MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2001

Musgrave Lake
Zurich, 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: 130091.019

MONTANA DEPARTMENT OF TRANSPORTATION

WETLAND MITIGATION MONITORING REPORT:

YEAR 2001

Musgrave Lake
Zurich, 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: 130091.019

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

The Musgrave Lake wetland mitigation project was constructed in late 2000/early 2001 in Watershed 11 (Milk River). It is anticipated that this site will compensate for wetland impacts resulting from several proposed Montana Department of Transportation (MDT) highway and bridge reconstruction projects along the U.S. Highway 2 corridor between Havre and Harlem. Constructed on private land in the MDT Great Falls District, the mitigation site is located approximately four miles south of Zurich and the U.S. Highway 2 corridor within 0.25 mile of the Milk River in Blaine County (**Figure 1**). The goal of the project is to restore hydrology via construction of ditch plugs in natural drained wetland basins and historic oxbow sections, providing approximately 27 acres of wetland credit within the confines of a 100-acre conservation easement.

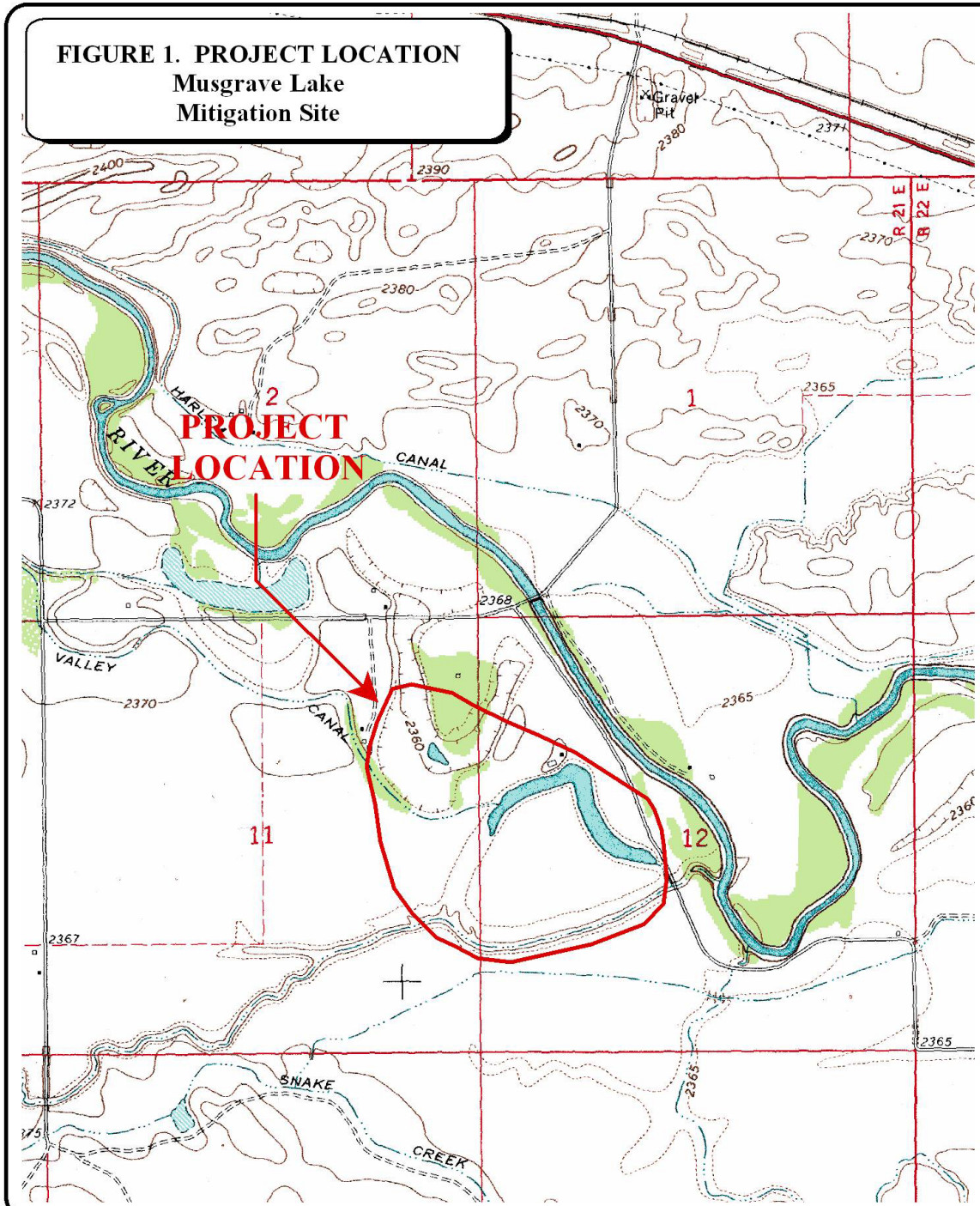
The approximate site boundary is illustrated on **Figure 2** (**Appendix A**), and the original conceptual layout is provided in **Appendix D**. The project is comprised of two "restoration" sites and two "enhancement" sites. Restoration Site 1 (RS1) occurs in a basin in the northwest corner of the mitigation area. Restoration Site 2 (RS2) occurs within a drained and farmed historic oxbow section of Musgrave Lake located along the south property boundary. Wetland hydrology in these areas is to be supplied by precipitation, surface runoff, and possibly groundwater, and is anticipated to result in maximum depths of 3-3.5 feet and 1-1.5 feet at RS1 and RS2, respectively.

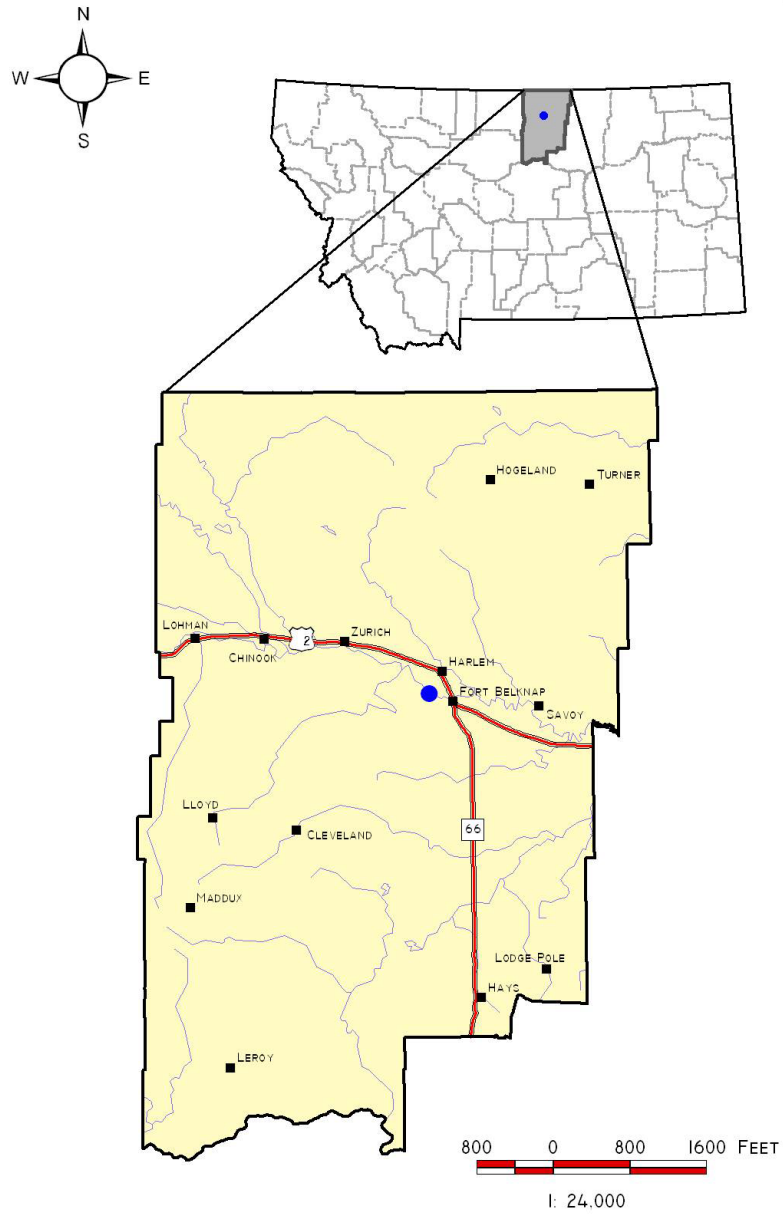
Approximately 4.6 acres of impaired, low-quality wetlands were delineated by MDT at RS1 prior to project implementation. However, given the restoration of hydrology, the Corps of Engineers (COE) has approved allocation of 1:1 credit at the two basins, inclusive of these existing impaired wetlands (1:1 ratio) (Urban pers. comm.). No pre-project wetlands were delineated by MDT at RS2. A target of 24.5 credit acres was established in these two basins by the landowner (Musgrave Lake Ranch LLC [MLR] 2001). An additional 0.75 acre of credit was proposed by the landowner and tentatively approved by the COE (2001) for maintenance of at least three acres of 75-foot wide upland buffer around all wetland and riparian areas (4:1 ratio).

The project further intends to enhance approximately 11 acres of Musgrave Lake at two areas contained within the 100-acre easement. These areas are referenced as Enhancement Site 1 (ES1) and Enhancement Site 2 (ES2) (**Figure 2, Appendix A**). Although currently wetland, Enhancement Site 1, the "middle" portion of Musgrave Lake, is separated from the lake's southern arm by an earthen dike and was impacted by a large drainage ditch, a perched culvert causing headcutting & associated sedimentation, and chronic overgrazing. Enhancement Site 2, the "lower" portion of Musgrave Lake, is also currently wetland and was impacted by grazing.

The project attempts to remedy these problems by relocating the water control structure, installing a larger culvert, and revising the grazing system. Grazing will be prohibited for five years, after which grazing prescriptions will follow a Natural Resources Conservation Service grazing management plan. Assuming that an appropriate increase in wetland functional condition is achieved, a ratio of 3:1 was tentatively approved by the COE, resulting in 3.7 acres of mitigation credit in these areas as proposed by the landowner (MLR 2001).

FIGURE 1. PROJECT LOCATION
Musgrave Lake
Mitigation Site





PROJECT #: 130091.019
DATE: MAY 2001
LOCATION:
PROJECT MANAGER: B. DUTTON
DRAWN BY: B. NOECKER

LAND & WATER CONSULTING, INC.
1120 CEDAR PO BOX 8254 MISSOULA, MT 59807

The wetland credit breakdown proposed by the landowner (MLR 2001) and tentatively approved by the COE (2001), once performance standards are met, is as follows:

- Restoration Site 1: 13.6 acres, 1:1 ratio, 13.6 credits
- Restoration Site 2: 10.9 acres, 1:1 ratio, 10.9 credits
- Enhancement Sites 1 and 2: 11.2 acres, 3:1 ratio, 3.7 credits
- Upland Buffer: 3 acres, 4:1 ratio, 0.75 credits

Total Credits: 28.95 acres

To achieve a 3:1 ratio for wetland enhancement, the COE has required that significant functional improvement be demonstrated (COE 2001). This will occur if the composite functional assessment score improves to within 10 percent of that achieved at the onsite reference wetland (**Figure 2**; see **Appendix C** for completed pre-project functional assessment forms). The COE (2001) further stated that *"enhancement of an existing wetland must show significant functional increase to qualify for any credit. Simply changing the character or type of an existing good wetland to a different type of equally good wetland may not qualify for credit.*" Other than these improvements to functional attributes, and a five-year monitoring term, no performance standards or success criteria were required by the COE or other agencies.

As the site was recently constructed, no previous monitoring was conducted by MDT. The Musgrave Lake site will be monitored twice 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 15th (spring) and July 16-17 (mid-season) 2001. The primary purpose of the spring visit was to conduct a bird/general wildlife reconnaissance. The mid-May period was selected for the spring visit because monitoring between mid-May and early June is likely to detect migrant as well as early nesting activities for a variety of avian species (Carlson pers. comm.), as well as maximizing the potential for amphibian detection. In Montana, most amphibian larval stages are present by early June (Werner pers. comm.).

The mid-season visit was conducted between late June and late July to document vegetation, soil, and hydrologic conditions used to map jurisdictional wetlands. All information contained on the Wetland Mitigation Site Monitoring Form (**Appendix B**) was collected at this time. Activities and information conducted/collected included: wetland delineation; wetland/open water boundary mapping; vegetation community mapping; vegetation transects; 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

Hydrologic indicators were evaluated at the site during the mid-season visit. Approximate designed water depths are shown on the conceptual restoration plan in **Appendix D**. Wetland hydrology indicators were recorded using procedures outlined in the Army Corps 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Hydrology data was recorded on COE Routine Wetland Delineation Data Forms (**Appendix B**).

All additional hydrologic data were recorded on the mitigation site monitoring form (**Appendix B**). The boundary between wetlands and open water (no rooted vegetation) aquatic habitats was mapped on the aerial photograph and an estimate of the average water depth at this boundary was recorded.

No groundwater monitoring wells were installed at the site. If located 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., *Typha latifolia/Scirpus acutus*) 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 may not reflect yearly changes. Estimated percent cover of the dominant species in each community type was listed on the site monitoring form (**Appendix B**).

Four 10-foot wide belt transects were established during the mid-season monitoring event to represent the range of current vegetation conditions. Transects were placed at RS 1, RS 2, ES 1, and ES 2. Percent cover was estimated for each vegetative species encountered within the "belt" using the following values: + (<1%); 1 (1-5%); 2 (6-10%); 3 (11-20%); 4 (21-50%); and 5 (>50%).

Approximate transect locations are depicted on **Figure 2** (**Appendix A**). The transects will be used to evaluate changes over time, especially the establishment and increase of hydrophytic vegetation. Transect locations were marked on the air photo and all data recorded on the mitigation site monitoring form. Transect endpoint locations were recorded with the GPS unit. Photos along each transect were taken from both ends during the mid-season visit.

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. Consequently, no monitoring relative to the survival of such species was conducted.

2.4 Soils

Soils were evaluated during the mid-season visit according to 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 Form (**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 within the 100-acre easement (exclusive of the reference wetland area) during the mid-season visit according the 1987 COE Wetland Delineation Manual. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1988). 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. The wetland/upland boundary in combination with the wetland/open water habitat boundary was used to calculate the wetland area developed at each impoundment.

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 each 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 implemented. A comprehensive list of observed species was compiled. Observations from past years will ultimately be compared with new data.

2.7 Birds

Bird observations were recorded during each visit. No formal census plots, spot mapping, point counts, or strip transects were conducted. During the spring visit, observations were recorded in compliance with the bird survey protocol in **Appendix E**. During the mid-season visit, bird observations were recorded incidental to other monitoring activities. During all visits, observations were categorized by species, activity code, and general habitat association (see field and office data forms in **Appendix B**). Observations from past years will be compared with new data.

2.8 Macroinvertebrates

A total of four macroinvertebrate samples, one at each area, were collected during the mid-season site visit and data recorded on the wetland mitigation monitoring form. Macroinvertebrate sampling procedures are included in **Appendix E**. The approximate locations of these sample points are shown on **Figure 2**, **Appendix A**. Samples were preserved as outlined in the sampling procedure and sent to a laboratory for analysis.

2.9 Functional Assessment

Functional assessment forms were completed for each of the four sites using the 1999 MDT Montana Wetland Assessment Method. Field data necessary for this assessment were generally collected during each mid-season site visit. An abbreviated field data sheet for the 1999 MDT Montana Wetland Assessment Method was compiled to facilitate rapid collection of field information (**Appendix B**). The remainder of the functional assessment was completed in the office.

Pre-project functional assessments of the mitigation site and reference area are included in **Appendix D**.

2.10 Photographs

Photographs were taken during the mid-season visit showing the current land use surrounding the site, the upland buffer, the monitored area, macroinvertebrate sampling locations, and the vegetation transects. Each photograph point location was recorded with a resource grade GPS. The approximate location of photo points is shown on **Figure 2**, **Appendix A**. All photographs were taken using a 50 mm lens. A description and compass direction for each photograph was recorded on the wetland monitoring form.

2.11 GPS Data

During the 2001 monitoring season, survey points were collected with a resource grade GPS unit at the vegetation transect beginning and ending locations, at all photograph locations, and at macroinvertebrate sampling locations. Wetland boundaries were also surveyed with a resource grade GPS unit.

2.12 Maintenance Needs

Dike structures were examined during site visits for obvious signs of breaching, damage, or other problems. This did not constitute an engineering-level structural inspection, but rather a cursory examination. Current or future potential problems were documented.

3.0 RESULTS

3.1 Hydrology

Inundation was present, to some extent, at each of the four sites. Water depths at open water/rooted vegetation interfaces ranged between approximately 20 inches and five feet. Open water areas are shown on **Figure 3** (**Appendix A**). Specific recorded values are provided on the attached data forms. According to the Western Regional Climate Center, the year-end 2001 precipitation total for Chinook (7.51 inches) was only 60 percent of the total annual mean precipitation (12.6 inches) in this area. Thus, this year-1 evaluation was conducted during s sub-normal precipitation year.

RS1 was approximately 40 percent inundated, with an average depth of four to six inches and a range of depths from 0 to three feet. Deepest areas were located at the foot of the dike in the northwest corner, which were as yet unvegetated. A groundwater component appears to contribute to this site, possibly resulting from upslope irrigation ditch seepage.

RS2 was approximately 10 percent inundated, with an average depth of 6 inches, and a depth range of 0 to five feet. A deep pool occurs where water enters the site through a culvert at the northwest end. The vast majority of this site east of the ditch/dike was not inundated, although some stranded *Lemna minor* was observed about 300-400 feet east of the dike, indicating inundation earlier in the year. Weak hydrological indicators (cracked, moist soils) indicated that saturation likely occurred further to the east. The ranch lessee noted that the standpipe was overflowing earlier in the year, and is likely set too low to achieve total inundation to the east. He recommended that the pipe should be raised by at least two feet.

ES1 was approximately 15 percent inundated, with an average depth of 24 inches and a range of depths from 0 to 30 inches. Only the ditch section of this site was inundated or showed recent evidence of inundation. ES2 was approximately 60 percent inundated, with an average depth of 12 inches and a range of depths from 0 to over six feet. Deepest areas were located in open water areas in the west portion of this site.

3.2 Vegetation

Vegetation species identified on the site are presented in **Table 1** and on the attached data form. Six wetland community types were identified and mapped on the mitigation area (**Figure 3**, **Appendix A**). These included Type 1: *Typha latifolia*/*Scirpus acutus*, Type 2: *Alopecurus pratensis*/*Polygonum lapathifolium*, Type 3: *Salix exigua*, Type 4: *Potamogeton*/*Myriophyllum*, Type 5: *Carex*, and Type 6: *Hordeum jubatum*/*Rumex crispus*. Dominant species within each of these communities are listed on the attached data form (**Appendix B**).

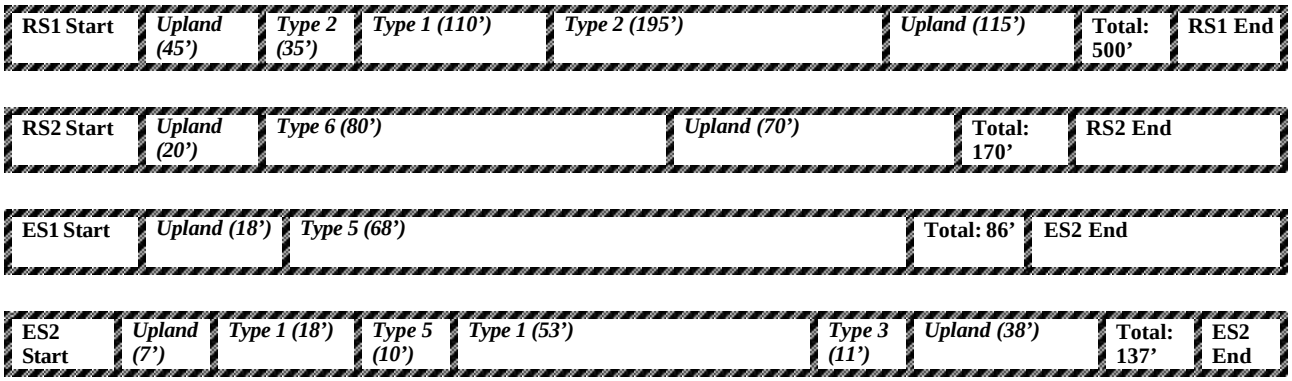
Type 1 occurs commonly at RS1, ES1, and ES3. Type 2 occurs primarily in newly developing wetland areas of RS1. Type 3 occurs in patches at ES1, ES2, and RS2. Type 4 occurs in flooded areas at all sites; primarily within ditches or deeper areas. Type 5 occurs primarily at ES1 and ES2. Type 6 is regulated to the majority of RS2, east of the main dike area.

Upland communities range from upland forest dominated by mature plains cottonwood (*Populus deltoides*), chiefly occurring along the south and east borders of RS1, to small kochia (*Kochia scoparia*) and smooth brome (*Bromus inermis*)-dominated areas, to hayland dominated by alfalfa (*Medicago sativa*) and/or foxtail barley (*Hordeum jubatum*).

Table 1: *2001 Musgrave Lake Vegetation Species List*

Species	Region 9 (Northwest) Wetland Indicator
Acer negundo	FAC+
Agropyron repens	FACU
Agrostis alba	FACW
Alisma plantago-aquatica	OBL
Alopecurus pratensis	FACW
Apocynum androsaemifolium	--
Arctium minus	--
Asclepias speciosa	FAC+
Asparagus officinalis	--
Beckmannia syzigachne	OBL
Bromus inermis	--
Carex lanuginose	OBL
Carex praegracilis	FACW
Carex stipata	OBL
Carex utriculata	OBL
Carex vesicaria	OBL
Carex vulpinoides	OBL
Chenopodium album	FAC
Cicuta douglasii	OBL
Cirsium arvense	FAC-
Cornus stolonifera	FACW
Elaeagnus angustifolia	FAC
Eleocharis acicularis	OBL
Eleocharis palustris	OBL
Festuca sp.	--
Glyceria grandis	OBL
Glycyrrhiza lepidota	FAC+
Helianthus annuus	FACU+
Hordeum jubatum	FAC-
Juncus effuses	FACW
Kochia scoparia	FAC
Lemna minor	OBL
Lycopus americanus	OBL
Medicago sativa	--
Myriophyllum spicatum	OBL
Phalaris arundinacea	FACW
Phleum pratense	FAC-
Plantago major	FAC+
Poa pratensis	FAC
Polygonum amphibium	OBL
Polygonum erectum	FACW-
Polygonum lapathifolium	FACW
Polygonum persicaria	FACW
Populus deltoids	FAC
Potamogeton natans	OBL
Potentilla anserine	OBL
Prunus virginiana	FACU
Ranunculus occidentalis	FAC
Rosa nutkana	FAC-
Rumex crispus	FACW
Sagittaria cuneata	OBL
Salix exigua	OBL
Salix lutea	OBL
Scirpus acutus	OBL
Scirpus americanus	OBL
Scirpus maritimus	OBL
Scirpus validus	OBL
Sium suave	OBL
Solidago canadensis	FACU
Sparganium eurycarpum	OBL
Symphoricarpos occidentalis	--
Taraxacum officinale	FACU
Typha latifolia	OBL

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



3.3 Soils

According to the Blaine County soil survey (Soil Conservation Service 1986), soils at RS1 and the proposed enhancement areas are Typic Fluvaquents. These are somewhat poorly drained or poorly drained silty clays and silty clay loams that formed in alluvium in areas with seasonally high water tables, usually during the irrigation season. Typic Fluvaquents are not suited to cultivated crops, windbreaks, or most urban uses due to flooding and general wetness.

These characteristics were generally confirmed during monitoring. Soils sampled in wetland areas within RS1 consistently were comprised of silty clays with a matrix color of 2.5Y4/2 with mottles in the range of 10YR 5/8, indicating a fluctuating water table. Soils at ES 1 and ES2 were comprised of silty clay with a matrix color of 2.5Y3/1 to 2.5Y3/2 and mottles at 7.5YR5/8. Strong sulfidic odor was also noted at RS1 and ES2, which is indicative of waterlogged soils that are permanently saturated and have sulfidic material near the soil surface. Wetland soils were saturated or inundated at the time of the survey.

Soils at RS2 consist of Havre silty clay loam, saline. This is a well-drained soil formed in alluvium on flood plains and stream terraces. Permeability is moderately slow, and the available water capacity is moderate because of the effects of salts and sodium. According to the Soil Survey, this soil type is often subject to rare flooding. Soils were sampled at RS2 in the eastern, more "marginal" areas of the wetland. Soils were comprised of silty clay loams with a matrix color of 2.5Y3/2 and faint mottles of a 10YR5/8 color. Soils were not saturated during the survey, but had been wet earlier in the year as evidenced by a strongly cracked surface. Soils in this area will likely develop stronger hydric characteristics as the hydroperiod is increased.

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. Delineation results are as follows:

RS1: 4.59 wetland acres impaired pre-existing, but currently "restored"
2.58 additional wetland acres "restored"
0.05 acre open water

RS2: 0 wetland acres pre-existing
2.33 wetland acres "restored"
0.19 acre open water

ES1: 4.3 wetland acres pre-existing within delineation area (see below)
0.5 estimated (planimeter) additional wetland acres within easement area north of ditch

ES2: 2.28 wetland acres pre-existing within delineation area (see below)
0.83 acres open water

Inclusive of minor open water areas, approximately 9.74 wetland acres have been "restored" on the mitigation site to date.

In addition to wetland borders delineated during the 2001 mid-season visit, RS1 also contains approximate borders of pre-existing, impaired wetlands delineated by MDT that were referenced in the introduction to this report. No wetlands were noted developing below the RS1 dike in addition to pre-existing wetlands associated with the ditch. No pre-existing wetlands were delineated by MDT at RS2.

Wetland borders of ES1 and ES2 were also delineated, although the north border of ES1 and the west border of ES2 were drawn based on the approximate easement borders in these areas and are therefore "artificial". The north border of ES1 was drawn along the path of the ditch flowing into the site from the west, even though the actual wetland is contiguous to the north and connects to ES2. The west border of ES2 was drawn along the approximate easement border, although the wetland is contiguous to the west and connects to ES1. Any wetland expansion relative to these areas is most likely to occur along the south border of ES1 (along the dike) and/or along the east border of ES2, both of which were carefully delineated and will be monitored for future changes.

3.5 Wildlife

Wildlife species, or evidence of wildlife, observed on the site during 2001 monitoring efforts are listed in **Table 2**. Specific evidence observed, as well as activity codes pertaining to birds, are provided on the completed monitoring form in **Appendix B**. Five mammal, two herptile, and numerous bird species were noted using portions of the mitigation site.

Of special interest were numerous observations of northern leopard frogs (*Rana pipiens*) at each of the four sites. Leopard frogs are considered a "species of special concern" by the Montana Natural Heritage Program (MNHP) due largely to their apparent extirpation from the portion of their historic distribution west of the Continental Divide. This species has been assigned ranks of S1 (critically imperiled) west of the Divide and S3 (rare occurrence and/or restricted range and/or vulnerable to extinction) east of the Divide by the MNHP.

Table 2: ***Fish and Wildlife Species Observed on the Musgrave Lake Mitigation Site***

FISH
Unidentified Minnow Species *(Hybognathus* sp.*)*

AMPHIBIANS
Great Plains Toad (*Bufo cognatus*)**
Northern Leopard Frog (*Rana pipiens*)

REPTILES
Plains Garter Snake (*Thamnophis radix*)

BIRDS
American Kestrel (*Falco sparverius*)
American Robin (*Turdus migratorius*)
American Wigeon (*Anas americana*)*
Barn Swallow (*Hirundo rustica*)
Belted Kingfisher (*Ceryle alcyon)**
Black-billed Magpie (*Pica pica*)
Black-capped Chickadee (*Poecile atricapillus*)*
Blue-winged Teal (*Anas discors*)*
Bobolink (*Dolichonyx oryzivorus*)*
Brewer's Blackbird (*Euphagus cyanocephalus*)
Brown-headed Cowbird (*Molothrus ater*)
Bufflehead (*Bucephala albeola*)*
Bullock's Oriole (*Icterus bullockii*)
Canada Goose (*Branta Canadensis*)
Canvasback (*Aythya valisineria*)*
Cedar Waxwing (*Bombycilla cedrorum*)
Clay-colored Sparrow (*Spizella pallida*)
Cliff Swallow (*Petrochelidon pyrrhonota*)*
Common Grackle (*Quiscalus quiscula*)*
Common Nighthawk (*Chordeiles minor)*
Common Snipe (*Gallinago gallinago*)
Common Yellowthroat (*Geothlypis trichas)**
Eastern Kingbird (*Tyrannus tyrannus*)
European Starling (*Sturnus vulgaris*)
Gadwall (*Anas strepera*)*
Gray Catbird (*Dumetella carolinensis*)*
Great Blue Heron (*Ardea herodias*)*
Green-winged Teal (*Anas crecca*)*
House Wren (*Troglodytes aedon*)*
Killdeer (*Charadrius vociferous*)
Least Flycatcher (*Empidonax minimus*)*
Mallard (*Anas platyrhynchos*)
Marbled Godwit (*Limosa fedoa*)
Marsh Wren (*Cistothorus palustris*)
Mourning Dove (*Zenaida macroura*)
Northern Flicker (*Colaptes auratus*)*
Northern Harrier (*Circus cyaneus*)
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)
Northern Shoveler (*Anas clypeata*)*
Orange-crowned Warbler (*Vermivora celata*)
Red-tailed Hawk (*Buteo jamaicensis)*
Red-winged Blackbird (*Agelaius phoeniceus)*
Ring-billed Gull (Larus delawarensis)
Ring-necked Pheasant (*Phasianus colchicus*)
Rock Dove (*Columba livia*)
Savannah Sparrow (*Passerculus sandwichensis*)*
Solitary Sandpiper (*Tringa solitaria*)
Song Sparrow (*Melospiza melodia*)*
Sora (*Porzana Carolina*)
Spotted Sandpiper (*Actitis macularia*)
Tree Swallow (*Tachycineta bicolor*)*
Upland Sandpiper (*Bartramia longicauda*)
Warbling Vireo (*Vireo gilvus*)*
Western Meadowlark (*Sturnella neglecta*)
Western Wood-pewee (*Contopus sordidulus*)*
Willet (*Catoptrophorus semipalmatus*)
Wilson's Phalarope (*Phalaropus tricolor*)*
Wood Duck (*Aix sponsa*)*
Yellow Warbler (*Dendroica petechia*)
Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*)

MAMMALS
American Beaver (*Castor Canadensis*)
Long-tailed Weasel (*Mustela frenata*)
Raccoon (*Procyon lotor*)
Richardson's Ground Squirrel (*Spermophilus richardsonii*)
White-tailed Deer (*Odocoileus virginianus*)

* Birds observed 6/10/01 by Jim Stutzman in 2001 that were not observed during formal 2001 monitoring activities.
** Observed by MDT in 1999; not observed during formal 2001 monitoring activities.

3.6 Macroinvertebrates

Macroinvertebrate sampling results are provided in **Appendix B** and summarized below.

RS1: Calculated scores for this area suggest optimal biotic conditions. The biotic index is low, implying good water quality. Taxa richness and midge taxa richness are both high, suggesting ample habitats.

RS2: Sub-optimal biological conditions are implied by scores calculated for this site. The biotic index is somewhat elevated, suggesting mild impairment of water quality, perhaps by nutrients or warm temperatures. The fauna at this site was rich and diverse, however, as was the Chironomid assemblage. Invertebrates were particularly abundant at this site. These findings imply good habitat availability. Notable was the presence of fish in the sample taken here.

ES1: Near-optimal biologic conditions are indicated by this analysis. High taxa richness and a diverse midge assembly are indicators of ample habitat availability. The biotic index value is somewhat elevated, suggesting mild impairment of water quality, perhaps by nutrients and/or warm water temperatures.

ES2: There were 85 organisms present in the sample taken at this site, probably too few for valid bioassessment. Whether this depauperate assemblage reflects actual conditions, or whether it is an artifact of sampling methods is not clear from the data.

3.7 Functional Assessment

Completed functional assessment forms are presented in **Appendix B**. Functional assessment results are summarized in **Table 3**. For comparative purposes, the functional assessment results for the reference wetland site and baseline conditions prepared by MDT and the landowner are also included in **Table 3**. RS1, ES1, and ES2 rated as Category II wetlands, primarily due to high wildlife habitat ratings. Each of these sites provides habitat for a wide variety of wildlife species. ES1 and ES2 also support high vegetative community diversity, and provide a degree of fish habitat. RS2 rated as a Category III wetland. Sediment/nutrient/toxicant removal is a prominent function at this site.

Based on the baseline functional assessments conducted by MDT and the landowner, the site has experienced an apparent gain of 38 functional units (acreage x functional points) at restoration sites RS1 and RS2, and 11.5 functional units at ES1. Some of this lift at ES1 may be due to differing approaches to completing the assessment form. No pre-project functional assessment was conducted at RS2 due to the absence of wetlands, and none was conducted at ES2 (Urban pers. comm.). Thus, functional unit "gain" at ES2 could not be calculated.

The composite scores for each of ES1 and ES2 are currently at or in excess of the composite score for the reference wetland. This is partially due to the fact that some variables evaluated and scored for the enhancement sites were not evaluated for the reference wetland, resulting in additional points assigned to the enhancement sites. Functional gain at the enhancement sites will likely need to be compared to the reference wetland in terms of percentage of possible score

achieved, functional units, individual functions, or some combination. This should be worked out with the COE and the landowner so that gains can be accurately tracked over the monitoring period.

3.8 Photographs

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

3.9 Maintenance Needs/Recommendations

All dikes were in good condition during the spring and mid-season visits. However, MDT has noted that small mammals have recently been burrowing into the southern-most dike at RS2 (Urban pers. comm.). Any such burrows should be repaired, and a long-term solution to this, such as installation of rodent-proof mesh along the dike face, should be considered.

As mentioned in the Hydrology section, the ranch lessee noted during the mid-season visit that the standpipe at RS2 was overflowing earlier in the year, and is likely set too low to achieve total inundation to the east. This was generally confirmed by the general termination of long-term inundation evidence beyond 300 to 400 feet east of the standpipe. The lessee recommended that the pipe should be raised by at least two feet. It is our recommendation that the elevation of the standpipe be re-evaluated and, if necessary, reset to maximize inundation to the east along the historic oxbow.

It is recommended that MDT or the landowner complete a baseline functional assessment for ES2 to provide an accurate basis for future comparison.

3.10 Current Credit Summary

As the project stands, approximately 9.74 acres of wetlands have apparently been restored at RS1 and RS2, inclusive of minor open water components.

A degree of functional enhancement has been achieved across about 4.8 acres within the easement area at ES1, currently calculated at an approximate 11.5 functional unit "gain". A degree of functional enhancement may have been achieved across about 3.11 acres within the easement area at ES2, however, a baseline functional assessment was not conducted with which to compare 2001 results. The method of credit calculation at these enhancement sites is unresolved; however, an applied 1:3 credit ratio at ES1 would result in approximately 1.6 acres of credit. Also, it should be noted that the total wetland acreage within the easement area at enhancement sites appears to be approximately 3 acres short of the original 11-acre estimate, reducing the amount of credit available at these sites.

Approximately 0.75 acre of credit is associated with the upland buffer surrounding wetlands. Consequently, the maximum assignable credit at this site (RS1, RS2, ES1, and upland buffer) as of 2001 is approximately 12.09 acres, not including any enhancement that may have occurred at ES2.

Table 3: ***Summary of 2001 Wetland Function/Value Ratings and Functional Points [1] at the Musgrave Lake Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Wetland Numbers						
	Reference Wetland (Stutzman 1999)	**Pre-Project RS1 (Stutzman 1999)[2]**	**Pre-Project ES1 (MDT 1999)**	**2001 RS1**	**2001 RS2**	**2001 ES1**	**2001 ES2**
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.0)	Low (0.3)	Low (0.3)
MNHP Species Habitat	Mod (0.7)	Low (0.1)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)
General Wildlife Habitat	High (0.9)	Low (0.1)	Mod (0.7)	high (0.9)	Mod (0.5)	High (0.9)	High (0.9)
General Fish/Aquatic Habitat	NA	NA	Low (0.3)	NA	Low (0.3)	Low (0.3)	Mod (0.5)
Flood Attenuation	Mod (0.5)	Low (0.1)	Mod (0.5)	NA	Low (0.2)	Mod (0.4)	Mod (0.5)
Short and Long Term Surface Water Storage	High (1)	Low (0.2)	Low (0.3)	Mod (0.6)	Low (0.3)	Low (0.6)	High (1)
Sediment, Nutrient, Toxicant Removal	Mod (0.7)	Mod (0.4)	Low (0.2)	NA	High (1)	High (0.9)	High (1)
Sediment/Shoreline Stabilization	NA	NA	Low (0.2)	NA	NA	Mod (0.6)	High (1)
Production Export/ Food Chain Support	High (0.9)	Mod (0.5) [Low 0.2]	Mod (0.7)	High (0.8)	Mod (0.7)	High (0.8)	High (0.9)
Groundwater Discharge/ Recharge	High (1)	NA	NA	High (1)	High (1)	High (1)	High (1)
Uniqueness	Low (0.3)	Low (0.2)	Low (0.1)	Mod (0.4)	Low (0.3)	Mod (0.5)	Mod (0.5)
Recreation/Education Potential	Low (0.3)	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.3)
Actual Points/ Possible Points	6.6 / 10	2.0 / 9	4.1 / 11	4.8 / 8	5.1 / 11	6.5 / 12	8.6 / 12
% of Possible Score Achieved	66%	22%	37%	60%	46%	54%	72%
Overall Category	II	III	III	II*	III	II*	II
Total Acreage of Assessed Wetlands within Easement	6.5 ac (estimated)	4.59 ac	4.8 ac (ES1)	7.22 ac	2.52 ac	4.8 ac	3.11 ac
Functional Units (acreage x actual points)	42.9 fu	9.18 fu	19.68 fu (ES1)	34.66 fu	12.85 fu	31.2 fu	26.75 fu
Net Acreage Gain	NA	NA	NA	2.63 ac	2.52 ac	0	0
Net Functional Unit Gain	NA	NA	NA	25.48 fu	12.85 fu	11.52 fu	Unknown
Total Functional Unit "Gain"	**49.85** Total Functional Units; **38.33** at restoration wetlands; **11.52** at enhancement wetlands (ES1 only; ES2 could not be calculated)						

[1] See completed MDT functional assessment forms in Appendix B for further detail. [2] Production Export rating was corrected based on size of vegetated component in the AA and shown in bold; this resulted in site rating as Category III. * Did not achieve Category II rating based on functional points, but did achieve Category II rating based on 0.9 score for wildlife habitat.

4.0 REFERENCES

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

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

Musgrave Lake Ranch LLC. 2001. June 26, 2001 letter from Jeff Stutzman to Todd Tillinger (Army Corps of Engineers) regarding Milk River Basin Wetland Mitigation Project. Missoula, MT.

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

Reed, P.B. 1988. National list of plant species that occur in wetlands: North West (Region 9). Biological Report 88(26.9), May 1988. U.S. Fish and Wildlife Service. Washington, D.C.

Soil Conservation Service. 1986. Soil survey of Blaine County and part of Phillips County, Montana. Bozeman, MT.

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

U.S. Army Corps of Engineers. 2001. December 6, 2001 letter from Allan Steinle to Jeff Stutzman (Musgrave Lake Ranch LLC) regarding Milk River Wetland Mitigation Project – Corps File # 2000-90-331. Helena, MT.

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

Werner, K. Herpetologist, Salish-Kootenai Community College. Pablo, MT. May 1998 instructional presentation.

Appendix A

FIGURES 2 - 3

MDT Wetland Mitigation Monitoring
Musgrave Lake
Zurich, Montana

LAND & WATER

Figure 2 – Monitoring Activity Locations

PROJECT NAME
MDT Musgrave Lake Wetland Mitigation
DRAWING TITLE
Monitoring Activity Locations

PROJ NO: 130091.019 | DRAWN: RA
FILE NAME: TASK19BASE.dwg | CHECKED:
SCALE: 1"= 300ft | APP'D: JB
LOCATION: Musgrave Lake | PROJ MGR: BD

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

SHEET NUMBER
2
REV -
DATE: 12-5-01

Figure 3 – Mapped Site Features

PROJECT NAME: MDT Musgrave Lake Wetland Mitigation

DRAWING TITLE: Mapped Site Features

DRAWN: RA
CHECKED:
APPVD: JB
PROJ MGR: BD

PROJ NO: 130091.019
FILE NAME: TASK19BASE.dwg
SCALE: 1" = 300ft
LOCATION: Musgrave Lake

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

SHEET NUMBER: 3

REV: -

DATE: 12-6-01

Appendix B

COMPLETED 2001 WETLAND MITIGATION SITE MONITORING FORM
COMPLETED 2001 BIRD SURVEY FORMS
COMPLETED 2001 WETLAND DELINEATION FORMS
COMPLETED 2001 FIELD AND FULL FUNCTIONAL ASSESSMENT FORMS

MDT Wetland Mitigation Monitoring
Musgrave Lake
Zurich, Montana

LAND & WATER

LAND & WATER B-1

DRAFT - MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: Musgrave Lake Project Number: NH-STPX 3(33) Assessment Date: 7/16/01
Location: S. of Zurich MDT District: Great Falls Milepost: —
Legal description: T 32N R 21E Section 11/12 Time of Day: 7:30 am - 5:00 pm
Weather Conditions: Sunny, calm Person(s) conducting the assessment: JB, RH
Initial Evaluation Date: 5/15/01 Visit #: 2 Monitoring Year: 2001
Size of evalusaiton area: 100 acres (easement) Land use surrounding wetland: Hayland + Pasture

HYDROLOGY

Surface Water
Inundation: Present X Absent ___ Average depths: 0-6" ft Range of depths: 0 - 5 ft
Assessment area under inundation: 35 %
Depth at emergent vegetation-open water boundary: ___ ft → 20" to 5 feet
If assessment area is not inundated are the soils saturated w/in 12" of surface: Yes X No ___
Other evidence of hydrology on site (drift lines, erosion, stained vegetation etc.):
Rest. Site #1 = drift lines, sediment deposits ; Enhancement # 1 = sediment deposits
Rest. Site #2 = drift lines, sediment deposits, duckweed ; Enhancement # 2 = sediment deposits

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:
Restoration Site #1: % inundation = 40; Ave. depth = 4-6"; Range of depths = 0 - 3 ft.

Restoration Site #2: " = 10; " " = 6"; " " " = 0-5 ft - vast majority of this site to east of ditch was not inundated, although some stranded duckweed was observed, indicating partial inundation earlier this year for approximately 300-400 feet east of the dike. Ranch lessee stated that standpipe was overflowing and is likely set too low to achieve total inundation to east. Standpipe should probably be raised by at least 2 feet.

Enhance Site #1: % inundation = 15; Ave depth = 24"; Range of depths = 0 - 30" (ditch only)

Enhance Site #2: " " = 60; " " = 12"; " " " = 0 - 6"+

COMPREHENSIVE VEGETATION LIST

LAND & WATER B-2

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
TYP LAT	1,2,5	ROS NUT	up
SCI ACU	1,2,5	RAN OCC (American buttercup)	1
SCI AME	1,2,6	LYC AME	1
SCI VAL	1,2	FES ARU	6
SCI MAR	1,2	POL HYD	1,2
CAR LAN	1,2,5	POL AMP	1,2
CAR VES	1,2,5	POA PRA	5,6,up
CAR VUL	1,2,5	POT ANS	1,2,5,6
CAR STI	1,2,5	ELE ANG	up
CAR UTR	1,2,5	PRU VIR	up
CAR PRA	1,2,5,6	ACE NEG	up
ELE PAL	1,2,5	COR STO	3
ELE ACI	1,4	POP DEL	up
ALO PRA	1,2,5	MED SAT	up
RUM CRI	All	SIU SUA	1
LEM MIN	4	CIR DOU	1
SAG CUN	1,4	APO AND (spreading dogbane)	up
SAL LUT	3	HEL ANN	up
SAL EXI	3,1	KOC SCO (Kochia)	up
ALI PLA AQU	1	SPA EUR (giant burreed)	1
PLA MAJ	2,5,6	ARC MIN (burdock)	up
HOR JUB	5,6	ASP OFF (asparagus)	up
POL PRE	1,2,5	PHA ARU	1,2
POL ERE	6	GLY GRA	1,2
AGR REP	2,3,5,6, up	SOL CAN (Canada goldenrod)	2,up
BRO INE	up	TAR OFF	up
CIR ARV	2,5,6	PHL PRA	up,2
RUM CRI	All	ASC SPE	2,5,up
MYR SPI	4	GLY LEP	2,5,up
POT NAT	4		
JUN EFF	1		
BEC SYZ	1,2		
AGR ALB	1,2,3,5		
SYM OCC	up		
CHE ALB	6		

COMMENTS/PROBLEMS: _____

VEGETATION COMMUNITIES

LAND & WATER B-3

Community No.: 1 Community Title (main species): Typha latifolia / Scirpus acutus

Dominant Species	% Cover	Dominant Species	% Cover
Typha latifolia	750		
Scirpus acutus	21-50		
Carex lanuginosa	21-50		
Eleocharis palustris	6-10		

COMMENTS/PROBLEMS: _____

Community No.: 2 Community Title (main species): Alopecuras pratensis / Polygonum lapathifolium

Dominant Species	% Cover	Dominant Species	% Cover
Alopecuras pratensis	21-50		
Polygonum lapathifolium	21-50		
Agropyron repens	21-50		
Eleocharis palustris	6-10		
Agrostis alba	1-5		

COMMENTS/PROBLEMS: _____

Community No.: 3 Community Title (main species): Salix exigua

Dominant Species	% Cover	Dominant Species	% Cover
Salix exigua	750		
Carex lanuginosa	21-50		
Agrostis alba	11-20		
Bromus inermis	6-10		

COMMENTS/PROBLEMS: _____

Additional Activities Checklist:

X Record and map vegetative communities on air photo

VEGETATION COMMUNITIES

LAND & WATER B-4

Community No.: 4 Community Title (main species): Potamogeton/Myriophyllum

Dominant Species	% Cover	Dominant Species	% Cover
Potamogeton natans	1-5		
Myriophyllum spicata	750		
Eleocharis acicularis	6-10		
Sagittaria cuneata	6-10		
Potamogeton sp.	750		

COMMENTS/PROBLEMS: _____

Community No.: 5 Community Title (main species): Carex

Dominant Species	% Cover	Dominant Species	% Cover
Carex vulpinoidea	21-50		
Carex utriculata	21-50		
Carex vesicaria	21-50		
Typha latifolia	6-10		

COMMENTS/PROBLEMS: _____

Community No.: 6 Community Title (main species): Hordeum jubatum/Rumex crispus

Dominant Species	% Cover	Dominant Species	% Cover
Hordeum jubatum	750	Carex vesicaria	6-10
Rumex crispus	750		
Agropyron repens	21-50		
Potentilla anserina	1-5		
Polygonum erectum	6-10		

COMMENTS/PROBLEMS: _____

Additional Activities Checklist:

____Record and map vegetative communities on air photo

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Musgrave Lake Date: 7/16/01 Examiner: SB/RH Transect # Restoration Site #1

Approx. transect length: 500 feet Compass Direction from Start (Upland): _____

Vegetation type 1:	Upland	
Length of transect in this type:	45	feet
AGR REP	21-50	
ALO PRA	6-10	
APO AND	6-10	
BRO INE	6-10	
POA PRA	6-10	
TAR OFF	<1	
PHL PRA	6-10	
SYM OCC	1-5	
SOL CAN	1-5	
POL LAP	6-10	
LYC AME	1-5	
Total Vegetative Cover:	100	

Vegetation type 2:	Alopecuras / Polygonum	
Length of transect in this type:	35	feet
ALO PRA	750	
TYP LAT	1-5	
GLY GRA	11-20	
Total Vegetative Cover:	100	

Vegetation type 3:	Typha latifolia / Scirpus Acutus	
Length of transect in this type:	110	feet
TYP LAT	750	
SCI ACU	21-50	
ALO PRA	11-20	
POL LAP	6-10	
CAR LAN	1-5	
Total Vegetative Cover:	100	

Vegetation type 4:	Alopecuras / Polygonum	
Length of transect in this type:	195	feet
ALO PRA	750	
AGR REP	750	
POL LAP	21-50	
CAR LAN	6-10	Veg Cover = 100%
ELE PAL	1-5	

Type 5: Upland	Length: 115 ft
ROC SCO	21-50
CHE ALB	11-20
BRO INE	6-10
AGR REP	6-10
RUM CRI	<1
Total Vegetative Cover:	100%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Musgrave Lake Date: 7-16-01 Examiner: JB/RH Transect # Enhancement Area #1

Approx. transect length: 86 feet Compass Direction from Start (Upland): E/SE 106°

Vegetation type 1:	Upland	
Length of transect in this type:	18	feet
PRU VIR	1-5	
MED SAT	11-20	
BRO INE	11-20	
POL LAP	11-20	
Total Vegetative Cover:	100 %	

Vegetation type 2:	Carex	
Length of transect in this type:	68	feet
CAR LAN	>50	
AGR ALB	>50	
ALO PRA	11-20	
RUM CRI	6-10	
BEC SYZ	1-5	
SCI ACU	1-5	
RAN OFF	<1	
POL LAP	<1	
CAR VES	21-50	
HOR JUB	<1	
Total Vegetative Cover:	100	

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

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

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Musgrave Lake Date: 7-16-01 Examiner: JB/RH Transect # Restoration Site #2

Approx. transect length: 170 feet Compass Direction from Start (Upland): _____

Vegetation type 1:	Upland	
Length of transect in this type:	20	feet
AGR REP	21-50	
BRO INE	11-20	
SYM OCC	11-20	
CHE ALB	1-5	
ROS NUT	1-5	
CIR ARV	6-10	
Total Vegetative Cover:	100	

Vegetation type 2:	Hordeum jubatum/Rumex crispus	
Length of transect in this type:	80	feet
HOR JUB	750	
RUM CRI	750	
AGR REP	21-50	
PLA MAJ	6-10	
CHE ALB	6-10	
POL ERE	1-5	
FES sp.	1-5	
POA PRA	1-5	
CIR ARV	1-5	
Total Vegetative Cover:	100	

Vegetation type 3:	Upland	
Length of transect in this type:	70	feet
BRO INE	11-20	
AGR REP	21-50	
POL LAP	11-20	
SYM OCC	21-50	
RUM CRI	1-5	
ROS NUT	1-5	
POA PRA	1-5	
CAR LAN	<1	
Total Vegetative Cover:	100	

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

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Musgrave Lake Date: 7-17-01 Examiner: JB/RH Transect # Enhancement site #2

Approx. transect length: 137 feet Compass Direction from Start (Upland): 20° N/NW

Vegetation type 1:	Upland	
Length of transect in this type:	7	feet
PRU VIR	75o	
ACE NEG	75o	
COR STO	6-10	
ARC MIN	6-10	
Total Vegetative Cover:	100	

Vegetation type 2:	Typha latifolia	
Length of transect in this type:	18	feet
TYP LAT	>50	
CAR UTR	6-10	100% vegetated

Type 3: Carex	Length: 10 feet	
CAR UTR	>50	
BEC SYZ	1-5	
SIU SUA	1-5	
TYP LAT	6-10	
POL PRE	6-10	
AGR ALB	1-5	
Total Vegetative Cover:	100	

Vegetation type 4:	Typha latifolia	
Length of transect in this type:	53	feet
TYP LAT	75o	
CAR VES	11-20	
POL LAP	6-10	
AGR ALB	1-5	
BEC SYZ	1-5	100% Vegetated

Type 5: Salix exigua	Length: 11 feet	
SAL EXI	11-20	
TYP LAT	21-50	
CAR VUL	6-10	
CAR VES	6-10	
ASC SIB	6-10	
SOL CAN	<1	
Total Vegetative Cover:	100	

Vegetation type 6:	Upland	
Length of transect in this type:	38	feet
BRO INE	21-50	
SYM OBL	11-20	
GLY LEP	<1	
SAL EXI	21-50	
SOL CAN	>50	
PRU VIR	1-5	
ACE NEG	1-5	
CAR VES	<1	
AGR REP	<1	
Total Vegetative Cover:	100	

MDT WETLAND MONITORING – VEGETATION TRANSECT (back of form)

Cover Estimate

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

Indicator Class:

+ = Obligate
- = Facultative/Wet
0 = Facultative

Source:

P = Planted
V = Volunteer

Rest #1 : 70 %
Rest #2 : 60 %

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

Enh. #1 : 90 %
Enh. #2 : 90 %

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

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

Notes:

PLANTED WOODY VEGETATION SURVIVAL

LAND & WATER B-10

Species	Number Originally Planted	Number Observed	Mortality Causes
N/A No species planted			

COMMENTS/PROBLEMS: _____

WETLAND DELINEATION

LAND & WATER B-11

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: Forms Attached

FUNCTIONAL ASSESSMENT

Collect information to complete MDT Function and Values Assessment in the office.

Jeff is completing this section

COMMENTS/PROBLEMS: Forms Attached

MAINTENANCE

Were man-made nesting structures installed at this site? YES___ NO X

If yes, do they need to be repaired? YES____ NO N/A

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

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

YES X NO____

If yes, are the structures working properly and in good working order? YES X NO X

If no, describe the problems below.

COMMENTS/PROBLEMS: Dikes in good shape, but standpipe on Restoration Site #2 set too low. Area does not inundate; water was observed by lessee spilling out of standpipe. Pipe should probably be raised by about 2 feet, according to lessee.

BIRD SUMMARY TABLE

Site: Musgrave Lake

Date: 5/15/01

Survey Time: 8:30 AM - 1:00 pm

Scientific Name	Common Name	Total Density	Foraging	Nesting	Flyover	Breeding	Loafing
	Pheasant	2	X				
	red-wing blackbird	sev.		X			
	Canada goose	6	X				
	Robin	sev	X				
	Barn Swallow	sev	X				
	Killdeer	2-3	X				
	rough-wing swallow	sev	X				
	Meadowlark	2	X				
	Orange crowned Warbler	2		X			
	Harrier	1	X		X		
	Cowbird	1	X				X
	E. kingbird	sev	X				X
	Mallard	1					X
	B.W. Teal	2					X
	Clay-colored sparrow	1					X
	Willit	1	X				
	bobolink	1	X				
	ring-billed gull	2	X		X		
	Marbled godwit	1	X				
	Red-tailed Hawk	1			X		
	American Kestrel	2	X				

BIRD SUMMARY TABLE

Page 1 of 1

Site: Musgrave Lake

Date: 7/16/01, 7/17/01

Survey Time: 7:30am – 5:00pm

Scientific Name	Common Name	Total Density	Foraging	Nesting	Flyover	Breeding	Loafing
	marsh wren	num.		X	X		X
	rock dove	sev.		X			X
	mallard	sev.	X	X		X	X
	common snipe	num.	X	X	X	X	X
	red-wing blackbird	num.	X	X	X	X	X
	Brewer's blackbird	num.	X	X	X	X	X
	yellow-head blackbird	sev.	X	X		X	X
	killdeer	num.	X	X			X
	willet	1	X				X
	ring-neck pheasant	sev.	X	X			
	cedar waxwing	sev.	X				
	upland sandpiper	1					X
	Starling	1			X		
	brown-headed cowbird	sev.	X		X		
	nighthawk	1	X				
	Sora	sev.	X	X			X
	mourning dove	sev.			X		
	Spotted Sandpiper	num.	X	X	X		X
	Solitary Sandpiper	num.	X	X	X		X
	American robin	sev.	X		X		
	barn swallow	sev.	X				
	American kestrel	2	X				X
	Eastern kingbird	sev.	X				
	Bullock's oriole	1					X
	yellow warbler	1					X
	ring-billed gull	1	X				
	clay-colored sparrow	1	X				

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	24	start transect Rest #1	N/NE 10°
B	25	End " " "	S/SW 192°
C	26	photo point 7, Rest #1 NW corner	S 186°
D	27	" " " " "	SE 143°
E	28	" " " " "	E/SE 104°
F	29	M.I. #1, Rest. #1	
G	30	photo pt 6, Rest. #1 SE corner	W/SW 250°
H	31	photo pt 6, " "	NW 310°
	32	" " " " "	N 14°

COMMENTS/PROBLEMS: (33) Enhance #1, PP#5, SE 123° / (34) PP#5 S/SW 195° / (35) W/NW 290° / (36) Enhance#1, Transect st E/SE 106° / transect end (37) W/NW 299° / (38) M.I. #2, Enh#1 / PP#4 → (39) N, 15° / PP#4, (40) S 19° / Rest site 2 transect st (1) S/SE 167 / transect end (2) W/NW 354° / PP#1 (3) W 260° / PP#1 (4) NE 60° / PP#3 (5) NE 54° / PP#2 (6) (7) N 0° / PP#2, (8) E 100° / MI#4, 9, Enhance#2 / PP#8, compass reading (10) (11) (12) ~105° Enhance#2 / transect start, Enhance#2, (13) N/NE 20° / End transect (14), S/SW 194° /

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: _____

WILDLIFE

LAND & WATER B-15

BIRDS

Species	Number Observed	Nesting or Breeding Activity	Likely Breeding Resident	Likely Migrating		Species	Number Observed	Nesting or Breeding Activity	Likely Breeding Resident	Likely Migrating
See bird form										

Were man made nesting structures installed? Yes____ No X Type: ✓ How many? ✓ Are the nesting structures being utilized? Yes____ No____ Do the nesting structures need repairs? Yes____ No____

MAMMALS AND HERPTILES

Species	Number Observed	Indirect indication of use			
		Tracks	Scat	Burrows	Other
Plain's garter snake	1				
Northern leopard frog	20+				
White-tailed deer	3-5				
long-tailed Weasel	1				
beaver					Dams
raccoon		X			
Richardson's ground squirrel	1				

Additional Activities Checklist:

X Macroinvertebrate sampling (if required)

COMMENTS/PROBLEMS: Leopard frogs commonly observed at each of the four units.

Field Data Sheet for 1999 MDT Wetland Assessment Form Site: Musgrove Lake Date: 7/16/01 By: JG/RH

Estimated AA Size (Circle Ac.): <1 1-5 (>5) Brief Description: Restoration Site #1 = 7.4 acres wetland

HGM Class (CIRCLE)	Cowardin Class	Est. % of AA	Predominant Water Regime (CIRCLE)
Mineral Soil Flats Organic Soil Flats Riverine (nonperennial) Riverine (upper perennial) Riverine (lower perennial) Lacustrine Fringe Depression (closed) (Depression (open, groundwater)) Depression (open, surface water) Slope Organic Soil Flats	(Emergent)	90%	Perm Flood Int Exp Sem Perm Flood (Seas Flood) Sat Tem Flood Int Flood
	(Aquatic Bed)	5%	Perm Flood Int Exp (Sem Perm Flood) Seas Flood Sat Tem Flood Int Flood
	Moss-Lichen		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
	Scrub-Shrub		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
	Forested		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
	(Unconsolidated Bottom) OW	<5%	Perm Flood Int Exp (Sem Perm Flood) Seas Flood Sat Tem Flood Int Flood
	Other:		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
	Total Estimated % Vegetated	95	

RELATIVE ABUNDANCE: rare (com.) abun. **DISTURBANCE** is: High Moderate (Low) _____

HYDROLOGY: Max. acre-ft surf. water at wetlands in AA subject to inundation: <1 (1-5) >5 (if no flooding/ponding, go to groundwater* section)

Does AA contain surface or subsurface outlet? (Y) N If outlet present, is it restricted (subsurface will always be "yes")? (Y) N

Longest duration of surface water:		Surface Water Duration and other attributes (circle)		
at any wetlands within AA		Perm / Peren	(Seas / Intermit)	Temp / Ephem
in at least 10% of AA (both wetlands and nonwetlands [deepwater, streambed...]		Perm / Peren	(Seas / Intermit)	Temp / Ephem
Where fish are or historically were present (circle NA if not applicable)		Perm / Peren	Seas / Intermit	Temp / Ephem
	% of waterbody containing cover objects	>25%	10-25%	<10%
	% bank or shore with riparian or wetland shrub or forested communities	>75%	50-74%	<50%
adjacent to rooted wetland vegetation along a defined watercourse or shoreline subject to wave action (circle NA if not applicable)		Perm / Peren	Seas / Intermit	Temp / Ephem
	% cover of wetland bank or shore by sp. with binding rootmasses	>65%	35-64%	<35%

Flood Attenuation: Do any wetlands on site flood as a result of in-channel or overbank flow? Y (N) (if no, go to groundwater* section below)

Estimated wetland area subject to periodic flooding (acres):	≥10	2-10	<2
Estimated % of flooded wetland classified SS, FO or both:	≥75	25-74	<25

*Evidence of groundwater discharge or recharge? (Y) N List: Discharge

HABITAT

Habitat for Listed or Proposed Threatened, Endangered, or Montana Natural Heritage Program S1, S2, or S3 Plants or Animals:

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

Primary or critical habitat (list species)	D S	T/E:	D S	MNHP:	
Secondary habitat (list species)	D S	T/E:	D (S)	MNHP:	black-necked stilt, yellow rail,
Incidental habitat (list species)	D (S)	T/E: Baldeagle	D S	MNHP:	black tern
No usable habitat	D	T/E:	D S	MNHP:	

Wildlife observations? see form – Northern leopard frogs present, but S3/S4; Wt deer, num. shorebirds

Fish observations? None

OTHERS

Do wetlands have potential to receive excess sediments, nutrients, or toxicants? Y (N) From: _____

Potential to receive: low to moderate levels high levels On TMDL List? Y (N)

Does site contain bog, fen, warm springs, >80 year-old forested wetland, or MNHP "S1" or "S2" plant association? Y (N)

List: _____

Is AA a known recreation / education site? Y (N) Type: _____

Does AA offer strong potential for use as recreation / education site? Y (N) Type: _____

Field Data Sheet for 1999 MDT Wetland Assessment Form Site: Musgrave Lake Date: 7/18/01 By: JB/RH

Estimated AA Size (Circle Ac.): <1 (1-5) >5 Brief Description: Enhancement #1, "middle" oxbow, 4.2 acres

HGM Class (CIRCLE)	Cowardin Class	Est. % of AA	Predominant Water Regime (CIRCLE)
Mineral Soil Flats Organic Soil Flats (Riverine (nonperennial)) Riverine (upper perennial) Riverine (lower perennial) Lacustrine Fringe Depression (closed) (Depression (open, groundwater)) Depression (open, surface water) Slope Organic Soil Flats	Emergent	75%	Perm Flood Int Exp Sem Perm Flood (Seas Flood) Sat Tem Flood Int Flood
	Aquatic Bed	10%	Perm Flood Int Exp (Sem Perm Flood) Seas Flood Sat Tem Flood Int Flood
	Moss-Lichen		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
	Scrub-Shrub	10%	Perm Flood Int Exp Sem Perm Flood Seas Flood (Sat) Tem Flood Int Flood
	Forested		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
	Unconsolidated Bottom (UB)	5%	Perm Flood Int Exp (Sem Perm Flood) Seas Flood Sat Tem Flood Int Flood
	Other:		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
	Total Estimated % Vegetated	95%	

RELATIVE ABUNDANCE: rare (com.) abun. **DISTURBANCE** is: High Moderate (Low)

HYDROLOGY: Max. acre-ft surf. water at wetlands in AA subject to inundation: <1 (1-5) >5 (if no flooding/ponding, go to groundwater* section)

Does AA contain surface or subsurface outlet? (Y) N If outlet present, is it restricted (subsurface will always be "yes")? (Y) N

Longest duration of surface water:		Surface Water Duration and other attributes (circle)		
at any wetlands within AA		Perm / Peren	(Seas / Intermit)	Temp / Ephem
in at least 10% of AA (both wetlands and nonwetlands [deepwater, streambed...]		Perm / Peren	(Seas / Intermit)	Temp / Ephem
Where fish are or historically were present (circle NA if not applicable)		Perm / Peren	(Seas / Intermit)	Temp / Ephem
	% of waterbody containing cover objects	(>25%)	10-25%	<10%
	% bank or shore with riparian or wetland shrub or forested communities	>75%	50-74%	(<50%)
adjacent to rooted wetland vegetation along a defined watercourse or shoreline subject to wave action (circle NA if not applicable)		Perm / Peren	(Seas / Intermit)	Temp / Ephem
	% cover of wetland bank or shore by sp. with binding rootmasses	>65%	35-64%	<35%

Flood Attenuation: Do any wetlands on site flood as a result of in-channel or overbank flow? Y (N) (if no, go to groundwater* section below)

Estimated wetland area subject to periodic flooding (acres):	≥10	2-10	<2
Estimated % of flooded wetland classified SS, FO or both:	≥75	25-74	<25

*Evidence of groundwater discharge or recharge? (Y) N List: Discharge

HABITAT

Habitat for Listed or Proposed Threatened, Endangered, or Montana Natural Heritage Program S1, S2, or S3 Plants or Animals:

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

Primary or critical habitat (**list species**)	D S	T/E:	D S	MNHP:	
Secondary habitat (**list species**)	D S	T/E:	D S	MNHP:	
Incidental habitat (**list species**)	D (S)	T/E: Bald eagle	D (S)	MNHP: black-necked stilt, yellow rail	
No usable habitat	D S	T/E:	D S	MNHP:	

Wildlife observations? long-tailed weasel, raccoon, beaver; No leopard frogs present (53/54)

Fish observations? 3/4"-long minnows

OTHERS

Do wetlands have potential to receive excess sediments, nutrients, or toxicants? (Y) N From: Agricultural fields + grazing

Potential to receive: (low to moderate levels) high levels On TMDL List? Y (N)

Does site contain bog, fen, warm springs, >80 year-old forested wetland, or MNHP "S1" or "S2" plant association? Y (N)

List:

Is AA a known recreation / education site? Y (N) Type:

Does AA offer strong potential for use as recreation / education site? Y (N) Type:

Field Data Sheet for 1999 MDT Wetland Assessment Form Site: Musgrave Lake Date: 7/17/01 By: JB/RH

Estimated AA Size (Circle Ac.): <1 (1-5) >5 Brief Description: Enhancement Area #2, NE Musgrave Lake, 3.1 Acre

HGM Class (CIRCLE)	Cowardin Class	Est. % of AA	Predominant Water Regime (CIRCLE)
Mineral Soil Flats	(Emergent)	50%	Perm Flood Int Exp Sem Perm Flood (Seas Flood) Sat Tem Flood Int Flood
Organic Soil Flats			
Riverine (nonperennial)	(Aquatic Bed)	20%	Perm Flood (Int Exp) Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
Riverine (upper perennial)	Moss-Lichen		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
(Riverine (lower perennial))	(Scrub-Shrub)	5%	Perm Flood Int Exp Sem Perm Flood (Seas Flood) Sat Tem Flood Int Flood
Lacustrine Fringe			
Depression (closed)	Forested		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
(Depression (open, groundwater))	(Unconsolidated Bottom)	25%	(Perm Flood) Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
Depression (open, surface water)	Other:		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
Slope			
Organic Soil Flats	Total Estimated % Vegetated		

RELATIVE ABUNDANCE: rare (com.) abun. **DISTURBANCE** is: High Moderate (Low)

HYDROLOGY: Max. acre-ft surf. water at wetlands in AA subject to inundation: <1 1-5 (>5) (if no flooding/ponding, go to groundwater* section)

Does AA contain surface or subsurface outlet? (Y) N If outlet present, is it restricted (subsurface will always be "yes")? (Y) N

Longest duration of surface water:		Surface Water Duration and other attributes (circle)		
at any wetlands within AA		(Perm / Peren)	Seas / Intermit	Temp / Ephem
in at least 10% of AA (both wetlands and nonwetlands [deepwater, streambed...]		(Perm / Peren)	Seas / Intermit	Temp / Ephem
Where fish are or historically were present (circle NA if not applicable)		(Perm / Peren)	Seas / Intermit	Temp / Ephem
	% of waterbody containing cover objects	>25%	(10-25%)	<10%
	% bank or shore with riparian or wetland shrub or forested communities	>75%	(50-74%)	<50%
adjacent to rooted wetland vegetation along a defined watercourse or shoreline subject to wave action (circle NA if not applicable)		(Perm / Peren)	Seas / Intermit	Temp / Ephem
	% cover of wetland bank or shore by sp. with binding rootmasses	(>65%)	35-64%	<35%

Flood Attenuation: Do any wetlands on site flood as a result of in-channel or overbank flow? Y (N) (if no, go to groundwater* section below)

Estimated wetland area subject to periodic flooding (acres):	≥10	2-10	<2
Estimated % of flooded wetland classified SS, FO or both:	≥75	25-74	<25

*Evidence of groundwater discharge or recharge? (Y) N List: Discharge

HABITAT

Habitat for Listed or Proposed Threatened, Endangered, or Montana Natural Heritage Program S1, S2, or S3 Plants or Animals:

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

Primary or critical habitat (**list species**)	D S	T/E:	D S	MNHP:	
Secondary habitat (**list species**)	D S	T/E:	D (S)	MNHP:	Black tern, black-necked stilt
Incidental habitat (**list species**)	D (S)	T/E: Bald eagle	D S	MNHP:	
No usable habitat	D S	T/E:	D S	MNHP:	

Wildlife observations? Northern Leopard frogs observed (33/54), numerous songbirds + game trails

Fish observations? None Obs

OTHERS

Do wetlands have potential to ~~receive excess sediments~~, nutrients, or toxicants? (Y) N From: Agricultural (Hayland, grazing)

Potential to receive (low to moderate levels) high levels On TMDL List? Y (N)

Does site contain bog, fen, warm springs, >80 year-old forested wetland, or MNHP "S1" or "S2" plant association? Y (N)

List:

Is AA a known recreation / education site? Y (N) Type:

Does AA offer strong potential for use as recreation / education site? Y (N) Type:

Field Data Sheet for 1999 MDT Wetland Assessment Form Site: Musgrave Lake Date: 7-16-01 By: SB/RH

Estimated AA Size (Circle Ac.): <1 (1-5) >5 Brief Description: Restoration Site #2, "South Oxbow", 3 Acres

HGM Class (CIRCLE)	Cowardin Class	Est. % of AA	Predominant Water Regime (CIRCLE)
Mineral Soil Flats	(Emergent)	90	Perm Flood Int Exp Sem Perm Flood (Seas Flood) Sat Tem Flood Int Flood
Organic Soil Flats			
Riverine (nonperennial)	Aquatic Bed		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
Riverine (upper perennial)			
Riverine (lower perennial)	Moss-Lichen		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
Lacustrine Fringe	(Scrub-Shrub)	5%	Perm Flood Int Exp Sem Perm Flood (Seas Flood) Sat Tem Flood Int Flood
Depression (closed)	Forested		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
(Depression (open, groundwater))	(Unconsolidated Bottom)	5%	Perm Flood Int Exp (Sem Perm Flood) Seas Flood Sat Tem Flood Int Flood
Depression (open, surface water)	Other:		Perm Flood Int Exp Sem Perm Flood Seas Flood Sat Tem Flood Int Flood
Slope			
Organic Soil Flats	Total Estimated % Vegetated	95%	

RELATIVE ABUNDANCE: rare (com) abun. **DISTURBANCE** is: High Moderate (Low)

HYDROLOGY: Max. acre-ft surf. water at wetlands in AA subject to inundation (<1) 1-5 >5 (if no flooding/ponding, go to groundwater* section)

Does AA contain surface or subsurface outlet? (Y) N If outlet present, is it restricted (subsurface will always be "yes")? (Y) N

Longest duration of surface water:		Surface Water Duration and other attributes (circle)		
at any wetlands within AA		Perm / Peren	(Seas / Intermit)	Temp / Ephem
in at least 10% of AA (both wetlands and nonwetlands [deepwater, streambed...]		Perm / Peren	(Seas / Intermit)	Temp / Ephem
Where fish are or historically were present (circle NA if not applicable)		Perm / Peren	(Seas / Intermit)	Temp / Ephem
	% of waterbody containing cover objects	>25%	10-25%	(<10%)
	% bank or shore with riparian or wetland shrub or forested communities	(>75%)	50-74%	<50%
adjacent to rooted wetland vegetation along a defined watercourse or shoreline subject to wave action (circle NA if not applicable)		Perm / Peren	Seas / Intermit	Temp / Ephem
	% cover of wetland bank or shore by sp. with binding rootmasses	>65%	35-64%	<35%

Flood Attenuation: Do any wetlands on site flood as a result of in-channel or overbank flow? Y (N) (if no, go to groundwater* section below)

Estimated wetland area subject to periodic flooding (acres):	≥10	2-10	<2
Estimated % of flooded wetland classified SS, FO or both:	≥75	25-74	<25

*Evidence of groundwater discharge or recharge? (Y) N List: Discharge

HABITAT

Habitat for Listed or Proposed Threatened, Endangered, or Montana Natural Heritage Program S1, S2, or S3 Plants or Animals:

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

Primary or critical habitat (list species)	D S	T/E:	D S	MNHP:	
Secondary habitat (list species)	D S	T/E:	D S	MNHP:	
Incidental habitat (list species)	D S	T/E:	D (S)	MNHP: black-necked stilt, yellow rail	
No usable habitat	D (S)	T/E: None	D S	MNHP:	

Wildlife observations? N. leopard frogs (53/54) present, Richardson's groundsquirrel

Fish observations? Minnows (no ID)

OTHERS

Do wetlands have potential to ~~receive excess~~ sediments, nutrients, or toxicants? (Y) N From: Agriculture / Grazing

Potential to receive: low to moderate levels high levels On TMDL List? Y (N)

Does site contain bog, fen, warm springs, >80 year-old forested wetland, or MNHP "S1" or "S2" plant association? Y (N)

List:

Is AA a known recreation / education site? Y (N) Type:

Does AA offer strong potential for use as recreation / education site? Y (N) Type:

DATA FORM
ROUTINE WETLAND
(1987 COE Wetlands Delineation Manual)

Project/Site:	Musgrave Lake Mitigation Site	Project No: #4421	Date: 17-Jul-2001
Applicant/Owner:	Montana Department of Transportation		County: Blaine
Investigators:	Berglund / Harris		State: Montana
			Plot ID: 4

Do Normal Circumstances exist on the site?	(Yes) No	Community ID:	Emergent
Is the site significantly disturbed (Atypical Situation)?	Yes (No)	Transect ID:	NA
Is the area a potential Problem Area?	Yes (No)	Field Location:	
(If needed, explain on the reverse side)		ES2, near upper end Musgrave Lk.	

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Typha latifolia	Herb	OBL	*Carex vesicaria*	Shrub	OBL
Cattail,Broad-Leaf			Sedge,Inflated		
Scirpus acutus	Herb	OBL	*Polygonum persicaria*	Shrub	FACW
Bulrush,Hard-Stem			Thumb,Lady's		
Agrostis alba	Herb	FACW	*Rumex crispus*	Shrub	FACW
Redtop			Dock,Curly		
Salix exigua	Shrub	OBL	*Phalaris arundinacea*	Shrub	FACW
Willow Sandbar			Grass,Reed Canary		
Myriophyllum spicatum	Shrub	OBL	*Eleocharis palustris*	Shrub	OBL
Water-Milfoil,Eurasian			Spikerush,Creeping		
Glyceria maxima	Shrub	OBL	*Sagittaria cuneata*	Shrub	OBL
Meadowgrass,Reed			Arrow-Head,Northern		
Beckmannia syzigachne	Shrub	OBL			
Sloughgrass,American					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 13/13 = 100.00%	FAC Neutral: 13/13 = 100.00% Numeric Index: 17/13 = 1.31

Remarks:

HYDROLOGY

YES Recorded Data(Describe in Remarks):
- NO Stream, Lake or Tide Gauge
- YES Aerial Photographs
- NO Other

NO No Recorded Data

Field Observations

Depth of Surface Water:	= 24 (in.)
Depth to Free Water in Pit:	N/A (in.)
Depth to Saturated Soil:	N/A (in.)

Wetland Hydrology Indicators
- Primary Indicators
  - YES Inundated
  - YES Saturated in Upper 12 Inches
  - NO Water Marks
  - NO Drift Lines
  - NO Sediment Deposits
  - YES Drainage Patterns in Wetlands
- Secondary Indicators
  - NO Oxidized Root Channels in Upper 12 Inches
  - NO Water-Stained Leaves
  - NO Local Soil Survey Data
  - YES FAC-Neutral Test
  - NO Other(Explain in Remarks)

Remarks:
Wetland signature on aerial photo. Well-hydrated.

DATA FORM
ROUTINE WETLAND
(1987 COE Wetlands Delineation Manual)

Project/Site:	Musgrave Lake Mitigation Site	Project No: #4421	Date: 17-Jul-2001
Applicant/Owner:	Montana Department of Transportation		County: Blaine
Investigators:	Berglund / Harris		State: Montana
			Plot ID: 4

SOILS

Map Unit Name (Series and Phase): Typic Fluvaquents, 0-2%
Map Symbol: 129 Drainage Class: PD — Mapped Hydric Inclusion?
Taxonomy (Subgroup): Typic Fluvaquents — Field Observations Confirm Mapped Type? (Yes) No

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
10	B	2.5Y3/2	7.5YR5/8	Many Prominent	Silty clay

Hydric Soil Indicators:
- NO Histosol
- NO Histic Epipedon
- YES Sulfidic Odor
- NO Aquic Moisture Regime
- NO Reducing Conditions
- YES Gleyed or Low Chroma Colors
- NO Concretions
- NO High Organic Content in Surface Layer in Sandy Soils
- NO Organic Streaking in Sandy Soils
- NO Listed on Local Hydric Soils List
- NO Listed on National Hydric Soils List
- NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:
Enhancement Site 2, near upper end of Musgrave Lake. Well-functioning wetland.

DATA FORM
ROUTINE WETLAND
(1987 COE Wetlands Delineation Manual)

Project/Site:	Musgrave Lake Mitigation Site	Project No: 84421	Date: 16-JU-2001
Applicant/Owner:	Montana Department of Transportation		County: Beire
Investigators:	Berglund / Harris		State: Montana
			Plot ID: 3

Do Normal Circumstances exist on the site?	(Yes) No	Community ID:	Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	Transect ID:	NA
Is the area a potential Problem Area?	Yes (No)	Field Location:	
(If needed, explain on the reverse side)		RS2 in transect vicinity	

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Hordeum jubatum	Herb	FAC+	*Agropyron repens*	Herb	FACU
Barley,Fox-Tail			Quackgrass		
Rumex crispus	Herb	FACW	*Polygonum aviculare*	Herb	FACU-
Dock,Curly			Knotweed,Erect		
Chenopodium album	Herb	FAC	*Festuca arundinacea*	Herb	FACU-
Goosefoot,White			Fescue,Kentucky		
Plantago major	Herb	FAC+			
Plantain,Common					

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 4/7 = 57.14%

FAC Neutral: 1/4 = 25.00%
Numeric Index: 23/7 = 3.29

Remarks:
Polygonum aviculare is an obligate species in the north plains region (R4), which is probably a more appropriate rating for this species at this site.

HYDROLOGY

NO Recorded Data(Describe in Remarks):
- N/A Stream, Lake or Tide Gauge
- N/A Aerial Photographs
- N/A Other

YES No Recorded Data

Field Observations

Depth of Surface Water:	N/A (in.)
Depth to Free Water in Pit:	N/A (in.)
Depth to Saturated Soil:	N/A (in.)

Wetland Hydrology Indicators
Primary Indicators
- NO Inundated
- NO Saturated in Upper 12 Inches
- NO Water Marks
- NO Drift Lines
- NO Sediment Deposits
- YES Drainage Patterns in Wetlands

Secondary Indicators
- NO Oxidized Root Channels in Upper 12 Inches
- NO Water-Stained Leaves
- NO Local Soil Survey Data
- NO FAC-Neutral Test
- YES Other(Explain in Remarks)

Remarks:
Soil moist at 10", but not currently saturated. Soil surface has been saturated and cracked. Indicators are weak, but appear to be developing.

DATA FORM
ROUTINE WETLAND
(1987 COE Wetlands Delineation Manual)

Project/Site:	Musgrave Lake Mitigation Site	Project No: 84421	Date: 16-JU-2001
Applicant/Owner:	Montana Department of Transportation		County: Beire
Investigators:	Berglund / Harris		State: Montana
			Plot ID: 3

SOILS

Map Unit Name (Series and Phase): Havre silty clay loam, saline
Map Symbol: 58 Drainage Class: WD
Taxonomy (Subgroup): Udic Torrifluvents
Profile Description

Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? (Yes) No

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
10	B	2.5Y3/2	10YR5/8	Few Faint	Silty clay loam

Hydric Soil Indicators:
- NO Histosol
- NO Histic Epipedon
- NO Sulfidic Odor
- NO Aquic Moisture Regime
- NO Reducing Conditions
- YES Gleyed or Low Chroma Colors
- NO Concretions
- NO High Organic Content in Surface Layer in Sandy Soils
- NO Organic Streaking in Sandy Soils
- NO Listed on Local Hydric Soils List
- NO Listed on National Hydric Soils List
- NO Other (Explain in Remarks)

Remarks:
Weak hydric soil indicators.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland?	(Yes) No
Wetland Hydrology Present?	(Yes) No		
Hydric Soils Present?	(Yes) No		

Remarks:
Restoration site 2, in eastern portion near transect location. Site appears to be developing, but could use more water.

DATA FORM
ROUTINE WETLAND
(1987 COE Wetlands Delineation Manual)

Project/Site: Musgrave Lake Mitigation Site	Project No: #4421	Date: 16-JU-2001	
Applicant/Owner: Montana Department of Transportation		County: Blaine	
Investigators: Berglund / Harris		State: Montana	
		Plot ID: 2	

Do Normal Circumstances exist on the site?	(Yes) No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	Transect ID: NA
Is the area a potential Problem Area?	Yes (No)	Field Location:
(If needed, explain on the reverse side)		S. end ES1, N of dike & W of main ditch

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Poa pratensis	Herb	FACU+	*Rumex crispus*	Herb	FACW
Bluegrass,Kentucky			Dock,Curly		
Agropyron repens	Herb	FACU	*Beckmannia syzigachne*	Herb	OBL
Quackgrass			Sloughgrass American		
Carex vulpinoidea	Herb	OBL	*Agrostis alba*	Herb	FACW
Sedge Fox			Redtop		
Hordeum jubatum	Herb	FAC+	*Alopecurus pratensis*	Herb	FACW
Barley,Fox-Tail			Foxtail,Meadow		
Typha latifolia	Herb	OBL	*Polygonum hydropiper*	Herb	OBL
Cattail,Broad-Leaf			Smartweed,Marshpepper		
Scirpus acutus	Herb	OBL	*Chenopodium album*	Herb	FAC
Bulrush,Hard-Stem			Goosefoot,White		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 10/12 = 83.33%
FAC Neutral: 8/10 = 80.00%
Numeric Index: 25/12 = 2.08

Remarks:

HYDROLOGY

YES Recorded Data(Describe in Remarks):
- NO Stream, Lake or Tide Gauge
- YES Aerial Photographs
- NO Other

NO No Recorded Data

Field Observations

Depth of Surface Water:	None (in.)
Depth to Free Water in Pit:	> 14 (in.)
Depth to Saturated Soil:	> 14 (in.)

Wetland Hydrology Indicators
Primary Indicators
- NO Inundated
- NO Saturated in Upper 12 Inches
- NO Water Marks
- NO Drift Lines
- NO Sediment Deposits
- YES Drainage Patterns in Wetlands

Secondary Indicators
- NO Oxidized Root Channels in Upper 12 Inches
- NO Water-Stained Leaves
- NO Local Soil Survey Data
- YES FAC-Neutral Test
- NO Other(Explain in Remarks)

Remarks:
Likely sub-irrigating from adjacent ditch. Wetland signature on aerial photo.

DATA FORM
ROUTINE WETLAND
(1987 COE Wetlands Delineation Manual)

Project/Site: Musgrave Lake Mitigation Site	Project No: #4421	Date: 16-JU-2001	
Applicant/Owner: Montana Department of Transportation		County: Blaine	
Investigators: Berglund / Harris		State: Montana	
		Plot ID: 2	

SOILS

Map Unit Name (Series and Phase): Typic Fluvaquents, 0-2%
Map Symbol: 129 Drainage Class: PO
Mapped Hydric Inclusion?
Taxonomy (Subgroup): Typic Fluvaquents
Field Observations Confirm Mapped Type? (Yes) No
Profile Description

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
10	B	2.5Y3/1	7.5YR5/8	Common Faint	Silty clay

Hydric Soil Indicators:
- NO Histosol
- NO Histic Epipedon
- NO Sulfidic Odor
- NO Aquic Moisture Regime
- NO Reducing Conditions
- YES Gleyed or Low Chroma Colors
- NO Concretions
- NO High Organic Content in Surface Layer in Sandy Soils
- NO Organic Streaking in Sandy Soils
- NO Listed on Local Hydric Soils List
- NO Listed on National Hydric Soils List
- NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:
Entrancement Site 1; south end. Site likely saturates to surface when water is up.

DATA FORM
ROUTINE WETLAND
(1987 COE Wetlands Delineation Manual)

Project/Site:	Musgrave Lake Mitigation Site	Project No: #4421	Date: 16-Jul-2001
Applicant/Owner:	Montana Department of Transportation		County: Blaine
Investigators:	Berglund / Harris		State: Montana
			Plot ID: 1

Do Normal Circumstances exist on the site?	(Yes) No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	Transect ID: NA
Is the area a potential Problem Area?	Yes (No)	Field Location:
(If needed, explain on the reverse side)		RS-1, west half of site, center

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Typha latifolia	Herb	OBL	*Agropyron repens*	Herb	FACU
Cattail,Broad-Leaf			Quackgrass		
Alopecurus pratensis	Herb	FACW	*Polygonum amphibium*	Herb	OBL
Foxtail Meadow			Smartweed,Water		
Scirpus acutus	Herb	OBL	*Eleocharis palustris*	Herb	OBL
Bulrush,Hard-Stem			Spikerush,Creeping		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 5/6 = 83.33%

FAC Neutral: 5/6 = 83.33%
Numeric Index: 10/6 = 1.67

Remarks:
Comments

HYDROLOGY

NO Recorded Data(Describe in Remarks):
N/A Stream, Lake or Tide Gauge
N/A Aerial Photographs
N/A Other

YES No Recorded Data

Field Observations

Depth of Surface Water:	= 3 (in.)
Depth to Free Water in Pit:	N/A (in.)
Depth to Saturated Soil:	N/A (in.)

Wetland Hydrology Indicators
Primary Indicators
YES Inundated
YES Saturated in Upper 12 Inches
NO Water Marks
NO Drift Lines
NO Sediment Deposits
NO Drainage Patterns in Wetlands
Secondary Indicators
NO Oxidized Root Channels in Upper 12 Inches
NO Water-Stained Leaves
NO Local Soil Survey Data
YES FAC-Neutral Test
NO Other(Explain in Remarks)

Remarks:
Much of site is inundated; seems to be groundwater connection. Free water at top of pit.

DATA FORM
ROUTINE WETLAND
(1987 COE Wetlands Delineation Manual)

Project/Site:	Musgrave Lake Mitigation Site	Project No: #4421	Date: 16-Jul-2001
Applicant/Owner:	Montana Department of Transportation		County: Blaine
Investigators:	Berglund / Harris		State: Montana
			Plot ID: 1

SOILS

Map Unit Name (Series and Phase): Typic Fluvaquents, 0-2%
Map Symbol: 129 Drainage Class: PD
Taxonomy (Subgroup): Typic Fluvaquents
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? (Yes) No
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
10	B	2.5Y4/2	10YR5/8	Common Distinct	Silty clay
10	B	2.5Y4/2	10YR5/8	Common Distinct	Silty clay

Hydric Soil Indicators:

NO Histosol	NO Concretions
NO Histic Epipedon	NO High Organic Content in Surface Layer in Sandy Soils
YES Sulfidic Odor	NO Organic Streaking in Sandy Soils
NO Aquic Moisture Regime	NO Listed on Local Hydric Soils List
NO Reducing Conditions	NO Listed on National Hydric Soils List
YES Gleyed or Low Chroma Colors	NO Other (Explain in Remarks)

Remarks:
Strong sulfide odor. Second pit excavated in center of site at north wetland boundary.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes) No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes) No	
Hydric Soils Present?	(Yes) No	

Remarks:
Restoration Site 1; large developing marsh.

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

1. Project Name: Musgrave Lake 2. Project #: NH-STPX 3(33) Control #: 4421

3. Evaluation Date: Mo. 7 Day 16 Yr. 01 4. Evaluator(s): JB/RH 5. Wetlands/Site #(s) Restoration #1

6. Wetland Location(s): i. Legal: T 32 (N) or S; R 21 (E) or W; S 11 ; T ___ N or S; R ___ E or W; S ___ ;
ii. Approx. Stationing or Mileposts: NA

iii. Watershed: 10050004 GPS Reference No. (if applies): —
Other Location Information:
SE of Zurich, S of Milk River, Blaine County

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)
7-8 (measured, e.g. by GPS [if applies])

9. Assessment area: (AA, tot., ac., see instructions on determining AA) ___ (visually estimated)
7-8 (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
Dep. (open, gw)	Palustrine	—	EM	SF	D	90%
"	"	—	AB	SPF	D	5%

(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), Intermittently 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.) Grazing in surrounding areas
ii. Prominent weedy, alien, & introduced species (including those not domesticated, feral): (list) CIR ARV

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: Restoration site #1 in NW corner of site — Surrounding use = hay + grazing. Site is large marsh.

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:

Rest #1

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	
Incidental habitat (**list species**)	D (S)	Bald Eagle
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	
Secondary habitat (**list species**)	(D) S	Northern leopard frog
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): Northern leopard frogs present, but only 2 observed despite intensive veg. survey

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.
- __ presence of extremely limiting habitat features not available in the surrounding area
- __ interviews with local biologists with knowledge of the AA

Low (based on any of the following [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:

 Rest #1

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: NA

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: NA

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: NA

14H Sediment/Shoreline Stabilization: (applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body 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: NA

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

___Springs are known or observed
XX Vegetation growing during dormant season/drought
___Wetland occurs at the toe of a natural slope
XX Seeps are present at the wetland edge
___AA permanently flooded during drought periods
___Wetland contains an outlet, but no inlet
___Other

II. Recharge Indicators

___Permeable substrate 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: ___ Educational/scientific study; ___ Consumptive rec.; ___ 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:

 Rest. #1

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	LOW	0.3	1	
B. MT Natural Heritage Program Species Habitat	MOD	0.7	1	
C. General Wildlife Habitat	HIGH	0.9	1	
D. General Fish/Aquatic Habitat	NA	–	–	
E. Flood Attenuation	NA	–	–	
F. Short and Long Term Surface Water Storage	MOD	0.6	1	
G. Sediment/Nutrient/Toxicant Removal	NA	–	–	
H. Sediment/Shoreline Stabilization	NA	–	–	
I. Production Export/Food Chain Support	HIGH	0.8	1	
J. Groundwater Discharge/Recharge	HIGH	1	1	
K. Uniqueness	MOD	0.4	1	
L. Recreation/Education Potential	LOW	0.1	1	
Totals:		4.8	8	

60%

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)
- ___ 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**
- ___ 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

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

1. Project Name: Musgrave Lake 2. Project #: NH-STPX 3(33) Control #: 4421

3. Evaluation Date: Mo. 7 Day 16 Yr. 01 4. Evaluator(s): JB/RH 5. Wetlands/Site #(s) Restoration #2 "South" Oxbow

6. Wetland Location(s): i. Legal: T 32 (N) or S; R 21 (E) or W; S 11, 12 ; T ___ N or S; R ___ E or W; S ___ ;
ii. Approx. Stationing or Mileposts: NA

iii. Watershed: 10050004 GPS Reference No. (if applies): —
Other Location Information:
SE of Zurich, S of Milk River, Blaine County

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) ~20 (visually estimated)
— (measured, e.g. by GPS [if applies])

9. Assessment area: (AA, tot., ac., see instructions on determining AA) 3 (visually estimated)
3 (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 (non-per.)	Palustrine	—	EM	SF	D	90
	"	—	SS	SF	D	5
	"	—	UB	SPF	D	5

(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), Intermittently 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.): Hayland
ii. Prominent weedy, alien, & introduced species (including those not domesticated, feral): (list) CIR ARV

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: "South" oxbow section, the east end of which was hayed in 2001. Surrounded by hayland. Site is largely developing wet meadow marsh.

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 Rest. #2

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	
Incidental habitat (**list species**)	D S	
No usable habitat	D (S)	None

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	Northern leopard frog
Secondary habitat (**list species**)	D S	
Incidental habitat (**list species**)	D (S)	black nickell S.I.T., yellow rail
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.): Leopard frogs present, but only 2 observed.

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

Low (based on any of the following [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]):
- XX observations of scattered wildlife groups or individuals or relatively few species during peak periods
- XX 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:

Rest. #2

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)

– limited by water depth and extent regulated by standpipe –

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: Minnows observed

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: Homes

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:

14H Sediment/Shoreline Stabilization: (applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body 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: Nominal "flow" Component.

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

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

ii. Recharge Indicators

- ___ Permeable substrate 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: ___ Educational/scientific study; ___ Consumptive rec.; ___ 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:

 Rest. #2

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	LOW	0	1	
B. MT Natural Heritage Program Species Habitat	MOD	0.7	1	
C. General Wildlife Habitat	MOD	0.5	1	
D. General Fish/Aquatic Habitat	LOW	0.3	1	
E. Flood Attenuation	LOW	0.2	1	
F. Short and Long Term Surface Water Storage	LOW	0.3	1	
G. Sediment/Nutrient/Toxicant Removal	HIGH	1	1	
H. Sediment/Shoreline Stabilization	NA	—	—	
I. Production Export/Food Chain Support	MOD	0.7	1	
J. Groundwater Discharge/Recharge	HIGH	1	1	
K. Uniqueness	LOW	0.3	1	
L. Recreation/Education Potential	LOW	0.1	1	
Totals:		5.1	11	

46%

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)
- ___ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
- ___ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ___ Score of .9 or 1 functional point for General Fish/Aquatic Habitat; **or**
- ___ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
- ___ Score of .9 functional point for Uniqueness; **or**
- ___ 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

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

1. Project Name: Musgrave Lake 2. Project #: NH-STPX 3(33) Control #: 4421

3. Evaluation Date: Mo. 7 Day 16 Yr. 01 4. Evaluator(s): JB/RH 5. Wetlands/Site #(s) Enhancement #1 "Middle" oxbow

6. Wetland Location(s): I. Legal: T 32 (N) or S; R 21 (E) or W; S 11, 12 ; T ___ N or S; R ___ E or W; S ___ ;
II. Approx. Stationing or Mileposts: NA

III. Watershed: 10050004 GPS Reference No. (if applies): —
Other Location Information:
SE of Zurich, S of Milk River, Blaine County

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) 20 AC. (visually estimated)
___ (measured, e.g. by GPS [if applies])

9. Assessment area: (AA, tot., ac., see instructions on determining AA) 4-5 (visually estimated)
4-5 (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 (non-per)	Palustrine	—	EM	SF	D	75%
"	"		AB	SPF	D	10%
"	"		SS	Sat	D	10%
"	Riverine	Intermittent	S.B	SPF	D	5%

(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), Intermittently 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.): Hayland
II. Prominent weedy, alien, & Introduced species (including those not domesticated, feral): (list) CIR ARV

III. Provide brief descriptive summary of AA and surrounding land use/habitat: "Middle" section of oxbow that drains to Musgrave Lake – bordered to E+W by hayland. AA is bordered @ upper end by dike + road, and @ lower end by ditch crossing.

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:

Enh. # 1

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	
Incidental habitat (**list species**)	D (S)	Bald Eagle
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	
Secondary habitat (**list species**)	(D) S	Great plains toad
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): Northern leopard frogs, but only 2 ; Great Plains toad obs. by MDT in 1999

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

Low (based on any of the following [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:

 Enh. #1

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)

fish regulated to "ditch" portion of site.

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: Minnows observed.

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: Homes

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: Sediments filtered by "upstream" impoundment.

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: Few shrubs along actual water course.

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

___Springs are known or observed
___Vegetation growing during dormant season/drought
___Wetland occurs at the toe of a natural slope
XX Seeps are present at the wetland edge
___AA permanently flooded during drought periods
___Wetland contains an outlet, but no inlet
___Other

ii. Recharge Indicators

___Permeable substrate 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: ___ Educational/scientific study; ___ Consumptive rec.; ___ 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:

 Enh. #1

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	LOW	0.3	1	
B. MT Natural Heritage Program Species Habitat	MOD	0.7	1	
C. General Wildlife Habitat	HIGH	0.9	1	
D. General Fish/Aquatic Habitat	LOW	0.3	1	
E. Flood Attenuation	MOD	0.4	1	
F. Short and Long Term Surface Water Storage	LOW	0.3	1	
G. Sediment/Nutrient/Toxicant Removal	HIGH	0.9	1	
H. Sediment/Shoreline Stabilization	MOD	0.6	1	
I. Production Export/Food Chain Support	HIGH	0.8	1	
J. Groundwater Discharge/Recharge	HIGH	1	1	
K. Uniqueness	MOD	0.5	1	
L. Recreation/Education Potential	LOW	0.1	1	
Totals:		6.5	12	

54 %

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)
___ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
XX 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**
___ 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

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

1. Project Name: Musgrave Lake 2. Project #: NH-STPX 3(33) Control #: 4421

3. Evaluation Date: Mo. 7 Day 16 Yr. 01 4. Evaluator(s): JB/RH 5. Wetlands/Site #(s) Enhancement #2 NE end of Musgrave Lk.

6. Wetland Location(s): I. Legal: T 32 (N) or S; R 21 (E) or W; S 12 ; T ___ N or S; R ___ E or W; S ___ ;
II. Approx. Stationing or Mileposts: NA

III. Watershed: 10050004 GPS Reference No. (if applies): —
Other Location Information:
SE of Zurich, S of Milk River, Blaine County

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) 20 Ac (visually estimated)
___ (measured, e.g. by GPS [if applies])

9. Assessment area: (AA, tot., ac., see instructions on determining AA) ___ (visually estimated)
3-4 (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 (Lower Per.)	Palustrine	—	EM	SF	—	50
"	"	—	AB	IE	—	20
"	"	—	SS	SF	—	5
"	"	—	UB	PF	—	25

(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), Intermittently 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 adjecent 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 substanbal 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.): Hayland
II. Prominent weedy, alien, & Introduced species (including those not domesticated, feral): (list) CIR ARV

III. Provide brief descriptive summary of AA and surrounding land use/habitat: Lower portion of Musgrave Lake within easement area. AA bordered to NTS by hayland, bordered to west by primarily open water, and to east by wetland boundary. AA consists of marsh w/ AB/EM habitat.

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:

Enh. #2

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	
Incidental habitat (list species)	D (S)	Bald Eagle
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	
Secondary habitat (list species)	(D) S	Northern leopard frog
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.): leopard frogs present, but only 1 obs.

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

Low (based on any of the following [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: Numerous songbirds + game trails.

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: Only minnows present according to FWP (Gilge pers. comm.)

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: Homes Flow could possibly "backlink" into the AA from Milk.

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:

 Enh. #2

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: Shrubs along shore

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

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

II. Recharge Indicators

- ___ Permeable substrate 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: ___ Educational/scientific study; XX Consumptive rec.; ___ 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: Waterfowl hunting

 Enh. #2

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	LOW	0.3	1	
B. MT Natural Heritage Program Species Habitat	MOD	0.7	1	
C. General Wildlife Habitat	HIGH	0.9	1	
D. General Fish/Aquatic Habitat	MOD	0.5	1	
E. Flood Attenuation	MOD	0.5	1	
F. Short and Long Term Surface Water Storage	HIGH	1	1	
G. Sediment/Nutrient/Toxicant Removal	HIGH	1	1	
H. Sediment/Shoreline Stabilization	HIGH	1	1	
I. Production Export/Food Chain Support	HIGH	0.9	1	
J. Groundwater Discharge/Recharge	HIGH	1	1	
K. Uniqueness	MOD	0.5	1	
L. Recreation/Education Potential	LOW	0.3	1	
Totals:		8.6	12	

72%

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)

___ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; or
XX 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
XX "High" to "Exceptional" ratings for both General Wildlife Habitat and General Fish/Aquatic Habitat; or
___ Score of .9 functional point for Uniqueness; or
XX 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
Wetland Mitigation Monitoring Project
for
Land and Water Consulting
2001

Project Name: Musgrave La Musgrave La Musgrave La Musgrave Lake
Project/task number: 019 Rest #1 019 Rest #2 019 Enh #1 019 Enh.#2
Date:
Field Personnel:
Note:

		Rhithron Sample Identification	2	15	6	21
Coelenterata		*Hydra*		1	1	
Oligochaeta	Enchytraeidae	Enchytraeidae	11			
	Naididae	*Chaetogaster*				6
		Nais elinguis	13			
		Nais variabilis		8		
		Ophidonais serpentina				
	Tubificidae	Tubificidae - immature			1	
		Limnodrilus hoffmeisteri	1			
Hirudinea	Erpobdellidae	*Mooreobdella microstoma*				
		Nephelopsis				
	Glossiphoniidae	*Helobdella stagnalis*				
		Helobdella				
		Glossiphonia				
Bivalvia	Sphaeriidae	*Sphaerium*				
Gastropoda	Lymnaeidae	*Fossaria*	1			
	Physidae	*Physa*		34	13	19
	Planorbidae	*Gyraulus*	1	15	26	5
		Helisoma				
Crustacea	Cladocera	Cladocera		52	57	9
	Copepoda	Calanoida				
		Cyclopoida	17	23	2	
	Ostracoda	Ostracoda	34	5	4	
	Amphipoda	*Gammarus*				
		Hyalella azteca	4	75	52	16
	Decapoda	*Orconectes*				
Acarina		Acari	18	5	3	7
Odonata	Aeshnidae	*Anax*			1	
	Libellulidae	Libellulidae-early instar				
		Sympetrum	1			
	Coenagrionidae	Coenagrionidae-early instar		1	7	9
		Enallagma				
	Lestidae	*Lestes*			1	1
Ephemeroptera	Baetidae	*Callibaetis*				
	Caenidae	*Caenis*	1	1		
Hemiptera	Corixidae	Corixidae - immature	2	7	4	1
		Hesperocorixa				
		Sigara	7		5	
		Trichocorixa		3	1	
	Nepidae	*Ranatra*		1		
	Notonectidae	*Notonecta*		1	1	
Trichoptera	Hydroptilidae	Hydroptilidae - pupa				
	Leptoceridae	Leptoceridae - early instar				
		Mystacides				
		Ylodes				
Coleoptera	Chrysomelidae	Chrysomelidae				
	Curculionidae	*Bagous*	1			
	Dytiscidae	*Acilius*			1	
		Hydroporinae - early instar larvae		2		
		Hygrotus		1	1	3
		Liodessus	2			
		Laccophilus	1	3	12	
		Neoporus		1		
	Elmidae	*Heterlimnius*				
	Haliplidae	*Haliplus*	9	6	7	1
		Peltodytes		1		
	Hydrophilidae	*Berosus*	3	2		
		Helophorus				
		Hydrobius	8			
		Hydrochara			1	
		Laccobius				
		Tropisternus	5			1
Diptera	Ceratopogoninae	*Bezzia/Palpomyia*	4			
		Dasyhelea	5			
	Chaoboridae	*Chaoborus*				
	Culicidae	*Anopheles*				
		Culex	5			
	Ephydridae	Ephydridae				
	Simuliidae	*Simulium*				
	Sciomyzidae	Sciomyzidae				
	Stratiomyidae	*Odontomyia*	3			
	Chironomidae	*Acricotopus*				
		Chironomus	29	2	3	
		Cladotanytarsus				
		Corynoneura			1	1
		Cryptotendipes				
		Dicrotendipes	4	3	2	1
		Einfeldia	5			
		Endochironomus		1	1	
		Labrundinia				
		Microtendipes				
		Orthocladius annectens	1	9	3	3
		Parachironomus		8	1	

Paramerina		3	1	
Paratanytarsus				2
Phaenopsectra				
Polypedilum				
Procladius	2			
Psectrocladius	1		1	
Psectrotanypus	1			
Pseudochironomus				
Tanypus				
Tanytarsus	1			
TOTAL	201	274	214	85
grids	8	1	23	30
Total taxa	32	28	29	16
POET	6	6	5	5
Chironomidae taxa	8	6	8	4
Crustacea taxa + Mollusca taxa	3	3	3	3
% Chironomidae	21.8905473	9.48905109	6.07476636	8.23529412
Orthocladiinae/Chironomidae	4.54545455	34.6153846	38.4615385	57.1428571
%Amphipoda	1.99004975	27.3722628	24.2990654	18.8235294
%Crustacea + %Mollusca	2.98507463	45.2554745	42.5233645	47.0588235
HBI	7.17412935	7.68248175	7.54672897	7.22352941
%Dominant taxon	16.9154229	27.3722628	26.635514	22.3529412
%Collector-Gatherers	67.6616915	61.3138686	38.7850467	49.4117647
%Filterers	0	18.9781022	26.635514	10.5882353
Total taxa	5	5	5	3
POET	5	5	3	3
Chironomidae taxa	5	3	5	3
Crustacea taxa + Mollusca taxa	5	5	5	5
% Chironomidae	1	3	3	3
Orthocladiinae/Chironomidae	1	3	3	3
%Amphipoda	3	1	1	1
%Crustacea + %Mollusca	3	1	1	1
HBI	3	1	1	3
%Dominant taxon	5	3	5	5
%Collector-Gatherers	3	3	1	3
%Filterers	3	1	1	1
site score	42	34	34	34

Appendix C

REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Musgrave Lake
Zurich, Montana

LAND & WATER

RS1, Transect 1 from Start, 10 degrees N/NE

RS1, Transect 1 from End, 192 degrees S/SW

ES1, Transect 2 from Start, 106 degrees E/SE

ES1, Transect 2 from End, 299 degrees W/NW

RS2, Transect 2 from Start, 167 degrees S/SE

RS2, Transect 2 from End, 354 degrees N/NW

2001 Musgrave Lake Sheet 1

ES2, Transect 4 from Start, 20 degrees N/NE

ES2, Transect 4 from End, 194 degrees S/SW

RS2, Photo Point 1, 260 degrees W

RS2, Photo Point 2, 100 degrees E

RS2, Photo Point 3, 54 degrees NE

RS2, Photo Point 4, 19 degrees S

2001 Musgrave Lake Sheet 2

ES1, Photo Point 4, 15 degrees N

ES1, Photo Point 5, 123 degrees SE

ES1, Photo Point 5, 290 degrees W/NW (adjacent upland)

RS1, Photo Point 6, 310 degrees NW

RS1, Photo Point 7, 143 degrees SE

ES2, Photo Point 8, 105 degrees N/NE

2001 Musgrave Lake Sheet 3

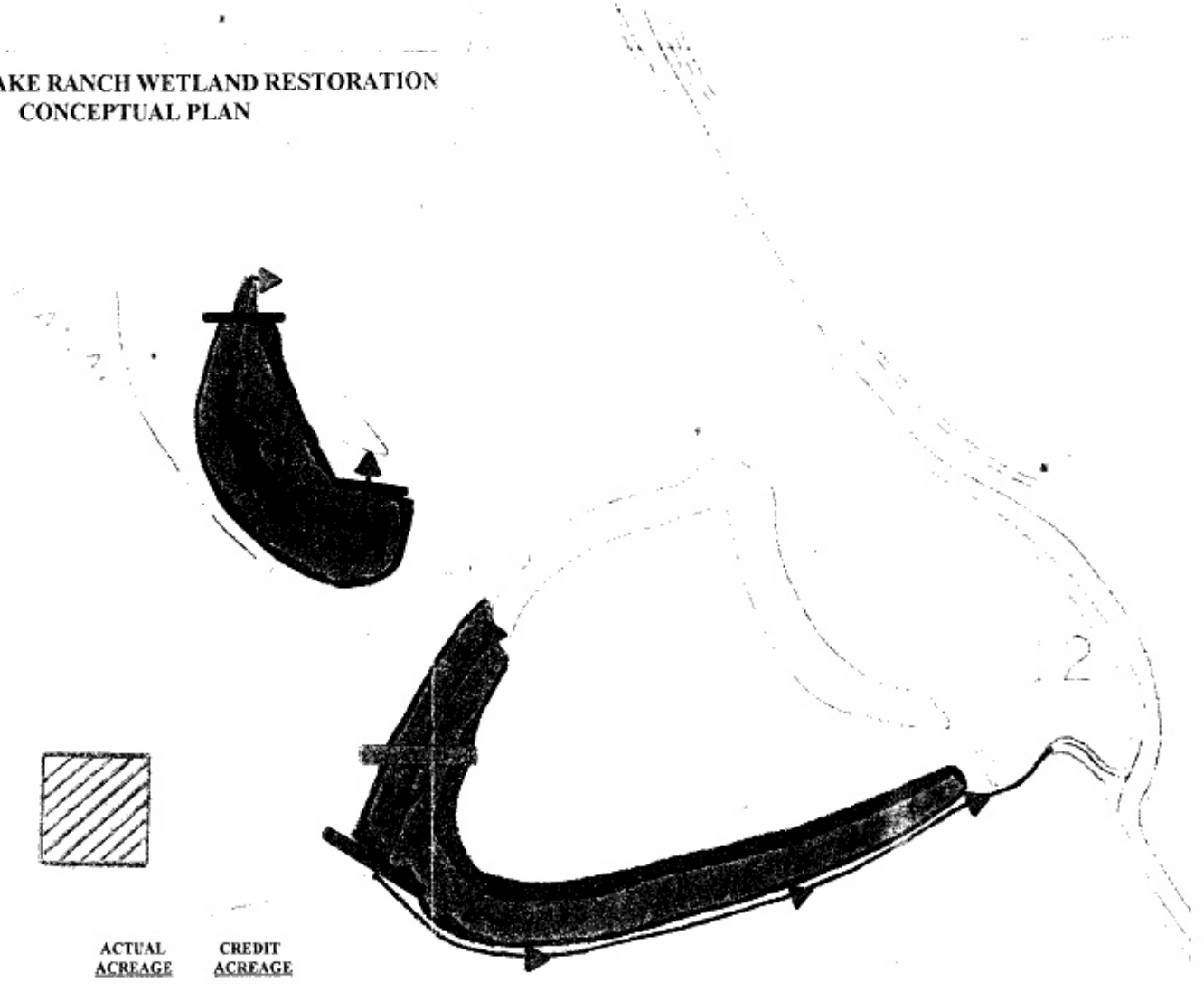
Appendix D

CONCEPTUAL SITE LAYOUT
COMPLETED PRE-PROJECT FUNCTIONAL ASSESSMENT FORMS

MDT Wetland Mitigation Monitoring
Musgrave Lake
Zurich, Montana

LAND & WATER

MUSGRAVE LAKE RANCH WETLAND RESTORATION
CONCEPTUAL PLAN



SYMBOL	DESCRIPTION	ACTUAL ACREAGE	CREDIT ACREAGE
	Standing Water Depth from 0" to 24"	16.6 acres	15.2 acres
	Standing Water Depth from 24" to 42"	3.6 acres	3.6 acres
	Riparian and Upland Buffer	8.4 acres	8.4 acres
	Ditch Plug/Dike		27.2 acres
	Borrow Area and Road Fill (existing)		
	Existing Ditches		

MDT Montana Wetland Assessment Form (revised 5/03/1999, PRELIMINARY DRAFT)

1. Project Name: Musgrave Lake Ranch 2. Project #: _____ Control #: _____

3. Evaluation Date: Mo 09 Da 29 Yr 99 4. Evaluator(s): Jim Stutzman 5. Wetlands/Site #(s) Reference Site

6. Wetland Location(s): i. Legal: T 32 (N) or S; R 21 (E) or W; S 11 NE ¼ : T 32 (N) or S, R 21 (E) or W; S 12 NW ¼ .
ii. Approx. Stationing or Mileposts: _____

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

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

8. Wetland size: (total acres) 20 + (visually estimated)
_____ (measured, e.g. by GPS [if applies])

9. Assessment area: (AA, tot., ac., see instructions on determining AA) 20 + (visually estimated)
_____ (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
Depression (open, surface, ground water)	Palustrine		EM, SS	F		100%

(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**), Intermittently 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

Comments: pockets of salix & populus Wetland has old, ineffective ditch

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

AA is fenced to livestock, one old crossing/road exists

Comments: (types of disturbance, intensity, season, etc.): grazing is light
ii. Prominent weedy, alien, & introduced species (including those not domesticated, feral): (list) none

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: Wetland is intact. An old ditch is has filled in and is ineffective. Grazing pressure has been light. Some periodic burning from wildfire has occurred. Uplands adjacent to the wetland are potentially grazed and cultivated for hay and grain.

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	
Incidental habitat (list species)	D (S)	Bald Eagle
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)	Great Plains Toad
Secondary habitat (list species)	(D) S	Great Blue Heron, Franklin's Gull
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]):
- ✓ observations of abundant wildlife #'s or high species diversity (during any period)
- ✓ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ___ presence of extremely limiting habitat features not available in the surrounding area
- ✓ interviews with local biologists with knowledge of the AA

Low (based on any of the following [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 in 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: NA

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: County Road, 1 Residence

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:

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 has a maximum depth exceeding 6.6 ft. at low water (e.g. 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: N/A

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 (circled)						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate (circled)		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes (circled)	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1H	.9H	.9H (circled)	.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

___Springs are known or observed
___Vegetation growing during dormant season/drought
X Wetland occurs at the toe of a natural slope
___Seeps are present at the wetland edge
___AA permanently flooded during drought periods
___Wetland contains an outlet, but no inlet
X Other

ii. Recharge Indicators

___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) (circled)
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) (circled)	.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: ___ 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 (circled)	high
public ownership	1 (H)	.5 (M)	.2 (L)
private ownership	.7 (M)	.3 (L) (circled)	.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	0.3		1	
B. MT Natural Heritage Program Species Habitat	0.7		1	
C. General Wildlife Habitat	0.9		1	
D. General Fish/Aquatic Habitat	NA		NA	
E. Flood Attenuation	0.5		1	
F. Short and Long Term Surface Water Storage	1.0		1	
G. Sediment/Nutrient/Toxicant Removal	0.7		1	
H. Sediment/Shoreline Stabilization	NA		NA	
I. Production Export/Food Chain Support	0.9		1	
J. Groundwater Discharge/Recharge	1.0		1	
K. Uniqueness	0.3		1	
L. Recreation/Education Potential	0.3		1	
Totals:	6.6		10	

$6.6/10.0 = 66\%$

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)
___ 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

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

1. Project Name: Musgrave Lake Ranch 2. Project #: STPX 3(33) Control #: 4421

Evaluation Date: Mo. 09 Day 29 Yr. 99 4. Evaluator(s): L. Urban, P. Basting 5. Wetlands/Site #(s) Site #2 - Drained oxbow of Musgrave Lake

6. Wetland Location(s): i. Legal: T 32 (N) or S; R 21 (E) or W; S 11 NE 1/4 ; T 32 (N) or S; R 21 (E) or W; S NW 1/4 :
ii. Approx. Stationing or Mileposts:

iii. Watershed: 10050004 GPS Reference No. (if applies):
Other Location Information: Watershed #11 Milk River

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

8. Wetland size: (total acres) 3.5 Acres (visually estimated) _____ (measured, e.g. by GPS [if applies])

9. Assessment area: (AA, tot., ac., see instructions on determining AA) 35+ (visually estimated) _____ (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	Palustrine		UB	Perm Flooded	D	20%
Riverine	Palustrine		S/S	Semi perm. Flooded	D	10%
Riverine	Palustrine		EM	Drained	F	60%
Riverine	Riverine	Lower Perennial	EM	Flooded	E	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), Intermittently 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.): - Ditched, drained and farmed oxbow of Milk River
ii. Prominent weedy, alien, & introduced species (including those not domesticated, feral): (list) Canada thistle, lambsquarter

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: - Assessment area includes Musgrave Lake and a drained historic oxbow of the Milk River that is in agricultural production. The area was formerly fed by a tributary to the Milk which has been ditched and drained into The "A" Drain which empties into Milk R.

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: Area has emergent and scrub/shrub vegetative communities in wetland areas of The Musgrave Lake oxbow, however over 60% of oxbow is drained & farmed. So a low structural diversity is more likely.

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	
Incidental habitat (list species)	D (S)	Bald eagle, mountain plover
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): Although both species have been identified in the region, it is anticipated that only incidental usage occurs due to man's disturbance.

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	
Secondary habitat (list species)	(D) S	Great Blue Heron, Great Plains Toad
Incidental habitat (list species)	D (S)	mountain plover, Swift Fox
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.): A number of species were identified by the MNHP as potentially found in the project area. Great Blue Herons and Great Plains Toads were observed

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

Low (based on any of the following [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: Area is utilized by a number of wildlife species, but it is also subject to agricultural practices, therefore the rating is moderate.

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 in the comments.)

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)

Milk River

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: Fish usage of the AA is severely limited by a perched culvert + massive headcut caused by ditching and draining of the tributary + oxbow. New Dike installation precludes fish passage

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)	.5(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: County Road and residences along Milk River downstream of site. Some woody vegetation within AA, but majority hayfield & cropland.

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: With the construction of a new dike structure storage will be longer in duration, however, currently the site drains quickly due to ditches.

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: As the AA contains Musgrave Lake and is surrounded by agricultural fields + pastures it does recieve nutrient runoff, unfortunately due to the ditching - no sediments/nutrients are captured.

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: The area around the drainage ditch is severely head cut and in need of stabilization water flows through the system year round.

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: As the drainage ditch carries all runoff to the Milk River there is a moderate level of food chain support outside the AA, but a low level within the AA.

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

i. Discharge Indicators

___Springs are known or observed
___Vegetation growing during dormant season/drought
___Wetland occurs at the toe of a natural slope
___Seeps are present at the wetland edge
___AA permanently flooded during drought periods
___Wetland contains an outlet, but no inlet
___Other

ii. Recharge Indicators

___Permeable substrate present without underlying impeding layer
___Wetland contains inlet but no outlet
___Other

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: It is unknown as to whether the area serves as a recharge/discharge area for groundwater as it is ditched and drained

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: A number of drained and farmed historic oxbows of the Milk River can be found in the region, therefore it is not unique.

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: ___ Educational/scientific study; ___ Consumptive rec.; ___ 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: The area is in private ownership and has not had much education/recreation usage due to past agricultural practices.

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	LOW	0.3	1	
B. MT Natural Heritage Program Species Habitat	MODERATE	0.7	1	
C. General Wildlife Habitat	MODERATE	.7	1	
D. General Fish/Aquatic Habitat	LOW	0.3	1	
E. Flood Attenuation	MODERATE	0.5	1	
F. Short and Long Term Surface Water Storage	LOW	0.3	1	
G. Sediment/Nutrient/Toxicant Removal	LOW	0.2	1	
H. Sediment/Shoreline Stabilization	LOW	0.2	1	
I. Production Export/Food Chain Support	MODERATE	0.7	1	
J. Groundwater Discharge/Recharge	N/A	N/A	+	
K. Uniqueness	LOW	0.1	1	
L. Recreation/Education Potential	LOW	0.1	1	
Totals:	LOW	4.1	11	

4.1 ÷ 11 = 37%

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)
- ___ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
- ___ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ___ Score of .9 or 1 functional point for General Fish/Aquatic Habitat; **or**
- ___ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
- ___ Score of .9 functional point for Uniqueness; **or**
- ___ 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 37 %.

MDT Montana Wetland Assessment Form (revised 5/03/1999, PRELIMINARY DRAFT)

1. Project Name: Musgrave Lake Ranch 2. Project #: _____ Control #: _____

3. Evaluation Date: Mo 09 Day 29 Yr 99 4. Evaluator(s): Jim Stutzman 5. Wetlands/Site #(s) Site # 1 - Depressional Wetland

6. Wetland Location(s): i. Legal: T 32 (N) or S; R 21 (E) or W; S 11 NE ¼ ; T ___ N or S; R ___ E or W; S _____.
ii. Approx. Stationing or Mileposts: _____

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

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

8. Wetland size: (total acres) 2.0 (visually estimated)
_____ (measured, e.g. by GPS [if applies])

9. Assessment area: (AA, tot., ac., see instructions on determining AA) 2.0 (visually estimated)
_____ (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
Depression (open, surface ground water)	Palustrine		EM	A	PD	100%

(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), Intermittently 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.): fall & winter 1-400 head of cattle grazing, wetland is ditched on both ends, historically basin was about 11 surface acres. Ditching has reduced wetland to 2 surface acres
II. Prominent weedy, alien, & introduced species (including those not domesticated, feral): (list) quack grass, Canada thistle, lambsquarter, pigweed

III. Provide brief descriptive summary of AA and surrounding land use/habitat: AA is an old oxbow of the Milk River. The wetland has been effectively drained by two ditches. Wetlands remaining are confined to the ditch bottoms and are linear in nature. Surrounding uplands are either heavily grazed or are cultivated for hay and grain.

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	
Incidental habitat (**list species**)	D (S)	Bald Eagle.
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	
Secondary habitat (**list species**)	D S	
Incidental habitat (**list species**)	D (S)	Peregrine falcon, Forest Plains toad
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]):
- ___ observations of abundant wildlife #'s or high species diversity (during any period)
- ___ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ___ presence of extremely limiting habitat features not available in the surrounding area
- ___ interviews with local biologists with knowledge of the AA

(**Low**) (based on any of the following [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: AA is a narrow, linear band of hydrophytic vegetation. Existing wetland is associated directly with drainage ditches. This wetland type rarely attracts or provides habitat for a wide variety of wildlife species. Consequently wildlife diversity is low.

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 in 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: NA

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: County Road, 1 year-round residence.

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: Wetland is ditched adversely impacting surface water storage capacity

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:

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 has a maximum depth exceeding 6.6 ft. at low water (e.g. 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: NA

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: [AA is est. 2 Acres and 100% Vegetated, so veg component is 1-5 acres] (Correction) (ERROR)

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

i. Discharge Indicators

___Springs are known or observed
___Vegetation growing during dormant season/drought
___Wetland occurs at the toe of a natural slope
___Seeps are present at the wetland edge
___AA permanently flooded during drought periods
___Wetland contains an outlet, but no inlet
___Other

II. Recharge Indicators

___Permeable substrate 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: To many man-induced disturbances (ie ditches, canals, etc) to determine

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: ___ Educational/scientific study; ✓ Consumptive rec.; ___ 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	0.3		1	
B. MT Natural Heritage Program Species Habitat	0.1		1	
C. General Wildlife Habitat	0.1		1	
D. General Fish/Aquatic Habitat	NA		NA	
E. Flood Attenuation	0.1		1	
F. Short and Long Term Surface Water Storage	0.2		1	
G. Sediment/Nutrient/Toxicant Removal	0.4		1	
H. Sediment/Shoreline Stabilization	NA		NA	
I. Production Export/Food Chain Support	~~0.2~~ 0.5		1	
J. Groundwater Discharge/Recharge	~~NA~~		~~NA~~	
K. Uniqueness	0.2		1	
L. Recreation/Education Potential	0.1		1	
Totals:	~~1.7~~ 2.0		9.0	

~~1.7/9.0 = 19%~~ 2.0/9.0 = 22%

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)
- ___ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
- ___ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ___ Score of .9 or 1 functional point for General Fish/Aquatic Habitat; **or**
- ___ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
- ___ Score of .9 functional point for Uniqueness; **or**
- ___ 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)
- X "Low" rating for Uniqueness; **and**
- X "Low" rating for Production Export/Food Chain Support; **and**
- X Total actual functional points < 30% (round to nearest whole #) of total possible functional points

Appendix E

BIRD SURVEY PROTOCOL
MACROINVERTEBRATE SAMPLING PROTOCOL
GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Musgrave Lake
Zurich, 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.