MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2004

Creston Site
Creston, Montana

Prepared for:

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

Prepared by:

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

June 2005

Project No: B43054.00 - 0108

MONTANA DEPARTMENT OF TRANSPORTATION

WETLAND MITIGATION MONITORING REPORT:

YEAR 2004

Creston
Creston, Montana

Prepared for:

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

Prepared by:

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

June 2005

Project No: B43054.00 - 0108

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 2004 represents the fourth year of monitoring.

2.0 METHODS

2.1 Monitoring Dates and Activities

The site was visited on May 27th (spring), July 29th (mid-season), and September 15th (fall), 2004. 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.

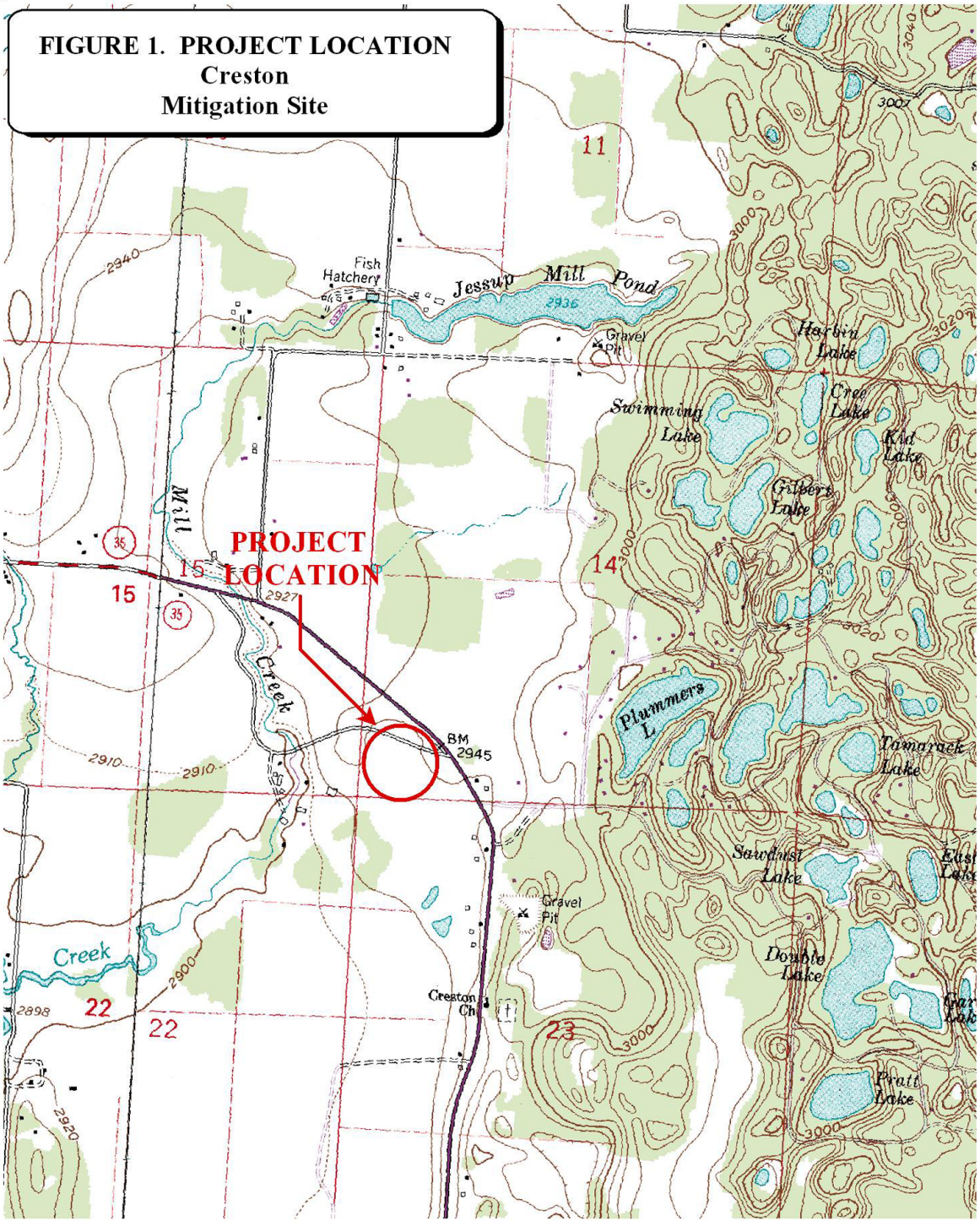
The mid-season visit was conducted between late July and August to document vegetation, soil, and hydrologic conditions used to map jurisdictional wetlands. All information contained on the Wetland Mitigation Site Monitoring Form (**Appendix B**) was collected at this time. Activities and information 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 2004); functional assessment; and (non-engineering) examination of dike structures. Groundwater monitoring wells were not accessible during the mid-season visit and so the site was visited in the fall to collect groundwater levels on the site.

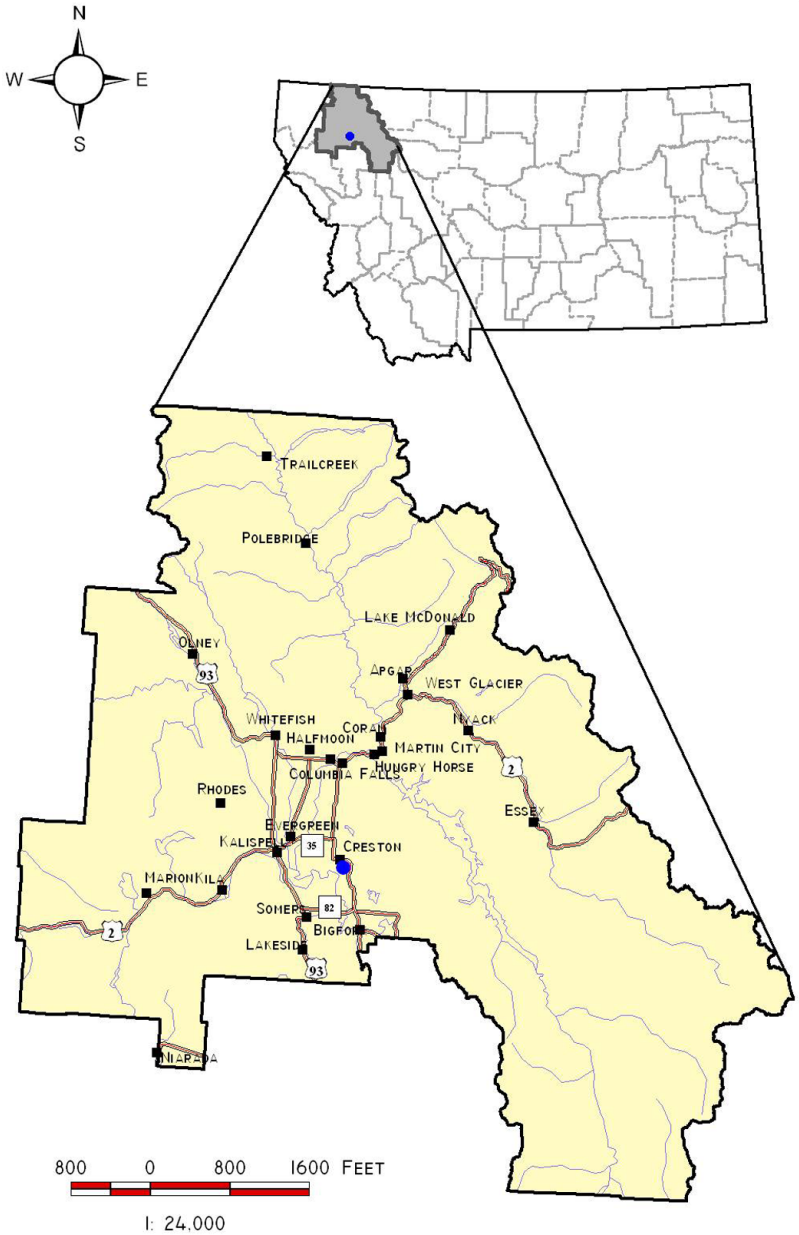
2.2 Hydrology

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

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

mapped on the aerial photograph and an estimate of the average water depth at this boundary was recorded.

Three groundwater-monitoring wells are present on site and groundwater elevations were obtained during the fall 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 fourth 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 fourth 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 2004, 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 2004 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 5 to10% of the mitigation site (see **Figure 3**, **Appendix A**). Inundation was not observed in the ditches along the north and east property lines during the mid-season visit although these areas are seasonally inundated in the spring. Emergent vegetation was observed throughout the inundated areas. The water table was depressed relative to previous years due to drought conditions. According to the Western Regional Climate Center, Creston yearly precipitation totals for 2001 (15.7 inches), 2002 (17.23), 2003 (16.42), and 2004 (17.72) were 79, 87, 83, and 89 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 fall 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 5.23 to 5.81 feet below the ground surface compared to 6.69 to 7.98-feet below the ground surface in 2003.

Table 1: ***July 2004 - 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)	8.36	3.05	5.31
West-2 (C94-12)	8.58	2.77	5.81
East (C94-10)	7.21	1.98	5.23

* Stick-up was initially measured by the USGS and is recorded on the well cover; this measurement was field checked for accuracy in 2004.

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 - 2004 Creston vegetation species list.***

Scientific Name	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	--

Table 2 (continued): ***2001 - 2004 Creston vegetation species list.***

Species	Region 9 (Northwest) Wetland Indicator
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+
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 encroaching on the large pond as it dried out 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 in recent years 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 **Table 3** and **Charts 1** and **2** below.

Chart 1: ***Transect maps showing vegetation types from the start of transect (0 feet) to the end of transect (466 feet) for each year monitored.***

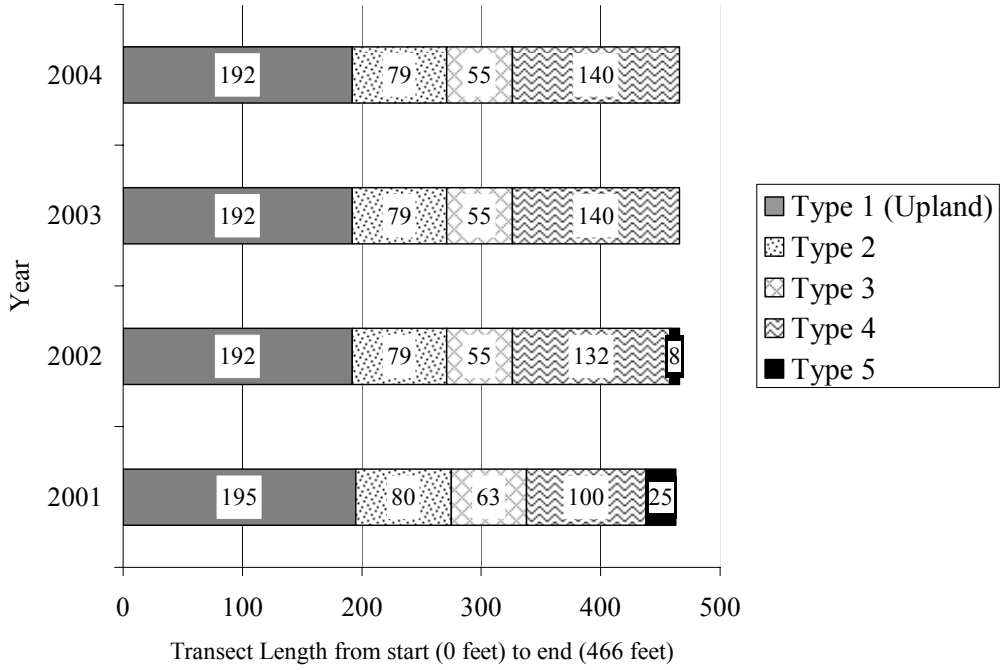
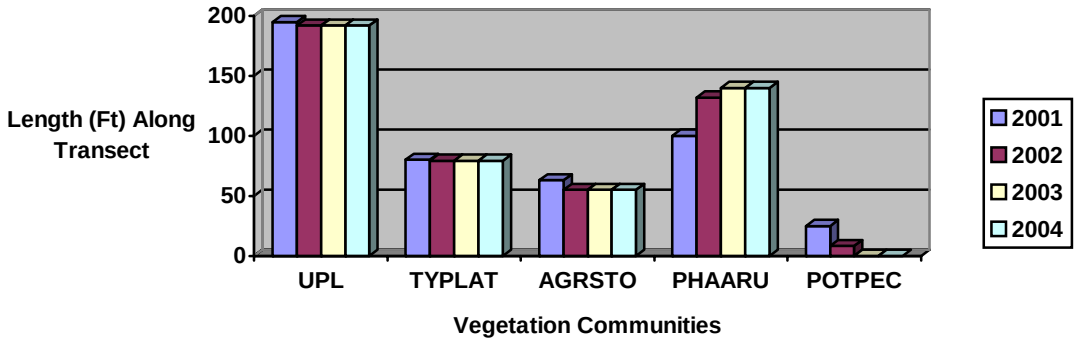


Table 3: ***Vegetation transect data summary.***

Monitoring Year	2001	2002	2003	2004
Transect Length (feet)	465	465	465	465
# Vegetation Community Transitions along Transect	5	5	4	4
# Vegetation Communities along Transect	5	5	4	4
# Hydrophytic Vegetation Communities along Transect	4	4	3	3
Total Vegetative Species	37	49	49	49
Total Hydrophytic Species	21	26	26	26
Total Upland Species	16	23	23	23
Estimated % Total Vegetative Cover	75	80	85	85
% Transect Length Comprised of Hydrophytic Vegetation Communities	58	59	59	59
% Transect Length Comprised of Upland Vegetation Communities	42	41	41	41
% Transect Length Comprised of Unvegetated Open Water	0	0	0	0

Chart 2: ***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 observed 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.

Table 4: ***2004 0bserved mortality of planted woody species.***

Row/Species	Estimated # Originally Planted	# Live Observed	Comments
A – *Pyrus* spp. (crab apple)	16	9	Some browse observed. Many fruit bearing in 2004
B - *Pyrus* spp. (crab apple)	20	14	Several re-sprouting from base
C – *Prunus* spp.	30	15	Small – unhealthy. Rodents.
D – *Prunus* spp.	150	111	Small – unhealthy. Rodents.
E - *Prunus* spp.	25	14	Competition from grasses.
F - *Elaeagnus commutata* and *Rosa woodsii*	145	60	Competition and rodents.
G - *Sheperdia* spp.	30	13	
H – *Sheperdia* spp.	60	29	
I - *Sheperdia* spp.	30	15	
J - *Rosa woodsii*	115	110	Doing very well.
K – *Elaeagnus commutata*	75	63	Doing very well.
L - *Rosa woodsii*	55	20	Competition
M - *Rosa woodsii*	40	35	Doing very well.

Weedy species most commonly noted onsite include spotted knapweed (*Centaurea maculosa*), Canada thistle (*Cirsium arvense*), and common mullein (*Verbascum thapsus*). The parking area has substantial knapweed, with other infestations occurring in upland areas that were heavily disturbed during construction. It does not appear that any weed management has occurred onsite since project inception.

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 (Aa) and as 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.

These characteristics were generally confirmed during monitoring. Three test pits were excavated and described in 2004 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 2003, 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, 2003, and 2004 observations, which indicated that *Typha latifolia* was dormant and 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 2004 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 2001-2004.***

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

Bolded species were documented during the 2004 monitoring. All other species were documented during one or more of the previous monitoring seasons.

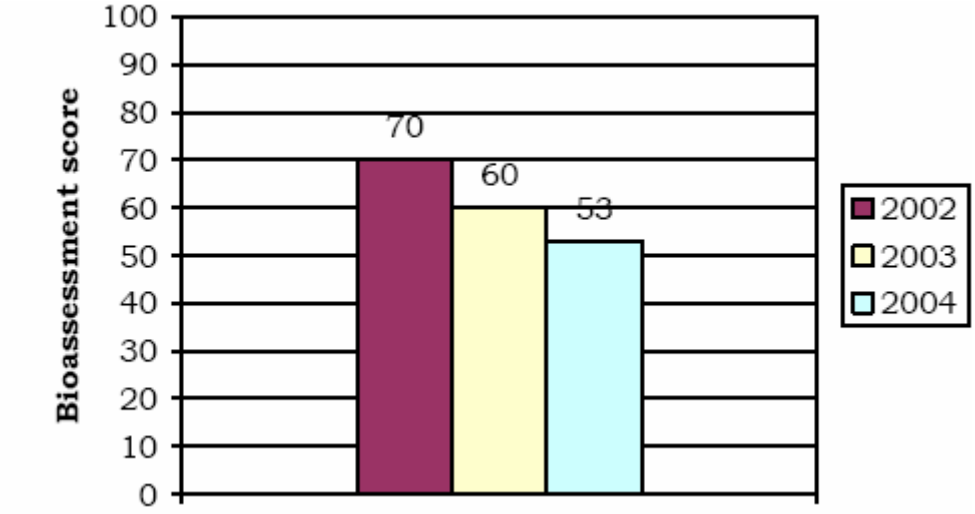
3.6 Macroinvertebrates

Macroinvertebrate sampling results are provided in **Appendix F** and were summarized by Rhithron Associates in the italicized sections below (Bollman 2004).

*Biotic conditions at the Creston site continued to deteriorate between 2003 and 2004 according to bioassessment scores **(Chart 3)**. However, the site supported a diverse assemblage in 2003, and water quality was probably excellent; the biotic index value was much lower than the median value for sites in this study. Taxonomic composition of the invertebrate assemblage was*

similar in both years; an additional sensitive taxon was collected in 2004. The substrate-water interface was inhabited by abundant ostracods, suggested 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 3: ***Macroinvertebrate bioassessment scores for 2002-2004.***



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 2004 aerial photograph is also provided in **Appendix C**.

3.9 Maintenance Needs/Recommendations

The berm and bird boxes were in good condition during the spring and mid-season visits. Weed infestations at the parking area and in other portions of the site continue to plague the site. Weed spraying at the parking area is recommended at this time. Other infested areas will be mapped during the 2005 monitoring so they too can be treated in future years. We have no other recommendations at this time.

Table 6: ***Summary of 2004 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	2004 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 (ac)	**5.2**
Functional Units (acreage x actual points) (fu)	**35.44**
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.

3.10 Current Credit Summary

Approximately 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; however, continued drought in this part of Montana could result in the temporary or permanent loss of wetland acreage over time.

4.0 REFERENCES

Bollman, W. 2004. MDT Wetland Mitigation Monitoring Project – Aquatic Invertebrate Monitoring Summary 2001, 2002, 2003, and 2004. Rhithron Associates Inc., Missoula, Montana.

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

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. U.S. 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.

Reed, P.B. 1988. *National list of plant species that occur in wetlands: North West (Region 9).* Biol. Report 88(26.9), May. 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 (NRCS). 1998. *Field Indicators of Hydric Soils in the US*, Version 4. G. Hurt, P. Whited and R. Pringle (eds.). USDA, NRCS Fort Worth, Texas.

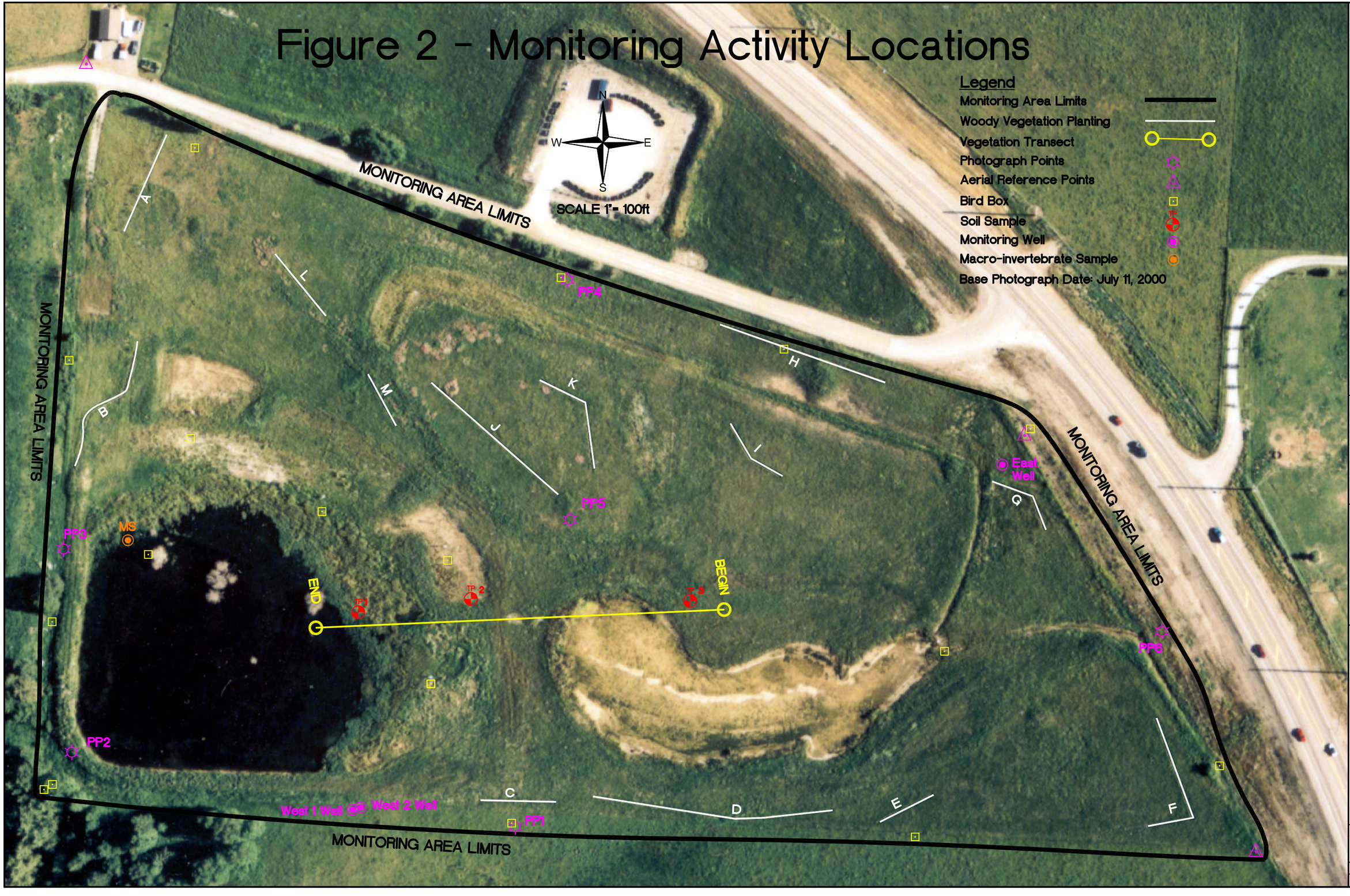
Werner, K. 1998. Herpetologist, Salish-Kootenai Community College, Pablo, Montana. May instructional presentation.

Appendix A

FIGURES 2 & 3

MDT Wetland Mitigation Monitoring
Creston
Creston, Montana

Figure 2 - Monitoring Activity Locations



Legend

- Monitoring Area Limits
- Woody Vegetation Planting
- Vegetation Transect
- Photograph Points
- Aerial Reference Points
- Bird Box
- Soil Sample
- Monitoring Well
- Macro-invertebrate Sample

Base Photograph Date: July 11, 2000

PROJECT NAME: MDT Creston Wetland Mitigation

DRAWING TITLE: Monitoring Activity Locations

DRAWN:	RA
CHECKED:	BD
APPVD:	BD
PROJ MGR:	BD
PROJ NO:	330054.108
FILE NAME:	TASK7BASE.dwg
SCALE:	1"= 100ft
LOCATION:	Creston

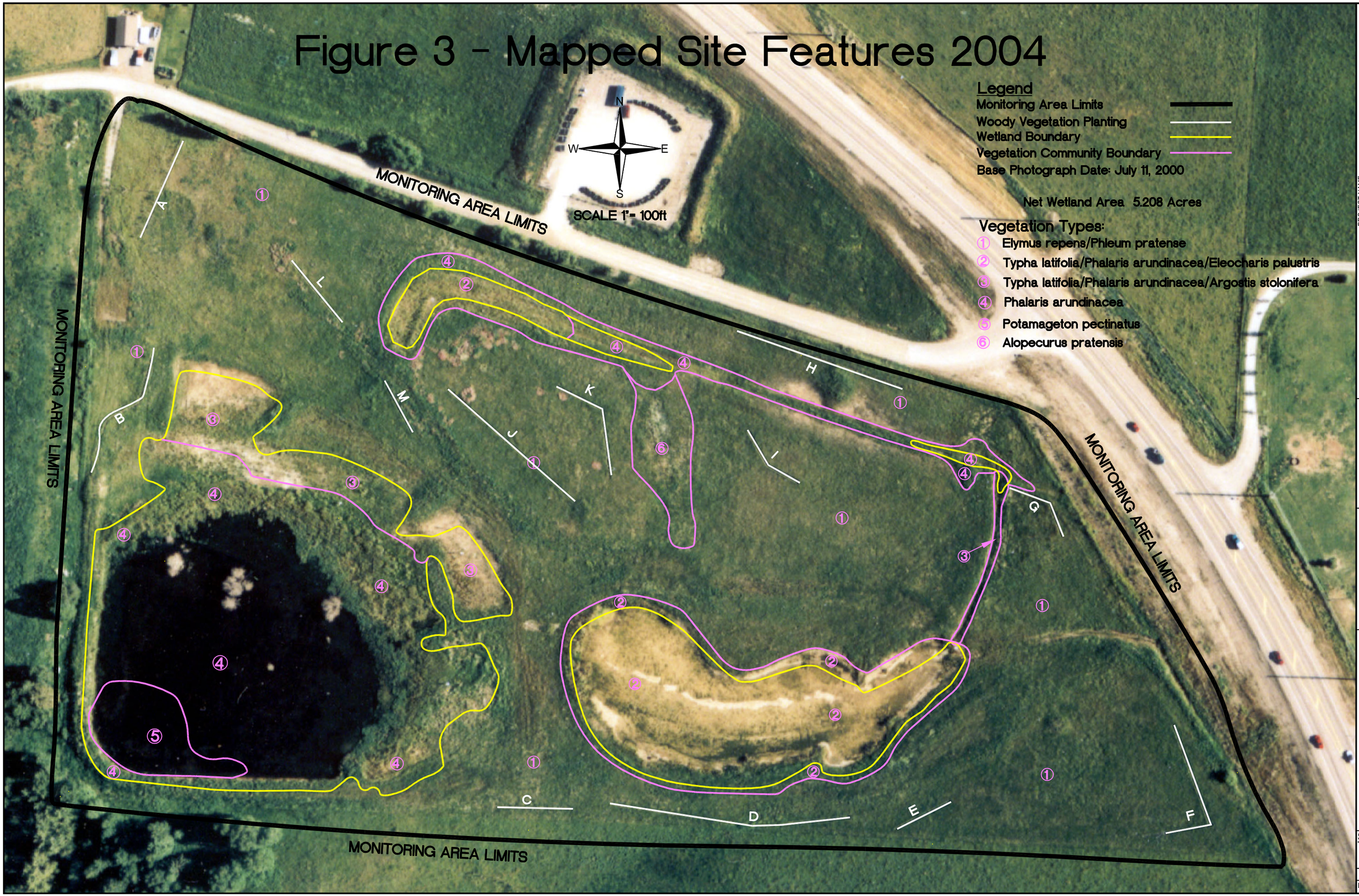
LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807

SHEET NUMBER 2 OF -

REV -

DATE: 3-23-05

Figure 3 - Mapped Site Features 2004



Legend

- Monitoring Area Limits
- Woody Vegetation Planting
- Wetland Boundary
- Vegetation Community Boundary

Base Photograph Date: July 11, 2000

Net Wetland Area 5.208 Acres

Vegetation Types:

1. Elymus repens/Phleum pratense
2. Typha latifolia/Phalaris arundinacea/Eleocharis palustris
3. Typha latifolia/Phalaris arundinacea/Argostis stolonifera
4. Phalaris arundinacea
5. Potamageton pectinatus
6. Alopecurus pratensis

PROJECT NAME: MDT Creston Wetland Mitigation

DRAWING TITLE: Mapped Site Features 2004

PROJ NO: 330054.108	DRAWN: RA
FILE NAME: TASK7BASE.dwg	CHECKED: BD
SCALE: 1"= 100ft	APPVD: BD
LOCATION: Creston	PROJ MGR: BD

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

SHEET NUMBER 3 OF -

REV -

DATE: 3-23-05

Appendix B

COMPLETED 2004 WETLAND MITIGATION SITE MONITORING FORM
COMPLETED 2004 BIRD SURVEY FORMS
COMPLETED 2004 WETLAND DELINEATION FORMS
COMPLETED 2004 FUNCTIONAL ASSESSMENT FORMS

MDT Wetland Mitigation Monitoring
Creston
Creston, Montana

PBSJ

LAND & WATER

LWC / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **Creston** Project Number: **B43054.00.0108** Assessment Date: **7/27/04**
Location: **Creston** MDT District: **Missoula** Milepost: _____
Legal description: T**28N** R**20W** Section **14** Time of Day: **0800-1100**
Weather Conditions: **Sunny/Clear approx. 70 degrees** Person(s) conducting the assessment: **Traxler**
Initial Evaluation Date: **7 / 25 / 01** Visit #: **2** Monitoring Year: **2004 (year 4)**
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 - 3** ft
Assessment area under inundation: **10%**
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)	5.31				
West 2 (C94-12)	5.81				
East (C94-10)	5.23				

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. Lower pond was at lowest levels since monitoring began in 2001.

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	20%
Agrostis stolonifera	20%	Taraxacum officinale	2%
Alopecurus pratensis	5%	Trifolium hybridum	15%
Eleocharis palustris	5%	Juncus tenuis & J. articulatus & J. regelii	5%

COMMENTS/PROBLEMS: __young Populus colonizing this community.

_____

_____

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	9	Browse. Some fruit bearing in 2003
B - Crab Apple	20	14	Many re-sprouting from base
C – *Prunus sp.*	30	15	Small-unhealthy
D - *Prunus sp.*	150	111	
E - *Prunus sp.*	25	14	competition
F - Silverberry & Woods Rose	145	60	Competition. Many sprouting from base.
G - buffaloberry	30	13	Doing well – fruit bearing
H – buffaloberry	60	29	Doing well – fruit bearing
I - buffaloberry	30	15	
J - Woods Rose	115	110	Doing very well
K - Silverberry	75	63	
L - Woods Rose	55	20	
M – Woods Rose	40	35	

COMMENTS/PROBLEMS: Overall survival in year four was not significantly changed from year 3.

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	
raccoon		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 2004.

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 2004; 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: 7/27/04 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 2004. 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 – this held true for 2004.

3/01 rev

BIRD SURVEY – FIELD DATA SHEET

Page 1 of 1
Date: 5/27/04

SITE: Creston

Survey Time: 1930

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
American Robin	2	F	UP				
Calliope Hummingbird	1	F, L	UP				
Cliff Swallow	3	F	MA, UP				
Eastern Kingbird	3	F	UP				
Hooded Merganser	6	N	MA				
Killdeer	3	F	US				
Northern Rough-winged Swallow	3	F	MA, UP				
Red-winged Blackbird	>10	N,BD	MA				
Spotted Sandpiper	2	F	US				
Tree Swallow	8	F,N	MA				

Notes: Conditions: overcast and light wind, approximately 55 degrees.
Upper pond approximately ¼ full.
Lower pond very low – Lower than in 2003.
Female Hooded Merganser with 5 young.
Deer and raccoon tracks.

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

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

BIRD SURVEY – FIELD DATA SHEET

Page 1 of 1
Date: 7/29/04

SITE: Creston

Survey Time:0830

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
American Goldfinch	2	FO					
Common Snipe	2	F	MA				
Eastern Kingbird	3	L	UP				
Killdeer	2	F	MF				
Mallard	1	L	MA				
Ring-necked Pheasant	6	L/F	UP				
Tree Swallow	>10	F	OW				

Notes: Hen Pheasant with 5 young

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

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

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

Project/Site: Creston Wetland Mitigation Site **Project No:**
Applicant/Owner: Montana Department of Transportation
Investigators: Traxler
Date: 29-Jul-2004
County: Flathead
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
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
Phalaris arundinacea	Herb	FACW			
Grass,Reed Canary					

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:
Water level in pond had retreated in 2004 below the plot elevation, thus eliminating the aquatic bed habitat previously recorded at this plot.

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: = 0 *(in.)*
Depth to Saturated Soil: = 5 *(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 within 5 inches of surface, but surface water had recently retreated below the soil pit elevation.

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

Project/Site: Creston Wetland Mitigation Site **Project No:**
Applicant/Owner: Montana Department of Transportation
Investigators: Traxler
Date: 29-Jul-2004
County: Flathead
State: Montana
Plot ID: 1

SOILS

Map Unit Name (Series and Phase): Muck and Peat
Map Symbol: Ms **Drainage Class:** Unknown
Taxonomy (Subgroup): Histosol / Histic Epipedon
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
16	Oi	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
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is the Sampling Point within the Wetland? (Yes) No

Remarks:
This plot is drying out as water in the pond recedes.

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

Project/Site: Creston Wetland Mitigation Site	**Project No:**	**Date:** 29-Jul-2004	
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? Yes (No)	**Field Location:** along vegetation transect (middle)
(If needed, explain on the reverse side)	

VEGETATION (USFWS Region No. 9)

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

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 mush lower than normal.

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

Project/Site: Creston Wetland Mitigation Site	**Project No:**	**Date:** 29-Jul-2004	
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:**
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
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:

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

Project/Site: Creston Wetland Mitigation Site	**Project No:**	**Date:** 29-Jul-2004	
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? Yes (No)	**Field Location:**
(If needed, explain on the reverse side)	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:** 29-Jul-2004	
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:

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

1. Project Name: _____ **2. Project #:** B43054.00.0108 **Control #:** _____

3. Evaluation Date: 7/29/04 **4. Evaluator(s):** _____ **5. Wetland / Site #(s):** _____

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

ii. Approx. Stationing / Mileposts: _____

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

Other Location Information: _____

7. A. Evaluating Agency _____

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

B. Purpose of Evaluation:
- ☐ Wetlands potentially affected by MDT project
- ☐ Mitigation wetlands; pre-construction
- ☒ Mitigation wetlands; post-construction
- ☐ Other

9. Assessment Area (total acres): _____ (visually estimated)
_____ (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	
Depression	Palustrine	None	Emergent Wetland	Intermittently Exposed	Excavated/Impounded	
Depression	Palustrine	None	Scrub-Shrub Wetland	Seasonally Flooded	Excavated	
---	---	---	---	---	---	

[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.) _____

ii. Prominent weedy, alien, & introduced species: _____

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
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	_____
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 **≥ 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: _____

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
≥ 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			1	
B. MT Natural Heritage Program Species Habitat			1	
C. General Wildlife Habitat			1	
D. General Fish/Aquatic Habitat			--	
E. Flood Attenuation			--	
F. Short and Long Term Surface Water Storage			1	
G. Sediment/Nutrient/Toxicant Removal			1	
H. Sediment/Shoreline Stabilization			--	
I. Production Export/Food Chain Support			1	
J. Groundwater Discharge/Recharge			1	
K. Uniqueness			1	
L. Recreation/Education Potential			1	
Totals:				
Percent of Total Possible Points:			**%** (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
2004 AERIAL PHOTOGRAPH

MDT Wetland Mitigation Monitoring
Creston
Creston, Montana

2004 CRESTON

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.

Creston 2004 Aerial Photograph

Appendix D

BIRD SURVEY PROTOCOL
GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Creston
Creston, Montana

PBSJ

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

PBSJ

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 - 2004

METHODS

Among other monitoring activities, aquatic invertebrate assemblages were collected at a number of mitigation wetlands throughout Montana. This report summarizes data generated from four 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 (Table1) tested and recommended by Stribling et al. (1995) in a report to the Montana Department of Health and Environmental Science. In that study, it was determined that some of the metrics were of limited use in some geographic regions, and for some wetland types. Despite that finding, all 12 metrics are used in this evaluation of mitigated wetlands, since detailed geographic information and wetland classifications were unavailable.

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

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

Sample processing

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

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

Bioassessment metrics

An index based on the performance of 12 metrics was constructed, as described above. Table 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; many are hemoglobin-bearers capable of tolerating de-oxygenated conditions.

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

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

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. In 2004, 25 sites were re-visited, and 6 new sites were sampled. Thus, the 2004 database contains data for 122 sampling events at 50 unique sites. Table 2 summarizes sites and sampling years.

Metric scoring criteria were re-developed each year as new data was added. For 2004, all 122 records were utilized. Ranges of individual metrics, as well as median metric values remained remarkably consistent in each of the 4 years; minimal changes resulted from the addition of new data in 2004. The summary metric values and scores for the 2004 samples are given in Tables 3a-3d.

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 1. Aquatic invertebrate metrics employed in the MTDT mitigation wetland monitoring study, 2001- 2004.

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

Table 2. Montana Department of Transportation Mitigated Wetlands Monitoring Project sites. 2001 – 2004.

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

Table 3a.

	BEAVER HEAD #1	BEAVER HEAD #3	BEAVER HEAD #5	BEAVER HEAD #6	BIG SPRING CREEK	CIRCLE	CLOUD RANCH POND	CLOUD RANCH STREAM	COLLOID	CRESTON
Total taxa	27	12	21	18	25	16	16	20	8	18
POET	3	0	2	3	4	2	2	4	2	3
Chironomidae taxa	7	5	5	5	8	5	6	11	1	2
Crustacea + Mollusca	7	3	4	6	7	1	6	1	1	7
% Chironomidae	0.33636	0.18888	0.39285	0.57547	0.44329	0.55855	0.41666	0.84	0.09090	0.06087
Orthocladiinae/Chir	0.05405	0.35294	0.06818	0.36065	0.27907	0.69354	0.4	0.16666	0	0
%Amphipoda	0.03636	0	0.01785	0.05660	0.05154	0	0.00925	0	0	0
%Crustacea + %Mollusca	0.31818	0.73333	0.05357	0.12264	0.18556	0.03603	0.36111	0.01	0.09090	0.73913
HBI	7.97169	7.88888	8.36363	8.15789	7.61855	7.19090	7.32291	4.84	6	6.92173
%Dominant taxon	0.2	0.57777	0.23214	0.25471	0.23711	0.38738	0.13888	0.38	0.27272	0.37391
%Collector-Gatherers	0.40909	0.75555	0.51785	0.62264	0.78350	0.05405	0.67592	0.74	0.18181	0.29565
%Filterers	0.12727	0	0	0	0.01030	0.15315	0.09259	0.17	0	0.06087
Total taxa	5	1	5	3	5	3	3	3	1	3
POET	3	1	1	3	5	1	1	5	1	3
Chironomidae taxa	5	3	3	3	5	3	3	5	1	1
Crustacea + Mollusca	5	1	3	5	5	1	5	1	1	5
% Chironomidae	3	3	3	1	1	1	1	1	5	5
Orthocladiinae/Chir	1	3	1	3	3	5	3	1	1	1
%Amphipoda	5	5	5	3	3	5	5	5	5	5
%Crustacea + %Mollusca	5	1	5	5	5	5	3	5	5	1
HBI	1	1	1	1	1	3	3	5	5	3
%Dominant taxon	5	1	5	5	5	3	5	3	5	3
%Collector-Gatherers	1	3	3	3	3	1	3	3	1	1
%Filterers	1	3	3	3	3	1	1	1	3	1
	40	26	38	38	44	32	36	38	34	32
	0.666667	0.433333	0.633333	0.633333	0.733333	0.533333	0.6	0.633333	0.566667	0.533333
	sub-optimal	poor	sub-optimal	sub-optimal	optimal	sub-optimal	sub-optimal	sub-optimal	sub-optimal	sub-optimal

Table 3b.

	FOURCHETTE CREEK ALBATROSS RESERVOIR	FOURCHETTE CREEK FLASHLIGHT RESERVOIR	FOURCHETTE CREEK PENGUIN RESERVOIR	FOURCHETTE CREEK PUFFIN RESERVOIR	JACK CREEK	MDT CAMP CREEK	MDT HOSKINS LANDING	MDT KLEINSCHMIDT CREEK	MDT KLEINSCHMIDT POND
Total taxa	18	23	19	22	23	35	25	19	19
POET	3	5	4	3	5	12	4	4	6
Chironomidae taxa	6	9	6	4	8	14	4	6	4
Crustacea + Mollusca	3	4	5	8	7	1	6	2	4
% Chironomidae	0.135135	0.265306	0.066116	0.247934	0.352113	0.37963	0.036697	0.438776	0.047619
Orthocladiinae/Chir	0.2	0.346154	0.625	0.3	0.52	0.585366	0.5	0.627907	0.8
%Amphipoda	0.126126	0.336735	0.578512	0.041322	0.028169	0	0.018349	0.010204	0.009524
%Crustacea + %Mollusca	0.684685	0.387755	0.77686	0.371901	0.380282	0.111111	0.541284	0.061224	0.190476
HBI	7.972973	7.216495	7.7	6.950413	7.647059	4.570093	6.59633	6.561224	6.67619
%Dominant taxon	0.495495	0.336735	0.561983	0.140496	0.15493	0.111111	0.366972	0.316327	0.552381
%Collector-Gatherers	0.873874	0.816327	0.702479	0.38843	0.394366	0.416667	0.091743	0.683673	0.114286
%Filterers	0	0.010204	0.132231	0.008264	0.042254	0.12037	0.018349	0.153061	0.047619
Total taxa									
POET	3	5	3	5	5	5	5	3	3
Chironomidae taxa	3	5	5	3	5	5	5	5	5
Crustacea + Mollusca	3	5	3	3	5	5	3	3	3
% Chironomidae	1	3	3	5	5	1	5	1	3
Orthocladiinae/Chir	5	3	5	3	3	3	5	1	5
%Amphipoda	3	3	5	3	5	5	5	5	5
%Crustacea + %Mollusca	3	1	1	3	5	5	5	5	5
HBI	1	3	1	3	3	5	3	5	5
%Dominant taxon	1	3	1	3	1	5	5	5	5
%Collector-Gatherers	1	5	1	5	5	5	3	5	1
%Filterers	5	5	3	1	1	1	1	3	1
	3	3	1	3	3	1	3	1	3
	32	44	32	40	46	46	48	42	44
	0.533333	0.733333	0.533333	0.666667	0.766667	0.766667	0.8	0.7	0.733333
	sub-optimal	optimal	sub-optimal	optimal	optimal	optimal	optimal	optimal	optimal

Table 3d.

	ROUNDUP	SOUTH FORK SMITH RIVER	STILLWATER	WIGEON
Total taxa	9	20	23	16
POET	0	5	4	3
Chironomidae taxa	4	7	9	5
Crustacea + Mollusca	3	3	4	3
% Chironomidae	0.55	0.482143	0.466667	0.314815
Orthocladiinae/Chir	0.072727	0.055556	0.244898	0.647059
%Amphipoda	0	0.071429	0.12381	0.481481
%Crustacea + %Mollusca	0.42	0.116071	0.180952	0.574074
HBI	8.89	6.589286	6.47619	7.534653
%Dominant taxon	0.28	0.294643	0.133333	0.481481
%Collector-Gatherers	0.56	0.839286	0.628571	0.657407
%Filterers	0.14	0	0	0.083333
Total taxa				
POET	1	3	5	3
Chironomidae taxa	1	5	5	3
Crustacea + Mollusca	3	5	5	3
% Chironomidae	1	1	3	1
Orthocladiinae/Chir	1	1	1	3
%Amphipoda	1	1	3	5
%Crustacea + %Mollusca	5	3	3	1
HBI	3	5	5	3
%Dominant taxon	1	5	5	3
%Collector-Gatherers	5	5	5	3
%Filterers	3	5	3	3
	1	3	3	1
	26	42	46	32
	0.433333	0.7	0.766667	0.533333
	poor	optimal	optimal	Sub-optimal

Aquatic Invertebrate Taxonomic Data

Site Name CRESTON **Date Collected** 7 /29/2004

Order	Family	Taxon	Count	Percent	Unique	BI	FFG
		Ostracoda	5	4.35%	Yes	8	CG
		Copepoda	17	14.78%	Yes	8	CG
Basommatophora							
	Lymnaeidae						
		Stagnicola	43	37.39%	Yes	6	SC
	Physidae						
		Physidae	10	8.70%	Yes	8	SC
	Planorbidae						
		Gyraulus	2	1.74%	Yes	8	SC
		Helisoma	1	0.87%	Yes	6	SC
Coleoptera							
	Haliplidae						
		Haliplus	3	2.61%	Yes	5	PH
Diplostraca							
		Cladocera	7	6.09%	Yes	8	CF
Diptera							
	Ceratopogonidae						
		Ceratopogoninae	5	4.35%	Yes	6	PR
	Chironomidae						
		Ablabesmyia	4	3.48%	Yes	8	CG
		Paratanytarsus	3	2.61%	Yes	6	CG
	Ephydridae						
		Ephydridae	3	2.61%	Yes	6	CG
Ephemeroptera							
	Baetidae						
		Callibaetis	2	1.74%	Yes	9	CG
Heteroptera							
	Corixidae						
		Hesperocorixa	2	1.74%	Yes	10	PH
	Notonectidae						
		Notonecta	1	0.87%	Yes	5	PR
Odonata							
	Coenagrionidae						
		Coenagrionidae	5	4.35%	Yes	7	PR
		Enallagma	1	0.87%	Yes	7	PR
Rhynchobdellida							
	Glossiphoniidae						
		Helobdella	1	0.87%	Yes	6	PA
Grand Total			**115**				

Aquatic Invertebrate Data Summary

Project ID: MDT04LW
STORET Station ID:
Station Name: CRESTON

Activity ID:
Sample Date: 7/29/2004

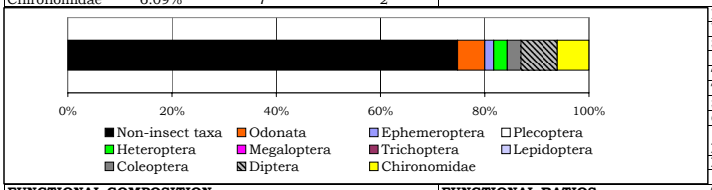
Sample type	
SUBSAMPLE TOTAL ORGANISMS	115
Portion of sample used	13.33%
Estimated number in total sample	863
Conversion factor	10.088
Estimated number in 1 square meter	1160
Sampling effort	
Habitat type	
EPT abundance	2
Taxa richness	18
Number EPT taxa	1
Percent EPT	1.74%

TAXONOMIC COMPOSITION

GROUP	PERCENT	ABUNDANCE	#TAXA
Non-insect taxa	74.78%	86	8
Odonata	5.22%	6	2
Ephemeroptera	1.74%	2	1
Plecoptera	0.00%	0	0
Heteroptera	2.61%	3	2
Megaloptera	0.00%	0	0
Trichoptera	0.00%	0	0
Lepidoptera	0.00%	0	0
Coleoptera	2.61%	3	1
Diptera	6.96%	8	2
Chironomidae	6.09%	7	2

TAXONOMIC RATIOS

METRIC	VALUE
EPT/Chironomidae	0.29
Baetidae/Ephemeroptera	1.00
Hydropsychidae/Trichopt	#DIV/0!

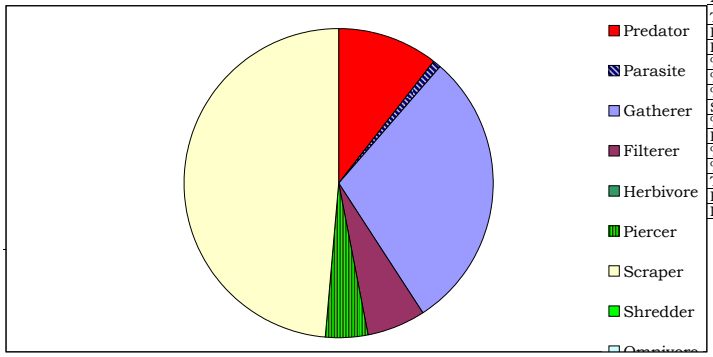


FUNCTIONAL COMPOSITION

GROUP	PERCENT	ABUNDANCE	#TAXA
Predator	10.43%	12	4
Parasite	0.87%	1	1
Gatherer	29.57%	34	6
Filterer	6.09%	7	1
Herbivore	0.00%	0	0
Piercer	4.35%	5	2
Scraper	48.70%	56	4
Shredder	0.00%	0	0
Omnivore	0.00%	0	0
Unknown	0.00%	0	0

FUNCTIONAL RATIOS

METRIC	VALUE
Scraper/Filterer	8.00
Scraper/Scraper + Filtere	0.89



COMMUNITY TOLERANCES

Sediment tolerant taxa	2
Percent sediment tolerant	39.13%
Sediment sensitive taxa	0
Percent sediment sensitive	0.00%
Metals tolerance index (McGuire)	2.97
Cold stenotherm taxa	0
Percent cold stenotherms	0.00%

HABITUS MEASURES

Hemoglobin bearer richness	3
Percent hemoglobin bearers	3.48%
Air-breather richness	0
Percent air-breathers	0.00%
Burrower richness	1
Percent burrowers	4.35%
Swimmer richness	4
Percent swimmers	6.96%

DOMINANCE

TAXON	ABUNDANCE	PERCENT
Stagnicola	43	37.39%
Copepoda	17	14.78%
Physidae	10	8.70%
Cladocera	7	6.09%
Ostracoda	5	4.35%
SUBTOTAL 5 DOMINANTS	82	71.30%
Coenagrionidae	5	4.35%
Ceratopogoninae	5	4.35%
Ablabesmyia	4	3.48%
Haliplus	3	2.61%
Ephydridae	3	2.61%
TOTAL DOMINANTS	102	88.70%

TOLERANCE/CONDITION INDICES

Community Tolerance Quotient (CTQa)	98.00
Hilsenhoff Biotic Index	6.92

DIVERSITY

Shannon H (loge)	3.14
Shannon H (log2)	2.18
Margalef D	3.58
Simpson D	0.18
Evenness	0.12

VOLTINISM

TYPE	ABUNDANCE	# TAXA	PERCENT
Multivoltine	38	6	33.04%
Univoltine	74	11	64.35%
Semivoltine	3	1	2.61%

TAXA CHARACTERS	#TAXA	PERCENT
Tolerant	7	60.00%
Sensitive	0	0.00%
Clinger	0	0.00%

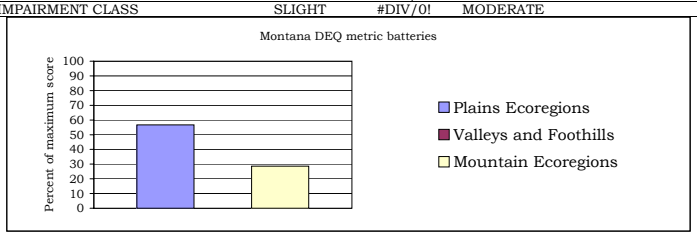
BIOASSESSMENT INDICES

B-IBI (Karr et al.)

METRIC	VALUE	SCORE	
Taxa richness	18	1	
E richness	1	1	
P richness	0	1	
T richness	0	1	
Long-lived	1	1	
Sensitive richness	0	1	
%tolerant	60.00%	1	
%predators	10.43%	3	
Clinger richness	0	1	
%dominance (3)	60.87%	3	
	TOTAL SCORE	14	28%

MONTANA DEQ INDICES (Bukantis 1998)

METRIC	VALUE	Plains Ecoregions	Valleys and Foothills	Mountain Ecoregions
Taxa richness	18	2	1	0
EPT richness	1	0	0	0
Biotic Index	6.92	1	0	0
%Dominant taxon	37.39%	2	2	1
%Collectors	35.65%	3	3	3
%EPT	1.74%	0	0	0
Shannon Diversity	2.18	1		
%Scrapers +Shredde	48.70%	3	3	2
Predator taxa	4	2		
%Multivoltine	33.04%	3		
%H of T	#DIV/0!		#DIV/0!	
TOTAL SCORES		17	#DIV/0!	6
PERCENT OF MAXIMUM		56.67	#DIV/0!	28.57
IMPAIRMENT CLASS		SLIGHT	#DIV/0!	MODERATE



Montana Valleys and Foothills revised index (Bollman 1998)

Percent max.	11.11%	Impairment class	SEVERE

Montana Plains ecoregions metrics (Bramblett and Johnson 2002)

Riffle		*Pool*	
EPT richness	1	E richness	1
Percent EPT	1.74%	T richness	0
Percent Oligochaetes and Leeches	0.87%	Percent EPT	1.74%
Percent 2 dominants	52.17%	Percent non-insect	74.78%
Filterer richness	1	Filterer richness	1
Percent intolerant	0.00%	Univoltine richness	11
Univoltine richness	11	Percent supertolerant	42.61%
Percent clingers	0.00%		
Swimmer richness	4		