.33%
Cricotopus (Cricotopus)	3	2.86%
Dicrotendipes	2	1.90%
Phaenopsectra	1	0.95%
Orthocladius	1	0.95%
Hyalella	1	0.95%
Dytiscidae	1	0.95%
Acari	1	0.95%

Functional Composition

Category	R	A	PRA
Predator	2	2	1.90%
Parasite			
Collector Gatherer	5	99	94.29%
Collector Filterer			
Macrophyte Herbivore			
Piercer Herbivore			
Xylophage			
Scraper	1	1	0.95%
Shredder	1	3	2.86%
Omivore			
Unknown			

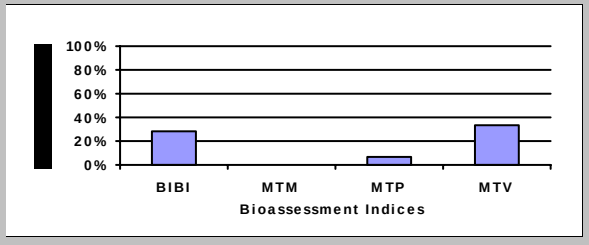


Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
Composition					
Taxa Richness	9	1	0		0
Non-Insect Percent	92.38%				
E Richness	0	1		0	
P Richness	0	1		0	
T Richness	0	1		0	
EPT Richness	0		0		0
EPT Percent	0.00%		0		0
Oligochaeta+Hirudinea Percent					
Baetidae/Ephemeroptera	0.000				
Hydropsychidae/Trichoptera	0.000				
Dominance					
Dominant Taxon Percent	77.14%		0		0
Dominant Taxa (2) Percent	90.48%				
Dominant Taxa (3) Percent	93.33%	1			
Dominant Taxa (10) Percent	100.00%				
Diversity					
Shannon H (loge)	0.835				
Shannon H (log2)	1.204		0		
Margalef D	1.723				
Simpson D	0.622				
Evenness	0.088				
Function					
Predator Richness	2		0		
Predator Percent	1.90%	1			
Filterer Richness	0				
Filterer Percent	0.00%			3	
Collector Percent	94.29%		1		0
Scraper+Shredder Percent	3.81%		1		0
Scraper/Filterer	0.000				
Scraper/Scraper+Filterer	0.000				
Habit					
Burrower Richness	1				
Burrower Percent	1.90%				
Swimmer Richness	0				
Swimmer Percent	0.00%				
Clinger Richness	2	1			
Clinger Percent	3.81%				
Characteristics					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	2				
Hemoglobin Bearer Percent	2.86%				
Air Breather Richness	1				
Air Breather Percent	0.95%				
Voltinism					
Univoltine Richness	1				
Semivoltine Richness	1	1			
Multivoltine Percent	98.10%		0		
Tolerance					
Sediment Tolerant Richness	0				
Sediment Tolerant Percent	0.00%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	4.857				
Pollution Sensitive Richness	0	1		0	
Pollution Tolerant Percent	2.86%	5		3	
Hilsenhoff Biotic Index	7.886		0		0
Intolerant Percent	0.00%				
Supertolerant Percent	93.33%				
CTQa	100.800				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	14	28.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	2	6.67%	Severe
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	6	33.33%	Moderate
MTM	Montana DEQ Mountains (Bukantis 1998)	0	0.00%	Severe



Taxa Listing

Project ID: MDT05LW
RAI No.: MDT05LW011

RAI No.: MDT05LW011 **Sta. Name:** BEAVERHEAD 5
Client ID:
Date Coll.: 7/14/2005 **No. Jars:** 1 **STORET ID:**

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Acari	1	2.94%	Yes	Unknown		5	PR
Physidae							
Physidae	1	2.94%	Yes	Unknown		8	SC
Heteroptera							
Corixidae							
Corixidae	2	5.88%	No	Larva	Larva	10	PH
Hesperocorixa sp.	2	5.88%	Yes	Adult		10	PH
Sigara sp.	2	5.88%	Yes	Adult		5	PH
Notonectidae							
Notonecta sp.	2	5.88%	Yes	Adult		5	PR
Coleoptera							
Dytiscidae							
Laccophilus sp.	1	2.94%	Yes	Adult		5	PR
Haliplidae							
Haliplus sp.	4	11.76%	Yes	Larva		5	PH
Hydrophilidae							
Hydrobius sp.	1	2.94%	Yes	Adult		8	PR
Hydrophilidae	1	2.94%	No	Larva	Larva	5	PR
Chironomidae							
Chironomidae							
Apedilum sp.	12	35.29%	Yes	Larva		11	CG
Cricotopus (Isocladius) sp.	1	2.94%	Yes	Larva		7	SH
Dicrotendipes sp.	3	8.82%	Yes	Larva		8	CG
Paratanytarsus sp.	1	2.94%	Yes	Larva		6	CG
Sample Count	**34**						

Metrics Report

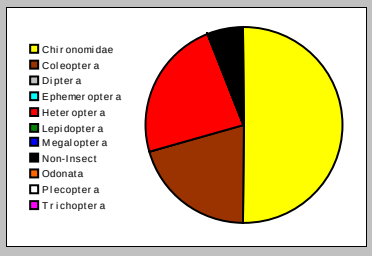
Project ID: MDT05LW
RAI No.: MDT05LW011
Sta. Name: BEAVERHEAD 5
Client ID:
STORET ID
Coll. Date: 7/14/2005

Abundance Measures

Sample Count:	34	
Sample Abundance:	34.00	100.00% of sample used
Total Abundance:	45.73	
Coll. Procedure:		
Sample Notes:		

Taxonomic Composition

Category	R	A	PRA
Non-Insect	2	2	5.88%
Odonata			
Ephemeroptera			
Plecoptera			
Heteroptera	3	8	23.53%
Megaloptera			
Trichoptera			
Lepidoptera			
Coleoptera	3	7	20.59%
Diptera			
Chironomidae	4	17	50.00%

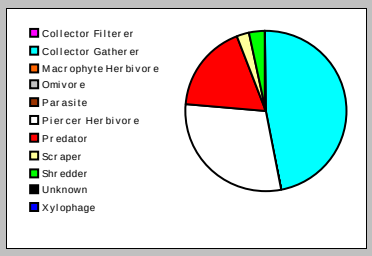


Dominant Taxa

Category	A	PRA
Apedilum	12	35.29%
Haliplus	4	11.76%
Dicrotendipes	3	8.82%
Sigara	2	5.88%
Notonecta	2	5.88%
Hesperocorixa	2	5.88%
Corixidae	2	5.88%
Physidae	1	2.94%
Paratanytarsus	1	2.94%
Laccophilus	1	2.94%
Hydrophilidae	1	2.94%
Hydrobius	1	2.94%
Cricotopus (Isocladius)	1	2.94%
Acari	1	2.94%

Functional Composition

Category	R	A	PRA
Predator	4	6	17.65%
Parasite			
Collector Gatherer	3	16	47.06%
Collector Filterer			
Macrophyte Herbivore			
Piercer Herbivore	3	10	29.41%
Xylophage			
Scraper	1	1	2.94%
Shredder	1	1	2.94%
Omivore			
Unknown			

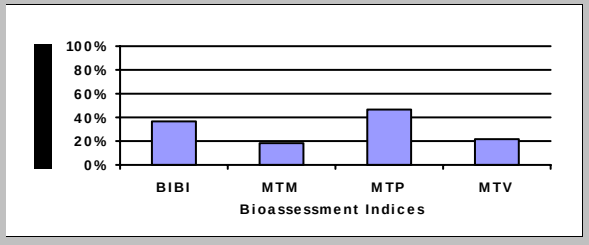


Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
Composition					
Taxa Richness	12	1	1		0
Non-Insect Percent	5.88%				
E Richness	0	1		0	
P Richness	0	1		0	
T Richness	0	1		0	
EPT Richness	0		0		0
EPT Percent	0.00%		0		0
Oligochaeta+Hirudinea Percent					
Baetidae/Ephemeroptera	0.000				
Hydropsychidae/Trichoptera	0.000				
Dominance					
Dominant Taxon Percent	35.29%		2		1
Dominant Taxa (2) Percent	47.06%				
Dominant Taxa (3) Percent	55.88%	3			
Dominant Taxa (10) Percent	88.24%				
Diversity					
Shannon H (loge)	2.053				
Shannon H (log2)	2.961		2		
Margalef D	3.203				
Simpson D	0.168				
Evenness	0.102				
Function					
Predator Richness	4		2		
Predator Percent	17.65%	3			
Filterer Richness	0				
Filterer Percent	0.00%			3	
Collector Percent	47.06%		3		3
Scraper+Shredder Percent	5.88%		1		0
Scraper/Filterer	0.000				
Scraper/Scraper+Filterer	0.000				
Habit					
Burrower Richness	1				
Burrower Percent	8.82%				
Swimmer Richness	5				
Swimmer Percent	38.24%				
Clinger Richness	1	1			
Clinger Percent	2.94%				
Characteristics					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	3				
Hemoglobin Bearer Percent	50.00%				
Air Breather Richness	2				
Air Breather Percent	8.82%				
Voltinism					
Univoltine Richness	4				
Semivoltine Richness	3	3			
Multivoltine Percent	52.94%		2		
Tolerance					
Sediment Tolerant Richness	0				
Sediment Tolerant Percent	0.00%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	4.154				
Pollution Sensitive Richness	0	1		0	
Pollution Tolerant Percent	23.53%	3		1	
Hilsenhoff Biotic Index	6.727		1		0
Intolerant Percent	0.00%				
Supertolerant Percent	26.47%				
CTQa	99.000				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	18	36.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	14	46.67%	Moderate
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	4	22.22%	Moderate
MTM	Montana DEQ Mountains (Bukantis 1998)	4	19.05%	Severe



Taxa Listing

Project ID: MDT05LW
RAI No.: MDT05LW012

RAI No.: MDT05LW012 **Sta. Name:** BEAVERHEAD 6
Client ID:
Date Coll.: 7/14/2005 **No. Jars:** 1 **STORET ID:**

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Cambaridae							
Cambaridae	3	3.33%	No	Immature	Immature	6	OM
Physidae							
Physidae	23	25.56%	Yes	Unknown		8	SC
Planorbidae							
Gyraulus sp.	23	25.56%	Yes	Unknown		8	SC
Talitridae							
Hyalella sp.	1	1.11%	Yes	Unknown		8	CG
Odonata							
Coenagrionidae							
Enallagma sp.	1	1.11%	Yes	Larva		7	PR
Ephemeroptera							
Caenidae							
Caenis sp.	4	4.44%	Yes	Larva		7	CG
Heteroptera							
Corixidae							
Corixidae	2	2.22%	No	Larva	Larva	10	PH
Sigara sp.	1	1.11%	Yes	Adult		5	PH
Notonectidae							
Notonecta sp.	3	3.33%	Yes	Adult		5	PR
Notonectidae	7	7.78%	No	Larva	Larva	10	PR
Coleoptera							
Dytiscidae							
Oreodytes sp.	1	1.11%	Yes	Adult		5	PR
Haliplidae							
Haliplidae	1	1.11%	No	Larva	Early Instar	7	SH
Haliplus sp.	4	4.44%	Yes	Adult		5	PH
Hydrophilidae							
Hydrophilidae	1	1.11%	Yes	Larva	Larva	5	PR
Chironomidae							
Chironomidae							
Apedilum sp.	12	13.33%	Yes	Larva		11	CG
Cladotanytarsus sp.	1	1.11%	Yes	Larva		7	CG
Cricotopus (Cricotopus) sp.	1	1.11%	Yes	Larva		7	SH
Dicrotendipes sp.	1	1.11%	Yes	Larva		8	CG
Sample Count	**90**						

Metrics Report

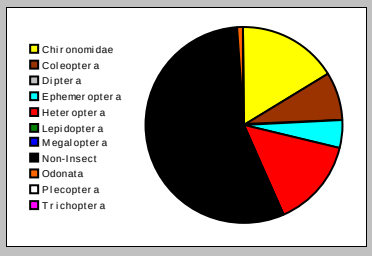
Project ID: MDT05LW
RAI No.: MDT05LW012
Sta. Name: BEAVERHEAD 6
Client ID:
STORET ID
Coll. Date: 7/14/2005

Abundance Measures

Sample Count:	90	
Sample Abundance:	90.00	100.00% of sample used
Total Abundance:	121.05	
Coll. Procedure:		
Sample Notes:		

Taxonomic Composition

Category	R	A	PRA
Non-Insect	3	50	55.56%
Odonata	1	1	1.11%
Ephemeroptera	1	4	4.44%
Plecoptera			
Heteroptera	2	13	14.44%
Megaloptera			
Trichoptera			
Lepidoptera			
Coleoptera	3	7	7.78%
Diptera			
Chironomidae	4	15	16.67%

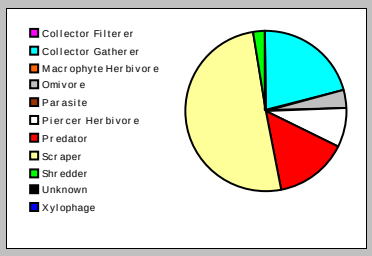


Dominant Taxa

Category	A	PRA
Physidae	23	25.56%
Gyraulus	23	25.56%
Apedilum	12	13.33%
Notonectidae	7	7.78%
Haliplus	4	4.44%
Caenis	4	4.44%
Notonecta	3	3.33%
Cambaridae	3	3.33%
Corixidae	2	2.22%
Sigara	1	1.11%
Hydrophilidae	1	1.11%
Enallagma	1	1.11%
Dicrotendipes	1	1.11%
Cricotopus (Cricotopus)	1	1.11%
Cladotanytarsus	1	1.11%

Functional Composition

Category	R	A	PRA
Predator	4	13	14.44%
Parasite			
Collector Gatherer	5	19	21.11%
Collector Filterer			
Macrophyte Herbivore			
Piercer Herbivore	2	7	7.78%
Xylophage			
Scraper	2	46	51.11%
Shredder	1	2	2.22%
Omivore	0	3	3.33%
Unknown			



Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
Composition					
Taxa Richness	14	1	1		0
Non-Insect Percent	55.56%				
E Richness	1	1		0	
P Richness	0	1		0	
T Richness	0	1		0	
EPT Richness	1		0		0
EPT Percent	4.44%		0		0
Oligochaeta+Hirudinea Percent					
Baetidae/Ephemeroptera	0.000				
Hydropsychidae/Trichoptera	0.000				
Dominance					
Dominant Taxon Percent	25.56%		3		2
Dominant Taxa (2) Percent	51.11%				
Dominant Taxa (3) Percent	64.44%	3			
Dominant Taxa (10) Percent	91.11%				
Diversity					
Shannon H (loge)	1.897				
Shannon H (log2)	2.736		2		
Margalef D	2.993				
Simpson D	0.201				
Evenness	0.109				
Function					
Predator Richness	4		2		
Predator Percent	14.44%	3			
Filterer Richness	0				
Filterer Percent	0.00%			3	
Collector Percent	21.11%		3		3
Scraper+Shredder Percent	53.33%		3		2
Scraper/Filterer	0.000				
Scraper/Scraper+Filterer	0.000				
Habit					
Burrower Richness	1				
Burrower Percent	1.11%				
Swimmer Richness	4				
Swimmer Percent	12.22%				
Clinger Richness	1	1			
Clinger Percent	1.11%				
Characteristics					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	4				
Hemoglobin Bearer Percent	51.11%				
Air Breather Richness	2				
Air Breather Percent	2.22%				
Voltinism					
Univoltine Richness	7				
Semivoltine Richness	3	3			
Multivoltine Percent	16.67%		3		
Tolerance					
Sediment Tolerant Richness	1				
Sediment Tolerant Percent	25.56%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	3.286				
Pollution Sensitive Richness	0	1		0	
Pollution Tolerant Percent	63.33%	1		0	
Hilsenhoff Biotic Index	7.667		0		0
Intolerant Percent	0.00%				
Supertolerant Percent	63.33%				
CTQa	92.250				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	16	32.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	17	56.67%	Slight
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	3	16.67%	Severe
MTM	Montana DEQ Mountains (Bukantis 1998)	7	33.33%	Moderate