# MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2003

*Creston Site*
*Creston, Montana*

Prepared for:

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

Prepared by:

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

March 2004

Project No: 130091.007

# MONTANA DEPARTMENT OF TRANSPORTATION

## WETLAND MITIGATION MONITORING REPORT:

## YEAR 2003

*Creston*
*Creston, Montana*

Prepared for:

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

Prepared by:

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

March 2004

Project No: 130091.007

## TABLE OF CONTENTS

**TABLES**



**FIGURES**



**CHARTS**



**APPENDICES**

# 1.0 INTRODUCTION

The Creston mitigation site was constructed in 1998 to mitigate wetland impacts associated with three Montana Department of Transportation (MDT) roadway projects; the Flathead River Bridge and Creston North and South projects. The site is located one mile south of the Creston Fish Hatchery adjacent to Highway 35 and Broeder Loop (**Figure 1**). The site consists of 20 acres located in Flathead County within the Flathead River Watershed (No. 4). The site elevation is 2,940 feet above mean sea level.

The site was designed to mitigate for riparian floodplain habitat, rooted emergent wetland, and ditches associated with previous highway construction. The mitigation goal was to enhance approximately two acres of existing wetland and create four acres of wetland. A formal wetland delineation and functional assessment were not performed prior to construction. The site was first monitored in 2001 and this is the third year of monitoring.

# 2.0 METHODS

## 2.1 Monitoring Dates and Activities

The site was visited on May 29th (spring) and July 24th (mid-season) 2003. The primary purpose of the spring visit was to conduct a bird/general wildlife reconnaissance. The May/June period was selected for the spring visit because monitoring between mid-May and early June is likely to detect migrant and early nesting activities for a variety of avian species, as well as maximizing the potential for amphibian detection. In Montana, most amphibian larval stages are present by early June.

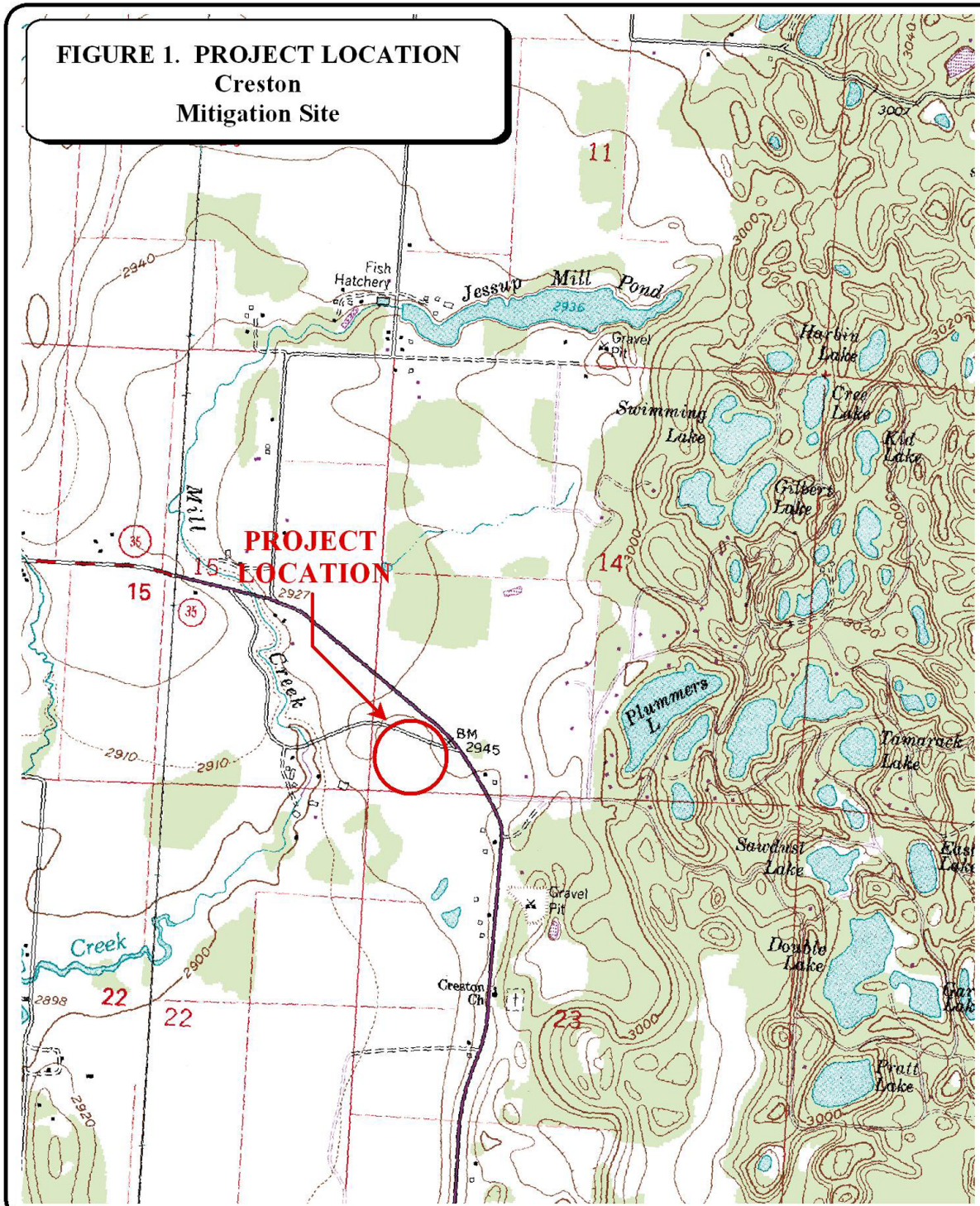
The mid-season visit was conducted between late July and August to document vegetation, soil, and hydrologic conditions used to map jurisdictional wetlands. All information contained on the Wetland Mitigation Site Monitoring Form (**Appendix B**) was collected at this time. Activities and information conducted/collected included: wetland delineation; wetland/open water boundary mapping; vegetation community mapping; vegetation transects; soils data; hydrology data; bird and general wildlife use; photograph points; GPS data points (no new points collected in 2003); functional assessment; and (non-engineering) examination of dike structures.

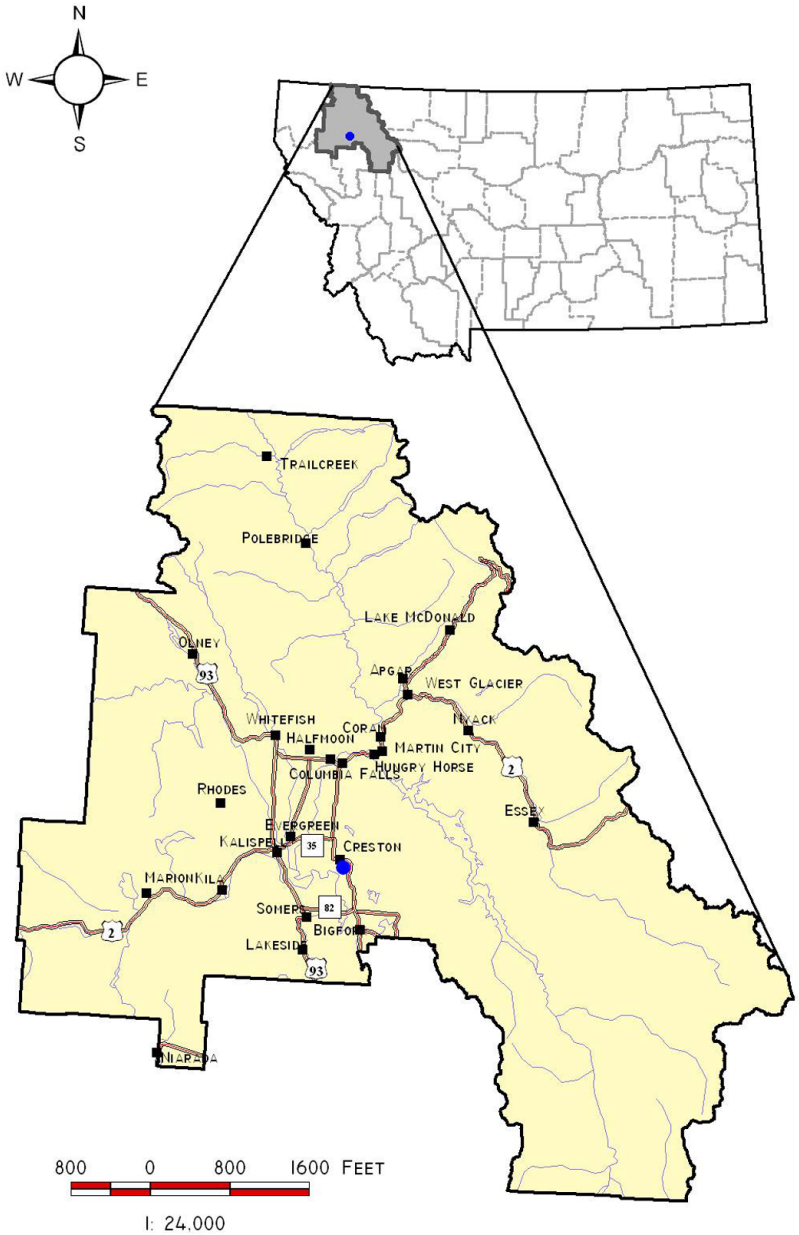
## 2.2 Hydrology

Hydrologic indicators were evaluated at the site during the mid-season visit. Wetland hydrology indicators were recorded using procedures outlined in the Army Corps (COE) 1987 Wetland Delineation Manual. Hydrology data were 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.

**FIGURE 1. PROJECT LOCATION**
**Creston**
**Mitigation Site**




PROJECT #: 130091.007
DATE: MAY 2001
LOCATION:
PROJECT MANAGER: B. DUTTON
DRAWN BY: B. NOECKER

LAND & WATER CONSULTING, INC.

1120 CEDAR PO BOX 8254 MISSOULA, MT 59807

Three groundwater-monitoring wells are present on site and groundwater elevations were obtained during the mid-season visit. Groundwater located within 18 inches of the ground surface (soil pit depth for purposes of delineation), was documented on the routine wetland delineation data form at each data point.

## 2.3 Vegetation

General dominant species-based vegetation community types (e.g., *Elymus repens/Phleum pratense*) 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**).

The 10-foot wide belt transect that was established in 2001 was evaluated for the second time **Figure 2 (Appendix A)**. Percent cover was estimated for each vegetative species for each successive vegetation community encountered within the "belt" using the following values: + (<1%); 1 (1-5%); 2 (6-10%); 3 (11-20%); 4 (21-50%); and 5 (>50%). The purpose of the transect is to evaluate changes over time, especially the establishment and increase of hydrophytic vegetation. The transect location was marked on the air photo and all data recorded on the mitigation site monitoring form. Transect endpoint locations were recorded with the GPS unit in 2001. Metal stakes were installed in 2001 to physically mark the transect ends.

A comprehensive plant species list for the site was first compiled in 2001 and has been updated with new species encountered. Ultimately, observations from past years will be compared with new data to document vegetation changes over time. Woody species were planted at this mitigation site. Monitoring relative to the survival of such species was conducted for the third time, and recorded on the Planted Woody Vegetation Survival Form in **Appendix B**.

## 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 were 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

The wetland delineation conducted during 2001 on the 20-acre mitigation site during the mid-season visit according the 1987 COE Wetland Delineation Manual was verified and changes made, if necessary. Wetland and upland areas within the monitoring area were investigated for the presence of wetland hydrology, hydrophytic vegetation and hydric soils. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1988). 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 in 2001. No changes to the wetland

boundary were visually noted in 2003, and GPS was not used to redefine the wetland boundary. 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, Reptiles, and Amphibians

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 for comparison to previous monitoring events.

### 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 D**. During the mid-season visit, bird observations were recorded incidental to other monitoring activities. During both visits, observations were categorized by species, activity code, and general habitat association (see data forms in **Appendix B**). Observations from past years will be compared with new data.

### 2.8 Macroinvertebrates

One macro-invertebrate sample was collected from the main impoundment during the mid-season site visit and data recorded on the wetland mitigation monitoring form. Macro-invertebrate sampling procedures are included in **Appendix E**. The approximate location of the sample point is shown on **Figure 2**, **Appendix A**. The sample was preserved as outlined in the sampling procedure and sent to Rhithron Associates for analysis.

### 2.9 Functional Assessment

A functional assessment form was completed for the site using the 1999 MDT Montana Wetland Assessment Method. Field data necessary for this assessment were generally collected during the mid-season site visit. The remainder of the functional assessment was completed in the office.

### 2.10 Photographs

Photographs were taken during the mid-season visit showing the current land use surrounding the site and the monitored area. Each photograph point location was initially recorded with a resource grade GPS in 2001. 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, point data were collected with a resource grade GPS unit at the vegetation transect beginning and ending locations and at all photograph locations. Wetland boundaries were also recorded with a resource grade GPS unit. The method used to collect these points is described in the GPS protocol in **Appendix D**. No new GPS data were collected during the 2003 monitoring year.

## 2.12 Maintenance Needs

The dike structure was 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. No problems were documented. Bird boxes were also inspected and appeared to be in good condition.

# 3.0 RESULTS

## 3.1 Hydrology

Inundation was present in the two large depressions and was estimated to be 10% of the mitigation site (see **Figure 3**, **Appendix A**). Emergent vegetation was observed throughout the inundated areas. The water table was depressed relative to previous years due to drought conditions and was lower than in both 2001 and 2002. According to the Western Regional Climate Center, Creston yearly precipitation totals for 2001 (15.7 inches), 2002 (17.23) and 2003 (15.38) were 79, 87, and 78 percent, respectively, of the total annual mean precipitation (19.79 inches) in this area.

The upper pond was again nearly dry in mid-July. The artesian well that discharges to the upper pond was flowing but the discharge rate was low and estimated at approximately one-gallon per minute. Three groundwater wells are located on the site and were measured during the mid-season visit. Static water levels are presented in **Table 1** and in the monitoring data form provided in **Appendix B**. Static water levels ranged from approximately 6.7 to 7.9 feet below the ground surface compared to 5.1 to 5.6-feet below the ground surface in 2002.

**Table 1:** ***July 2003 - Static Water Levels***

| Well ID (USGS label) | Static Water Level (from top of steel casing) | Stick-up* | Static Water Level (from ground surface) |
|---|---|---|---|
| West-1 (C94-11) | 10.42 | 3.05 | 7.37 |
| West-2 (C94-12) | 10.75 | 2.77 | 7.98 |
| East (C94-10) | 8.67 | 1.98 | 6.69 |

* Stick-up was initially measured by the USGS and is recorded on the well cover; this measurement was field checked for accuracy in 2003.

## 3.2 Vegetation

Vegetation species identified on the site are presented in **Table 2** and on the attached data form. Six community types were identified and mapped on the mitigation area (**Figure 3**, **Appendix A**). These included Type 1: *Elymus repens*/*Phleum pratense*; Type 2: *Typha latifolia*; Type 3:

*Typha latifolia/Agrostis stolonifera*; Type 4: *Phalaris arundinacea*; Type 5: *Potamogeton pectinatus*; and Type 6: *Alopecurus pratensis.* Dominant species within each of these communities are listed on the attached data form (**Appendix B**).

**Table 2:** ***2001 - 2003 Creston Vegetation Species List***

| Species | Region 9 (Northwest) Wetland Indicator |
|---|---|
| *Agrostis stolonifera* | FAC+ |
| *Alopecurus pratensis* | FACW |
| *Amelanchier alnifolia* | FACU |
| *Artemesia absinthium* | -- |
| *Arctium minus* | -- |
| *Astragalus cicer* | -- |
| *Barbarea vulgaris* | FAC- |
| *Beckmannia syzigachne* | OBL |
| *Bromus inermis* | -- |
| *Carex arcta* | FACW+ |
| *Carex bebbii* | OBL |
| *Carex aurea* | FACW+ |
| *Carex flava* | OBL |
| *Carex lasiocarpa* | OBL |
| *Carex microptera* | FAC |
| *Centaurea maculosa* | -- |
| *Ceratophyllum demersum* | OBL |
| *Chenopodium album* | FAC |
| *Chrysanthemum leucanthemum* | -- |
| *Chenopodium rubrum* | FACW+ |
| *Cirsium arvense* | FAC- |
| *Cirsium vulgare* | FACU |
| *Cynoglossum officinale* | FACU |
| *Dactylis glomerata* | FACU |
| *Elaeagnus commutata* | NI |
| *Eleocharis palustris* | OBL |
| *Elymus repens* | FACU |
| *Elymus smithii* | -- |
| *Epilobium ciliatum* | FACW- |
| *Equisetum arvense* | FAC |
| *Erigeron acris* | FACW |
| *Festuca arundinacea* | FAC- |
| *Galium aparine* | FACU |
| *Gnaphalium palustre* | FAC+ |
| *Juncus articulatus* | OBL |
| *Juncus balticus* | FACW+ |
| *Juncus regelii* | FACW |
| *Juncus tenuis* | FAC |
| *Lactuca serriola* | FACU |
| *Lamium amplexicaule* | -- |
| *Linum perenne* | -- |
| *Lotus corniculatus* | FACW+ |
| *Medicago lupulina* | FAC |
| *Melilotus alba* | FACU |
| *Melilotus officinale* | FACU |
| *Myosotis laxa* | OBL |
| *Phalaris arundinacea* | FACW |
| *Phleum pratense* | FAC- |
| *Plantago lanceolatum* | FACU+ |
| *Plantago major* | FAC+ |

**Table 2:** ***2001 - 2003 Creston Vegetation Species List (continued)***

| Species | Region 9 (Northwest) Wetland Indicator |
|---|---|
| *Poa compressa* | FACU+ |
| *Poa palustris* | FAC |
| *Poa pratensis* | FAC |
| *Polygonum convolvulus* | FACU- |
| *Populus balsamifera* | FAC |
| *Potamogeton natans* | OBL |
| *Potamogeton pectinatus* | OBL |
| *Potentilla anserina* | OBL |
| *Prunella vulgaris* | FACU+ |
| *Ranunculus aquatilis* | OBL |
| *Ranunculus sceleratus* | OBL |
| *Rumex crispus* | FACW |
| *Salix bebbiana* | FACW |
| *Scirpus acutus* | OBL |
| *Silene latifolia* | -- |
| *Sitanion hystrix* | FACU- |
| *Sparganium emersum* | OBL |
| *Stipa nelsonii* | -- |
| *Taraxacum officinale* | FACU |
| *Thlaspi arvense* | NI |
| *Tragopogon dubius* | UPL |
| *Trifolium hybridum* | FACU+ |
| *Trifolium pratense* | FACU |
| *Typha latifolia* | OBL |
| *Verbascum thapsus* | UPL |
| *Veronica americana* | OBL |

Type 1 occurred in the upland and consisted primarily of *Elymus repens* with an even distribution of *Phleum pratense, Agrostis stolonifera*, and *Cirsium arvense*. This community type was weedy and included a trace of *Cynoglossum officinale* (common hound's tongue), which is classified as a noxious weed in Flathead County. This community type was relatively unchanged from the previous year. Type 2 was present around the pond edges, particularly the upper pond and consisted primarily of *Typha latifolia, Ceratophyllum demersum, Scirpus acutus* and *Phalaris arundinacea*.

Type 3 was present in small depressions with less frequent inundation and consisted of *Typha latifolia* mixed with weedy grasses. Small changes were observed in this type, such as a slight decrease in *Typha latifolia* from 10% to 5% and an increase in *Agrostis stolonifera* cover. It appeared that *Typha latifolia* was not reproducing well in this community. Type 4 was dominated by *Phalaris arundinacea* and was present adjacent to the large pond and in some of the small depressions.

Type 5 consisted of aquatic bed communities dominated by *Potamogeton pectinatus*. This community was unchanged in composition, however, its lateral extent decreased due to the encroachment of the *Phalaris arundinacea* (Type 4) as is illustrated in the vegetation transect. Type 6 was a minor upland community that was dominated by *Alopecurus pratensis.* It appeared unchanged from the previous monitoring year. Vegetation transect results are detailed in the attached data form (**Appendix B**), and are summarized in the transect maps, **Table 3**, and **Chart 1** below.

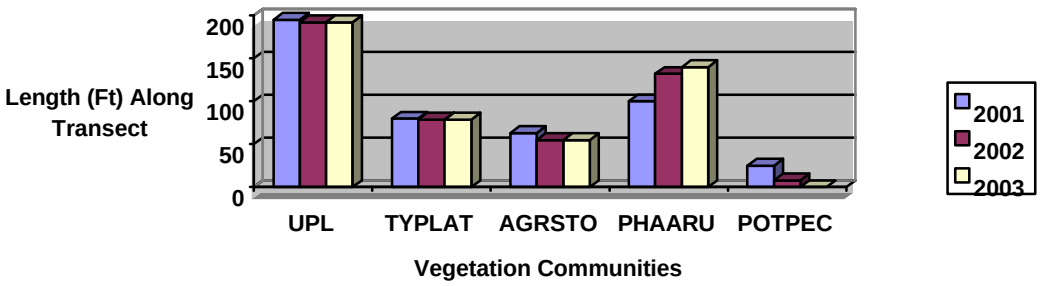
### *Transect Maps*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **2001** | **VT Start** | ***Type 1 Upland (195')*** | ***Type 2 (80')*** | ***Type 3 (63')*** | ***Type 4 (100')*** | ***Type 5 (25')*** | **Total: 465'** | **VT End** |
| **2002** | **VT Start** | ***Type 1 Upland (192')*** | ***Type 2 (79')*** | ***Type 3 (55')*** | ***Type 4 (132')*** | ***Type 5 (8')*** | **Total: 465'** | **VT End** |
| **2003** | **VT Start** | ***Type 1 Upland (192')*** | ***Type 2 (79')*** | ***Type 3 (55')*** | ***Type 4 (140')*** | | **Total: 465'** | **VT End** |

**Table 3:** ***Vegetation Transect Data Summary***

| Monitoring Year | 2001 | 2002 | 2003 |
|---|---|---|---|
| Transect Length | 465 feet | 465 feet | 465 feet |
| # Vegetation Community Transitions along Transect | 5 | 5 | 5 |
| # Vegetation Communities along Transect | 5 | 5 | 3 |
| # Hydrophytic Vegetation Communities along Transect | 4 | 4 | 3 |
| Total Vegetative Species | 37 | 49 | 49 |
| Total Hydrophytic Species | 21 | 26 | 26 |
| Total Upland Species | 16 | 23 | 23 |
| Estimated % Total Vegetative Cover | 75% | 80% | 85% |
| % Transect Length Comprised of Hydrophytic Vegetation Communities | 58% | 59% | 59% |
| % Transect Length Comprised of Upland Vegetation Communities | 42% | 41% | 41% |
| % Transect Length Comprised of Unvegetated Open Water | 0% | 0% | 0% |

**Chart 1: Length of Vegetation Communities along Transect 1**




As part of the project design, woody species were planted in rows at various locations across the site. For monitoring purposes, the rows were labeled alphabetically (Rows A-M). The rows are labeled on **Figure 2** in **Appendix A** and the **o**bserved mortality of planted woody vegetation species is summarized below in **Table 4**. Overall survival is moderate across the site, with rodents and competition from more aggressive herbaceous species being the primary problems.

### 3.3 Soils

According to the Upper Flathead Valley Area soil survey (Soil Conservation Service 1960), soils in the mitigation site are classified as poorly drained alluvial land and (Aa) and the Swims silt loam (So). The poorly drained alluvial land soil has poor surface and internal drainage, mottling in the subsurface and typically consists of loam or silty loam. The Swims soil consists of silt loam and tends to occupy low terraces along the Flathead River.

**Table 4:** ***2003 Observed Mortality of Planted Woody Species***

| Row/Species | Estimated # Originally Planted | # Dead Observed | Comments |
|---|---|---|---|
| *A – Pyrus sp. (crab apple)* | 16 | 5 | Some browse observed. Many fruit bearing in 2003 |
| *B - Pyrus sp. (crab apple)* | 20 | 6 | Several re-sprouting from base |
| *C – Prunus sp.* | 30 | 13 | Small – unhealthy. Rodents. |
| *D – Prunus sp.* | 150 | 38 | Small – unhealthy. Rodents. |
| *E - Rosa woodsii* | 25 | 7 | Competition from grasses. |
| *F - Elaeagnus commutata & Rosa woodsii* | 145 | 85 | Competition and rodents. |
| *G - Elaeagnus commutata* | 30 | 16 | |
| *H – Sheperdia sp.* | 60 | 30 | |
| *I - Rosa woodsii* | 30 | 12 | |
| *J - Rosa woodsii* | 115 | 5 | Doing very well. |
| *K – Elaeagnus commutata* | 75 | 10 | Doing very well. |
| *L - Rosa woodsii* | 55 | 35 | |
| *M - Rosa woodsii* | 40 | 5 | Doing very well. |

These characteristics were generally confirmed during monitoring. Three test pits were excavated and described in 2003 using the ACE routine wetland monitoring form. The TP1 located adjacent to the pond consisted of 16-inches of organic detritus overlying a mottled silt loam. Hydric soil characteristics were well developed including a histic epipedon. TP2 was classified as a poorly developed hydric soil. A thin (1-inch) layer of organic detritus was present. A low-chroma (7.5 YR 2.5/2) A-horizon was present from 1 to 9-inches and mottles were observed below 9-inches. These soil characteristics indicated an oxygen-depleted environment with a fluctuating water table. TP3 was a loam representative of the upland soil, which did not exhibit hydric characteristics in the A horizon (7.5 YR 2.5/2) or B horizon (7.5 YR 4/3).

### 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 indicated acreage that was unchanged from 2002, with a total of 5.2 acres of wetland.

The original mitigation goal was to enhance two acres of existing wetland and create four acres for a total of six acres. As of 2001, it appeared likely that the area within the Type 3 Community and within the ditches will develop hydric soil characteristics with continued inundation. Based on 2002 and 2003 observations, which indicated that *Typha latifolia* was not successfully reproducing in these areas, it is apparent that wetland attributes will not be enhanced until the hydrology is restored to pre-drought conditions.

### 3.5 Wildlife

Wildlife species, or evidence of wildlife, observed on the site during 2003 monitoring efforts are listed in **Table 5** in bold, with the remaining listed species having been seen during previous years monitoring. Specific evidence observed and activity codes pertaining to birds are provided on the completed monitoring form in **Appendix B**. Five mammal and numerous bird species have been noted using the mitigation site.

**Table 5:** ***Fish and Wildlife Species Observed at the Creston Mitigation Site 2001-2003***

| | |
|---|---|
| **FISH**<br>none | |
| **AMPHIBIANS**<br>None observed | |
| **REPTILES**<br>None observed | |
| **BIRDS**<br>**American robin (*Turdus migratorius*)**<br>Bohemian waxwing (*Bombycilla garrulus*)<br>**Canada goose (*Branta Canadensis*)**<br>**Cedar Waxwing (*Bombycilla cedrorum*)**<br>**Cinnamon teal (*Anas cyanoptera*)**<br>**Cliff swallow (*Petrochelidon pyrrhonota*)**<br>**Common goldeneye (*Bucephala clangula*)**<br>**Common raven (*Corvus corax*)**<br>**Common snipe (*Gallinago gallinago*)**<br>**Eastern Kingbird (*Tyrannus tyrannus*)**<br>**European Starling (*Sturnus vulgaris*)**<br>**Great blue heron (*Ardea herodias*)**<br>Hooded merganser (*Lophodytes cucullatus*)<br>Hummingbird (*Selasphorus* sp.)<br>**Killdeer (*Charadrius vociferous*)** | **Mallard (*Anas platyrhynchos*)**<br>Northern flicker (*Colaptes auratus*)<br>**Northern rough-winged swallow (*Stelgidopteryx serripennis*)**<br>Northern shoveler (*Anas clypeata*)<br>Osprey (*Pandion haliaetus*)<br>Pintail (*Anas acuta*)<br>**Red-winged blackbird (*Agelaius phoeniceus)***<br>Ring-necked duck (*Aythya collaris*)<br>**Ring-necked pheasant (*Phasianus colchicus*)**<br>**Song Sparrow (*Melospiza melodia*)**<br>**Spotted Sandpiper (*Actitis macularia*)**<br>**Tree swallow (*Tachycineta bicolor*)**<br>**Violet-green Swallow (*Tachycineta thalassina*)**<br>Wood duck (*Aix sponsa*)<br>Yellow-headed blackbird (*Xanthocephalus xanthocephalus*) |
| **MAMMALS**<br>Coyote (*Canis latrans*) or dog sign<br>**Meadow vole (*Microtus pennsylvanicus*)**<br>**Muskrat (*Ondatra zibethicus*)**<br>Northern pocket gopher (*Thomomys talpoides*)<br>**White-tailed Deer (*Odocoileus virginianus*)** | |

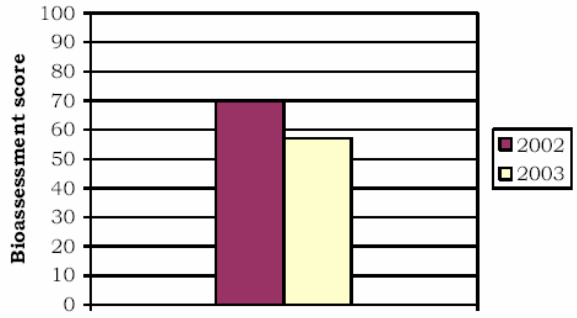
**Bolded** species were documented during the 2003 monitoring. All other species were documented during one or more of the previous monitoring seasons.

## 3.6 Macroinvertebrates

Macroinvertebrate sampling results are provided in **Appendix F** and were summarized by Rhithron Associates in the italicized section below (Bollman 2003).

*Biotic conditions at the Creston site apparently deteriorated from optimal to sub-optimal between 2002 and 2003, according to bioassessment scores. However, the site supported a diverse assemblage in 2003, and water quality was probably excellent. The substrate-water interface was inhabited by abundant ostracods, suggesting that oxygenation was adequate there. Macrophyte habitats were indicated by snails, and the water column supported a diverse assemblage. It is likely that the bioassessment method has underestimated biotic conditions at this site.*

**Chart 2:** ***Bioassessment Scores for Creston***



### 3.7 Functional Assessment

Completed functional assessment forms are presented in **Appendix B**. Functional assessment results are summarized in **Table 6**. The site was evaluated as a single assessment area and rated as a Category II wetland. Wildlife habitat and groundwater discharge were the primary functions of the site. The site provided a total of 35.4 functional units and achieved 76% of possible points. This was unchanged from the 2001 assessment. A functional assessment was not conducted prior to site construction and therefore cannot be used for comparison.

### 3.8 Photographs

Representative photos taken from photo-points are provided in **Appendix C**. A 2003 aerial photograph is also provided in **Appendix C**.

### 3.9 Maintenance Needs/Recommendations

The berm was in good condition during the spring and mid-season visits. We have no recommendations at this time. The bird boxes also appeared to be in good condition.

### 3.10 Current Credit Summary

Approx. 5.2 acres of wetlands were present on the mitigation site. Based on pre-construction goals, 2 acres were to be enhanced and 4 acres created for a total of 6 acres. The existing acreage is close to the goal. Based on current site conditions, it is expected that additional wetland acres will develop in the future if hydrology is restored to pre-drought conditions.

## 4.0 REFERENCES

Bollman, W. 2003. MDT Wetland Mitigation Monitoring Project – Aquatic Invertebrate Monitoring Summary 2001, 2002, 2003. Rhithron Associates Inc. Missoula, MT.

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

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

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.

**Table 6:** ***Summary of 2003 Wetland Function/Value Ratings and Functional Points*** [1] ***at the Creston Mitigation Project***

| Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method | 2003 Assessment |
|---|---|
| Listed/Proposed T&E Species Habitat | Mod (0.7) |
| MNHP Species Habitat | Low (0.1) |
| General Wildlife Habitat | High (0.9) |
| General Fish/Aquatic Habitat | NA |
| Flood Attenuation | NA |
| Short and Long Term Surface Water Storage | High (0.8) |
| Sediment, Nutrient, Toxicant Removal | Mod (0.7) |
| Sediment/Shoreline Stabilization | NA |
| Production Export/Food Chain Support | High (1.0) |
| Groundwater Discharge/Recharge | High (1) |
| Uniqueness | Mod (0.6) |
| Recreation/Education Potential | High (1) |
| Actual Points/Possible Points | 6.8 / 9 |
| % of Possible Score Achieved | 76% |
| Overall Category | II |
| Total Acreage of Assessed Wetlands within Easement | 5.2 ac (calculated) |
| Functional Units (acreage x actual points) | 35.44 fu |
| Net Acreage Gain | NA |
| Net Functional Unit Gain | NA |
| Total Functional Unit "Gain" | NA |

[1] See completed MDT functional assessment forms in **Appendix B** for further detail.

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

Soil Conservation Service. 1960. Soil survey of Upper Flathead Valley Area, Montana. Series 1946, No. 4.

USDA Natural Resources Conservation Service. 1998. *Field Indicators of Hydric Soils in the US*, 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 (per Jeff Berglund).

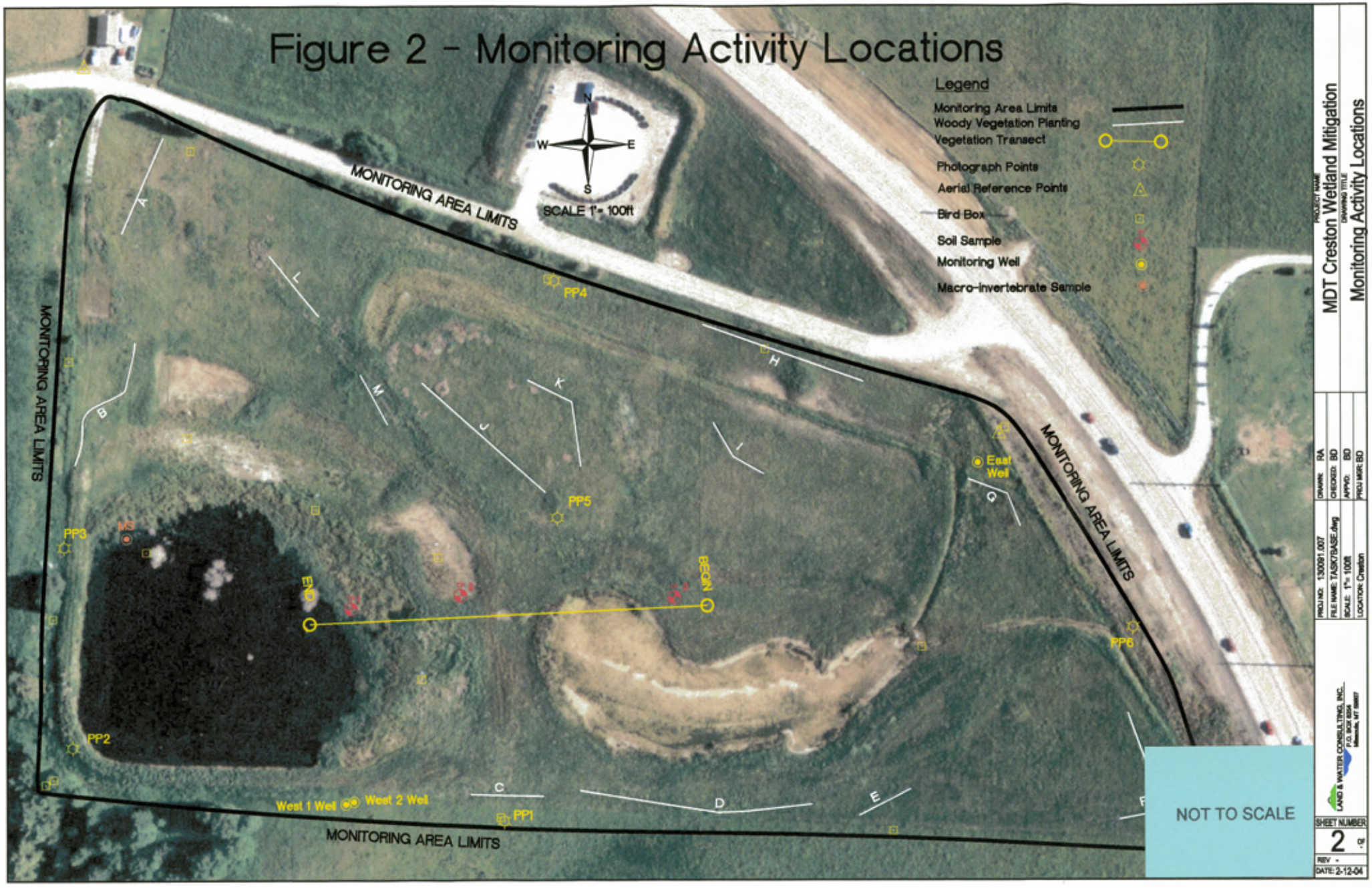
# Appendix A

## FIGURES 2 & 3

***MDT Wetland Mitigation Monitoring***
***Creston***
***Creston, Montana***

LAND & WATER

# Figure 2 - Monitoring Activity Locations



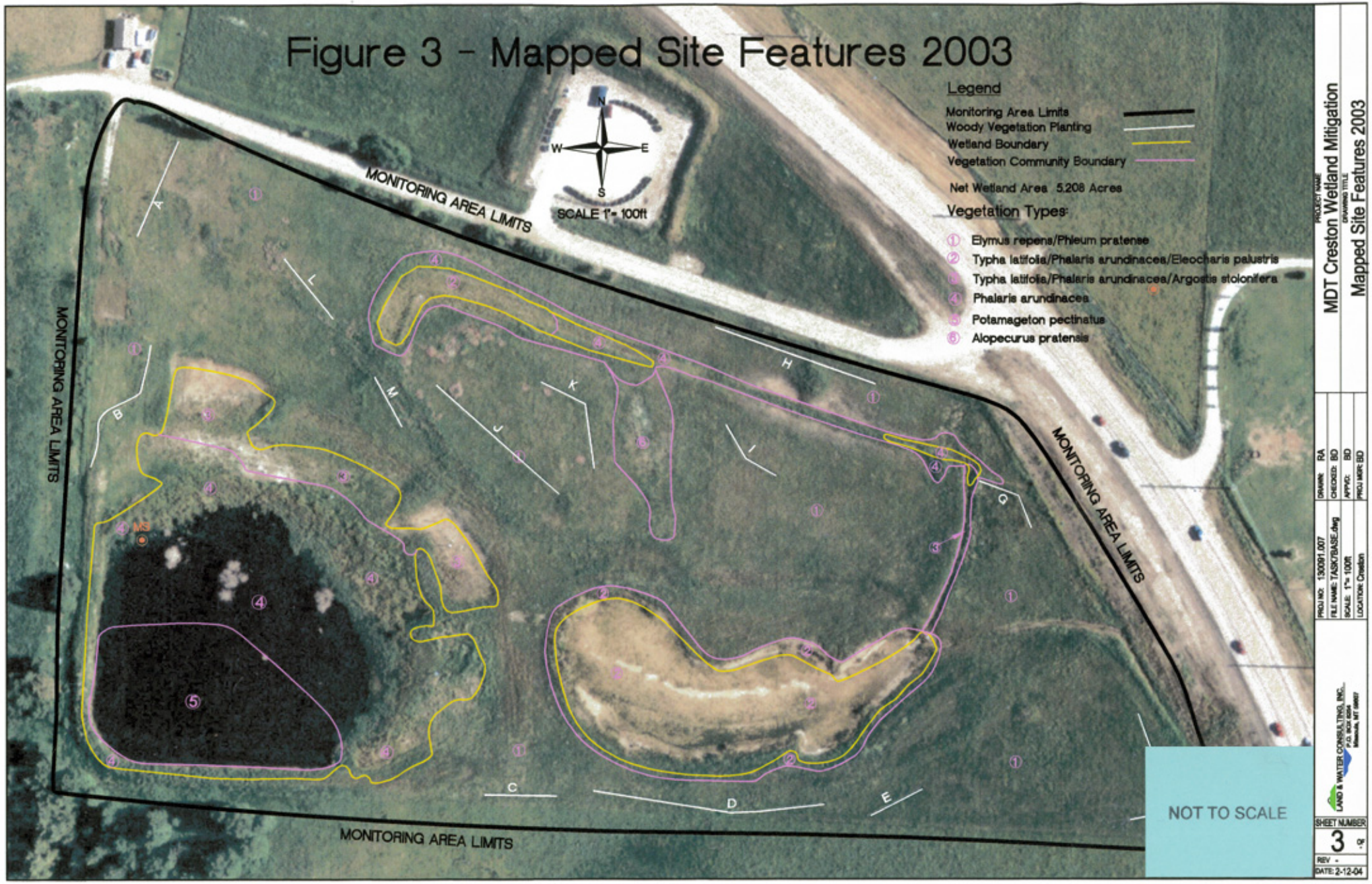

PROJECT NAME: MDT Creston Wetland Mitigation
DRAWING TITLE: Monitoring Activity Locations

PROJ NO: 130091.007 | DRAWN: RA
FILE NAME: TASK7/BASE.dwg | CHECKED: BD
SCALE: 1"= 100ft | APPVD: BD
LOCATION: Creston | PROJ MGR: BD

LAND & WATER CONSULTING, INC.
P.O. BOX 8354
Missoula, MT 59807

SHEET NUMBER 2
REV -
DATE: 2-12-04

# Figure 3 - Mapped Site Features 2003




PROJECT NAME: MDT Creston Wetland Mitigation
DRAWING TITLE: Mapped Site Features 2003

PROJ NO: 130091.007
FILE NAME: TASKOBASE.dwg
SCALE: 1"= 100ft
LOCATION: Creston

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

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

SHEET NUMBER: 3
REV: -
DATE: 2-12-04

# Appendix B

---

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

---

***MDT Wetland Mitigation Monitoring***
***Creston***
***Creston, Montana***

LAND & WATER

# LWC / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **Creston** Project Number: **130091.007** Assessment Date: **7/24/03**
Location: **Creston** MDT District: **Missoula** Milepost: _____
Legal description: T**28N** R**20W** Section **14** Time of Day: **0800-1100**
Weather Conditions: **Partly cloudy approx. 70 degrees** Person(s) conducting the assessment: **Traxler**
Initial Evaluation Date: **7 / 25 / 01** Visit #: **2** Monitoring Year: **2003 (year 3)**
Size of evaluation area: **20 acres** Land use surrounding wetland: **Rural Residential, Agriculture**

## HYDROLOGY

**Surface Water** Source: **Runoff**
Inundation**:** Present **X** Absent____ Average depths: **2-3 ft** Range of depths: **0 - 6** ft
Assessment area under inundation: **15%**
Depth at emergent vegetation-open water boundary: **2-3 ft**
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.): **Drought conditions persist on the site and upland vegetation is encroaching on areas previously dominated by hydrophytic species.**

**Groundwater**
Monitoring wells: Present **X** Absent _____
Record depth of water below ground surface

| Well # | Depth | Well # | Depth | Well # | Depth |
|---|---|---|---|---|---|
| West 1 (C94-11) | 7.37 | | | | |
| West 2 (C94-12) | 7.98 | | | | |
| East (C94-10) | 6.69 | | | | |
| | | | | | |

**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: Water was extremely low during the mid-season site visit. Well readings were considerably lower than in 2001 and 2002.**

VEGETATION COMMUNITIES - CRESTON

Community No.:__1__ Community Title (main species):___Elymus repens/Phleum pratense weedy upland____

| Dominant Species | % Cover | Dominant Species | % Cover |
|---|---|---|---|
| Elymus repens | 40% | Linum perenne | 3% |
| Phleum pratense | 10% | Trifolium hybridum | 5% |
| Agrostis stolonifera | 10% | Taraxacum officinale | 10% |
| Cirsium arvense | 10% | Medicago lupulina | 5% |
| Astragalus cicer & purple legume combined | 15% | Poa pratensis | 2% |

**COMMENTS/PROBLEMS:** _____

_____

_____

_____

Community No.:__2__ Community Title (main species): ___Typha latifolia – pond edges_____

| Dominant Species | % Cover | Dominant Species | % Cover |
|---|---|---|---|
| Typha latifolia (also in water) | 50% | Juncus articulatus (also in water) | 2% |
| Phalaris arundinacea | 30% | Epilobium ciliatum | Trace |
| Eleocharis palustris (also in water) | 20% | Ceratophyllum demersum (in water) | 50% |
| Alopecurus pratensis | 5% | Sparganium emersum (in water) | 1% |
| Agrostis stolonifera | 1% | Scirpus acutus (in water) | 1% |

**COMMENTS/PROBLEMS:** _____

_____

_____

_____

Community No.:__3__ Community Title (main species):_Depressions: mixed Typha latifolia and weedy grasses____

| Dominant Species | % Cover | Dominant Species | % Cover |
|---|---|---|---|
| Typha latifolia | 10% | Medicago lupulina | 10% |
| Phalaris arundinacea | 10% | Populus balsamifera | 4% |
| Agrostis stolonifera | 20% | Taraxacum officinale | 2% |
| Alopecurus pratensis | 5% | Trifolium hybridum | 15% |
| Eleocharis palustris | 5% | Juncus tenuis & J. articulatus & J. regelii | 5% |

**COMMENTS/PROBLEMS:** _____

_____

**Additional Activities Checklist:**

**____Record and map vegetative communities on air photo**

## VEGETATION COMMUNITIES - CRESTON

Community No.:__4__ Community Title (main species):__Phalaris arundinacea_____

| Dominant Species | % Cover | Dominant Species | % Cover |
|---|---|---|---|
| Phalaris arundinacea | 95% | Juncus articulatus & J. tenuis | 1% |
| Agrostis stolonifera | 1% | Alopecurus pratensis | trace |
| Equisetum arvense | trace | Cirsium arvense | trace |
| Carex bebbii | trace | Carex lasiocarpa | trace |
| Eleocharis palustris | 1% | Plantago major | trace |

**COMMENTS/PROBLEMS: ___**

**_____**

_____

_____

_____

Community No.:__5__ Community Title (main species):___Potamageton pectinatus_____

| Dominant Species | % Cover | Dominant Species | % Cover |
|---|---|---|---|
| Potamageton pectinatus | 98% | Plantago major | trace |
| Ranunculus scleratus | trace | Phalaris arundinacea | 5% |
| Potamageton natans | trace | | |
| Barbarea vulgaris | trace | | |
| Ceratophyllum demersum | 1% | | |

**COMMENTS/PROBLEMS:** _____

_____

_____

_____

Community No.:__6__ Community Title (main species):___Alopecurus pratensis_____

| Dominant Species | % Cover | Dominant Species | % Cover |
|---|---|---|---|
| Alopecurus pratensis | 70% | Agrostis stolonifera | 2% |
| Phalaris arundinacea | 10% | Taraxacum officinale | trace |
| Cirsium arvense | 2% | Lactuca serriola | 1% |
| Medicago lupulina | trace | Trifolium hybridum | trace |
| Trifolium pratensis | trace | Erigeron acris | trace |

**COMMENTS/PROBLEMS:** _____

_____

_____

_____

**Additional Activities Checklist:**

____Record and map vegetative communities on air photo

**COMPREHENSIVE VEGETATION LIST**

| Species | Vegetation Community Number(s) | Species | Vegetation Community Number(s) |
|---|---|---|---|
| Elymus repens | 1,2,3 | Juncus articulatus | 2,3,4 |
| Astragalus cicer | 1,3 | Juncus regelii | 3 |
| Linum perenne | 1 | Ranunculus scleratus | 5 |
| Poa pratensis | 1,3,4 | Beckmannia syzigachne | 2 |
| Rumex crispus | 1 | Ceratophyllum demersum | 2,5 |
| Cirsium arvense | 1,2,3,4,6 | Carex bebbii | 3,4 |
| Taraxacum officinale | 1,2,3,6 | Erigeron acris | 3,6 |
| Phleum pratense | 1,3 | Scirpus acutus | 2,3 |
| Dactylis glomerata | 1 | Populus balsamifera | 3 |
| Chrysanthemum leucanthemum | 1 | Equisetum arvense | 3,4 |
| Alopecurus pratensis | 1,2,3,4,6 | Poa palustris | 2,4 |
| Silene latifolia | 1 | Galium aparine | 1 |
| Melilotus alba | 1,3 | Lamium amplexicaule | 1 |
| Melilotus officinale | 1,3 | Carex flava | 3,6 |
| Agrostis stolonifera | 1,2,3,4,6 | Ranunculus aquatilis | 5 |
| Poa spp. | 1 | Barbarea vulgaris | 5 |
| Medicago lupulina | 1,3,4,6 | Sparganium emersum | 2 |
| Trifolium hybridum | 1,3,6 | Potamageton pectinatus | 5 |
| Lactuca serriola | 1,2,3,4,6 | Lotus corniculatus | 1 |
| Trifolium pratense | 1,3,6 | Carex arcta | 3 |
| Verbascum thapsus | 1,4 | Potamageton natans | 5 |
| Tragopogon dubius | 1 | Poa compressa | 1,3,4 |
| Bromus inermis | 1 | Arctium minus | 1 |
| Cynoglossum officinale | 1,4 | Carex aurea | 3 |
| Thlaspi arvense | 1 | Carex lasiocarpa | 3,4 |
| Cirsium vulgare | 1,3 | Artemesia absinthium | 3 |
| Centaurea maculosa | 1 | Amelanchier alnifolia | 4 |
| Plantago major | 1,2,3,4,5 | Prunella vulgaris | 4 |
| Purple legume (Astragalus?) | 1 | Stipa nelsonii | 1 |
| Phalaris arundinacea | 1,2,3,4,5,6 | Elymus smithii | 1 |
| Epilobium ciliatum | 1,2,3,4 | Salix bebbiana | 3,4 |
| Typha latifolia | 2,3 | Carex microptera | 4 |
| Eleocharis palustris | 2,3,4,5 | Juncus balticus | 3 |
| Juncus tenuis | 2,3,4 | Festuca arundinacea | 3 |
| Eleagnus commutata | 1 | Elymus elymoides | 3 |

**COMMENTS/PROBLEMS:** _____

_____

_____

_____

_____

**PLANTED WOODY VEGETATION SURVIVAL – CRESTON 2003**

| Species | Number Originally Planted | Number Observed | Mortality Causes |
|---|---|---|---|
| A - Crab Apple | 16 | 11 | Browse. Some fruit bearing in 2003 |
| B - Crab Apple | 20 | 14 | Many re-sprouting from base |
| C – *Prunus sp.* | 30 | 17 | Small-unhealthy |
| D - *Prunus sp.* | 150 | 112 | |
| E - Woods Rose | 25 | 18 | competition |
| F - Silverberry & Woods Rose | 145 | 60 | Competition. Many sprouting from base. |
| G - Silverberry | 30 | 14 | |
| H – Buffaloberry | 60 | 30 | |
| I - Woods Rose | 30 | 18 | |
| J - Woods Rose | 115 | 110 | Doing very well |
| K - Silverberry | 75 | 65 | |
| L - Woods Rose | 55 | 20 | |
| M – Woods Rose | 40 | 35 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**COMMENTS/PROBLEMS: Overall survival in year three was not significantly changed from year 2.**

**WILDLIFE**

## BIRDS

(Attach Bird Survey Field Forms)

Were man made nesting structures installed? Yes __**x**__ No____Type:_____ How many? __**~ 10**____ Are the nesting structures being utilized? Yes __**x**__ No ___ Do the nesting structures need repairs? Yes __ No __**x**__

## MAMMALS AND HERPTILES

| Species | Number Observed | Indirect indication of use | | | |
|---|---|---|---|---|---|
| | | *Tracks* | Scat | Burrows | Other |
| white-tailed deer | 1 | yes | yes | | |
| meadow vole | 2 | | | | |
| muskrat | 1 | | | yes | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Additional Activities Checklist:

__**X**__Macroinvertebrate sampling (if required)

**COMMENTS/PROBLEMS: Swallows utilizing blue bird boxes and various species using artificial cavity nests. See attached data sheets for bird observations in 2003.**

## 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 | | See photo sheets and field notes | |
| B | | | |
| C | | | |
| D | | | |
| E | | | |
| F | | | |
| G | | | |
| H | | | |

**COMMENTS/PROBLEMS:** _____

## GPS SURVEYING

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

Checklist:

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

**COMMENTS/PROBLEMS:** ___GPS not used during 2003; minor changes in wetland borders were hand-adjusted using aerial photograph and 2002 delineation.

## WETLAND DELINEATION

(Attach Corps of Engineers delineation forms)

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

**COMMENTS/PROBLEMS:** _See attached completed delineation forms._____

## FUNCTIONAL ASSESSMENT

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

**COMMENTS/PROBLEMS:** **__See attached completed functional assessment forms._____**

## MAINTENANCE

Were man-made nesting structures installed at this site? YES __X__ NO____
If yes, do they need to be repaired? YES ____ NO __X__
If yes, describe problems below and indicate if any actions were taken to remedy the problems.

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

**COMMENTS/PROBLEMS:**

**MDT WETLAND MONITORING – VEGETATION TRANSECT**

Site: Creston Date: 7/24/03 Examiner: Traxler Transect # 1

Approx. transect length: 465 feet Compass Direction from Start (Upland): _____

| **Vegetation type A:** | Type 1 upland | | |
|---|---|---|---|
| Length of transect in this type: | 192 (3 sections) | feet | |
| Elymus repens | 4 | Cirsium vulgare | + |
| Astragalus cicer | 4 | Dactylis glomerata | + |
| Agrostis stolonifera | 2 | Phalaris arundinacea | + |
| Cirsium arvense | 2 | Stipa nelsonii | + |
| Medicago lupulina | 1 | Trifolium hybridum | + |
| Poa spp. | + | Melilotus officinale | + |
| Phleum pratense | 1 | Silene latifolia | + |
| Poa pratensis | + | Tragopogon dubius | + |
| Alopecurus pratensis | + | Poa compressa | + |
| Taraxacum officinale | + | Elymus smithii | + |
| Rumex crispus | + | Arctium minus | + |
| Linum perenne | 1 | Lactuca serriola | + |
| Total Vegetative Cover: | 90% | | |

| **Vegetation type B:** | Typha latifolia - Type 2 | |
|---|---|---|
| Length of transect in this type: | 79 | feet |
| Typha latifolia | 5 | |
| Phalaris arundinacea | 4 | |
| Eleocharis palustris | 3 | |
| Alopecurus pratensis | 1+ | |
| Agrostis stolonifera | + | |
| Lactuca serriola | + | |
| Epilobium ciliatum | + | |
| Plantago major | + | |
| Juncus articulatus | + | |
| Cirsium arvense | + | |
| Juncus tenuis | + | |
| Elymus repens | + | |
| Total Vegetative Cover: | 80% | |

| **Vegetation type C:** | mixed TYPLAT/grasses – Type 3 | | |
|---|---|---|---|
| Length of transect in this type: | 55 | feet | |
| *Typha latifolia* | 1 ( 3) | Erigeron acris | + |
| Agrostis stolonifera | 3 | Medicago lupulina | + |
| Eleocharis palustris | 1+ | Taraxacum officinale | + |
| Juncus tenuis | 1+ | Cirsium vulgare | + |
| Juncus regelii | 1 | Carex flava | + |
| Juncus articulatus | 1 | Carex aurea | + |
| Alopecurus pratensis | 1 | Salix bebbiana | + |
| Melilotus officinale | + | Phleum pratense | + |
| Cirsium arvense | + | Trifolium hybridum | + |
| Equisetum arvense | 1- | Trifolium pratense | + |
| *Phalaris arundinacea* | 3 (1) | Populus balsamifera | + |
| Plantago major | + | | |
| Total Vegetative Cover: | 75% | | |

| **Vegetation type D:** | Phalaris arundinacea – Type 4 | | |
|---|---|---|---|
| Length of transect in this type: | 140 | feet | |
| Phalaris arundinacea | 5 | Amelanchier alnifolia | + |
| Eleocharis palustris | + | Verbascum thapsus | + |
| Equisetum arvense | + | Epilobium ciliatum | + |
| Agrostis stolonifera | + | Medicago lupulina | + |
| Plantago major | + | | |
| Lactuca serriola | + | | |
| Cirsium arvense | + | | |
| Carex bebbii | + | | |
| Juncus tenuis | + | | |
| Salix bebbiana | + | | |
| Poa pratensis | + | | |
| Carex microptera | + | | |
| Total Vegetative Cover: | 90% | | |

MDT WETLAND MONITORING – VEGETATION TRANSECT (back of form)

**Cover Estimate**

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

**Indicator Class:**

+ = Obligate
- = Facultative/Wet
0 = Facultative

**Source:**

P = Planted
V = Volunteer

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

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

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

Notes:

| |
|---|
| **Bolded** species are new additions in 2003. Changes in species cover percentages are indicated by *italics*, with the 2002 percentages included in parentheses |
| |
| Due to low water elevations in the lower pond, the Potemageton type dropped out of the transect in 2003 and was replaced by Phalaris. |
| |
| |
| |
| |
| |
| |
| |
| |

3/01 rev



LAND & WATER

BIRD SURVEY – FIELD DATA SHEET

Page 1 of 1
Date: 5/29/03

SITE: Creston

Survey Time: 0800

| Bird Species | # | Behavior | Habitat | Bird Species | # | Behavior | Habitat |
|---|---|---|---|---|---|---|---|
| American Robin | 2 | F | UP | | | | |
| Canada Goose | 2 | FO | | | | | |
| Cinnamon Teal | 1 | L | OW | | | | |
| Common Goldeneye | 6 | L | OW,MA | | | | |
| Eastern Kingbird | 1 | F | UP | | | | |
| European Starling | 6 | N,F | box | | | | |
| Great Blue Heron | 1 | FO | | | | | |
| Killdeer | 3 | F | US | | | | |
| Mallard | 5 | L,F | OW,MA | | | | |
| Red-winged Blackbird | 11 | N,BP | MA | | | | |
| Ring-necked Pheasant | 1 | L | UP | | | | |
| Spotted Sandpiper | 2 | F | US | | | | |
| Tree Swallow | 4 | F,N | MA | | | | |
| Violet-green Swallow | 3 | F | MA | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| Notes: Conditions: Mostly sunny and light wind, approximately 70 degrees. |
|---|
| |
| Upper pond approximately ¾ full. |
| Lower pond very low. |
| All shrubs along Broeder Loop Rd had been cut down. |
| 2 Female Common Goldeneye with 2 young each. |
| |
| |
| |
| |

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

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

BIRD SURVEY – FIELD DATA SHEET

Page 1 of 1
Date: 7/24/03

SITE: Creston

Survey Time:0800

| Bird Species | # | Behavior | Habitat | Bird Species | # | Behavior | Habitat |
|---|---|---|---|---|---|---|---|
| Cedar Waxwing | 6 | L | SS | | | | |
| Cliff Swallow | 4 | F | OW | | | | |
| Common Raven | 4 | FO | | | | | |
| Common Snipe | 2 | F | MA | | | | |
| Red-winged Blackbird | 6 | F | MA | | | | |
| Rough-winged Swallow | >10 | F | OW | | | | |
| Song Sparrow | 2 | L | SS | | | | |
| Spotted Sandpiper | 1 | F | US | | | | |
| Tree Swallow | >30 | F | OW | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| Notes: Whitetail doe |
|---|
| |
| |
| |
| |
| |
| |
| |
| |
| |

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

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

## ROUTINE WETLAND DETERMINATION
### (1987 COE Wetlands Delineation Manual)

| | | | |
|---|---|---|---|
| Project/Site: Creston Wetland Mitigation Site | Project No: | Date: 24-Jul-2003 |
| Applicant/Owner: Montana Department of Transportation | | County: Flathead |
| Investigators: Traxler | | State: Montana |
| | | Plot ID: 1 |

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

Community ID: EM / AB
Transect ID:
Field Location:
Near end of vegetation transect

VEGETATION (USFWS Region No. 9)

| Dominant Plant Species(Latin/Common) | Stratum | Indicator | Plant Species(Latin/Common) | Stratum | Indicator |
|---|---|---|---|---|---|
| *Potamogeton pectinatus* | Herb | OBL | *Phalaris arundinacea* | Herb | FACW |
| Pondweed,Sago | | | Grass,Reed Canary | | |
| *Lemna minor* | Herb | OBL | | | |
| Duckweed,Lesser | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 3/3 = 100.00%
FAC Neutral: 3/3 = 100.00%
Numeric Index: 4/3 = 1.33

Remarks:
This site was drier in 2003 than in previous years and Phalaris had started to encroach.

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: = 1 (in.)
- Depth to Saturated Soil: = 0 (in.)

Wetland Hydrology Indicators
Primary Indicators
- NO Inundated
- YES Saturated in Upper 12 Inches
- YES 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
- YES Local Soil Survey Data
- YES FAC-Neutral Test
- NO Other(Explain in Remarks)

Remarks:
Soil was saturated to surface, but surface water had recently retreated below the soil pit elevation.



ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

| | | | |
|---|---|---|---|
| Project/Site: Creston Wetland Mitigation Site | Project No: | Date: 24-Jul-2003 |
| Applicant/Owner: Montana Department of Transportation | | County: Flathead |
| Investigators: Traxler | | State: Montana |
| | | Plot ID: 1 |

SOILS

Map Unit Name (Series and Phase): Muck and Peat
Map Symbol: Mc Drainage Class: Unknown
Taxonomy (Subgroup): Histosol / Histic Epipedon
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? (Yes) No

Profile Descriptions

| Depth (inches) | Horizon | Matrix Color (Munsell Moist) | Mottle Color (Munsell Moist) | Mottle Abundance | Mottle Contrast | Texture, Concretions, Structure, etc |
|---|---|---|---|---|---|---|
| 16 | O | 5YR2.5/1 | N/A | N/A | N/A | Loam |
| >16 | B | 7.5YR6/1 | 7.5YR6/3 | Common | Distinct | Silt loam |

Hydric Soil Indicators:
- NO Histosol
- NO Histic Epipedon
- NO Sulfidic Odor
- NO Aquic Moisture Regime
- YES 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
- YES 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:

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

| | | |
|---|---|---|
| Project/Site: Creston Wetland Mitigation Site | Project No: | Date: 24-Jul-2003 |
| Applicant/Owner: Montana Department of Transportation | | County: Flathead |
| Investigators: Traxler | | State: Montana |
| | | Plot ID: 2 |

| | | |
|---|---|---|
| Do Normal Circumstances exist on the site? | (Yes) No | Community ID: EM |
| Is the site significantly disturbed (Atypical Situation:)? | Yes (No) | Transect ID: |
| Is the area a potential Problem Area? (If needed, explain on the reverse side) | Yes (No) | Field Location: along vegetation transect (middle) |

**VEGETATION** (USFWS Region No. 9)

| Dominant Plant Species(Latin/Common) | Stratum | Indicator | Plant Species(Latin/Common) | Stratum | Indicator |
|---|---|---|---|---|---|
| *Phalaris arundinacea* Grass,Reed Canary | Herb | FACW | | | |

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 1/1 = 100.00%

FAC Neutral: 1/1 = 100.00%
Numeric Index: 2/1 = 2.00

**Remarks:**
monotypic stand of reed canary grass along veg. transect. Common on 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: | > 16 *(in.)* |
| Depth to Saturated Soil: | > 16 *(in.)* |

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

Secondary Indicators
- YES 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:**
Very dry year ~~with groundwater elevations much lower than normal~~.



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

| | | |
|---|---|---|
| Project/Site: Creston Wetland Mitigation Site | Project No: | Date: 24-Jul-2003 |
| Applicant/Owner: Montana Department of Transportation | | County: Flathead |
| Investigators: Traxler | | State: Montana |
| | | Plot ID: 2 |

**SOILS**

Map Unit Name (Series and Phase): Alluvial Land, poorly drained
Map Symbol: Aa Drainage Class: Mapped Hydric Inclusion?
Taxonomy (Subgroup): 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 |
|---|---|---|---|---|---|---|
| 9 | A | 7.5YR2.5/2 | N/A | N/A | N/A | Loam |
| 16 | B | 7.5YR2.5/1 | 7.5YR5/3 | Common | Distinct | Silt loam |

Hydric Soil Indicators:
- NO Histosol
- NO Histic Epipedon
- NO Sulfidic Odor
- NO Aquic Moisture Regime
- YES 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:**
Hydric soil not well developed

**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:**





LAND & WATER

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

| | | |
|---|---|---|
| Project/Site: Creston Wetland Mitigation Site | Project No: | Date: 24-Jul-2003 |
| Applicant/Owner: Montana Department of Transportation | | County: Flathead |
| Investigators: Traxler | | State: Montana |
| | | Plot ID: 3 |

| | | |
|---|---|---|
| Do Normal Circumstances exist on the site? | (Yes) No | Community ID: Upland |
| Is the site significantly disturbed (Atypical Situation:)? | Yes (No) | Transect ID: |
| Is the area a potential Problem Area? (If needed, explain on the reverse side) | Yes (No) | Field Location: Near beginning of vegetation transect |

**VEGETATION** (USFWS Region No. 9)

| Dominant Plant Species(Latin/Common) | Stratum | Indicator | Plant Species(Latin/Common) | Stratum | Indicator |
|---|---|---|---|---|---|
| *Agropyron repens* | Herb | FACU | *Agrostis stolonifera* | Herb | FAC+ |
| Quackgrass | | | Bentgrass,Spreading | | |
| *Phleum pratense* | Herb | FACU | *Cirsium arvense* | Herb | FACU+ |
| Timothy | | | Thistle,Creeping | | |

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 1/4 = 25.00%

FAC Neutral: 0/3 = 0.00%
Numeric Index: 15/4 = 3.75

Remarks:

**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: | > 18 *(in.)* |

Wetland Hydrology Indicators
Primary Indicators
- NO Inundated
- NO 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
- NO FAC-Neutral Test
- NO Other(Explain in Remarks)

Remarks:
upland area




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

| | | |
|---|---|---|
| Project/Site: Creston Wetland Mitigation Site | Project No: | Date: 24-Jul-2003 |
| Applicant/Owner: Montana Department of Transportation | | County: Flathead |
| Investigators: Traxler | | State: Montana |
| | | Plot ID: 3 |


**SOILS**

Map Unit Name (Series and Phase): Swims silt loam
Map Symbol: So Drainage Class:
Taxonomy (Subgroup):
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 |
|---|---|---|---|---|---|---|
| 5 | A | 7.5YR2.5/2 | N/A | N/A | N/A | Loam |
| 16 | B | 7.5YR4/3 | N/A | N/A | N/A | Loam |

Hydric Soil Indicators:
- NO Histosol
- NO Histic Epipedon
- NO Sulfidic Odor
- NO Aquic Moisture Regime
- NO Reducing Conditions
- NO 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:
soil is very dry at this location

**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:





LAND & WATER

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

**1. Project Name:** Creston **2. Project #:** 130091.007 **Control #:** _____

**3. Evaluation Date:** 7/24/2003 **4. Evaluator(s):** Traxler **5. Wetland / Site #(s):** Creston

**6. Wetland Location(s) i. T:** 28 N **R:** 20 W **S:** 14 **T:** __ N **R:** __ E **S:** _____

**ii. Approx. Stationing / Mileposts:** _____

**iii. Watershed:** 17010208 **GPS Reference No. (if applies):** _____

**Other Location Information:** Flathead-04

**7. A. Evaluating Agency** LWC/MDT

**B. Purpose of Evaluation:**

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

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

**9. Assessment Area (total acres):** 20 (visually estimated)
_____ (measured, e.g. GPS)

**10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA**

| HGM CLASS [1] | SYSTEM [2] | SUBSYSTEM [2] | CLASS [2] | WATER REGIME [2] | *MODIFIER* [2] | % OF AA |
|---|---|---|---|---|---|---|
| Depression | Palustrine | None | Aquatic Bed | Permanently Flooded | Excavated/Impounded | 15 |
| Depression | Palustrine | None | Emergent Wetland | Intermittently Exposed | Excavated/Impounded | 70 |
| Depression | Palustrine | None | Scrub-Shrub Wetland | Seasonally Flooded | Excavated | 5 |
| --- | --- | --- | --- | --- | --- | |

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

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

**12. GENERAL CONDITION OF AA**

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

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

**Comments:** (types of disturbance, intensity, season, etc.) most plants are introduced, disturbance is minimal

**ii. Prominent weedy, alien, & introduced species:** hound's tongue

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

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

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

**Comments:** _____

**14A. HABITAT FOR FEDERALLY LISTED OR PROPOSED THREATENED OR ENDANGERED PLANTS AND ANIMALS**

i. AA is Documented (D) or Suspected (S) to contain (check box):

| | | |
|---|---|---|
| Primary or Critical habitat **(list species)** | ☐ D ☐ S | |
| Secondary habitat **(list species)** | ☐ D ☒ S | bald eagle |
| Incidental habitat **(list species)** | ☐ D ☐ S | |
| No usable habitat | ☐ D ☐ S | |

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

| Highest Habitat Level | doc/primary | sus/primary | doc/secondary | sus/secondary | doc/incidental | sus/incidental | none |
|---|---|---|---|---|---|---|---|
| Functional Point and Rating | --- | --- | --- | .7 (M) | --- | --- | --- |

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

**14B. HABITAT FOR PLANTS AND ANIMALS RATED AS S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM.**
**Do not include species listed in 14A(i).**

i. AA is Documented (D) or Suspected (S) to contain (check box):

| | | |
|---|---|---|
| Primary or Critical habitat **(list species)** | ☐ D ☐ S | _____ |
| Secondary habitat **(list species)** | ☐ D ☐ S | _____ |
| Incidental habitat **(list species)** | ☐ D ☒ S | western toad, northern leopard frog, peregrine falcon, black tern |
| No usable habitat | ☐ D ☐ S | _____ |

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

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

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

**14C. General Wildlife Habitat Rating**

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

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

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

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

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

| Structural Diversity (from #13) | ☒High | | | | | | | | ☐Moderate | | | | | | | | ☐Low | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Class Cover Distribution (all vegetated classes) | ☐Even | | | | ☒Uneven | | | | ☐Even | | | | ☐Uneven | | | | ☐Even | | | |
| Duration of Surface Water in = 10% of AA | P/P | S/I | T/E | A | P/P | S/I | T/E | A | P/P | S/I | T/E | A | P/P | S/I | T/E | A | P/P | S/I | T/E | A |
| **Low** disturbance at AA (see #12) | -- | -- | -- | -- | E | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **Moderate** disturbance at AA (see #12) | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **High** disturbance at AA (see #12) | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

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

| Evidence of Wildlife Use from 14C(i) | **Wildlife Habitat Features Rating** from 14C(ii) | | | |
|---|---|---|---|---|
| | ☒ Exceptional | ☐ High | ☐ Moderate | ☐ Low |
| Substantial | -- | -- | -- | -- |
| Moderate | .9 (H) | -- | -- | -- |
| Low | -- | -- | -- | -- |

**Comments:** _____

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

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

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

| Duration of Surface Water in AA | ☐ Permanent/Perennial | | | ☐ Seasonal / Intermittent | | | ☐ Temporary / Ephemeral | | |
|---|---|---|---|---|---|---|---|---|---|
| Cover - % of waterbody in AA containing cover objects (*e.g.* submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation) | >25% | 10-25% | <10% | >25% | 10-25% | <10% | >25% | 10-25% | <10% |
| Shading - >75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Shading – 50 to 75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities. | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Shading - < 50% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities. | -- | -- | -- | -- | -- | -- | -- | -- | -- |

ii. **Modified Habitat Quality:** Is fish use of the AA precluded or significantly reduced by a culvert, dike, other man-made structure or activity **or** is the waterbody included on the 'MDEQ list of waterbodies in need of TMDL development' with 'Probable Impaired Uses' listed as cold or warm water fishery or aquatic life support**?**
☐ **Y** ☐ **N** If yes, reduce the rating from 14D(i) by one level and check the modified habitat quality rating: ☐ E ☐ H ☐ M ☐ L

iii. **Rating** (Use the conclusions from 14D(i) and 14D(ii) above and the matrix below to pick the functional point and rating of exceptional (E), high (H), moderate (M), or low (L).)

| **Types of Fish Known or Suspected Within AA** | **Modified Habitat Quality** from 14D(ii) | | | |
|---|---|---|---|---|
| | ☐ Exceptional | ☐ High | ☐ Moderate | ☐ Low |
| **Native game** fish | -- | -- | -- | -- |
| **Introduced game** fish | -- | -- | -- | -- |
| **Non-game** fish | -- | -- | -- | -- |
| **No** fish | -- | -- | -- | -- |

**Comments:** _____

**14E. FLOOD ATTENUATION** ☒ **NA** (proceed to 14G)
Applies only to wetlands subject to flooding via in-channel or overbank flow.
If wetlands in AA do not flooded from in-channel or overbank flow, check NA above.

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

| Estimated wetland area in AA subject to periodic flooding | ☐ ≥ 10 acres | | | ☐ <10, >2 acres | | | ☐ ≤2 acres | | |
|---|---|---|---|---|---|---|---|---|---|
| % of flooded wetland classified as forested, scrub/shrub, or both | 75% | 25-75% | <25% | 75% | 25-75% | <25% | 75% | 25-75% | <25% |
| AA contains **no outlet or restricted outlet** | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| AA contains **unrestricted outlet** | -- | -- | -- | -- | -- | -- | -- | -- | -- |

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

**14F. SHORT AND LONG TERM SURFACE WATER STORAGE** ☐ **NA** (proceed to 14G)
Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, check NA above.

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

| Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding. | ☐ >5 acre feet | | | ☒ <5, >1 acre feet | | | ☐ ≤1 acre foot | | |
|---|---|---|---|---|---|---|---|---|---|
| Duration of surface water at wetlands within the AA | P/P | S/I | T/E | P/P | S/I | T/E | P/P | S/I | T/E |
| Wetlands in AA flood or pond [3] **5 out of 10 years** | -- | -- | -- | .8 (H) | -- | -- | -- | -- | -- |
| Wetlands in AA flood or pond **< 5 out of 10 years** | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**Comments**: _____

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

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

| Sediment, Nutrient, and Toxicant Input Levels Within AA | AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present. | | | | Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present. | | | |
|---|---|---|---|---|---|---|---|---|
| % 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** | -- | -- | .7 (M) | -- | -- | -- | -- | -- |
| AA contains **unrestricted outlet** | -- | -- | -- | -- | -- | -- | -- | -- |

**Comments**: _____



LAND & WATER

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

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

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

| % Cover of wetland streambank or shoreline by species with deep, binding rootmasses. | ***Duration of Surface Water Adjacent to Rooted Vegetation*** | | |
|---|---|---|---|
| | ☐Permanent / Perennial | ☐Seasonal / Intermittent | ☐Temporary / Ephemeral |
| [3] **65 %** | -- | -- | -- |
| **35-64 %** | -- | -- | -- |
| **< 35 %** | -- | -- | -- |

**Comments:**

**14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT**

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

| ***A*** | ☒ Vegetated component >5 acres | | | | | | ☐ Vegetated component 1-5 acres | | | | | | ☐ Vegetated component <1 acre | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *B* | ☒ High | | ☐ Moderate | | ☐ Low | | ☐ High | | ☐ Moderate | | ☐ Low | | ☐ High | | ☐ Moderate | | ☐ Low | |
| ***C*** | ☒Y | ☐N | ☐Y | ☐N | ☐Y | ☐N | ☐Y | ☐N | ☐Y | ☐N | ☐Y | ☐N | ☐Y | ☐N | ☐Y | ☐N | ☐Y | ☐N |
| **P/P** | 1H | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **S/I** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **T/E/A** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**Comments:**

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

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

ii. ☐ **Recharge Indicators**
- ☐ Permeable substrate presents without underlying impeding layer.
- ☐ Wetland contains inlet but not outlet.
- ☐ Other

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

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

**Comments:**

**14K. UNIQUENESS**

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

| Replacement Potential | AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland or plant association listed as "S1" by the MTNHP. | | | AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MTNHP. | | | AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate. | | |
|---|---|---|---|---|---|---|---|---|---|
| Estimated Relative Abundance from #11 | ☐rare | ☐common | ☐abundant | ☐rare | ☐common | ☐abundant | ☐rare | ☐common | ☐abundant |
| **Low** disturbance at AA (#12i) | -- | -- | -- | -- | .6M | -- | -- | -- | -- |
| **Moderate** disturbance at AA (#12i) | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **High** disturbance at AA (#12i) | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**Comments:**

**14L. RECREATION / EDUCATION POTENTIAL**

**i. Is the AA a known recreational or educational site?** ☒ **Yes (Rate ☒ High (1.0)**, then proceed to 14L(ii) only] ☐ **No** [Proceed to 14L(iii)]

**ii. Check categories that apply to the AA:** ☐ Educational / scientific study ☐ Consumptive rec. ☒ Non-consumptive rec. ☐ Other

**iii. Based on the location, diversity, size, and other site attributes, is there a strong potential for recreational or educational use?**

☒ **Yes** [Proceed to 14L (ii) and then 14L(iv).] ☐ **No** [Rate as low in 14L(iv)]

**iv. Rating** (Use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

| Ownership | Disturbance at AA from #12(i) | | |
|---|---|---|---|
| | ☒ Low | ☐ Moderate | ☐ High |
| **Public** ownership | 1(H) | -- | -- |
| **Private** ownership | -- | -- | -- |

**Comments:** _____

## FUNCTION, VALUE SUMMARY, AND OVERALL RATING

| Function and Value Variables | Rating | Actual Functional Points | Possible Functional Points | Functional Units (Actual Points x Estimated AA Acreage) |
|---|---|---|---|---|
| A. Listed/Proposed T&E Species Habitat | L | 0.70 | 1 | |
| B. MT Natural Heritage Program Species Habitat | L | 0.10 | 1 | |
| C. General Wildlife Habitat | H | 0.90 | 1 | |
| D. General Fish/Aquatic Habitat | N/A | 0.00 | -- | |
| E. Flood Attenuation | N/A | 0.00 | -- | |
| F. Short and Long Term Surface Water Storage | H | 0.80 | 1 | |
| G. Sediment/Nutrient/Toxicant Removal | M | 0.70 | 1 | |
| H. Sediment/Shoreline Stabilization | N/A | 0.00 | -- | |
| I. Production Export/Food Chain Support | H | 1.00 | 1 | |
| J. Groundwater Discharge/Recharge | H | 1.00 | 1 | |
| K. Uniqueness | M | 0.60 | 1 | |
| L. Recreation/Education Potential | H | 1.00 | 1 | |
| | **Totals:** | 6.80 | 9.00 | 136 |
| | ***Percent of Total Possible Points:*** | | **76%** (Actual / Possible) x 100 [rd to nearest whole #] | |

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

**Category II Wetland:** (Criteria for Category I not satisfied **and** meets any **one** of the following Category II criteria. If not satisfied, proceed to Category IV.)
- ☐ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
- ☒ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish/Aquatic Habitat; **or**
- ☐ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish / Aquatic Habitat; **or**
- ☐ Score of .9 functional point for Uniqueness; **or**
- ☒ Percent of total possible points is > 65%.

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

**Category IV Wetland:** (Criteria for Categories I or II are not satisfied **and** all of the following criteria are met; If not satisfied, proceed to Category III.)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ "Low" rating for Production Export / Food Chain Support; **and**
- ☐ Percent of total possible points is < 30%.

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

☐ **I** ☒ **II** ☐ **III** ☐ **IV**

# Appendix C

## REPRESENTATIVE PHOTOGRAPHS
## 2003 AERIAL PHOTOGRAPH

***MDT Wetland Mitigation Monitoring***
***Creston***
***Creston, Montana***

LAND & WATER

Photo Point No. 1: View looking north; the Flathead County green bins are located in the distance.

Photo Point No. 2: View looking northeast; Highway 35 is visible in the background.

Photo Point No. 3: View looking east. The photo is taken near the north perimeter of the impoundment.

Vegetation transect from East end looking west.

Photo Point No. 5: View looking south and taken from the center of the mitigation site.

Photo Point No. 6: View looking west; the shallow pond is present in the background.


0025
7-24-03 Creston Wetland
Horizons, Inc.

# Appendix D

## BIRD SURVEY PROTOCOL
## GPS PROTOCOL

***MDT Wetland Mitigation Monitoring***
***Creston***
***Creston, Montana***

LAND & WATER

# BIRD SURVEY PROTOCOL

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

**Species Use within the Mitigation Wetland: Survey Method**

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

***Sites that can be circumambulated or walked throughout.***

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

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

***Sites that cannot be circumambulated.***

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

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

**Species Use within the Mitigation Wetland: Data Recording**

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

***1. Bird Species List***

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

***2. Bird Density***

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

***3. Bird Behavior***

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

***4. Bird Species Habitat Use***

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

# GPS Mapping and Aerial Photo Referencing Procedure

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

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

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

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

# Appendix E

## MACROINVERTEBRATE SAMPLING PROTOCOL AND DATA

***MDT Wetland Mitigation Monitoring***
***Creston***
***Creston, Montana***

LAND & WATER

# AQUATIC INVERTEBRATE SAMPLING PROTOCOL

## Equipment List

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

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

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

## Site Selection

Select the sampling site with these considerations in mind:

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

## Sampling

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

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

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

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

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

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

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

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

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

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

Photograph the sampled site.

**Sample Handling/Shipping**

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

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

## METHODS

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

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

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

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

### Sample Processing

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

Sampling consisted of D-frame net sweeps through emergent vegetation (when present), the water column, over the water surface, and included disturbing and scraping substrates at each sampled sites. Samples were preserved in ethanol at each wetland site and subsequently delivered to Rhithron Associates, Inc. for processing, taxonomic determinations, and data analysis.

At Rhithron's laboratory, Caton subsamplers and stereomicroscopes with 10X magnification were used to randomly select a minimum of 200 organisms, when possible, from each sample. In some cases, the entire sample contained fewer than 200 organisms; in these cases, all organisms from the sample were taken. Taxa were identified in general accordance with the taxonomic resolution standards set out in the MDEQ Standard Operating Procedures for Sampling and Sample Analysis (Bukantis 1998). Ten percent of samples were re-identified by a second taxonomist

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

**Bioassessment Metrics**

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

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

Four composition metrics (%Chironomidae, %Orthocladiinae of Chironomidae, %Crustacea + %Mollusca, and Amphipoda) measure the relative contributions of certain taxonomic groups that may have significant responses to habitat and/or water quality impacts. For example, amphipods have been demonstrated to increase in abundance in alkaline conditions. Short-lived, relatively mobile taxa such as chironomids dominate ephemeral environments; any are hemoglobin-bearers capable of tolerating de-oxygenated conditions.

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

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

**RESULTS**

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

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

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

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

**LITERATURE CITED**


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

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

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

**Table 2. Sampled MDT Mitigation Sites by Year**

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

**Aquatic Invertebrate Taxonomic Data**

**Site Name** CRESTON **Date Collected** 7/24/2003

| Order | Family | Taxon | Count | Percent | Unique | BI | FFG |
|---|---|---|---|---|---|---|---|
| | | Ostracoda | 13 | 7.51% | Yes | 8 | CG |
| | | Copepoda | 76 | 43.93% | Yes | 8 | CG |
| **Amphipoda** | | | | | | | |
| | Talitridae | | | | | | |
| | | *Hyalella* | 2 | 1.16% | Yes | 8 | CG |
| **Arhynchobdellida** | | | | | | | |
| | Erpobdellidae | | | | | | |
| | | *Erpobdella* | 2 | 1.16% | Yes | 8 | PR |
| **Basommatophora** | | | | | | | |
| | Lymnaeidae | | | | | | |
| | | Lymnaeidae | 3 | 1.73% | No | 6 | SC |
| | | *Stagnicola* | 13 | 7.51% | Yes | 6 | SC |
| | Physidae | | | | | | |
| | | *Physa* | 8 | 4.62% | Yes | 8 | SC |
| | | Physidae | 18 | 10.40% | No | 8 | SC |
| | Planorbidae | | | | | | |
| | | *Gyraulus* | 1 | 0.58% | Yes | 8 | SC |
| **Coleoptera** | | | | | | | |
| | Dytiscidae | | | | | | |
| | | *Hygrotus* | 2 | 1.16% | Yes | 5 | PR |
| | | *Laccophilus* | 1 | 0.58% | Yes | 5 | PR |
| | Haliplidae | | | | | | |
| | | *Haliplus* | 4 | 2.31% | Yes | 5 | PH |
| | Hydrophilidae | | | | | | |
| | | *Tropisternus* | 2 | 1.16% | Yes | 5 | PR |
| **Diptera** | | | | | | | |
| | Ceratopogonidae | | | | | | |
| | | Ceratopogoninae | 4 | 2.31% | Yes | 6 | PR |
| | Chironomidae | | | | | | |
| | | *Procladius* | 1 | 0.58% | Yes | 9 | PR |
| **Heteroptera** | | | | | | | |
| | Notonectidae | | | | | | |
| | | *Notonecta* | 16 | 9.25% | Yes | 5 | PR |
| **Odonata** | | | | | | | |
| | Coenagrionidae | | | | | | |
| | | *Enallagma* | 4 | 2.31% | Yes | 7 | PR |
| **Rhynchobdellida** | | | | | | | |
| | Glossiphoniidae | | | | | | |
| | | *Glossiphonia complanata* | 1 | 0.58% | Yes | 9 | PR |
| **Trichoptera** | | | | | | | |
| | Limnephilidae | | | | | | |
| | | *Limnephilus* | 2 | 1.16% | Yes | 3 | SH |
| **Grand Total** | | | **173** | | | | |

**Aquatic Invertebrate Data Summary**

**Project ID:** MDT03LW
**STORET Station ID:**
**Station Name:** CRESTON

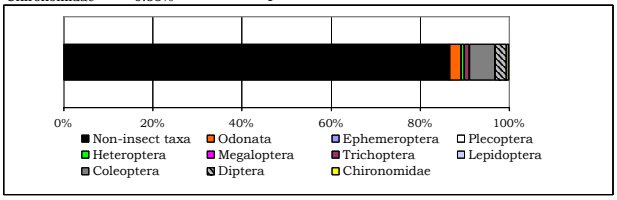
**Activity ID:**

**Sample Date:** 7/24/2003

| | |
|---|---|
| Sample type | |
| SUBSAMPLE TOTAL ORGANISMS | 173 |
| Portion of sample used | 1.00% |
| Estimated number in total sample | 17300 |
| Sampling effort | |
| Time | |
| Distance | |
| Jabs | |
| Habitat type | |
| EPT abundance | 2 |
| Taxa richness | 17 |
| Number EPT taxa | 1 |
| Percent EPT | 1.16% |

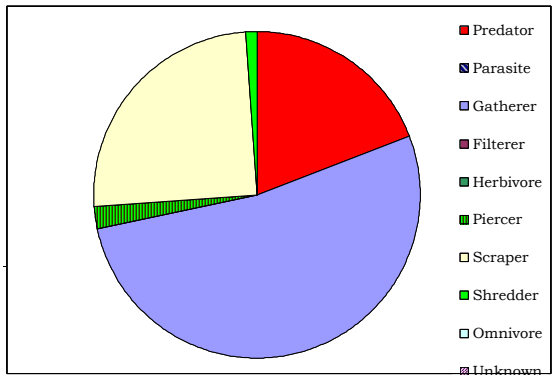
**TAXONOMIC COMPOSITION**

| GROUP | PERCENT | #TAXA |
|---|---|---|
| Non-insect taxa | 79.19% | 10 |
| Odonata | 2.31% | 1 |
| Ephemeroptera | 0.00% | 0 |
| Plecoptera | 0.00% | 0 |
| Heteroptera | 0.58% | 1 |
| Megaloptera | 0.00% | 0 |
| Trichoptera | 1.16% | 1 |
| Lepidoptera | 0.00% | 0 |
| Coleoptera | 5.20% | 4 |
| Diptera | 2.31% | 1 |
| Chironomidae | 0.58% | 1 |




**FUNCTIONAL COMPOSITION**

| GROUP | PERCENT | #TAXA |
|---|---|---|
| Predator | 19.08% | 9 |
| Parasite | 0.00% | 0 |
| Gatherer | 52.60% | 3 |
| Filterer | 0.00% | 0 |
| Herbivore | 0.00% | 0 |
| Piercer | 2.31% | 1 |
| Scraper | 24.86% | 5 |
| Shredder | 1.16% | 1 |
| Omnivore | 0.00% | 0 |
| Unknown | 0.00% | 0 |




**COMMUNITY TOLERANCES**

| | |
|---|---|
| Sediment tolerant taxa | 2 |
| Percent sediment tolerant | 9.83% |
| Sediment sensitive taxa | 0 |
| Metals tolerance index (McGuire) | 7.97 |
| Cold stenotherm taxa | 0 |
| Percent cold stenotherms | 0.00% |

**HABITUS MEASURES**

| | |
|---|---|
| Hemoglobin bearer richness | 2 |
| Percent hemoglobin bearers | 9.83% |
| Air-breather richness | 3 |
| Percent air-breathers | 2.89% |
| Burrower richness | 1 |
| Percent burrowers | 2.31% |
| Swimmer richness | 3 |
| Percent swimmers | 6.36% |

**DOMINANCE**

| TAXON | ABUNDANCE | PERCENT |
|---|---|---|
| Copepoda | 76 | 43.93% |
| Physidae | 18 | 10.40% |
| Notonecta | 16 | 9.25% |
| Stagnicola | 13 | 7.51% |
| Ostracoda | 13 | 7.51% |
| SUBTOTAL 5 DOMINANTS | 136 | 78.61% |
| Physa | 8 | 4.62% |
| Enallagma | 4 | 2.31% |
| Haliplus | 4 | 2.31% |
| Ceratopogoninae | 4 | 2.31% |
| Lymnaeidae | 3 | 1.73% |
| TOTAL DOMINANTS | 159 | 91.91% |

**SAPROBITY**

| | |
|---|---|
| Hilsenhoff Biotic Index | 6.65 |

**DIVERSITY**

| | |
|---|---|
| Shannon H (loge) | 2.84 |
| Shannon H (log2) | 1.97 |
| Margalef D | 3.49 |
| Simpson D | 0.22 |
| Evenness | 0.10 |

**VOLTINISM**

| TYPE | # TAXA | PERCENT |
|---|---|---|
| Multivoltine | 3 | 52.02% |
| Univoltine | 10 | 42.77% |
| Semivoltine | 4 | 5.20% |

**TAXA CHARACTERS**

| | #TAXA | PERCENT |
|---|---|---|
| Tolerant | 8 | 28.90% |
| Intolerant | 0 | 0.00% |
| Clinger | 0 | 0.00% |

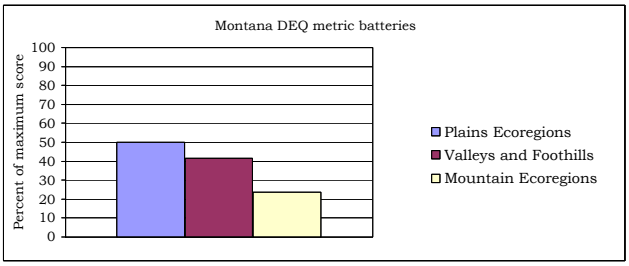
**BIOASSESSMENT INDICES**

**B-IBI (Karr et al. )**

| METRIC | VALUE | SCORE | |
|---|---|---|---|
| Taxa richness | 17 | 1 | |
| E richness | 0 | 1 | |
| P richness | 0 | 1 | |
| T richness | 1 | 1 | |
| Long-lived | 4 | 3 | |
| Sensitive richness | 0 | 1 | |
| %tolerant | 28.90% | 3 | |
| %predators | 19.08% | 3 | |
| Clinger richness | 0 | 1 | |
| %dominance (3) | 63.58% | 3 | |
| | TOTAL SCORE | 18 | 36% |

**MONTANA DEQ METRICS (Bukantis 1998)**

| METRIC | VALUE | Plains Ecoregions | Valleys and Foothills | Mountain Ecoregions |
|---|---|---|---|---|
| Taxa richness | 17 | 1 | 1 | 0 |
| EPT richness | 1 | 0 | 0 | 0 |
| Biotic Index | 6.65 | 1 | 0 | 0 |
| %Dominant taxon | 43.93% | 2 | 1 | 1 |
| %Collectors | 52.60% | 3 | 3 | 3 |
| %EPT | 1.16% | 0 | 0 | 0 |
| Shannon Diversity | 1.97 | 1 | | |
| %Scrapers +Shredders | 26.01% | 2 | 2 | 1 |
| Predator taxa | 9 | 3 | | |
| %Multivoltine | 52.02% | 2 | | |
| %H of T | 0.00% | | 3 | |
| TOTAL SCORES | | 15 | 10 | 5 |
| PERCENT OF MAXIMUM | | 50.00 | 41.67 | 23.81 |
| IMPAIRMENT CLASS | | MODERATE | MODERATE | MODERATE |




**Montana Plains ecoregions metrics (Bramblett and Johnson)**

| *Riffle* | | *Pool* | |
|---|---|---|---|
| EPT richness | 1 | E richness | 0 |
| Percent EPT | 1.16% | T richness | 1 |
| Percent Oligochaetes and Leeches | 1.73% | Percent EPT | 1.16% |
| Percent 2 dominants | 54.34% | Percent non-insect | 79.19% |
| Filterer richness | 0 | Filterer richness | 0 |
| Percent intolerant | 0.00% | Univoltine richness | 10 |
| Univoltine richness | 10 | Percent supertolerant | 70.52% |
| Percent clingers | 0.00% | | |
| Swimmer richness | 3 | | |