MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2001

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

July 2002

Project No: 130091.011

LAND & WATER

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1.0 INTRODUCTION

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. Wetland hydrology is provided by upwelling groundwater and springs with surface retention behind a constructed dike. Precipitation and surface runoff will provide 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.

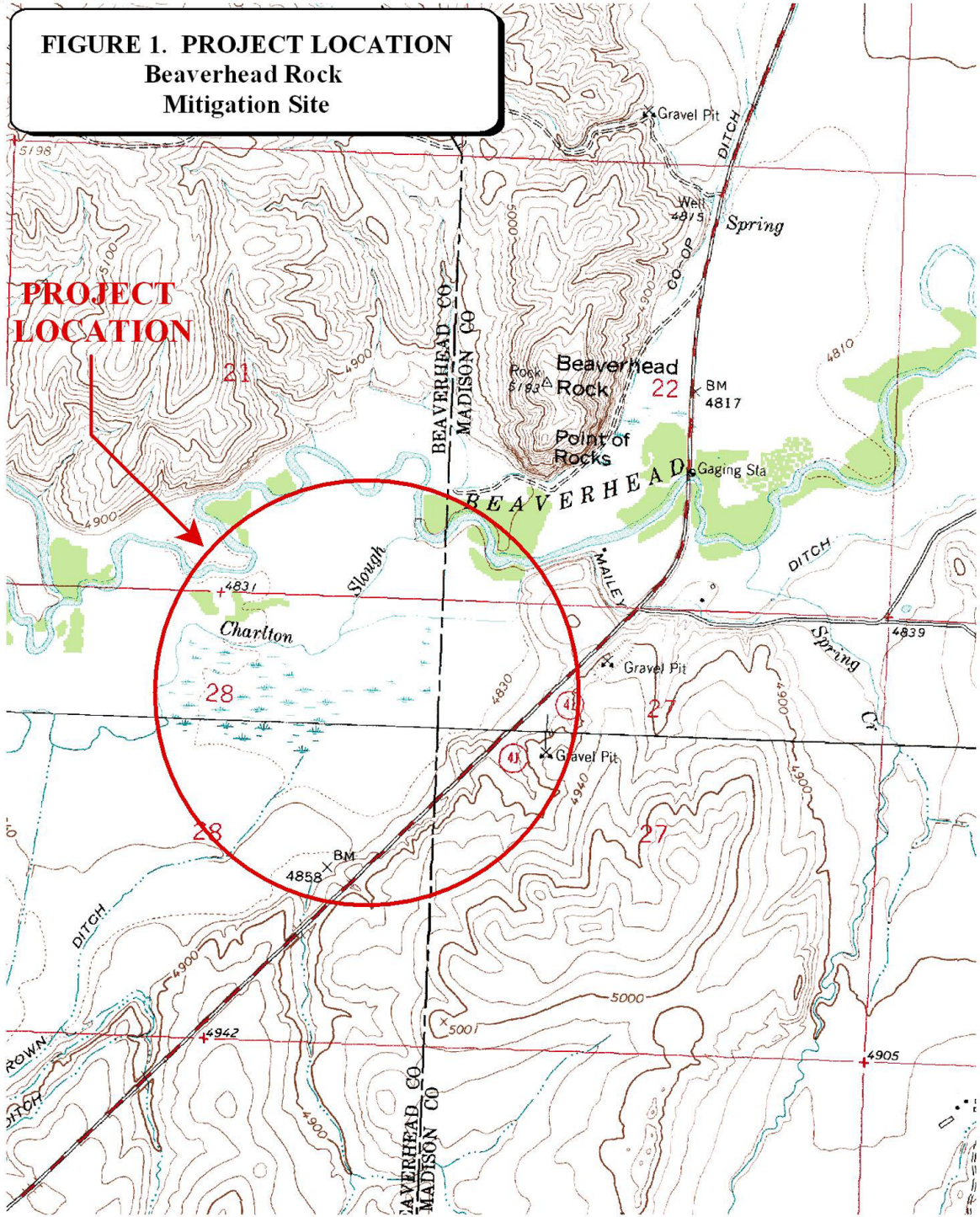
A pre-construction wetland delineation documented 5.2 acres of wetlands at the site (Hackley 1997). The Beaverhead Gateway site will be monitored once per year over the 3-year contract period to document wetland and other biological attributes. The monitoring area is illustrated in **Figure 2** (**Appendix A**).

2.0 METHODS

2.1 Monitoring Dates and Activities

The site was visited on May 20 (early season), August 23 (mid-season) and November 9, 2001 (late season). The primary purpose of the mid-May visit was to conduct a bird/general wildlife reconnaissance, as early season monitoring is likely to detect migrant as well as early nesting activities for a variety of avian species (Carlson pers. comm.), as well as maximize the potential for amphibian detection.

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

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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 were established during the mid-season monitoring event to represent the range of current vegetation conditions. Percent cover was estimated for each vegetative species 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). Wetland indicator status will be recorded for each species. Percent cover was estimated for each vegetative species encountered. 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. 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 delineated on the air photo and recorded with a resource grade GPS unit using the procedures outlined in **Appendix E**. 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 and Herptiles

Mammal and herptile species observations and other positive indicators of use, such as vocalizations, were recorded on the wetland monitoring form during the annual visit. 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 the annual visit. 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

Six macroinvertebrate samples were collected during the mid-season site visit at six separate locations (**Figure 2**). Macroinvertebrate sampling procedures are provided in **Appendix E**. Samples were preserved as outlined in the sampling procedure and sent to a laboratory for analysis.

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 made 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. The location of photo points is shown on **Figure 2**, **Appendix A**. All photographs were taken using a 50 mm lens.

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. 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. 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 at this time across another 10-15% of the wetland area. Inundation was present throughout all of Community type 2 (**Figure 3**), throughout most of Type 8 and in small portions of Type 6. Casual observations during the early season visit indicated complete inundation of Type 8 and more extensive inundation throughout Type 6.

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 20. 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

Almost 100 plant species were identified at the site and are listed in **Table 1**. The majority of these species are 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 and three upland community types were identified and mapped at the mitigation area (**Figure 3**, **Appendix A**). The four wetland community types include Type 2: *Scirpus* , Type 5: *Alopecurus/Juncus,* Type 6: *Alopecurus/Scirpus and* Type 8: *Potamogeton/Polygonum.* Plant species observed within each of these communities are listed on the attached data form (**Appendix B**). The three upland community types include Type 3: *Hordeum/Kochia ,* Type 4: *Muhlenbergia/Agropyron and* Type 7: *Sarcobatus/Elymus.* 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 occurs as an aquatic bed community in the shallower water areas (**Figure 3**). It is dominated by pondweed and smartweed. Type 2 is the next wettest and occurs mainly as a fringe around the border of shallow water areas dominated by bulrush. Type 6 is the next wettest wetland vegetation type and occurs throughout the monitoring area on sites slightly higher than Type 2. The vegetation in Type 6 is highly variable from spot to spot due to small changes in soil properties, topography, past disturbance and other factors. Vegetation is Type 6 is also highly variable since it is in transition from upland to wetland. Across much of this type, the vegetation is dominated meadow foxtail and bulrush. However, small areas are dominated by other species.

Adjacent upland vegetation community types are mainly dominated by rangeland species with cropland along the southern border. Type 3 is located on dikes, spoil pile and or other highly disturbed soil materials and is dominated by weedy species such as foxtail barley, kochia and Canada thistle. Type 4 is mostly dominated by alkali muhly, slender wheatgrass and western wheatgrass. Type 7 is dominated by greasewood, basin wild rye and western wheatgrass.

Noxious weeds at the site include spotted knapweed and Canada thistle. Other weedy species include kochia, houndstongue, curlycup gumweed, lambsquarters, whitetop and quackgrass. Eurasian milfoil has been reported by MDT at this site. No common reed (*Phragmites australis*) has been observed at the site although it is present nearby along Highway 41. This is an extremely aggressive invader of wetlands and a serious concern at this site. Weed control and re-vegetation 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 milfoil, common reed or

other important weeds are present. If Eurasian milfoil is present it will likely require significant effort to manage in the future.

Vegetation transect results are detailed in the attached data forms, and are summarized graphically below.

Transect 1:

Start	***Type 1 – Sarcobatus/Elymus Upland (40')***	***Type 2 - Alopecurus/Juncus Wetland (1030')***	***Type 3 - Alopecurus/Scirpus Wetland (150')***	***Type 4 – Juncus/Triglochin Wetland (400')***	***Type 5 - Scirpus Wetland (30')***	**Total: 1650'**	**End**

Transect 2:

Start	***Type 1 – Hordeum/Kochia Upland (50')***	***Type 2 - Alopecurus/Scirpus (100')***	***Type 3 – Muhlenbergia/Agropyron Upland (170')***	**Total: 280'**	**End**

Table 1: ***2001 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 Carex	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	Canadian 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 stricta	Saltgrass	FAC+
Elaeagnus angustifolia*	Russian Olive	FAC
Eleocharis acicularis*	Least Spike Rush	OBL
Eleocharis pauciflora	Few-flowered Spike Rush	OBL
Elymus cinereus	Big Basin Wild Rye	FACU
Epilobium palustris	Swamp Willow-herb	OBL
Equisetum laevigatum	Smooth Scouring-Rush	FACW
Festuca pratensis	Meadow Fescue	FACU+
Gentianella amarelle	Northern Gentian	FACW-
Glaux maritime	Sea-Milkwort	FACW+

Table 1*: (continued)*

Grindelia squarrosa	Curly-cup Gumweed	FACU
Habenaria dilatata	Bog orchid	--
Haplopappus carthamoides	Columbia Goldenweed	--
Helianthus nuttallii	Nuttall's Sunflower	FACW-
Helenium autumnale*	Sneezeweed	FACW
Hippuris vulgaris	Common Mare's-Tail	OBL
Hordeum jubatum	Barley Fox-Tail	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
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-
Spartina gracilis	Alkali Cordgrass	FACW
Sporobolus cryptandrus	Sand Dropseed	FACU
Stipa comata	Needle & Thread Grass	--
Sueda intermedia	Alkali Seepweed	FAC
Tragopogon dubius	Yellow Salsify	--
Triglochin maritima	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.**

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 portion of the site mapped during the Madison County soil survey is mainly under water now.

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

Delineated wetland boundaries are illustrated on **Figure 3**. Completed wetland delineation forms are included in **Appendix B**. Soils, vegetation, and hydrology are discussed in preceding sections. Monitoring in 2001 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 are currently within the 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.

3.5 Wildlife

Wildlife species, or evidence of wildlife, observed on the site during 2001 monitoring efforts are listed in **Table 2**. Some of the most significant wildlife are birds including pelicans, trumpeter swans, black terns, and sandhill cranes. On two of the three site visits there were over 500 individual birds present. Specific evidence observed, as well as activity codes pertaining to birds, are provided on the completed monitoring form in **Appendix B**.

This site provides habitat for a variety of wildlife species. Three mammal and twenty-one bird species were noted at the mitigation site during the 2001 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 2: ***Wildlife Species Observed at the Beaverhead Gateway Mitigation Site***

FISH None	
AMPHIBIANS None	
REPTILES Garter Snake (*Thamnophis radix*)	
BIRDS American White Pelican (*Pelecanus erythrorhynchos*) American Crow (*Corvus brachyrhynchos*) American Coot (*Fulica americana*) American Dipper (*Cinclus*) Bank Swallow (*Riparia riparia*) Black-necked Stilt (*Himantopus mexicanus*) Black Tern (*Chlidonias niger*) Brown-headed Cowbird (*Molothrus ater*) Canada Goose (*Branta Canadensis*) Cinnamon Teal (*Anas cyanoptera*) Cliff Swallow (*Petrochelidon pyrrhonota*) Common Snipe (*Gallinago gallinago*) Franklins Gull (*Larus pipixcan*)	Great Blue Heron (*Ardea herodias*) Hooded Merganser (*Lophodytes cucullatus*) Killdeer (*Charadrius vociferous*) Lesser Scaup (*Aythya affinis*) Mallard (*Anas platyrhynchos*) Red-head Duck (*Aythya americana*) Red-tail Hawk (*Buteo jamaicensis*) Red-winged Blackbird (*Agelaius phoeniceus)* Sandhill Cranes (*Grus canadensis*) Vesper Sparrow (*Pooecetes gramineus*) Western Bluebird (*Sialia mexicana*) Western Meadowlark (*Sturnella neglecta*)
MAMMALS Coyote Mule Deer (*Odocoileus hemionus*) Muskrat (*Ondatra zibethicus*)	

3.6 Macroinvertebrates

Complete results from the six macroinvertebrate sampling locations (**Figure 2**) are presented in **Appendix B.** The best macroinvertebrate results were from locations 2 and 3. Site 2 is located at the upper end of an excavated channel where groundwater upwells. Site 3 is located along the southwestern shore of the main water body which is the upwind side base on the most common wind direction. The poorest macroinvertebrate results were from sites 1, 5 and 6 located along the dike where the most noticeable turbidity was observed. This is the downwind side of the main water body and is subject to the most intense wave action. It is also has the highest amount of bare soil and weedy plant species.

At Beaverhead #1, the assessment method implied that biological conditions were sub-optimal at this site. Low Chironomid taxa richness suggested monotonous substrates. The biotic index value was higher than expected; water quality may have been mildly impaired by nutrients or elevated water temperature or both.

At Beaverhead #2, the method applied in this study suggested near-optimal biologic conditions. Low Chironomid taxa richness suggested monotonous substrates, but moderately high taxa richness indicated availability of plentiful habitats of other kinds.

At Beaverhead #3, a near-optimal biologic condition was suggested by the assessment scores. The site seemed to manifest different habitat and water quality conditions than the other Beaverhead sites: the biotic index score suggested less saprobity or cooler temperatures, and a high Chironomid richness suggested diverse benthic habitats. Interestingly, the sample was not dominated by amphipods, as were most of the other Beaverhead site samples. A high proportion of amphipods have been shown to be a positive correlate of alkalinity (Apfelbeck 1996). Taxonomic composition of the sample suggested that macrophytes may have been sparse or lacking at this site.

At Beaverhead #4, the approach employed in this study suggested sub-optimal biologic conditions. Taxa richness was somewhat lower than expected, and there were relatively few midge taxa; this suggested that benthic and other habitats may have been monotonous. The biotic index was high, implying warm water temperatures or abundant nutrients or both.

At Beaverhead #5, scores suggested poor biologic conditions. The sample was overwhelmed by the tolerant amphipod *Hyallela azteca* and the biotic index was elevated. These findings suggested that water quality may have been moderately impaired by warm temperatures or nutrients, or both.

At Beaverhead #6, sub-optimal biotic conditions were suggested by the metric scores. Taxa richness was very low, and not a single Chironomid was present in the sample. This indicated depauperate habitat conditions at this site, though taxonomic composition suggested the presence of macrophytes. The biotic index value was low, and the dominant amphipod was the less tolerant *Gammarus* sp. Water quality may be better here than at most other Beaverhead sites.

3.7 Functional Assessment

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.

It is significant to note that much of the wetland area, especially vegetation community Type 6 (**Figure 3**) would have significantly higher functional ratings if the height of existing herbaceous vegetation and the number of vegetation strata or layers were increased. This area has little cover or vertical diversity. Eliminating or reducing grazing, planting taller herbaceous species and planting woody species are examples of methods for increasing functional ratings at the site.

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

Table 3: ***Summary of 2001 Wetland Function/Value Ratings and Functional Points*** [1]

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Wetland Numbers
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**.

3.9 Maintenance Needs/Recommendations

Weed control and re-vegetation of disturbed sites is 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, houndstongue 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 a significant impact on the sites value for many wildlife species. Methods to improve wildlife value and the functional rating include suspension of grazing and planting of taller herbaceous and woody species.

Dike erosion and sediment production from the poorly vegetated shoreline should be monitored more closely by installing permanent markers or by periodic surveys. Examples of potential

solutions to erosion problems include shoreline reinforcement, off-shore wave protection, protected off-shore plantings and shoreline plantings especially using woody species.

3.10 Current Credit Summary

At this time approximately 107 acres of wetland and 6.3 acres of open water creation have been accomplished compared with a goal of 52 acres. It is likely that additional acreage will form with additional time and more normal precipitation.

4.0 REFERENCES

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Appendix A

FIGURES 2 - 3

MDT Wetland Mitigation Monitoring
Beaverhead Gateway
Dillon, Montana

LAND & WATER

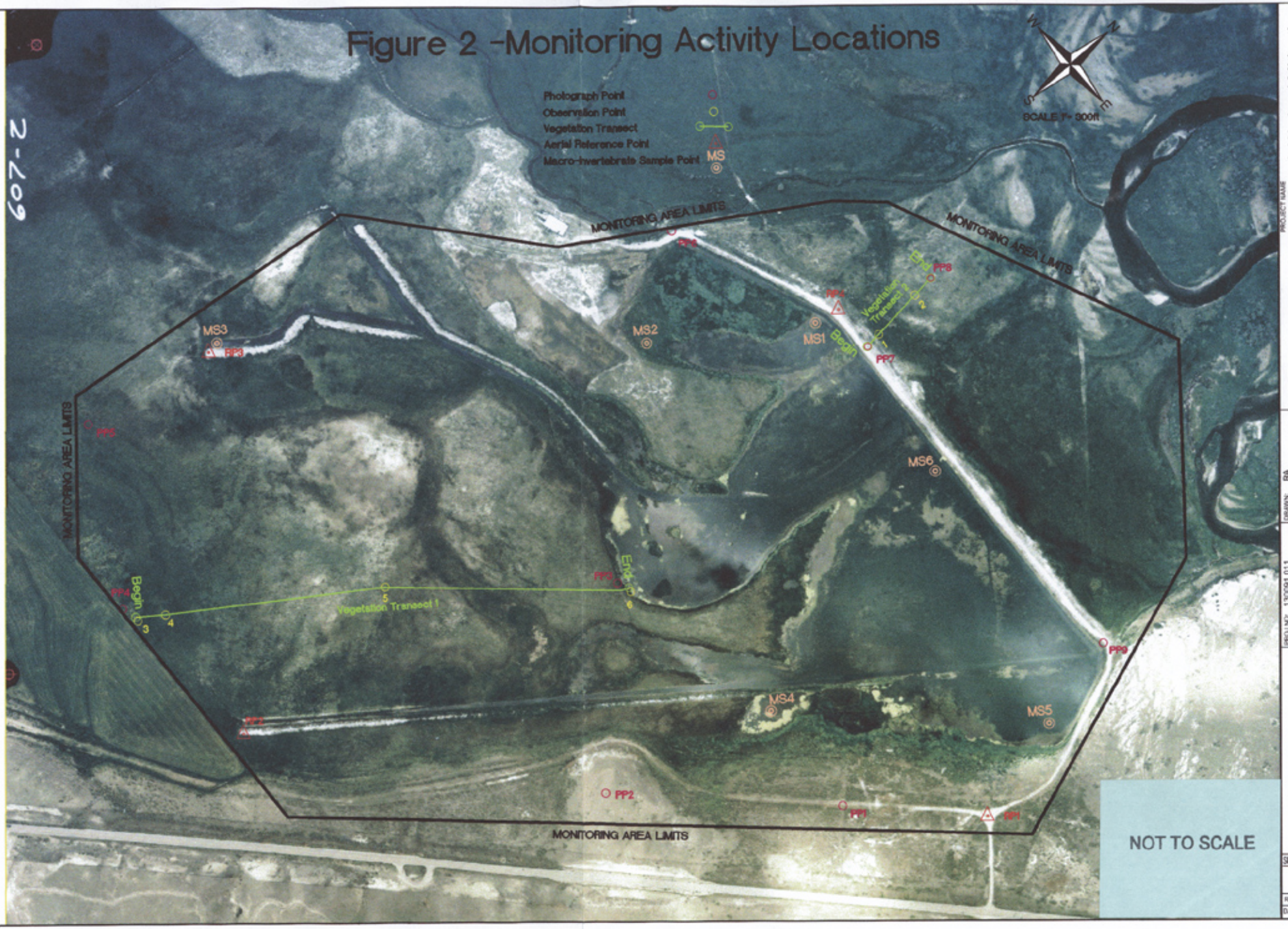


Figure 2 -Monitoring Activity Locations
Photograph Point
Observation Point
Vegetation Transect
Aerial Reference Point
Macro-Invertebrate Sample Point
MS
SCALE 1"= 300ft
MONITORING AREA LIMITS
MONITORING AREA LIMITS
MONITORING AREA LIMITS
MONITORING AREA LIMITS
PP1
PP2
PP3
PP4
PP5
PP6
PP7
PP8
PP9
MS1
MS2
MS3
MS4
MS5
MS6
Begin
End
Vegetation Transect 1
Vegetation Transect 2
NOT TO SCALE
MDT Beaverhead Gateway Ranch Wetland Mitigation
Monitoring Activity Locations
PROJ NO: 1300991.011
FILE NAME: TASK11BASE.dwg
SCALE: 1"= 300ft
LOCATION: Beaverhead Rock
DRAWN: RA
CHECKED: JH
APP'D: BD
PROJ MGR: BD
LAND & WATER CONSULTING, INC.
SHEET NUMBER
2
REV -
DATE: 12-10-0
2-709

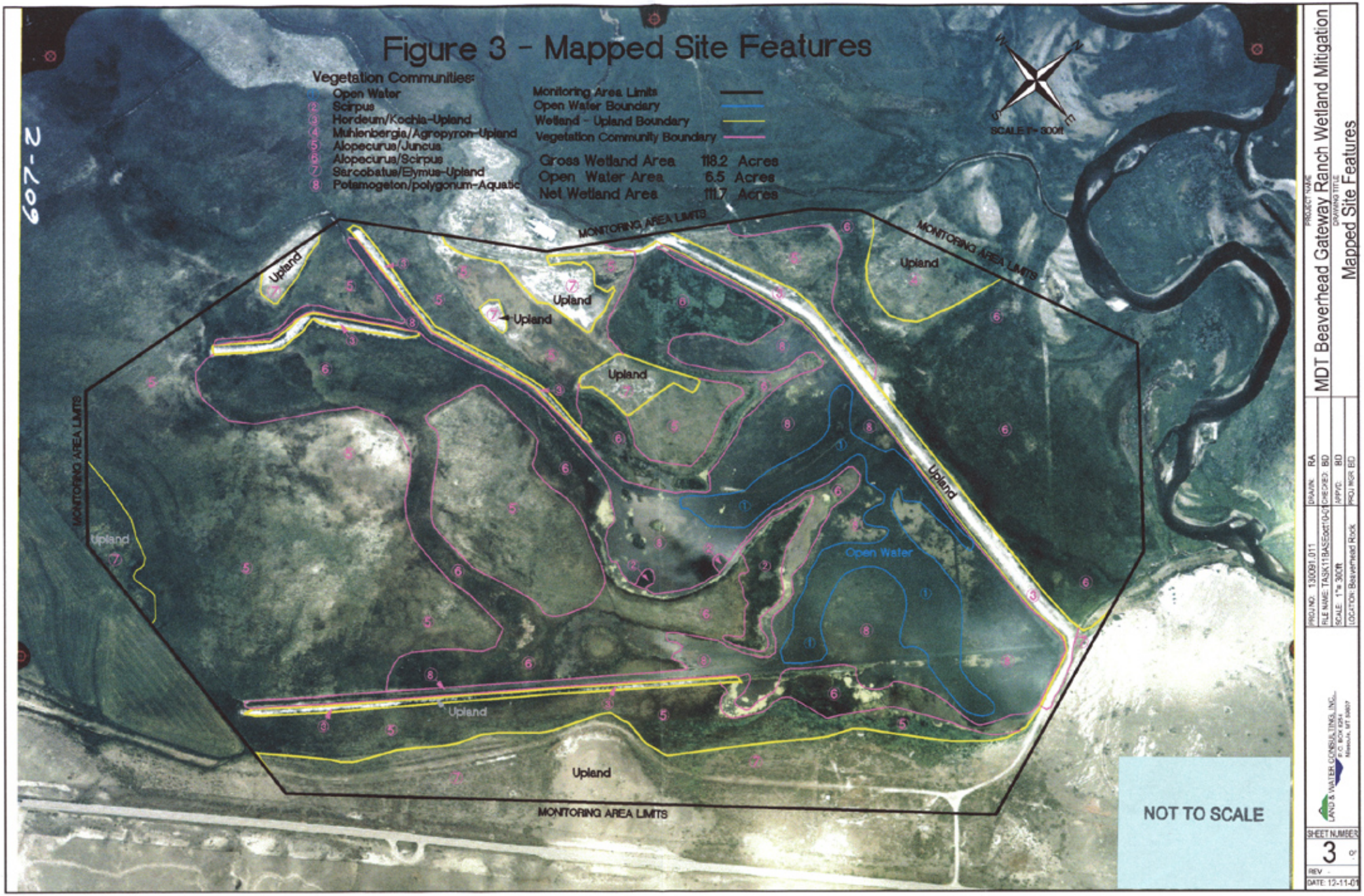


Figure 3 - Mapped Site Features
Vegetation Communities:
1 Open Water
2 Scirpus
3 Hordeum/Kochia-Upland
4 Muhlenbergia/Agropyron-Upland
5 Alopecurus/Juncus
6 Alopecurus/Scirpus
7 Sarcobatus/Elymus-Upland
8 Potamogeton/polygonum-Aquatic
Monitoring Area Limits
Open Water Boundary
Wetland - Upland Boundary
Vegetation Community Boundary
Gross Wetland Area 118.2 Acres
Open Water Area 6.5 Acres
Net Wetland Area 111.7 Acres
SCALE 1"= 300ft
MONITORING AREA LIMITS
Upland
Open Water
NOT TO SCALE
2-709
PROJECT NAME
MDT Beaverhead Gateway Ranch Wetland Mitigation
DRAWING TITLE
Mapped Site Features
PROJ NO: 130091.011
DRAWN: RA
FILE NAME: TASK11BASE041004
CHECKED: BD
SCALE: 1"= 300ft
APPVD: BD
LOCATION: Beaverhead Rock
PROJ MGR: BD
LAND & WATER CONSULTING, INC.
SHEET NUMBER
3
REV -
DATE: 12-11-01

Appendix B

COMPLETED 2001 WETLAND MITIGATION SITE MONITORING FORM
COMPLETED 2001 BIRD SURVEY FORM
COMPLETED 2001 WETLAND DELINEATION FORMS
COMPLETED 2001 FUNCTIONAL ASSESSMENT FORM
MACROINVERTEBRATE SAMPLE ANALYSES

MDT Wetland Mitigation Monitoring
Beaverhead Gateway
Dillon, Montana

LAND & WATER

DRAFT - MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: Beaverhead Rock Project Number: 130091 T12 Assessment Date: 8/23/01
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 J. Elliot
Initial Evaluation Date: / / Visit #: 2 Monitoring Year: 2001
Size of evaluation area: 147 acres Land use surrounding wetland: Agriculture (crops, grazing)
monitoring area - includes wetland + upland

HYDROLOGY

Surface Water
Inundation: Present X Absent___ Average depths: .25 ft Range of depths: 0 - 4 ft est.
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. Veg types as mapped have varying coverages of the indicated species.

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

VEGETATION COMMUNITIES

LAND & WATER B-2

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

Dominant Species	% Cover	Dominant Species	% Cover
SCIAME	9		
SCIACU	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
HORJUB	2	AGRTRA	P
KOCSCO	2	DICSTR saltgrass	P
CIRARV	1	SUEINT seepweed	P
CARORA whitetop	P	OESSOP Tansy	P
CHEBER lambsquarters	T		

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

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

Dominant Species	% Cover	Dominant Species	% Cover
MULASP	5	SUEINT	T
AGRSMI	2	SARVER	T
HORJUB	T	JUNBAL	T
ELYCIN	P	AGRTRA	P
POAPRA	T		

COMMENTS/PROBLEMS: Slightly higher mound above wetland area.

Additional Activities Checklist:

X Record and map vegetative communities on air photo

VEGETATION COMMUNITIES

LAND & WATER B-3

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

Dominant Species	% Cover	Dominant Species	% Cover
ALO PRA	7	RUMCRI	P
TRI MER	P	AGRTRA	P
AGRALB	1	CARLIM	T
CAR NEB	1	MUL ASP	P
JUN BAL	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): Alopecuris / Scirpus

Dominant Species	% Cover	Dominant Species	% Cover
ALO PRA	5	CARLIM	T
SCI AME	1	AGRTRA	T
SCI ACU	P	SCI PUN	T
JUNBAL	2	HOR JUB	T
TRIMAR	1	CHEALB	T

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

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

Dominant Species	% Cover	Dominant Species	% Cover
SAR ELE greasewood	3	JUN BAL	T
ELY CIN	1	POA PRA	T
HOR JUB	1	AGR SMI	T
AGR SMI	P		
AGR TRA	1		

COMMENTS/PROBLEMS: Upland areas adjacent to wetland.

Additional Activities Checklist:

X Record and map vegetative communities on air photo

COMPREHENSIVE VEGETATION LIST

LAND & WATER B-4

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
ALO PRA		SCI PUN	
TRI MER		SCI AME	
JUN BAL		IRI MIS	
CAR NEB		BRO JAP	
HOR JUB		URT DIO	
AGR CRI		JUN BUF	
KOS SCO Kochia		SPO CRY	
AGR TRA		SCR ACU	
DIC STR		CAR PRA	
CIR ARV		CYN OFF	
CAR PRA		LEP PER	
DES SOP		MED SAT	
MUL ASP		MED LUP	
greasewood SAR VER		PUC LEM	
seep weed		SAL EXI	
SAR VER		AST HES	
ELY CIN		CLE SER	
POA PRA		CIR UNP	
AST FAC		RUM CRI	
FES PRA		SAL KAL	
EQUISETUM EQUAE		BRO INE	
Plantago PLA ERI		ART FRI	
CHE ALB		CAL NEP	
SPA ARA		SUE INT	
AGR SMI		STI COM	
CAR SPP.		PHL LON	
HAB OIL		PHL ARU	
CAR NEB		MEL OFF	
CAR LIM		MEL ALB	
BRO TEC		LAC SER	
BRO INE		JUN ENS	
ELE PAU		MEN ARV	
GEN AMA		ART FRI	
SON ARV		CHE RUB	
TYP LAT		CHR NAU	

COMMENTS/PROBLEMS: _____

COMPREHENSIVE VEGETATION LIST

LAND & WATER B-5

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
AGRREP			
POASAN			
POLYGONUM			
DACGLO			
GLAMAR			
CAREX SPP. CARCAP			
RANPOP			
ZYGVEN			
SCIVAL			
SCIMAR			
IVAAXI			
HELNUT			
GRISQU			
AGRSTO			
HAPCAR			
LACSER			
POTANS			
SALSPP (saltwort)			
TRADUB			
SISANG			
MENARV			
MIMULUS SPP. (yellow)			
PHRAUS			
POLAVI (knotweed)			
CENMAC			
ELEACI			
PHLPRA			
EPIPAL			

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
A			
B			
C			
D			
E			
F			
G			
H			

COMMENTS/PROBLEMS: Not all photos turned out.

GPS SURVEYING

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

Checklist:

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

COMMENTS/PROBLEMS:

WETLAND DELINEATION

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: _____

FUNCTIONAL ASSESSMENT

Complete Jeff's abbreviated MDT Function and Values Assessment field form.

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____ NO____
If yes, are the structures working properly and in good working order? YES____ NO___
If no, describe the problems below.

COMMENTS/PROBLEMS: Erosion/sedimentation along dike. Lots of weeds along spoils. Wind + water erosion in bare areas.

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Beaverhead Rock Date: 8-21-02 Examiner: B. Dutton / J. Elliot Transect # 1 - page 1

Approx. transect length: 1650 Feet Compass Direction from Start (Upland): 35°

Vegetation type 1:	Sarcobatus / Elymus	
Length of transect in this type:	40	feet
Species:		Cover:
SARELE	Greasewood	4
ELYCIN		3
AGRTRA		3
POAPRA		P
JUNBAL		P
HORJUB		P
PHLPRA		T
	Total Vegetative Cover:	9

Vegetation type 2:	Alopecurus / Juncus	
Length of transect in this type:	1030	feet
Species:		Cover:
ALOPRA		3
JUNBAL		3
HORJUB		P
CHEALB	goosefoot	P
FESPRA		T
ASTFAC		T
MUHASP		2
PLANTAGO SPP.		T
AGRSMI		T
SPAGRA		P
AGRTRA		P
CARLIM-P	Total Vegetative Cover:	9

Vegetation type 3:	Alopecurus / Scirpus	
Length of transect in this type:	150	feet
Species:		Cover:
ALOPRA		3
JUNBAL		3
SCRPUG		2
MUHASP		1
CARLIM		P
HORJUB		P
SPAGRA		P
AGRTRA		P
CHEALB		1
	Total Vegetative Cover:	9

Vegetation type 4:	Juncus / Triglochin	
Length of transect in this type:	400	feet
Species:		Cover:
JUNBAL		3
TRIMAR		3
ALOPRA		1
HORJUB		P
AGRTRA		2
CARLIM		P
SCRPUG		P
EQULAE		T
AGRSMI		T
PLANTAGO SPP		T
HELIANTHUS SPP		
	Total Vegetative Cover:	9

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Beaverhead Rock Date: _____ Examiner: _____ Transect # 1 - page 2

Approx. transect length: 1600 Compass Direction from Start (Upland): _____

Vegetation type #5	Scirpus	
Length of transect in this type:	30	feet
Species:		Cover:
SCRAME		9
SCRACU		P
Total Vegetative Cover:		9

Vegetation type 2:		
Length of transect in this type:		feet
Species:		Cover:
Total Vegetative Cover:		

Vegetation type 3:		
Length of transect in this type:		feet
Species:		Cover:
Total Vegetative Cover:		

Vegetation type 4:		
Length of transect in this type:		feet
Species:		Cover:
Total Vegetative Cover:		

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Beaverhead Rock Date: 8-23-01 Examiner: B. Dutton / J. Elliot Transect # 2

Approx. transect length: 280 feet Compass Direction from Start (Upland): 350°

Vegetation type 1:	Hordeum / Kochia – dike upland	
Length of transect in this type:	30	feet
Species:		Cover:
HORJUB		2
KOCSCO		2
CIRARV		P
CARDRA		T
CHEBER	lambsquarter	T
AGRTRA		P
OICSTR		T
SUEINT		T
Total Vegetative Cover:		4

Vegetation type 2:	Alopecurus / Scirpus – wetland	
Length of transect in this type:	100	feet
Species:		Cover:
ALOPRA		8
AGRTRA		1
JUNBAL		2
CARNEB		1
RUMCRI		P
HABOIL		T
Total Vegetative Cover:		9

Vegetation type 3:	Muhlenbergia / Agropyron – upland	
Length of transect in this type:	170	feet
Species:		Cover:
MUHASP		8
AGRTRA		2P
FESIOA		P
RUMCRI		P
AGRSMI		1
HORJUB		1
JUNBAL		P
POAPRA		P
ELYCIN		T
Total Vegetative Cover:		9

Vegetation type 4:		
Length of transect in this type:		feet
Species:		Cover:
Total Vegetative Cover:		

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

Project/Site: Beaverhead Rock OPI (T2)
Applicant/Owner: MDT
Investigator: B. Dutton J. Elliot

Date: 8-23-01
County: Beaverhead
State: MT

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

Community ID:
Transect ID: T2
Plot ID: 1

VEGETATION

Dominant Plant Species		Stratum	Indicator
1.	ALOPRA	G	FACW
2.	AGRTRA	G	FAC
3.	JUNBAL	G	OBL
4.	CARNEB	G	OBL
5.	RUMCRI	F	FACW
6.	HABDIL	T	OBL
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			

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

Remarks: 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: 0 (in.)
Depth to Free Water in Pit: > 18 (in.)
Depth to Saturated Soil: > 18 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
___ Inundated
___ Saturated in Upper 12 Inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
X Oxidized Root Channels in Upper 12 Inches
___ Water-Stained Leaves
___ Local Soil Survey Data
X FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: Dry year.

SOILS

Map Unit Name (Series and Phase): Neen silty clay loam
Drainage Class: Somewhat poorly
Taxonomy (Subgroup): Aquic Calciorthids
Field Observations Confirm Mapped Type? Yes (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	10YR 2/0	—	—	Silt Loam
12-18+	B2	10YR 3/1	10YR 6/6	Few Faint	very fine sandy loam

Hydric Soil Indicators:

- [ ] Histosol
- [X] Histic Epipedon
- [X] Sulfidic Odor
- [ ] Aquic Moisture Regime
- [X] Reducing Conditions
- [X] 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)

Remarks: Mucky mineral surface soil

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Yes) No (Circle)

Remarks:

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

Project/Site: Beaverhead Rock T2-OP2
Applicant/Owner: MDT
Investigator: B. Dutton J. Elliot

Date: 8-23-01
County: Beaverhead
State: MT

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

Community ID: ____
Transect ID: T2
Plot ID: 2

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. AGRTRA	H	FAC
2. MULASP	H	FACW
3. FESIDA	H	—
4. RUMCRI	H	FACW
5. AGRSMI	H	FACU
6. HORJUB	H	FAC+
7. JUNBAL	H	OBL
8. POAPRA	H	FACU+
9. ELYCIN T	H	FACU
10.		
11.		
12.		
13.		
14.		
15.		
16.		

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

Remarks:

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: 0 (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.

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 (No)

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4	A	10YR3/2	None	None	Silt Loam
4-8	B1	10YR4/3	None	None	Silt loam
8-20+	B2	10YR5/3	NONE	NONE	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)

Remarks: Upland soil colors and features

WETLAND DETERMINATION

marginal

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

Is this Sampling Point Within a Wetland? (Circle) Yes (No)

Remarks:

Upland site.

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

Project/Site: Beaverhead Rock OP3 (T1)	Date: 8-23-01
Applicant/Owner: MDT	County: Beaverhead
Investigator: D. Sutton J. Elliot	State: MT
Do Normal Circumstances exist on the site? (Yes) No	Community ID:
Is the site significantly disturbed (Atypical Situation)? Yes (No)	Transect ID: T1
Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Plot ID: 3

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. Greasewood	S	—
2. ELYCIN	H	FACU
3. POAPRA	H	FACU+
4. AGRTRA	H	FAC
5. JUNBAL	H	OBL
6.		
7.		
8.		

Dominant Plant Species	Stratum	Indicator
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

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

Remarks: Upland veg.

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: 0 (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:

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 (No)

Profile Description:

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

Remarks: upland soil

WETLAND DETERMINATION

Hydrophytic Vegetation Present? Yes (No) (Circle)
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

Is this Sampling Point Within a Wetland? (Circle) Yes (No)

Remarks: Upland site on small mound above wetland

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

Project/Site: Beanhead Rock OP4 (T1) Applicant/Owner: MDT Investigator: B. Dutton J. Elliot	Date: 8-23-01 County: Beaverhead State: MT
Do Normal Circumstances exist on the site? (Yes) No Is the site significantly disturbed (Atypical Situation)? Yes (No) Is the area a potential Problem Area? Yes (No) (If needed, explain on reverse.)	Community ID: ____ Transect ID: T1 Plot ID: 4

VEGETATION

Dominant Plant Species		Stratum	Indicator
1. ALOPRA	P	H	FACW
2. HORJUB	1	H	FAC+
3. EQULAE	P	H	FACW
4. MULASP	P	H	FACW
5. JUNBAL	P	H	OBL
6. CARLIM	2	H	—
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 83%

Remarks: Wetland veg. CARLIM is not rated or else would be 100%.

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: 0 (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: Reduced colors. No water in pit - probably due to time of year and multi-year drought.

SOILS

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

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
A1	0-14	10YR 2/0			loam
B1	14-20	10YR 3/1	10YR 6/6	few faint	loam

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- X Reducing Conditions
- X 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)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks:

Wetland - probably will see indicators improve over time as wetland develops and more normal precipitation returns

SOILS

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

Profile Description:

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

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- X Aquic Moisture Regime
- X Reducing Conditions
- X 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)

Remarks: Soil is developing hydric features – will likely get stronger with more normal rainfall.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Circle) (Yes) No

Remarks: Soil and hydrology indicators are not real strong but there and likely to improve with normal precipitation.

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

Project/Site: Beavrhead Rock, T1-05 Date: 8-23-01
Applicant/Owner: MDT County: Beaverhead
Investigator: B. Dutton J. Elliot State: MT

Do Normal Circumstances exist on the site?	(Yes)	No	Community ID:
Is the site significantly disturbed (Atypical Situation)?	Yes	(No)	Transect ID: T1
Is the area a potential Problem Area? (If needed, explain on reverse.)	Yes	(No)	Plot ID: 5

VEGETATION

Dominant Plant Species		Stratum	Indicator
1. JUN BAL	4	H	OBL
2. SPA GRA	3	H	FACW
3. ALO PRA	T	H	FACW
4. CHE ALB	P	H	FAC
5. PLA ERI	T	H	FACW
6. CARLIM	T	H	—
7. MULASP	2	H	FACW
8. AGR TRA	P	H	FAC
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 88%

Remarks: CARLIM is not rated or the % would be 100%.

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: 0 (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

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

Project/Site: Beaverhead Rock T1-(OP6) Date: 8-23-01
Applicant/Owner: MDT County: Beaverhead
Investigator: B. Dutton J. Elliot State: MT

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

Community ID:
Transect ID: T1
Plot ID: 6

VEGETATION

Dominant Plant Species	Stratum	Indicator
1. SCRARC P	H	OBL
2. HORJUB J	H	FAC+
3. SCI AME 9	H	OBL
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		

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

Remarks: Wetland veg.

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: 0 (in.)
Depth to Free Water in Pit: 18 (in.)
Depth to Saturated Soil: 2 (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):
X Oxidized Root Channels in Upper 12 Inches
X Water-Stained Leaves
___ Local Soil Survey Data
X FAC-Neutral Test
___ Other (Explain in Remarks)

Remarks: Wetland hydrology.

SOILS

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

Taxonomy (Subgroup): Aquic Calciorthids Field Observations Confirm Mapped Type? Yes (No)

Profile Description:

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

Hydric Soil Indicators:

- ___ Histosol
- ___ Histic Epipedon
- X Sulfidic Odor
- ___ Aquic Moisture Regime
- X Reducing Conditions
- X 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)

Remarks: thin surface layer of more-recent deposition over very low chroma and high OM layer.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No (Circle)
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point Within a Wetland? (Yes) No (Circle)

Remarks: Good wetland.

Beaverhead Gateway

BIRD SURVEY - FIELD DATA SHEET

LAND & WATER B-23

Page of

Date:

Survey Time:

SITE: 5/20/01 7:00 - 12:00 11/9/01 9:00 - 1:00

	Bird, Species	Behavior	Habitat Type
150	Pelicans	F/FO	OW/MA/MS
20	Sandhill Cranes	F/N/B	WM
100	Mallards	F/N/B	MS/OW
2	Heron	F/FO	WM
1	Hooded merganser	F	MS/MA
2	Red head Yhrck	F/N/B	MS
15	American Coot	F	MA
50	Canada Geese	F/FO	OW/MS
2	Cinnamon Teal	F	MS
5	Redwing blackbird	F/L/N	UP/MA
12	Bank Swallow	F/FO	UP
1	Black Tern	F	MS
2	Red-tail Hawk	FO	UP
6	Common Snipe	F/L	MS
20	American Pipper	F/L	MS
1	American Crow	FO	UP
2	Western Bluebird	FO	UP
1	Cowbird	F/L	UP
4	Franklins Gull	FO	MS
6	Western meadowlark	F	
≈200	Unidentified various		

Bird Species	Behavior	Habitat Type	
Mallards	L/F	MA	≈250
Hooded Mergansers	F	MA	1+
Canada Goose	FO	MA	20
American Coot	L	MA	20
Lesser scaup	L	MA	1
Vesper sparrow		UP	

NOTES: ANIMALS:

Deer - 12

Coyote - 3 (chased by cranes)

GarterSnake - 1

Coyote - scat

Muskrat - scat & burrows (may be digging in dike)

Deer - 4 ± tracks

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

Habitat: AB - aquatic Bed; FO - forested; I - Island; MA - marsh; MF: Mud Flat; OW - open water; SS - scrub-shrub; UP - upland buffer; WM - wet meadow

LAND & WATER B-24

MDT Montana Wetland Assessment Form (revised 5/25/1999)

1. Project Name: Beaverhead Gateway Mitigation Site 2. Project #: 130091 TIZ Control #:

3. Evaluation Date: Mo. 8 Day 23 Yr. 01 4. Evaluator(s): B. Dutton J. Bergdahl 5. Wetlands/Site #(s)

6. Wetland Location(s): i. Legal: T 5 N or (S) R 7 E or (W) S 28/27/21 ; T ___ N or S; R ___ E or W; S ___ ;
ii. Approx. Stationing or Mileposts:

iii. Watershed: 10020004 GPS Reference No. (if applies):
Other Location Information:

7. a. Evaluating Agency: MDT ;
b. Purpose of Evaluation:
1. ___ Wetlands potentially affected by MDT project
2. ___ Mitigation wetlands; pre-construction
3. X Mitigation wetlands; post-construction
4. ___ Other

8. Wetland size: (total acres) ___ (visually estimated)
118 (measured, e.g. by GPS [if applies])

9. Assessment area: (AA, tot., ac., see instructions on determining AA) ___ (visually estimated)
118 ac (measured, e.g. by GPS [if applies])

10. Classification of Wetland and Aquatic Habitats in AA (HGM according to Brinson, first col.; USFWS according to Cowardin [1979], remaining cols.)

HGM Class	System	Subsystem	Class	Water Regime	Modifier	% of AA
Riverine	Riverine	Lower Perennial	EM	B	D	70
"	"	"	AB	H	D	20
"	"	"	UB	H	D	10

(Abbreviations: System: Palustrine(P)/ Subsyst.: none/ Classes: Rock Bottom (RB), Unconsolidated bottom (UB), Aquatic Bed (AB), Unconsolidated Shore (US), Moss-lichen Wetland (ML), Emergent Wetland (EM), Scrub-Shrub Wetland (SS), Forested Wetland (FO)/ System: Lacustrine (L)/ Subsyst.: Limnetic (2)/ Classes: RB, UB, AB/ Subsystem: Littoral (4)/ Classes: RB, UB, AB, US, EM/ System: Riverine (R)/ Subsyst.: Lower Perennial (2)/ Classes: RB, UB, AB, US, EM/ Subsystem: Upper Perennial (3)/ Classes: RB, UB, AB, US/ Water Regimes: Permanently Flooded (H), Intermittently Exposed (G), Semipermanently Flooded (F), Seasonally Flooded (C), Saturated (B), Temporarily Flooded (A), Intermittenly Flooded (J) Modifiers: Excavated (E), Impounded (I), Diked (D), Partly Drained (PD), Farmed (F), Artificial (A) HGM Classes: Riverine, Depressional, Slope, Mineral Soil Flats, Organic Soil Flats, Lacustrine Fringe

11. Estimated relative abundance: (of similarly classified sites within the same Major Montana Watershed Basin, see definitions)
(Circle one) Unknown Rare (Common) Abundant
Comments:

12. General condition of AA:
i. Regarding disturbance: (use matrix below to determine [circle] appropriate response)

Conditions within AA	Predominant conditions adjacent to (within 500 feet of) 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 natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings.	moderate disturbance	(moderate disturbance)	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.	high disturbance	high disturbance	high disturbance

Comments: (types of disturbance, intensity, season, etc.): moderate grazing, hay production
ii. Prominent weedy, alien, & introduced species (including those not domesticated, feral): (list) Whitetop, Knapweed, Eurasian milfoil, houndstongue, Canada thistle, Curlycup gumweed, Quackgrass, Kochia, lambsquarters
iii. Provide brief descriptive summary of AA and surrounding land use/habitat:
Constructed wetland where portions were formerly wetland. Includes open water, and wetland veg dominated by herbaceous species. Surrounding land use is crops and grazing.

13. Structural Diversity: (based on number of "Cowardin" *vegetated* classes present [do not include unvegetated classes], see #10 above)

# of "Cowardin" vegetated classes present in AA (see #10)	≥ 3 vegetated classes (or ≥ 2 if one is forested)	2 vegetated classes (or 1 if forested)	≤ 1 vegetated class
Rating (circle)	High	(Moderate)	Low

Comments:

SECTION PERTAINING to FUNCTIONS & VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

I. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (**list species**)	D S	
Secondary habitat (**list species**)	D (S)	Bald Eagle
Incidental habitat (**list species**)	D (S)	
No usable habitat	D S	

II. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Highest Habitat Level	doc./primary	sus/primary	doc./secondary	sus./secondary	doc./incidental	sus./incidental	None
Functional Points and Rating	1 (H)	.9 (H)	.8 (M)	.7 (M)	.5 (L)	.3 (L)	0 (L)

Sources for documented use (e.g. observations, records, etc):

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

I. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (**list species**)	(D) S	Black Tern (S3) Lemmons Alkaligrass (S1), Pelican (S2), Trumpeter Swan,
Secondary habitat (**list species**)	D S	
Incidental habitat (**list species**)	D S	
No usable habitat	D S	

II. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Highest Habitat Level	doc./primary	sus/primary	doc./secondary	sus./secondary	doc./incidental	sus./incidental	None
Functional Points and Rating	1 (H)	.8 (H)	.7 (M)	.6 (M)	.2 (L)	.1 (L)	0 (L)

Sources for documented use (e.g. observations, records, etc.):

14C. General Wildlife Habitat Rating:

I. Evidence of overall wildlife use in the AA (circle substantial, moderate, or low based on supporting evidence):

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

Low (based on any of the following [check]):
- __ 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 the AA

Moderate (based on any of the following [check]):
- __ 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, circle appropriate AA attributes in matrix to arrive at 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 of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms].)

Structural diversity (see #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 #12i)	E	E	E	H	E	E	H	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1 (E)	.9 (H)	.8 (H)	.7 (M)
Moderate	.9 (H)	.7 (M)	.5 (M)	.3 (L)
Minimal	.6 (M)	.4 (M)	.2 (L)	.1 (L)

Comments:

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

i. Habitat Quality (circle appropriate AA attributes in matrix to arrive at 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 such as submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation, etc.	>25%	10–25%	<10%	>25%	10–25%	<10%	>25%	10–25%	<10%
Shading - >75% of streambank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	E	E	H	H	H	M	M	M	M
Shading – 50 to 75% of streambank or shoreline within AA contains rip. or wetland scrub-shrub or forested communities	H	H	M	M	M	M	M	L	L
Shading - < 50% of streambank or shoreline within AA contains rip. or wetland scrub-shrub or forested communities	H	M	M	M	L	L	L	L	L

ii. Modified Habitat Quality (Circle the appropriate response to the following question. If answer is Y, then reduce rating in i above by one level [E = H, H = M, M = L, L = L]). *Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity or is the waterbody included on the MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support?* (Y) N Modified habitat quality rating = (circle) E H M (L)

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function)

Types of fish known or suspected within AA	*Modified Habitat Quality (ii)*			
	Exceptional	High	Moderate	Low
Native game fish	1 (E)	.9 (H)	.7 (M)	.5 (M)
Introduced game fish	.9 (H)	.8 (H)	.6 (M)	.4 (M)
Non-game fish	.7 (M)	.6 (M)	.5 (M)	.3 (L)
No fish	.5 (M)	.3 (L)	.2 (L)	.1 (L)

Comments: Unidentified minnows assumed to be native game fish.

14E. Flood Attenuation: (applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, circle **NA** here and proceed to next function.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] 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**	1(H)	.9(H)	.6(M)	.8(H)	.7(H)	.5(M)	.4(M)	.3(L)	.2(L)
AA contains **unrestricted outlet**	.9(H)	.8(H)	.5(M)	.7(H)	.6(M)	.4(M)	.3(L)	.2(L)	.1(L)

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

Comments: Potentially flooded area is NE of dike along river.

14F. Short and Long Term Surface Water Storage: (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, circle **NA** here and proceed with the evaluation.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			<5, >1 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ≥ **5 out of 10 years**	1(H)	.9(H)	.8(H)	.8(H)	.6(M)	.5(M)	.4(M)	.3(L)	.2(L)
Wetlands in AA flood or pond < **5 out of 10 years**	.9(H)	.8(H)	.7(M)	.7(M)	.5(M)	.4(M)	.3(L)	.2(L)	.1(L)

Comments:

14G. Sediment/Nutrient/Toxicant Retention and Removal: (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, circle **NA** here and proceed with the evaluation.)

I. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function.

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with 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 with 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)	.8 (H)	.7 (M)	.5 (M)	.5 (M)	.4 (M)	.3 (L)	.2 (L)
AA contains **unrestricted outlet**	.9 (H)	.7 (M)	.6 (M)	.4 (M)	.4 (M)	.3 (L)	.2 (L)	.1 (L)

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

14H Sediment/Shoreline Stabilization: (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 which is subject to wave action. If does not apply, circle NA here and proceed to next function)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function.

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses	*Duration of surface water adjacent to rooted vegetation*		
	permanent / perennial	seasonal / intermittent	Temporary / ephemeral
≥ 65%	1 (H)	.9 (H)	.7 (M)
35-64%	.7 (M)	.6 (M)	.5 (M)
< 35%	.3 (L)	.2 (L)	.1 (L)

Comments:

14I. Production Export/Food Chain Support:

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function. Factor A = acreage of vegetated component in the AA; Factor B = structural diversity rating from #13; Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P = permanent/perennial; S/I = seasonal/intermittent; T/E /A= temporary/ephemeral or absent [see instructions for further definitions of these terms].)

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	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1H	.9H	.9H	.8H	.8H	.7M	.9H	.8H	.8H	.7M	.7M	.6M	.7M	.6M	.6M	.4M	.4M	.3L
S/I	.9H	.8H	.8H	.7M	.7M	.6M	.8H	.7M	.7M	.6M	.6M	.5M	.6M	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.7M	.7M	.6M	.6M	.5M	.7M	.6M	.6M	.5M	.5M	.4M	.5M	.4M	.4M	.2L	.2L	.1L

Comments:

14J. Groundwater Discharge/Recharge: (Check the indicators in i & ii below that apply to the AA)

i. Discharge Indicators

- X Springs are known or observed
- X Vegetation growing during dormant season/drought
- ___Wetland occurs at the toe of a natural slope
- ___Seeps are present at the wetland edge
- X AA permanently flooded during drought periods
- X Wetland contains an outlet, but no inlet
- ___Other

ii. Recharge Indicators

- X Permeable substrate present without underlying impeding layer
- ___Wetland contains inlet but no outlet
- ___Other

iii. Rating: Use the information from i and ii above and the table below to arrive at [circle] the functional points and rating [H = high, L = low] for this function.

Criteria	*Functional Points and Rating*
AA is known Discharge/Recharge area or one or more indicators of D/R present	1 (H)
No Discharge/Recharge indicators present	.1 (L)
Available Discharge/Recharge information inadequate to rate AA D/R potential	N/A (Unknown)

Comments:

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] 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 MNHP			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MNHP			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1 (H)	.9 (H)	.8 (H)	.8 (H)	.6 (M)	.5 (M)	.5 (M)	.4 (M)	.3 (L)
Moderate disturbance at AA (#12i)	.9 (H)	.8 (H)	.7 (M)	.7 (M)	.5 (M)	.4 (M)	.4 (M)	.3 (L)	.2 (L)
High disturbance at AA (#12i)	.8 (H)	.7 (M)	.6 (M)	.6 (M)	.4 (M)	.3 (L)	.3 (L)	.2 (L)	.1 (L)

Comments:

14L. Recreation/Education Potential: i. Is the AA a known rec./ed. site: (circle) Y N (if yes, rate as [circle] High [1] and go to ii; if no go to iii)

ii. Check categories that apply to the AA: X Educational/scientific study; X Consumptive rec.; X Non-consumptive rec.; ___Other

iii. Based on the location, diversity, size, and other site attributes, is there strong potential for rec./ed. use? (Y) N
(If yes, go to ii, then proceed to iv; if no, then rate as [circle] Low [0.1])

iv. Rating (use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function.

Ownership	*Disturbance at AA (#12i)*		
	low	moderate	high
public ownership	1 (H)	.5 (M)	.2 (L)
private ownership	.7 (M)	.3 (L)	.1 (L)

Comments:

FUNCTION & VALUE SUMMARY & OVERALL RATING

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units; (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	M	.7	1	
B. MT Natural Heritage Program Species Habitat	H	1	1	
C. General Wildlife Habitat	E	1	1	
D. General Fish/Aquatic Habitat	M	.5	1	
E. Flood Attenuation	M	.5	1	
F. Short and Long Term Surface Water Storage	H	1	1	
G. Sediment/Nutrient/Toxicant Removal	H	1	1	
H. Sediment/Shoreline Stabilization	L	.3	1	
I. Production Export/Food Chain Support	H	1	1	
J. Groundwater Discharge/Recharge	H	1	1	
K. Uniqueness	M	.5	1	
L. Recreation/Education Potential	L	.3	1	
Totals:		8.6	12	

= 73%

OVERALL ANALYSIS AREA (AA) RATING: (Circle appropriate category based on the criteria outlined below) I (II) III IV

Category I Wetland: (Must satisfy **one** of the following criteria; if does not meet criteria, go 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**
- ___ Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; if not satisfied, go to Category IV)
- X Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
- X 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**
- X Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

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 does not satisfy criteria go to Category III)
- ___ "Low" rating for Uniqueness; **and**
- ___ "Low" rating for Production Export/Food Chain Support; **and**
- ___ Total actual functional points < 30% (round to nearest whole #) of total possible functional points

Montana Department of Transportation		Project Name	Beaverhead
Wetland Mitigation Monitoring Project		Project/task number	#1
for		Date	8/15/01
Land and Water Consulting		Field Personnel	
		Note	
2001		Rhithron Sample Identification	22
Coelenterata		*Hydra*	
Oligochaeta	Enchytraeidae	Enchytraeidae	
	Naididae	*Chaetogaster*	
		Nais elinguis	
		Nais variabilis	
		Ophidonais serpentina	
	Tubificidae	Tubificidae - immature	
		Limnodrilus hoffmeisteri	
Hirudinea	Erpobdellidae	*Mooreobdella microstoma*	
		Nephelopsis	
	Glossiphoniidae	*Helobdella stagnalis*	
		Helobdella	
		Glossiphonia	
Bivalvia	Sphaeriidae	*Sphaerium*	
Gastropoda	Lymnaeidae	*Fossaria*	
	Physidae	*Physa*	5
	Planorbidae	*Gyraulus*	17
		Helisoma	
Crustacea	Cladocera	Cladocera	7
	Copepoda	Calanoida	
		Cyclopoida	3
	Ostracoda	Ostracoda	48
	Amphipoda	*Gammarus*	
		Hyalella azteca	61
	Decapoda	*Orconectes*	2
Acarina		Acari	2
Odonata	Aeshnidae	*Anax*	
	Libellulidae	Libellulidae-early instar	
		Sympetrum	
	Coenagrionidae	Coenagrionidae-early instar	7
		Enallagma	
	Lestidae	*Lestes*	
Ephemeroptera	Baetidae	*Callibaetis*	9
	Caenidae	*Caenis*	70
Hemiptera	Corixidae	Corixidae - immature	
		Hesperocorixa	
		Sigara	
		Trichocorixa	
	Nepidae	*Ranatra*	
	Notonectidae	*Notonecta*	5
Trichoptera	Hydroptilidae	Hydroptilidae - pupa	
	Leptoceridae	Leptoceridae - early instar	
		Mystacides	
		Ylodes	
Coleoptera	Chrysomelidae	Chrysomelidae	
	Curculionidae	*Bagous*	
	Dytiscidae	*Acilius*	
		Hydroporinae - early instar larvae	
		Hygrotus	
		Liodessus	
		Laccophilus	1
		Neoporus	
	Elmidae	*Heterlimnius*	
	Haliplidae	*Haliplus*	2
		Peltodytes	
	Hydrophilidae	*Berosus*	
		Helophorus	
		Hydrobius	
		Hydrochara	
		Laccobius	
		Tropisternus	

Beaverhead #1. The assessment method used here implies that biological conditions are sub-optimal at this site. Low Chironomid taxa richness suggests monotonous substrates. The biotic index value is higher than expected; water quality may be mildly impaired by nutrients or elevated water temperature or both.

Diptera	Ceratopogoninae	*Bezzia/Palpomyia*	
		Dasyhelea	1
	Chaoboridae	*Chaoborus*	
	Culicidae	*Anopheles*	
		Culex	
	Ephydridae	Ephydridae	
	Simuliidae	*Simulium*	
	Sciomyzidae	Sciomyzidae	
	Stratiomyidae	*Odontomyia*	
	Chironomidae	*Acricotopus*	
		Chironomus	
		Cladotanytarsus	1
		Corynoneura	
		Cryptotendipes	
		Dicrotendipes	
		Einfeldia	
		Endochironomus	
		Labrundinia	
		Microtendipes	
		Orthocladius annectens	
		Parachironomus	
		Paramerina	
		Paratanytarsus	1
		Phaenopsectra	
		Polypedilum	
		Procladius	
		Psectrocladius	
		Psectrotanypus	
		Pseudochironomus	
		Tanypus	
		Tanytarsus	1
		TOTAL	243
		grids	8

Total taxa	18
POET	3
Chironomidae taxa	3
Crustacea taxa + Mollusca taxa	4
% Chironomidae	1.234567901
Orthocladiinae/Chironomidae	0
%Amphipoda	25.10288066
%Crustacea + %Mollusca	34.97942387
HBI	7.543209877
%Dominant taxon	28.80658436
%Collector-Gatherers	81.89300412
%Filterers	3.29218107

Total taxa	3
POET	3
Chironomidae taxa	3
Crustacea taxa + Mollusca taxa	5
% Chironomidae	3
Orthocladiinae/Chironomidae	1
%Amphipoda	1
%Crustacea + %Mollusca	1
HBI	1
%Dominant taxon	3
%Collector-Gatherers	3
%Filterers	1

site score	28

Montana Department of Transportation		Project Name	Beaverhead
Wetland Mitigation Monitoring Project		Project/task number	#2
for		Date	8/16/01
Land and Water Consulting		Field Personnel	
		Note	
2001		Rhithron Sample Identification	7
Coelenterata		*Hydra*	
Oligochaeta	Enchytraeidae	Enchytraeidae	
	Naididae	*Chaetogaster*	2
		Nais elinguis	
		Nais variabilis	1
		Ophidonais serpentina	
	Tubificidae	Tubificidae - immature	
		Limnodrilus hoffmeisteri	
Hirudinea	Erpobdellidae	*Mooreobdella microstoma*	
		Nephelopsis	
	Glossiphoniidae	*Helobdella stagnalis*	
		Helobdella	
		Glossiphonia	
Bivalvia	Sphaeriidae	*Sphaerium*	
Gastropoda	Lymnaeidae	*Fossaria*	
	Physidae	*Physa*	16
	Planorbidae	*Gyraulus*	17
		Helisoma	
Crustacea	Cladocera	Cladocera	16
	Copepoda	Calanoida	
		Cyclopoida	8
	Ostracoda	Ostracoda	44
	Amphipoda	*Gammarus*	
		Hyalella azteca	53
	Decapoda	*Orconectes*	
Acarina		Acari	4
Odonata	Aeshnidae	*Anax*	
	Libellulidae	Libellulidae-early instar	
		Sympetrum	
	Coenagrionidae	Coenagrionidae-early instar	1
		Enallagma	1
	Lestidae	*Lestes*	
Ephemeroptera	Baetidae	*Callibaetis*	7
	Caenidae	*Caenis*	40
Hemiptera	Corixidae	Corixidae - immature	4
		Hesperocorixa	
		Sigara	
		Trichocorixa	
	Nepidae	*Ranatra*	
	Notonectidae	*Notonecta*	
Trichoptera	Hydroptilidae	Hydroptilidae - pupa	
	Leptoceridae	Leptoceridae - early instar	
		Mystacides	
		Ylodes	
Coleoptera	Chrysomelidae	Chrysomelidae	
	Curculionidae	*Bagous*	
	Dytiscidae	*Acilius*	
		Hydroporinae - early instar larvae	
		Hygrotus	
		Liodessus	3
		Laccophilus	
		Neoporus	
	Elmidae	*Heterlimnius*	
	Haliplidae	*Haliplus*	1
		Peltodytes	
	Hydrophilidae	*Berosus*	
		Helophorus	
		Hydrobius	2
		Hydrochara	
		Laccobius	
		Tropisternus	

Beaverhead #2. The method applied in this study suggests near-optimal biologic conditions. Low Chironomid taxa richness suggests monotonous substrates, but moderately high taxa richness indicates availability of plentiful habitats of other kinds.

Diptera	Ceratopogoninae	*Bezzia/Palpomyia*	1
		Dasyhelea	4
	Chaoboridae	*Chaoborus*	
	Culicidae	*Anopheles*	
		Culex	
	Ephydridae	Ephydridae	
	Simuliidae	*Simulium*	
	Sciomyzidae	Sciomyzidae	
	Stratiomyidae	*Odontomyia*	
	Chironomidae	*Acricotopus*	
		Chironomus	
		Cladotanytarsus	1
		Corynoneura	
		Cryptotendipes	
		Dicrotendipes	
		Einfeldia	
		Endochironomus	
		Labrundinia	
		Microtendipes	
		Orthocladius annectens	
		Parachironomus	
		Paramerina	
		Paratanytarsus	
		Phaenopsectra	
		Polypedilum	
		Procladius	
		Psectrocladius	
		Psectrotanypus	
		Pseudochironomus	1
		Tanypus	
		Tanytarsus	
		TOTAL	227
		grids	6.5

Total taxa	21
POET	4
Chironomidae taxa	2
Crustacea taxa + Mollusca taxa	3
% Chironomidae	0.881057269
Orthocladiinae/Chironomidae	0
%Amphipoda	23.34801762
%Crustacea + %Mollusca	37.88546256
HBI	7.511013216
%Dominant taxon	23.34801762
%Collector-Gatherers	76.65198238
%Filterers	7.488986784

Total taxa	5
POET	3
Chironomidae taxa	3
Crustacea taxa + Mollusca taxa	5
% Chironomidae	3
Orthocladiinae/Chironomidae	1
%Amphipoda	1
%Crustacea + %Mollusca	1
HBI	3
%Dominant taxon	5
%Collector-Gatherers	3
%Filterers	1
site score	34

Montana Department of Transportation		Project Name	Beaverhead	
Wetland Mitigation Monitoring Project		Project/task number	#3	
for		Date		8/16/01
Land and Water Consulting		Field Personnel		
		Note		
2001		Rhithron Sample Identification		4
Coelenterata		*Hydra*		
Oligochaeta	Enchytraeidae	Enchytraeidae		
	Naididae	*Chaetogaster*		
		Nais elinguis		
		Nais variabilis		29
		Ophidonais serpentina		
	Tubificidae	Tubificidae - immature		
		Limnodrilus hoffmeisteri		
Hirudinea	Erpobdellidae	*Mooreobdella microstoma*		
		Nephelopsis		
	Glossiphoniidae	*Helobdella stagnalis*		
		Helobdella		
		Glossiphonia		
Bivalvia	Sphaeriidae	*Sphaerium*		
Gastropoda	Lymnaeidae	*Fossaria*		1
	Physidae	*Physa*		
	Planorbidae	*Gyraulus*		
		Helisoma		
Crustacea	Cladocera	Cladocera		
	Copepoda	Calanoida		
		Cyclopoida		1
	Ostracoda	Ostracoda		
	Amphipoda	*Gammarus*		
		Hyalella azteca		8
	Decapoda	*Orconectes*		
Acarina		Acari		
Odonata	Aeshnidae	*Anax*		
	Libellulidae	Libellulidae-early instar		
		Sympetrum		
	Coenagrionidae	Coenagrionidae-early instar		8
		Enallagma		
	Lestidae	*Lestes*		
Ephemeroptera	Baetidae	*Callibaetis*		
	Caenidae	*Caenis*		
Hemiptera	Corixidae	Corixidae - immature		
		Hesperocorixa		
		Sigara		
		Trichocorixa		
	Nepidae	*Ranatra*		
	Notonectidae	*Notonecta*		
Trichoptera	Hydroptilidae	Hydroptilidae - pupa		
	Leptoceridae	Leptoceridae - early instar		
		Mystacides		
		Ylodes		
Coleoptera	Chrysomelidae	Chrysomelidae		
	Curculionidae	*Bagous*		
	Dytiscidae	*Acilius*		
		Hydroporinae - early instar larvae		
		Hygrotus		
		Liodessus		
		Laccophilus		
		Neoporus		
	Elmidae	*Heterlimnius*		
	Haliplidae	*Haliplus*		1
		Peltodytes		
	Hydrophilidae	*Berosus*		
		Helophorus		1
		Hydrobius		
		Hydrochara		
		Laccobius		
		Tropisternus		

Beaverhead #3. Near-optimal biologic condition was suggested by the assessment scores. The site seems to manifest different habitat conditions as well as water quality conditions than the other Beaverhead sites: the biotic index score suggests less saprobity or cooler temperatures, and a high Chironomid richness suggests diverse benthic habitats. Interestingly, the sample was not dominated by Amphipods, as were most of the other Beaverhead site samples. A high proportion of Amphipods has been shown to be a positive correlate of alkalinity (Apfelbeck 1996). Taxonomic composition of the sample suggests that macrophytes may be sparse or lacking at this site.

Diptera	Ceratopogoninae	*Bezzia/Palpomyia*	1
		Dasyhelea	
	Chaoboridae	*Chaoborus*	
	Culicidae	*Anopheles*	
		Culex	
	Ephydridae	Ephydridae	6
	Simuliidae	*Simulium*	
	Sciomyzidae	Sciomyzidae	
	Stratiomyidae	*Odontomyia*	
	Chironomidae	*Acricotopus*	4
		Chironomus	
		Cladotanytarsus	
		Corynoneura	
		Cryptotendipes	
		Dicrotendipes	11
		Einfeldia	
		Endochironomus	
		Labrundinia	
		Microtendipes	
		Orthocladius annectens	124
		Parachironomus	
		Paramerina	
		Paratanytarsus	
		Phaenopsectra	2
		Polypedilum	
		Procladius	
		Psectrocladius	3
		Psectrotanypus	1
		Pseudochironomus	
		Tanypus	
		Tanytarsus	1
		TOTAL	202
		grids	3

Total taxa	16
POET	1
Chironomidae taxa	7
Crustacea taxa + Mollusca taxa	2
% Chironomidae	72.27722772
Orthocladiinae/Chironomidae	89.7260274
%Amphipoda	3.96039604
%Crustacea + %Mollusca	4.455445545
HBI	6.584158416
%Dominant taxon	61.38613861
%Collector-Gatherers	93.06930693
%Filterers	0

Total taxa	3
POET	1
Chironomidae taxa	5
Crustacea taxa + Mollusca taxa	3
% Chironomidae	1
Orthocladiinae/Chironomidae	3
%Amphipoda	3
%Crustacea + %Mollusca	3
HBI	3
%Dominant taxon	1
%Collector-Gatherers	5
%Filterers	3

site score	34

Montana Department of Transportation Wetland Mitigation Monitoring Project for Land and Water Consulting 2001		Project Name Project/task number Date Field Personnel Note Rhithron Sample Identification	Beaverhead #4 BD 8/16/01 3
Coelenterata		*Hydra*	
Oligochaeta	Enchytraeidae	Enchytraeidae	
	Naididae	*Chaetogaster*	
		Nais elinguis	
		Nais variabilis	
		Ophidonais serpentina	
	Tubificidae	Tubificidae - immature	
		Limnodrilus hoffmeisteri	
Hirudinea	Erpobdellidae	*Mooreobdella microstoma*	
		Nephelopsis	
	Glossiphoniidae	*Helobdella stagnalis*	
		Helobdella	
		Glossiphonia	
Bivalvia	Sphaeriidae	*Sphaerium*	
Gastropoda	Lymnaeidae	*Fossaria*	5
	Physidae	*Physa*	2
	Planorbidae	*Gyraulus*	5
		Helisoma	
Crustacea	Cladocera	Cladocera	5
	Copepoda	Calanoida	
		Cyclopoida	
	Ostracoda	Ostracoda	59
	Amphipoda	*Gammarus*	
		Hyalella azteca	72
	Decapoda	*Orconectes*	
Acarina		Acari	1
Odonata	Aeshnidae	*Anax*	
	Libellulidae	Libellulidae-early instar	1
		Sympetrum	
	Coenagrionidae	Coenagrionidae-early instar	5
		Enallagma	
	Lestidae	*Lestes*	
Ephemeroptera	Baetidae	*Callibaetis*	1
	Caenidae	*Caenis*	18
Hemiptera	Corixidae	Corixidae - immature	
		Hesperocorixa	
		Sigara	
		Trichocorixa	
	Nepidae	*Ranatra*	
	Notonectidae	*Notonecta*	
Trichoptera	Hydroptilidae	Hydroptilidae - pupa	
	Leptoceridae	Leptoceridae - early instar	
		Mystacides	
		Ylodes	
Coleoptera	Chrysomelidae	Chrysomelidae	
	Curculionidae	*Bagous*	
	Dytiscidae	*Acilius*	
		Hydroporinae - early instar larvae	
		Hygrotus	
		Liodessus	
		Laccophilus	1
		Neoporus	
	Elmidae	*Heterlimnius*	
	Haliplidae	*Haliplus*	11
		Peltodytes	
	Hydrophilidae	*Berosus*	
		Helophorus	
		Hydrobius	
		Hydrochara	
		Laccobius	
		Tropisternus	

Beaverhead #4. The approach employed in this study suggests sub-optimal biologic condition at this site. Taxa richness is somewhat lower than expected, and there are relatively few midge taxa; this suggests that benthic and other habitats may be monotonous. The biotic index is high, implying warm water temperatures or abundant nutrients or both.

Diptera	Ceratopogoninae	*Bezzia/Palpomyia*	1
		Dasyhelea	
	Chaoboridae	*Chaoborus*	
	Culicidae	*Anopheles*	
		Culex	
	Ephydridae	Ephydridae	
	Simuliidae	*Simulium*	
	Sciomyzidae	Sciomyzidae	
	Stratiomyidae	*Odontomyia*	
	Chironomidae	*Acricotopus*	
		Chironomus	15
		Cladotanytarsus	
		Corynoneura	
		Cryptotendipes	
		Dicrotendipes	
		Einfeldia	
		Endochironomus	
		Labrundinia	
		Microtendipes	
		Orthocladius annectens	4
		Parachironomus	
		Paramerina	1
		Paratanytarsus	
		Phaenopsectra	
		Polypedilum	
		Procladius	
		Psectrocladius	
		Psectrotanypus	
		Pseudochironomus	
		Tanypus	2
		Tanytarsus	
		TOTAL	209
		grids	4

Total taxa	18
POET	4
Chironomidae taxa	4
Crustacea taxa + Mollusca taxa	4
% Chironomidae	10.52631579
Orthocladiinae/Chironomidae	18.18181818
%Amphipoda	34.44976077
%Crustacea + %Mollusca	40.19138756
HBI	7.736842105
%Dominant taxon	34.44976077
%Collector-Gatherers	84.21052632
%Filterers	2.392344498

Total taxa	3
POET	3
Chironomidae taxa	3
Crustacea taxa + Mollusca taxa	5
% Chironomidae	1
Orthocladiinae/Chironomidae	3
%Amphipoda	1
%Crustacea + %Mollusca	1
HBI	1
%Dominant taxon	3
%Collector-Gatherers	5
%Filterers	1

site score	30

Montana Department of Transportation Wetland Mitigation Monitoring Project for Land and Water Consulting		Project Name	Beaverhead
		Project/task number	#5
		Date	8/16/01
		Field Personnel	
		Note	
2001		Rhithron Sample Identification	26
Coelenterata		*Hydra*	
Oligochaeta	Enchytraeidae	Enchytraeidae	
	Naididae	*Chaetogaster*	
		Nais elinguis	
		Nais variabilis	
		Ophidonais serpentina	
	Tubificidae	Tubificidae - immature	
		Limnodrilus hoffmeisteri	1
Hirudinea	Erpobdellidae	*Mooreobdella microstoma*	
		Nephelopsis	
	Glossiphoniidae	*Helobdella stagnalis*	
		Helobdella	
		Glossiphonia	
Bivalvia	Sphaeriidae	*Sphaerium*	
Gastropoda	Lymnaeidae	*Fossaria*	
	Physidae	*Physa*	9
	Planorbidae	*Gyraulus*	22
		Helisoma	
Crustacea	Cladocera	Cladocera	
	Copepoda	Calanoida	
		Cyclopoida	
	Ostracoda	Ostracoda	5
	Amphipoda	*Gammarus*	4
		Hyalella azteca	158
	Decapoda	*Orconectes*	
Acarina		Acari	2
Odonata	Aeshnidae	*Anax*	
	Libellulidae	Libellulidae-early instar	
		Sympetrum	
	Coenagrionidae	Coenagrionidae-early instar	1
		Enallagma	
	Lestidae	*Lestes*	
Ephemeroptera	Baetidae	*Callibaetis*	1
	Caenidae	*Caenis*	2
Hemiptera	Corixidae	Corixidae - immature	3
		Hesperocorixa	
		Sigara	
		Trichocorixa	
	Nepidae	*Ranatra*	
	Notonectidae	*Notonecta*	
Trichoptera	Hydroptilidae	Hydroptilidae - pupa	
	Leptoceridae	Leptoceridae - early instar	2
		Mystacides	
		Ylodes	
Coleoptera	Chrysomelidae	Chrysomelidae	
	Curculionidae	*Bagous*	
	Dytiscidae	*Acilius*	
		Hydroporinae - early instar larvae	
		Hygrotus	7
		Liodessus	
		Laccophilus	
		Neoporus	
	Elmidae	*Heterlimnius*	
	Haliplidae	*Haliplus*	3
		Peltodytes	
	Hydrophilidae	*Berosus*	
		Helophorus	
		Hydrobius	
		Hydrochara	
		Laccobius	
		Tropisternus	

Beaverhead #5. Scores suggest poor biologic conditions at this site. The sample was overwhelmed by the tolerant amphipod *Hyallela azteca* and the biotic index is elevated. These findings suggest that water quality may be moderately impaired by warm temperatures or nutrients, or both.

Diptera	Ceratopogoninae	*Bezzia/Palpomyia*	6
		Dasyhelea	
	Chaoboridae	*Chaoborus*	
	Culicidae	*Anopheles*	
		Culex	
	Ephydridae	Ephydridae	
	Simuliidae	*Simulium*	
	Sciomyzidae	Sciomyzidae	1
	Stratiomyidae	*Odontomyia*	
	Chironomidae	*Acricotopus*	
		Chironomus	1
		Cladotanytarsus	7
		Corynoneura	
		Cryptotendipes	
		Dicrotendipes	1
		Einfeldia	
		Endochironomus	
		Labrundinia	
		Microtendipes	
		Orthocladius annectens	
		Parachironomus	
		Paramerina	
		Paratanytarsus	
		Phaenopsectra	
		Polypedilum	
		Procladius	
		Psectrocladius	
		Psectrotanypus	
		Pseudochironomus	
		Tanypus	
		Tanytarsus	2
		TOTAL	238
		grids	8

Total taxa	20
POET	4
Chironomidae taxa	4
Crustacea taxa + Mollusca taxa	4
% Chironomidae	4.621848739
Orthocladiinae/Chironomidae	0
%Amphipoda	68.06722689
%Crustacea + %Mollusca	81.09243697
HBI	7.617647059
%Dominant taxon	66.38655462
%Collector-Gatherers	77.31092437
%Filterers	2.941176471

Total taxa	3
POET	3
Chironomidae taxa	3
Crustacea taxa + Mollusca taxa	5
% Chironomidae	3
Orthocladiinae/Chironomidae	1
%Amphipoda	1
%Crustacea + %Mollusca	1
HBI	1
%Dominant taxon	1
%Collector-Gatherers	3
%Filterers	1
site score	26

Montana Department of Transportation		Project Name	Beaverhead
Wetland Mitigation Monitoring Project		Project/task number	#6
for		Date	8/16/01
Land and Water Consulting		Field Personnel	
		Note	
2001		Rhithron Sample Identification	5
Coelenterata		*Hydra*	
Oligochaeta	Enchytraeidae	Enchytraeidae	
	Naididae	*Chaetogaster*	
		Nais elinguis	
		Nais variabilis	
		Ophidonais serpentina	
	Tubificidae	Tubificidae - immature	
		Limnodrilus hoffmeisteri	
Hirudinea	Erpobdellidae	*Mooreobdella microstoma*	
		Nephelopsis	
	Glossiphoniidae	*Helobdella stagnalis*	
		Helobdella	
		Glossiphonia	
Bivalvia	Sphaeriidae	*Sphaerium*	
Gastropoda	Lymnaeidae	*Fossaria*	
	Physidae	*Physa*	1
	Planorbidae	*Gyraulus*	12
		Helisoma	
Crustacea	Cladocera	Cladocera	
	Copepoda	Calanoida	
		Cyclopoida	
	Ostracoda	Ostracoda	8
	Amphipoda	*Gammarus*	114
		Hyalella azteca	84
	Decapoda	*Orconectes*	
Acarina		Acari	3
Odonata	Aeshnidae	*Anax*	
	Libellulidae	Libellulidae-early instar	
		Sympetrum	
	Coenagrionidae	Coenagrionidae-early instar	1
		Enallagma	
	Lestidae	*Lestes*	
Ephemeroptera	Baetidae	*Callibaetis*	
	Caenidae	*Caenis*	7
Hemiptera	Corixidae	Corixidae - immature	1
		Hesperocorixa	
		Sigara	
		Trichocorixa	
	Nepidae	*Ranatra*	
	Notonectidae	*Notonecta*	
Trichoptera	Hydroptilidae	Hydroptilidae - pupa	
	Leptoceridae	Leptoceridae - early instar	
		Mystacides	
		Ylodes	
Coleoptera	Chrysomelidae	Chrysomelidae	
	Curculionidae	*Bagous*	
	Dytiscidae	*Acilius*	
		Hydroporinae - early instar larvae	
		Hygrotus	
		Liodessus	
		Laccophilus	
		Neoporus	
	Elmidae	*Heterlimnius*	
	Haliplidae	*Haliplus*	
		Peltodytes	
	Hydrophilidae	*Berosus*	
		Helophorus	
		Hydrobius	
		Hydrochara	
		Laccobius	
		Tropisternus	

Beaverhead #6. Sub-optimal biotic conditions are suggested by metric scores. Taxa richness is very low, and not a single Chironomid was present in the sample. This may indicate depauperate habitat conditions at this site, though taxonomic composition suggests the presence of macrophytes. The biotic index value is low, and the dominant amphipod is the less tolerant *Gammarus* sp. Water quality may be better here than at most other Beaverhead sites.

Diptera	Ceratopogoninae	*Bezzia/Palpomyia*
		Dasyhelea
	Chaoboridae	*Chaoborus*
	Culicidae	*Anopheles*
		Culex
	Ephydridae	Ephydridae
	Simuliidae	*Simulium*
	Sciomyzidae	Sciomyzidae
	Stratiomyidae	*Odontomyia*
	Chironomidae	*Acricotopus*
		Chironomus
		Cladotanytarsus
		Corynoneura
		Cryptotendipes
		Dicrotendipes
		Einfeldia
		Endochironomus
		Labrundinia
		Microtendipes
		Orthocladius annectens
		Parachironomus
		Paramerina
		Paratanytarsus
		Phaenopsectra
		Polypedilum
		Procladius
		Psectrocladius
		Psectrotanypus
		Pseudochironomus
		Tanypus
		Tanytarsus

TOTAL	231
grids	4

Total taxa	9
POET	2
Chironomidae taxa	0
Crustacea taxa + Mollusca taxa	4
% Chironomidae	0
Orthocladiinae/Chironomidae	#DIV/0!
%Amphipoda	85.71428571
%Crustacea + %Mollusca	91.34199134
HBI	6.41991342
%Dominant taxon	49.35064935
%Collector-Gatherers	92.64069264
%Filterers	0

Total taxa	1
POET	3
Chironomidae taxa	1
Crustacea taxa + Mollusca taxa	5
% Chironomidae	3
Orthocladiinae/Chironomidae	1
%Amphipoda	1
%Crustacea + %Mollusca	1
HBI	3
%Dominant taxon	1
%Collector-Gatherers	5
%Filterers	3

site score	28

Appendix C

REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Beaverhead Gateway
Dillon, Montana

LAND & WATER

Photo Point 1: View towards wetland, 300° northwest.

Photo Point 1: View towards upland, 120° southeast.

Photo Point 3: View northeast, 45°.

Photo Point 3: Transect 1, end view looking toward start, 225° southwest.

Photo Point 4: View of wetland, 40° southwest. Also, beginning of Transect 1.

Photo Point 5: View of wetland 45°, northeast.

Photo Point 6: View northeast, 40° along Charlton Slough.

Photo Point 7: View from Transect 2 start, 350° north.

Photo Point 7: Eroding dike east of photo point 7.

Photo Point 8: View from Transect 2 end, 170° south.

Photo Point 9: View southeast 150°.

Photo Point 9: View west 270°.

Photo Point 2 Panorama: Eastern view, 40° - 300°.

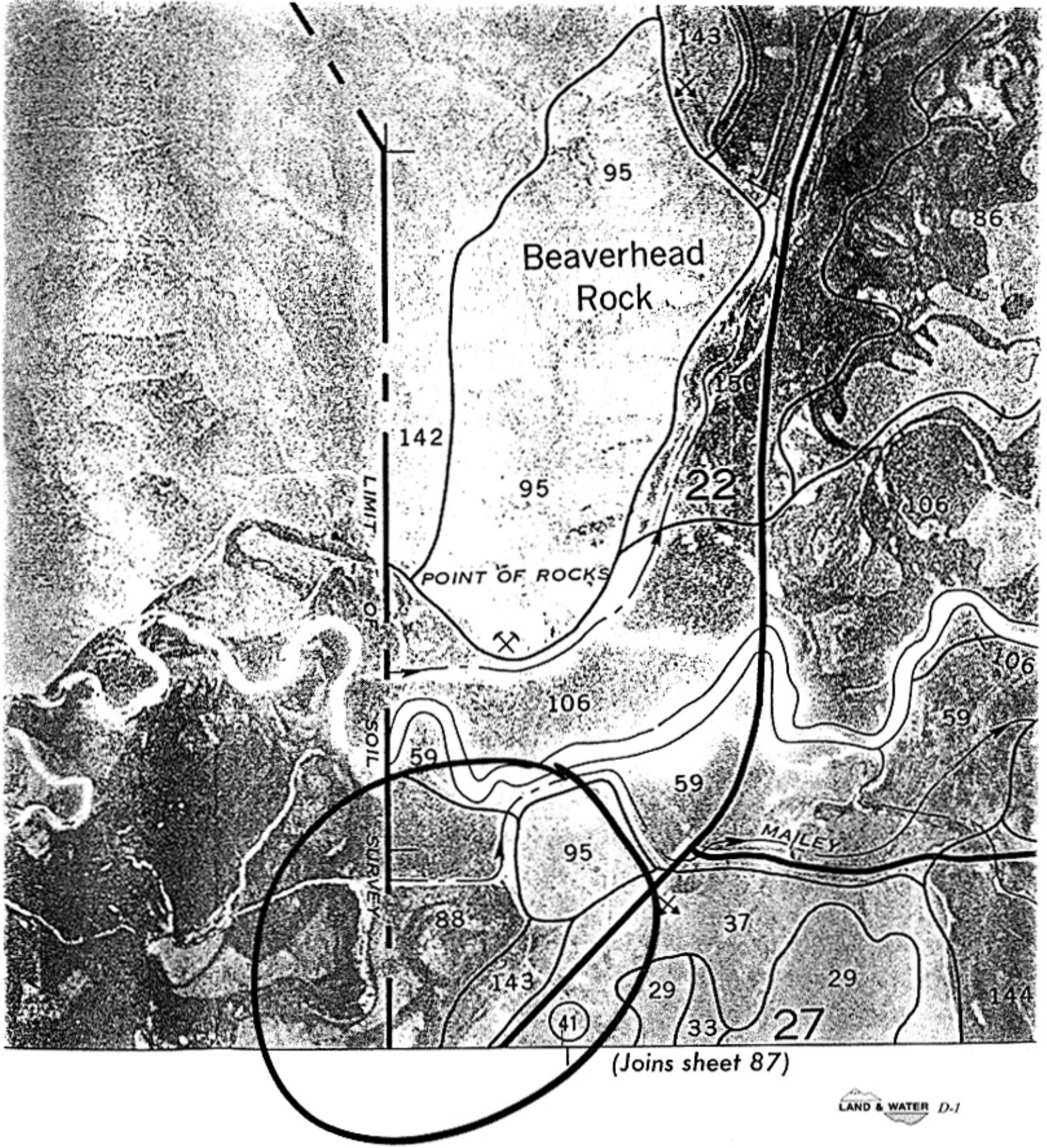
Photo Point 2 Panorama: Western portion, 300° - 220°.

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)

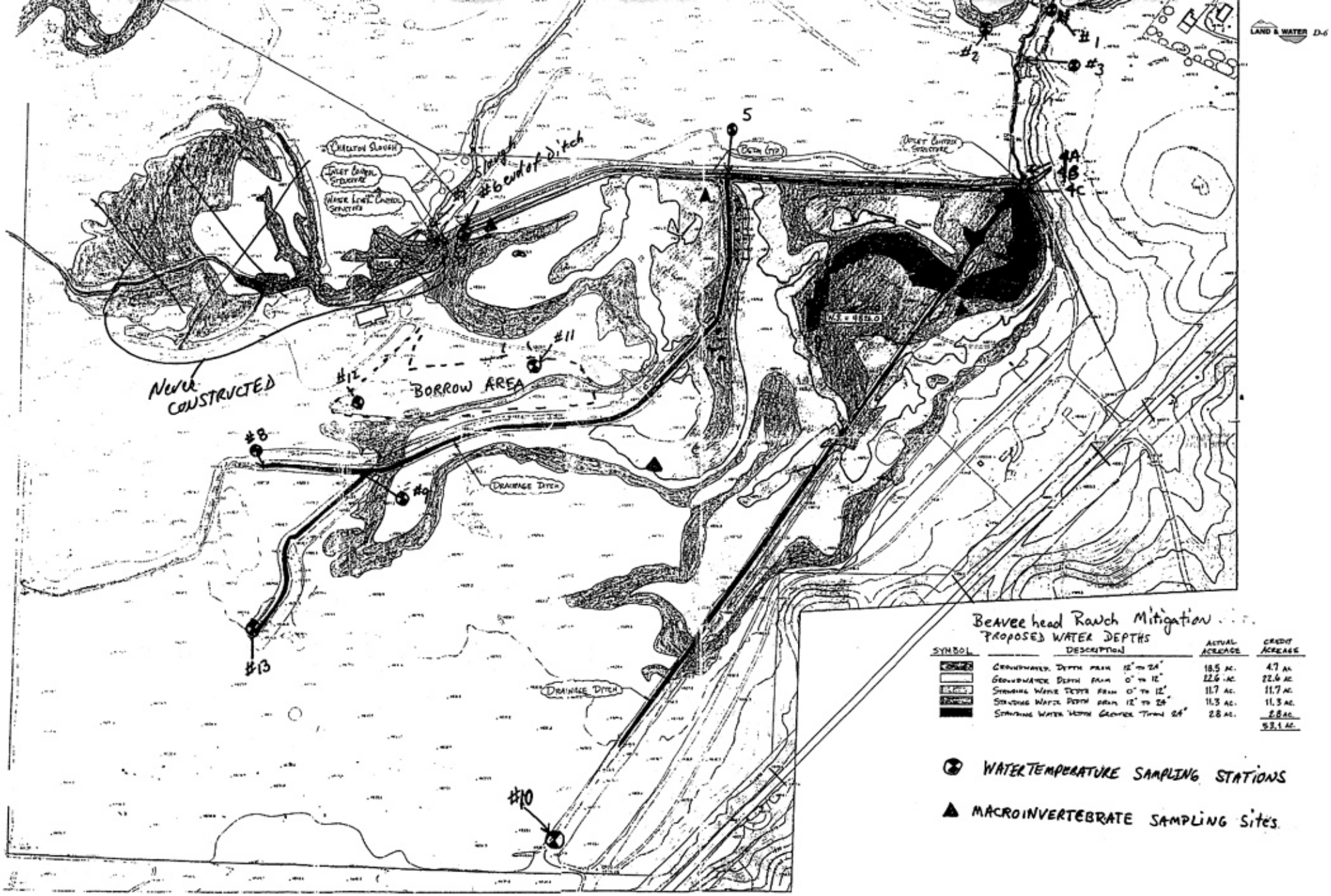
Dippers:
American Dipper

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
CHELATON SLOUGH
INLET CONTROL STRUCTURE
WEIR LEVEL CONTROL STRUCTURE
Slough
#6 end of ditch
W.S. ELEV. 0.0
#11
#12
BORROW AREA
NEVER CONSTRUCTED
#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
MACROINVERTEBRATE 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.

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.

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.