MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2003

Beaverhead Gateway
Dillon, Montana

Prepared for:

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

Prepared by:

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

March 2004

Project No: 130091.011

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1.0 INTRODUCTION

This report represents the third year of monitoring at the Beaverhead Gateway Ranch wetland mitigation site by Land & Water Consulting. 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 Butte District. Some of these projects are completed and some have yet to be constructed. The mitigation site is located 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.

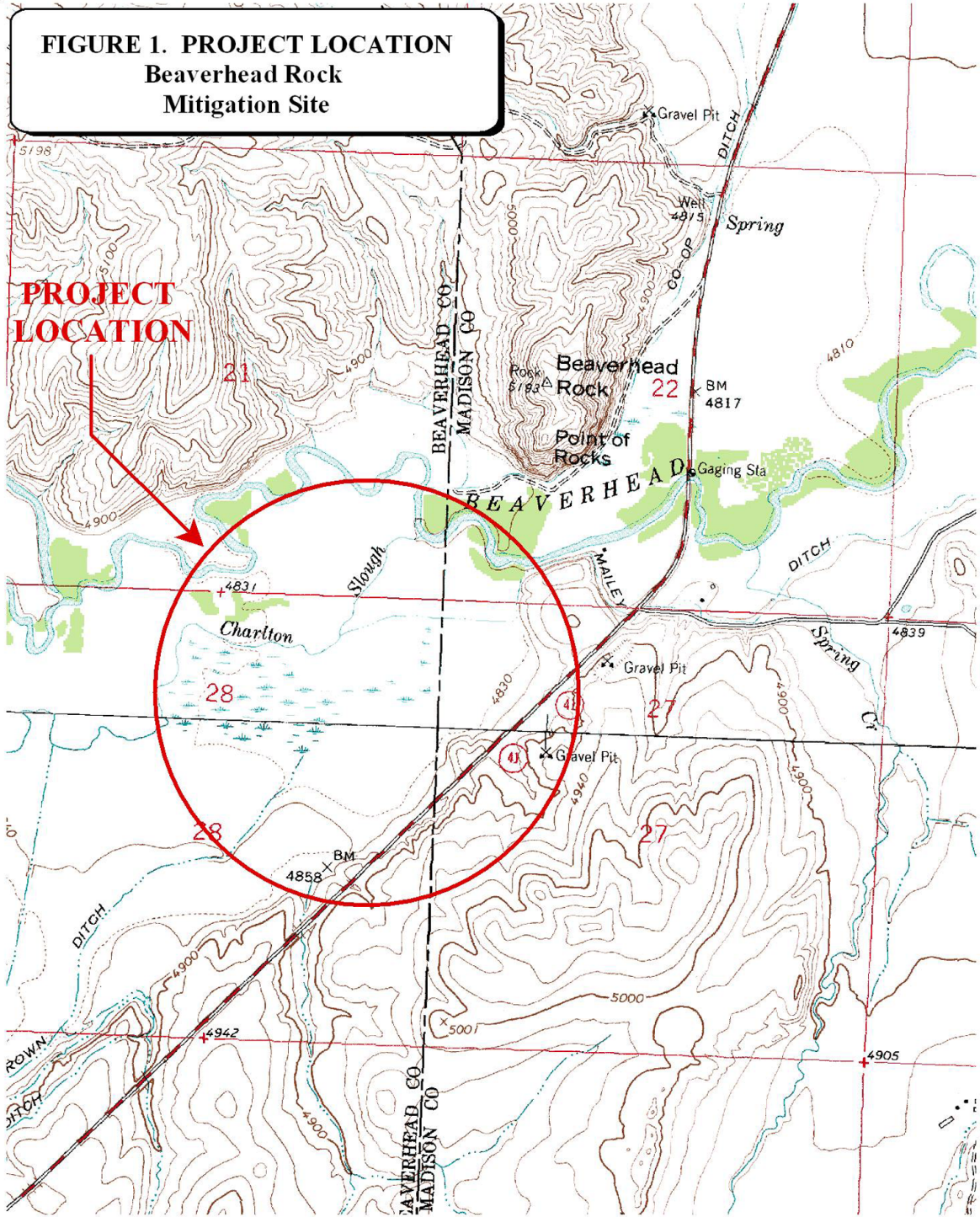
The approximate site boundary is illustrated on **Figure 2** (**Appendix A**), and the original site plans are included in **Appendix D**. The project is located adjacent to the Beaverhead River and Highway 41. Upwelling groundwater and springs with surface retention behind a constructed dike provides wetland hydrology. Precipitation and surface runoff provides minor contributions to wetland hydrology at this site. The site is in private ownership and has a conservation easement in place. The wetland easement area is not 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 Beaverhead Gateway site will be monitored once per year over the 3-year contract period to document wetland and other biological attributes. 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 29 (spring season), August 5 (mid-season) and October 16, 2003 (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 August 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**). No groundwater monitoring wells were installed at the site. 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**). The transects will be used to evaluate changes over time, especially the establishment and increase of hydrophytic vegetation. The transect locations were marked on the air photo and all data were recorded on the mitigation site monitoring form.

Transect endpoint locations were recorded with the GPS unit during 2001. A photo was taken from both ends of each transect looking along the transect path.

A comprehensive plant species list for the site was compiled and will be updated as new species are 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 was 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 air photo and recorded with a resource grade GPS unit in 2001 using procedures outlined in **Appendix E**. Modifications to these boundaries in 2003 were accomplished by hand-mapping onto the 2002 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 and herptile species observations and other positive indicators of use, such as vocalizations, were recorded on the wetland monitoring and bird forms during the 2003 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 2003 there were two sites with no water so 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 was 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 aerial photograph in 2002 and 2003. 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 6.3 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 significantly less than in the past two years. 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. The reason for lower water levels is unclear but may be related to owner manipulation or rainfall patterns in 2003.

Only one of six wetland sites documented on the Routine Wetland Determination forms (**Appendix B**) had groundwater within 18 inches of the surface on August 6, 2002. 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. 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 2003. 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 and is ranked S1 by the Montana Natural Heritage Program. 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 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 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 the transect maps, **Table 2**, **Table 3, Chart 1** and **Chart 2** below. Vegetation transect results show no change between the different monitoring years.

Transect 1 Map for year 2001, 2002 and 2003:

Start	*Sarcobatus/Elymus Upland (40')*	*Alopecurus/Juncus Wetland (1030')*	*Alopecurus/Scirpus Wetland (150')*	*Alopecurus/Juncus Wetland (400')*	*Scirpus Wetland (30')*	Total: 1650'	End

Transect 2 Map for year 2001, 2002 and 2003:

Start	*Hordeum/Kochia Upland (30')*	*Alopecurus/Juncus Wetland (40')*	*Alopecurus/Scirpus Wetland (80')*	*Muhlenbergia/Agropyron Upland (130')*	Total: 280'	End

Table 1: ***2001-2003 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

Table 1: ***2001-2003 Beaverhead Gateway Vegetation Species List (continued)***

Scientific Name	Common Name	Region 9 (Northwest) Wetland Indicator
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
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
Myriophyllum spicatum	Eurasian water milfoil	OBL
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	Lemmon's Alkali Grass	FAC
Ranunculus populago	Popular Buttercup	FACW
*Rorippa spp.**	Watercress	OBL
*Rumex crispus**	Curly Dock	FACW
*Salicornia spp.**	Saltwort	--
*Salix bebbiana**	Bebbs 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-

Table 1: *2001-2003 Beaverhead Gateway Vegetation Species List (continued)*

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.**

Table 2: *Transect 1 Data Summary*

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

Table 3: *Transect 2 Data Summary*

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

Chart 1: Length of Vegetation Community along Transect 1

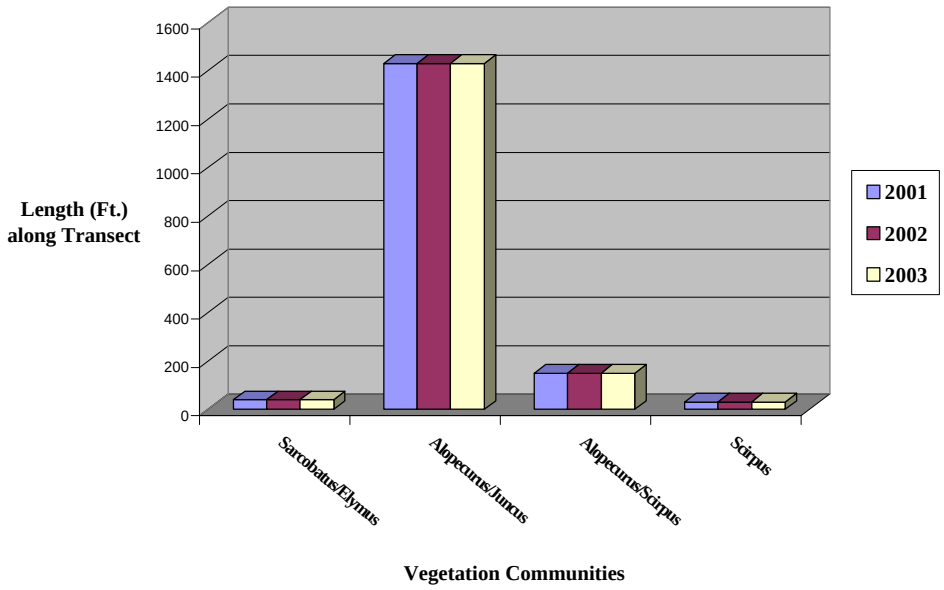
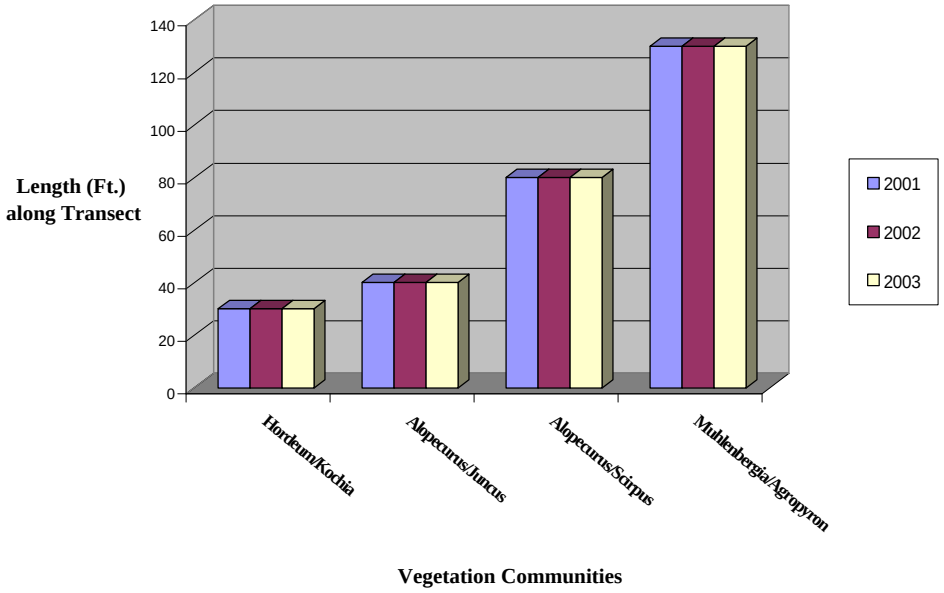


Chart 2: Length of Vegetation Communities along Transect 2



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*). MDT has reported Eurasian water-milfoil (*Myriophyllum spicatum*) at this site. 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 Eurasian water-milfoil, common reed or other important weeds are present. If Eurasian water-milfoil is present it will likely require significant effort to manage in the future. 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. **Appendix D** contains a copy of the soil survey map and description. 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. 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 2003 to those mapped in 2001 and 2002. 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.

Monitoring in 2001 through 2003 identified the following conditions:

	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**

Approximately 111.7 wetland acres and 6.5 open water acres occur within the 2003 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.

MDT has indicated that the monitoring area will likely be reduced in 2004, only including the area above the dike and eliminating the area below the dike (Urban pers. comm.).

3.5 Wildlife

Wildlife species, or evidence of wildlife, observed on the site during 2001, 2002 and 2003 monitoring efforts are listed in **Table 2**. The site receives substantial use by American white pelicans, trumpeter swans, black terns, sandhill cranes, and other species. 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.

In 2003 there were fewer birds observed and fewer bird species. The greatest number of birds observed at the site was about 200, compared with over 500 in 2001. 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. Two mammal and twenty-four bird species were noted at the mitigation site during the 2003 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 over the past five years.

Table 4: ***Wildlife Species Observed at the Beaverhead Gateway Mitigation Site During 2001-2003***

FISH None	
AMPHIBIANS None	
REPTILES Garter Snake (*Thamnophis spp.*)	
BIRDS **American White Pelican (*Pelecanus erythrorhynchos*)** American Crow (*Corvus brachyrhynchos*) **American Coot (*Fulica americana*)** American Dipper (*Cinclus*) Bank Swallow (*Riparia riparia*) **Black-billed magpie (*Pica pica*)** Black-necked Stilt (*Himantopus mexicanus*) Black Tern (*Chlidonias niger*) **Blue-winged teal (*Anas discors*)** **Bullock's oriole (*Icterus bullockii*)** **Canada Goose** (*Branta Canadensis*) **Cinnamon Teal** (*Anas cyanoptera*) **Cliff Swallow** (*Petrochelidon pyrrhonota*) **Common goldeneye (*Bucephala clangula*)** Common Snipe (*Gallinago gallinago*) **Common yellowthroat (***Geothlypis trichas***)** Cowbird (*Molothrus ater*) **Eared grebe (*Podiceps nigricollis*)** Franklins Gull (*Larus pipixcan*) **Forster's tern (*Sterna forsteri*)** **Gadwall (*Anas strepera*)** Great Blue Heron (*Ardea herodias*) Hooded Merganser (*Lophodytes cucullatus*) **Horned lark (*Eremophila alpestris*)**	**Killdeer (*Charadrius vociferous*)** **Lesser Scaup** (*Aythya affinis*) **Long-billed dowitcher (*Limnodromus scolopaceus*)** **Mallard (*Anas platyrhynchos*)** **Marsh Hawk (*Circus cyaneus*)** **Marsh wren (*Cistothorus palustris*)** **Northern harrier (*Circus cyaneus*)** **Northern pintail (*Anas acuta*)** **Northern rough-winged swallow (*Stelgidopteryx serripennis*)** **Northern shoveler (*Anas clypeata*)** **Raven (*Corvus corax*)** Plovers (*Charadrius spp.*) Red-head Duck (*Aythya americana*) Red-tail Hawk (*Buteo jamaicensis*) **Red-winged Blackbird (*Agelaius phoeniceus)*** **Sandhill Cranes (*Grus canadensis*)** **Sora (*Porzana carolina*)** **Tree swallow (*Tachycineta bicolor*)** Vesper Sparrow (*Pooecetes gramineus*) Western Bluebird (*Sialia mexicana*) **Western Meadowlark (*Sturnella neglecta*)** **Wilson's phalarope (*Phalaropus tricolor*)** **Yellow-headed Blackbird (*Xanthocephalus xanthocephalus)***
MAMMALS Coyote (*Canis latrans*) Mule Deer (*Odocoileus hemionus*) Muskrat (*Ondatra zibethicus*)	
Bolded species were observed during 2003. All other species were observed during one or more of the previous monitoring years, but during 2003.	

3.6 Macroinvertebrates

Complete results from the four macroinvertebrate sampling locations (**Figure 2**) are presented in **Appendix F.** Samples were not taken at locations 1 and 2 in 2003 due to a lack of water. The following analysis was provided by Rhithron Associates (Bollman 2003).

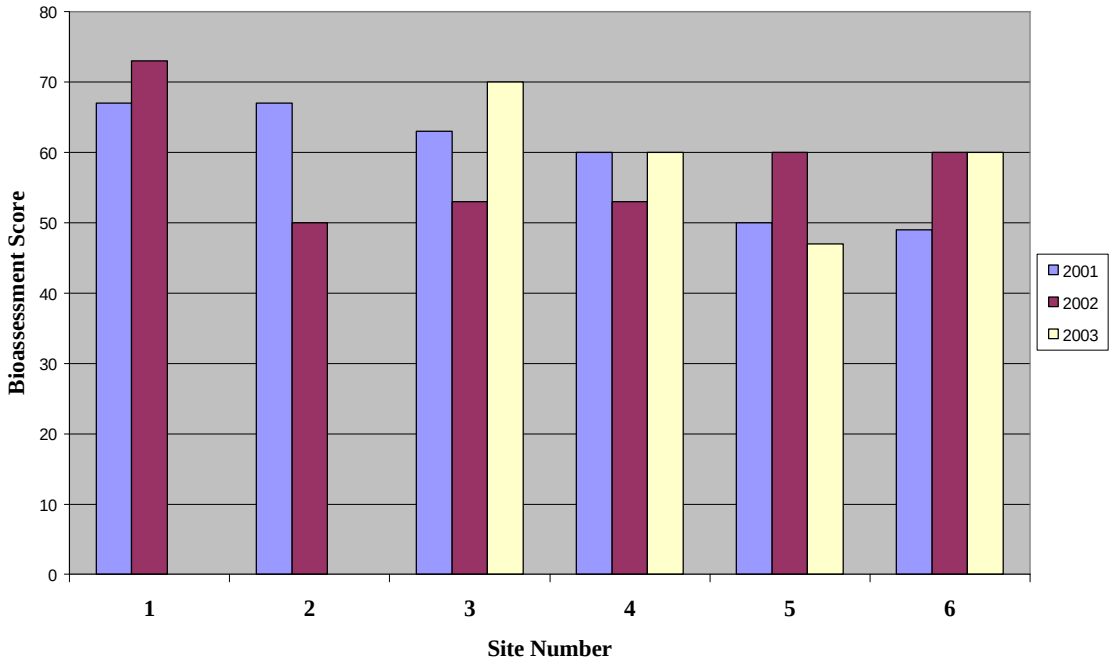
Beaverhead #3. Total bioassessment score fell slightly, and probably insignificantly, between 2002 and 2003; the evaluation suggested that overall biologic condition was sub-optimal in all 3 years. An increase in assemblage sensitivity was a positive change; the biotic index value of 6.63 was well below the median for sites in this study. This may indicate improvement in water quality since 2002. There was a shift in the functional composition of the fauna; whereas gatherers dominated the mix in previous years, scrapers were prevalent in 2003. A decrease in nutrient enrichment or temperature could account for the shift. The scud-and-snail dominated assemblage suggests abundant macrophytes.

Beaverhead #4. The biotic index value improved at this site between 2002 and 2003, and the relatively sensitive taxa (POET) which had apparently been absent from the site in 2002 were again collected in 2003. Cladoceran filter-feeders were the most prevalent animals, and gatherers rounded out what appears to be a fauna adapted to moderately deep water. Improvement in water quality is suggested by these findings. The low taxa richness may be correlated with depth as well, and the depauperate midge fauna suggests monotonous substrates. Sub-optimal biotic conditions were indicated by scores in all 3 years.

Beaverhead #5. The scud-and-snail pattern suggests abundant macrophytes at this site. As at all the other Beaverhead sites sampled in 2003, water quality appeared to be better than median conditions for wetland sites in this study; the biotic index value was relatively low, and the number of POET taxa was within expectations. Benthic habitat complexity is suggested by the midge fauna, and substrates were likely hypoxic since 3 of 4 taxa were hemoglobin-bearers. Although the total bioassessment score indicated worsening biotic conditions at this site since 2003, taxonomic and functional composition of the invertebrate assemblage appear to be appropriate for a shallow wetland site.

Beaverhead #6. Scores indicate stable sub-optimal biotic conditions at this site from 2002 to 2003. Ample large organic debris and resulting benthic habitat complexity is suggested by the dominance of shredders in the functional mix; a stable macrophyte crop could be the source of this material. Overall assemblage sensitivity improved between the 2 years, suggesting improved water quality in terms of nutrients and/or temperature.

Chart 3: ***Bioassessment Scores for Beaverhead Gateway***



3.7 Functional Assessment

The functional assessment numbers for 2003 are similar to those from 2001 and 2002. 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 exceptional 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 rating due to few fish and habitat deficiencies. The site received a moderate flood attenuation rating since only a small portion below the dike is subject to flooding by the Beaverhead River. The site received a low recreation/education rating since it has moderate disturbance and is in private ownership. 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.

Much of the wetland area, especially vegetation community Type 6 (**Figure 3**) would have higher functional capacity if the number of vegetation strata or layers were increased. This area has little cover or vertical diversity. Eliminating or reducing grazing and planting woody species are examples of methods for increasing functional capacity at the site, although the site does rate as a Category II wetland and rates "high" to "exceptional" for several assessed functions.

Based on functional assessment results (**Table 3)**, approximately 993 functional units have been created thus far at the Beaverhead Gateway mitigation site.

Table 5: ***Summary of 2001-2003 Wetland Function/Value Ratings and Functional Points*** [1]

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	2001/2002/2003 Ratings and Scores
Listed/Proposed T&E Species Habitat	Mod (0.7)
MNHP Species Habitat	High (1.0)
General Wildlife Habitat	Exceptional (1.0)
General Fish/Aquatic Habitat	Low (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 (1.0)
Groundwater Discharge/Recharge	High (1.0)
Uniqueness	Mod (0.5)
Recreation/Education Potential	Low (0.3)
Actual Points/Possible Points	8.8 / 12
% of Possible Score Achieved	73%
Overall Category	II
Total Acreage of Assessed Wetlands and Other Aquatic Habitats	118.2 ac
Functional Units (acreage x actual points)	1040.16 fu
Net Acreage Gain	112.8 ac
Net Functional Unit Gain	992.64 fu

3.8 Photographs

Representative photographs taken from photo-points and transect ends are presented in **Appendix C**. A copy of the 2003 aerial photograph is also provided 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 which must be controlled under the Montana County Noxious Weed Control Act [7-22-2151].

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 the dike and other poorly vegetated sites. The most effective remedy is to grade the spoil piles and revegetate them along with other sites needing revegetation. It may be necessary to treat these sites with organic matter or other amendments and plant desired native species.

The lack of hiding cover throughout much of the wetland area has an impact on the site's value for many wildlife species. Methods to improve wildlife value and functional capacity include suspension of grazing and planting of taller herbaceous and woody species. No woody plant regeneration (shrubs/trees) was observed across the site.

Dike erosion and sediment production from the poorly vegetated shoreline should 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.). Examples of potential solutions to erosion problems include shoreline reinforcement, off-shore wave protection, protected off-shore plantings and shoreline plantings.

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 indicated that they might not purchase the credits that have developed below the dike, and that the monitoring area may be reduced to the area above the dike in 2004 (Urban pers. comm.). Consequently, available credit at the site ranges between 92.7 and 113 acres, depending on whether or not credits below the dike are purchased.

4.0 REFERENCES

Bollman, W. Rhithron Associates. 2003. *MDT Wetland Mitigation Monitoring Project*. Missoula, MT.

Carlson, J. Program Zoologist, Montana Natural Heritage Program. Helena, MT. April 2001 conversation.

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

Hackley, Pam. 1997. Pre-Project Wetland Delineation – Beaverhead Gateway Wetland Mitigation Site. Helena, MT.

Ralph, C.J., Geupel, G.R., Pyle, P., Martin, T.E., and D.F. DeSante. 1993. *Handbook of field methods for monitoring landbirds*. Gen. Tech. Rep. PSW-GTR-144. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Dept. of Agriculture. 41 p.

Urban, L. Wetland Mitigation Specialist, Montana Department of Transportation. Helena, MT. March 2001 meeting; January 2002 meeting; March 2004 meeting.

USDA Natural Resource Conservation Service. 1989. *Soil Survey of Madison County Area, Montana.*

USDA Natural Resources Conservation Service. 1998. *Field Indicators of Hydric Soils in the United States*, Version 4. G. Hurt, P. Whited and R. Pringle (eds.). USDA, NRCS Fort Worth, TX.

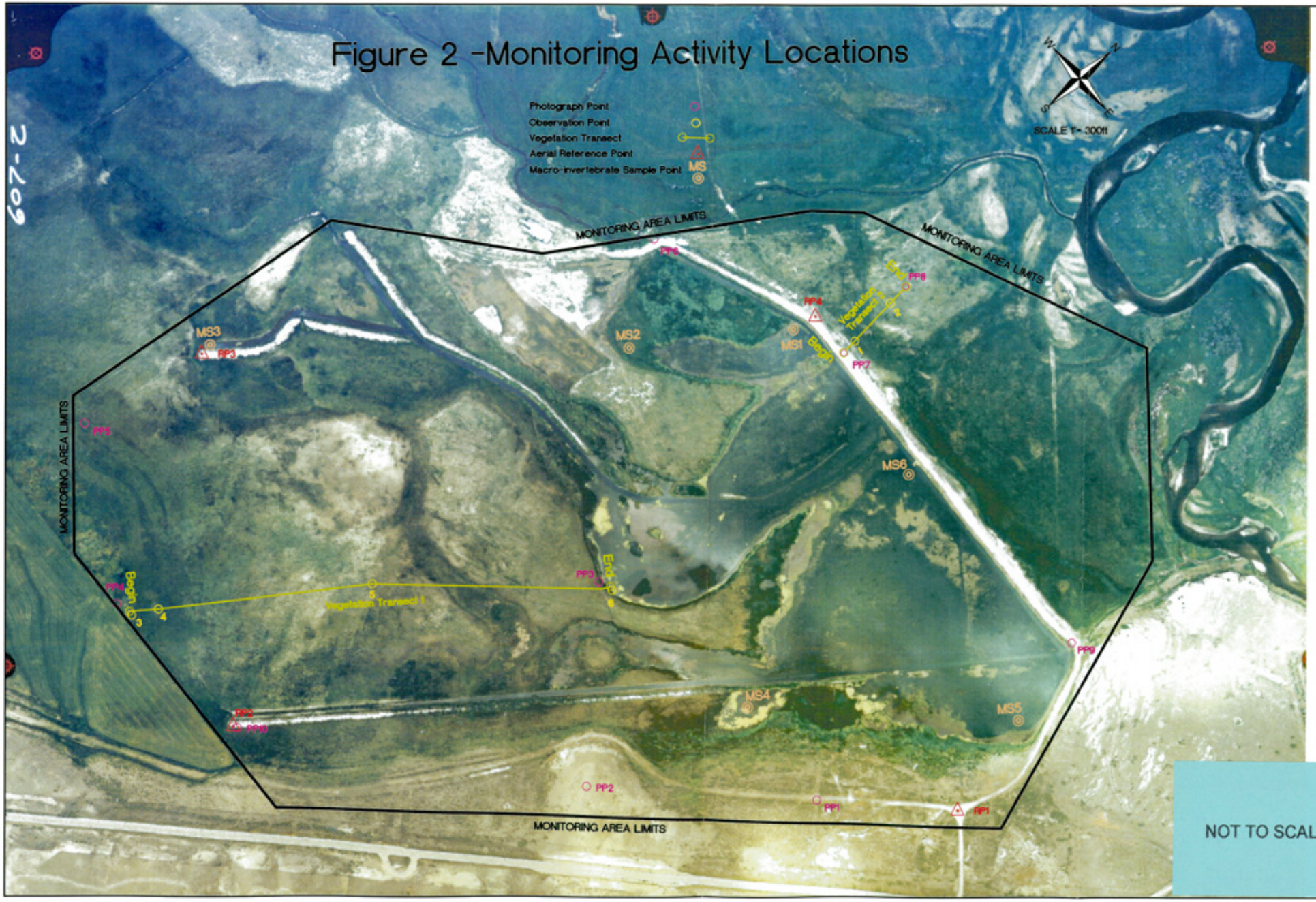
Appendix A

FIGURES 2 - 3

MDT Wetland Mitigation Monitoring
Beaverhead Gateway
Dillon, Montana

LAND & WATER

Figure 2 -Monitoring Activity Locations



PROJECT NAME	MDT Beaverhead Gateway Ranch Wetland Mitigation
DRAWING TITLE	Monitoring Activity Locations
PROJ NO: 130091.011	DRAWN: RA
FILE NAME: TASK11BASE.dwg	CHECKED: JH
SCALE: 1"= 300ft	APPVD: BD
LOCATION: Beaverhead Rock	PROJ MGR: BD
SHEET NUMBER	F2
REV	
DATE: 1-28-03	

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

Figure 3 - Mapped Site Features 2003

PROJECT NAME: MDT Beaverhead Gateway Ranch Wetland Mitigation
DRAWING TITLE: Mapped Site Features 2003

PROJ NO: 130091.011 | DRAWN: RA
FILE NAME: TASK11BASEoct10-0 | CHECKED: BD
SCALE: 1"= 300ft | APPVD: BD
LOCATION: Beaverhead Rock | PROJ MGR: BD

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

SHEET NUMBER: F-3
REV: -
DATE: 2-6-04

Appendix B

COMPLETED 2003 WETLAND MITIGATION SITE MONITORING FORM
COMPLETED 2003 BIRD SURVEY FORM
COMPLETED 2003 WETLAND DELINEATION FORMS
COMPLETED 2003 FUNCTIONAL ASSESSMENT FORM

MDT Wetland Mitigation Monitoring
Beaverhead Gateway
Dillon, Montana

LAND & WATER

LWC / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: Beaverhead Rock Project Number: 130091.12 Assessment Date: 8/06/03
Location: NE of Dillon MDT District: Butte Milepost:_____
Legal description: T____ R____ Section 21, 27, & 28 Time of Day: All
Weather Conditions: Clear Person(s) conducting the assessment: B. Dutton
Initial Evaluation Date:___/____/____ Visit #: 2 Monitoring Year: 2002
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.

High turbidity in submerged/open water areas, perhaps wave action eroding dike which has insufficient vegetation cover, especially of the deep –rooted plants.

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		*Myriophyllum spicatum*	
Dactylis glomerata		*Phalaris arundinacea*	
Descurainia sophia		*Phleum pratense*	
Distichlis spicata		*Phlox longifolia*	
Eleocharis acicularis		*Phragmites australis*	
Eleocharis pauciflora		*Plantago eriopoda*	
Elymus cinereus		*Poa pratensis*	

COMMENTS/PROBLEMS: No new species in 2003. 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
8	6	x	x		
Coyote	1	x	x		

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: _____

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 2002.

FUNCTIONAL ASSESSMENT

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

COMMENTS/PROBLEMS: _____

MAINTENANCE

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

Were man-made structures build or installed to impound water or control water flow into or out of the wetland? YES _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: Erosion/sedimentation along dike, wind and water erosion in bare areas and still lots of weeds along excavation piles. Lots of lambsquarters (Chenopodium) this year – conspicuous.

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Beaverhead Rock Date: 8/06/03 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: 8/06/03 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: 8/06/03 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 2001 field season.

3

BIRD SURVEY – FIELD DATA SHEET

Page__1_of__1_
Date: 5/29/03
Survey Time: 1300-1500

SITE: Beaverhead Ranch (Spring)

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
American coot	2	F	OW				
blue-winged teal	20	F	OW, MA				
Bullock's oriole	1	F	UP				
Canada goose	20	F, N	OW, MA				
cinnamon teal	20	F	OW, MA				
cliff swallow	200	F	OW, MA				
common yellowthroat	2	F	MA				
Forster's tern	4	F, L	MF, OW				
gadwall	6	F	OW, MA				
killdeer	50	F, N	MF, US				
lesser scaup	2	F	OW				
mallard	12	F	OW, MA				
marsh wren	2	F	MA				
northern harrier	1	F	MA				
northern pintail	2	F	OW, MA				
northern rough-winged swallow	10	F	OW				
northern shoveler	6	F	OW, MA				
raven	2	F	MA				
red-winged blackbird	20	F, N	MA				
sandhill crane	35	F	MA				
sora	1	F	MA				
tree swallow	100	F	OW, MA				
western meadowlark	2	F	UP				
Wilson's phalarope	120	F	OW, MA				
yellow-headed blackbird	40	F, N	MA				

Notes:
Hot, light breeze, sunny
7 pairs of Canada geese with broods; tree swallows are using bluebird nest boxes
Coyote scat, tracks; deer tracks; muskrat trails
No herps observed
Site 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

LAND & WATER

BIRD SURVEY – FIELD DATA SHEET

Page__1_of__1_
Date: 8/06/03

SITE: Beaverhead Ranch (Mid-season)

Survey Time: 7am-5PM

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
marsh hawk	2	F	UP, WM				
Canada goose	40	F	MA, MF, OW				
pelican	20	F	MF, OW				
American coot	6	F	OW				
Sandhill crane	32	F	UP, WM				
killdeer	6	F	MF				
Redwing blackbird	4	F	UP				
Mallard	8	F	OW				
Cinnamon teal	12	F	OW, MF				
meadowlark	4	F	UP				

Notes:
Deer – 8 + tracks & scat
Coyote – 1 + scat
No herps

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

Page__1_of__1_
Date: 10/16/03
Survey Time: 1300-1500

SITE: Beaverhead Ranch (Fall)

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
American coot	15	F,L	OW				
mallard	35	F,L	OW				
eared grebe	1	L	OW				
Canada goose	65	F	OW				
long-billed dowitcher	30	F	MA				
common goldeneye	53	F,L	OW				
raven	3	FO	MA				
horned lark	3	FO	UP				
killdeer	4	F	MF				
black-billed magpie	4	F	WM				

Notes:
cloudy, breezy, dry
Coyote scat, tracks; deer tracks; raccoon tracks; skunk tracks
2 whitetail deer observed
Site 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

DATA FORM

ROUTINE WETLAND DETERMINATION

(1987 COE Wetlands Delineation Manual)

Project/Site: Beaverhead Rock	Date: 8/06/03
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: 1
(If needed, explain on reverse.)					

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	--	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.

LAND & WATER

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 2003 as 2001 & 2002.

Approved by HQUSACE 2/92

LAND & WATER

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

Project/Site:	Beaverhead Rock	Date:	8/06/03
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

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 – 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
____ 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 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 2003 as 2001 and 2002.

Approved by HQUSACE 2/92

LAND & WATER

DATA FORM

ROUTINE WETLAND DETERMINATION

(1987 COE Wetlands Delineation Manual)

Project/Site:	Beaverhead Rock			Date:	8/06/03
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:	3
(If needed, explain on reverse.)					

VEGETATION

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

LAND & WATER

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 2003 as 2001 and 2002.

Approved by HQUSACE 2/92

LAND & WATER

DATA FORM

ROUTINE WETLAND DETERMINATION

(1987 COE Wetlands Delineation Manual)

Project/Site:	Beaverhead Rock			Date:	8/06/03
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.

LAND & WATER

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 - 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 2003 as 2001 and 2002.

Approved by HQUSACE 2/92

DATA FORM

ROUTINE WETLAND DETERMINATION

(1987 COE Wetlands Delineation Manual)

Project/Site:	Beaverhead Rock			Date:	8/06/03
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:	5
(If needed, explain on reverse.)					

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.

LAND & WATER

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 2003 as 2001 and 2002.

Approved by HQUSACE 2/92

DATA FORM

ROUTINE WETLAND DETERMINATION

(1987 COE Wetlands Delineation Manual)

Project/Site:	Beaverhead Rock			Date:	8/06/03
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.

LAND & WATER

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

Remarks:

Good wetland, same conditions in 2003 as 2001 and 2002.

Approved by HQUSACE 2/92

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

1. Project Name: Beaverhead Gateway **2. Project #:** 130091.012 **Control #:** _____

3. Evaluation Date: 8/6/2003 **4. Evaluator(s):** Barry Dutton **5. Wetland / Site #(s):** Emergent wetlands & openwater

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

ii. Approx. Stationing / Mileposts: _____

iii. Watershed: 10020004 **GPS Reference No. (if applies):** _____

Other Location Information: _____

7. A. Evaluating Agency _____

B. Purpose of Evaluation:

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

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

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 & hay production

ii. Prominent weedy, alien, & introduced species: Whitetop, spotted knapweed, Euraian milfoil, hound's tongue, Canada thistle, curly cup gumweed, quackgrass, kochia and lambsquater

iii. Briefly describe AA and surrounding land use / habitat: Constructed wetlands 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: _____

LAND & WATER

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	Bald Eagle
No usable habitat	☐ D ☐ S	_____

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

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	---	---	.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	Blacktern, Lemmons alkaligrass, pelican & trumpeter swan
Secondary habitat **(list species)**	☐ D ☐ S	_____
Incidental habitat **(list species)**	☐ D ☐ S	_____
No usable habitat	☐ D ☐ S	_____

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

Highest Habitat Level:	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	1 (H)	---	---	---	---	---	---

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

14C. General Wildlife Habitat Rating

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

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

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

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

ii. **Wildlife Habitat Features** (Working from top to bottom, select appropriate AA attributes to determine the exceptional (E), high (H), moderate (M), or low (L) rating. Structural diversity is from #13. For class cover to be considered evenly distributed, vegetated classes must be within 20% of each other in terms of their percent composition in the AA (see #10). Duration of Surface Water: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; A= absent.

Structural Diversity (from #13)	☒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** (Using 14C(i) and 14C(ii) above and the matrix below to arrive at the functional point and rating of exceptional (E), high (H), moderate (M), or low (L) for this function.)

Evidence of Wildlife Use from 14C(i)	**Wildlife Habitat Features Rating** from 14C(ii)			
	☒ Exceptional	☐ High	☐ Moderate	☐ Low
Substantial	1 (E)	--	--	--
Moderate	--	--	--	--
Low	--	--	--	--

Comments: _____

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

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

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

Duration of Surface Water in AA	☒ 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 pick the functional point and rating of exceptional (E), high (H), moderate (M), or low (L).)

Types of Fish Known or Suspected Within AA	**Modified Habitat Quality** from 14D(ii)			
	☐ 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 14G)
Applies only to wetlands subject to flooding via in-channel or overbank flow.
If wetlands in AA do not flooded from in-channel or overbank flow, check NA above.

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

Estimated wetland area in AA subject to periodic flooding	☒ ≥ 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 NE 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, check NA above.

i. Rating (Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.)
Abbreviations: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral.

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	☒ >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 [3] **5 out of 10 years**	1 (H)	--	--	--	--	--	--	--	--
Wetlands in AA flood or pond **< 5 out of 10 years**	--	--	--	--	--	--	--	--	--

Comments: ____

14G. SEDIMENT/NUTRIENT/TOXICANT RETENTION AND REMOVAL ☐ **NA** (proceed to 14H)
Applies to wetlands with potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input.
If no wetlands in the AA are subject to such input, check NA above.

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

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% 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 agriculture runoff from cropland to the west.

LAND & WATER

14H. SEDIMENT/SHORELINE STABILIZATION ☐ **NA** (proceed to 14I)

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

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

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	***Duration of Surface Water Adjacent to Rooted Vegetation***		
	☒Permanent / Perennial	☐Seasonal / Intermittent	☐Temporary / Ephemeral
[3] **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	1H	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S/I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments: _____

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

i. ☒ **Discharge Indicators**
- ☒ Springs are known or observed.
- ☒ Vegetation growing during dormant season/drought.
- ☐ Wetland occurs at the toe of a natural 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 the information from 14J(i) and 14j(ii) above and the table below to arrive at the functional point and rating of high (H) or low (L) for this function.

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

Comments: _____

14K. UNIQUENESS

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

Replacement Potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland or plant association listed as "S1" by the MTNHP.			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MTNHP.			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate.		
Estimated Relative Abundance from #11	☐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: _____

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	Excep.	1.00	1	
D. General Fish/Aquatic Habitat	Moderate	0.50	1	
E. Flood Attenuation	Moderate	0.5	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	1.00	1	
J. Groundwater Discharge/Recharge	High	1.00	1	
K. Uniqueness	Moderate	0.50	1	
L. Recreation/Education Potential	Low	0.30	1	
	Totals:	**8.60**	**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 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, proceed 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
2003 AERIAL PHOTOGRAPH

MDT Wetland Mitigation Monitoring
Beaverhead Gateway
Dillon, Montana

LAND & WATER

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

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

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

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

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

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

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. 9: View looking southeast along dike shore (150°).

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

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

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

Beaverhead Rock: 2003

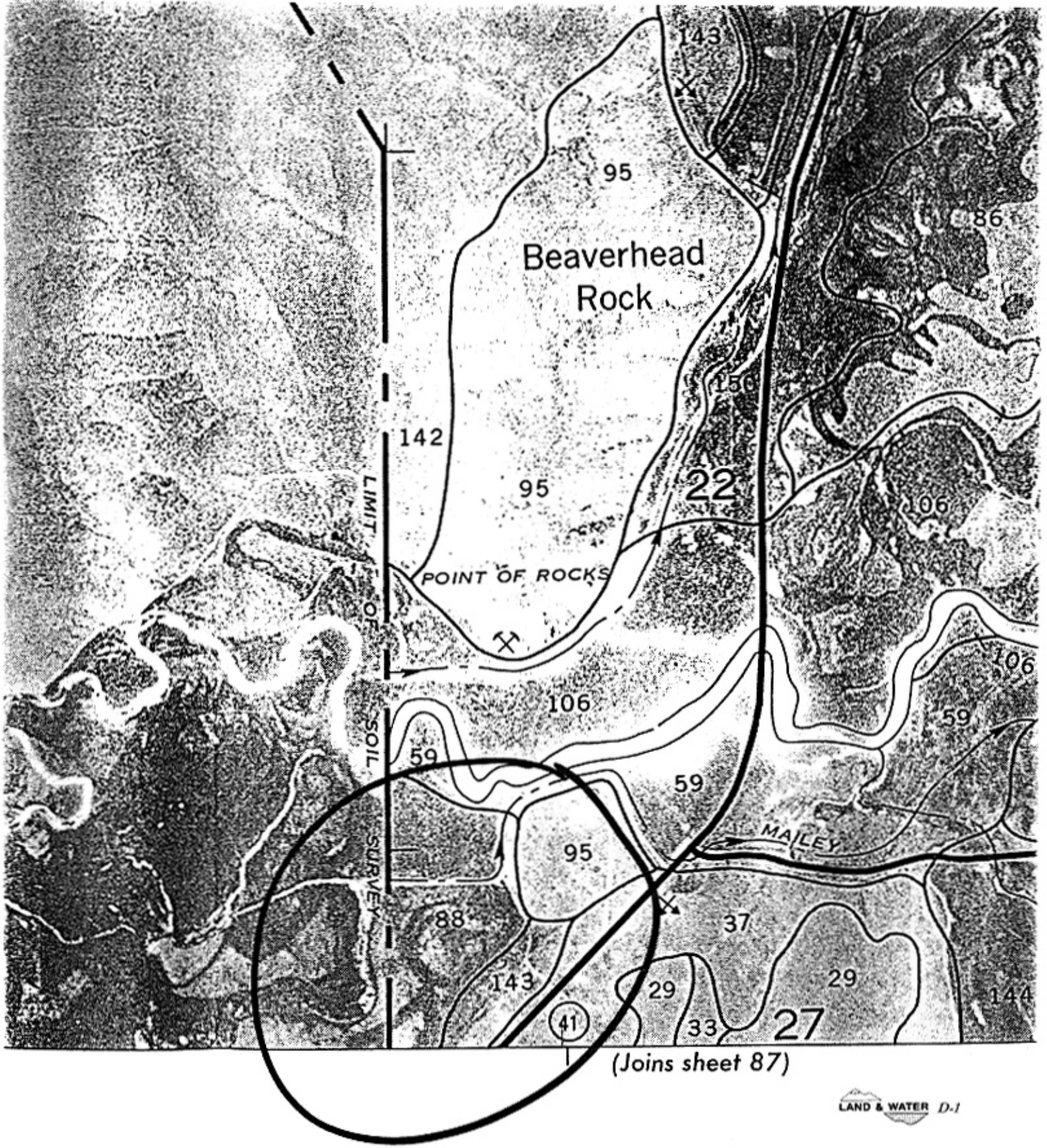
Beaverhead Gateway Mitigation Site
2003 Aerial Photograph

Appendix D

ORIGINAL SITE PLAN
SOIL SURVEY MAP AND DESCRIPTION
MDT BIRD OBSERVATIONS

MDT Wetland Mitigation Monitoring
Beaverhead Gateway
Dillon, Montana

LAND & WATER



Project Area

1 3/4 1/2 1/4 0

1 0.5 0

NRCS - Madison County Soil Survey

This unit is used as irrigated cropland. The main crops are small grain, alfalfa, and clover for hay, and grass for pasture.

Cropland management. This unit is limited for irrigated crops by the hazard of soil blowing, the seasonal high water table, salinity, and soil tilth. Excess salts generally can be leached from the soil with irrigation. Good irrigation water management is necessary to avoid application of too much water and to keep the root zone free of salts. Sprinkler irrigation is suitable for the controlled application of water. Salt-tolerant crops should be grown in the initial stages of reclamation. The surface layer of the soil in this unit is high in content of lime and low in content of organic matter. Crops respond well to phosphorus and nitrogen. Using green manure crops, barnyard manure, and crop residue increases organic matter content and fertility. Growing grasses and legumes for hay and pasture reduces soil blowing. Maintaining crop residue on or near the surface reduces soil blowing and helps to maintain soil tilth and organic matter content.

Windbreak management. This unit is suited to windbreaks. The seasonal high water table limits the choice of trees and shrubs to those that are water tolerant. Suitable trees for planting are cottonwood, golden willow, white willow, Russian olive, Siberian elm, Siberian crabapple, blue spruce, and Rocky Mountain juniper. Suitable shrubs are purpleosier willow, common chokecherry, lilac, and silver buffaloberry.

Homesite development. This unit is poorly suited to homesite development because of the rare periods of flooding and the seasonal high water table.

This map unit is in capability subclass IVe, irrigated.

88—Neen silty clay loam, wet, 0 to 2 percent slopes. This deep, somewhat poorly drained, salt-affected soil is in swales on stream terraces in the western part of the survey area. It has a wetness problem associated with excess irrigation. It formed in loamy alluvium. Elevation is 4,200 to 6,000 feet. The average annual precipitation is about 12 inches, the average annual air temperature is about 40 degrees F, and the average frost-free period is about 100 days.

Included in this unit are small, randomly distributed areas of Villy soils and soils that have a layer of organic material 4 to 20 inches thick on the surface. Included areas make up about 10 percent of the total acreage.

Typically, the surface layer of this Neen soil is light gray silty clay loam about 9 inches thick. The underlying material to a depth of 60 inches or more is light gray silty clay loam.

Permeability is moderately slow. Available water capacity is about 7 inches. Effective rooting depth is 60 inches or more. Where this soil is under native vegetation, the average annual wetting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is slight. A seasonal high water table is at a depth of 6 to 12 inches from April through August. This soil is subject to occasional, brief periods of flooding from January through June. The soil is calcareous throughout. It is moderately salt-affected throughout the soil profile.

This unit is used as rangeland. It is very poorly suited to cultivated crops because of the seasonal high water table and the problem of salts in the surface layer.

Rangeland management. The potential native plant community is mainly alkali sacaton, sedges, alkali cordgrass, tufted hairgrass, inland saltgrass, alkali bluegrass, American sloughgrass, and northern reedgrass. If the rangeland is overgrazed, the proportion of alkali sacaton, alkali cordgrass, tufted hairgrass, alkali bluegrass, American sloughgrass, and northern reedgrass decreases and the proportion of inland saltgrass, slough sedge, and beaked sedges increases. If overgrazing continues, plants such as foxtail barley, Baltic rush, and annual forbs may invade. The potential native plant community produces about 4,500 pounds of air-dry vegetation per acre in years of above-normal precipitation and 3,800 pounds in years of below-normal precipitation.

Grazing should be delayed until the soil is firm and the more desirable forage plants have achieved sufficient growth to withstand grazing pressure. Use of mechanical treatment is not practical because of wetness and the high content of salts in the soil.

Windbreak management. This unit is very poorly suited to windbreaks. It is limited by the seasonal high water table and the high content of salts.

Homesite development. This unit is very poorly suited to homesite development because of the occasional periods of flooding and the seasonal high water table.

This map unit is in capability subclass VIw, nonirrigated. It is in Wet Meadow range site, 10- to 14-inch precipitation zone.

89—Nuley sandy loam, 2 to 12 percent slopes. This deep, well drained soil is on hills and broad ridgetops in the northwestern and central parts of the survey area. It formed in gneiss. Elevation is 4,500 to 6,500 feet. The average annual precipitation is about 12 inches, the average annual air temperature is about 40 degrees F, and the average frost-free period is about 100 days.

Included in this unit are small, randomly distributed areas of Rock outcrop and soils that have bedrock at a

ɔils on fans and terraces. These soils formed in luvial and eolian material derived mainly from nestone. Slope is 0 to 25 percent. Elevation is 4,500 · 6,500 feet. The average annual precipitation is 10 to 1 inches, the average annual air temperature is 38 to 2 degrees F, and the frost-free period is 90 to 105 ays.

These soils are coarse-loamy, carbonatic Borollic alciorthids.

Typical pedon of Musselshell loam, cool, 2 to 8 ercent slopes, in an area of rangeland, 700 feet north ıd 300 feet east of the southwest corner of sec. 36, T. S., R. 6 W.

11—0 to 4 inches; light brownish gray (10YR 6/2) loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, very friable, slightly sticky and plastic; many very fine, fine, and medium roots; common very fine and fine pores; 5 percent pebbles; strongly effervescent; moderately alkaline; abrupt wavy boundary.

12—4 to 8 inches; pale brown (10YR 6/3) loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; many very fine, fine, and medium roots; common very fine and fine pores; 10 percent pebbles; strongly effervescent; moderately alkaline; abrupt wavy boundary.

1ca—8 to 15 inches; white (10YR 8/2) loam, pale brown (10YR 6/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; many very fine and fine roots; few fine pores; 10 percent pebbles; common fine soft masses of lime and lime coatings on pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

2ca—15 to 25 inches; very pale brown (10YR 7/3) gravelly loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common fine pores; 30 percent pebbles; common fine soft masses of lime, lime coatings on pebbles, and lime pendants on underside of pebbles; violently effervescent; moderately alkaline; clear smooth boundary.

3ca—25 to 41 inches; white (10YR 8/2) very gravelly loam, pale brown (10YR 6/3) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; 40 percent pebbles; common fine soft masses of lime, lime coatings on pebbles, and lime pendants on underside of pebbles; violently effervescent; moderately alkaline; gradual wavy boundary.

IIC4—41 to 60 inches; light gray (10YR 7/2) very gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; soft, very friable, slightly sticky and slightly plastic; 60 percent pebbles; strongly effervescent; moderately alkaline.

The A horizon is loam or gravelly loam and is 5 to 25 percent pebbles. The C horizon is loam or gravelly loam in the upper part and very gravelly loam or very gravelly sandy loam in the lower part. There is a very gravelly loamy sand layer below a depth of about 40 inches in some pedons. The Cca horizon is 40 to 80 percent calcium carbonate. Reaction is moderately alkaline or strongly alkaline.

Neen Series

The Neen series consists of deep, somewhat poorly drained soils on stream terraces and in upland swales. These soils formed in alluvium. Slope is 0 to 2 percent. Elevation is 4,200 to 6,000 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 38 to 42 degrees F, and the frost-free period is 90 to 105 days.

These soils are fine-silty, mixed, frigid Aquic Calciorthids.

Typical pedon of Neen silty clay loam, 0 to 2 percent slopes, in an area of rangeland, 2,140 feet west and 1,940 feet north of the southeast corner of sec. 25, T. 4 S., R. 7 W.

A11sa—0 to 2 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; weak to moderate fine and medium granular structure; slightly hard, friable, sticky and plastic; few very fine and fine roots; many very fine interstitial pores; many very fine salt crystals; violently effervescent; moderately alkaline; abrupt smooth boundary.

A12sa—2 to 9 inches; light gray (10YR 6/1) silty clay loam, dark gray (10YR 4/1) moist; weak very fine and fine granular structure; slightly hard, friable, sticky and plastic; many very fine roots; many very fine interstitial pores; many very fine salt crystals; strongly effervescent; moderately alkaline; abrupt wavy boundary.

C1casa—9 to 32 inches; light gray (10YR 7/2) silty clay loam, grayish brown (10YR 5/2) moist; moderate fine granular structure; slightly hard, friable, sticky

and plastic; common very fine roots; common very fine continuous tubular pores; violently effervescent; many very fine salt crystals; moderately alkaline; clear smooth boundary.

C2casa—32 to 50 inches; light gray (10YR 7/2) silty clay loam, grayish brown (10YR 5/2) moist; weak to moderate fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; few very fine roots; common very fine continuous tubular pores; few very fine salt crystals; violently effervescent; moderately alkaline; clear smooth boundary.

C3cag—50 to 60 inches; light gray (5Y 7/2) silty clay loam, olive gray (5Y 5/2) moist; common fine distinct yellowish red (5YR 4/6) mottles; massive; hard, firm, sticky and plastic; many very fine roots; many very fine interstitial pores; few very fine salt crystals; strongly effervescent; moderately alkaline.

The water table fluctuates between depths of 24 and 42 inches during the growing season. The electrical conductivity is 8 to 16 millimhos per centimeter. Where the profile is drained and irrigated, the conductivity is 2 to 4 millimhos per centimeter in the upper part and 2 to 8 millimhos per centimeter in the lower part. Depth to the Cca horizon is 6 to 30 inches. The C3 horizon is clay loam or silty clay loam.

Nuley Series

The Nuley series consists of deep, well drained soils on uplands. These soils formed in material derived from metamorphic and igneous rock. Slope is 2 to 35 percent. Elevation is 4,500 to 6,500 feet. The average annual precipitation is 10 to 14 inches, the average annual air temperature is 38 to 42 degrees F, and the frost-free period is 90 to 105 days.

These soils are fine-loamy, mixed Aridic Argiborolls.

Typical pedon of Nuley clay loam, 2 to 8 percent slopes, in an area of cropland, 2,000 feet west and 25 feet north of the southeast corner of sec. 16, T. 1 S., R. 1 W.

Ap—0 to 7 inches; grayish brown (10YR 5/2) clay loam, dark brown (10YR 3/3) moist; weak to moderate fine granular structure; soft, friable, slightly sticky and slightly plastic; many fine roots; many fine tubular pores and few fine interstitial pores; 5 percent pebbles; mildly alkaline; abrupt smooth boundary.

B2t—7 to 11 inches; brown (10YR 4/3) clay loam, dark yellowish brown (10YR 3/4) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; many fine roots; common fine tubular pores; common to many distinct clay films on faces of peds; 5 percent pebbles; mildly alkaline; clear wavy boundary.

B3ca—11 to 15 inches; light gray (10YR 7/2) sandy clay loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; common fine roots; few fine tubular pores and common fine interstitial pores; 5 percent pebbles; disseminated lime; violently effervescent; moderately alkaline; abrupt smooth boundary.

C1ca—15 to 24 inches; white (10YR 8/1) sandy loam, light gray (10YR 7/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; common fine roots; common fine tubular pores; 5 percent pebbles; disseminated lime; violently effervescent; moderately alkaline; abrupt smooth boundary.

IIC2—24 to 50 inches; grayish brown (2.5Y 5/2) gravelly coarse sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose, nonsticky and nonplastic; very few very fine roots; common fine and medium interstitial pores; 25 percent pebbles; moderately effervescent; moderately alkaline; gradual irregular boundary.

R—50 inches; granitic gneiss.

Depth to calcareous material is 10 to 15 inches. Depth to granitic bedrock is 40 to 60 inches. The A and B horizons are 5 to 15 percent rock fragments, mainly pebbles. The A and B2t horizons are neutral or mildly alkaline. The Ap horizon is clay loam or sandy loam. The B2t horizon is mainly clay loam or sandy clay loam and is 20 to 35 percent clay. The IIC horizon is gravelly coarse sand or gravelly loamy coarse sand. It is 25 to 35 percent rock fragments.

Oro Fino Series

The Oro Fino series consists of deep, well drained soils on uplands. These soils formed in colluvium and material derived from gneiss and schist. Slope is 2 to 45 percent. Elevation is 6,000 to 7,500 feet. The average annual precipitation is 15 to 19 inches, the average annual air temperature is 36 to 40 degrees F, and the frost-free period is 60 to 90 days.

These soils are fine-loamy, mixed Argic Cryoborolls.

Typical pedon of an Oro Fino gravelly loam in an area of Oro Fino-Poin complex, 4 to 15 percent slopes, in an area of rangeland, 2,400 feet north and 1,000 feet west of the southeast corner of sec. 13, T. 8 S., R. 7 W.

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)

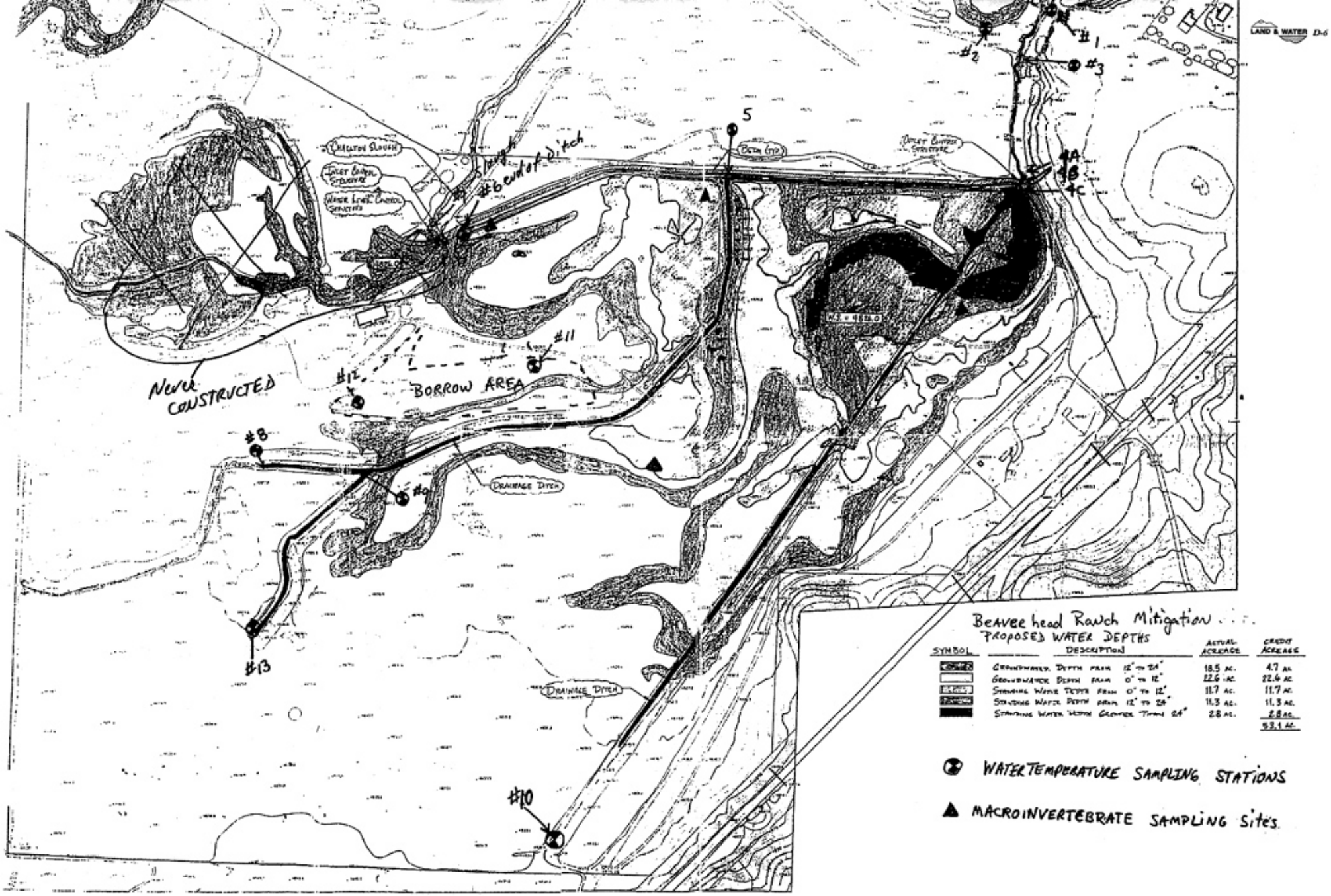
Dippers:
American Dipper

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


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

Appendix E

BIRD SURVEY PROTOCOL
GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Beaverhead Gateway
Dillon, Montana

LAND & WATER

BIRD SURVEY PROTOCOL

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

Species Use within the Mitigation Wetland: Survey Method

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

Sites that can be circumambulated or walked throughout.

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

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

Sites that cannot be circumambulated.

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

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

Species Use within the Mitigation Wetland: Data Recording

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

1. Bird Species List

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

2. Bird Density

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

3. Bird Behavior

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

4. Bird Species Habitat Use

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

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

MACROINVERTEBRATE SAMPLE PROTOCOL AND DATA ANALYSES

MDT Wetland Mitigation Monitoring
Beaverhead Gateway
Dillon, Montana

LAND & WATER

AQUATIC INVERTEBRATE SAMPLING PROTOCOL

Equipment List

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

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

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

Site Selection

Select the sampling site with these considerations in mind:

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

Sampling

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

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

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

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

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

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

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

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

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

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

Photograph the sampled site.

Sample Handling/Shipping

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

MDT WETLAND MITIGATION MONITORING PROJECT
Aquatic Invertebrate Monitoring
Summary 2001, 2002, 2003

METHODS

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

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

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

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

Sample Processing

Aquatic invertebrate samples were collected at mitigation wetland sites in the summer months of 2001, 2002, and 2003 by personnel of Wetlands West, Inc. and/or Land & Water Consulting, Inc. Sampling procedures utilized were based on the protocols developed by the Montana Department of Environmental Quality (MDEQ).

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 200 organisms, when possible, from each sample. In some cases, the entire sample contained fewer than 200 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 MDEQ Standard Operating Procedures for Sampling and Sample Analysis (Bukantis 1998). Ten percent of samples were re-identified by a second taxonomist

for quality assurance purposes. The identified samples have been archived at Rhithron's laboratory. Taxonomic data and organism counts were entered into an Excel 2000 spreadsheet, and metrics were calculated and scored using spreadsheet formulae.

Bioassessment Metrics

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

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

Four composition metrics (%Chironomidae, %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; any are hemoglobin-bearers capable of tolerating de-oxygenated conditions.

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

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

RESULTS

In 2001, 29 sites were sampled statewide. Nineteen of these sites were revisited in 2002, and 13 new sites were sampled. In 2003, 17 sites that had been visited in both 2001 and 2002 were re-sampled, and 11 sites sampled for the first time in 2001 were re-visited. In addition, 2 new sites were sampled. Thus, the 2003 database contains records for 90 sampling events at 44 unique sites. **Table 2** summarizes sites and sampling dates.

Metric scoring criteria were re-developed each year as new data was added. For 2003, 88 records were utilized. Because of the addition of data, scoring criteria changed for several metrics in 2003; thus, biotic condition classifications assigned in 2002 for some sites also changed. However, ranges of individual metrics, as well as median metric values remained remarkably consistent in each of the three years.

Table 1. Aquatic invertebrate metrics employed in the MTDT mitigation wetland monitoring study, 2001- 2003.

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

LITERATURE CITED

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

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

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

Table 2. Sampled MDT Mitigation Sites by Year

2001	2002	2003
Beaverhead 1	Beaverhead 1	Beaverhead 1
Beaverhead 2	Beaverhead 2	
Beaverhead 3	Beaverhead 3	
Beaverhead 4	Beaverhead 4	Beaverhead 4
Beaverhead 5	Beaverhead 5	Beaverhead 5
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 – Flashlight	Fourchette – Flashlight	Fourchette – Flashlight
Fourchette – Penguin	Fourchette – Penguin	Fourchette – Penguin
Fourchette – Albatross	Fourchette – Albatross	Fourchette – Albatross
Big Spring	Big Spring	Big Spring
Vince Ames		
Ryegate		
Lavinia		
Stillwater	Stillwater	Stillwater
Roundup	Roundup	Roundup
Wigeon	Wigeon	Wigeon
Ridgeway	Ridgeway	Ridgeway
Musgrave – Rest. 1	Musgrave – Rest. 1	Musgrave – Rest. 1
Musgrave – Rest. 2	Musgrave – Rest. 2	Musgrave – Rest. 2
Musgrave – Enh. 1	Musgrave – Enh. 1	Musgrave – Enh. 1
Musgrave – Enh. 2		
	Hoskins Landing	Hoskins Landing
	Peterson - 1	Peterson – 1
	Peterson – 2	
	Peterson – 4	Peterson – 4
	Peterson – 5	Peterson – 5
	Jack Johnson - main	Jack Johnson - main
	Jack Johnson - SW	Jack Johnson - SW
	Creston	Creston
	Lawrence Park	
	Perry Ranch	
	SF Smith River	SF Smith River
	Camp Creek	Camp Creek
	Kleinschmidt	Kleinschmidt – pond
		Kleinschmidt – stream
		Ringling - Galt

Aquatic Invertebrate Taxonomic Data

Site Name BEAVERHEAD #1 **Date Collected** 8/ 7/2003

Order	Family	Taxon	Count	Percent	Unique	BI	FFG
Acarina							
	Acari						
		Acari	1	0.49%	Yes	5	PR
Amphipoda							
	Gammaridae						
		Gammarus	2	0.97%	Yes	4	SH
	Talitridae						
		Hyalella	24	11.65%	Yes	8	CG
Basommatophora							
	Lymnaeidae						
		Stagnicola	2	0.97%	Yes	6	SC
	Physidae						
		Physidae	30	14.56%	Yes	8	SC
	Planorbidae						
		Gyraulus	75	36.41%	Yes	8	SC
		Helisoma	1	0.49%	Yes	6	SC
Coleoptera							
	Haliplidae						
		Haliplus	4	1.94%	Yes	5	PH
	Hydrophilidae						
		Enochrus	1	0.49%	Yes	5	CG
Diptera							
	Chironomidae						
		Cricotopus (Cricotopus)	1	0.49%	Yes	7	SH
Ephemeroptera							
	Baetidae						
		Callibaetis	3	1.46%	Yes	9	CG
	Caenidae						
		Caenis	2	0.97%	Yes	7	CG
Heteroptera							
	Corixidae						
		Corixidae	12	5.83%	No	10	PH
		Hesperocorixa	16	7.77%	Yes	10	PH
	Notonectidae						
		Notonecta	5	2.43%	Yes	5	PR
Odonata							
	Coenagrionidae						
		Enallagma	24	11.65%	Yes	7	PR
Trichoptera							
	Leptoceridae						
		Triaenodes	3	1.46%	Yes	6	SH
Grand Total			**206**				

Aquatic Invertebrate Taxonomic Data

Site Name BEAVERHEAD #4 **Date Collected** 8/ 7/2003

Order	Family	Taxon	Count	Percent	Unique	BI	FFG
		Ostracoda	9	5.96%	Yes	8	CG
		Copepoda	18	11.92%	Yes	8	CG
Amphipoda							
	Gammaridae						
		Gammarus	3	1.99%	Yes	4	SH
	Talitridae						
		Hyalella	37	24.50%	Yes	8	CG
Basommatophora							
	Physidae						
		Physidae	2	1.32%	Yes	8	SC
	Planorbidae						
		Gyraulus	1	0.66%	Yes	8	SC
		Helisoma	1	0.66%	Yes	6	SC
Coleoptera							
	Dytiscidae						
		Hygrotus	1	0.66%	Yes	5	PR
	Haliplidae						
		Haliplus	1	0.66%	Yes	5	PH
Diplostraca							
		Cladocera	64	42.38%	Yes	8	CF
Ephemeroptera							
	Caenidae						
		Caenis	2	1.32%	Yes	7	CG
Heteroptera							
	Corixidae						
		Hesperocorixa	2	1.32%	Yes	10	PH
	Notonectidae						
		Notonecta	8	5.30%	Yes	5	PR
Odonata							
	Coenagrionidae						
		Coenagrionidae	1	0.66%	Yes	7	PR
	Libellulidae						
		Libellulidae	1	0.66%	Yes	9	PR
Grand Total			**151**				

Aquatic Invertebrate Taxonomic Data

Site Name BEAVERHEAD #5 **Date Collected** 8/ 7/2003

Order	Family	Taxon	Count	Percent	Unique	BI	FFG
Amphipoda							
	Talitridae						
		Hyalella	37	26.81%	Yes	8	CG
Arhynchobdellida							
	Erpobdellidae						
		Erpobdella	1	0.72%	Yes	8	PR
Basommatophora							
	Physidae						
		Physidae	15	10.87%	Yes	8	SC
	Planorbidae						
		Gyraulus	33	23.91%	Yes	8	SC
Coleoptera							
	Dytiscidae						
		Oreodytes	4	2.90%	Yes	5	PR
	Haliplidae						
		Haliplidae	1	0.72%	No	7	SH
		Haliplus	2	1.45%	Yes	5	PH
Diptera							
	Ceratopogonidae						
		Ceratopogoninae	9	6.52%	Yes	6	PR
	Chironomidae						
		Cladotanytarsus	12	8.70%	Yes	7	CG
		Cryptochironomus	1	0.72%	Yes	8	PR
		Orthocladius annectens	1	0.72%	Yes	6	CG
		Polypedilum	5	3.62%	Yes	6	SH
Ephemeroptera							
	Baetidae						
		Callibaetis	4	2.90%	Yes	9	CG
	Caenidae						
		Caenis	1	0.72%	Yes	7	CG
Heteroptera							
	Corixidae						
		Corisella	3	2.17%	Yes	11	PR
		Corixidae	7	5.07%	No	10	PH
Odonata							
	Coenagrionidae						
		Enallagma	2	1.45%	Yes	7	PR
Grand Total			**138**				

Aquatic Invertebrate Taxonomic Data

Site Name BEAVERHEAD #6 **Date Collected** 8/ 7/2003

Order	Family	Taxon	Count	Percent	Unique	BI	FFG
		Ostracoda	14	10.94%	Yes	8	CG
		Copepoda	1	0.78%	Yes	8	CG
Amphipoda							
	Gammaridae						
		Gammarus	7	5.47%	Yes	4	SH
	Talitridae						
		Hyalella	1	0.78%	Yes	8	CG
Basommatophora							
	Physidae						
		Physidae	14	10.94%	Yes	8	SC
Coleoptera							
	Dytiscidae						
		Agabus	3	2.34%	Yes	5	PR
		Laccornis	1	0.78%	Yes	5	PR
Diplostraca							
		Cladocera	2	1.56%	Yes	8	CF
Diptera							
	Chironomidae						
		Cricotopus (Cricotopus)	64	50.00%	Yes	7	SH
		Dicrotendipes	7	5.47%	Yes	8	CG
		Endochironomus	1	0.78%	Yes	10	SH
		Paratanytarsus	1	0.78%	Yes	6	CG
		Phaenopsectra	11	8.59%	Yes	7	SC
Trichoptera							
	Limnephilidae						
		Limnephilus	1	0.78%	Yes	3	SH
Grand Total			**128**				

Aquatic Invertebrate Data Summary

Project ID: MDT03LW

STORET Station ID:

Station Name: BEAVERHEAD #1

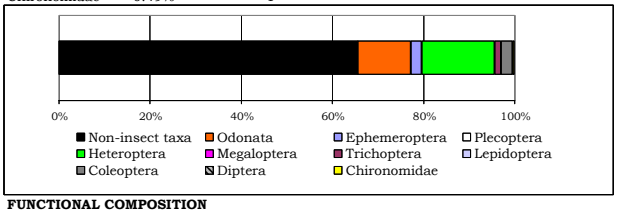
Activity ID:

Sample Date: 8/7/2003

Sample type	
SUBSAMPLE TOTAL ORGANISMS	206
Portion of sample used	8.33%
Estimated number in total sample	2172
Sampling effort	
Time	
Distance	
Jabs	
Habitat type	
EPT abundance	9
Taxa richness	16
Number EPT taxa	3
Percent EPT	4.42%

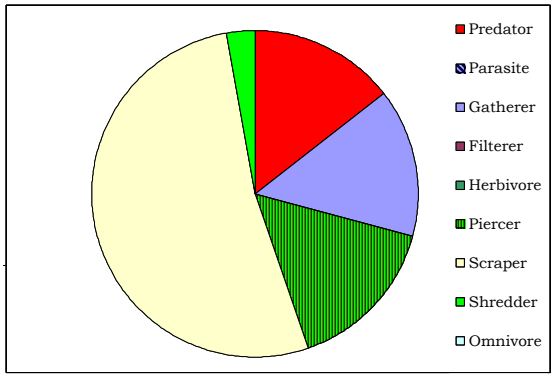
TAXONOMIC COMPOSITION

GROUP	PERCENT	#TAXA
Non-insect taxa	65.53%	7
Odonata	11.65%	1
Ephemeroptera	2.43%	2
Plecoptera	0.00%	0
Heteroptera	16.02%	3
Megaloptera	0.00%	0
Trichoptera	1.46%	1
Lepidoptera	0.00%	0
Coleoptera	2.43%	2
Diptera	0.00%	0
Chironomidae	0.49%	1



FUNCTIONAL COMPOSITION

GROUP	PERCENT	#TAXA
Predator	14.56%	3
Parasite	0.00%	0
Gatherer	14.56%	4
Filterer	0.00%	0
Herbivore	0.00%	0
Piercer	15.53%	3
Scraper	52.43%	4
Shredder	2.91%	3
Omnivore	0.00%	0
Unknown	0.00%	0



COMMUNITY TOLERANCES

Sediment tolerant taxa	2
Percent sediment tolerant	42.54%
Sediment sensitive taxa	0
Metals tolerance index (McGuire)	3.67
Cold stenotherm taxa	0
Percent cold stenotherms	0.00%

HABITUS MEASURES

Hemoglobin bearer richness	3
Percent hemoglobin bearers	39.32%
Air-breather richness	1
Percent air-breathers	0.49%
Burrower richness	1
Percent burrowers	0.49%
Swimmer richness	0
Percent swimmers	0.00%

DOMINANCE

TAXON	ABUNDANCE	PERCENT
Gyraulus	75	36.41%
Physidae	30	14.56%
Hyalella	24	11.65%
Enallagma	24	11.65%
Hesperocorixa	16	7.77%
SUBTOTAL 5 DOMINANTS	169	82.04%
Corixidae	12	5.83%
Notonecta	5	2.43%
Haliplus	4	1.94%
Callibaetis	3	1.46%
Triaenodes	3	1.46%
TOTAL DOMINANTS	196	95.15%

SAPROBITY

Hilsenhoff Biotic Index	6.63

DIVERSITY

Shannon H (loge)	2.64
Shannon H (log2)	1.83
Margalef D	3.07
Simpson D	0.22
Evenness	0.11

VOLTINISM

TYPE	# TAXA	PERCENT
Multivoltine	3	2.76%
Univoltine	11	94.48%
Semivoltine	2	2.76%

TAXA CHARACTERS

	#TAXA	PERCENT
Tolerant	8	58.74%
Intolerant	0	0.00%
Clinger	1	0.55%

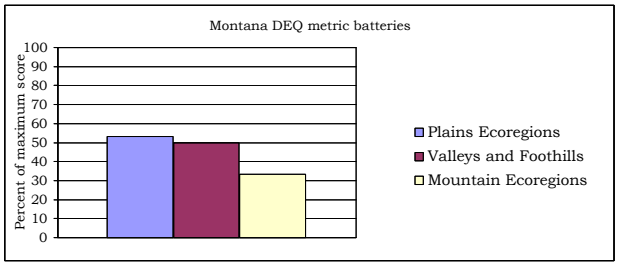
BIOASSESSMENT INDICES

B-IBI (Karr et al.)

METRIC	VALUE	SCORE
Taxa richness	16	1
E richness	2	1
P richness	0	1
T richness	1	1
Long-lived	2	1
Sensitive richness	0	1
%tolerant	58.74%	1
%predators	14.56%	3
Clinger richness	1	1
%dominance (3)	67.96%	3
	TOTAL SCORE	14
		28%

MONTANA DEQ METRICS (Bukantis 1998)

METRIC	VALUE	Plains Ecoregions	Valleys and Foothills	Mountain Ecoregions
Taxa richness	16	1	1	0
EPT richness	3	1	0	0
Biotic Index	6.63	1	0	0
%Dominant taxon	36.41%	2	2	1
%Collectors	14.56%	3	3	3
%EPT	4.42%	0	0	0
Shannon Diversity	1.83	1		
%Scrapers +Shredders	55.34%	3	3	3
Predator taxa	3	1		
%Multivoltine	2.76%	3		
%H of T	0.00%		3	
TOTAL SCORES		16	12	7
PERCENT OF MAXIMUM		53.33	50.00	33.33
IMPAIRMENT CLASS		SLIGHT	MODERATE	MODERATE



Montana Plains ecoregions metrics (Bramblett and Johnson)

Riffle		*Pool*	
EPT richness	3	E richness	2
Percent EPT	4.42%	T richness	1
Percent Oligochaetes and Leeches	0.00%	Percent EPT	4.42%
Percent 2 dominants	50.97%	Percent non-insect	65.53%
Filterer richness	0	Filterer richness	0
Percent intolerant	0.00%	Univoltine richness	11
Univoltine richness	11	Percent supertolerant	77.67%
Percent clingers	0.55%		
Swimmer richness	0		

Aquatic Invertebrate Data Summary

Project ID: MDT03LW
STORET Station ID:
Station Name: BEAVERHEAD #4

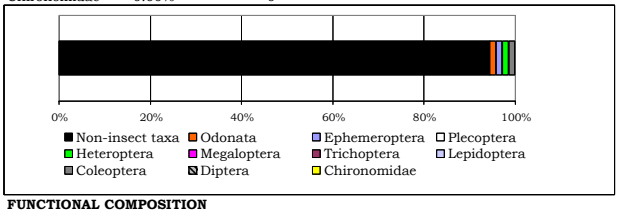
Activity ID:

Sample Date: 8/7/2003

Sample type	
SUBSAMPLE TOTAL ORGANISMS	151
Portion of sample used	0.83%
Estimated number in total sample	18120
Sampling effort	
Time	
Distance	
Jabs	
Habitat type	
EPT abundance	2
Taxa richness	15
Number EPT taxa	1
Percent EPT	1.32%

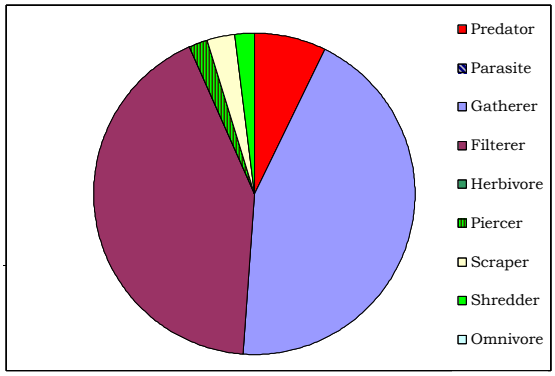
TAXONOMIC COMPOSITION

GROUP	PERCENT	#TAXA
Non-insect taxa	89.40%	8
Odonata	1.32%	2
Ephemeroptera	1.32%	1
Plecoptera	0.00%	0
Heteroptera	1.32%	2
Megaloptera	0.00%	0
Trichoptera	0.00%	0
Lepidoptera	0.00%	0
Coleoptera	1.32%	2
Diptera	0.00%	0
Chironomidae	0.00%	0



FUNCTIONAL COMPOSITION

GROUP	PERCENT	#TAXA
Predator	7.28%	4
Parasite	0.00%	0
Gatherer	43.71%	4
Filterer	42.38%	1
Herbivore	0.00%	0
Piercer	1.99%	2
Scraper	2.65%	3
Shredder	1.99%	1
Omnivore	0.00%	0
Unknown	0.00%	0



COMMUNITY TOLERANCES

Sediment tolerant taxa	1
Percent sediment tolerant	0.66%
Sediment sensitive taxa	0
Metals tolerance index (McGuire)	7.36
Cold stenotherm taxa	0
Percent cold stenotherms	0.00%

HABITUS MEASURES

Hemoglobin bearer richness	3
Percent hemoglobin bearers	6.62%
Air-breather richness	1
Percent air-breathers	0.66%
Burrower richness	0
Percent burrowers	0.00%
Swimmer richness	5
Percent swimmers	20.53%

DOMINANCE

TAXON	ABUNDANCE	PERCENT
Cladocera	64	42.38%
Hyalella	37	24.50%
Copepoda	18	11.92%
Ostracoda	9	5.96%
Notonecta	8	5.30%
SUBTOTAL 5 DOMINANTS	136	90.07%
Gammarus	3	1.99%
Physidae	2	1.32%
Caenis	2	1.32%
Hesperocorixa	2	1.32%
Gyraulus	1	0.66%
TOTAL DOMINANTS	146	96.69%

SAPROBITY

Hilsenhoff Biotic Index	7.07

DIVERSITY

Shannon H (loge)	2.12
Shannon H (log2)	1.47
Margalef D	2.79
Simpson D	0.26
Evenness	0.10

VOLTINISM

TYPE	# TAXA	PERCENT
Multivoltine	3	60.26%
Univoltine	9	37.75%
Semivoltine	3	1.99%

TAXA CHARACTERS

	#TAXA	PERCENT
Tolerant	7	7.28%
Intolerant	0	0.00%
Clinger	0	0.00%

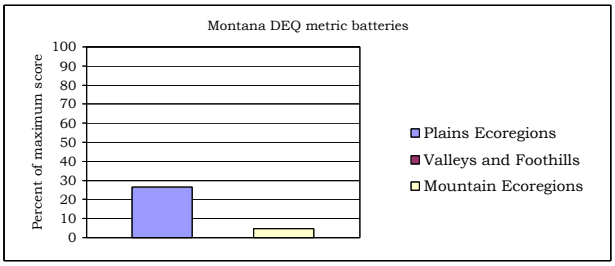
BIOASSESSMENT INDICES

B-IBI (Karr et al.)

METRIC	VALUE	SCORE	
Taxa richness	15	1	
E richness	1	1	
P richness	0	1	
T richness	0	1	
Long-lived	3	3	
Sensitive richness	0	1	
%tolerant	7.28%	5	
%predators	7.28%	1	
Clinger richness	0	1	
%dominance (3)	78.81%	1	
	TOTAL SCORE	16	32%

MONTANA DEQ METRICS (Bukantis 1998)

METRIC	VALUE	Plains Ecoregions	Valleys and Foothills	Mountain Ecoregions
Taxa richness	15	1	1	0
EPT richness	1	0	0	0
Biotic Index	7.07	0	0	0
%Dominant taxon	42.38%	2	1	1
%Collectors	86.09%	1	1	0
%EPT	1.32%	0	0	0
Shannon Diversity	1.47	0		
%Scrapers +Shredders	4.64%	1	0	0
Predator taxa	4	2		
%Multivoltine	60.26%	1		
%H of T	#DIV/0!		#DIV/0!	
TOTAL SCORES		8	#DIV/0!	1
PERCENT OF MAXIMUM		26.67	#DIV/0!	4.76
IMPAIRMENT CLASS		MODERATE	#DIV/0!	SEVERE



Montana Plains ecoregions metrics (Bramblett and Johnson)

Riffle		*Pool*	
EPT richness	1	E richness	1
Percent EPT	1.32%	T richness	0
Percent Oligochaetes and Leeches	0.00%	Percent EPT	1.32%
Percent 2 dominants	66.89%	Percent non-insect	89.40%
Filterer richness	1	Filterer richness	1
Percent intolerant	0.00%	Univoltine richness	9
Univoltine richness	9	Percent supertolerant	88.74%
Percent clingers	0.00%		
Swimmer richness	5		

Aquatic Invertebrate Data Summary

Project ID: MDT03LW
STORET Station ID:
Station Name: BEAVERHEAD #5

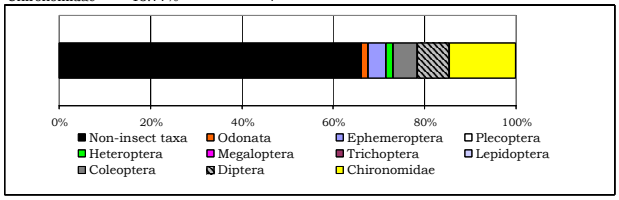
Activity ID:

Sample Date: 8/7/2003

Sample type	
SUBSAMPLE TOTAL ORGANISMS	138
Portion of sample used	10.00%
Estimated number in total sample	1380
Sampling effort	
Time	
Distance	
Jabs	
Habitat type	
EPT abundance	5
Taxa richness	15
Number EPT taxa	2
Percent EPT	3.62%

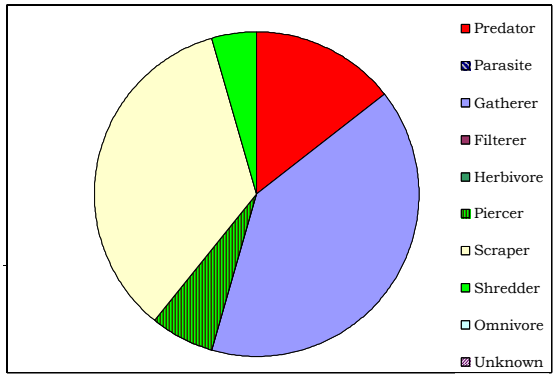
TAXONOMIC COMPOSITION

GROUP	PERCENT	#TAXA
Non-insect taxa	62.32%	4
Odonata	1.45%	1
Ephemeroptera	3.62%	2
Plecoptera	0.00%	0
Heteroptera	1.45%	2
Megaloptera	0.00%	0
Trichoptera	0.00%	0
Lepidoptera	0.00%	0
Coleoptera	5.07%	3
Diptera	6.52%	1
Chironomidae	13.77%	4



FUNCTIONAL COMPOSITION

GROUP	PERCENT	#TAXA
Predator	14.49%	6
Parasite	0.00%	0
Gatherer	39.86%	5
Filterer	0.00%	0
Herbivore	0.00%	0
Piercer	6.52%	2
Scraper	34.78%	2
Shredder	4.35%	2
Omnivore	0.00%	0
Unknown	0.00%	0



COMMUNITY TOLERANCES

Sediment tolerant taxa	1
Percent sediment tolerant	23.91%
Sediment sensitive taxa	0
Metals tolerance index (McGuire)	2.83
Cold stenotherm taxa	0
Percent cold stenotherms	0.00%

HABITUS MEASURES

Hemoglobin bearer richness	2
Percent hemoglobin bearers	27.54%
Air-breather richness	1
Percent air-breathers	2.90%
Burrower richness	1
Percent burrowers	6.52%
Swimmer richness	4
Percent swimmers	8.70%

DOMINANCE

TAXON	ABUNDANCE	PERCENT
Hyalella	37	26.81%
Gyraulus	33	23.91%
Physidae	15	10.87%
Cladotanytarsus	12	8.70%
Ceratopogoninae	9	6.52%
SUBTOTAL 5 DOMINANTS	106	76.81%
Corixidae	7	5.07%
Polypedilum	5	3.62%
Callibaetis	4	2.90%
Oreodytes	4	2.90%
Corisella	3	2.17%
TOTAL DOMINANTS	129	93.48%

SAPROBITY

Hilsenhoff Biotic Index	7.00

DIVERSITY

Shannon H (loge)	2.95
Shannon H (log2)	2.05
Margalef D	3.24
Simpson D	0.15
Evenness	0.12

VOLTINISM

TYPE	# TAXA	PERCENT
Multivoltine	5	16.67%
Univoltine	8	78.26%
Semivoltine	2	5.07%

TAXA CHARACTERS

	#TAXA	PERCENT
Tolerant	8	50.00%
Intolerant	0	0.00%
Clinger	1	3.62%

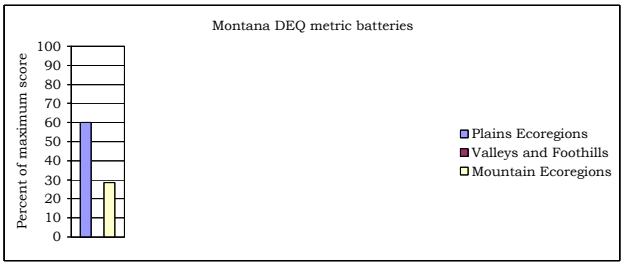
BIOASSESSMENT INDICES

B-IBI (Karr et al.)

METRIC	VALUE	SCORE	
Taxa richness	15	1	
E richness	2	1	
P richness	0	1	
T richness	0	1	
Long-lived	2	1	
Sensitive richness	0	1	
%tolerant	50.00%	3	
%predators	14.49%	3	
Clinger richness	1	1	
%dominance (3)	61.59%	3	
	TOTAL SCORE	16	32%

MONTANA DEQ METRICS (Bukantis 1998)

METRIC	VALUE	Plains Ecoregions	Valleys and Foothills	Mountain Ecoregions
Taxa richness	15	1	1	0
EPT richness	2	0	0	0
Biotic Index	7.00	1	0	0
%Dominant taxon	26.81%	3	3	2
%Collectors	39.86%	3	3	3
%EPT	3.62%	0	0	0
Shannon Diversity	2.05	1		
%Scrapers +Shredders	39.13%	3	3	1
Predator taxa	6	3		
%Multivoltine	16.67%	3		
%H of T	#DIV/0!		#DIV/0!	
TOTAL SCORES		18	#DIV/0!	6
PERCENT OF MAXIMUM		60.00	#DIV/0!	28.57
IMPAIRMENT CLASS		SLIGHT	#DIV/0!	MODERATE



Montana Plains ecoregions metrics (Bramblett and Johnson)

Riffle		*Pool*	
EPT richness	2	E richness	2
Percent EPT	3.62%	T richness	0
Percent Oligochaetes and Leeches	0.72%	Percent EPT	3.62%
Percent 2 dominants	50.72%	Percent non-insect	62.32%
Filterer richness	0	Filterer richness	0
Percent intolerant	0.00%	Univoltine richness	8
Univoltine richness	8	Percent supertolerant	73.19%
Percent clingers	3.62%		
Swimmer richness	4		

Aquatic Invertebrate Data Summary

Project ID: MDT03LW
STORET Station ID:
Station Name: BEAVERHEAD #6

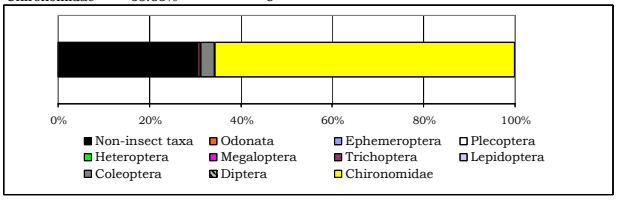
Activity ID:

Sample Date: 8/7/2003

Sample type	
SUBSAMPLE TOTAL ORGANISMS	128
Portion of sample used	10.00%
Estimated number in total sample	1280
Sampling effort	
Time	
Distance	
Jabs	
Habitat type	
EPT abundance	1
Taxa richness	14
Number EPT taxa	1
Percent EPT	0.78%

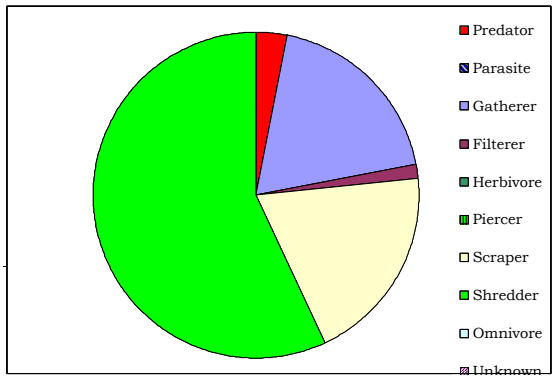
TAXONOMIC COMPOSITION

GROUP	PERCENT	#TAXA
Non-insect taxa	30.47%	6
Odonata	0.00%	0
Ephemeroptera	0.00%	0
Plecoptera	0.00%	0
Heteroptera	0.00%	0
Megaloptera	0.00%	0
Trichoptera	0.78%	1
Lepidoptera	0.00%	0
Coleoptera	3.13%	2
Diptera	0.00%	0
Chironomidae	65.63%	5



FUNCTIONAL COMPOSITION

GROUP	PERCENT	#TAXA
Predator	3.13%	2
Parasite	0.00%	0
Gatherer	18.75%	5
Filterer	1.56%	1
Herbivore	0.00%	0
Piercer	0.00%	0
Scraper	19.53%	2
Shredder	57.03%	4
Omnivore	0.00%	0
Unknown	0.00%	0



COMMUNITY TOLERANCES

Sediment tolerant taxa	0
Percent sediment tolerant	0.00%
Sediment sensitive taxa	0
Metals tolerance index (McGuire)	8.29
Cold stenotherm taxa	0
Percent cold stenotherms	0.00%

HABITUS MEASURES

Hemoglobin bearer richness	3
Percent hemoglobin bearers	14.84%
Air-breather richness	2
Percent air-breathers	3.13%
Burrower richness	1
Percent burrowers	5.47%
Swimmer richness	3
Percent swimmers	7.81%

DOMINANCE

TAXON	ABUNDANCE	PERCENT
Cricotopus (Cricotopus)	64	50.00%
Physidae	14	10.94%
Ostracoda	14	10.94%
Phaenopsectra	11	8.59%
Gammarus	7	5.47%
SUBTOTAL 5 DOMINANTS	110	85.94%
Dicrotendipes	7	5.47%
Agabus	3	2.34%
Cladocera	2	1.56%
Copepoda	1	0.78%
Hyalella	1	0.78%
TOTAL DOMINANTS	124	96.88%

SAPROBITY

Hilsenhoff Biotic Index	6.79

DIVERSITY

Shannon H (loge)	2.26
Shannon H (log2)	1.57
Margalef D	2.67
Simpson D	0.28
Evenness	0.11

VOLTINISM

TYPE	# TAXA	PERCENT
Multivoltine	8	78.91%
Univoltine	4	17.97%
Semivoltine	2	3.13%

TAXA CHARACTERS

	#TAXA	PERCENT
Tolerant	5	23.44%
Intolerant	0	0.00%
Clinger	2	58.59%

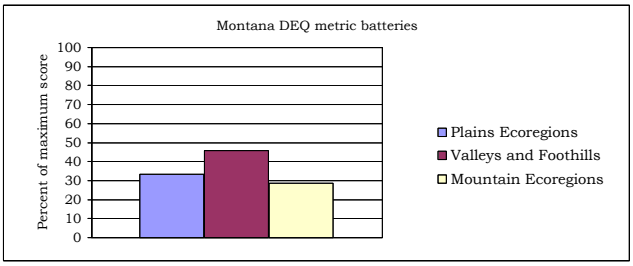
BIOASSESSMENT INDICES

B-IBI (Karr et al.)

METRIC	VALUE	SCORE
Taxa richness	14	1
E richness	0	1
P richness	0	1
T richness	1	1
Long-lived	2	1
Sensitive richness	0	1
%tolerant	23.44%	3
%predators	3.13%	1
Clinger richness	2	1
%dominance (3)	71.88%	3
	TOTAL SCORE	14 28%

MONTANA DEQ METRICS (Bukantis 1998)

METRIC	VALUE	Plains Ecoregions	Valleys and Foothills	Mountain Ecoregions
Taxa richness	14	1	1	0
EPT richness	1	0	0	0
Biotic Index	6.79	1	0	0
%Dominant taxon	50.00%	1	1	0
%Collectors	20.31%	3	3	3
%EPT	0.78%	0	0	0
Shannon Diversity	1.57	0		
%Scrapers +Shredders	76.56%	3	3	3
Predator taxa	2	0		
%Multivoltine	78.91%	1		
%H of T	0.00%		3	
TOTAL SCORES		10	11	6
PERCENT OF MAXIMUM		33.33	45.83	28.57
IMPAIRMENT CLASS		MODERATE	MODERATE	MODERATE



Montana Plains ecoregions metrics (Bramblett and Johnson)

Riffle		*Pool*	
EPT richness	1	E richness	0
Percent EPT	0.78%	T richness	1
Percent Oligochaetes and Leeches	0.00%	Percent EPT	0.78%
Percent 2 dominants	60.94%	Percent non-insect	30.47%
Filterer richness	1	Filterer richness	1
Percent intolerant	0.00%	Univoltine richness	4
Univoltine richness	4	Percent supertolerant	31.25%
Percent clingers	58.59%		
Swimmer richness	3		