MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2009

Sportsman's Campground
Deer Lodge County, Montana

Prepared for:

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

Prepared by:

POST, BUCKLEY, SCHUH, AND JERNIGAN
820 North Montana Avenue, Suite A
Helena, MT 59601

December 2009

PBS&J Project No: 0B4308802.03.04

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1.0 INTRODUCTION

The Sportsman's Campground wetland mitigation project was constructed in 2007 by the Montana Department of Transportation (MDT). The purpose of the project is to create approximately 15.6 acres of palustrine emergent, scrub/shrub, and aquatic bed wetland habitat to serve as compensatory wetland mitigation for MDT's Sportsman's Campground East and Dickie Bridge – Wise River reconstruction projects. Wetland impacts associated with these two projects total 14.36 acres, with an additional impact of 0.18 acre expected to existing wetlands at the mitigation site during construction of the mitigation project.

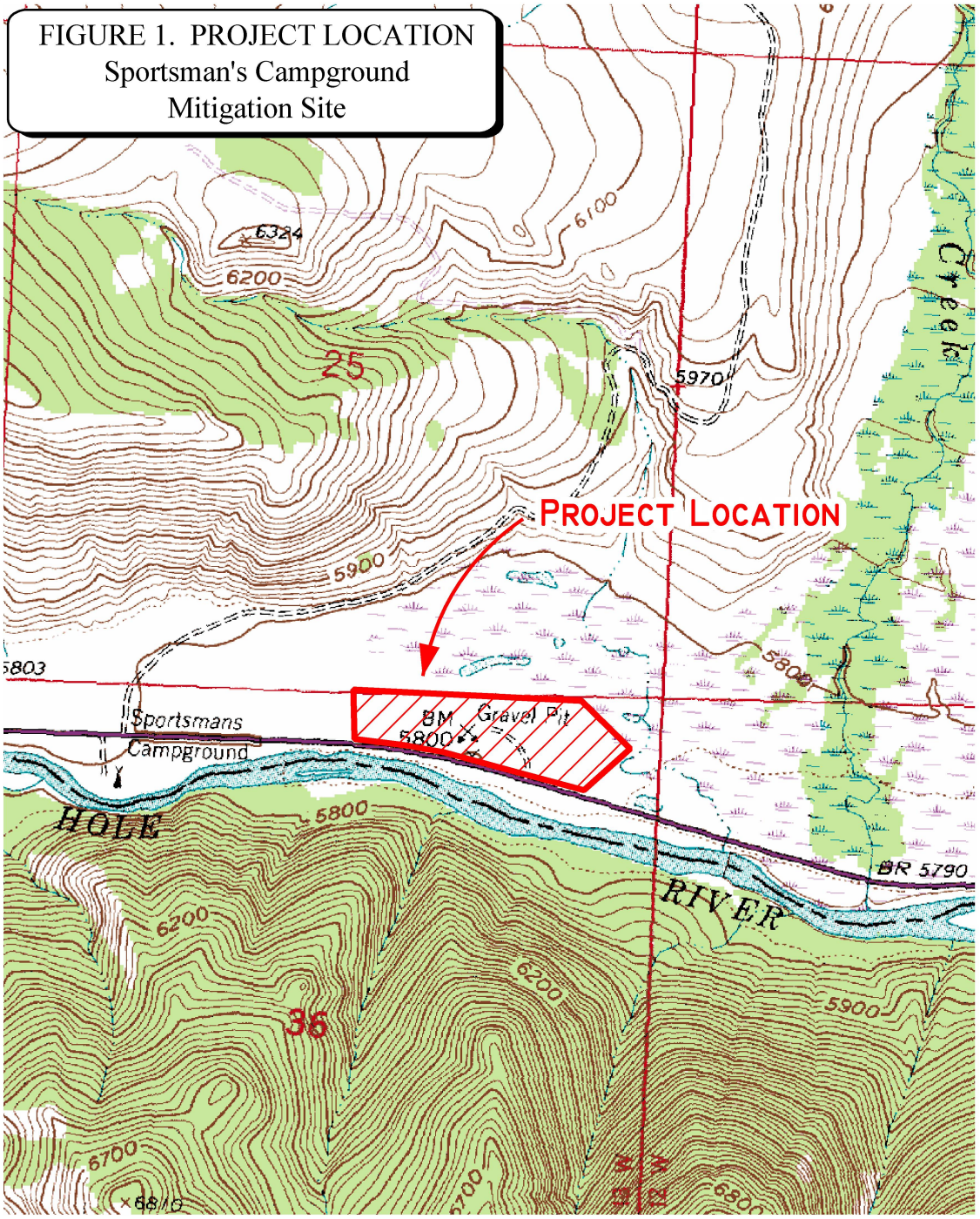
This report documents the second year of monitoring at the Sportsman's Campground Wetland Mitigation site. This project is located on public land (MDT-owned) adjacent to Montana State Highway 43 (P-46), approximately 13 miles west of Wise River, Montana (**Figure 1**). The project is located in the NE ¼ of the NE ¼ of Section 36, Township 2 North and Range 13 West in Deer Lodge County.

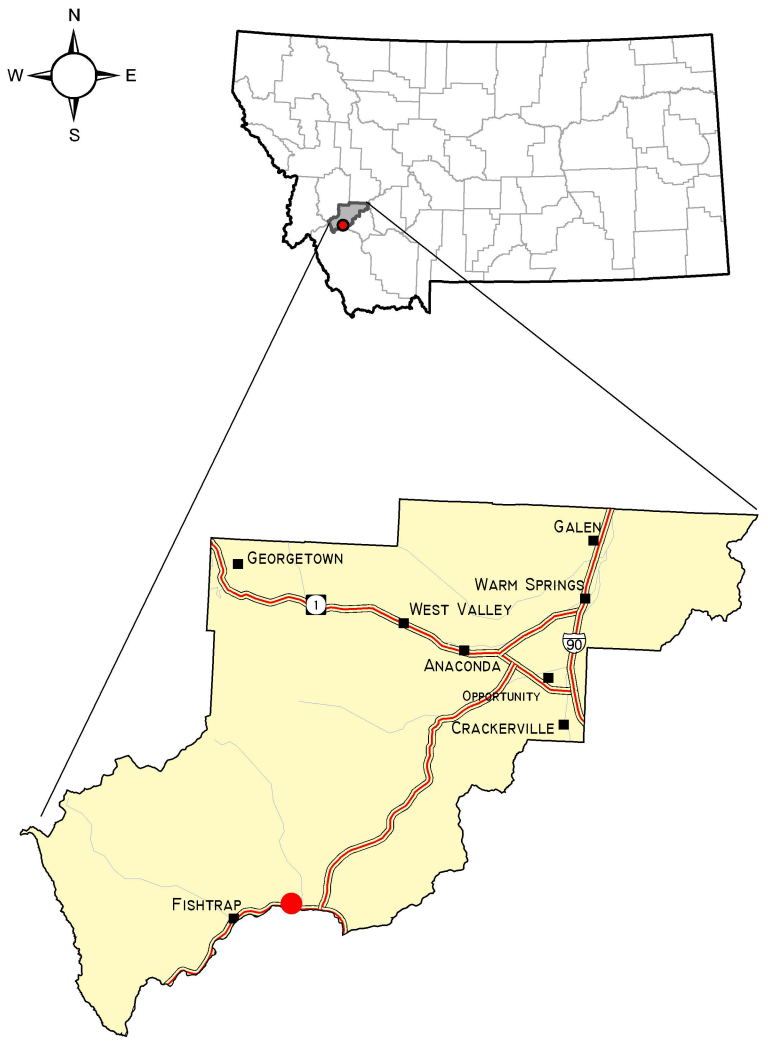
The 27.2-acre project site was utilized by MDT for gravel mining, equipment storage, and gravel stockpiling prior to being converted to a wetland mitigation site in 2007. Gravel was mined from the site for use in the Sportsman's Campground East highway reconstruction project, leaving a pit approximately 19.2 acres in size. The mitigation area is hydrologically connected via groundwater to the nearby Big Hole River (located immediately south of Highway 43). Additional seasonal groundwater recharge occurs at the site as a result of snowmelt from the nearby Pintlar Mountain Range to the north.

The gravel pit was excavated to varying depths so as to provide a range of inundation within developing wetlands including areas of permanent, semi-permanent, and seasonal inundation. Four small islands were also included as part of the design. A project plan sheet is provided in **Appendix D**.

Prior to project implementation, wetland habitat existed in two areas within the project site, both as a result of past gravel mining in this area. A 1.62 acre open water pond with an emergent / scrub-shrub fringe occurs in the north central portion of the project, while a 0.35 acre emergent marsh wetland occurs immediately south of the pond area. Target wetland communities to be produced across the site included open water/aquatic bed, scrub/shrub, and shallow marsh/wet meadow.

FIGURE 1. PROJECT LOCATION
Sportsman's Campground
Mitigation Site





0 800 1,600 FEET

1:16,000

PROJECT #: 0B4308801
DATE: NOVEMBER 2008
LOCATION: SPORTSMAN'S CG
PROJECT MGR: J. BERGLUND
DRAWN BY: MSA

PBS&J
801 N. LAST CHANCE GULCH
SUITE 101
HELENA, MT 59601-3360

2.0 METHODS

2.1 Monitoring Dates and Activities

Monitoring in 2009 occurred on August 11th and 12th. All information contained on the Wetland Mitigation Site Monitoring Form was collected during this site visit (**Appendix B**). Activities conducted and information collected included: wetland delineation; vegetation community mapping; vegetation transect monitoring; soils data collection; hydrology data collection; bird and wildlife use documentation; macroinvertebrate sampling; and photo documentation.

2.2 Hydrology

Hydrologic indicators were evaluated during the site visit on August 12th. Wetland hydrology indicators were recorded using procedures outlined in the COE 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Hydrology data were recorded on COE Routine Wetland Delineation Data Forms and on the Wetland Mitigation Site Monitoring Form (**Appendix B**).

There are no groundwater monitoring wells at the site. Soil pits excavated for wetland delineation purposes were also used to evaluate the presence of groundwater if occurring within 12 inches from the ground surface. Data were recorded on the COE Routine Wetland Delineation Data Form (**Appendix B**).

2.3 Vegetation

General dominant species-based vegetation community types were delineated in the field during the mid-summer field visit. Standardized community mapping was not employed as many of these systems are geared towards climax vegetation. Estimated percent cover of the dominant species in each community type was recorded on the Wetland Mitigation Site Monitoring Form (**Appendix B**). Plants observed were identified using Flora of the Pacific Northwest (Hitchcock and Conquist 1975) and Plants of Montana (Dorn 1984). Nomenclature follows that of Dorn (1984).

Three 10-foot wide vegetation belt transects were established at the site in 2007 and monitored for the second year in 2009. The transect start and end points were marked in the field and recorded with a global positioning system (GPS) unit in 2008. Percent cover was estimated for each successive vegetative species encountered within the "belt" using the following values: + (<1%); 1 (1-5%); 2 (6-10%); 3 (11-20%); 4 (21-50%); and 5 (>50%). Photographs were taken at the start and end of each transect during the mid-season visit (**Appendix C**). No woody species were planted at the site. Consequently, no monitoring of such species was conducted.

2.4 Soils

Soil information was obtained from the Web Soil Survey (NRCS 2008). Soils were evaluated during the mid-season visit according to procedures outlined in the COE 1987 Wetland Delineation Manual. In the field, surface soils were evaluated for signs of wetland formation. If

wetland indicators for hydrology or plants were found then a soil pit was excavated to look for evidence of hydric soil formation. Soil data were then recorded on the COE Routine Wetland Delineation Form (**Appendix B**).

2.5 Wetland Delineation

Wetland delineation was conducted during the mid-season visit in accordance with the 1987 COE Wetland Delineation Manual. In July 2008, consultation with the COE (Steinle pers. comm.) confirmed that, where the 1987 manual was used to establish baseline wetland conditions at MDT wetland mitigation sites, it should continue to be applied at such sites for the duration of the monitoring period. Consequently, application of the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (COE 2008) was not required or undertaken at this site in 2009.

The monitoring area was 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 to a COE Routine Wetland Delineation Data Form (**Appendix B**).

2.6 Mammals, Reptiles, and Amphibians

Mammal, reptile, and amphibian species observations and other positive indicators of use, such as vocalizations, were recorded on the wetland monitoring form during the site visit. Indirect use indicators, including tracks, scat, burrow, eggshells, skins, and bones, were also recorded. These signs were recorded as the observer traversed the site while conducting other required activities. Direct sampling methods, such as snap traps, live traps, and pitfall traps, were not used. A comprehensive wildlife species list for the entire site was compiled (**Appendix B**).

2.7 Birds

Bird observations were recorded during the site visit. No formal census plots, spot mapping, point counts, or strip transects were conducted. Bird observations were recorded incidental to other monitoring activity observations, using the bird survey protocol as a general guideline (**Appendix E**). Observations were categorized by species, activity code, and general habitat association and recorded onto the **Bird Survey Field Data Sheet** (**Appendix B**). A comprehensive bird list has been compiled for the site.

2.8 Macroinvertebrates

Per MDT instructions, three aquatic macroinvertebrate samples were collected at the site in 2009. The samples were collected and preserved according to the Macroinvertebrate Sampling Protocol (**Appendix F**). The sites were marked using a GPS unit and mapped onto the 2009 aerial photograph. Laboratory analysis of the sample and reporting were conducted by Rhithron Associates, Inc. in Missoula, Montana.

2.9 Functional Assessment

In 2009, the 2008 MDT Montana Wetland Assessment Method (Berglund and McEldowney 2008) was applied at the site. Field data necessary for this assessment were collected during the mid-season site visit. A Functional Assessment Form was completed for each wetland or for a group of wetlands sharing similar functions and values (**Appendix B**).

2.10 Photographs

Photographs were taken in 2009 to show the current land use surrounding the site, the upland buffer, the monitored area, and the vegetation transects. Four photograph points were established and their location recorded with a resource grade GPS unit in 2008. A description and compass direction for each photograph was recorded onto the Wetland Mitigation Site Monitoring Form (**Appendix B**).

2.11 GPS Data

During the 2008 monitoring season, survey points were collected with a resource grade GPS unit at vegetation transect beginning and ending locations, photo point locations, macroinvertebrate locations, and around the perimeter of all identified wetlands (**Appendix E**). No new GPS data were collected during the 2009 monitoring year.

2.12 Maintenance Needs

The Sportsman's Campground mitigation site is a groundwater driven project that does not include any manmade diversions, water level control structures, or other structures that might require periodic maintenance.

3.0 RESULTS

3.1 Hydrology

According to precipitation data collected at nearby Wise River, this region of Montana received at or above average precipitation for the last three months of 2008 and into the first five months of 2009 (Western Regional Climate Center [WRCC] 2009), leading to adequate inundation at the Sportsman's Campground mitigation site in 2009. During the August monitoring, standing water at depths ranging from 2"-24" was noted in the low areas surrounding the islands and within the historic gravel pit in the north-central portion of the site. Shallow surface water was also noted in a low area towards the western edge of the site (**Figure 3** in **Appendix A**). Much of the remaining wetland area was either saturated to near the surface or within the upper 12 inches of the soil profile during the August monitoring. These conditions were comparable to the hydrologic conditions noted at the site in 2008.

3.2 Vegetation

Prior to gravel operations at this site, the project area was dominated by native and introduced grasses and sagebrush (*Artemisia* spp.). These communities are still present in the adjacent rangelands. Scattered lodgepole pine (*Pinus contorta*) also occurred along the southern boundary of the site; a few pines still remain.

Plant species observed during this first two years of monitoring have been recorded (**Table 1**). Wetland communities are beginning to establish across much of the site, with varying levels of ground cover noted. Those areas quickly becoming established with emergent species typically have a minimum of four inches of topsoil over cobbles and gravels, while those areas struggling to support herbaceous species have little or no topsoil. Substantial inundation across much of the site in 2009 aided in the establishment of emergent plant growth. Dried water smartweed (*Polygonum amphibian*) was found in many areas where standing water had obviously persisted well into the growing season.

Mapped vegetation community types were based on topography, hydrology, and plant composition. A total of one upland community, four wetland communities, and one transitional community were identified: Type 1-*Carex / Juncus* Wetland; Type 2-Upland; Type 3-Transitional; Type 4-*Salix* Wetland; Type 5-*Hordeum* / *Eleocharis* Wetland; and Type 6-*Beckmannia* Wetland. Details for each community type are presented in the **Monitoring Form** (**Appendix B**), while mapped communities are shown on **Figure 3** (**Appendix A**).

In this the second year of monitoring, aquatic bed habitat was generally still absent from open water areas surrounding the four constructed islands. Aquatic bed wetland habitat is expected to develop in these areas, as *Polygonum* and other floating aquatic species become established. Three of the four islands showed development of a narrow (10-foot wide) emergent vegetative component in the zone of inundation around the perimeter of the islands.

Willow (Type 4-*Salix*) dominated wetlands occur around the perimeter of the historic gravel pit and is beginning to develop immediately east of the pit. Scattered volunteer willow shoots are common throughout the project area, but occur in low densities at this time. The original wetland mitigation plan called for willow sprigs to be planted within the project area; however, to date, no willow or other shrub species have been planted.

Areas identified as Type 3-Transitional lack a prevalence of hydrophytic vegetation but are showing signs of transitioning from upland to wetland or from bare ground to wetland. With continued inundation, these transitional areas are expected to support a prevalence of wetland species over time. The acreage of transitional areas in 2008 decreased from 3.48 acres to 2.46 acres in 2009 because some land transitioned to emergent wetland. A variety of wetland species including but not limited to *Agrostis alba, Carex nebrascensis, Eleocharis palustris, Calamagrostis canadensis*, and *Juncus balticus* were seeded into disturbed wetland areas following construction. Seeding appears to have been successful in some areas and less so in other areas. Many species not included in the seed mix have germinated in the site.

Table 1: ***Vegetation species observed from 2008 to 2009 at the Sportsman's Campground Wetland Mitigation Site.***

Scientific Name	Region 9 (Northwest) Wetland Indicator	Scientific Name	Region 9 (Northwest) Wetland Indicator
Achellea millefolium	FACU	*Festuca* sp.	---
Agropyron dasystachyum	---	*Glycyrrhiza lepidota*	FAC+
Agropyron spicatum	FACU	*Hordeum jubatum*	FAC+
Agropyron trachycaulum	---	*Juncus balticus*	OBL
Agrostis alba	FACW	*Kochia scoparia*	FAC
Alopecurus pratensis	---	*Melilotus officinale*	FACU
Artemisia tridentata	---	*Phleum pratense*	FACU
Beckmannia syzigachne	OBL	*Pinus contorta*	FAC-
Bromus inermis	---	*Poa pratensis*	FACU+
Calamagrostis canadensis	FACW+	*Polygonum amphibium*	OBL
Carex athrostachya	FACW	*Populus trichocarpa*	FAC
Carex nebrascensis	OBL	*Potamogeton* sp.	OBL
Carex prionophylla	FACW	*Rumex crispus*	FACW
Carex utriculata	OBL	*Salix exigua*	OBL
Carex vesicaria	OBL	*Salix lemmonii*	FACW+
Centaurea maculosa	---	*Scirpus acutus*	OBL
Cirsium arvense	FACU+	*Spiranthes romanzoffiana*	OBL
Eleocharis palustris	OBL	*Thlaspi arvense*	---
Equisetum arvense	FAC	*Typha latifolia*	OBL

Type 2 was mapped as one community, but actually consists of both distinct and integrating parcels where exotic (disturbed) or native upland plants dominate. Disturbed upland areas around the perimeter of the site were seeded with an upland grass mix following construction. For the most part upland seeding was successful. Spotted knapweed was observed on the site in one primary location (**Figure 3** in **Appendix A**). The infestation was small, with few plants scattered across a small area of disturbed upland.

Plant composition was quantified along three Transects (T-1, T-2, and T-3) from 2008 to 2009. Transect 1 runs north to south across the site in the western half of the mitigation area (**Figure 2** in **Appendix A**). This transect included areas of Type 2-Upland, Type 3-Transitional, and Type 5-*Hordeum / Eleocharis* Wetland (**Table 2**; **Charts 1** and **2**; and **Photos 13** and **14** in **Appendix C**). Transect results are detailed in the **Monitoring Form** (**Appendix B**)

Table 2: ***Data summary for Transect 1 at the Sportsman's Campground Mitigation Site.***

Monitoring Year	2008	2009
Transect Length (feet)	391	391
# Vegetation Community Transitions along Transect	4	3
# Vegetation Communities along Transect	4	3
# Hydrophytic Vegetation Communities along Transect	1	2
Total Vegetative Species	14	15
Total Hydrophytic Species	5	6
Total Upland Species	9	9
Estimated % Total Vegetative Cover	50	65
% Transect Length Comprised of Hydrophytic Vegetation Communities	34	73
% Transect Length Comprised of Upland Vegetation Communities	37	37
% Transect Length Comprised of Unvegetated Open Water	0	0
% Transect Length Comprised of Bare Substrate	29	0

Chart 1: ***Transect maps showing vegetation types of Transect 1 from start (0 feet) to end (391 feet) from 2008 to 2009.***

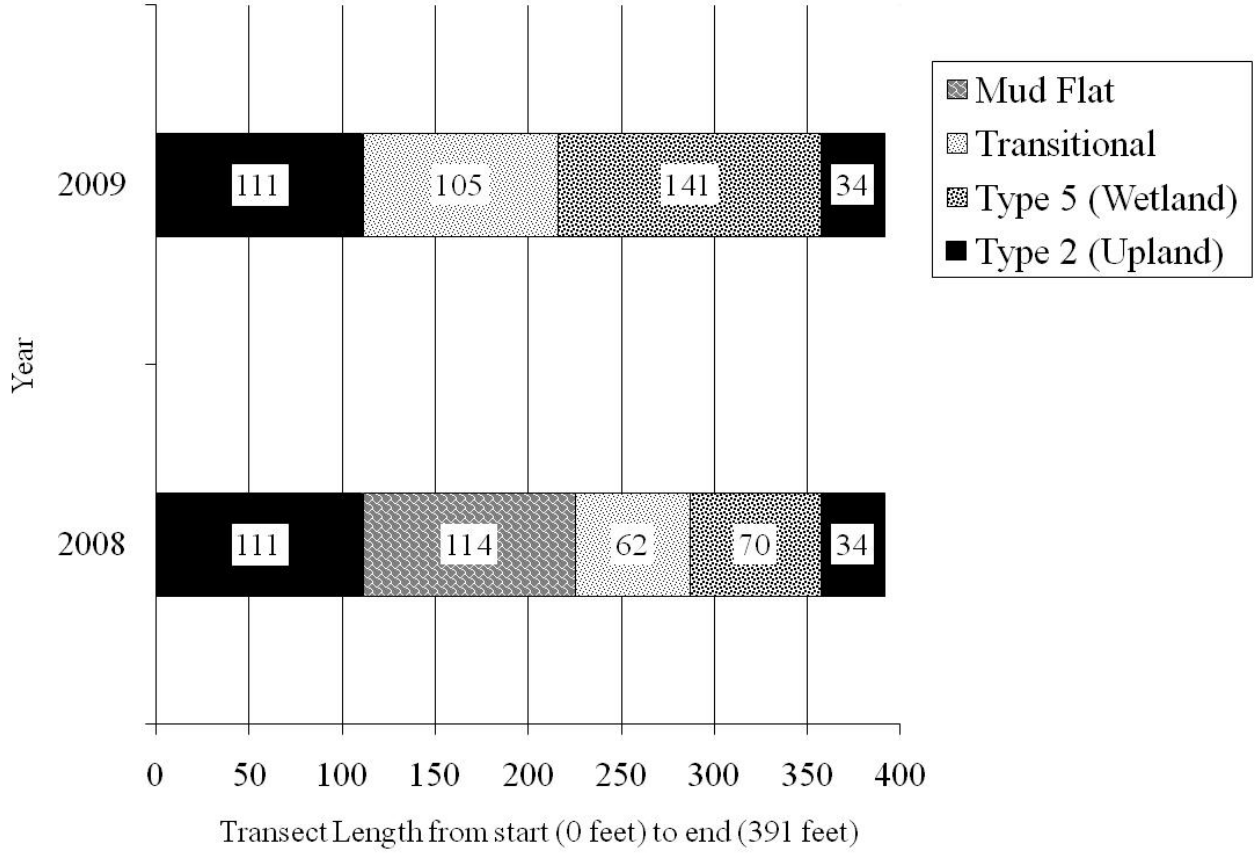
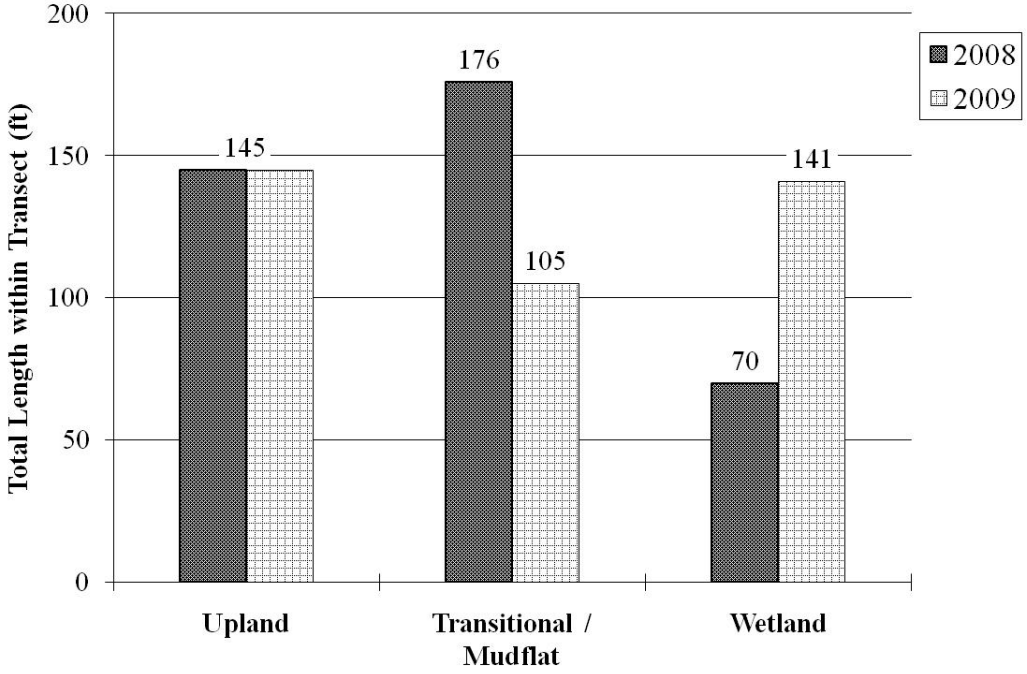


Chart 2: ***Length of vegetation communities within Transect 1 during 2008 and 2009.***



Transect 2 runs north to south across the site in the eastern half of the mitigation area (**Figure 2** in **Appendix A**). This transect included areas of Type 2-Upland, Open Water, Type 1-*Carex / Juncus* Wetland, and Type 1/5-Wetland (**Table 3**; **Charts 3** and **4**; **Photos 15** and **16** in **Appendix C**). In 2009 there was a distinct gain in wetland along this transect as transitional areas developed stronger wetland characteristics and were re-classified as Type 1/5-Wetland.

Table 3: ***Data summary for Transect 2 at the Sportsman's Campground Mitigation Site.***

Monitoring Year	2008	2009
Transect Length (feet)	400	400
# Vegetation Community Transitions along Transect	3	3
# Vegetation Communities along Transect	3	3
# Hydrophytic Vegetation Communities along Transect	2	2
Total Vegetative Species	14	15
Total Hydrophytic Species	9	10
Total Upland Species	5	5
Estimated % Total Vegetative Cover	30	45
% Transect Length Comprised of Hydrophytic Vegetation Communities	56	56
% Transect Length Comprised of Upland Vegetation Communities	2	2
% Transect Length Comprised of Unvegetated Open Water	42	42
% Transect Length Comprised of Bare Substrate	0	0

Chart 3: ***Transect maps showing vegetation types of Transect 2 from start (0 feet) to end (400 feet) from 2008 to 2009.***

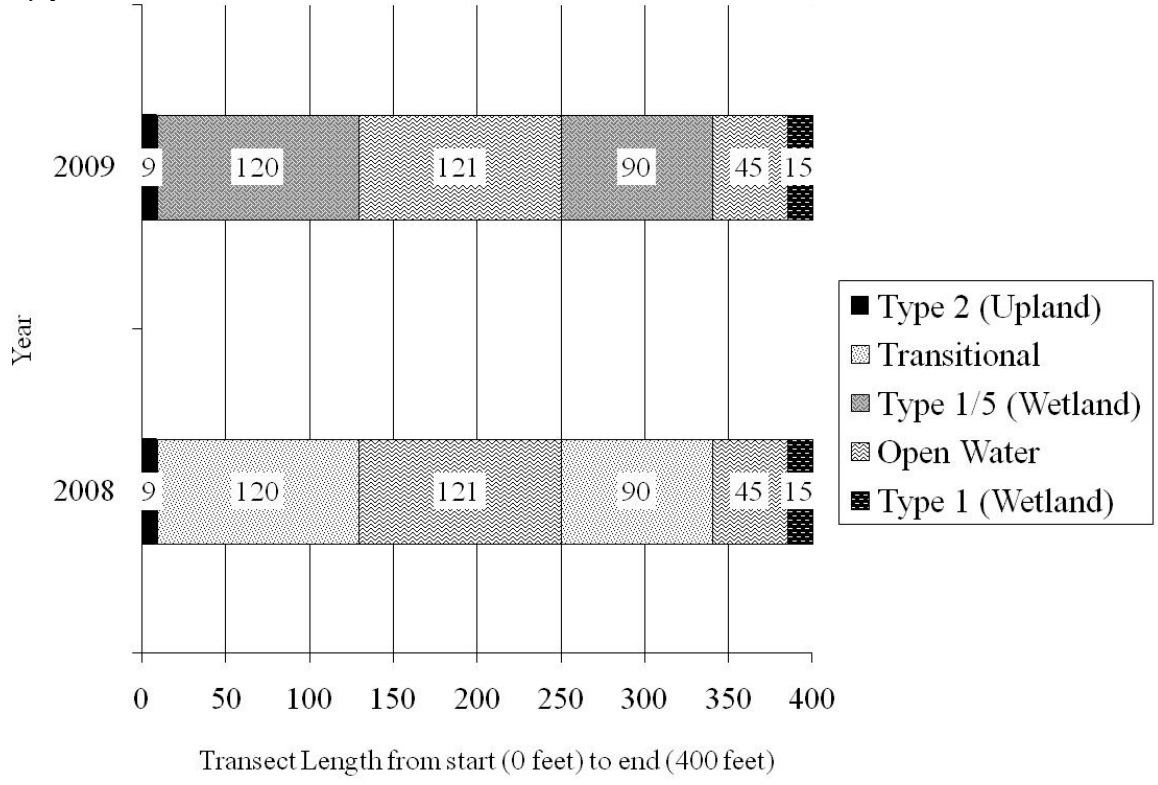
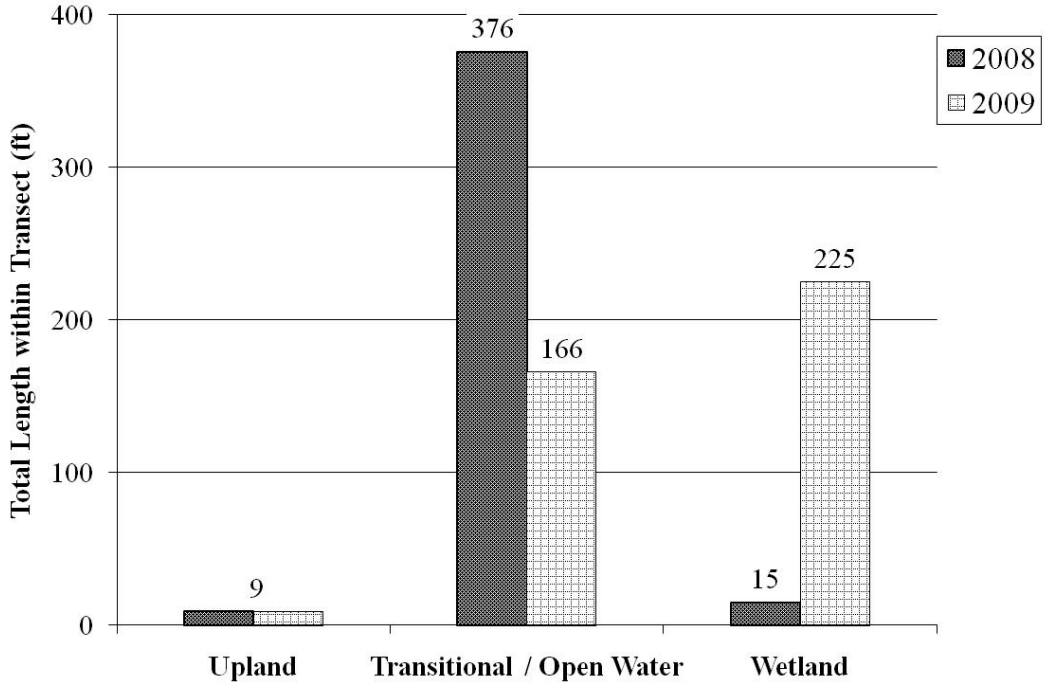


Chart 4: ***Length of vegetation communities within Transect 2 during 2008 and 2009.***



Transect 3 runs north to south across the center of the mitigation area. Unlike T-1 and T-2, this transect included an area of wetland that existed prior to implementation of the project. This transect included areas of Type 2-Upland, Type 3-Transitional, Type 5-*Hordeum* / *Eleocharis* Wetland, Type 1-*Carex* / *Juncus* Wetland, and Type 4-Salix Wetland (**Table 4**; **Charts 5** and **6**; **Photos 17** and **18** in **Appendix C**).

Table 4: ***Data summary for Transect 3 at the Sportsman's Campground Mitigation Site.***

Monitoring Year	2008	2009
Transect Length (feet)	377	377
# Vegetation Community Transitions along Transect	7	7
# Vegetation Communities along Transect	6	5
# Hydrophytic Vegetation Communities along Transect	4	4
Total Vegetative Species	21	21
Total Hydrophytic Species	15	15
Total Upland Species	6	6
Estimated % Total Vegetative Cover	50	65
% Transect Length Comprised of Hydrophytic Vegetation Communities	69	77
% Transect Length Comprised of Upland Vegetation Communities	23	23
% Transect Length Comprised of Unvegetated Open Water	0	0
% Transect Length Comprised of Bare Substrate	8	0

Chart 5: ***Transect maps showing vegetation types of Transect 3 from start (0 feet) to end (377 feet) from 2008 to 2009.***

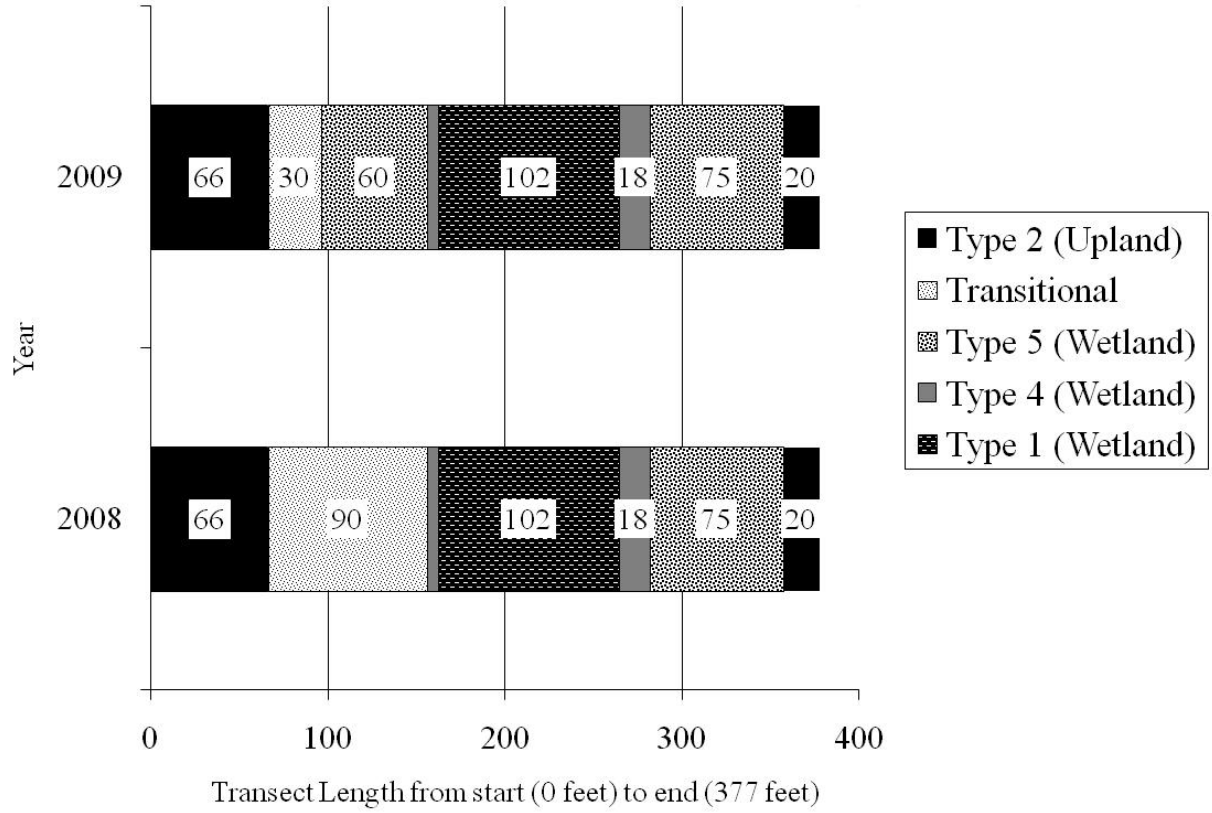
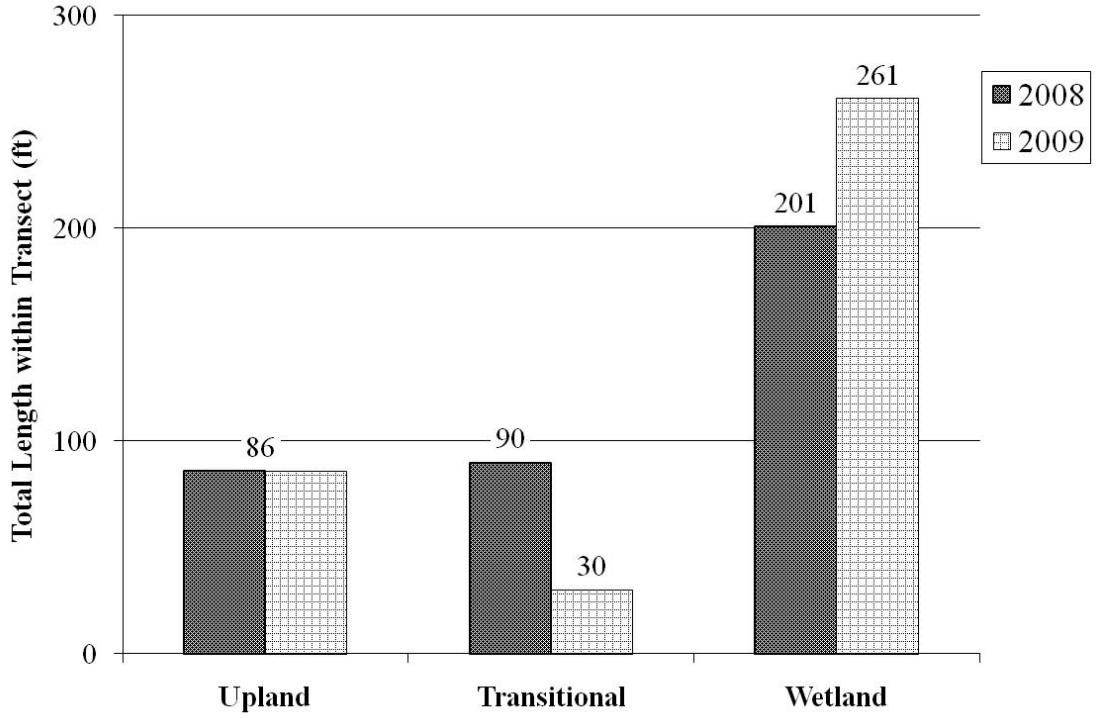


Chart 6: ***Length of vegetation communities within Transect 3 during 2008 and 2009.***



3.3 Soils

Prior to construction of the wetland mitigation site, the project site was composed of two soil type designations: *Gravel Pit*; and *Maurice Loam, 2 to 8 percent slope* (NRCS 2008). Much of the project area was utilized as a gravel pit prior to construction of the wetland mitigation site and gravels were used from the site in the reconstruction of Highway 43. A thin layer of salvaged topsoil was placed across some of the project area following construction, while other areas received no top soil treatment. Areas designated "CG" on **Figure 3** (**Appendix A**) represent areas of unvegetated cobble and gravel with no topsoil treatment.

Soils were investigated across much of the site in 2009. Typical soil profiles throughout the site consisted of 4"-6" of sandy loam over cobble and gravel. Areas of clay loam over gravel were also encountered. Soils had matrix colors ranging from 10YR 2/1 with no mottles to 10YR 4/2 with distinct 10YR 5/8 mottles (**COE Forms** in **Appendix B**). Within wetland areas, soils were generally saturated within the upper 12 inches of the profile and to near the surface in many cases.

3.4 Wetland Delineation

According to MDT project data, the proposed disturbance area prior to construction contained 0.18 acre of emergent wetland that was likely created as a result of previous gravel extraction from the site. This total did not include the pre-existing open water pond (1.31 acres) with wetland fringe around it (0.31 acre) that is included within the north central part of the monitoring area, or another small pre-existing wetland that occurred outside of proposed disturbance limits (0.17 acre). Consequently, within the monitoring area, it was determined during the 2008 monitoring that there was 0.66 acre of pre-existing wetland within monitoring limits and 1.31 acres of open water, for a total of 1.97 acres of aquatic habitat.

Delineated wetland boundaries, open water areas, transitional areas, uplands, and unvegetated areas of cobble and gravel were mapped in 2009 (**Figure 3** in **Appendix A**). All areas identified as mudflat in 2008 showed vegetative establishment in 2009 and were considered transitional wetland in 2009. Hydrophytic vegetation was quick to establish in the northwest corner of the site and also in the two areas just east of the pre-existing pond. Areas identified as transitional vegetation Type 3 on **Figure 3** in **Appendix A** are transitioning towards wetland but have been slow to develop and are not considered wetland at this time. Some transitional areas identified in 2008 continued to develop wetland characteristics in 2009 and were classified as wetland this year. Open water areas around the four islands were mostly unvegetated in years 1 and 2, while the four islands had a prevalence of upland vegetation, with some wetland establishment noted in 2009 around three of the four islands. Volunteer willow and cottonwood shoots were documented in several locations within the monitoring area in 2009. Acreages were calculated for delineated wetlands (pre- and post-construction), open water (pre- and post- construction), transitional areas, mudflats, and unvegetated cobble/gravel within the monitoring limits (**Table 5**).

Table 5: ***Acreages for communities and landforms within the Sportsman's Campground Wetland Mitigation Site from 2008 to 2009.***

COMMUNITY / LANDFORM	ACREAGE	
	2008	2009
Pre-existing wetland	0.66	0.66
Created wetland	4.81	7.39
Pre-existing open water	1.31	1.31
Created open water	3.84	3.70
Transitional areas	3.48	2.46
Mudflat	0.85	0.00
Unvegetated cobble/gravel	1.23	1.06
Upland	7.82	7.51
Total Acreage	**24.00**	**24.00**

3.5 Wildlife

Direct observations of all wildlife species and signs indicating their presence were compiled during the August site visit (**Table 6**; **Monitoring Forms** in **Appendix B)**. As anticipated, the site is being used by many species of waterfowl and shorebirds. No amphibians or reptiles were noted on the site but are likely to appear in future years as habitat is available. Big game species appear to use the site from time to time, but regular use was not documented.

Table 6: ***Fish and wildlife species observed at the Sportsman's Campground Wetland Mitigation Site from 2008 to 2009.***

FISH, AMPHIBIAN, and REPTILE	
None	
BIRD	
Blue-winged Teal (*Anas discors*)	**American Wigeon (*Anas americana*)**
Dark-eyed Junco (*Junco hyemalis*)	**Mallard (*Anas platyrhynchos*)**
Great Blue Heron (*Ardea herodias*)	**Common Snipe (*Gallinago gallinago*)**
Killdeer (*Charadrius vociferous*)	**Cliff Swallow (*Petrochelidon pyrrhonota*)**
Mourning Dove (*Zenaida macroura*)	**Sparrow spp.**
Spotted Sandpiper (*Actitis macularia*)	
Wilson's Phalarope (*Phalaropus tricolor*)	
MAMMAL	
American Badger (*Taxidea taxus*)	Moose (*Alces alces*)
Deer (*Odocoileus* sp.)	Muskrat (*Ondatra zibethicus*)

Bolded species were observed during the 2009 monitoring season.

3.6 Macroinvertebrates

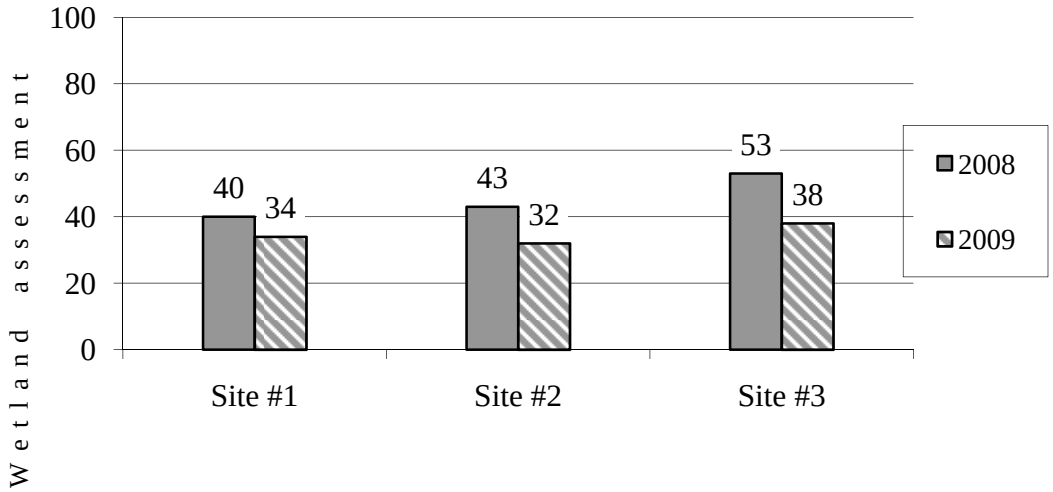
Aquatic macroinvertebrates were sampled at three locations within the Sportsman's Campground monitoring area in 2009. The first sample (Site 1) was collected in the existing gravel pit while the other two (Sites 2 and 3) were collected from newly created open water areas (**Figure 2** in **Appendix A**). The complete 2009 sampling results are presented in **Appendix F** and are summarized by Rhithron Associates, Inc. in the italicized section below.

Sportsman's Campground – Site #1. *Fingernail clams (Sphaeriidae) and amphipods (*Gammarus *sp. and* Hyalella *sp.) continued to dominate the fauna at this site. However, there was a functional shift from filterers to shredders, suggesting that detritus from senescent macrophytes was an important energy source in 2008. There was a better representation of predators in the 2009 sample, compared to 2008; this may be related to improved habitat complexity. Filamentous algae may have been present; midges associated with algal masses were common. Hypoxic substrates are suggested by the large proportion of hemoglobin-bearing taxa among the midges. The wetland assessment index indicated "sub-optimal" biotic conditions (**Chart 7**). The thermal preference of the assemblage was estimated at 18.1ºC.*

Sportsman's Campground – Site #2. *Midges accounted for 90% of animals sampled from this site in 2009. No long-lived taxa were observed in the sample, suggesting that periodic drying or thermal extremes may influence colonization at this site. Hemoglobin-bearing taxa were common and may indicate hypoxic substrates. Habitats may lack complexity. The wetland assessment index indicated "sub-optimal" biologic conditions at the site (**Chart 7**). Thermal preference for the assemblage was calculated at 18.2ºC.*

Sportsman's Campground – Site #3. *Similar to 2008, the invertebrate assemblage at this site was strongly dominated by midges and non-insects, especially copepods and cladocerans, possibly indicating the importance of deep open water habitats. There was very little shift in the functional composition of the assemblage, with gatherers continuing to dominate, and filterers and predators common in the mix. Although the complex invertebrate fauna suggests stability, there may have been a shift in habitat importance from substrates to the water column between the years of sampling. The estimated thermal preference of the assemblage was 18.4ºC. The wetland assessment tool categorized this site as "sub-optimal" (**Chart 7**).*

Chart 7: ***Bioassessment scores using the wetland index for 2008 to 2009.***



3.7 Functional Assessment

The MDT project files indicate that wetlands occurring within proposed disturbance boundaries prior to construction rated as a Category IV using the 1999 MDT Montana Wetland Assessment Method (MWAM). Assessment forms for this evaluation are not available. The 2009 conditions were assessed using the 2008 MWAM (**Functional Assessment Form** in **Appendix B**).

In 2009, the Sportsman's Campground Wetland Mitigation Site rated as a Category II wetland because it achieved a high wildlife habitat rating (**Table 7**). The site also rated high for short- and long-term surface water storage, production export/food chain support, and groundwater discharge/recharge (**Table 7**).

Table 7: ***Summary of 2008 and 2009 wetland function/value ratings and functional points at the Sportsman's Campground Wetland Mitigation Site.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2008	2009
Listed/Proposed T&E Species Habitat	Low (0.00)	Low (0.00)
MTNHP Species Habitat	Low (0.10)	Low (0.10)
General Wildlife Habitat	High (0.90)	High (0.90)
General Fish/Aquatic Habitat	NA	NA
Flood Attenuation	NA	NA
Short and Long Term Surface Water Storage	High (0.90)	High (0.90)
Sediment/Nutrient/Toxicant Removal	Mod (0.70)	Mod (0.70)
Sediment/Shoreline Stabilization	NA	Low (0.30)
Production Export/Food Chain Support	High (0.80)	High (0.80)
Groundwater Discharge/Recharge	High (1.00)	High (1.00)
Uniqueness	Mod (0.40)	Mod (0.40)
Recreation/Education Potential	High (0.20)	High (0.20)
Actual Points / Possible Points	**5.0 / 8**	**5.3 / 9**
% of Possible Score Achieved	**63%**	**59%**
Overall Category	**II**	**II**
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries	**14.95**	**15.52**
Functional Units (acreage x actual points)	**74.8**	**82.25**

3.8 Photographs

Representative photos taken from four photo-points (**Photos 1-12**) and from transect ends (**Photos 13-18**) are provided in **Appendix C**. The 2009 aerial photograph taken on July 1st was used as a base for **Figures 2** and **3** (**Appendix A**).

3.9 Maintenance Needs / Recommendations

As the mitigation site relies entirely on groundwater to support wetlands, there are no man-made water level control features to monitor. The project area has a standard barbed wire fence around the perimeter that was in good condition in 2009.

From a vegetative standpoint, disturbed upland areas that were reseeded following construction appeared to be well vegetated in most areas. One small infestation of spotted knapweed was identified (**Figure 3** in **Appendix A**). Results of wetland seeding were mixed in 2008, with some areas developing well while others did not. Transitional areas and mudflat areas showed significant vegetative growth in 2009 and no additional seeding is recommended at this time.

Areas identified as CG will likely need to be covered with topsoil in order to get desired vegetation to grow in these areas (**Figure 3** in **Appendix A**). A minimum of four inches of topsoil in these areas is recommended.

3.10 Current Credit Summary

Correspondence in the MDT project file indicates that a rate of one acre created for one acre removed (filled) was agreed upon during agency consultation. Wetland impacts associated with the Sportsman's Campground – East and Dickie Bridge – Wise River projects total 14.36 acres of jurisdictional wetland. MDT anticipated that 15.6 acres of wetland would be created at the mitigation site to compensate for the 14.36 acres of highway construction impacts.

As of 2009, the Sportsman's Campground site has developed 7.39 acres of Class II wetland, 2.46 acres of transitional area (transitioning to wetland), and 3.70 acres of transitional open water for a total of 13.55 acres of aquatic habitat. When added to the 0.66 acre of pre-existing wetland and 1.31 acres of pre-existing open water, there is a total of 15.52 acres of aquatic habitat within monitoring limits.

After year 2 of monitoring, the mitigation site is 2.05 acres of created aquatic habitat short of the anticipated goal of 15.6 acres and 0.81 acres short of the amount necessary to cover the 14.36 acres of impact. However, an additional approximate 1.5 acres of aquatic habitat is possible at the site should the area currently identified as cobble/gravel (1.06 acres) and the fringe areas around the four ponds eventually develop into wetland. As recommended in this report, MDT may need to spread a layer of topsoil across the area of cobble/gravel before a vegetative component is recognized in this area. The area is seasonally inundated and would likely develop wetland characteristics given a substrate suitable for plant establishment. Over time, a broader wetland fringe around the perimeter of the four constructed ponds will likely develop, providing for an additional 0.5 – 1.0 acres of wetland within project boundaries.

With an additional 1.5 acres of aquatic habitat possible, the mitigation site has the potential to support 15.00 acres of created aquatic habitat which is less than originally anticipated, but enough to cover the 14.36 acres of highway construction related impacts at a ratio of 1:1.

4.0 REFERENCES

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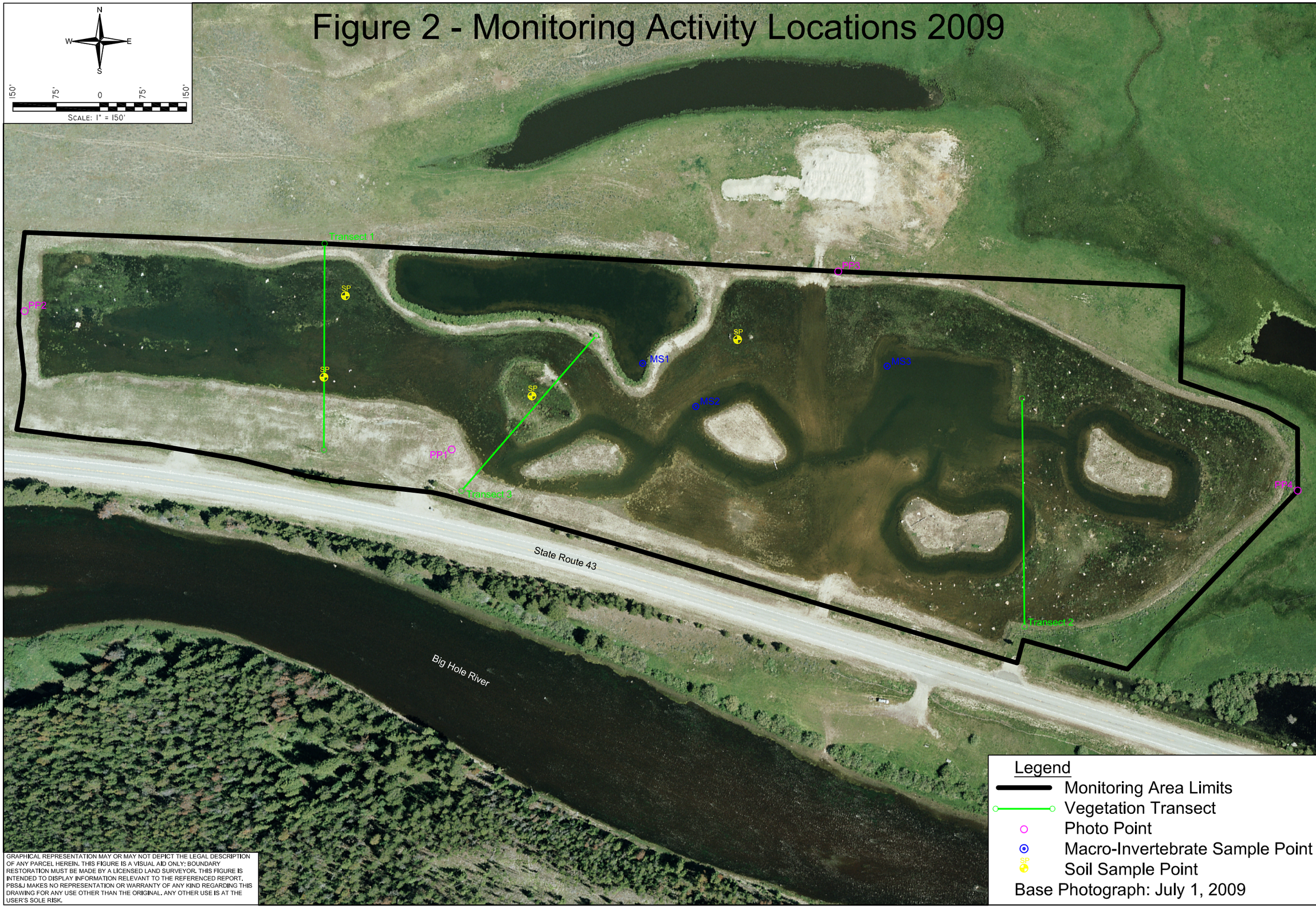
Appendix A

FIGURES 2 & 3

MDT Wetland Mitigation Monitoring
Sportsman's Campground
Deer Lodge County, Montana

Figure 2 - Monitoring Activity Locations 2009



GRAPHICAL REPRESENTATION MAY OR MAY NOT DEPICT THE LEGAL DESCRIPTION OF ANY PARCEL HEREIN. THIS FIGURE IS A VISUAL AID ONLY; BOUNDARY RESTORATION MUST BE MADE BY A LICENSED LAND SURVEYOR. THIS FIGURE IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. PBS&J MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND REGARDING THIS DRAWING FOR ANY USE OTHER THAN THE ORIGINAL. ANY OTHER USE IS AT THE USER'S SOLE RISK.

MDT SPORTSMAN'S CAMPGROUND WETLAND MITIGATION

MONITORING ACTIVITY LOCATIONS 2009

DRAWN:	JR
PROJ MGR:	J. BERGLUND
CHECKED: MT	APPVD: JB
PLOTTED:	Nov/19/2009
PROJ NO:	0B4308802 03.04
LOCATION:	FISHTRAP, MT
SCALE:	NOTED
FILE NAME:	BASE 2009.dwg

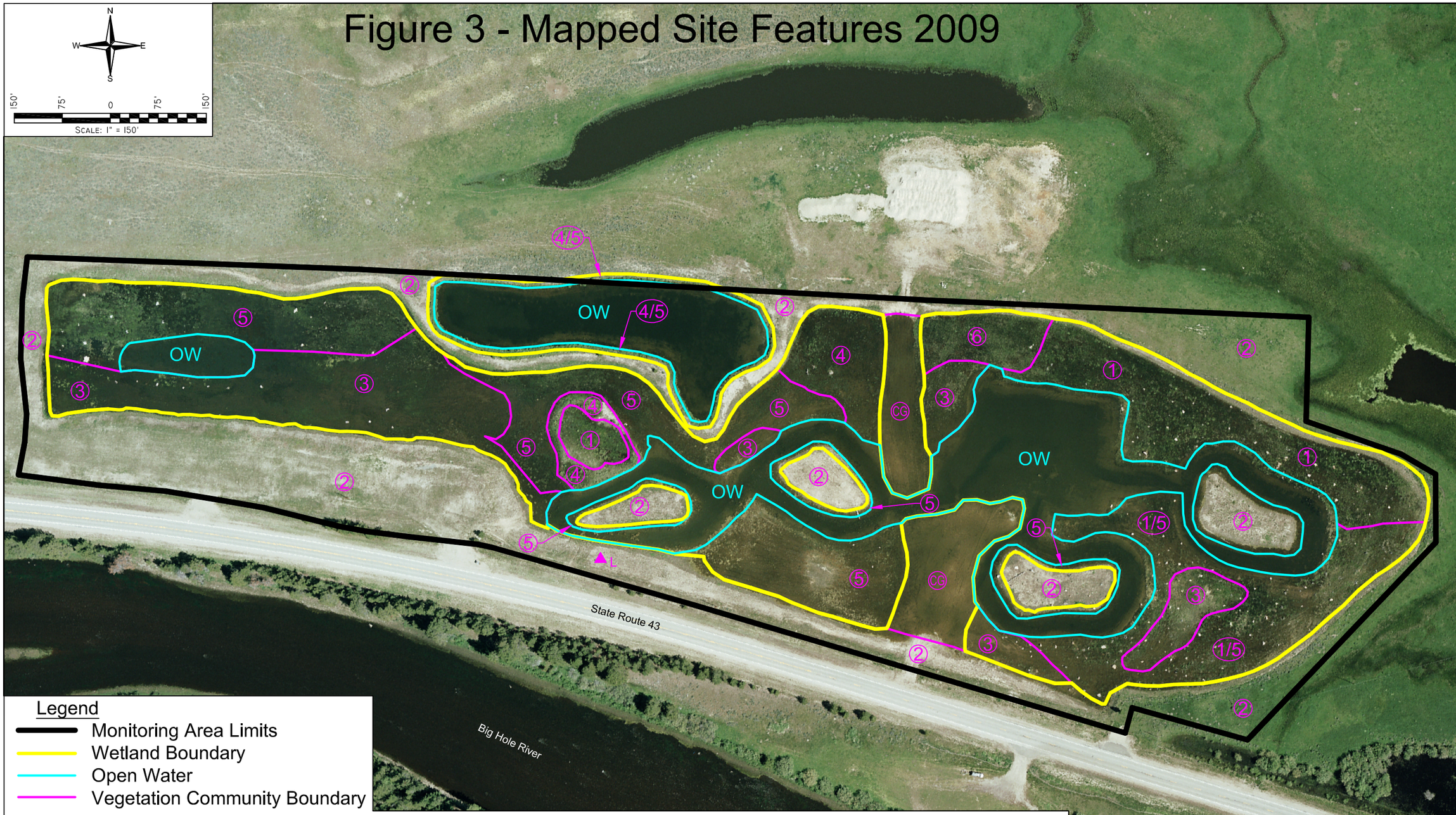
PBSJ
801 N. Last Chance Gulch
Suite 100
Helena, MT 59601

FIGURE 2

REV -

DATE 10/13/2009

Figure 3 - Mapped Site Features 2009



Legend

- Monitoring Area Limits
- Wetland Boundary
- Open Water
- Vegetation Community Boundary

Base Photograph: July 1, 2009

Noxious Weed

Centaurea maculosa

Infestation Size

▲ = 0.1 to 1 acre

Cover Class

L = Low (1-5% cover)

Vegetation Types		Acreages	
①	Carex/Juncus Wetland	Upland Buffer	6.58 acres
②	Upland	Upland Islands	0.93 acres
③	Transitional	Unvegetated Cobble/Gravel	1.06 acres
④	Salix Wetland	Transitional	2.46 acres
⑤	Hordeum/Eleocharis Wetland	Wetland	8.05 acres
⑥	Beckmannia Wetland	Open Water	5.01 acres
CG	Unvegetated Cobble/Gravel		

MDT SPORTSMAN'S CAMPGROUND WETLAND MITIGATION

MAPPED SITE FEATURES 2009

DRAWN: JR
PROJ MGR: J. BERGLUND
CHECKED: MT | APPVD: JB
PLOTTED: Nov/20/2009

PROJ NO: 0B4308802 03.04
LOCATION: FISHTRAP, MT
SCALE: NOTED
FILE NAME: BASE 2009.dwg

801 N. Last Chance Gulch
Suite 100
Helena, MT 59601

PBSJ

FIGURE 3

REV -

DATE 10/13/2009

Appendix B

2009 WETLAND MITIGATION SITE MONITORING FORMS
2009 BIRD SURVEY FORM
2009 COE WETLAND DELINEATION FORMS
2009 MDT FUNCTIONAL ASSESSMENT FORM

MDT Wetland Mitigation Monitoring
Sportsman's Campground
Deer Lodge County, Montana

PBS&J / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **Sportsman's Campground** Project Number: **0B4308802**
Assessment Date: **August 12, 2009** Person(s) conducting the assessment: **Traxler**
Location: **13 miles west of Wise River along HWY 43** MDT District: **Butte** Milepost: _____
Legal Description: T **2N** R **13W** Section **36**
Weather Conditions: **cloudy, windy** Time of Day: **1:30pm - 4:30pm**
Initial Evaluation Date: **August 7, 2008** Monitoring Year: **2** # Visits in Year: **1**
Size of evaluation area: **24 acres** Land use surrounding wetland: **Rangeland; Big Hole River**

HYDROLOGY

Surface Water Source: **precipitation**
Inundation: **Present** Average Depth: _____ Range of Depths: **0-24"**
Percent of assessment area under inundation: **67%**
Depth at emergent vegetation-open water boundary: **0.5 feet**
If assessment area is not inundated then are the soils saturated within 12 inches of surface: **Yes**
Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc.):
Drift lines

Groundwater Monitoring Wells: **Absent**
Record depth of water below ground surface (in feet):

Well Number	Depth	Well Number	Depth	Well Number	Depth

Additional Activities Checklist:
☒ Map emergent vegetation-open water boundary on aerial photograph.
☒ Observe extent of surface water during each site visit and look for evidence of past surface water elevations (drift lines, erosion, vegetation staining, etc.)
☐ Use GPS to survey groundwater monitoring well locations, if present.

COMMENTS / PROBLEMS:
Evidence that groundwater levels were significantly higher during the spring and early summer period.

VEGETATION COMMUNITIES

Community Number: **1** Community Title (main spp): **Carex/Juncus**

Dominant Species	% Cover	Dominant Species	% Cover
Carex nebrascensis	3 = 11-20%	Spiranthes romanzoffiana	+ = < 1%
Carex prionophylla	2 = 6-10%	Rumex crispus	2 = 6-10%
Carex utriculata	3 = 11-20%		
Carex vesicaria	1 = 1-5%		
Juncus balticus	3 = 11-20%		
Eleocharis palustris	2 = 6-10%		

Comments / Problems: **unchanged from previous year**

Community Number: **2** Community Title (main spp): **Upland**

Dominant Species	% Cover	Dominant Species	% Cover
Achellea millefolium	1 = 1-5%	Kochia scoparia	1 = 1-5%
Agropyron dasystachyum	2 = 6-10%	Melilotus officinale	1 = 1-5%
Agropyron spicatum	2 = 6-10%	Poa pratensis	2 = 6-10%
Agropyron trachycaulum	2 = 6-10%		
Artemisia tridentata	2 = 6-10%		
Bromus inermis	1 = 1-5%		

Comments / Problems: **unchanged from previous year**

Community Number: **3** Community Title (main spp): **Transitional**

Dominant Species	% Cover	Dominant Species	% Cover
Eleocharis palustris	2 = 6-10%		
Hordeum jubatum	1 = 1-5%		
Polygonum amphibium	1 = 1-5%		
Juncus balticus	+ = < 1%		
Rumex crispus	+ = < 1%		
Agrostis alba	+ = < 1%		

Comments / Problems: **Few plants pioneering bare ground - transition to wetland**

Community Number: **4** Community Title (main spp): **Salix**

Dominant Species	% Cover	Dominant Species	% Cover
Salix exigua	3 = 11-20%		
Salix lemmonii	3 = 11-20%		
Populus trichocarpa	2 = 6-10%		
Agrostis alba	3 = 11-20%		

Comments / Problems: _____

VEGETATION COMMUNITIES (continued)

Community Number: **5** Community Title (main spp): **Hordeum Jubatum / Eleocharis palustris**

Dominant Species	% Cover	Dominant Species	% Cover
Hordeum jubatum	4 = 21-50%		
Eleocharis palustris	4 = 21-50%		
Agrostis alba	1 = 1-5%		
Beckmannia syzigachne	1 = 1-5%		
Rumex crispus	+ = < 1%		
Alopecurus pratensis	+ = < 1%		

Comments / Problems: _____

Community Number: **6** Community Title (main spp): **Beckmannia syzigachne**

Dominant Species	% Cover	Dominant Species	% Cover
Beckmannia syzigachne	5 = > 50%		
Hordeum jubatum	2 = 6-10%		
Juncus balticus	1 = 1-5%		
Eleocharis palustris	1 = 1-5%		
Rumex crispus	+ = < 1%		

Comments / Problems: _____

Community Number: ___ Community Title (main spp): _____

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: _____

Community Number: ___ Community Title (main spp): _____

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: _____

COMPREHENSIVE VEGETATION LIST

Plant Species	Vegetation Community Number (s)	Plant Species	Vegetation Community Number (s)
Achellea millefolium	2	Spiranthes romanzoffiana	1
Agropyron dasystachyum	2,3	Thlaspi arvense	2
Agropyron spicatum	2	Typha latifolia	1
Agropyron trachycaulum	2		
Agrostis alba	2,3,4,5		
Alopecurus pratensis	1,2,3,5,6		
Artemisia tridentata	2		
Beckmannia syzigachne	5,6		
Bromus inermis	2		
Calamagrostis canadensis	1		
Carex athrostachya	1		
Carex nebrascensis	1		
Carex prionophylla	1		
Carex utriculata	1		
Carex vesicaria	1		
Centaurea maculosa	2		
Cirsium arvense	2		
Eleocharis palustris	1,3,5,6		
Equisetum arvense	1,2,3		
Festuca sp.	2		
Glycyrrhiza lepidota	2		
Hordeum jubatum	2,3,5,6		
Juncus balticus	1,3,6		
Kochia scoparia	2		
Melilotus officinale	2		
Phleum pratense	2		
Pinus contorta	2		
Poa pratensis	2		
Polygonum amphibium	3		
Populus trichocarpa	3,4		
Potamogeton sp.	3		
Rumex crispus	3,5		
Salix exigua	4		
Salix lemmonii	4		
Scirpus acutus	1		

Comments / Problems: _____

PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number Observed	Mortality Causes
NA			

Comments / Problems: **None planted.**

WILDLIFE

Birds

Were man-made nesting structures installed? **No**
If yes, type of structure: _____ How many? _____
Are the nesting structures being used? **NA**
Do the nesting structures need repairs? _____

Mammals and Herptiles

Mammal and Herptile Species	Number Observed	Indirect Indication of Use			
		Tracks	Scat	Burrows	Other
deer	0	☒	☒	☐	
moose	0	☐	☒	☐	
badger	0	☐	☐	☒	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	

Additional Activities Checklist:
Yes Macroinvertebrate Sampling (if required)

Comments / Problems: Waterfowl and shorebird use is common - mammal and herps uncommon.

PHOTOGRAPHS

Using a camera with a 50mm lens and color film take photographs of the following permanent reference points listed in the check list below. Record the direction of the photograph using a compass. When at the site for the first time, establish a permanent reference point by setting a ½ inch rebar or fencepost extending 2-3 feet above ground. Survey the location with a resource grade GPS and mark the location on the aerial photograph.

Photograph Checklist:

- ☒ One photograph for each of the four cardinal directions surrounding the wetland.
- ☒ At least one photograph showing upland use surrounding the wetland. If more than one upland exists then take additional photographs.
- ☒ At least one photograph showing the buffer surrounding the wetland.
- ☒ One photograph from each end of the vegetation transect, showing the transect.

Location	Photograph Frame #	Photograph Description	Compass Reading (°)
PP1		View looking east at island with standing water	90
PP1		View looking north	0
PP1		View looking west	280
PP1		View looking NE	55
PP2		View looking east	90
PP2		View looking SE	135
PP2		View looking NE at the NW corner of the site	20
PP2		View looking west at disturbed upland buffer	270
PP3		View looking west	270
PP3		View looking south	180
PP3		View looking southwest	210
PP3		View looking southeast	120
PP4		View looking west	270
PP4		View looking southwest	200
PP4		View looking northwest	300
Transect 1		View from start of Transect looking north	0
Transect 1		View from end of Transect looking south	180
Transect 2		View from start of Transect looking north	0
Transect 2		View from end of Transect looking south	180
Transect 3		View from start of Transect looking northeast	35
Transect 3		View from end of Transect looking southwest	215

Comments / Problems: _____

GPS SURVEYING

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

GPS Checklist:

- ☒ Jurisdictional wetland boundary.
- ☒ 4-6 landmarks that are recognizable on the aerial photograph.
- ☒ Start and End points of vegetation transect(s).
- ☒ Photograph reference points.
- ☐ Groundwater monitoring well locations.

Comments / Problems: _____

WETLAND DELINEATION

(attach COE delineation forms)

At each site conduct these checklist items:

- ☒ Delineate wetlands according to the 1987 Army COE manual.
- ☒ Delineate wetland – upland boundary onto aerial photograph.

Yes Survey wetland – upland boundary with a resource grade GPS survey.

Comments / Problems: _____

FUNCTIONAL ASSESSMENT

(Complete and attach full MDT Montana Wetland Assessment Method field forms.)
(Also attach any completed abbreviated field forms, if used)

Comments / Problems: _____

MAINTENANCE

Were man-made nesting structure installed at this site? **No**
If yes, do they need to be repaired? **NA**
If yes, describe the problems below and indicate if any actions were taken to remedy the problems.

Were man-made structures built or installed to impound water or control water flow into or out of the wetland? **No**
If yes, are the structures working properly and in good working order? **NA**
If no, describe the problems below.

Comments / Problems: _____

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Sportsman's Campground** Date: **August 12, 2009** Examiner: **Traxler**
Transect Number: **1** Approximate Transect Length: **391 feet** Compass Direction from Start: **0˚** Note: _____

Vegetation Type A: **Upland Type 2**	
Length of transect in this type: 145 feet	
Plant Species	**Cover**
Achellea millefolium	1 = 1-5%
Agropyron dasystachyum	2 = 6-10%
Agropyron spicatum	2 = 6-10%
Agropyron trachycaulum	2 = 6-10%
Kochia scoparia	2 = 6-10%
Thlaspi arvense	1 = 1-5%
Artemisia tridentata	1 = 1-5%
Poa pratensis	2 = 6-10%
Melilotus officinale	+ = < 1%
Total Vegetative Cover:	75%

Vegetation Type B: **Type 5 Hordeum/Eleocharis**	
Length of transect in this type: 141 feet	
Plant Species	**Cover**
Hordeum jubatum	2 = 6-10%
Eleocharis palustris	5 = > 50%
Beckmannia syzigachne	+ = < 1%
Typha latifolia	+ = < 1%
Total Vegetative Cover:	85%

Vegetation Type C: **Transitional Type 3**	
Length of transect in this type: 105 feet	
Plant Species	**Cover**
Eleocharis palustris	1 = 1-5%
Hordeum jubatum	1 = 1-5%
Polygonum amphibium	1 = 1-5%
Salix sp.	1 = 1-5%
Total Vegetative Cover:	15%

Vegetation Type D:	
Length of transect in this type: feet	
Plant Species	**Cover**
Total Vegetative Cover:	

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Sportsman's Campground** Date: **August 12, 2009** Examiner: **Traxler**
Transect Number: **2** Approximate Transect Length: **400 feet** Compass Direction from Start: **0˚** Note: _____

Vegetation Type A: **Upland Type 2**	
Length of transect in this type: 9 feet	
Plant Species	**Cover**
Achellea millefolium	1 = 1-5%
Phleum pratense	3 = 11-20%
Festuca sp.	3 = 11-20%
Equisetum arvense	2 = 6-10%
Glycyrrhiza lepidota	1 = 1-5%
Total Vegetative Cover:	70%

Vegetation Type B: **Type 1 Carex/Juncus**	
Length of transect in this type: 15 feet	
Plant Species	**Cover**
Carex utriculata	2 = 6-10%
Juncus balticus	2 = 6-10%
Eleocharis palustris	2 = 6-10%
Potamogeton sp.	2 = 6-10%
Rumex crispus	1 = 1-5%
Total Vegetative Cover:	55%

Vegetation Type C: **Wetland Type 1/5**	
Length of transect in this type: 210 feet	
Plant Species	**Cover**
Carex athrostachya	1 = 1-5%
Carex nebrascensis	2 = 6-10%
Potamogeton sp.	2 = 6-10%
Eleocharis palustris	3 = 11-20%
Hordeum jubatum	2 = 6-10%
Alopecurus pratensis	1 = 1-5%
Beckmannia syzigachne	1 = 1-5%
Rumex crispus	1 = 1-5%
Total Vegetative Cover:	50%

Vegetation Type D: **Open Water**	
Length of transect in this type: 166 feet	
Plant Species	**Cover**
Total Vegetative Cover:	%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Sportsman's Campground** Date: **August 12, 2009** Examiner: **Traxler**
Transect Number: **3** Approximate Transect Length: **377 feet** Compass Direction from Start:**35˚** Note: _____

Vegetation Type A: **Upland Type 2**	
Length of transect in this type: 66 feet	
Plant Species	**Cover**
Achellea millefolium	1 = 1-5%
Agropyron dasystachyum	2 = 6-10%
Agropyron spicatum	2 = 6-10%
Agropyron trachycaulum	2 = 6-10%
Kochia scoparia	2 = 6-10%
Thlaspi arvense	1 = 1-5%
Total Vegetative Cover:	50%

Vegetation Type B: **Transitional type 3**	
Length of transect in this type: 30 feet	
Plant Species	**Cover**
Hordeum jubatum	1 = 1-5%
Eleocharis palustris	1 = 1-5%
Polygonum amphibium	1 = 1-5%
Total Vegetative Cover:	20%

Vegetation Type C: **Type 4 Salix**	
Length of transect in this type: 6 feet	
Plant Species	**Cover**
Salix exigua	2 = 6-10%
Salix lemmonii	2 = 6-10%
Populus trichocarpa	2 = 6-10%
Agrostis alba	2 = 6-10%
Total Vegetative Cover:	70%

Vegetation Type D: **Type 1 Carex/Juncus**	
Length of transect in this type: 102 feet	
Plant Species	**Cover**
Carex athrostachya	1 = 1-5%
Carex nebrascensis	2 = 6-10%
Carex prionophylla	1 = 1-5%
Carex utriculata	2 = 6-10%
Carex vesicaria	1 = 1-5%
Juncus balticus	2 = 6-10%
Spiranthes romanzoffiana	+
Total Vegetative Cover:	80%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Sportsman's Campground** Date: **August 12, 2009** Examiner: **Traxler**
Transect Number: **3** Approximate Transect Length: **377 feet** Compass Direction from Start: **35˚** Note: _____

Vegetation Type E: **Type 4 Salix**	
Length of transect in this type: 18 feet	
Plant Species	**Cover**
Salix exigua	1 = 1-5%
Salix lemmonii	2 = 6-10%
Populus trichocarpa	2 = 6-10%
Agrostis alba	2 = 6-10%
Total Vegetative Cover:	60%

Vegetation Type F: **Type 5 Hordeum/Eleocharis**	
Length of transect in this type: 135 feet	
Plant Species	**Cover**
Hordeum jubatum	3 = 11-20%
Eleocharis palustris	3 = 11-20%
Beckmannia syzigachne	1 = 1-5%
Salix sp.	2 = 6-10%
Total Vegetative Cover:	45%

Vegetation Type G: **Upland type 2**	
Length of transect in this type: 20 feet	
Plant Species	**Cover**
Achellea millefolium	1 = 1-5%
Agropyron trachycaulum	2 = 6-10%
Kochia scoparia	1 = 1-5%
Thlaspi arvense	1 = 1-5%
Agrostis alba	2 = 6-10%
Total Vegetative Cover:	50%

Vegetation Type H:	
Length of transect in this type: feet	
Plant Species	**Cover**
Total Vegetative Cover:	%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Cover Estimate		**Indicator Class**	**Source**
+ = < 1%	3 = 11-10%	+ = Obligate	P = Planted
1 = 1-5%	4 = 21-50%	- = Facultative/Wet	V = Volunteer
2 = 6-10%	5 = > 50%	0 = Facultative	

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): **70%**

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 foot depth (in open water), or at the point where water depths or saturation are maximized. Mark this location with another metal fencepost.

Estimate cover within a 10 foot 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.

Comments: _____

BIRD SURVEY – FIELD DATA SHEET

Site: **Sportsman's Campground** Date: **8/12/09**
Survey Time: **1:30 pm** to **4:30 pm**

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
widgeon	30	L F	OW				
common snipe	5	F L	MA				
Mallard	5	L	OW				
cliff swallow	3	FO					
sparrow sp.	5	F L	UP				
Spotted Sandpiper	3	F N	MA MF				
Wilson's Phalarope	20	F L	MF MA OW				
Killdeer	7	F	MA MF				

BEHAVIOR CODES
BP = One of a breeding pair
BD = Breeding display
F = Foraging
FO = Flyover
L = Loafing
N = Nesting

HABITAT CODES
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 shore

Weather: **Partly cloudy and warm - approx. 80 degrees**

Notes: **significant waterfowl use including evidence of nesting - brood of 6 widgeon. Phalaropes were common on the site. Young spotted sandpiper seen onsite.**

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

Project/Site:	Sportsman's campground	**Project No:**	**Date:** 12-Aug-2009
Applicant/Owner:	Montana Department of Transportation		**County:** Deerlodge
Investigators:	PBSJ -Traxler		**State:** Montana
			Plot ID: 1

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:**
(If needed, explain on the reverse side)		Near North end of Transect 1

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

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Hordeum jubatum	Herb	FAC+	*Polygonum amphibium*	Herb	OBL
Barley,Fox-Tail			Smartweed,Water		
Eleocharis palustris	Herb	OBL			
Spikerush,Creeping					

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

FAC Neutral: 2/2 = 100.00%

Numeric Index: 5/3 = 1.67

Remarks:
Wetland still developing - approximately 65% vegetative cover in 2009.

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:	= 0 *(in.)*

Wetland Hydrology Indicators

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

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

Remarks:
Soil saturated to surface - likely had standing water in spring - groundwater fed

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

Project/Site:	Sportsman's campground	**Project No:**	**Date:** 12-Aug-2009
Applicant/Owner:	Montana Department of Transportation		**County:** Deerlodge
Investigators:	PBSJ -Traxler		**State:** Montana
			Plot ID: 1

SOILS

Map Unit Name (Series and Phase): Maurice Loam 2-8% slopes
Map Symbol: 21C **Drainage Class:** well drained **Mapped Hydric Inclusion?**
Taxonomy (Subgroup): **Field Observations Confirm Mapped Type?** Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
4	A/B	10YR2/1	N/A	N/A	N/A	Clay loam

Hydric Soil Indicators:

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

Remarks:
4 inches of soil over cobble/gravel.

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:
Area is gradually developing wetland characteristics.

Explanation for response to: Normal Circumstances? Atypical Situation ? Potential Problem Area ?
Area was mined for gravel and then reclaimed to wetland.

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

Project/Site:	Sportsman's campground	**Project No:**	**Date:** 12-Aug-2009
Applicant/Owner:	Montana Department of Transportation		**County:** Deerlodge
Investigators:	PBSJ -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:**
(If needed, explain on the reverse side)		Along Transect 3

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

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Carex athrostachya	Herb	FACW	*Carex rostrata*	Herb	OBL
Sedge,Slender-Beak			Sedge,Beaked		
Carex nebrascensis	Herb	OBL	*Calamagrostis canadensis*	Herb	FACW+
Sedge,Nebraska			Reedgrass,Blue-Joint		
Carex vesicaria	Herb	OBL	*Juncus longistylis*	Herb	FACW
Sedge,Inflated			Rush,Long-Style		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 6/6 = 100.00%

FAC Neutral: 6/6 = 100.00%

Numeric Index: 9/6 = 1.50

Remarks:
Existing wetland area that was not disturbed during construction.

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:	= 9 *(in.)*

Wetland Hydrology Indicators

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

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

Remarks:

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

Project/Site:	Sportsman's campground	**Project No:**	**Date:** 12-Aug-2009
Applicant/Owner:	Montana Department of Transportation		**County:** Deerlodge
Investigators:	PBSJ -Traxler		**State:** Montana
			Plot ID: 2

SOILS

Map Unit Name (Series and Phase): Gravel Pits
Map Symbol: 102 **Drainage Class:** na
Mapped Hydric Inclusion?
Taxonomy (Subgroup):
Field Observations Confirm Mapped Type? Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
5	A/B	10YR4/2	10YR5/8	Many Distinct	Loamy sand

Hydric Soil Indicators:

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

Remarks:

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:
Existing wetland created by past gravel mining.

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

Project/Site:	Sportsman's campground	**Project No:**	**Date:** 12-Aug-2009
Applicant/Owner:	Montana Department of Transportation		**County:** Deerlodge
Investigators:	PBSJ -Traxler		**State:** Montana
			Plot ID: 3

Do Normal Circumstances exist on the site?	Yes (No)	**Community ID:** SS
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)		north central portion of site

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

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Populus balsamifera	Shrub	FAC	*Salix lemmonii*	Shrub	FACW+
Poplar,Balsam			Willow,Lemmon's		
Salix exigua	Shrub	OBL			
Willow,Sandbar					

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

FAC Neutral: 2/2 = 100.00%

Numeric Index: 6/3 = 2.00

Remarks:
developing scrub/shrub wetland area.

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:	= 5 *(in.)*

Wetland Hydrology Indicators

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

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

Remarks:

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

Project/Site:	Sportsman's campground	**Project No:**	**Date:** 12-Aug-2009
Applicant/Owner:	Montana Department of Transportation		**County:** Deerlodge
Investigators:	PBSJ -Traxler		**State:** Montana
			Plot ID: 3

SOILS

Map Unit Name (Series and Phase): Maurice Loam 2-8% slopes
Map Symbol: 21C **Drainage Class:** well drained **Mapped Hydric Inclusion?**
Taxonomy (Subgroup): **Field Observations Confirm Mapped Type?** Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
6	A	10YR2/2	10YR5/6	Many	Distinct	Sandy loam

Hydric Soil Indicators:

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

Remarks:

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:

Explanation for response to: Normal Circumstances? Atypical Situation ? Potential Problem Area ?
Area was mined for gravel and then reclaimed to create wetland.

MDT MONTANA WETLAND ASSESSMENT FORM (revised March 2008)

1. Project Name: Sportsman's Campground Mitigation Site **2. MDT Project #:** STPP 46-5(12)51 **3. Control #:** A137

3. Evaluation Date: 8/12/09 **4. Evaluator(s):** PBS&J - Traxler **5. Wetland/Site #(s):** Sportman's Campground

6. Wetland Location(s): Township 2 N, Range 13 W, Section 36; Township ___N, Range ___E, Section _____

Approximate Stationing or Roadposts: _____

Watershed: 6 - Upper Missouri **County:** Deer Lodge _ _ _____

7. Evaluating Agency: MDT

Purpose of Evaluation:

- ☐ **Wetland potentially affected by MDT project**
- ☐ **Mitigation wetlands; pre-construction**
- ☒ **Mitigation wetlands; post-construction**
- ☐ **Other** _____

8. Wetland Size (acre): _____ (visually estimated)
10.5 (measured, e.g. GPS)

9. Assessment Area (AA) Size (acre): _____ (visually estimated)
(see manual for determining AA) 15.52 (measured, e.g. GPS)

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA (See manual for definitions.)

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% OF AA
Depressional	Emergent Wetland	Excavated	Seasonal / Intermittent	40
Depressional	Scrub-Shrub Wetland	Excavated	Seasonal / Intermittent	20
Depressional	Rock Bottom	Excavated	Permanent / Perennial	40

Comments: _____

11. ESTIMATED RELATIVE ABUNDANCE (of similarly classified sites within the same Major Montana Watershed Basin; see manual.)
common

12. GENERAL CONDITION OF AA

i. Disturbance: Use matrix below to select the appropriate response; see manual for Montana listed noxious weed and aquatic nuisance vegetation species lists.

Conditions within AA	Predominant Conditions Adjacent to (within 500 feet of) AA		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is ≤15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is ≤15%.	---	low disturbance	---
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	---	---	---
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.	---	---	---

Comments (types of disturbance, intensity, season, etc.)**:** Few weedy species

ii. Prominent noxious, aquatic nuisance, and other exotic vegetation species: Spotted knapweed

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: AA is reclaimed gravel pit for pupose of providing wetland mitigation credit to MDT. Site contains areas of existing and developing wetland with pockets of open water. Land use surrounding AA is rangeland used for grazing and the Big Hole River immediately south of the site across Highway 43.

13. STRUCTURAL DIVERSITY (Based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes]; see #10 above.)

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management preventing (passive) existence of additional vegetated classes?		Modified Rating
≥3 (or 2 if one is forested) classes	---	NA	NA	NA
2 (or 1 if forested) classes	mod	NA	NA	NA
1 class, but not a monoculture	---	←NO	YES→	---
1 class, monoculture (1 species comprises ≥90% of total cover)	---	NA	NA	NA

Comments: Aquatic bed habitat may develop over time in the areas currently definded as open water.

Wetland/Site #(s): Sportsman's Campground

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

i. AA is Documented (D) or Suspected (S) to contain: Check box based on definitions in manual.

Primary or critical habitat (**list species**) ☐ D ☐ S _____
Secondary habitat (**list species**) ☐ D ☐ S _____
Incidental habitat (**list species**) ☐ D ☐ S _____
No usable habitat ☒ S

ii. Rating: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
Functional Point/Rating	---	---	---	---	---	---	0L

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

14B. HABITAT FOR PLANTS OR ANIMALS RATED S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM
Do not include species listed in 14A above.

i. AA is Documented (D) or Suspected (S) to contain: Check box based on definitions in manual.

Primary or critical habitat (**list species**) ☐ D ☐ S _____
Secondary habitat (**list species**) ☐ D ☐ S _____
Incidental habitat (**list species**) ☒ D ☐ S bald eagle
No usable habitat ☐ S

ii. Rating: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
S1 Species Functional Point/Rating	---	---	---	---	---	---	---
S2 and S3 Species Functional Point/Rating	---	---	---	---	.2L	---	---

Sources for documented use (e.g. observations, records): MDT observed bald eagle onsite in 2008

14C. GENERAL WILDLIFE HABITAT RATING

i. Evidence of Overall Wildlife Use in the AA: Check substantial, moderate, or low based on supporting evidence.

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

☐ ***Minimal:*** Based on any of the following [check].
- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interview with local biologist with knowledge of AA

☒ ***Moderate:*** Based on any of the following [check].
- ☒ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- ☐ common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☒ adequate adjacent upland food sources
- ☐ interview with local biologist with knowledge of the AA

ii. Wildlife Habitat Features: Working from top to bottom, check appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent **vegetated** classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see manual for further definitions of these terms].

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

iii. Rating: Use the conclusions from i and ii above and the matrix below to select the functional point and rating.

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

Comments: Adequate habitat onsite to support a variety of bird species as well as small and large mammals and various herps.

Wetland/Site #(s): Sportsman's Campground

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

If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then check the NA box and proceed to 14E.

Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier].

Type of Fishery: ☐ Cold Water (**CW**) ☐ Warm Water (**WW**) **Use the CW or WW guidelines in the manual to complete the matrix.**

i. Habitat Quality and Known / Suspected Fish Species in AA: Use matrix to select the functional point and rating.

Duration of Surface Water in AA	☐ **Permanent / Perennial**						☐ **Seasonal / Intermittent**						☐ **Temporary / Ephemeral**					
Aquatic Hiding / Resting / Escape Cover	☐ **Optimal**		☐ **Adequate**		☐ **Poor**		☐ **Optimal**		☐ **Adequate**		☐ **Poor**		☐ **Optimal**		☐ **Adequate**		☐ **Poor**	
Thermal Cover: optimal / suboptimal	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**
FWP Tier I fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier II or **Native Game** fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier III or **Introduced Game** fish	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Non-Game Tier IV or **No** fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Sources used for identifying fish spp. potentially found in AA: _____

ii. Modified Rating: NOTE: Modified score cannot exceed 1.0 or be less than 0.1.

a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity, ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* ☐ **YES**, reduce score in **i** by 0.1 = __ or ☐ **N0**

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area; specify in comments) for native fish or introduced game fish? ☐ **YES**, add to score in **i** or **iia** 0.1 = __ or ☐ **N0**

iii. Final Score and Rating: _ **Comments:** _____

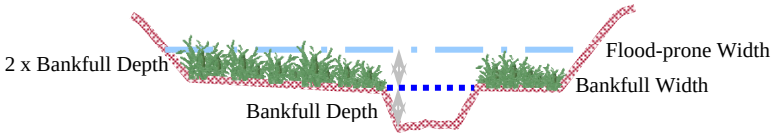
14E. FLOOD ATTENUATION ☒ **NA** (proceed to 14F)

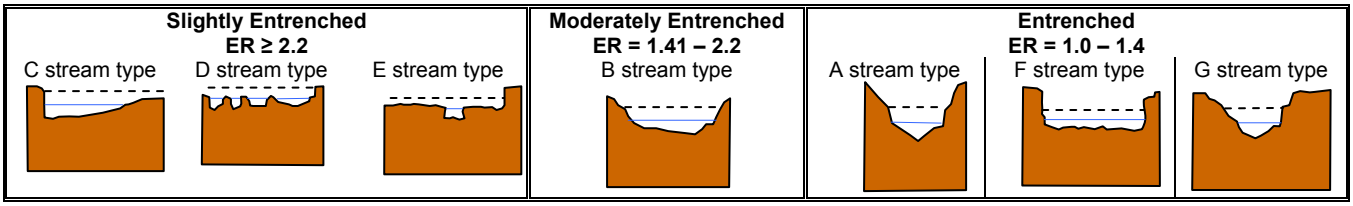
Applies only to wetlands that are subject to flooding via in-channel or overbank flow.
If wetlands in AA are not flooded from in-channel or overbank flow, check the NA box and proceed to 14F.

Entrenchment Ratio (ER) Estimation (see manual for additional guidance). Entrenchment ratio = (flood-prone width) / (bankfull width).
Flood-prone width = estimated horizontal projection of where 2 X maximum bankfull depth elevation intersects the floodplain on each side of the stream.

_____ / _____ = _____

flood prone width / bankfull width = entrenchment ratio





i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	☐ Slightly Entrenched C, D, E stream types			☐ Moderately Entrenched B stream type			☐ Entrenched A, F, G stream types		
Percent of Flooded Wetland Classified as Forested and/or Scrub/Shrub	☐ 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 ≥10 acres of wetland in the AA subject to flooding AND are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA? ☐ YES ☐ NO **Comments:** _____

Wetland/Site #(s): Sportsman's Campground

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, then check the NA box and proceed to 14G.

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see manual for further definitions of these terms].

Estimated Maximum Acre Feet of Water Contained in Wetlands within the AA that are Subject to Periodic Flooding or Ponding	☒ **>5 acre feet**			☐ **1.1 to 5 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**	---	.9H	---	---	---	---	---	---	---
Wetlands in AA flood or pond **< 5 out of 10 years**	---	---	---	---	---	---	---	---	---

Comments: System is groundwater fed and fluctuates as Big Hole River levels fluctuate.

14G. SEDIMENT / NUTRIENT / TOXICANT / RETENTION AND REMOVAL ☐ **NA** (proceed to 14H)

Applies to wetland with potential to receive 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 the NA box and proceed to 14H.

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Sediment, Nutrient, and Toxicant Input Levels within AA	**AA receives or surrounding land use has potential to deliver sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.**				**Waterbody is 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 / Ponding in AA	☐ **Yes**	☐ **No**	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	---	---	.7M	---	---	---	---	---
AA contains **unrestricted outlet**	---	---	---	---	---	---	---	---

Comments: _____

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

Applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action.
If 14H does not apply, check the NA box and proceed to 14I.

% Cover of Wetland Streambank or Shoreline by Species with Stability Ratings of ≥6 (see Appendix F).	**Duration of Surface Water Adjacent to Rooted Vegetation**		
	☒ **Permanent / Perennial**	☐ **Seasonal / Intermittent**	☐ **Temporary / Ephemeral**
☐ **≥ 65%**	---	---	---
☐ **35-64%**	---	---	---
☒ **< 35%**	.3L	---	---

Comments: Site is developing.

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

i. Level of Biological Activity: Synthesis of wildlife and fish habitat rates (select).

General Fish Habitat Rating (14Diii)	**General Wildlife Habitat Rating (14Ciii)**		
	☒ **E/H**	☐ **M**	☐ **L**
☐ **E/H**	---	---	---
☐ **M**	---	---	---
☐ **L**	---	---	---
☒ **NA**	H	---	---

ii. Rating: Working from top to bottom, use the matrix below to select the functional point and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14Ii); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to the duration of surface water in the AA, where P/P, S/I, and T/E were previously defined, and A = "absent" [see manual for further definitions of these terms].

A	☒ **Vegetated Component >5 acres**						☐ **Vegetated Component 1-5 acres**						☐ **Vegetated Component <1 acre**					
B	☒ **High**		☐ **Moderate**		☐ **Low**		☐ **High**		☐ **Moderate**		☐ **Low**		☐ **High**		☐ **Moderate**		☐ **Low**	
C	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
P/P	---	.7M	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S/I	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
T/E/A	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Wetland/Site #(s): Sportsman's Campground

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT (continued)

iii. Modified Rating: Note: Modified score cannot exceed 1.0 or be less than 0.1.

Vegetated Upland Buffer: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, AND that is not subjected to periodic mechanical mowing or clearing (unless for weed control).
Is there an average ≥ 50-foot wide vegetated upland buffer around ≥ 75% of the AA's perimeter? ☒ **YES**, add 0.1 to score in **ii** = 0.70 ☐ **NO**

iv. Final Score and Rating: .8H **Comments:** _____

14J. GROUNDWATER DISCHARGE / RECHARGE
Check the appropriate indicators in i and ii below.

i. Discharge Indicators
- ☐ The AA is a slope wetland.
- ☐ Springs or seeps are known or observed.
- ☐ Vegetation growing during dormant season/drought.
- ☐ Wetland occurs at the toe of a natural slope.
- ☐ Seeps are present at the wetland edge.
- ☐ AA permanently flooded during drought periods.
- ☐ Wetland contains an outlet, but no inlet.
- ☒ Shallow water table and the site is saturated to the surface.
- ☐ Other: _____

ii. Recharge Indicators
- ☐ Permeable substrate present without underlying impeding layer.
- ☐ Wetland contains inlet but no outlet.
- ☐ Stream is a known 'losing' stream. Discharge volume decreases.
- ☐ Other: _____

iii. Rating: Use the information from i and ii above and the table below to select the functional point and rating.

Criteria	Duration of Saturation at AA Wetlands ***FROM GROUNDWATER DISCHARGE*** or ***WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*** ☒ P/P	☐ S/I	☐ T	☐ None
☒ **Groundwater Discharge or Recharge**	1H	---	---	---
☐ **Insufficient Data/Information**	---			

Comments: _____

14K. UNIQUENESS

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

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 (#11)	☐ Rare	☐ Common	☐ Abundant	☐ Rare	☐ Common	☐ Abundant	☐ Rare	☐ Common	☐ Abundant
☒ **Low Disturbance** at AA (#12i)	---	---	---	---	---	---	---	.4M	---
☐ **Moderate Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---
☐ **High Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---

Comments: _____

14L. RECREATION / EDUCATION POTENTIAL ☐ NA (proceed to Overall Summary and Rating page)
Affords 'bonus' points if AA provides a recreational or educational opportunity.

i. Is the AA a known or potential recreational or educational site? ☒ **YES**, go to ii. ☐ **NO**, check the NA box.

ii. Check categories that apply to the AA: ☒ Educational/Scientific Study ☒ Consumptive Recreational ☒ Non-consumptive recreational
☐ Other: _____

iii. Rating: Use the matrix below to select the functional point and rating.

Known or Potential Recreational or Educational Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	---
Private ownership with general public access (no permission required)	---	---
Private or public ownership without general public access, or requiring permission for public access	---	---

Comments: Site is owned by State of Montana - MDT. Site is open to hunting, bird watching, hiking.

15. GENERAL SITE NOTES: _____

Wetland/Site #(s): Sportsman's Campground

Function & Value Variables	Rating – Actual Functional Points	Possible Functional Points	Functional Units: Actual Points x Estimated AA Acreage	Indicate the Four Most Prominent Functions with an Asterisk
A. Listed / Proposed T&E Species Habitat	low 0.00	1.00		
B. MT Natural Heritage Program Species Habitat	low 0.10	1.00		
C. General Wildlife Habitat	high 0.90	1.00		*
D. General Fish Habitat	NA	NA		
E. Flood Attenuation	NA	NA		
F. Short and Long Term Surface Water Storage	high 0.90	1.00		*
G. Sediment / Nutrient / Toxicant Removal	mod 0.70	1.00		*
H. Sediment / Shoreline Stabilization	low 0.30	1.00		
I. Production Export / Food Chain Support	high 0.80	1.00		
J. Groundwater Discharge / Recharge	high 1.00	1.00		*
K. Uniqueness	mod 0.40	1.00		
L. Recreation / Education Potential (bonus point)	high 0.20			
Total Points	**5.3**	**9.0**	**82.25 Total Functional Units**	
Percent of Possible Score 59% (round to nearest whole number)				

Category I Wetland: (must satisfy **one** of the following criteria; otherwise go to Category II)
- ☐ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
- ☐ Score of 1 functional point for Uniqueness; **or**
- ☐ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
- ☐ Percent of possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; otherwise go to Category IV)
- ☐ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**
- ☒ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish 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 possible score > 65% (round to nearest whole #).

☐ **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 go to Category III)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
- ☐ Percent of possible score < 35% (round to nearest whole #).

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

☐ **I** ☒ **II** ☐ **III** ☐ **IV**

Appendix C

2009 REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Sportsman's Campground
Deer Lodge County, Montana

2009 SPORTSMAN'S CAMPGROUND WETLAND MITIGATION SITE

Photo 1: PP1 – View looking east at island with shallow standing water and developing wetland.

Photo 2: PP1 – View looking north across site.

Photo 3: PP1 – View looking west at disturbed upland buffer.

Photo 4: PP2 – View looking east from west end of project area.

Photo 5: PP2 – View looking at southwest corner of mitigation area – developing wetland vegetation.

Photo 6: PP2 – View looking at northwest corner of the mitigation site – developing *Hordeum*/*Eleocharis* wetland.

Photo 7: PP3 – View looking west.

Photo 8: PP3 – View looking south across site. *Beckmannia* wetland is on left and unvegetated cobble/gravel is on right.

Photo 9: PP3 – View looking southeast across site.

Photo 10: PP4 – View looking west from east end of project area.

Photo 11: PP1 – View looking southwest from east end of site

Photo 12: PP1 – View looking northwest from east end of project.

Photo 13: Transect 1 - south end looking north.

Photo 14: Transect 1 - north end looking south.

Photo 15: Transect 2 - south end looking north.

Photo 16: Transect 2 - north end looking south.

Photo 17: Transect 3 – south end looking northeast.

Photo 18: Transect 3 – north end looking southwest.

Appendix D

PROJECT PLAN SHEET

MDT Wetland Mitigation Monitoring
Sportsman's Campground
Deer Lodge County, Montana

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	STPP 46-5(2)51	WM8

PT 15+34.14 IS S. 74°51'52" W.
398.46 m FROM THE EN CORNER
OF SECTION 36. T.2 N. , R.13 W.

14+60 TO 15+00
REMOVE BERM
TO CONNECT
WETLANDS

NOTE: MOVE EXISTING TOPSOIL
STOCKPILES TO NEW
STOCKPILE AREA.

PERMANENT FENCE

CONST. LIMITS

PI = 13+05.42
Δ = 14° 26' 18"
R = 1,825 m
T = 231.17 m
L = 459.99 m

EXISTING WETLAND
(DO NOT DISTURB)

398 M² = 0.098 AC.

EXISTING WETLAND

EXISTING WETLAND

ISLAND
902 M² = 0.223 AC.

4039 M² = 1.00 ACRE POND
FLOOR ELEV. 1 764 m

EXISTING MDT
MAINTENANCE YARD

TOPSOIL
STOCKPILE AREA

TEMPORARY
FENCE

PERMANENT
FENCE

EXISTING TOPSOIL
STOCKPILE

ISLAND
746 M² = 0.184 AC.

ISLAND
719 M² = 0.178 AC.

CONST. LIMITS

PT 15+34.14

S 76° 01' 25" E

EXISTING TOPSOIL
STOCKPILES

STATE ROUTE 43

OUT HOUSE

OUT HOUSE

EXISTING WETLAND

PWR

12 13 14 15 16 17 18 19

25 30
36 31

PERMANENT FENCE

TOPSOIL
STOCKPILE AREA

9 10

N 89° 32' 17" E

STAGING AREA

PC 10+74.25

TEMPORARY
FENCE

OUTLET DT.

LEGEND

- EXISTING WETLAND
- EXISTING TREE
- FENCE
- EXISTING CONTOURS
- TEMPORARILY FLOODED
- ROSE PLANTING
- REMOVE BERM

T. 2 N. R. 13 W.

WETLAND MITIGATION SITE AND FEATURES

SCALE 1:1000

MONTANA DEPARTMENT OF TRANSPORTATION

sega

...\a137enplnz01.dgn
06 AUG 2003
11:00:05

1	2	3	MBahnsen

DESIGNED BY
DRAWN BY
APPROVED BY
REVISED BY

m1en\a137enplnz01.dgn

Appendix E

BIRD SURVEY PROTOCOL
GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Sportsman's Campground
Deer Lodge County, Montana

BIRD SURVEY PROTOCOL

This protocol was developed by the Montana Department of Transportation (MDT) to monitor bird use within their Wetland Mitigation Sites. Though each wetland mitigation site is vastly different, the bird survey data collection methods were standardized to order to increase repeatability. The protocol uses an "area search within a restricted time frame" to collect data on bird species, density, behavior, and habitat-type use.

Survey Area

Sites that can be entirely walked: Sites where the entire perimeter or area can be walked include, but are not limited to: small ponds, enhanced historic river channels, and wet meadows. If the wetland is not uncomfortably inundated, walk several meandering transects to sufficiently cover the wetland. Meandering transects can be used, even if a small portion of the area is inaccessible (e.g. cannot cross due to inundation). Use binoculars to identify the bird species, to count the number of individuals, and to identify their behavior and habitat type. Data can be recorded directly onto the bird survey form or into a field notebook. The number of meandering transects and their direction (or location) should be recorded in the field notebook and/or drawn onto the aerial photograph or topographic map. Meandering transects are not formal and should not be staked. Each site should be walked and surveyed to the fullest extent within the set time limit.

Sites than cannot be entirely walked: Sites where the entire perimeter or area cannot be walked include, but are not limited to: very large sites (i.e. perimeter of 2-3 miles), and large-bodied waters (i.e. reservoirs), where deep water habitat (> 6 feet) is close to shore. For large-bodied waters where only one area was graded to create or enhance the development of wetland, bird surveys should be walked along meandering transects within or around the graded area (see above.). For sites that cannot be walked, bird surveys should be conducted from many lookout posts, established at key vantage points. The general location of lookout posts should be recorded in the field notebook or drawn onto the aerial photograph or topographic map. Lookout post locations do not need to be staked. Both binoculars and spotting scopes may be used in order to accurately identify and count the birds. Depending upon the size of the open water, more time may be spent viewing the mitigation area from lookout posts than is spent traveling between posts.

Survey Time

Ideally, bird surveys should be conducted in the morning hours when bird activity is often greatest (i.e. sunrise to no later than 11:00 am). Surveys can be completed before 11am if all transects have been walked or all lookout posts have been viewed with no new bird activity observed. For some sites bird surveys may need to be performed in the late afternoon or evening due to traveling constraints or weather. The overall limiting time factor will be the number of budgeted hours for the project.

Data Recording

Bird Species List: Record each bird species observed onto the Bird Survey-Field Data Sheet (or field notebook). Record the bird's common name using the appropriate 4-letter code. The 4-letter code uses the first two letters of the first two word's of the bird's common name or if one name, the first four letters. For example, Mourning Dove is coded as MODO while Mallard is coded as MALL. If an unknown individual is observed, use the 4-letter protocol, but define your

abbreviation at the bottom of the field data sheet. For example, unknown shorebird is UNSB; unknown brown bird is UNBR; unknown warbler is UNWA; and unknown waterfowl is 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 parenthesis; do not fill in the habitat column. For example, a flock of black, medium-sized birds could be coded as UNBB / FO (25).

Bird Density: For each observation record the actual or estimated number of individuals observed per species and per behavior. Totals can be tallied in the office and entered onto the Bird Survey-Field Data Sheet.

Bird Behavior: Bird behavior must be identified by what is known. When a species is observed, the behavior that is immediately exhibited is recorded. Only behaviors that have discreet descriptive terms should be used. The following terms are recommended: breeding pair (BP); foraging (F); flyover (FO); loafing (L), which is defined as sleeping, roosting, or floating with head tucked under wing; and nesting (N). If other behaviors that have a specific descriptive word are observed then it can be used and should later be added to the protocol. Descriptive words or phrases such as "migrating" or "living on site" are unknown behaviors.

Bird Species Habitat Use: When a species is observed, the habitat is also recorded. The following broad habitat categories are used:

- aquatic bed (AB), defined as rooted-floating, floating-leaved, or submergent vegetation.
- marsh (MA), defined as emergent (e.g. cattail, bulrush) vegetation with surface water.
- wet meadow (WM), defined as grasses, sedges, or rushes with little to no surface water.
- scrub-shrub (SS), defined as shrub covered wetland.
- forested (FO), defined as tree covered wetland.
- open water (OW), defined as unvegetated surface water.
- upland (UP), defined as the upland buffer.

Other categories can be used and defined on the data sheet and should later be added to the protocol.

Other Fields

Bird Visit: Each bird survey (i.e. spring, fall, and mid-season) should be completed on separate Bird Survey-Field Data Sheets.

Time: Record the start time and end time on the Bird Survey-Field Data Sheet.

Date: Record the date of the bird survey.

Weather: Record the weather conditions (i.e. temperature, wind, condition).

Notes: Note if a particular individual bird is using a constructed nest box and note the condition of constructed nest box(es). Also record any comments about the site, wildlife, wetland conditions, etc.

GPS MAPPING AND AERIAL PHOTO REFERENCING PROCEDURE

From 2001 through 2006, PBS&J mapped the vegetation community boundaries, photograph points, and other sampling locations in the field using the resource-grade Trimble GEO III GPS (Global Positioning System) unit. The data were collected with a minimum of three positions per feature using Course/Acquisition code. The collected data were then transferred to a personal computer (PC) and differentially corrected to the nearest operating Community Base Station. The corrected data were then exported to ACAD drawings in Montana State Plain Coordinates NAD 83 international feet. The Trimble GEO III GPS unit was also used for some sites in 2007.

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

In 2007 and 2008 sites were mapped using the resource-grade Magellan MobileMapper Office GPS unit. The Magellan GPS unit has a comparable accuracy level to the Trimble Geo III unit.

Each year, MDT photographs each mitigation site from the air. These aerial photographs are not geo-referenced, but serve as a visual aid to map wetland development and vegetation communities, and to show approximate locations for various monitoring activities (i.e. photograph points, transects, or macroinvertebrate sampling). Reference points that are observable on the aerial photo (i.e. road, stream channel, or fence) were also marked with the GPS unit in order to better position the aerial photograph. This positioning did not remove any of the distortion inherent to all photos. All mapped features and community boundaries were reviewed by the wetland biologist, to increase the figure's accuracy.

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

Appendix F

2009 MACROINVERTEBRATE SAMPLING PROTOCOL AND DATA

MDT Wetland Mitigation Monitoring
Sportsman's Campground
Deer Lodge County, Montana

AQUATIC INVERTEBRATE SAMPLING PROTOCOL

Equipment List

- D-frame sampling net with 1 mm mesh.
- 1-liter, wide-mouth, plastic sample jars provided by Rhithron Associates, Inc. (Quart sized, wide-mouthed canning jars can be substituted.)
- 95% ethanol (alternatively isopropyl alcohol).
- Pre-printed sample labels (printed on rite-in-the-rain paper); two labels per sample.
- Pencil.
- Clear packaging tape.
- 3-5 gallon plastic pail.
- Large tea strainer or framed screen.
- Cooler with ice for storing sample.

Site Selection

Select a site that is accessible with hip waders or rubber boots. If the substrate is too soft, place a wide board down to walk on. Choose a site that is representative of the overall condition of the wetland. Annual sampling should occur at the same site within the wetland.

Sampling Procedure

Wetland invertebrates (macroinvertebrates) inhabit the substrate, the water column, the stems and leaves of aquatic vegetation, and the water surface. At the given location, each habitat type is sampled and combined into a single 1-liter sample jar. Pre-cautions are made to minimize disturbing the sample site in order to maximize the number of animals collected.

Fill the pail with approximately 1 gallon of wetland water. Ideally, sample the water column from near-shore outward to a depth of 3 feet. Sample the water column using a long sweep of the net, keeping the net at about half the depth of the water. Sample the water surface with a long sweep of the net. Aquatic vegetation is sampled by pulling the net beneath the water surface, for at least a meter in distance. The substrate is sampled by pulling the net along the bottom, bumping it against the substrate several times as you pull. Be sure to place some muck, mud, and/or vegetation into the jar. After sampling a habitat, rinse the net in the bucket and look for insects, crustaceans, and other aquatic invertebrates. It is not necessary to sample habitats in any specific order, but all habitats, if present, are to be sampled. Habitats can be sampled more than once.

Fill about 1 cup of ethanol into the sample jar. Sieve the contents of the bucket through the straining device and pour or carefully scrape the contents of the strainer into the sample jar. Top off the jar with enough ethanol to cover all the material and leave as little headroom as possible. Alternatively, sampled materials can be lifted out of the net and put directly into the jar. Be sure to include some muck, mud, and/or vegetation into the jar. Each macroinvertebrate sampling site should have only one sampling jar.

Using pencil, complete two labels with the required information: project name, project number, date, collector's name, and habitats sampled. Do not complete the label with ink as it will dissolve in ethanol. For wetlands with at least two macroinvertebrate sampling sites, number the site consecutively followed by the total number of sites (e.g. Sample 2 of 3 sites). Place one label into the jar and seal the jar. Dry the jar off, if necessary, and tape the second label to the outside of the jar.

Photograph each macroinvertebrate sampling site.

Sample Handling/Delivery

In the field, keep sample jars cool by placing in a cooler with a small amount of ice.
Deliver samples to the PBS&J office in Missoula, where they will be inventoried and delivered to Rhithron Associates, Inc.

MDT Mitigated Wetland Monitoring Project: Aquatic Invertebrate Monitoring
Summary 2001 – 2009

Prepared for Post, Buckley, Schuh, and Jernigan (PBS&J)
Prepared by W.Bollman, Rhithron Associates, Inc.

INTRODUCTION

This report summarizes data generated from eight years of mitigated wetland monitoring from sites throughout the State of Montana. A total of 229 invertebrate samples have been collected over the study period. Table 1 lists the currently monitored sites at which aquatic invertebrates were collected in 2009, and summarizes the sampling history of each.

METHODS

Sampling and Sample Processing

Aquatic invertebrate samples were collected at mitigated wetland sites in the summer months of 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, and 2009 by personnel of PBS&J. Sampling procedures were based on the protocols developed by the Montana Department of Environmental Quality (MDEQ) for wetland sampling. Sampling consisted of D-frame net sweeps through emergent vegetation (when present), the water column, and over the water surface, and included disturbing and scraping substrates at each sampled site. These sample components were composited and preserved in ethanol at each wetland site. Samples were delivered to Rhithron Associates, Inc. for processing, taxonomic determinations, and data analysis.

Standard sorting protocols were applied to achieve representative subsamples of a minimum of 100 organisms. Caton sub-sampling devices (Caton 1991), divided into 30 grids, each approximately 5 cm by 6 cm, were used. Grid contents were examined under stereoscopic microscopes using 10x-30x magnification. All aquatic invertebrates from each selected grid were sorted from the substrate, and placed in 95% ethanol for subsequent identification. Grid selection, examination, and sorting continued until at least 100 organisms were sorted. A large/rare search was conducted to collect any taxa not found in the subsampling procedure.

Organisms were individually examined using 10x – 80x stereoscopic dissecting scopes (Leica S8E and S6E) and identified to the lowest practical taxonomic levels using appropriate published taxonomic references. Identification, counts, life stages, and information about the condition of specimens were recorded on bench sheets. To obtain accuracy in richness measures, organisms that could not be identified to the target level specified in MDEQ protocols were designated as “not unique” if other specimens from the same group could be taken to target levels. Organisms designated as “unique” were those that could be definitively distinguished from other organisms in the sample. Identified organisms were preserved in 95% ethanol in labeled vials, and archived at the Rhithron laboratory. Midges were morphotyped using 10x – 80x stereoscopic dissecting microscopes (Leica S8E and S6E) and representative specimens were slide mounted and examined at 200x – 1000x magnification using an Olympus BX 51 compound microscope. Slide mounted organisms were also archived at the Rhithron laboratory.

Assessment

The method employed to assess these wetlands is based on an index incorporating a battery of 12 bioassessment metrics or attributes (Table 1) tested and recommended by Stribling et al. (1995) in a report to the Montana Department of Health and Environmental Science. In that study, it was determined that some of the metrics were of limited use in some geographic regions, and for some wetland types. Despite that finding, all 12 metrics are used in this evaluation of mitigated wetlands, since detailed geographic information and wetland classifications were unavailable for this report. Scoring criteria for the 12 metrics were developed specifically for this project, since mitigated wetlands were not included in original criteria development.

Scoring criteria for wetland metrics were developed by generally following the tactic used by Stribling et al. (1995). Boxplots were generated using a statistical software package (Statistica™), and distributions, median values, ranges, and quartiles for each metric were examined. For the wetland sites, “good” 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 good, 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, which is expressed as a percentage of the maximum possible score (60). Total bioassessment scores were classified according to a similar process, using the ranges and distributions of total scores for all sites studied between 2001 and 2007. Data from a total of 167 sites were used to develop criteria.

Six sites in this study supported aquatic fauna characteristic of lotic habitats rather than lentic wetland habitats; these sites were excluded from mitigated wetland scoring criteria development, and were evaluated with a metric battery specific to flowing water habitats. In 2008, the lotic sites were Camp Creek (2 sites), Cloud Ranch stream, Jack Creek – McKee Spring, and Jocko Spring Creek (2 sites). Invertebrate assemblages at these sites were generally characteristic of montane or foothill stream conditions and were assessed using the tested metric battery developed for montane streams of Western Montana (MVFP index: Bollman 1998).

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. However, the nature of the action needed is not determined solely by the index score or impairment classification, 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 since our understanding of the interrelationships of natural environmental factors and anthropogenic disturbances is tentative. Thus, the bioassessment index used in this report may not be universally applicable to all wetland types, and in particular, to constructed wetlands. Scores and impairment classifications derived from the index may not be valid indications of impairment or non-impairment. In addition, the further interpretive remarks accompanying the raw taxonomic and metric data in this summary are offered cautiously. Year-to-year comparisons depend on an assumption that specific sites were revisited in each year, and that equivalent sampling methods were utilized at each site revisit.

Bioassessment metrics - wetlands

An index based on the performance of 12 metrics was constructed, as described above. Table 2 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 (Hilsenhoff Biotic Index [HBI] 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.

Summary metric values and scores for the 2009 samples are given in Tables 4a-4c and 5. Thermal preference of invertebrate assemblages was calculated using Brandt 2001.

Bioassessment metrics – lotic habitats

For sites supporting rheophilic invertebrate assemblages, bioassessment was based on a metric battery and scoring criteria developed for montane regions of Montana (MVFP index: Bollman 1998). The six metrics constituting the bioassessment index used for MVFP sites in this study were selected because, both individually and as an integrated metric battery, they are robust at distinguishing impaired sites from relatively unimpaired sites (Bollman 1998). They have been demonstrated to be more variable with anthropogenic disturbance than with natural environmental gradients (Bollman 1998). Each of the six metrics and their expected responses to various stressors are described below.

1. Ephemeroptera (mayfly) taxa richness. The number of mayfly taxa declines as water quality diminishes. Impairments to water quality which have been demonstrated to adversely affect the ability of mayflies to flourish include elevated water temperatures, heavy metal contamination, increased turbidity, low or high pH, elevated specific conductance and toxic chemicals. Few mayfly species are able to tolerate certain disturbances to instream habitat, such as excessive sediment deposition.

2. Plecoptera (stonefly) taxa richness. Stoneflies are particularly susceptible to impairments that affect a stream on a reach-level scale, such as loss of riparian canopy, streambank instability, channelization, and alteration of morphological features such as pool frequency and function, riffle development and sinuosity. Just as all benthic organisms, they are also susceptible to smaller scale habitat loss, such as by sediment deposition, loss of interstitial spaces between substrate particles, or unstable substrate.

3. Trichoptera (caddisfly) taxa richness. Caddisfly taxa richness has been shown to decline when sediment deposition affects habitat. In addition, the presence of certain case-building caddisflies can indicate good retention of woody debris and lack of scouring flow conditions.

4. Number of sensitive taxa. Sensitive taxa are generally the first to disappear as anthropogenic disturbances increase. The list of sensitive taxa used here includes organisms sensitive to a wide range of disturbances, including warmer water temperatures, organic or nutrient pollution, toxic pollution, sediment deposition, substrate instability and others. Unimpaired streams of western Montana typically support at least four sensitive taxa (Bollman 1998).

5. Percent filter feeders. Filter-feeding organisms are a diverse group; they capture small particles of organic matter, or organically enriched sediment material, from the water column by means of a variety of adaptations, such as silken nets or hairy appendages. In forested montane streams, filterers are expected to occur in insignificant numbers. Their abundance increases when canopy cover is lost and when water temperatures increase and the accompanying growth of filamentous algae occurs. Some filtering organisms, specifically the Arctopsychid caddisflies (*Arctopsyche* spp. and *Parapsyche* spp.) build silken nets with large mesh sizes that capture small organisms such as chironomids and early-instar mayflies. Here they are considered predators, and, in this study, their abundance does not contribute to the percent filter feeders metric.

6. Percent tolerant taxa. Tolerant taxa are ubiquitous in stream sites, but when disturbance increases, their abundance increases proportionately. The list of taxa used here includes organisms tolerant of a wide range of disturbances, including warmer water temperatures, organic or nutrient pollution, toxic pollution, sediment deposition, substrate instability and others.

Table 1. Montana Department of Transportation Mitigated Wetlands Monitoring Project sites: sampling history. Only sites sampled in 2009 are included. An asterisk indicates lotic sites.

Site identifier	2002	2003	2004	2005	2006	2007	2008	2009
Camp Creek MS-1*	+	+	+	+	+	+	+	+
Camp Creek MS-2*					+	+	+	+
Cloud Ranch Pond			+	+	+	+	+	+
Cloud Ranch Stream (Big Timber)*			+			+	+	+
Jack Creek – McKee Spring Creek*					+	+	+	+
Jack Creek – pond			+	+	+	+	+	+
Rock Creek Ranch				+	+	+	+	+
Wagner Marsh				+	+	+	+	+
Alkali Lake 1					+	+	+	+
West Fork of Charley Creek						+	+	+
Little Muddy Creek						+	+	+
Selkirk Ranch						+	+	+
Jocko Spring Creek MS1							+	+
Jocko Spring Creek MS2							+	+
Sportsman's Campground Site #1							+	+
Sportsman's Campground Site #2							+	+
Sportsman's Campground Site #3							+	+
Lonepine #1							+	+
Lonepine #2							+	+

Table 2. Aquatic invertebrate metrics employed for wetland (lentic) invertebrate assemblages in the MDT mitigated wetlands study, 2001 – 2009.

Metric	Metric calculation	Expected response to degradation or impairment
Total taxa	Count of unique taxa identified to lowest recommended taxonomic level.	Decrease
POET	Count of unique Plecoptera, Trichoptera, Ephemeroptera, and Odonata taxa identified to lowest recommended taxonomic level.	Decrease
Chironomidae taxa	Count of unique midge taxa identified to lowest recommended taxonomic level.	Decrease
Crustacea taxa + Mollusca taxa	Count of 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 by that taxon's modified Hilsenhoff Biotic Index (tolerance) 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

RESULTS

(Note: Individual site discussions were removed from this report by PBS&J and are included in the macroinvertebrate sections of individual monitoring reports. Summary tables for lentic (4a – 4c) and lotic (5) sites and project specific taxa listing(s) and metrics report(s) are provided on the following pages.)

Table 4a. Metric values and scores for wetland (lentic) sites in the MDT mitigated wetland study – 2009 sampling.

METRIC	Cloud Ranch Pond	Jack Creek Pond	Rock Creek Ranch	Wagner Marsh	Alkali Lake	West Fork of Charley Creek	Little Muddy Creek
Total taxa	15	11	20	18	17	7	18
POET	2	0	2	3	1	0	1
Chironomidae taxa	6	3	3	5	10	2	6
Crustacea + Mollusca	0	5	6	7	1	1	6
% Chironomidae	14.47%	66.67%	43.75%	16.07%	61.00%	2.73%	42.40%
Orthocladiinae/Chir	45.45%	20.00%	57.14%	22.22%	52.46%	0.00%	86.79%
%Amphipoda	0.00%	3.33%	0.00%	1.79%	0.00%	91.82%	4.80%
%Crustacea + %Mollusca	0.00%	23.33%	32.14%	34.82%	1.00%	91.82%	34.40%
HBI	6.026666	9	7.045045	7.981652	6	7.90909	7.448
%Dominant taxon	40.79%	53.33%	23.21%	23.21%	30.00%	91.82%	36.00%
%Collector-Gatherers	21.05%	73.33%	61.61%	43.75%	51.00%	91.82%	37.60%
%Filterers	0.00%	0.00%	7.14%	4.46%	0.00%	0.00%	4.80%
Total taxa	3	1	3	3	3	1	3
POET	1	1	1	3	1	1	1
Chironomidae taxa	3	3	3	3	5	1	3
Crustacea + Mollusca	1	3	5	5	1	1	5
% Chironomidae	5	1	1	5	1	5	1
Orthocladiinae/Chir	5	3	5	3	5	1	5
%Amphipoda	5	5	5	5	5	1	3
%Crustacea + %Mollusca	5	5	5	3	5	1	3
HBI	5	1	3	1	5	1	3
%Dominant taxon	3	1	5	5	5	1	3
%Collector-Gatherers	1	3	3	1	3	5	1
%Filterers	3	3	1	3	3	3	3
Total score	**40**	**30**	**40**	**40**	**42**	**22**	**34**
Percent of maximum score	**66.67%**	**50.00%**	**66.67%**	**66.67%**	**70.00%**	**36.67%**	**56.67%**
Impairment classification	**optimal**	**sub-optimal**	**optimal**	**optimal**	**optimal**	**poor**	**sub-optimal**

Table 4b. Metric values and scores for wetland (lentic) sites in the MDT mitigated wetland study – 2009 sampling.

METRIC	Selkirk Ranch	Sportsman's Campground Site #1	Sportsman's Campground Site #2	Sportsman's Campground Site #3	Lonepine #1	Lonepine #2
Total taxa	17	19	11	23	22	19
POET	1	1	0	2	2	3
Chironomidae taxa	6	10	8	11	11	8
Crustacea + Mollusca	6	4	2	4	4	2
% Chironomidae	27.27%	38.46%	90.00%	41.82%	67.83%	25.86%
Orthocladiinae/Chir	43.33%	37.50%	3.33%	23.91%	7.69%	16.67%
%Amphipoda	5.45%	25.96%	2.00%	4.55%	0.00%	0.00%
%Crustacea + %Mollusca	62.73%	51.92%	5.00%	50.00%	6.96%	18.10%
HBI	8.245455	6.942309	6.9	7.345455	7.196427	7.191304
%Dominant taxon	30.00%	24.04%	45.00%	27.27%	51.30%	15.52%
%Collector-Gatherers	57.27%	50.00%	91.00%	83.64%	86.09%	63.79%
%Filterers	3.64%	25.96%	18.00%	29.09%	1.74%	6.03%
Total taxa	3	3	1	5	5	3
POET	1	1	1	1	1	3
Chironomidae taxa	3	5	5	5	5	5
Crustacea + Mollusca	5	3	1	3	3	1
% Chironomidae	3	3	1	1	1	3
Orthocladiinae/Chir	3	3	1	3	1	1
%Amphipoda	3	1	5	3	5	5
%Crustacea + %Mollusca	3	3	5	3	5	5
HBI	1	3	3	3	3	3
%Dominant taxon	5	5	3	5	1	5
%Collector-Gatherers	3	3	5	5	5	3
%Filterers	3	1	1	1	3	1
Total score	**36**	**34**	**32**	**38**	**38**	**38**
Percent of maximum score	**60.00%**	**56.67%**	**53.33%**	**63.33%**	**63.33%**	**63.33%**
Impairment classification	**sub-optimal**	**sub-optimal**	**sub-optimal**	**sub-optimal**	**sub-optimal**	**sub-optimal**

Table 5. Metric values and scores for stream (lotic) sites in the MDT mitigated wetland study – 2009 sampling.

METRIC	Camp Creek MS-1	Camp Creek MS-2	Cloud Ranch Stream	Jack Creek McKee	Jocko Spring Creek MS-1	Jocko Spring Creek MS-2
E Richness	2	4	1	1	2	1
P Richness	1	0	0	0	0	0
T Richness	2	4	4	1	3	2
Pollution Sensitive Richness	1	1	0	0	1	0
Filterer Percent	11.88%	22.02%	18.18%	25.23%	27.36%	10.91%
Pollution Tolerant Percent	13.86%	12.84%	15.15%	8.41%	12.26%	32.73%
E Richness	1	2	0	0	1	0
P Richness	1	0	0	0	0	0
T Richness	1	2	2	0	2	1
Pollution Sensitive Richness	1	1	0	0	1	0
Filterer Percent	1	1	1	0	0	1
Pollution Tolerant Percent	1	1	1	2	1	1
Total score	**6**	**7**	**4**	**2**	**5**	**3**
Percent of maximum score	**33.33%**	**38.89%**	**22.22%**	**11.11%**	**27.78%**	**16.67%**
Impairment classification	**moderate**	**moderate**	**moderate**	**severe**	**moderate**	**severe**

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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.

Taxa Listing

Project ID: MDT09PBSJ
RAI No.: MDT09PBSJ012

RAI No.: MDT09PBSJ012 **Sta. Name:** Sportsman's Campground Site # 1
Client ID:
Date Coll.: 8/11/2009 **No. Jars:** 1 **STORET ID:**

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Cladocera	2	1.92%	Yes	Unknown		8	CF
Gammaridae							
Gammarus sp.	16	15.38%	Yes	Unknown		4	SH
Glossiphoniidae							
Glossiphoniidae	1	0.96%	Yes	Immature		9	PR
Hyalellidae							
Hyalella sp.	11	10.58%	Yes	Unknown		8	CG
Sphaeriidae							
Sphaeriidae	25	24.04%	Yes	Unknown		8	CF
Odonata							
Coenagrionidae							
Coenagrionidae	2	1.92%	Yes	Larva	Early Instar	7	PR
Heteroptera							
Notonectidae							
Notonecta sp.	4	3.85%	Yes	Adult		5	PR
Coleoptera							
Dytiscidae							
Liodessus sp.	2	1.92%	Yes	Adult		5	PR
Diptera							
Ceratopogonidae							
Ceratopogoninae	1	0.96%	Yes	Larva		6	PR
Chironomidae							
Chironomidae							
Corynoneura sp.	2	1.92%	Yes	Larva		7	CG
Corynoneura sp.	1	0.96%	No	Pupa		7	CG
Cricotopus (Isocladius) sp.	8	7.69%	Yes	Larva		7	SH
Cricotopus trifascia	1	0.96%	Yes	Larva		7	SH
Dicrotendipes sp.	7	6.73%	Yes	Larva		8	CG
Glyptotendipes sp.	4	3.85%	Yes	Larva		10	SH
Orthocladius sp.	1	0.96%	Yes	Pupa		6	CG
Paratanytarsus sp.	1	0.96%	Yes	Larva		6	CG
Polypedilum sp.	10	9.62%	Yes	Larva		6	SH
Procladius sp.	3	2.88%	Yes	Larva		9	PR
Psectrocladius sp.	2	1.92%	Yes	Larva		8	CG
Sample Count	**104**						

Metrics Report

Project ID: MDT09PBSJ
RAI No.: MDT09PBSJ012
Sta. Name: Sportsman's Campground Site # 1
Client ID:
STORET ID:
Coll. Date: 8/11/2009

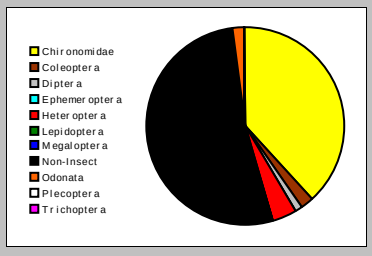
Abundance Measures

Sample Count: 104
Sample Abundance: 135.65 76.67% of sample used

Coll. Procedure:
Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	5	55	52.88%
Odonata	1	2	1.92%
Ephemeroptera			
Plecoptera			
Heteroptera	1	4	3.85%
Megaloptera			
Trichoptera			
Lepidoptera			
Coleoptera	1	2	1.92%
Diptera	1	1	0.96%
Chironomidae	10	40	38.46%

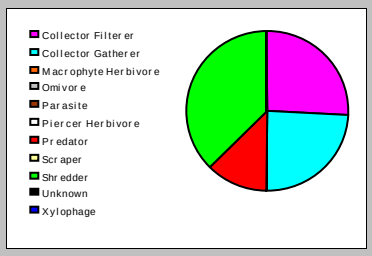


Dominant Taxa

Category	A	PRA
Sphaeriidae	25	24.04%
Gammarus	16	15.38%
Hyalella	11	10.58%
Polypedilum	10	9.62%
Cricotopus (Isocladius)	8	7.69%
Dicrotendipes	7	6.73%
Notonecta	4	3.85%
Glyptotendipes	4	3.85%
Procladius	3	2.88%
Corynoneura	3	2.88%
Psectrocladius	2	1.92%
Liodessus	2	1.92%
Coenagrionidae	2	1.92%
Cladocera	2	1.92%
Ceratopogoninae	1	0.96%

Functional Composition

Category	R	A	PRA
Predator	6	13	12.50%
Parasite			
Collector Gatherer	6	25	24.04%
Collector Filterer	2	27	25.96%
Macrophyte Herbivore			
Piercer Herbivore			
Xylophage			
Scraper			
Shredder	5	39	37.50%
Omivore			
Unknown			

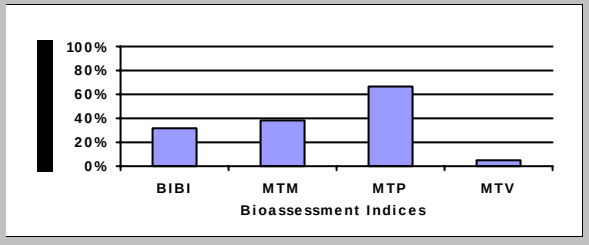


Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
Composition					
Taxa Richness	19	1	2		1
Non-Insect Percent	52.88%				
E Richness	0	1		0	
P Richness	0	1		0	
T Richness	0	1		0	
EPT Richness	0		0		0
EPT Percent	0.00%		0		0
Oligochaeta+Hirudinea Percent	0.96%				
Baetidae/Ephemeroptera	0.000				
Hydropsychidae/Trichoptera	0.000				
Dominance					
Dominant Taxon Percent	24.04%		3		3
Dominant Taxa (2) Percent	39.42%				
Dominant Taxa (3) Percent	50.00%	3			
Dominant Taxa (10) Percent	87.50%				
Diversity					
Shannon H (loge)	2.442				
Shannon H (log2)	3.524		3		
Margalef D	3.884				
Simpson D	0.112				
Evenness	0.077				
Function					
Predator Richness	6		3		
Predator Percent	12.50%	3			
Filterer Richness	2				
Filterer Percent	25.96%			0	
Collector Percent	50.00%		3		3
Scraper+Shredder Percent	37.50%		3		1
Scraper/Filterer	0.000				
Scraper/Scraper+Filterer	0.000				
Habit					
Burrower Richness	3				
Burrower Percent	11.54%				
Swimmer Richness	2				
Swimmer Percent	5.77%				
Clinger Richness	3	1			
Clinger Percent	18.27%				
Characteristics					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	5				
Hemoglobin Bearer Percent	26.92%				
Air Breather Richness	1				
Air Breather Percent	1.92%				
Voltinism					
Univoltine Richness	7				
Semivoltine Richness	1	1			
Multivoltine Percent	40.38%		2		
Tolerance					
Sediment Tolerant Richness	0				
Sediment Tolerant Percent	0.00%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	3.047				
Pollution Sensitive Richness	0	1		0	
Pollution Tolerant Percent	28.85%	3		1	
Hilsenhoff Biotic Index	6.942		1		0
Intolerant Percent	0.00%				
Supertolerant Percent	52.88%				
CTQa	108.000				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	16	32.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	20	66.67%	Slight
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	1	5.56%	Severe
MTM	Montana DEQ Mountains (Bukantis 1998)	8	38.10%	Moderate



Taxa Listing

Project ID: MDT09PBSJ
RAI No.: MDT09PBSJ013

RAI No.: MDT09PBSJ013 **Sta. Name:** Sportsman's Campground Site # 2
Client ID:
Date Coll.: 8/11/2009 **No. Jars:** 1 **STORET ID:**

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Copepoda	3	3.00%	Yes	Unknown		8	CG
Glossiphoniidae							
Glossiphoniidae	4	4.00%	No	Immature		9	PR
Placobdella sp.	1	1.00%	Yes	Unknown		6	PR
Hyalellidae							
Hyalella sp.	2	2.00%	Yes	Unknown		8	CG
Chironomidae							
Chironomidae							
Chironomini	3	3.00%	No	Larva	Early Instar	6	CG
Cladotanytarsus sp.	45	45.00%	Yes	Larva		7	CG
Cricotopus (Cricotopus) sp.	1	1.00%	Yes	Larva		7	SH
Dicrotendipes sp.	14	14.00%	Yes	Larva		8	CG
Glyptotendipes sp.	1	1.00%	Yes	Larva		10	SH
Micropsectra sp.	4	4.00%	Yes	Larva		4	CG
Orthocladius sp.	2	2.00%	Yes	Larva		6	CG
Tanytarsini	4	4.00%	No	Larva	Early Instar	6	CF
Tanytarsus sp.	1	1.00%	No	Pupa		6	CF
Tanytarsus sp.	13	13.00%	Yes	Larva		6	CF
Thienemannimyia Gr.	2	2.00%	Yes	Larva		5	PR
Sample Count	**100**						

Metrics Report

Project ID: MDT09PBSJ
RAI No.: MDT09PBSJ013
Sta. Name: Sportsman's Campground Site # 2
Client ID:
STORET ID:
Coll. Date: 8/11/2009

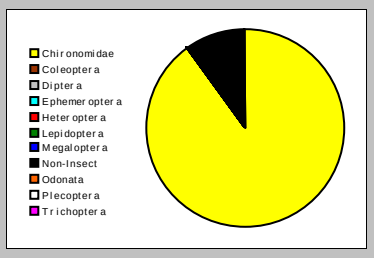
Abundance Measures

Sample Count: 100
Sample Abundance: 3,000.00 3.33% of sample used

Coll. Procedure:
Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	3	10	10.00%
Odonata			
Ephemeroptera			
Plecoptera			
Heteroptera			
Megaloptera			
Trichoptera			
Lepidoptera			
Coleoptera			
Diptera			
Chironomidae	8	90	90.00%

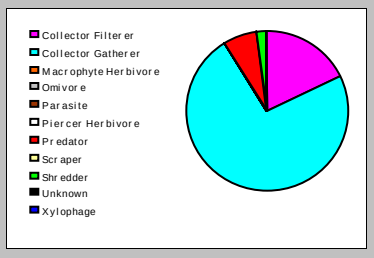


Dominant Taxa

Category	A	PRA
Cladotanytarsus	45	45.00%
Tanytarsus	14	14.00%
Dicrotendipes	14	14.00%
Tanytarsini	4	4.00%
Micropsectra	4	4.00%
Glossiphoniidae	4	4.00%
Copepoda	3	3.00%
Chironomini	3	3.00%
Thienemannimyia Gr.	2	2.00%
Orthocladius	2	2.00%
Hyalella	2	2.00%
Placobdella	1	1.00%
Glyptotendipes	1	1.00%
Cricotopus (Cricotopus)	1	1.00%

Functional Composition

Category	R	A	PRA
Predator	2	7	7.00%
Parasite			
Collector Gatherer	6	73	73.00%
Collector Filterer	1	18	18.00%
Macrophyte Herbivore			
Piercer Herbivore			
Xylophage			
Scraper			
Shredder	2	2	2.00%
Omivore			
Unknown			

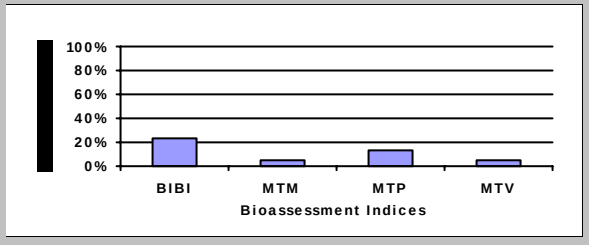


Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
Composition					
Taxa Richness	11	1	0		0
Non-Insect Percent	10.00%				
E Richness	0	1		0	
P Richness	0	1		0	
T Richness	0	1		0	
EPT Richness	0		0		0
EPT Percent	0.00%		0		0
Oligochaeta+Hirudinea Percent	5.00%				
Baetidae/Ephemeroptera	0.000				
Hydropsychidae/Trichoptera	0.000				
Dominance					
Dominant Taxon Percent	45.00%		1		1
Dominant Taxa (2) Percent	59.00%				
Dominant Taxa (3) Percent	73.00%	3			
Dominant Taxa (10) Percent	95.00%				
Diversity					
Shannon H (loge)	1.584				
Shannon H (log2)	2.286		1		
Margalef D	2.233				
Simpson D	0.306				
Evenness	0.117				
Function					
Predator Richness	2		0		
Predator Percent	7.00%	1			
Filterer Richness	1				
Filterer Percent	18.00%			1	
Collector Percent	91.00%		1		0
Scraper+Shredder Percent	2.00%		0		0
Scraper/Filterer	0.000				
Scraper/Scraper+Filterer	0.000				
Habit					
Burrower Richness	2				
Burrower Percent	18.00%				
Swimmer Richness	0				
Swimmer Percent	0.00%				
Clinger Richness	2	1			
Clinger Percent	15.00%				
Characteristics					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	2				
Hemoglobin Bearer Percent	15.00%				
Air Breather Richness	0				
Air Breather Percent	0.00%				
Voltinism					
Univoltine Richness	2				
Semivoltine Richness	0	1			
Multivoltine Percent	93.00%		0		
Tolerance					
Sediment Tolerant Richness	0				
Sediment Tolerant Percent	0.00%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	3.329				
Pollution Sensitive Richness	0	1		0	
Pollution Tolerant Percent	59.00%	1		0	
Hilsenhoff Biotic Index	6.900		1		0
Intolerant Percent	0.00%				
Supertolerant Percent	24.00%				
CTQa	108.000				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	12	24.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	4	13.33%	Severe
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	1	5.56%	Severe
MTM	Montana DEQ Mountains (Bukantis 1998)	1	4.76%	Severe



Taxa Listing

Project ID: MDT09PBSJ
RAI No.: MDT09PBSJ014

RAI No.: MDT09PBSJ014 **Sta. Name:** Sportsman's Campground Site # 3
Client ID:
Date Coll.: 8/11/2009 **No. Jars:** 1 **STORET ID:**

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Acari	1	0.91%	Yes	Unknown		5	PR
Cladocera	20	18.18%	Yes	Unknown		8	CF
Copepoda	30	27.27%	Yes	Unknown		8	CG
Gammaridae							
Gammarus sp.	2	1.82%	Yes	Unknown		4	SH
Glossiphoniidae							
Glossiphoniidae	1	0.91%	Yes	Immature		9	PR
Hyalellidae							
Hyalella sp.	3	2.73%	Yes	Unknown		8	CG
Naididae							
Nais sp.	1	0.91%	Yes	Unknown		8	CG
Odonata							
Coenagrionidae							
Coenagrionidae	1	0.91%	Yes	Larva	Early Instar	7	PR
Ephemeroptera							
Baetidae							
Callibaetis sp.	2	1.82%	Yes	Larva		9	CG
Heteroptera							
Corixidae							
Corixidae	1	0.91%	Yes	Larva		10	PH
Notonectidae							
Notonecta sp.	1	0.91%	Yes	Adult		5	PR
Coleoptera							
Dytiscidae							
Stictotarsus sp.	1	0.91%	Yes	Adult		5	PR
Chironomidae							
Chironomidae							
Ablabesmyia sp.	2	1.82%	Yes	Larva		8	CG
Cladotanytarsus sp.	3	2.73%	Yes	Larva		7	CG
Cladotanytarsus sp.	1	0.91%	No	Pupa		7	CG
Corynoneura sp.	1	0.91%	Yes	Larva		7	CG
Cricotopus (Isocladius) sp.	4	3.64%	Yes	Larva		7	SH
Dicrotendipes sp.	4	3.64%	Yes	Larva		8	CG
Micropsectra sp.	5	4.55%	Yes	Larva		4	CG
Orthocladiinae	1	0.91%	No	Larva	Early Instar	6	CG
Paratanytarsus sp.	2	1.82%	Yes	Larva		6	CG
Procladius sp.	3	2.73%	Yes	Larva		9	PR
Psectrocladius sp.	5	4.55%	Yes	Larva		8	CG
Rheotanytarsus sp.	3	2.73%	Yes	Larva		6	CF
Tanypodinae	3	2.73%	No	Larva	Early Instar	7	PR
Tanytarsus sp.	1	0.91%	No	Pupa		6	CF
Tanytarsus sp.	8	7.27%	Yes	Larva		6	CF
Sample Count	**110**						

Metrics Report

Project ID: MDT09PBSJ
RAI No.: MDT09PBSJ014
Sta. Name: Sportsman's Campground Site # 3
Client ID:
STORET ID:
Coll. Date: 8/11/2009

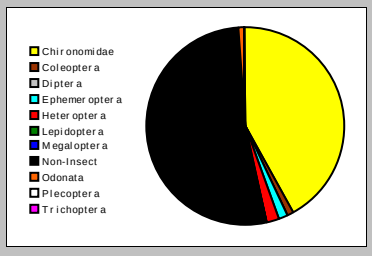
Abundance Measures

Sample Count: 110
Sample Abundance: 366.67 30.00% of sample used

Coll. Procedure:
Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	7	58	52.73%
Odonata	1	1	0.91%
Ephemeroptera	1	2	1.82%
Plecoptera			
Heteroptera	2	2	1.82%
Megaloptera			
Trichoptera			
Lepidoptera			
Coleoptera	1	1	0.91%
Diptera			
Chironomidae	11	46	41.82%

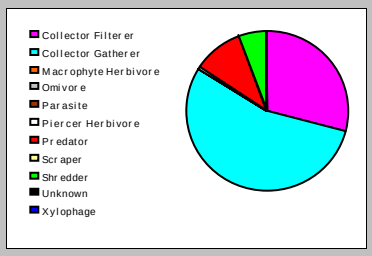


Dominant Taxa

Category	A	PRA
Copepoda	30	27.27%
Cladocera	20	18.18%
Tanytarsus	9	8.18%
Psectrocladius	5	4.55%
Micropsectra	5	4.55%
Dicrotendipes	4	3.64%
Cricotopus (Isocladius)	4	3.64%
Cladotanytarsus	4	3.64%
Tanypodinae	3	2.73%
Rheotanytarsus	3	2.73%
Procladius	3	2.73%
Hyalella	3	2.73%
Gammarus	2	1.82%
Callibaetis	2	1.82%
Ablabesmyia	2	1.82%

Functional Composition

Category	R	A	PRA
Predator	6	11	10.00%
Parasite			
Collector Gatherer	11	60	54.55%
Collector Filterer	3	32	29.09%
Macrophyte Herbivore			
Piercer Herbivore	1	1	0.91%
Xylophage			
Scraper			
Shredder	2	6	5.45%
Omivore			
Unknown			



Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
Composition					
Taxa Richness	23	3	2		1
Non-Insect Percent	52.73%				
E Richness	1	1		0	
P Richness	0	1		0	
T Richness	0	1		0	
EPT Richness	1		0		0
EPT Percent	1.82%		0		0
Oligochaeta+Hirudinea Percent	1.82%				
Baetidae/Ephemeroptera	1.000				
Hydropsychidae/Trichoptera	0.000				
Dominance					
Dominant Taxon Percent	27.27%		3		2
Dominant Taxa (2) Percent	45.45%				
Dominant Taxa (3) Percent	53.64%	3			
Dominant Taxa (10) Percent	79.09%				
Diversity					
Shannon H (loge)	2.486				
Shannon H (log2)	3.586		3		
Margalef D	4.737				
Simpson D	0.131				
Evenness	0.072				
Function					
Predator Richness	6		3		
Predator Percent	10.00%	3			
Filterer Richness	3				
Filterer Percent	29.09%			0	
Collector Percent	83.64%		1		0
Scraper+Shredder Percent	5.45%		1		0
Scraper/Filterer	0.000				
Scraper/Scraper+Filterer	0.000				
Habit					
Burrower Richness	1				
Burrower Percent	3.64%				
Swimmer Richness	4				
Swimmer Percent	4.55%				
Clinger Richness	3	1			
Clinger Percent	14.55%				
Characteristics					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	4				
Hemoglobin Bearer Percent	9.09%				
Air Breather Richness	1				
Air Breather Percent	0.91%				
Voltinism					
Univoltine Richness	7				
Semivoltine Richness	1	1			
Multivoltine Percent	90.00%		0		
Tolerance					
Sediment Tolerant Richness	0				
Sediment Tolerant Percent	0.00%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	2.867				
Pollution Sensitive Richness	0	1		0	
Pollution Tolerant Percent	20.91%	3		1	
Hilsenhoff Biotic Index	7.345		0		0
Intolerant Percent	0.00%				
Supertolerant Percent	65.45%				
CTQa	105.600				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	18	36.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	13	43.33%	Moderate
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	1	5.56%	Severe
MTM	Montana DEQ Mountains (Bukantis 1998)	3	14.29%	Severe