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**MONTANA DEPARTMENT OF TRANSPORTATION  
WETLAND MITIGATION MONITORING REPORT: YEAR 2008**

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*US Highway 93 Onsite: Bouchard, Jocko River Bridge, Jocko Spring Creek, and Peterson Property*



Prepared for:

**MONTANA DEPARTMENT OF TRANSPORTATION**  
2701 Prospect Ave  
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Prepared by:

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Helena, MT 59601-3360

December 2008

PBS&J Project No: 0B43088.01.02.06



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## 1.0 INTRODUCTION

The US Highway 93 Onsite Wetland Mitigation Sites were developed to mitigate wetland impacts associated with eight Montana Department of Transportation (MDT) segments of the US 93 Evaro to Polson highway reconstruction project along US Highway 93. This report documents the second year of monitoring at three of the four sites monitored in 2008: Bouchard, Jocko River Bridge, and Jocko Spring Creek property. The Peterson property was monitored for the first time in 2008.

The US Highway 93 Onsite Wetland Mitigation Sites are all located in Lake County in Watershed # 3 (Lower Clark Fork). The four mitigation sites are located north of Arlee, Montana between Mileposts 20 and 35. The Jocko River Bridge site is located just south of Milepost 20 and within the segment referenced as Project 3 - North of Arlee-White Coyote Road (**Figure 1-1**). The Bouchard and Jocko Spring Creek sites are located between Mileposts 20 and 25, along a segment identified as Project 4 - White Coyote Road-South of Ravalli (**Figure 1-1**). The Peterson site is located north of St. Ignatius near Milepost 35, along a segment identified as Project 6 – Medicine Tree (Old US 93)-vicinity Red Horn Road (**Figure 1-2**).

### 1.1 Impacts and Mitigation

Wetland impacts for the US 93 Evaro to Polson Highway reconstruction project were identified in a wetland mitigation plan prepared by Herrera Environmental Consultants (Herrera 2004). The impact totals for this report are based on information in the 2004 mitigation plan and 2007 monitoring report (Herrera 2007) and further clarification with MDT (Basting pers. comm.). The 2004 wetland mitigation plan provides wetland mitigation concepts, identifies the wetland community types targeted for establishment, and calculates the wetland mitigation credits expected to be obtained from each site. The mitigation plan specified total acres of impacts predicted for project segments 3, 4, and 6. These acres are separated into impact totals based on the Confederated Salish and Kootenai Tribes (CSKT) and the Army Corps of Engineers (Corps) regulated wetlands. Mitigation crediting systems also vary between these two agencies and are described in more detail in following sections.

Approximately 16.51 acres of impacts were calculated for the CSKT and 14.13 acres for the Corps regulated wetlands. **Table 1** shows the acreage of wetlands impacted within the three project segments. **Table 2** shows the expected mitigation credits for each project segment, wetland mitigation site, mitigation types, and expected wetland mitigation credits for both the CSKT and Corps. These expected credits are discussed in more detail in the results section for each mitigation site.

The CSKT crediting approach is based on the *CKST Wetlands Conservation Plan (1999)*. The CSKT crediting approach determines the final acres of credit based on an equation that calculates a weighted ratio for restoration based on two variables: mitigation types and impacted wetland classes. The CSKT uses the following mitigation types to determine ratios: preservation, restoration (primary or secondary), enhancement, and creation. The varying mitigation types have a range of ratios that are applied to calculate the final crediting ratios. **Table 3** lists the credit ratios per targeted mitigation type developed by CSKT for the highway reconstruction

project. Refer to **Appendix H – CSKT Mitigation Ratios from Wetland Conservation Plan** (Parker 2002) for specific details on how the ratios are calculated.

**Table 1: Wetland impacts for project segments 3, 4, and 6 of the US 93 Evaro to Polson Highway Reconstruction project.**

Project Name, Location, and Number	Wetland Impacts (acre)	
	CSKT Regulated Wetlands	Corps Regulated Wetlands
<b>Project 3</b> North of Arlee to vicinity White Coyote Road MDT Project Number NH 5-2 (119) 19 , CN744	1.55	1.55
<b>Project 4</b> Coyote Road – South of Ravalli MDT Project Number NH 5-2(110)20, CN 0744	3.64	2.53
<b>Project 6</b> Medicine Tree (Old US 93) - Red Horn Road MDT Project Number NH 5-2(112)31, CN Q744	11.32	10.05
<b>TOTAL</b>	<b>16.51</b>	<b>14.13</b>

**Table 2: Wetland mitigation for project segments 3, 4, and 6 of the US 93 Evaro to Polson Highway Reconstruction Project.**

Project	Wetland Mitigation Site	Expected CSKT Wetland Mitigation Credits <sup>1,2,3</sup>		Expected COE Wetland Mitigation Credits <sup>1,2,3</sup>	
		Mitigation Type	Acre	Mitigation Type	Acre
<b>Project 3</b> North of Arlee - White Coyote Road	Jocko River Bridge	Secondary Restoration	0.54	Enhancement	0.33
		<b>Project Total</b>	0.54	<b>Project Total</b>	0.33
<b>Project 4</b> Coyote Road – South of Ravalli	Bouchard	Creation	1.54	Creation	5.16
		Primary Restoration	1.58	Re-establishment	2.94
		Secondary Restoration	10.23	Rehabilitation	4.05
		<b>Project Total</b>	13.35	<b>Project Total</b>	12.15
	Jocko Spring Creek	Primary Restoration	1.17	Creation	2.17
		Secondary Restoration	0.32	Restoration	0.59 <sup>4</sup>
		Enhancement	0.01		
	<b>Project Total</b>	1.49	<b>Project Total</b>	2.77 <sup>4</sup>	
<b>Project 6</b> Medicine Tree (Old US 93) – Red Horn Road	Peterson	Creation	0.64	Creation	2.14
		Secondary Restoration	0.67	Rehabilitation	0.25
		<b>Project Total</b>	1.31	<b>Project Total</b>	2.39

<sup>1</sup> Onsite wetland Mitigation Plan, US 93 Evaro to Polson (Herrera 2004).

<sup>2</sup> MDT Wetland Mitigation Monitoring Report: Year 2007 (Herrera 2007).

<sup>3</sup> Personal Communication with MDT (Basting 2008).

<sup>4</sup> Corrected from values presented in the 2007 US 93 mitigation monitoring report; revised figures are based on the site plan.

**Table 3: Mitigation credit ratio for CSKT per targeted mitigation type.**

Targeted Mitigation Type	Credit Ratio <sup>1</sup>
Creation	3.36:1
Primary restoration	1.86:1
Secondary restoration	1.86:1

<sup>1</sup> From MDT Wetland Mitigation Monitoring Report: Year 2007 (Herrera 2007).

The Corps crediting approach for the US Hwy 93 Onsite project is based on a crediting system developed by Herrera Environmental Consultants and approved by the Corps (Herrera 2004). The Corps crediting approach includes the following mitigation types: creation, restoration (re-establishment and rehabilitation) and enhancement. The credit ratio for creation and restoration (re-establishment) activities is 1:1. The credit ratio for restoration (rehabilitation) and enhancement is based on the measured and projected shift in wetland functions and values resulting from wetland mitigation activities. Wetland compensatory mitigation ratios specified by the Corps for rehabilitation and enhancement are based on use of the 1999 MDT Montana Wetland Assessment Method (Berglund 1999) to assign a functional score. Mitigation concepts use baseline (pre-project) and post-project scores to evaluate functional lift. The ratio for rehabilitation and enhancement is calculated each year to determine an enhancement factor that is then applied to the total acres of the applicable mitigation type. The enhancement factor is part of the equation and is the inverse of the enhancement ratio. The following equation is used to determine the enhancement factor and ultimately the enhancement ratio:

$$\text{Enhancement factor} = [(F_{\text{post}} - F_{\text{pre}}) / F_{\text{pre}}]$$

where  $F_{\text{post}}$  = projected post-mitigation project functional score; and  $F_{\text{pre}}$  = pre-project functional score.

The following formula includes the enhancement factor in the equation and is used to calculate wetland mitigation credits expressed as acres (Herrera 2004).

$$A_{\text{credited}} = A_{\text{created}} + A_{\text{existing}} [(F_{\text{post}} - F_{\text{pre}}) / F_{\text{pre}}]$$

where  $A_{\text{credited}}$  = wetland mitigation credits expressed as acres;  $A_{\text{created}}$  = wetland creation acres;  $A_{\text{existing}}$  = existing wetland acres to be enhanced;  $F_{\text{post}}$  = projected post-mitigation project functional score; and  $F_{\text{pre}}$  = pre-project functional score.

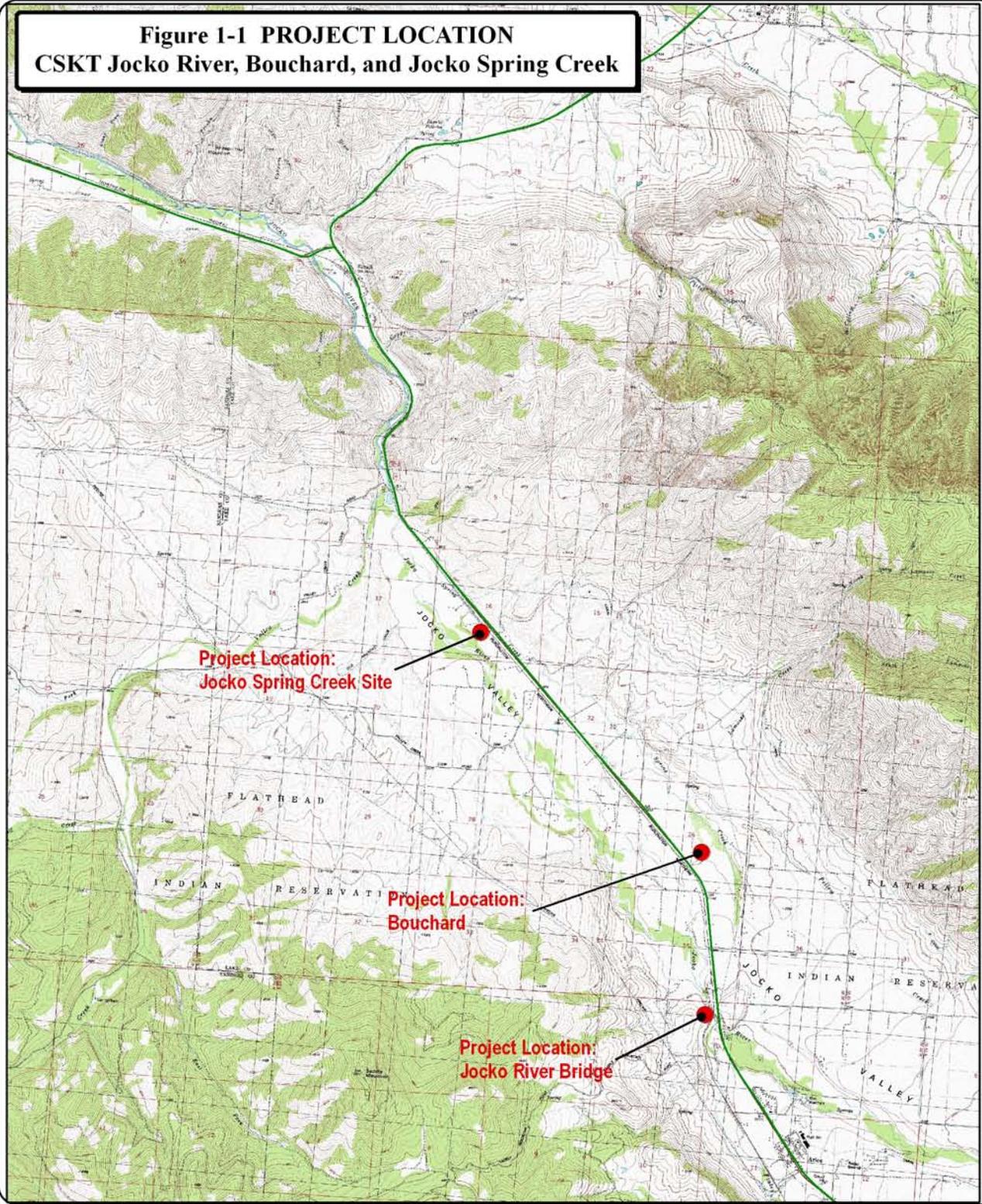
Mitigation crediting systems and current credits are discussed for each individual mitigation site under each **Current Credit Summary** section. The above-mentioned equation is applied to mitigation sites that include rehabilitation and enhancement activities to determine the current credit ratio and the associated credit acres.

## 1.2 Mitigation Sites

The US Highway 93 Onsite project includes four wetland mitigation sites located on the Flathead Indian Reservation and managed by the CSKT (**Figures 1-1** and **1-2**). The following sections provide a general discussion of each wetland mitigation site including location, site topography, mitigation objectives, and targeted wetland community goals.

The sites were designed to mitigate for specific wetland functions impacted by MDT roadway projects, including: storm water retention, roadway runoff filtration, sediment and nutrient retention, water quality, groundwater recharge, wildlife habitat and riparian vegetation.

**Figure 1-1 PROJECT LOCATION**  
**CSKT Jocko River, Bouchard, and Jocko Spring Creek**



Project No: 0B4308801 Task: 02.06.02  
 Date: June 2008  
 Location: T16 & 17, R 20, Sec. 2, 16, & 26  
 Project Manager: J. Berglund  
 Drawn: R. Schreiner

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**Figure 1-2 PROJECT LOCATION  
CSKT Peterson Site**



Project No: 0B4308801 Task: 02.06.02  
Date: June 2008  
Location: T19, R 20, Sec. 35  
Project Manager: J. Berglund  
Drawn: R. Schreiner



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### 1.2.1 Bouchard Property

The Bouchard Property mitigation site is a 40-acre parcel located in the Project 4 segment and is adjacent to US 93 at approximately Milepost 20.5. The Bouchard Property is located in Township 17N, Range 20W, Section 26. The site occurs east of US Highway 93, between the highway and Spring Creek. Spring Creek runs along the east side of the parcel boundary and historically provided a major source of surface water to the Bouchard property. The parcel previously included an abandoned home site, fish rearing ponds, and a system of drainage ditches and berms used to control water flow on the property. The site is near the headwaters of Jocko Spring Creek and has a high water table that inundates a large portion of the site. Elevation is approximately 2,960 feet with slight topographic variation throughout the project site.

The monitoring area boundary is illustrated on **Figure 2: Bouchard (Appendix A)**. Mitigation plan sheets are presented in **Appendix D**. Proposed mitigation actions included the following:

- Plug drainage ditches and remove berms adjacent to the existing fish ponds;
- Excavate topography in the southeast corner of the property to lower elevation to that of adjacent wetlands; and
- Create forested, scrub-shrub and emergent wetland vegetation types with installation of native plant species in the excavated cells.

The target wetland community types include forested and scrub-shrub, dominated by a smaller cover area of quaking aspen (*Populus tremuloides*) / red osier dogwood (*Cornus stolonifera*) habitat, and larger coverage of Bebb's willow (*Salix bebbiana*) and bog birch (*Betula glandulosa*) / beaked sedge (*Carex utriculata*) communities. Initial construction was completed in summer 2006, and revegetation with herbaceous plants and shrubs was completed in August-October 2006.

### 1.2.2 Jocko River Bridge

The Jocko River Bridge mitigation site is approximately one acre in size, and occurs west of the new Jocko River Bridge and adjacent to the south side of the Jocko River within the 2-year flood zone. The site is south of milepost 19 in Township 16N, Range 20W, Section 2. Jocko Spring Brook flows along and through the western edge of this site. Flows from the Jocko River and Jocko Spring Brook serve as the primary hydrology sources for the site. No increase in wetland acreage was planned for this site; rather, an enhancement of existing degraded wetland and riparian area with native plantings is proposed.

The monitoring area boundary is illustrated on **Figure 2: Jocko River Bridge (Appendix A)**. The mitigation plan sheets are included in **Appendix D**. Objectives included the following:

- Removing livestock (part of this riparian wetland was previously a leased horse pasture); and
- Planting trees and shrubs to enhance the existing wetlands and riparian areas.

The targeted wetland community type at this site is a scrub-shrub / emergent vegetation type, supporting a Drummond willow/beaked sedge habitat type. Revegetation work at this site was completed in October 2006.

### 1.2.3 Jocko Spring Creek

The 6.5-acre Jocko Spring Creek mitigation site is located along the south side of the Montana Rail Link (MRL) grade just north of the Jocko Spring Creek highway crossing. The site occurs at approximately Milepost 23 in Township 17N, Range 20W, Section 16. Jocko Spring Creek flows under the highway and the MRL bridge in a newly constructed channel, and then flows northwest parallel to the railroad grade before it connects to the existing channel alignment on the northwest end of the project area. The mitigation site encompasses the new channel and its floodplain. Existing flows from Jocko Spring Creek provide water for the wetland mitigation site. Elevation is approximately 3,000 feet with slight topographic variation throughout the small project site.

The monitoring area boundary is illustrated on the **Figure 2: Jocko Spring Creek (Appendix A)**. Site plans are included in **Appendix D**.

Objectives included the following:

- Relocating Jocko Spring Creek from between the railroad and highway to a newly constructed channel west of the railroad;
- Constructing a new culvert under the railroad and in-line with the new highway bridge;
- Applying soft bioengineering treatments and installing near-bank plant material along in the new channel;
- Filling the abandoned Jocko Spring Creek channel with cobbles and gravel, topping with salvaged wetland soil, and planting;
- Creating scrub-shrub and emergent vegetation types with native wetland shrub and grass-like plantings and broadcast seeding of a wetland mix;
- Salvaging sod from the excavated channel placing along stream banks;
- Excluding grazing from the property; and
- Eliminating the existing vehicle pullout along the US Hwy 93.

The target wetland community is a palustrine scrub-shrub system supporting Bebb's willow with inclusions of emergent habitat. Initial construction of the new channel and floodplain was completed in March 2006 with prevegetated coir mats installed during April 2006. Revegetation efforts, including shrub and herbaceous plantings, were completed during August to October 2006.

### 1.2.4 Peterson

The 30-acre Peterson mitigation site occurs in the Project 6 segment approximately 3 miles north of St. Ignatius and west of the highway. The site is south of Milepost 36 in Township 16N,

Range 20W, Section 2. The Peterson site consists of a wetland draw dominated by herbaceous vegetation. Site hydrology is sourced by an unnamed perennial tributary to Post Creek.

The monitoring area boundary is illustrated on **Figure 2: Peterson (Appendix A)**. Site plans are included in **Appendix D**.

Objectives included the following:

- Constructing impoundments using twelve log crib structures and earthen berms;
- Excavating an oxbow basin along the outer fringe of existing wetland boundaries; and
- Planting shrubs and herbaceous plugs within the oxbow basin, wetland fringe, and log crib structures.

The targeted wetland community type at this site is a scrub-shrub / emergent vegetation type, supporting thinleaf alder (*Alnus incana*)/ red osier dogwood (*Cornus stolonifera*) and Nebraska sedge (*Carex nebrascensis*) / Baltic rush (*Juncus balticus*) habitat type. Revegetation work at this site was completed in October 2006.

## 2.0 METHODS

### 2.1 Monitoring Dates and Activities

Monitoring activities at the four sites were conducted between July 28<sup>th</sup> and August 15<sup>th</sup> of 2008. Specifically, the mitigation sites were visited on the following dates in 2008: Jocko River Bridge – July 28<sup>th</sup>; Bouchard – July 29<sup>th</sup>; Jocko Spring Creek - August 11<sup>th</sup>; and Peterson - August 15<sup>th</sup>. A spring kickoff visit was conducted on May 28<sup>th</sup> to review all the sites with MDT and CSKT personnel. The mid-season visit was conducted to document vegetation, soil, and hydrologic conditions used to map jurisdictional wetlands. All information contained on the Wetland Mitigation Site Monitoring Form for all four sites (**Appendix B**) was collected at this time. Activities and information conducted/collected included: wetland delineation; wetland/open water aquatic habitat boundary mapping; vegetation community mapping; vegetation transects; soils data; hydrology data; bird and general wildlife use; photograph points; macroinvertebrate sampling (Jocko Spring Creek site only); GPS data points; functional assessment; and (non-engineering) examination of topographic features.

### 2.2 Hydrology

Wetland hydrology indicators were recorded during the mid-season visit using procedures outlined in the COE 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Hydrology data were recorded on COE Routine Wetland Delineation Data Forms (**Appendix B**). Additional hydrologic data were recorded on the Wetland Mitigation Site Monitoring Form (**Appendix B**). No groundwater monitoring wells were installed at any of the four wetland mitigation sites.

## 2.3 Vegetation

General dominant species-based vegetation community types were delineated on 2008 aerial photographs during the mid-season visit. Standardized community mapping was not employed as many of these systems are geared towards climax vegetation and do not reflect yearly changes. Estimated percent cover of the dominant species in each community type was listed on the Wetland Mitigation Site Monitoring Forms (**Appendix B**).

In association with MDT and CSKT, new ten-foot wide belt transects were established at all sites during the May reconnaissance visit. These new transects replaced any previously-located transects to better represent and capture future vegetative changes at each of the sites. These were sampled during the mid-season monitoring event to represent the range of current vegetation conditions. Percent cover was estimated for each vegetative species within each successive vegetative community encountered within the “belt” using the following values: + (< 1 %); 1 (1-5%), 2 (6-10%); 3 (11-20%); 4 (21-50%); and 5 (>50%). Wetland indicator status was recorded for each species.

The transect locations were marked on the aerial photographs and all data were recorded on the mitigation site monitoring forms. Transect endpoint locations were recorded with a global positioning system (GPS) unit. A photograph was taken from both ends of each transect along the transect path.

A comprehensive plant species list was compiled for each site and will be updated as new species are encountered in the future. All noxious weed locations observed on the sites were mapped. Survival for any planted woody species was estimated.

## 2.4 Soils

Soils were evaluated during the mid-season site visit using the hydric soils determination procedures outlined in the COE 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Soil data were recorded for each wetland determination point on the COE Routine Wetland Delineation Data Forms (**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 new *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 any of the four sites in 2008.

Wetland and upland areas within the monitoring areas were investigated for the presence of wetland hydrology, hydrophytic vegetation and hydric soils. The information was recorded on COE Routine Wetland Delineation Data Forms (**Appendix B**). The wetland/upland boundaries

were recorded with a resource grade GPS unit using the procedures outlined in **Appendix E**, as well as by hand mapping onto the 2008 aerial photographs. The wetland/upland boundary in combination with the wetland/open water boundary was used to calculate the final wetland acreage.

## **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 mid-season visits. Indirect use indicators, including tracks, scat, burrows, eggshells, skins, bones, etc. were also recorded. Observations were recorded as the observer traversed the site while conducting other required activities. Direct sampling methods, such as snap traps, live traps, and pitfall traps, were not used.

## **2.7 Birds**

Bird observations were recorded during the mid-season visits. No formal census plots, spot mapping, point counts, or strip transects were conducted. During the mid-season visit, bird observations were recorded incidental to other monitoring activities. Bird species observations were categorized by species, activity code, and general habitat association on the Bird Survey Field Data Sheet (**Appendix B**).

## **2.8 Macroinvertebrates**

Macroinvertebrate samples were only collected at Jocko Spring Creek during the mid-season site visit. Collection occurred using the Macroinvertebrate Sampling Protocol (**Appendix F**). Samples were preserved as outlined in the sampling procedure and sent to Rhithron Associates, Inc. in Missoula, Montana for analysis (**Appendix F**). The macroinvertebrate sampling location was mapped with a GPS.

## **2.9 Functional Assessment**

Pre-project functional assessments at all four sites applied the 1999 MDT Montana Wetland Assessment Method. In 2008, application of the 1999 method was continued at all four sites, despite the availability of a 2008 MDT assessment method version, due to the crediting requirement that compares functional shift between the pre- and post-project assessments (**Appendix B**). Field data necessary for these assessments were collected during the mid-season visits.

## **2.10 Photographs**

The July 7, 2008 aerial photographs for each of the four sites were used for all **Figures 2 and 3** (**Appendix A**). Photographs were taken to illustrate the current land uses surrounding each site, the upland buffer, the monitored area, and the vegetation transects (**Appendix C**). Each photograph point location was mapped using a resource grade GPS unit. All photographs were taken using a digital camera.

## 2.11 GPS Data

During the 2008 monitoring season, point data were collected with a resource grade GPS unit at the vegetation transect beginning and ending locations and at all photograph locations. Wetland boundaries were recorded with a resource grade GPS unit in 2008, and were also modified via hand mapping onto 2008 aerial photographs. Procedures used for GPS mapping and aerial photography referencing are included in **Appendix E**.

## 2.12 Maintenance Needs

Observations were made of existing structures and of erosion/sediment problems to identify maintenance needs. This did not constitute an engineering-level structural inspection, but rather a cursory examination. Current or future potential problems were documented on the monitoring forms.

## 3.0 RESULTS

### 3.1 Bouchard Property

#### 3.1.1 Hydrology

The main source of hydrology is seasonal inundation from a high groundwater table associated with adjacent perennial Spring Creek. Spring Creek irrigation surface water previously entered the site through a series of ditches and berms. Several historic fish rearing ponds are located onsite that were previously filled with surface water from Spring Creek and were mapped as open water. Mitigation objectives included plugging and filling the ditches, and removing berms and other water-controlling features. A secondary source of hydrology is the persistent upwelling and lateral movement of groundwater through the alluvial materials across the valley floor sourced by local irrigation practices and hydrology associated with the Jocko River.

The shallow open-water areas occurred across approximately 0.39 acre or 1 % of the wetland area during the mid-season visit (**Figure 3 in Appendix A**). Water depth in these areas was approximately 4.0 feet. Inundation from discharging groundwater was observed at this time across another 15% of the wetland area. Inundation was present within Community Types 2, 3, 5, and 7 (**Figure 3 in Appendix B**).

According to the Western Regional Climate Center (WRCC), mean monthly precipitation from January through July from 1896 to 2008 totaled 10.13 inches for the St Ignatius weather station (WRCC 2008). During 2008, 10.14 inches (100 % of the mean) of precipitation were recorded at this station between January and July (WRCC 2008).

### 3.1.2 Vegetation

Seventy-nine plant species were identified at the site (**Table 4**). The majority of these species are herbaceous. The site has a few small stands of black cottonwood (*Populus trichocarpa*) and aspen (*Populus tremuloides*) located near or adjacent to the ponds. Eight wetland types and one upland community type were identified and mapped at the mitigation site (**Bouchard Figure 3 in Appendix A**). The eight wetland community types were Type 2: *Deschampsia/Juncus*, Type 3: *Juncus/Eleocharis*, Type 4: *Juncus/Cirsium*, Type 5: *Carex*, Type 6: *Betula/Potentilla*, Type 7: *Alnus/Glyceria*, Type 8: *Populus*, and Type 9: *Typha*. The eight wetland communities occur within wetland creation, rehabilitation, and re-establishment areas. Plant species observed within each of these communities are listed on the **Monitoring Forms (Appendix B)**.

The upland community type was Type 1: *Agropyron/Agrostis*. Plant species observed within this community are also listed on the **Monitoring Forms (Appendix B)**.

Types 2, 3, and the pond areas were the wettest sites located in the southeast corner of the property with the wetland creation areas, and were dominated by emergent vegetation and aquatic bed habitat. The wetland creation area was planted and seeded with yarrow (*Achillea millefolium*), tufted hairgrass (*Deschampsia cespitosa*), slender wheatgrass, and fowl bluegrass (*Poa palustris*). Type 2 is currently dominated by tufted hairgrass, reedtop (*Agrostis alba*), and Slender rush (*Juncus tenuis*). Type 3 is also located within the wetland creation area and is dominated by several species including dagger rush (*Juncus ensifolius*), slender rush, reedtop, and spike-rush (*Eleocharis* spp.). Several small patches of cattail (*Typha latifolia*) existed within the boundaries of Types 2 and 3-dominated wetland creation areas, but were not mapped as a separate community type (**Bouchard Figure 3 in Appendix A**).

Native containerized shrubs and herbaceous plugs were planted during the spring of 2006. Planted shrubs are arranged in patches within the created wetland to mimic natural distribution of native scrub-shrub species.

Community Types 4, 5, 6, 7, 8, and 9 are located in the wetland rehabilitation areas and are dominated by emergent, scrub-shrub and forested vegetation types. Types 4, 5, and 9 are dominated by mostly emergent vegetation types. Type 4 is an existing emergent wetland that consists of mostly wetland species, but has a small inclusion of weedy and / or aggressive species. The wetter species within Type 4 included Baltic rush, reedtop, and big-leaf avens (*Geum macrophyllum*). Type 4 has two noxious weed species: Canada thistle (*Cirsium arvense*) and hounds tongue (*Cynoglossum officinale*). Type 5 also occurs within the existing wetlands and consists of a wetland rehabilitation area dominated by herbaceous wetland species including beaked sedge, fox sedge (*Carex vesicaria*), Baltic rush, fowl mannagrass (*Glyceria striata*), and woolly sedge (*Carex lanuginosa*). Type 9 occurs in the wettest area and is dominated by a monoculture of cattail.

**Table 4: 2007 to 2008 vegetation species list for the Bouchard Wetland Mitigation Site.**

Scientific Name <sup>1</sup>	Common Name	Region 9 (Northwest) Wetland Indicator
<i>Achillea millefolium</i>	common yarrow	FACU
<i>Agrostis alba</i>	redtop	FAC+
<i>Agropyron repens</i>	quackgrass	FACU
<i>Agropyron trachycaulum</i>	slender wheatgrass	FAC
<i>Alnus incana</i>	alder	FACW
<i>Alopecurus pratensis</i>	meadow foxtail	FACW
<i>Alyssum alyssoides</i>	alyssum	--
<i>Anthemis cotula</i>	chamomile	FACU
<i>Artemisia ludoviciana</i>	white sagebrush	FACU-
<i>Betula occidentalis</i>	water birch	FACW
<i>Bromus carinatus</i>	mountain brome	--
<i>Bromus tectorum</i>	cheatgrass	--
<i>Calamagrostis canadensis</i>	bluejoint reedgrass	FACW+
<i>Campanula rotundifolia</i>	bluebell bellflower	FACU+
<i>Carduus nutans</i>	musk thistle	--
<i>Carex lanuginosa</i>	wooly sedge	OBL
<i>Carex nebrascensis</i>	Nebraska sedge	OBL
<i>Carex praegracilis</i>	clustered field sedge	FACW
<i>Carex utriculata</i>	beaked sedge	OBL
<i>Carex stipata</i>	awlfuit sedge	OBL
<i>Carex retrorsa</i>	retorse sedge	FAC
<i>Carex vesicaria</i>	fox sedge	OBL
<i>Centaurea maculosa</i>	spotted knapweed	--
<i>Chenopodium album</i>	white goosefoot	FAC
<i>Chrysanthemum leucanthemum</i>	ox-eye daisy	--
<i>Cichorium intybus</i>	chicory	--
<i>Cirsium arvense</i>	Canada thistle	FACU+
<i>Cornus stolonifera</i>	red-osier dogwood	FACW
<i>Crataegus douglasii</i>	Douglas hawthorn	FAC
<i>Cynoglossum officinale</i>	hound's tongue	FACU
<i>Deschampsia cespitosa</i>	tufted hairgrass	FACW
<i>Dodecatheon spp.</i>	shooting star	--
<i>Eleocharis palustris</i>	creeping spikerush	OBL
<i>Eleocharis spp.</i>	spike-rush	--
<i>Epilobium ciliatum</i>	hairy willow-herb	FACW+
<i>Epilobium spp.</i>	willow-herb	--
<i>Equisetum arvense</i>	field horsetail	FAC
<i>Geum macrophyllum</i>	big leafed avens	OBL
<i>Glyceria grandis</i>	American mannagrass	OBL
<i>Glyceria striata</i>	fowl mannagrass	OBL
<i>Hordeum jubatum</i>	fox-tail barley	FAC+
<i>Hypericum perforatum</i>	St. John's wort	--
<i>Juncus balticus</i>	Baltic rush	FACW
<i>Juncus ensifolius</i>	three-stamen rush	FACW
<i>Juncus tenuis</i>	slender rush	FAC
<i>Juniperus scopulorum</i>	Rocky Mountain juniper	--
<i>Juncus spp.</i>	rush	--
<i>Lactuca serriola</i>	prickly lettuce	FAC-
<i>Lychnis alba</i>	white campion	--
<i>Mentha arvensis</i>	field mint	FAC
<i>Medicago Sativa</i>	alfalfa	--

**Table 4 (continued): 2007 to 2008 vegetation species list for the Bouchard Wetland Mitigation Site.**

Scientific Name <sup>1</sup>	Common Name	Region 9 (Northwest) Wetland Indicator
<i>Mimulus guttatus</i>	monkey-flower	OBL
<i>Nepeta cataria</i>	catnip	--
<i>Phalaris arundinacea</i>	Reed canarygrass	FACW
<i>Phleum pratense</i>	timothy	FACU
<i>Plantago major</i>	common plantain	FAC+
<i>Poa palustris</i>	fowl bluegrass	FAC
<i>Poa pratensis</i>	Kentucky bluegrass	FACU+
<i>Polygonum amphibium</i>	water smartweed	OBL
<i>Populus tremuloides</i>	quaking aspen	FAC+
<i>Populus trichocarpa</i>	cottonwood	FAC
<i>Potentilla anserina</i>	silverweed	OBL
<i>Potentilla fruticosa</i>	shrubby cinquefoil	FAC-
<i>Ranunculus spp.</i>	buttercup	--
<i>Ribes spp.</i>	currant	--
<i>Rosa woodsii</i>	woods rose	FACU
<i>Rubus idaeus</i>	wild raspberry	FACU
<i>Rumex crispus</i>	curly dock	FACW
<i>Salix bebbiana</i>	Bebb willow	FACW
<i>Salix exigua</i>	sandbar willow	OBL
<i>Salix geyeriana</i>	Geyer willow	FACW+
<i>Salix lutea</i>	yellow willow	OBL
<i>Solanum dulcamara</i>	climbing nightshade	FAC+
<i>Solidago missouriensis</i>	Missouri goldenrod	--
<i>Sonchus arvensis</i>	field sowthistle	FACU+
<i>Symphoricarpos albus</i>	snowberry	FACU
<i>Typha latifolia</i>	broad-leaf cattail	OBL
<i>Verbascum thapsus</i>	common mullein	--
<i>Vicia spp.</i>	vetch	--

<sup>1</sup> Species documented in the analysis area during 2008 by PBS&J.

Types 6, 7, and 8 are the scrub-shrub and forested types located in the wetland rehabilitation areas of the Bouchard Property. Type 6 is a scrub-shrub community dominated by water birch (*Betula occidentalis*) and shrubby potentilla (*Potentilla fruticosa*) with a mixture of herbaceous species similar to Type 5. The Type 6 area encompasses the second largest area of the eight community types in the mitigation area. Type 7 is also a scrub-shrub vegetation type dominated by thinleaf alder (*Alnus incana*) and containing an herbaceous layer dominated by fowl mannagrass. Type 8 is a forested vegetation type dominated by black cottonwood and quaking aspen in wetland rehabilitation areas. Black cottonwood and some quaking aspen dominate the areas surrounding the several existing ponds or shallow open waters. Type 8 areas are also found along the east side of the property along Spring Creek.

Adjacent upland vegetation communities are dominated by pasture grasses and/or aggressive invasive species. Type 1 upland areas are dominated by slender wheatgrass (*Agropyron trachycaulum*), yarrow, quackgrass (*Agropyron repens*), Canada thistle, and hounds tongue.

Several noxious weeds were observed at the Bouchard property. Type 1, 3, and 4 contained invasive species including Canada thistle, hounds tongue and St. John's wort (*Hypericum*

*perforatum*). The majority of the weed species were identified on the west side of the parcel along the upland and wetland fringe between Type 1 and 5. Canada thistle had a moderate to high coverage value as the most abundant weed species. Hounds tongue and St. John’s wort were recorded at low to moderate levels. Two other noxious weeds, oxeye daisy (*Chrysanthemum leucanthemum*) and spotted knapweed (*Centaurea maculosa*), were recorded at low levels. Noxious weed locations observed during the 2008 field visit were mapped and are illustrated on **Figure 3** in **Appendix A**.

Vegetation transect results are detailed in the **Monitoring Form (Appendix B)** and are summarized in **Tables 5, 6, and 7**, and **Charts 1** through **6**. As all 2007 transect locations were changed in 2008, no 2007 transect data are presented.

**Table 5: Bouchard Property: Transect 1 data summary.**

Monitoring Year	2008
Transect Length (feet)	526
# Vegetation Community Transitions along Transect	5
# Vegetation Communities along Transect	4
# Hydrophytic Vegetation Communities along Transect	3
Total Vegetative Species	28
Total Hydrophytic Species	19
Total Upland Species	9
Estimated % Total Vegetative Cover	95
% Transect Length Comprised of Hydrophytic Vegetation Communities	77
% Transect Length Comprised of Upland Vegetation Communities	33
% Transect Length Comprised of Unvegetated Open Water	0
% Transect Length Comprised of Bare Substrate	0

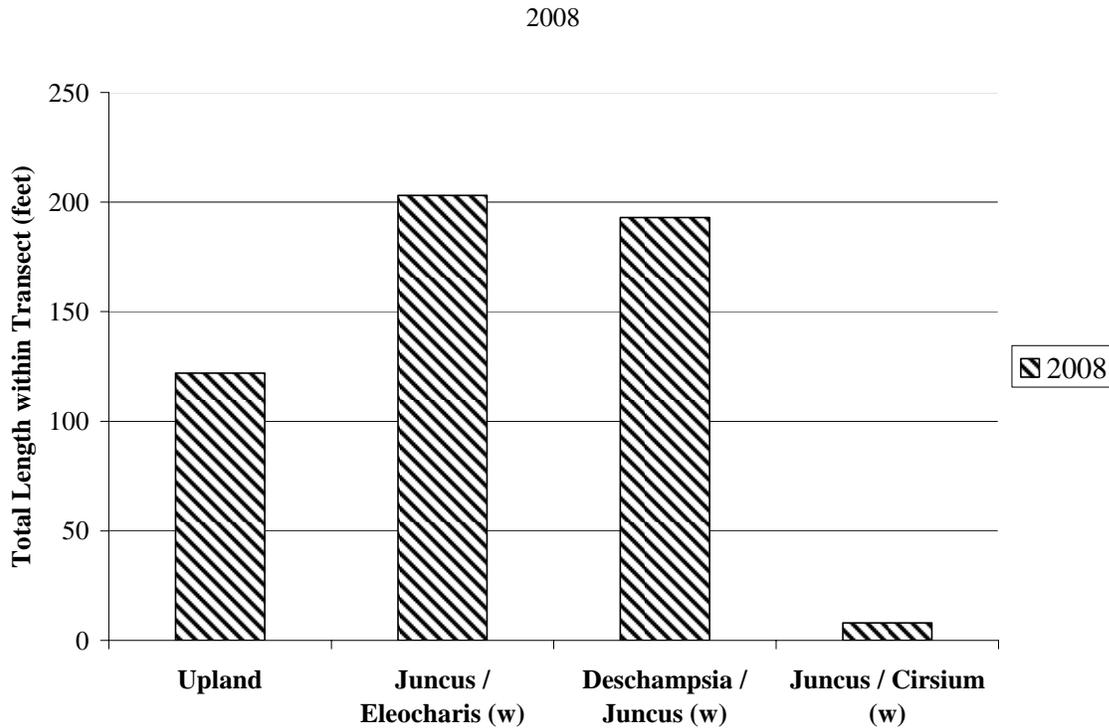
**Table 6: Bouchard Property: Transect 2 data summary.**

Monitoring Year	2008
Transect Length (feet)	313
# Vegetation Community Transitions along Transect	2
# Vegetation Communities along Transect	2
# Hydrophytic Vegetation Communities along Transect	2
Total Vegetative Species	16
Total Hydrophytic Species	13
Total Upland Species	3
Estimated % Total Vegetative Cover	98
% Transect Length Comprised of Hydrophytic Vegetation Communities	100
% Transect Length Comprised of Upland Vegetation Communities	0
% Transect Length Comprised of Unvegetated Open Water	0
% Transect Length Comprised of Bare Substrate	0

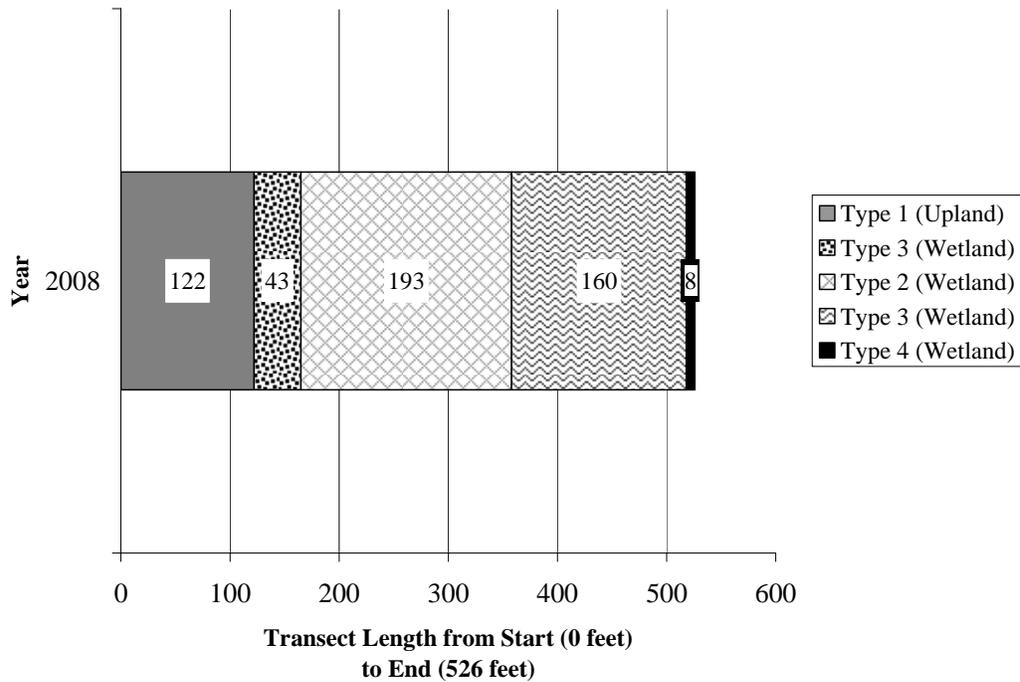
**Table 7: Bouchard Property: Transect 3 data summary.**

<b>Monitoring Year</b>	<b>2008</b>
<b>Transect Length (feet)</b>	133
<b># Vegetation Community Transitions along Transect</b>	2
<b># Vegetation Communities along Transect</b>	2
<b># Hydrophytic Vegetation Communities along Transect</b>	1
<b>Total Vegetative Species</b>	13
<b>Total Hydrophytic Species</b>	3
<b>Total Upland Species</b>	9
<b>Estimated % Total Vegetative Cover</b>	80
<b>% Transect Length Comprised of Hydrophytic Vegetation Communities</b>	7
<b>% Transect Length Comprised of Upland Vegetation Communities</b>	93
<b>% Transect Length Comprised of Unvegetated Open Water</b>	0
<b>% Transect Length Comprised of Bare Substrate</b>	0

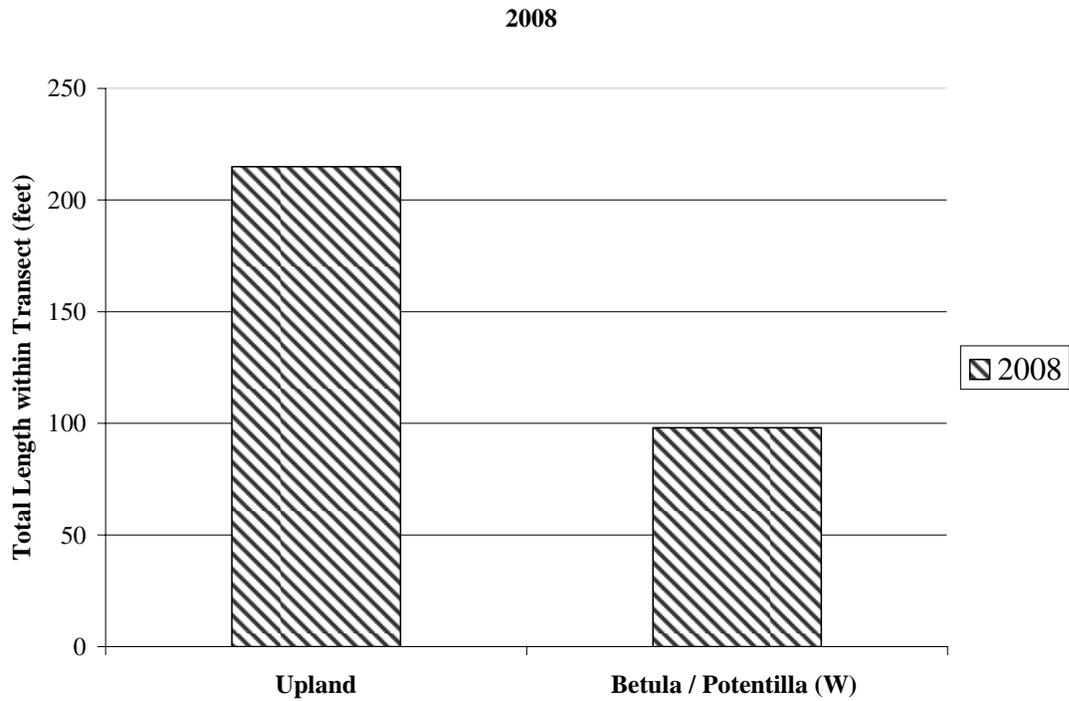
**Chart 1: Bouchard Property: Transect 1 maps showing vegetation types from the start of transect (0 feet) to the end of transect (526) feet for 2008.**



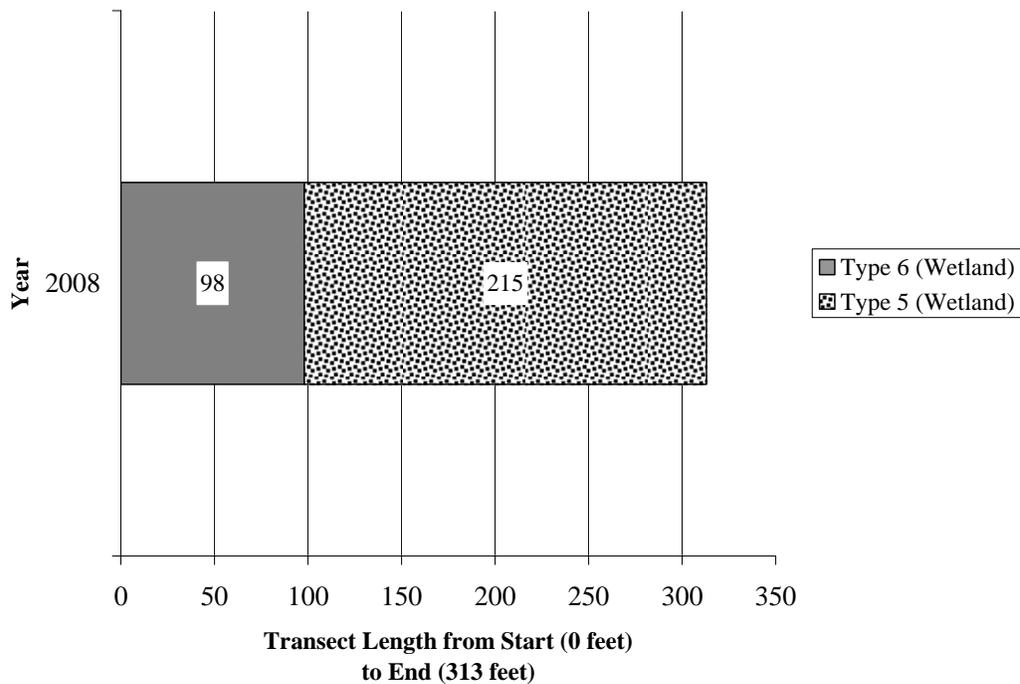
**Chart 2: Bouchard Property: Length of vegetation communities within Transect 1 for 2008.**



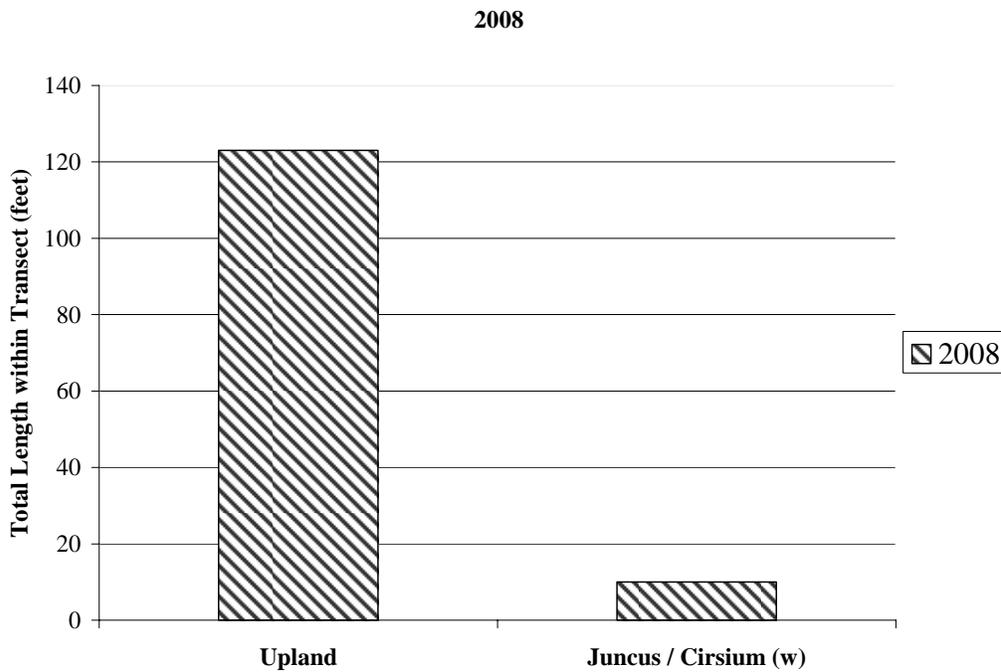
**Chart 3: Bouchard Property: Transect 2 maps showing vegetation types from the start of transect (0 feet) to the end of transect (313) feet for 2008.**



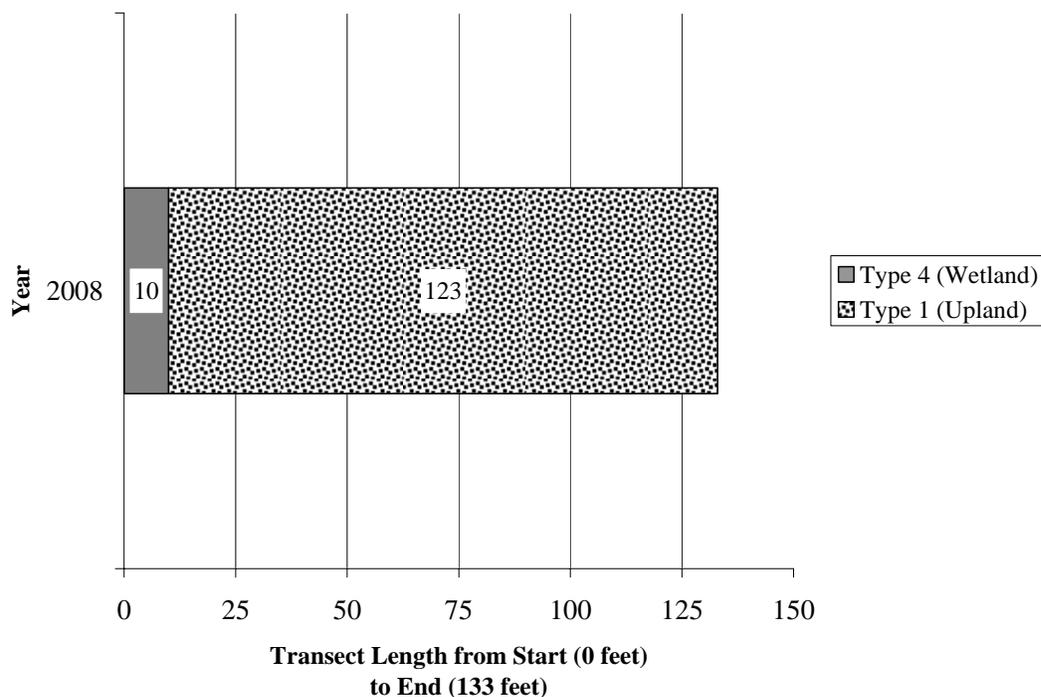
**Chart 4: Bouchard Property: Length of vegetation communities within Transect 2 for 2008.**



**Chart 5: Bouchard Property: Transect 3 map showing vegetation types from the start of transect (0 feet) to the end of transect (133) feet for 2008.**



**Chart 6: Bouchard Property: Length of vegetation communities within Transect 3 for 2008.**



### 3.1.3 Soils

The five soils types mapped at the Bouchard property in the Lake County Soil Survey are:

- Borohemists, 0 to 1 percent slope
- Colake silt loam, 0 to 1 percent slope
- Colake silt loam, drained, 0 to 1 percent slope
- Jocko gravelly loam, 0 to 4 percent slope
- Lamoose loam, 0 to 2 percent slope

Four of the five soils types mapped at the Bouchard property were listed as hydric soils (NRCS 2008). These were Borohemists, Colake silt loams, and Lamoose loam. Borohemists are very poorly drained and occur on low stream terraces and floodplains. The Colake silt loam series are poorly drained and occur in swales and depressions on till plains and low stream terraces. The Lamoose series are poorly drained and occur on floodplains. The Jocko series is well drained and occurs in a very small portion of the site (NRCS 2008). Soil characteristics at each wetland determination point were compared with those of the mapped soils. The soils observed across most of the site generally matched the soil descriptions.

Wetland soils observed during monitoring and documented on the Routine Wetland Determination form were mostly loam or silt loam textured soils with very low chroma colors (1 or 2) throughout the soil profile. Redoximorphic features such as redox concentration (mottles) or depleted matrixes were not observed in any of three profiles.

### 3.1.4 Wetland Delineation

Wetlands were delineated and mapped (**Bouchard Figure 3 in Appendix A**). Soils, vegetation, and hydrology are discussed in preceding sections and on the **COE Forms (Appendix B)**. Approximately 28.53 gross wetland acres currently occur within the monitoring area (**Table 8; Bouchard Figure 3 in Appendix A**). The site contains 28.14 wetlands acres and 0.39 acre of shallow open water (**Table 8**).

**Table 8: Wetland conditions and acreages at the Bouchard Site.**

CONDITION	2004 <sup>1</sup> (acre)	2007(acre) <sup>2</sup>	2008 (acre)
Wetland Area	19.03	29.26	28.14
Open Water Area	---		0.39
<b>Total Aquatic Habitat</b>	<b>19.03</b>	<b>29.26</b>	<b>28.53</b>

<sup>1</sup>Herrera 2004, <sup>2</sup>Herrera 2007

Overall, the project has gained an estimated 9.50 wetland acres in comparison to 2004 baseline conditions. Prior to construction, the site contained approximately 19.03 acres of wetlands and shallow open water ponds within the current monitoring limits. The overall cumulative change in aquatic habitat at the site since construction has been approximately 28.53 - 19.03 = 9.5 acres.

Wetland size changed between the 2007 and 2008 monitoring, with a decrease of 0.73 acre. The 2007 and 2008 delineations were conducted by different firms. Slight variations in wetland mapping between the two firms most likely contributed to small differences in wetland acreages. Differences in wetland boundaries between the 2007 and 2008 wetland mapping were observed along the south side of the creation and restoration areas.

### 3.1.5 Wildlife

Wildlife species, or evidence of wildlife, observed on the site during 2007 and 2008 monitoring efforts are listed in **Table 9**. Specific evidence observed, as well as activity codes pertaining to birds, is provided on the Monitoring Form in **Appendix B**. This site provides habitat for a variety of wildlife species. Four mammal, one amphibian, and 15 bird species were noted at the mitigation site during the 2008 site visits. Many other wildlife species presumably use the site but were not observed during the monitoring visits.

### 3.1.6 Macroinvertebrates

Macroinvertebrate sampling was not conducted at the Bouchard Property.

**Table 9: Fish and wildlife species observed at the Bouchard Mitigation Site from 2007 to 2008.**

<b>FISH</b>	
None	
<b>AMPHIBIAN</b>	
<b>Spotted Frog (<i>Rana luteiventris</i>)</b>	
<b>REPTILE</b>	
None	
<b>BIRD</b>	
<b>American Crow (<i>Corvus brachyrhynchos</i>)</b> American Finch ( <i>Carduelis tristis</i> ) <b>Black-Billed Magpie (<i>Pica hudsonia</i>)</b> <b>Black Capped Chickadee (<i>Parus atricapillus</i>)</b> <b>Brown-Headed cowbird (<i>Molothrus ater</i>)</b> <b>Common Flicker (<i>Colaptes auratus</i>)</b> Cordilleran flycatcher ( <i>Empidonax occidentalis</i> ) <b>Eastern Kingbird (<i>Tyrannus tyrannus</i>)</b> <b>Mallard (<i>Anas platyrhynchos</i>)</b>	<b>Marsh Wren (<i>Cistothorus palustris</i>)</b> <b>Mourning Dove (<i>Zenaida macroura</i>)</b> <b>Red-Winged blackbird (<i>Agelaius phoeniceus</i>)</b> <b>Ring-necked Pheasant (<i>Phasianus colchicus</i>)</b> <b>Snipe (<i>Gallinago gallinago</i>)</b> Song Sparrow ( <i>Melospiza melodia</i> ) <b>Tree Swallow (<i>Tachycineta bicolor</i>)</b> <b>Wilson's Warbler (<i>Wilsonia pusilla</i>)</b> Wood Duck ( <i>Aix sponsa</i> ) <b>Yellow Warbler (<i>Dendroica petechia</i>)</b>
<b>MAMMAL</b>	
<b>Coyote (<i>Canis latrans</i>)</b> <b>Deer (<i>Odocoileus spp.</i>)</b>	<b>Meadow vole (<i>Microtus pennsylvanicus</i>)</b> <b>Muskrat (<i>Ondatra zibethicus</i>)</b>

**Bolded** species were observed during 2008 monitoring. All other species were observed during one or more of the previous monitoring years, but not during 2008.

### 3.1.7 Functional Assessment

The functional assessment form completed in 2008 is included in **Appendix B** and is summarized in **Table 10**. The 1999 MDT MWAM version was used during 2008 monitoring due to the requirement that pre-and post-project functional assessments be directly compared to evaluate the functional point shift and calculate the enhancement ratio for Corps crediting. The mitigation crediting system is addressed in **Section 3.1.11 Current Credit Summary**. Baseline functional assessment results are also provided in **Table 10** for comparative purposes. The Bouchard Property site was assessed as one assessment area (AA-1), which was rated as a Category II site in 2008. Based on functional assessment results (**Table 10**), approximately 176.89 functional units occur at the Bouchard Property mitigation site.

### 3.1.8 Photographs

Representative photographs were taken in 2008 from established photo-points and transect ends (**Appendix C**).

**Table 10: Summary of baseline and 2008 wetland function/value ratings and functional points at the Bouchard Wetland Mitigation Project.**

Function and Value Parameters from the MDT Montana Wetland Assessment Method	Baseline (AA-1) <sup>1</sup>	2008 (AA-1) <sup>2</sup>
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)
MTNHP Species Habitat	Low (0.1)	Low (0.1)
General Wildlife Habitat	High (0.8)	High (0.9)
General Fish/Aquatic Habitat	NA	NA
Flood Attenuation	NA	NA
Short and Long Term Surface Water Storage	High (0.8)	High (0.9)
Sediment/Nutrient/Toxicant Removal	NA	High (1.0)
Sediment/Shoreline Stabilization	NA	NA
Production Export/Food Chain Support	High (0.9)	High (0.9)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Mod (0.6)	Mod (0.6)
Recreation/Education Potential	Low (0.1)	Mod (0.5)
<b>Actual Points / Possible Points</b>	<b>4.6 / 8</b>	<b>6.2 / 8</b>
<b>% of Possible Score Achieved</b>	<b>56%</b>	<b>78%</b>
<b>Overall Category</b>	<b>III</b>	<b>II</b>
<b>Total Acreage of Assessed Wetlands and Open Water within Easement (ac)</b>	<b>19.03</b>	<b>28.53</b>
<b>Total Functional Units (acreage x actual points) (fu)</b>	<b>87.54</b>	<b>176.89</b>
<b>Net Acreage Gain (ac)</b>	<b>NA</b>	<b>9.5</b>
<b>Net Functional Unit Gain (fu)</b>	<b>NA</b>	<b>89.35</b>

<sup>1</sup>The baseline assessment was performed by Herrera Environmental Consultants using the 1999 MDT Montana Wetland Assessment Method (MWAM).

<sup>2</sup>The post-project functional assessment was performed by PBS&J during 2008 using the 1999 MDT MWAM because the mitigation crediting systems require direct comparisons of pre- and post-project functions. The completed MDT MWAM form for 2008 is in **Appendix B**.

### 3.1.9 Revegetation Efforts

Wetland and riparian vegetation enhancements were implemented during 2006. **Appendix G** presents the specifications for seed mixes and containerized plantings. Wetland areas surrounding the excavated areas were broadcast seeded with a custom wetland seed mix and also planted with herbaceous and woody seedlings. These enhancements included drill seeding of upland and wetland seed mix in the different mitigation types or cells. The site was planted with native shrub, grass and grass-like seedlings.

Survival rates for native shrub plantings were assessed during summer 2008. Methodology employed by PBS&J included walking ten transects within the planting areas and recording all living woody plantings by species. PBS&J results are recorded on the **Monitoring Form (Appendix B)**. Species survival was based on visual estimates and counts for each live species. The original plantings numbers as listed on the **Monitoring Form (Appendix B)** were referenced from the Bouchard Wetland – Wetland Planting Summary (**Appendix G**). Actual planting numbers and prescribed species may have varied from the original plan. Three species

were found that were not listed in the original planting summary. Overall survival ratings are considered moderate to high based on visual assessment. Plant growth was vigorous and looked healthy with few discolored leaves. Browse protection was intact and properly functioning.

### 3.1.10 Maintenance Needs/Recommendations

Several Category 1 noxious weeds were present (**Bouchard Figure 3** in **Appendix A**): Canada thistle, hound's-tongue, oxeye daisy, St. John's wort, and spotted knapweed. Noxious weeds should be controlled in accordance with the *Noxious Weed Management Guidelines, Species and Control Methods for US 93 Evaro to Polson Wetland Mitigation Sites* contained in the mitigation plan (Herrera 2004).

### 3.1.11 Current Credit Summary

As of 2008, approximately 28.53 aquatic habitat acres (28.14 acres of wetlands, 0.39 acre of shallow open water) occur on the mitigation site. Pre-project wetland delineation documented 19.03 acres of wetlands / open water. The initially-calculated net increase in aquatic habitat acres to date is approximately  $28.53 - 19.03 = 9.50$  acres.

To determine the current crediting acres for the Bouchard Property, the total wetland acreage was separated into the individual mitigation type zones and the appropriate credit ratios applied for both the CSKT and Corps crediting systems. The Bouchard Property mitigation types are: creation, re-establishment (Corps) / primary restoration (CSKT), and rehabilitation (Corps) / secondary restoration (CSKT).

The following equation calculates the enhancement ratio for the rehabilitation activities based on functional assessment scores (**Table 10**):

$$\text{Enhancement factor} = [(F_{\text{post}} - F_{\text{pre}}) / F_{\text{pre}}]$$

where:  $F_{\text{post}}$  = projected post-mitigation project functional score; and  $F_{\text{pre}}$  = pre-project functional score.

$$\text{Enhancement factor} = [(6.2 - 4.6) / 4.6]; \text{ Enhancement factor} = 0.35$$

$$\text{Enhancement Ratio} = 1 / 0.35; \text{ Enhancement Ratio} = 2.86$$

**Table 11** lists the current credits based on COE and CSKT credit ratios, including this year's calculated ratio for the rehabilitation areas at the Bouchard Property site. The Bouchard Property wetland mitigation site is progressing toward reaching the expected credits. The site currently provides slightly less than the expected creation credit acres, but is exceeding expectations in the remaining categories and as a whole, and is predicted to continue gaining in functional points and credit acreage as the wetlands continue to develop.

**Table 11. Current credits at the Bouchard Property Mitigation Site.**

Targeted Mitigation Type	Current Wetlands (Acre)	Credit Ratio		Current Credit (Acre)		Expected Credit (Acre)	
		COE	CSKT	COE	CSKT	COE	CSKT
Creation	4.79	1:1	3.36:1	4.79	1.43	5.16	1.54
Re-establishment / primary restoration	4.71 <sup>1</sup>	1:1	1.86:1	4.71	2.53	2.94	1.58
Rehabilitation / secondary restoration	19.03	2.86:1	1.86:1	6.65	10.23	4.05	10.23
<b>Total</b>	<b>28.53</b>			<b>16.15</b>	<b>14.19</b>	<b>12.15</b>	<b>13.35</b>

<sup>1</sup> Includes wetlands delineated outside of targeted creation, re-establishment, and rehabilitation areas and assumed to have been re-established by project implementation.

### 3.2 Jocko River Bridge

#### 3.2.1 Hydrology

The main source of hydrology is seasonal flooding by Jocko Spring Brook that runs across the southwest corner of the mitigation site. This mitigation site is also located adjacent to the Jocko River and is within the 2-year floodplain. Consequently, it may receive some seasonal inundation from the Jocko River inundating the Jocko Spring Brook outlet, as well as from groundwater associated with the river. The wetland areas within the mitigation site were inundated with shallow water during the mid-season visit.

According to the WRCC, mean monthly precipitation from January through July from 1896 to 2008 totaled 10.13 inches for the St Ignatius weather station (WRCC 2008). During 2008, 10.14 inches (100 % of the mean) of precipitation were recorded at this station between January and July (WRCC 2008).

#### 3.2.2 Vegetation

Forty-nine plant species were identified at the site (**Table 12**). The majority of these species are herbaceous. The site vegetation consists of existing riparian areas, degraded riparian, and wetland areas with scrub-shrub and emergent vegetation types.

Three wetlands types and five riparian / upland community types were identified and mapped at the mitigation site (**Jocko River Bridge Figure 3** in **Appendix A**). The three wetland community types are Type 1: *Phalaris/Carex*, Type 2: *Carex/Glyceria*, and Type 3: *Betula/Alnus*. The five riparian / upland community types are Type 4: *Grass spp. / Plantago*, Type 5: *Populus /Prunus*, Type 6: *Populus*, Type 7: *Salix/Alnus (non-wetland)*, and Type 8: *Melilotus*. Plant species observed within each of these communities are listed on the Jocko River Bridge **Monitoring Form (Appendix B)**.

The three wetland community types are located on the west side of the mitigation site in areas of pre-existing wetlands. Type 1 is an emergent vegetation type dominated by reed canarygrass, beaked sedge, spike-rush and yellow monkey-flower (*Mimulus guttatus*). Type 2 is also an emergent vegetation type dominated by mostly herbaceous plants including beaked sedge, awlfruit sedge (*Carex stipata*), fowl mannagrass, reed canarygrass and a small inclusion of

**Table 12: 2007 to 2008 vegetation species list for the Jocko River Bridge Wetland Mitigation Site.**

Scientific Name <sup>1</sup>	Common Name	Region 9 (Northwest) Wetland Indicator
<i>Alnus incana</i>	alder	FACW
<i>Alyssum alyssoides</i>	alyssum	--
<i>Anthemis cotula</i>	chamomile	FACU
<i>Berteroa incana</i>	madwort	--
<i>Betula occidentalis</i>	water birch	FACW
<i>Bromus tectorum</i>	cheatgrass	--
<i>Carex utriculata</i>	beaked sedge	OBL
<i>Carex stipata</i>	awlfruit sedge	OBL
<i>Centaurea maculosa</i>	spotted knapweed	--
<i>Chenopodium album</i>	white goosefoot	FAC
<i>Cynoglossum officinale</i>	hound's tongue	FACU
<i>Dactylis glomerata</i>	orchardgrass	FACU
<i>Eleocharis palustris</i>	creeping spikerush	OBL
<i>Equisetum arvense</i>	field horsetail	FAC
<i>Festuca pratensis</i>	meadow fescue	FACU+
<i>Geum macrophyllum</i>	big leafed avens	OBL
<i>Glyceria striata</i>	fowl mannagrass	OBL
<i>Impatiens ecalcarata</i>	impatiens	FACW
<i>Juncus ensifolius</i>	three-stamen rush	FACW
<i>Lychnis alba</i>	white campion	--
<i>Melilotus alba</i>	white sweetclover	FACU
<i>Melilotus officinalis</i>	yellow sweetclover	FACU
<i>Mentha arvensis</i>	field mint	FAC
<i>Mimulus guttatus</i>	monkey-flower	OBL
<i>Phalaris arundinacea</i>	Reed canarygrass	FACW
<i>Plantago major</i>	common plantain	FAC+
<i>Poa pratensis</i>	Kentucky bluegrass	FACU+
<i>Populus tremuloides</i>	quaking aspen	FAC+
<i>Populus trichocarpa</i>	cottonwood	FAC
<i>Pinus ponderosa</i>	Ponderosa pine	FACU-
<i>Prunus virginiana</i>	chokecherry	FACU
<i>Ranunculus acris</i>	tall buttercup	FACW-
<i>Rosa woodsii</i>	woods rose	FACU
<i>Salix bebbiana</i>	Bebb willow	FACW
<i>Salix drummondiana</i>	Drummond willow	FACW
<i>Salix exigua</i>	sandbar willow	OBL
<i>Sambucus racemosa</i>	elderberry	FACU
<i>Sisymbrium altissimum</i>	tall tumble mustard	FACU-
<i>Solidago missouriensis</i>	Missouri goldenrod	--
<i>Symphoricarpos albus</i>	snowberry	FACU
<i>Taraxacum officinale</i>	common dandelion	FACU
<i>Thlaspi arvense</i>	pennycress	NI
<i>Typha latifolia</i>	broadleaf cattail	OBL
<i>Veronica americana</i>	American speedwell	OBL
<i>Verbascum thapsus</i>	common mullein	--
<i>Viola</i> spp.	viola	--
<i>Xanthium strumarium</i>	cocklebur	FAC

shrubs including thinleaf alder and water birch. Type 3 is dominated mostly by scrub-shrub vegetation type including thinleaf alder, water birch, and Bebb's willow (*Salix bebbiana*).

The remaining community types were located in riparian / upland areas adjacent to the wetland types and throughout the site. The areas of existing riparian were dominated by mature trees and shrubs. Type 5 is dominated by tree and shrub species including quaking aspen, common snowberry, and woods rose. Type 6 is located adjacent to the river on the north side of the mitigation site and consists of mostly unaltered riparian area with the following species: black cottonwood, ponderosa pine (*Pinus ponderosa*), common snowberry, and woods rose. Type 7 is dominated by mostly wetland shrubs, but is mapped outside of the wetland area. Type 7 is in a rehabilitation area and was planted with thinleaf alder, water birch, Bebb's willow, red osier dogwood, and sandbar willow (*Salix exigua*).

Type 4 is located within the areas prescribed for habitat rehabilitation. The community type was based on vegetation observed during the 2008 monitoring. The site was heavily impacted from grazing by horses from the neighboring parcel. Type 4 vegetation was difficult to identify due to the small amount of available plant parts (stems, leaves, and seed heads) required for identification. The area was heavily impacted and none of the original plantings were observed. The existing vegetation includes mostly an unknown grass species and other weedy forbs including common plantain (*Plantago major*), hounds tongue, quackgrass, and chamomile (*Anthemis cotula*).

Type 8 is located on the west side of the mitigation site between the native vegetation and the roadway. Type 8 is dominated by mostly non-desirable pasture species and one noxious weed species including yellow and white sweetclover (*Melilotus officinalis* and *Melilotus alba*), common mullein (*Verbascum thapsus*), quackgrass and spotted knapweed (*Centaurea maculosa*).

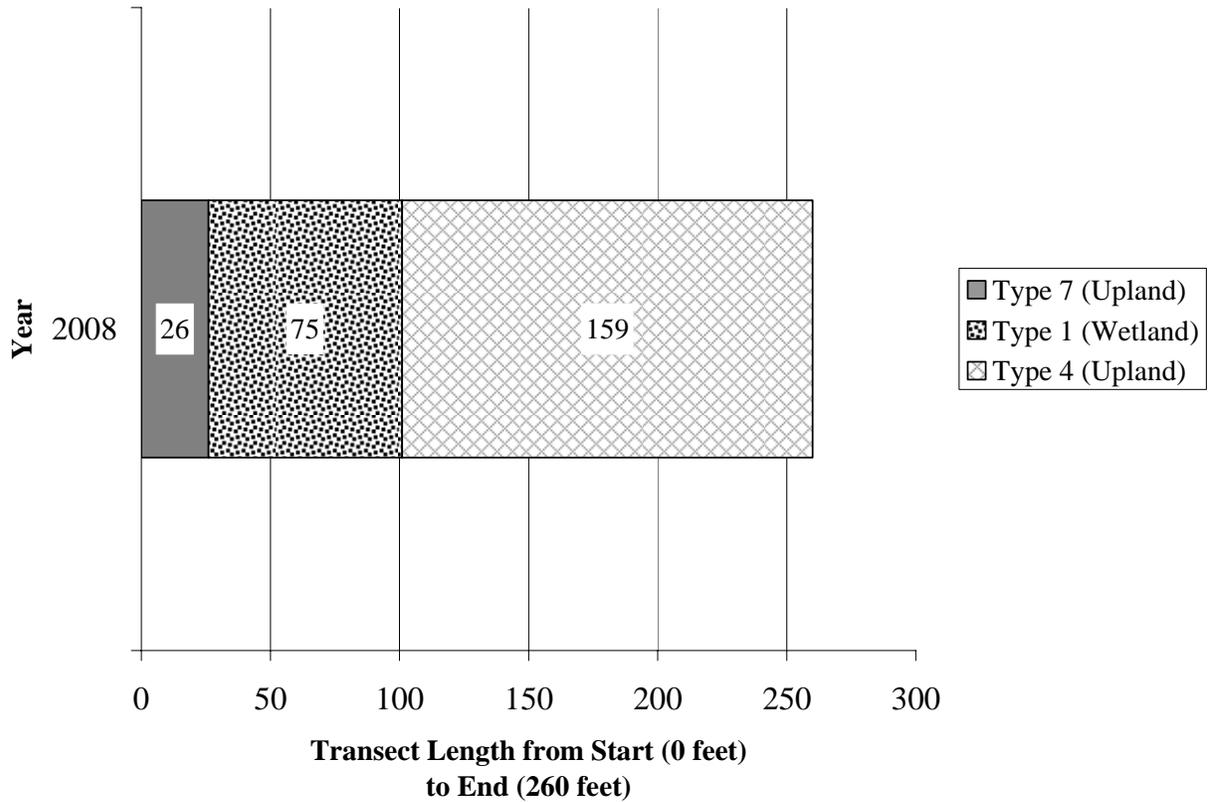
Several noxious weeds were observed throughout the Jocko River Bridge site. Type 1, 4, and 8 had small amounts of invasive species. Noxious weed locations observed during the 2008 field visit were mapped (**Jocko River Bridge Figure 3 in Appendix A**). These were individual noxious weed locations or small patches not mapped as a community type, and included the following species: spotted knapweed, hounds tongue, and tall buttercup (*Ranunculus acris*). The tall buttercup was located in the wetlands and has an indicator status of FACW. Weed species distributions illustrated on **Jocko River Bridge Figure 3** were also captured in the community type lists (**Appendix B**) which provide detailed information regarding cover values for each species.

Vegetation transect results are detailed in the **Jocko River Bridge Monitoring Form (Appendix B)** and are summarized in **Table 13** and **Charts 7** and **8**. As the 2007 transect location was changed in 2008, no 2007 transect data are presented.

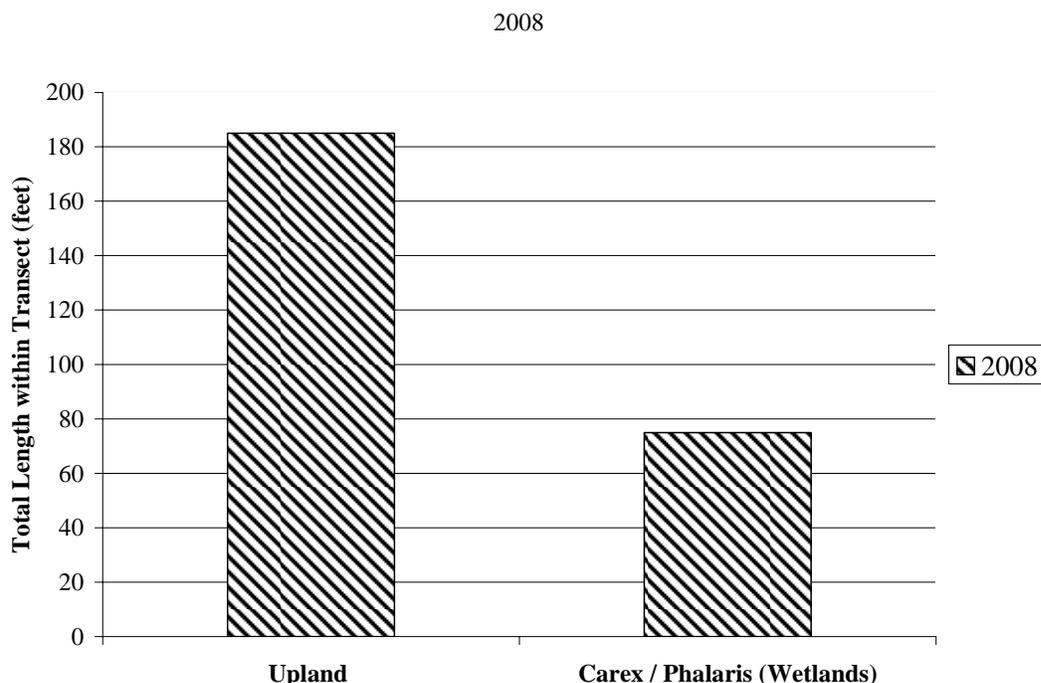
**Table 13: Jocko River Bridge: Transect data summary.**

<b>Monitoring Year</b>	<b>2008</b>
<b>Transect Length (feet)</b>	260
<b># Vegetation Community Transitions along Transect</b>	3
<b># Vegetation Communities along Transect</b>	3
<b># Hydrophytic Vegetation Communities along Transect</b>	1
<b>Total Vegetative Species</b>	19
<b>Total Hydrophytic Species</b>	11
<b>Total Upland Species</b>	8
<b>Estimated % Total Vegetative Cover</b>	82
<b>% Transect Length Comprised of Hydrophytic Vegetation Communities</b>	29
<b>% Transect Length Comprised of Upland Vegetation Communities</b>	71
<b>% Transect Length Comprised of Unvegetated Open Water</b>	0
<b>% Transect Length Comprised of Bare Substrate</b>	0

**Chart 7: Jocko River Bridge: Transect maps showing vegetation types from the start of transect (0 feet) to the end of transect (260 feet) for 2008.**



**Chart 8: Jocko River Bridge: Length of vegetation communities within Transect for 2008.**



### 3.2.3 Soils

Soils at the site are mapped in the Lake County Soil Survey as Xerofluvents, 0 to 2 % slope (NRCS 2008). The Xerofluvents soil series are associated with floodplains. Xerofluvents have two minor components that were used to describe the existing soils at the site: Bolack and Kerl series. Bolack silt loam, 0 to 2 percent slopes is listed as hydric and poorly drained. Bolack series consist of clayey alluvium with a seasonal water table at approximately 24 inches. The Kerl loam, 2 to 4 percent slope series was also a minor component, but was not considered hydric. Kerl loam is associated with alluvial fans and stream terraces landforms.

Wetland soils observed during monitoring and documented on the COE Routine Wetland Determination Form were mostly loams to sandy loam textured soils with very low chromas (1 or 2) within several inches of the surface (**Appendix B**). Redoximorphic features such as redox concentrations or depletion were not present in the profiles. The remaining soil profile described on the Routine Wetland Determination form was classified as upland soil, having no soil moisture or distinct hydric characteristics within 18 inches of the surface.

### 3.2.4 Wetland Delineation

Wetlands were delineated and mapped (**Jocko River Bridge Figure 3 in Appendix A**). Soils, vegetation, and hydrology are discussed in preceding sections (**COE Forms in Appendix B**). Approximately 0.19 wetland acre currently occurs within the monitoring area (**Table 14; Jocko River Bridge Figure 3 in Appendix A**). This site was not targeted for wetland creation, but rather enhancement / secondary restoration.

**Table 14: Wetland conditions identified at Jocko River Bridge Mitigation Site.**

CONDITION	2007(acre) <sup>1</sup>	2008 (acre)
Wetland Area	0.42	0.19
<b>Total Aquatic Habitat Area</b>	<b>0.42</b>	<b>0.19</b>

<sup>1</sup>Herrera 2007

The pre-construction (baseline) wetland delineation area is unknown, and therefore a pre-and post-project acreage comparison was not performed. Wetland size changed between the 2007 and 2008 monitoring, with a decrease of 0.23 acre. The 2007 delineation may have encountered slightly larger wetlands, before the site was significantly altered from neighboring horses entering and grazing the mitigation site. The net decrease in aquatic habitat to date on the site is approximately  $0.42 - 0.19 = 0.23$  acre.

### 3.2.5 Wildlife

Wildlife species, or evidence of wildlife, observed on the site during 2007 and 2008 monitoring efforts are listed in **Table 15**. Specific evidence observed, as well as activity codes pertaining to birds, is provided on the **Monitoring Form (Appendix B)**. This site provides habitat for a variety of wildlife species. One amphibian and 16 bird species were noted at the mitigation site during the 2008 site visits (**Table 15**). Other wildlife species presumably use the site but were not observed during the monitoring visits.

**Table 15: Fish and wildlife species observed at the Jocko River Bridge Wetland Mitigation Site from 2007 to 2008.**

<b>FISH</b>	
None	
<b>AMPHIBIAN</b>	
<b>Spotted frog (<i>Rana luteiventris</i>)</b>	
<b>REPTILE</b>	
None	
<b>BIRD</b>	
<b>American Robin (<i>Turdus migratorius</i>)</b>	<b>Common Grackle (<i>Quiscalus quiscula</i>)</b>
<b>American Redstart (<i>Setophaga ruticilla</i>)</b>	<b>Downey woodpecker (<i>Picoides pubescens</i>)</b>
<b>Belted Kingfisher (<i>Ceryle alcyon</i>)</b>	<b>Magpie (<i>Pica pica</i>)</b>
<b>Barn Swallow (<i>Hirundo rustica</i>)</b>	<b>Red-Tailed Hawk (<i>Buteo jamaicensis</i>)</b>
<b>Black Capped Chickadee (<i>Parus atricapillus</i>)</b>	<b>Red-Winged blackbird (<i>Agelaius phoeniceus</i>)</b>
<b>Brewer's Blackbird (<i>Euphagus cyanocephalus</i>)</b>	<b>Tree Swallow (<i>Tachycineta bicolor</i>)</b>
<b>Cedar waxwing (<i>Bombycilla cedrorum</i>)</b>	<b>Western Kingbird (<i>Tyrannus verticalis</i>)</b>
<b>Cliff Swallow (<i>Petrochelidon pyrrhonota</i>)</b>	<b>Yellow Warbler (<i>Dendroica petechia</i>)</b>
<b>MAMMAL</b>	
None	

**Bolded** species were observed during 2008 monitoring. All other species were observed during one or more of the previous monitoring years, but not during 2008.

### 3.2.6 Macroinvertebrates

Macroinvertebrate sampling was not conducted at the Jocko River Bridge site.

### 3.2.7 Functional Assessment

The functional assessment form completed in 2008 is included in **Appendix B** and is summarized in **Table 16**. The Jocko River Bridge site was assessed as one area (AA-1) for the purpose of functional assessment, and is currently rated as a Category III site.

Based on functional assessment results, approximately 0.99 functional units occur at the Jocko River Bridge site (**Table 16**). Baseline functional assessment results are provided in **Table 16**, but it should be noted that no calculated pre-project wetland area was available for comparison of functional gain. In addition, the pre-project functional assessment AA included several areas along the greater Jocko River corridor on either side of the highway, and the river itself, which were not included in the 2008 AA. The pre-project functional assessment score was therefore significantly inflated compared to the post-project assessment completed in 2008, and direct comparison of the two assessments is not practical.

**Table 16: Summary of baseline and 2008 wetland function/value ratings and functional points at the Jocko River Bridge Wetland Mitigation Project.**

Function and Value Parameters from the MDT Montana Wetland Assessment Method	Baseline <sup>1</sup>	2008 (AA-1) <sup>2</sup>
Listed/Proposed T&E Species Habitat	High (1.0)	Low (0.3)
MTNHP Species Habitat	Mod (0.7)	Low (0.1)
General Wildlife Habitat	Mod (0.5)	Mod (0.5)
General Fish/Aquatic Habitat	High (0.9)	NA
Flood Attenuation	Low (0.2)	Low (0.1)
Short and Long Term Surface Water Storage	High (0.8)	Mod (0.4)
Sediment/Nutrient/Toxicant Removal	High (0.9)	High (0.9)
Sediment/Shoreline Stabilization	High (1)	High (1.0)
Production Export/Food Chain Support	High (0.9)	Mod (0.6)
Groundwater Discharge/Recharge	High (1)	High (1.0)
Uniqueness	Mod (0.4)	Low (0.2)
Recreation/Education Potential	High (1)	Low (0.1)
<b>Actual Points / Possible Points</b>	<b>9.3 / 12</b>	<b>5.2 / 11</b>
<b>% of Possible Score Achieved</b>	<b>78%</b>	<b>47%</b>
<b>Overall Category</b>	<b>III</b>	<b>III</b>
<b>Total Acreage of Assessed Wetlands and Open Water within Easement (ac)</b>	Unknown	<b>0.19</b>
<b>Total Functional Units (acreage x actual points) (fu)</b>	Unknown	<b>0.99</b>
<b>Net Acreage Gain (ac)</b>	NA	Unknown
<b>Net Functional Unit Gain (fu)</b>	NA	Unknown

<sup>1</sup> The baseline assessment was performed by Herrera Environmental Consultants using the 1999 MDT Montana Wetland Assessment Method (MWAM) and included a much larger assessment area (Jocko River corridor on both sides of the highway) than did the 2008 assessment.

<sup>2</sup> Assessed by PBS&J during 2008 using the 1999 MDT MWAM because the mitigation crediting systems require direct comparisons of pre- and post-project functions. The completed form is in **Appendix B**.

### 3.2.8 Photographs

Representative photographs were taken in 2008 from established photo-points and transect ends (**Appendix C**).

### 3.2.9 Revegetation Efforts

Wetland and riparian vegetation enhancements were implemented in 2006 at the Jocko River Bridge Site. **Appendix G** presents the different planting specification for the containerized plantings. These enhancements included planting of containerized native tree and shrubs. Plants installed in the upland / riparian and wetland areas included thinleaf alder, serviceberry, water birch, red-osier dogwood, chokecherry, woods rose, Bebbs willow, Drummonds willow, sandbar willow and common snowberry.

Survival rates for native shrub plantings were assessed. Methodology employed by PBS&J included walking one transect within the planting areas and recording all living woody plantings by species. The survival transect revealed a heavily disturbed site with minimal remnants of plant installation. The neighboring horses apparently entered the site and destroyed many to most of the plantings. Few plantings did still exist near the south side of property outside of the fence-line. Plantings not affected by grazing had vigorous growth and appeared healthy.

### 3.2.10 Maintenance Needs/Recommendations

Two Category 1 noxious weeds, spotted knapweed and hounds tongue, were present at low cover values (**Jocko River Bridge Figure 3 in Appendix A**). A Category 2 noxious weed, tall buttercup, was also present both in wetland and upland areas. Noxious weeds should be controlled in accordance with the *Noxious Weed Management Guidelines, Species and Control Methods for US 93 Evaro to Polson Wetland Mitigation Sites* contained in the mitigation plan (Herrera 2004).

Evidence of horses accessing the site was observed during 2008 visit. The mitigation site should preclude grazing. Re-planting of impacted species should be considered.

### 3.2.11 Current Credit Summary

As of 2008, approximately 0.19 wetland acre occurs on the mitigation site. Pre-construction wetland delineation was not available for comparison. During the 2007 monitoring, 0.43 acre of wetlands was recorded at the site. The calculated net decrease in aquatic habitat acres to date is approximately  $0.42 - 0.19 = 0.23$  acre. The site was not proposed for wetland creation, but rather enhancement of riparian vegetation. As discussed in the functional assessment section, the pre- and post-project functional assessment scores were not entirely comparable due to the difference in evaluated AAs.

To determine the current crediting acres for the Jocko River Bridge, the total wetland acreage was separated into the individual mitigation type zones, and appropriate credit ratios were

applied for both the CSKT and Corps crediting systems. The Jocko Spring Creek mitigation type consists of enhancement (Corps) / secondary restoration (CSKT).

The following equation calculates the enhancement ratio for the enhancement activities for the site based on functional assessment scores described in preceding **Table 17**:

$$\text{Enhancement factor} = [(F_{\text{post}} - F_{\text{pre}}) / F_{\text{pre}}]$$

$$\text{Enhancement factor} = [(5.2 - 9.3) / 9.3]; \text{ Enhancement factor} = -0.44$$

$$\text{Enhancement Ratio} = 1 / -0.44; \text{ Enhancement Ratio} = -2.27 (0.0)$$

**Table 17** lists the current credits based on COE and CSKT credit ratios including this year’s calculated ratio for the rehabilitation areas at the Jocko River Bridge site. The enhancement ratio was calculated as negative value (due, in part, to differing functional assessment AAs), and therefore cannot be applied as a credit ratio. However, even if the pre- and post-project AAs were identical, it is likely that no gain (or possibly even a loss) in the functional points would have been recognized as of 2008 due to the impact of horse grazing on the site. The site is not progressing toward reaching the expected credits and currently is receiving no Corps credits based on the calculations. Current credit acres are below the expected credit acres.

**Table 17: Current credits at the Jocko River Bridge Mitigation Site.**

Targeted Mitigation Type	Current Wetland (Acre)	Credit Ratio		Current Credit (Acre)		Expected Credit (Acre)	
		COE	CSKT	COE	CSKT	COE	CSKT
Enhancement / secondary restoration	0.19	0:1	1.86:1	0.0	0.10	0.33	0.54
<b>TOTAL</b>	<b>0.19</b>			<b>0.0</b>	<b>0.10</b>	<b>0.33</b>	<b>0.54</b>

### 3.3 Jocko Spring Creek

#### 3.3.1 Hydrology

The main source of hydrology is perennial Jocko Spring Creek. This mitigation site occurs along the newly constructed Jocko Spring Creek channel and floodplain. A secondary source of hydrology is the persistent upwelling and lateral movement of groundwater through the alluvial materials across the Jocko Valley. The site is located adjacent to the MRL line along the toe of the slope. The site may receive additional hydrology from discharging groundwater along that boundary. Inundation was observed across approximately 50% of the created and enhanced mitigation area wetlands adjacent to the channel.

According to the WRCC, mean monthly precipitation from January through July from 1896 to 2008 totaled 10.13 inches for the St Ignatius weather station (WRCC 2008). During 2008, 10.14 inches (100 % of the mean) of precipitation were recorded at this station between January and July (WRCC 2008).

### 3.3.2 Vegetation

Fifty-seven plant species were identified at the site (**Table 18**). The majority of these species are herbaceous. A few small remnant shrub patches exist, found mostly along the southeast side of the project boundary. In addition, a small remnant stand of black cottonwood occurs within this area on the south side of railroad grade. A large peach-leaf willow occurs on the north side of the MRL line along the old channel. Five wetland types and three upland community types were identified and mapped at the mitigation site (**Jocko Spring Creek Figure 3 in Appendix A**). The five wetland community types are Type 3: *Carex/Glyceria*, Type 4: *Typha*, Type 5: *Populus*, Type 6: *Juncus/Agrostis*, and Type 7: *Salix/Juncus*. The three upland community types are Type 1: *Agropyron*, Type 2: *Symphoricarpos*, and Type 8: *Salix*. Plant species observed within each of these communities are listed on the **Monitoring Form (Appendix B)**.

Types 3 and 4 are the wettest community types and occurred as emergent wetland communities with shallow inundation (**Jocko Spring Creek Figure 3 in Appendix A**). Type 3 is the most prevalent community type and is dominated by beaked sedge, Bebb's sedge, tall mannagrass, dagger rush and reed canarygrass. Type 4 is dominated by mostly cattail and a minor amount of reed canarygrass.

Types 6 and 7 are the next wettest areas, consisting of emergent and scrub-shrub vegetation types occurring in an undisturbed wetland and the fringes of newly constructed channel. Type 6 is located adjacent to the channel and is dominated by Baltic rush and redtop. Type 7 is a remnant shrub patch and is dominated by an overstory of Bebb's willow with an understory dominated by Baltic rush and redtop. Type 7 is similar to Type 6, except for the inclusion of shrub species. Type 5 consisted of a small stand of forested vegetation dominated by black cottonwood with an understory of Bebb's willow and reed canarygrass.

Adjacent upland vegetation communities are mainly dominated by pasture grasses, aggressive invasives, upland shrub species and several large peach-leaf willows. Type 1 upland areas are currently dominated by slender wheatgrass, quackgrass, Kentucky bluegrass, Idaho fescue, cheatgrass and clasping pepper-grass. Type 2 upland areas are dominated by mostly common snowberry found in thick patches between the railroad grade and the highway, and other invasive species including Canada thistle, hounds tongue, quackgrass and goldenrod. Type 8 is a small area dominated by several large peach-leaf willows along the north side of railroad grade located adjacent to the old Jocko Spring Creek channel.

Several noxious weeds were observed and mapped throughout the Jocko Spring Creek site (**Jocko Spring Creek Figure 3 in Appendix A**). Types 1 and 2 contained several patches of invasive species with a moderate cover class. These were individual noxious weed locations or small patches not mapped as a community type, and included Canada thistle and hound's-tongue.

**Table 18: 2007 to 2008 vegetation species list for the Jocko Spring Creek Mitigation Site.**

Scientific Name <sup>1</sup>	Common Name	Region 9 (Northwest) Wetland Indicator
<i>Achillea millefolium</i>	common yarrow	FACU
<i>Agrostis alba</i>	redtop	FAC+
<i>Agropyron repens</i>	quackgrass	FACU
<i>Agropyron trachycaulum</i>	slender wheatgrass	FAC
<i>Alnus incana</i>	alder	FACW
<i>Bromus tectorum</i>	cheatgrass	--
<i>Carex aquatilis</i>	water sedge	OBL
<i>Carex bebbii</i>	Bebb sedge	OBL
<i>Carex lanuginosa</i>	wooly sedge	OBL
<i>Carex nebrascensis</i>	Nebraska sedge	OBL
<i>Carex spp.</i>	sedge	--
<i>Carex stipata</i>	awlfruit sedge	OBL
<i>Carex utriculata</i>	beaked sedge	OBL
<i>Centaurea maculosa</i>	spotted knapweed	--
<i>Chrysanthemum leucanthemum</i>	oxeye daisy	--
<i>Cirsium arvense</i>	Canada thistle	FACU+
<i>Cornus stolonifera</i>	red-osier dogwood	FACW
<i>Crataegus douglasii</i>	Douglas hawthorn	FAC
<i>Cynoglossum officinale</i>	hound's tongue	FACU
<i>Deschampsia cespitosa</i>	tufted hairgrass	FACW
<i>Dipsacus sylvestris</i>	teasel	NI
<i>Epilobium ciliatum</i>	hairy willow-herb	FACW+
<i>Festuca idahoensis</i>	Idaho fescue	--
<i>Geum macrophyllum</i>	big leafed avens	OBL
<i>Glyceria grandis</i>	tall mannagrass	OBL
<i>Impatiens ecalcarata</i>	impatiens	FACW
<i>Juncus ensifolius</i>	three-stamen rush	FACW
<i>Juncus spp.</i>	rush	--
<i>Lactuca serriola</i>	prickly lettuce	FAC-
<i>Lepidium perfoliatum</i>	clasping pepper-grass	FACU+
<i>Lychnis alba</i>	white campion	--
<i>Mentha arvensis</i>	field mint	FAC
<i>Mimulus guttatus</i>	monkey-flower	OBL
<i>Nepeta cataria</i>	catnip	--
<i>Phalaris arundinacea</i>	Reed canarygrass	FACW
<i>Phleum pretense</i>	timothy	FACU
<i>Poa pratensis</i>	Kentucky bluegrass	FACU+
<i>Polygonum amphibium</i>	water smartweed	OBL
<i>Polygonum spp.</i>	smartweed	--
<i>Populus trichocarpa</i>	cottonwood	FAC
<i>Prunus Americana</i>	American plum	FACU
<i>Rorippa nasturtium-aquaticum</i>	white watercress	OBL
<i>Rosa woodsii</i>	woods rose	FACU
<i>Rumex crispus</i>	curly dock	FACW
<i>Salix amygdaloides</i>	peach-leaf willow	FACW
<i>Salix bebbiana</i>	Bebb willow	FACW
<i>Salix drummondiana</i>	Drummond willow	FACW
<i>Salix lutea</i>	yellow willow	OBL

**Table 18 (continued): 2007 to 2008 vegetation species list for the Jocko Spring Creek Wetland Mitigation Site.**

Scientific Name <sup>1</sup>	Common Name	Region 9 (Northwest) Wetland Indicator
<i>Scirpus microcarpus</i>	small-fruit bulrush	OBL
<i>Sisymbrium altissimum</i>	tall tumble mustard	FACU-
<i>Solanum dulcamara</i>	climbing nightshade	FAC+
<i>Solidago missouriensis</i>	Missouri goldenrod	--
<i>Symphoricarpos albus</i>	snowberry	FACU
<i>Thlaspi arvense</i>	pennycress	NI
<i>Typha latifolia</i>	broad-leaf cattail	OBL
<i>Veronica Americana</i>	American speedwell	OBL
<i>Verbascum Thapsus</i>	common mullein	--

<sup>1</sup> **Bolded** species indicate those documented in the analysis area for the first time in 2008.

Vegetation transect results are detailed in the **Monitoring Form (Appendix B)** and are summarized in **Table 19 and 20**, and **Charts 9, 10, 11, and 12**. As all 2007 transect locations were changed in 2008, no 2007 transect data are presented.

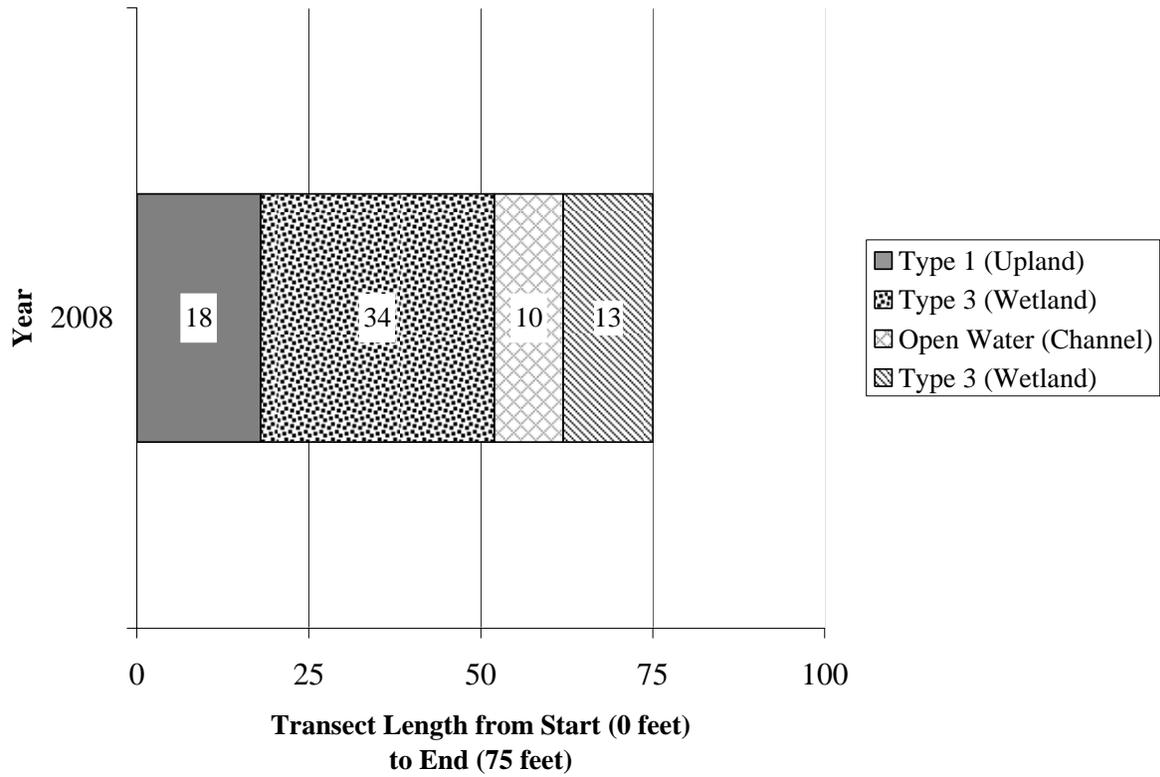
**Table 19: Jocko Spring Creek: Transect 1 data summary.**

Monitoring Year	2008
Transect Length (feet)	75
# Vegetation Community Transitions along Transect	2
# Vegetation Communities along Transect	2
# Hydrophytic Vegetation Communities along Transect	1
Total Vegetative Species	16
Total Hydrophytic Species	12
Total Upland Species	4
Estimated % Total Vegetative Cover	95
% Transect Length Comprised of Hydrophytic Vegetation Communities	63
% Transect Length Comprised of Upland Vegetation Communities	24
% Transect Length Comprised of Unvegetated Open Water	13
% Transect Length Comprised of Bare Substrate	0

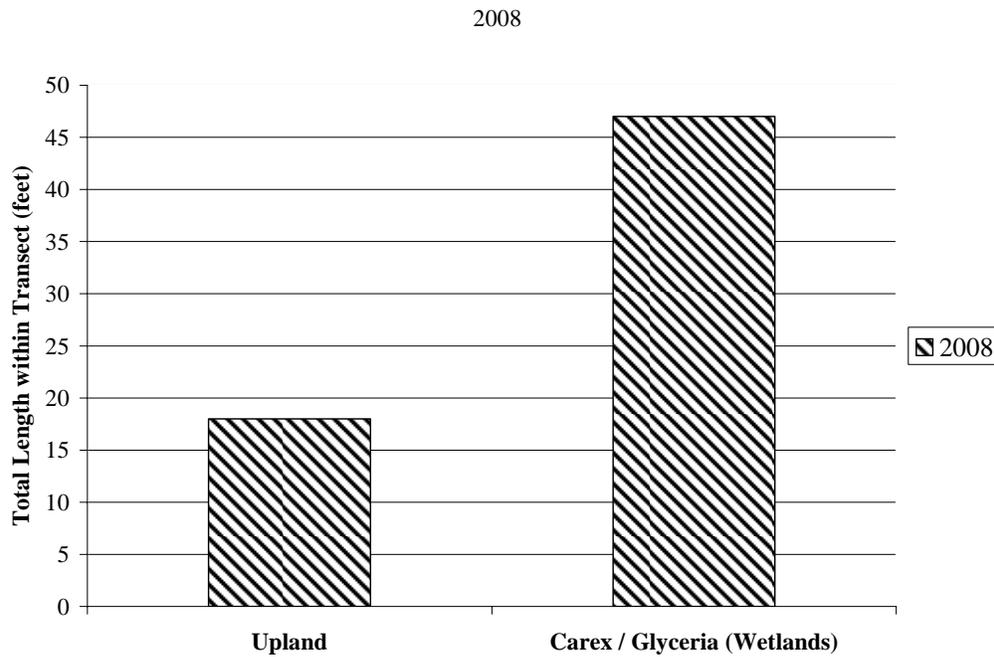
**Table 20: Jocko Spring Creek: Transect 2 data summary.**

Monitoring Year	2008
Transect Length (feet)	208
# Vegetation Community Transitions along Transect	2
# Vegetation Communities along Transect	2
# Hydrophytic Vegetation Communities along Transect	1
Total Vegetative Species	23
Total Hydrophytic Species	17
Total Upland Species	6
Estimated % Total Vegetative Cover	82
% Transect Length Comprised of Hydrophytic Vegetation Communities	88
% Transect Length Comprised of Upland Vegetation Communities	6
% Transect Length Comprised of Unvegetated Open Water	6
% Transect Length Comprised of Bare Substrate	0

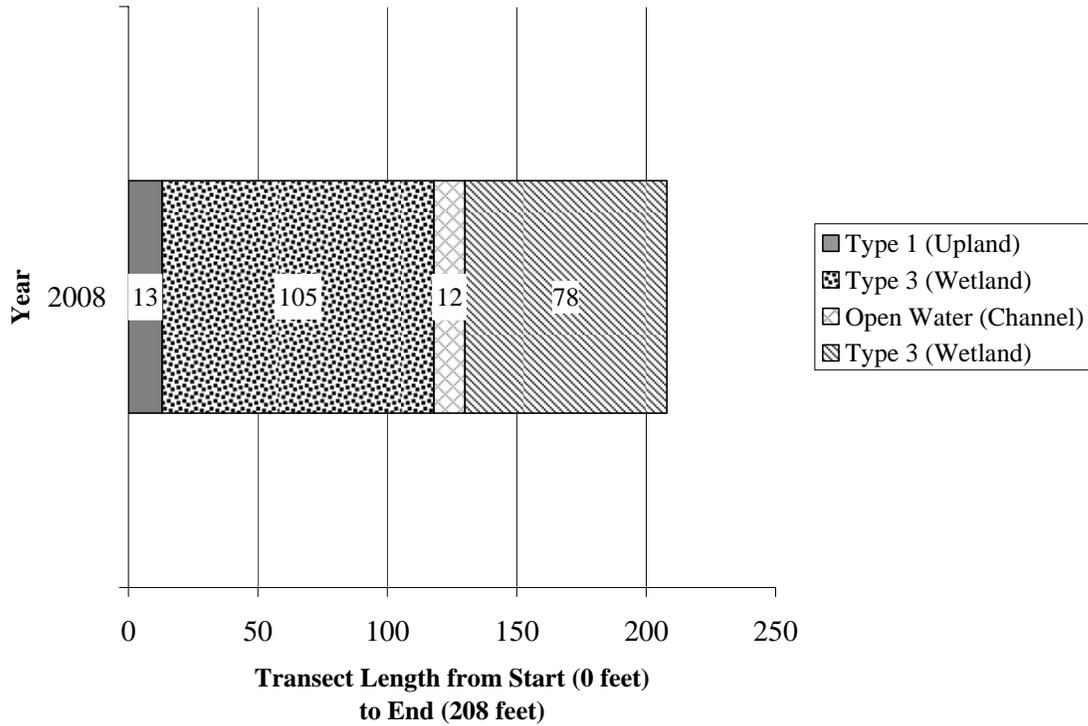
**Chart 9: Jocko Spring Creek: Transect 1 map showing vegetation types from the start of transect (0 feet) to the end of transect (75 feet) for 2008.**



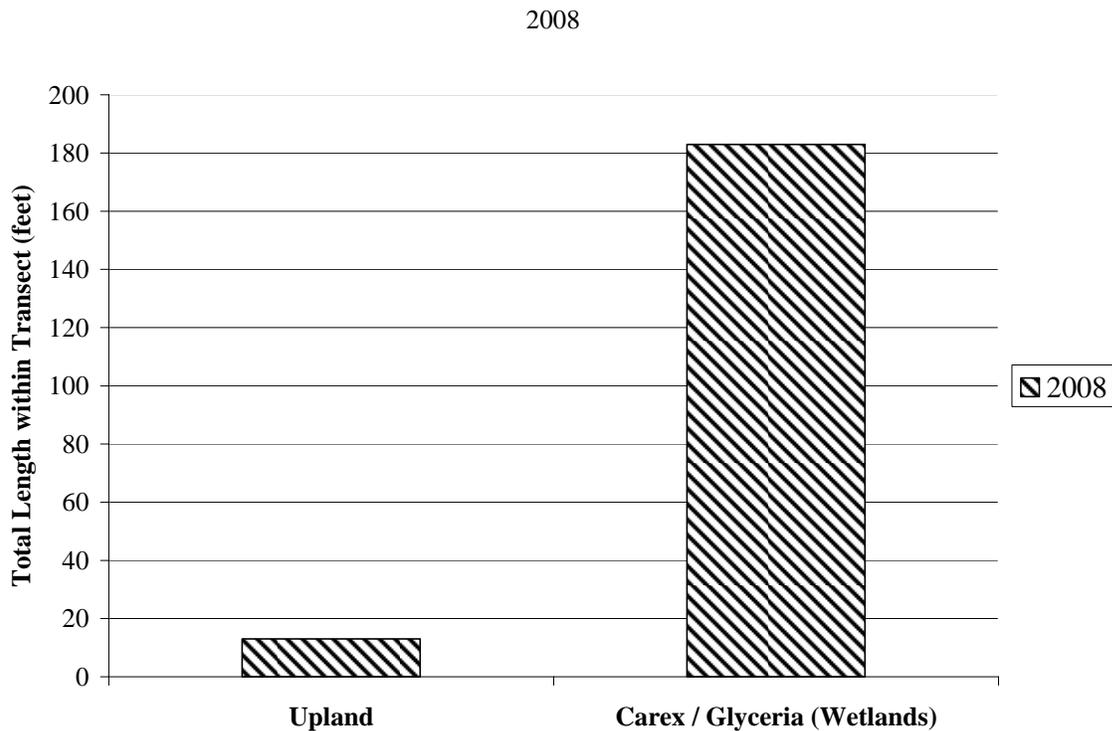
**Chart 10: Jocko Spring Creek: Length of vegetation communities within Transect 1 for 2008.**



**Chart 11: Jocko Spring Creek: Transect 2 map showing vegetation types from the start of transect (0 feet) to the end of transect (208) feet for 2008.**



**Chart 12: Jocko Spring Creek: Length of vegetation communities within Transect 2 for 2008.**



### 3.3.3 Soils

Soils at the site are mapped in the Lake County Soil Survey as Jocko gravelly loam, 0 to 4 percent slope, Ninepipe silt loam, 0 to 2 percent slope, and Xerofluvents, 0 to 2 percent slope. The Jocko gravelly loam series are somewhat excessively drained soils and are located on stream terraces. The Ninepipe and Xerofluvents soil series are associated with low stream terraces, fans, drainageways, and floodplains, and are moderately drained to somewhat poorly drained. Xerofluvents have two minor inclusions: Bohnly and Belton soils. Bohnly soils are considered hydric and are poorly drained (NRCS 2008).

Wetland soils observed during monitoring and documented on the Routine Wetland Determination form were mostly loams, or silt loams with very low chroma colors (1 or 2) within several inches of the surface. Redoximorphic feature such as redox concentrations or depleted matrix were not present in profiles.

### 3.3.4 Wetland Delineation

Wetland boundaries were delineated and mapped (**Jocko Spring Creek Figure 3 in Appendix A**). Soils, vegetation, and hydrology are discussed in preceding sections and on the **COE Forms (Appendix B)**. Approximately 2.08 aquatic habitat acres occur within the monitoring area (**Table 21; Jocko Spring Creek Figure 3 in Appendix A**).

**Table 21: Wetland conditions identified at Jocko Spring Creek Mitigation Site.**

CONDITION	2007(acre) <sup>2</sup>	2004 <sup>1</sup> (acre)	2008 (acre)
Wetland Area	1.35	2.0	1.81
Open Water Area			0.27
<b>Total Aquatic Habitat</b>	<b>1.35</b>	<b>2.0</b>	<b>2.08</b>

<sup>1</sup>Herrera 2004, <sup>2</sup>Herrera 2007

Pre-project wetland delineation documented 2.00 acres of wetlands that included the degraded Jocko Spring Creek channel and wetlands along the west side of the MRL line that were enhanced as part of the mitigation activities (Herrera 2004). The net increase in aquatic habitat acres to date on the site is approximately  $2.08 - 2.0 = 0.08$  acre.

Wetland size increased between the 2007 and 2008 monitoring by 0.90 acre. Wetland mapping captured new wetland areas along the southeast boundary during the 2008 monitoring that were not mapped during 2007, possibly due to wetland development associated with continued surface and groundwater flows across the site. Approximately 1.81 wetland acres and 0.27 open water acre consisting of the creek are currently within the monitoring area for a total of 2.08 acres of aquatic habitat (**Jocko Spring Creek Figure 3 in Appendix A**).

### 3.3.5 Wildlife

Wildlife species, or evidence of wildlife, observed on the site during 2007 and 2008 monitoring efforts were compiled (**Table 22**). Specific evidence observed, as well as activity codes pertaining to birds, is provided on the **Monitoring Form (Appendix B)**. This site provided

habitat for a variety of wildlife species. Three mammal, one reptile, and 16 bird species were noted at the mitigation site during the 2008 site visits (**Table 22**). Many other wildlife species presumably use the site but were not observed during the monitoring visits.

**Table 22: Fish and wildlife species observed at the Jocko Spring Creek Wetland Mitigation Site from 2007 to 2008.**

<b>FISH</b>	
Longnose dace ( <i>Rhinichthys cataractae</i> ) <sup>1</sup> Longnose sucker ( <i>Catostomus catostomus</i> ) <sup>1</sup> Brook trout ( <i>Salvelinus fontinalis</i> ) <sup>1</sup> Brown trout ( <i>Salmo trutta</i> ) <sup>1</sup>	Mountain whitefish ( <i>Prosopium williamsoni</i> ) <sup>1</sup> Rainbow trout ( <i>Oncorhynchus mykiss</i> ) <sup>1</sup> Rainbow trout x westslope cutthroat trout ( <i>Oncorhynchus clarkii X mykiss</i> ) <sup>1</sup> Slimy sculpins ( <i>Cottus cognatus</i> ) <sup>1</sup>
<b>AMPHIBIAN</b>	
None	
<b>REPTILE</b>	
<b>Painted Turtle (<i>Chrysemys picta</i>)</b>	
<b>BIRD</b>	
American Coot ( <i>Fulica americana</i> ) American Crow ( <i>Corvus brachyrhynchos</i> ) <b>American Robin (<i>Turdus migratorius</i>)<sup>2</sup></b> American Wigeon ( <i>Anas americana</i> ) American White Pelican ( <i>Pelecanus erythrorhynchos</i> ) Bald Eagle ( <i>Haliaeetus leucocephalus</i> ) Belted Kingfisher ( <i>Ceryle alcyon</i> ) Barn Swallow ( <i>Hirundo rustica</i> ) <b>Black-Billed Magpie (<i>Pica hudsonia</i>)<sup>2</sup></b> <b>Black Capped Chickadee (<i>Parus atricapillus</i>)<sup>2</sup></b> Black & White Warbler ( <i>Mniotilta varia</i> ) Blue-Winged Teal ( <i>Anas discors</i> ) Brown-Headed cowbird ( <i>Molothrus ater</i> ) Canada Goose ( <i>Branta canadensis</i> ) Cinnamon Teal ( <i>Anas cyanoptera</i> ) Cliff Swallow ( <i>Petrochelidon pyrrhonota</i> ) <b>Common Raven (<i>Corvus corax</i>)<sup>2</sup></b> Doubled Crested Cormorant ( <i>Phalacrocorax auritus</i> ) Eastern Kingbird ( <i>Tyrannus tyrannus</i> ) Eurasian Wigeon ( <i>Anas Penelope</i> ) European Starling ( <i>Sturnus vulgaris</i> ) Field Sparrow ( <i>Spizella pusilla</i> ) Great Blue Heron ( <i>Ardea herodias</i> )	Hooded Merganser ( <i>Lophodytes cucullatus</i> ) Killdeer ( <i>Charadrius vociferous</i> ) Lesser Yellowlegs ( <i>Tringa flavipes</i> ) <b>Mallard (<i>Anas platyrhynchos</i>)<sup>2</sup></b> <b>Mourning Dove (<i>Zenaida macroura</i>)<sup>2</sup></b> Northern Flicker ( <i>Colaptes auratus</i> ) Northern Harrier ( <i>Circus cyaneus</i> ) Northern Shoveler ( <i>Anas clypeata</i> ) <b>Osprey (<i>Pandoin haliaetus</i>)<sup>2</sup></b> <b>Red-Tailed Hawk (<i>Buteo jamaicensis</i>)<sup>2</sup></b> <b>Red-Winged blackbird (<i>Agelaius phoeniceus</i>)<sup>2</sup></b> <b>Ring-Billed Gull (<i>Larus delawarensis</i>)<sup>2</sup></b> <b>Ring-necked Pheasant (<i>Phasianus colchicus</i>)</b> Song Sparrow ( <i>Melospiza melodia</i> ) <b>Spotted Sandpiper (<i>Actitis macularia</i>)<sup>2</sup></b> <b>Tree Swallow (<i>Tachycineta bicolor</i>)</b> Violet-Green Swallow ( <i>Tachycineta thalassina</i> ) Western Kingbird ( <i>Tyrannus verticalis</i> ) Western Meadowlark ( <i>Sturnella neglecta</i> ) <b>Wood Duck (<i>Aix sponsa</i>)<sup>2</sup></b> <b>Yellow-Headed Blackbird (<i>Xanthocephalus xanthocephalus</i>)<sup>2</sup></b> <b>Yellow Warbler (<i>Dendroica petechia</i>)<sup>2</sup></b>
<b>MAMMAL</b>	
Coyote ( <i>Canis latrans</i> ) <b>Deer (<i>Odocoileus spp.</i>)</b> Mouse [young] ( <i>Peromyscus spp.</i> )	<b>Muskrat (<i>Ondatra zibethicus</i>)</b> <b>Raccoon (<i>Procyon lotor</i>)</b> Red Fox ( <i>Vulpes vulpes</i> )

<sup>1</sup> Survey conducted by CSKT Fisheries Department.

<sup>2</sup> Observed by MDT.

**Bolded** species were observed during 2008 monitoring. All other species were observed during one or more of the previous monitoring years, but not during 2008.

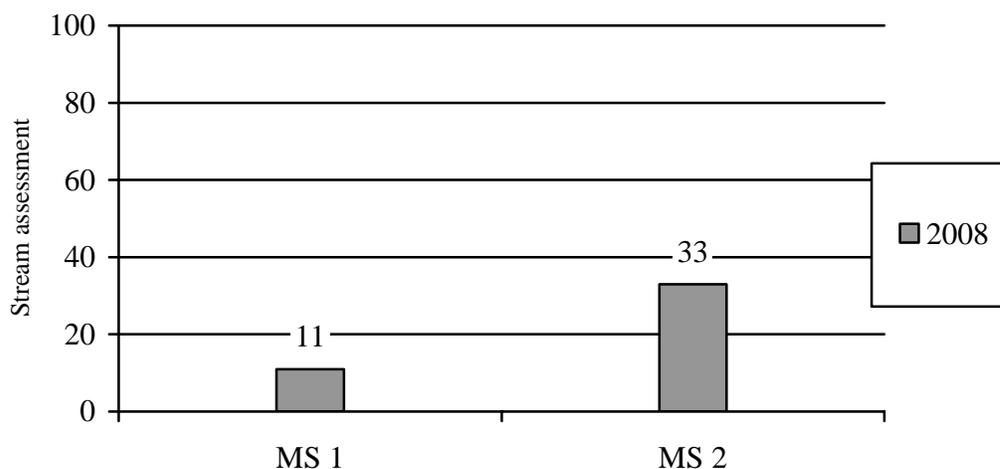
### 3.3.6 Macroinvertebrates

Sampling points for Jocko Spring Creek was located along the newly constructed channels at two locations (**Jocko Spring Creek Figure 2 in Appendix A**). The complete macroinvertebrate data results are included in **Appendix F** and are summarized below, in italics, by Rhithron Associates, Inc. (Bollman 2008). Stream bioassessment scores were graphed for 2008 (**Chart 13**) (Bollman 2008).

**Jocko Spring Creek – MS 1.** *The sample collected at this site yielded only 26 individuals. This extremely low abundance suggests poor habitat conditions or poor water quality or both. No additional inferences can be drawn, because of the depauperate fauna. Scores indicated in the chart were derived by means of a metric battery and scoring criteria developed for lotic conditions (MVFP index: Bollman 1998).*

**Jocko Spring Creek – MS 2.** *The sample collected at this site yielded an abundance of invertebrates; however, the stream assessment index suggests that water quality and habitat conditions here are moderately impaired. The fauna here is not typical of a spring-fed system; instead, the site supports an assemblage similar to expectations for a runoff based stream. Midges account for 61% of the sampled animals, and no mayflies or stoneflies were collected. These findings suggest that water quality may have been impaired. Nutrient enrichment is suggested by the abundance of *Cricotopus spp.* and *Orthocladius spp.*, since these midges are typically associated with filamentous algae. Thermal preference for the assemblage was calculated at 16.3°C. Colonization of stony substrate habitats was apparently not substantially impaired by sediment deposition. Scores indicated in the chart were derived by means of a metric battery and scoring criteria developed for lotic conditions (MVFP index: Bollman 1998).*

**Chart 13: Stream assessment scores for Jocko Spring Creek Wetland Mitigation Site.**



### 3.3.7 Functional Assessment

The completed 2008 functional assessment form is included in **Appendix B**. The Jocko Spring Creek site was assessed as one area (AA-1) for the purpose of functional assessment, and is currently rated as a Category II site. Based on functional assessment results approximately 18.1 functional units occur at the Jocko Spring Creek mitigation site as of 2008 (**Table 23**). Baseline functional assessment results are also provided for general comparative purposes (**Table 23**). Mitigation crediting systems required that a pre-and post-project functional assessment using the 1999 methods be conducted to assess a functional shift to higher score.

Despite projections, the post-project assessment considered the site to have a moderate (as opposed to low) disturbance rating due to the existing agriculture to west, adjacent railroad grade and highway influence. Nonetheless, functional points and ratings improved significantly for several assessed parameters over baseline conditions.

**Table 23: Summary of baseline and 2008 wetland function/value ratings and functional points at the Jocko Spring Creek Wetland Mitigation Project.**

Function and Value Parameters from the MDT Montana Wetland Assessment Method	Baseline (AA-1) <sup>1</sup>	2008 (AA-1) <sup>2</sup>
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)
MTNHP Species Habitat	Mod (0.6)	Mod (0.6)
General Wildlife Habitat	Mod (0.5)	Mod (0.7)
General Fish/Aquatic Habitat	High (0.9)	High (0.9)
Flood Attenuation	Low (0.2)	Low (0.1)
Short and Long Term Surface Water Storage	High (0.8)	High (0.8)
Sediment/Nutrient/Toxicant Removal	Mod (0.6)	High (0.9)
Sediment/Shoreline Stabilization	Mod (0.7)	High (1.0)
Production Export/Food Chain Support	Mod (0.7)	High (0.9)
Groundwater Discharge/Recharge	High (1)	High (1.0)
Uniqueness	Mod (0.4)	Mod (0.5)
Recreation/Education Potential	High (1.0)	High (1.0)
<b>Actual Points / Possible Points</b>	<b>7.7 / 12</b>	<b>8.7 / 12</b>
<b>% of Possible Score Achieved</b>	<b>64%</b>	<b>73%</b>
<b>Overall Category</b>	<b>III</b>	<b>II</b>
<b>Total Acreage of Assessed Wetlands and Open Water within Easement (ac)</b>	<b>2.0</b>	<b>2.08</b>
<b>Total Functional Units (acreage x actual points) (fu)</b>	<b>15.40</b>	<b>18.1</b>
<b>Net Acreage Gain (ac)</b>	<b>NA</b>	<b>0.08</b>
<b>Net Functional Unit Gain (fu)</b>	<b>NA</b>	<b>2.7</b>

<sup>1</sup> The baseline assessment was performed by Herrera Environmental Consultants using the 1999 MDT Montana Wetland Assessment Method (MWAM).

<sup>2</sup> Performed by PBS&J during 2008 using the 1999 MDT MWAM because the mitigation crediting systems require direct comparisons of pre- and post-project functions. The completed MDT MWAM forms for 2008 are in **Appendix B**.

### 3.3.8 Photographs

Representative photographs were taken in 2008 from established photo-points and transect ends (**Appendix C**).

### 3.3.9 Revegetation Efforts

Wetland and riparian vegetation seeding and plantings were implemented in 2006. **Appendix G** presents the different planting specification for each seed mix and containerized plantings. These enhancements included broadcast seeding of a wetland seed mix and planting of native shrub and grass-like seedlings.

Survival rates for native shrub plantings were assessed. Methodology included walking three transects within the planting areas and recording all living woody plantings by species. The survival transects only assessed woody species and not the grass-like species plantings. Two transects were established along the wetlands with one on both sides of wetlands near the outer edge, capturing the varying planting zones. A third survival transect was established on the north side of the railroad grade within the restored upland community.

Results are recorded on the **Monitoring Form (Appendix B)** and include general qualitative descriptions of each species within the different planting areas. The percentage ratings for each species' survival were not calculated due to lack of quantifiable planting numbers within the transect locations and the inherent inaccuracy with calculations based on total number of original plantings within limited transect areas. The observed plantings along all transects looked healthy and exhibited vigorous growth for the season. Few dead species were recorded. Plantings were protected with browse control nets that offered protection from local wildlife. Plantings along the wetland fringes were flourishing and received more than adequate hydrology to sustain continued growth.

### 3.3.10 Maintenance Needs/Recommendations

Category 1 noxious weeds Canada thistle and hounds tongue were present at moderate cover values (**Jocko Spring Creek Figure 3 in Appendix A**). Noxious weeds should be controlled in accordance with the *Noxious Weed Management Guidelines, Species and Control Methods for US 93 Evaro to Polson Wetland Mitigation Sites* contained in the mitigation plan (Herrera 2004).

### 3.3.11 Current Credit Summary

As of 2008, approximately 1.81 acres of wetland and 0.27 acres of open water / channel occur on the mitigation site, for a total of 2.08 acres of aquatic habitat. Subtracting the original 2.0 acres of pre-project wetlands from this total yields a current net of approximately 0.08 wetland/open water acres. The site has gained approximately 2.7 functional units to date.

To determine the current crediting acres for the Jocko Spring Creek, the total wetland acreage was separated into the individual mitigation type zones, acreages were calculated for each type, and credit ratios were applied for both the CSKT and Corps crediting systems. The Jocko Spring

Creek mitigation types consist of creation, re-establishment (Corps) / primary restoration (CSKT), and enhancement (Corps) / secondary restoration (CSKT).

The following equation calculates the enhancement ratio for the rehabilitation activities based on functional assessment scores described in preceding **Table 24**:

$$\text{Enhancement factor} = [(F_{\text{post}} - F_{\text{pre}}) / F_{\text{pre}}]$$

$$\text{Enhancement factor} = [(8.7 - 7.7) / 7.7]; \text{ Enhancement factor} = 0.13$$

$$\text{Enhancement Ratio} = 1 / 0.13; \text{ Enhancement Ratio} = 7.69$$

**Table 24** lists the current credits based on COE and CSKT credit ratios, including this year's calculated ratio for the rehabilitation areas at the Jocko Spring Creek site. The Jocko Spring Creek wetland mitigation site is progressing toward reaching the expected credits. Current credit acres are below expected credit acres, but with further development of targeted wetland creation between the highway and the railroad grade, the site could reach the mitigation goals. Functional assessment scores are predicted to increase as vegetation matures.

**Table 24: Current credits at the Jocko Spring Creek Mitigation Site.**

Targeted Mitigation Type <sup>1</sup>	Current Wetland (Acre) <sup>1</sup>	Credit Ratio		Current Credit (Acre)		Expected Credit (Acre)	
		COE	CSKT	COE	CSKT	COE	CSKT
Creation	0.66	1:1	3.36:1	0.66	0.19	2.17	1.17
Rehabilitation / primary restoration	0.82	1:1	1.86:1	0.82	0.44	0.59 <sup>2</sup>	0.32
Enhancement / secondary restoration	0.05	7.69:1	--	0.01	0.0	0.01	0.0
Assumed pre-existing wetland (based on the site plan) occurring outside of Mitigation Type boundaries	0.55	--	--	--	--	--	--
<b>TOTAL</b>	<b>2.08</b>			<b>1.49</b>	<b>0.63</b>	<b>2.77<sup>2</sup></b>	<b>1.49</b>

<sup>1</sup> Target mitigation type zone boundaries were derived from the site plan.

<sup>2</sup> Corrected from values presented in the 2007 mitigation monitoring report. The revised figures are based on the site plan (**Appendix D**).

### 3.4 Peterson

#### 3.4.1 Hydrology

The main source of hydrology at the Peterson site is an unnamed perennial tributary of Post Creek. This mitigation site occurs within a long wetland swale that runs east to west. The site receives seasonal flooding during spring runoff and sustained flows during the summer from irrigation return. As part of the mitigation activities, twelve log crib structures were installed to create shallow inundation behind the structures. The site exhibited shallow inundation of varying extents behind these impoundments during the monitoring visit. Each crib structure was designed to allow surface flow to spill through a designated overflow. Inundation was present

throughout all of Community Types 2, 3, and 4 as described below (**Peterson Figure 3 in Appendix A**).

According to the WRCC, mean monthly precipitation from January through July from 1896 to 2008 totaled 10.13 inches for the St. Ignatius weather station (WRCC 2008). During 2008, 10.14 inches (100 % of the mean) of precipitation were recorded at this station between January and July (WRCC 2008).

### 3.4.2 Vegetation

Sixty-three plant species were identified at the site (**Table 25**). The majority of these species are herbaceous. The site has no woody vegetation, except for the plantings installed as part of the mitigation efforts to enhance scrub-shrub habitat. Three wetland types and one upland community type were identified and mapped at the mitigation site (**Peterson Figure 3 in Appendix A**). The three wetland community types were Type 2: *Phalaris*, Type 3: *Phalaris/Typha*, and Type 4: *Carex/Poa*. The upland community type was Type 1: *Agropyron*. Plant species observed within each of these communities are listed on the **Monitoring Form (Appendix B)**.

**Table 25: 2008 vegetation species list for the Peterson Wetland Mitigation Site.**

Scientific Name <sup>1</sup>	Common Name	Region 9 (Northwest) Wetland Indicator
<i>Achillea millefolium</i>	common yarrow	FACU
<i>Agrostis alba</i>	redtop	FAC+
<i>Agropyron repens</i>	quackgrass	FACU
<i>Agropyron smithii</i>	western wheatgrass	FACU
<i>Agropyron spp.</i>	wheatgrass	--
<i>Agropyron trachycaulum</i>	slender wheatgrass	FAC
<i>Alnus incana</i>	alder	FACW
<i>Bidens cernua</i>	nodding beggar-ticks	FACW+
<i>Bromus inermis</i>	smooth brome	--
<i>Bromus japonicus</i>	Japanese brome	FACU
<i>Bromus tectorum</i>	cheatgrass	--
<i>Cardaria draba</i>	whitetop	--
<i>Carex bebbii</i>	Bebb sedge	--
<i>Carex nebrascensis</i>	Nebraska sedge	OBL
<i>Carduus nutans</i>	musk thistle	--
<i>Carex spp.</i>	sedge	--
<i>Carex stipata</i>	awlfuit sedge	OBL
<i>Carex utriculata</i>	beaked sedge	OBL
<i>Chrysanthemum leucanthemum</i>	oxeye daisy	--
<i>Cirsium arvense</i>	Canada thistle	FACU+
<i>Cirsium vulgare</i>	bull thistle	FACU
<i>Cornus stolonifera</i>	red-osier dogwood	FACW
<i>Dactylis glomerata</i>	orchardgrass	FACU
<i>Descurainia sophia</i>	flixweed	--
<i>Dipsacus sylvestris</i>	teasel	NI
<i>Eleocharis palustris</i>	creeping spikerush	OBL
<i>Epilobium ciliatum</i>	hairy willow-herb	FACW+
<i>Erodium cicutarium</i>	redstem stork's bill	--

**Table 25 (continued): 2008 vegetation species list for the Peterson Wetland Mitigation Site.**

Scientific Name	Common Name	Region 9 (Northwest) Wetland Indicator
<i>Festuca arundinacea</i>	Kentucky fescue	FACU-
<i>Festuca</i> spp.	Fescue	--
<i>Glyceria grandis</i>	American mannagrass	OBL
<i>Impatiens ecalcarata</i>	impatiens	FACW
<i>Iris pseudacorus</i>	yellow iris	OBL
<i>Juncus balticus</i>	Baltic rush	OBL
<i>Juncus ensifolius</i>	three-stamen rush	FACW
<i>Juncus</i> spp.	rush	--
<i>Lactuca serriola</i>	prickly lettuce	FAC-
<i>Lemna minor</i>	common duckweed	OBL
<i>Lepidium campestre</i>	field pepperweed	--
<i>Lepidium perfoliatum</i>	clasping pepper-grass	FACU+
<i>Lychnis alba</i>	white campion	--
<i>Malva neglecta</i>	common mallow	--
<i>Medicago Sativa</i>	alfalfa	--
<i>Melilotus officinalis</i>	yellow sweetclover	FACU
<i>Nepeta cataria</i>	catnip	--
<i>Oenanthe</i> spp.	primrose	--
<i>Phalaris arundinacea</i>	Reed canarygrass	FACW
<i>Poa pratensis</i>	Kentucky bluegrass	FACU+
<i>Poa</i> spp.	bluegrass	--
<i>Polygonum bistortoides</i>	American bisort	FACW+
<i>Polygonum</i> spp.	smartweed	--
<i>Potentilla recta</i>	sulphur cinquefoil	--
<i>Rorippa nasturtium-aquaticum</i>	white watercress	OBL
<i>Rosa woodsii</i>	woods rose	FACU
<i>Rumex crispus</i>	curly dock	FACW
<i>Salix bebbiana</i>	Bebb willow	FACW
<i>Salix drummondiana</i>	Drummond willow	FACW
<i>Scirpus microcarpus</i>	small-fruit bulrush	OBL
<i>Sonchus arvensis</i>	field sowthistle	FACU+
<i>Thlaspi arvense</i>	pennycress	NI
<i>Tragopogon dubius</i>	yellow salsify	--
<i>Trifolium pratense</i>	red clover	FACU
<i>Trifolium</i> spp.	clover	--
<i>Typha latifolia</i>	broad-leaf cattail	OBL

Types 2 and 3 are the wettest community types and occurred as aquatic bed/emergent wetland communities in the shallow water impounded behind the log crib structures (**Peterson Figure 3** in **Appendix A**). Type 2 is dominated by a monoculture of reed canarygrass with a small inclusion of teasel. Type 3 is dominated by a slightly higher diversity of plants including cattail, reed canarygrass, beaked sedge, tall mannagrass, and rush (*Juncus spp.*). Reed canarygrass and cattail had the highest cover values for this community type and were inundated with shallow water. Type 4 is dominated by a slightly drier species mix and was found in the transition zone between the wettest inundated areas and the dry outer fringes of the wetland. Type 4 is dominated mostly by Nebraska sedge and fowl bluegrass, with small amounts of reed canarygrass, teasel and common plantain.

Adjacent upland vegetation communities are mainly dominated by pasture grasses and/or aggressive invasive species. Type 1 is an upland area currently dominated by pasture grasses

such as quackgrass and Kentucky bluegrass, and other invasive / aggressive species including claspig pepperweed, field pepperweed, teasel, tumble mustard, sulfur cinquefoil, and whitetop.

Several noxious weeds were observed throughout the Peterson site. Type 1 has a moderate amount of invasive species located throughout. Noxious weed locations observed during the 2008 field visit were mapped (**Peterson Figure 3** in **Appendix A**). These were individual noxious weed locations or small patches not mapped as a community type, and include Canada thistle, yellow iris, and whitetop (*Cardaria draba*). Several other noxious weed species were recorded only at the community level and were therefore not mapped.

Vegetation transect results are detailed in the **Monitoring Form (Appendix B)** and are summarized in **Table 26** and **27** and **Charts 14, 15, 16, and 17**.

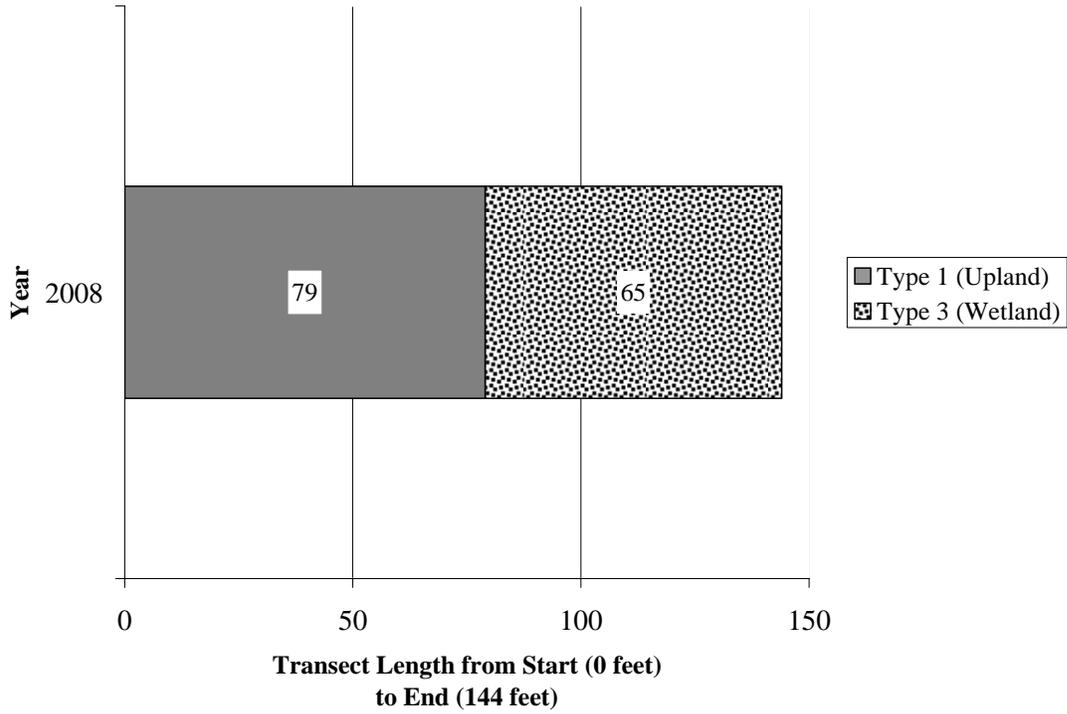
**Table 26: Peterson: Transect 1 data summary.**

Monitoring Year	2008
Transect Length (feet)	144
# Vegetation Community Transitions along Transect	3
# Vegetation Communities along Transect	2
# Hydrophytic Vegetation Communities along Transect	1
Total Vegetative Species	19
Total Hydrophytic Species	9
Total Upland Species	10
Estimated % Total Vegetative Cover	100
% Transect Length Comprised of Hydrophytic Vegetation Communities	45
% Transect Length Comprised of Upland Vegetation Communities	55
% Transect Length Comprised of Unvegetated Open Water	0
% Transect Length Comprised of Bare Substrate	0

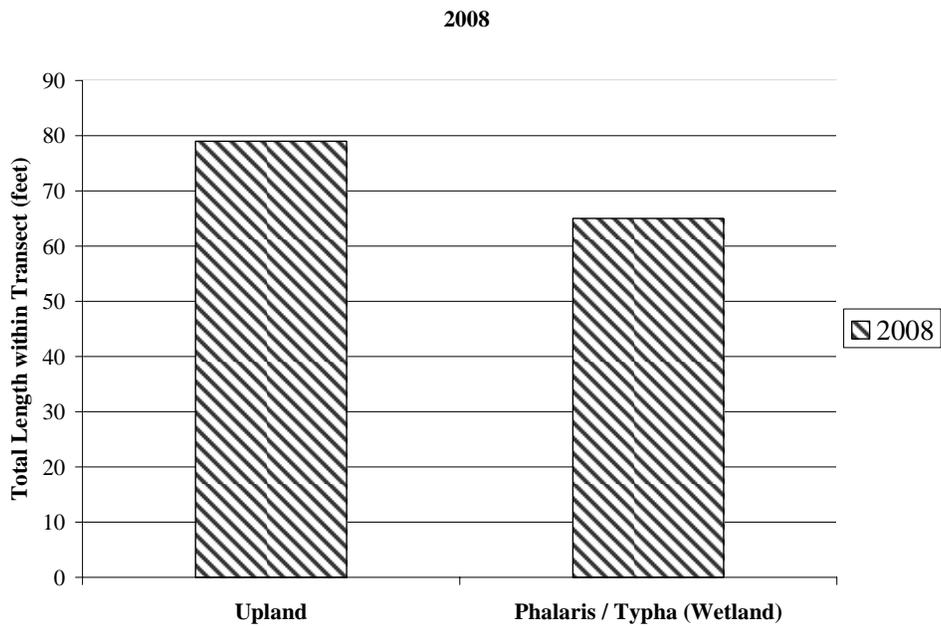
**Table 27: Peterson: Transect 2 data summary.**

Monitoring Year	2008
Transect Length (feet)	325
# Vegetation Community Transitions along Transect	3
# Vegetation Communities along Transect	3
# Hydrophytic Vegetation Communities along Transect	2
Total Vegetative Species	21
Total Hydrophytic Species	11
Total Upland Species	10
Estimated % Total Vegetative Cover	93
% Transect Length Comprised of Hydrophytic Vegetation Communities	90
% Transect Length Comprised of Upland Vegetation Communities	10
% Transect Length Comprised of Unvegetated Open Water	0
% Transect Length Comprised of Bare Substrate	0

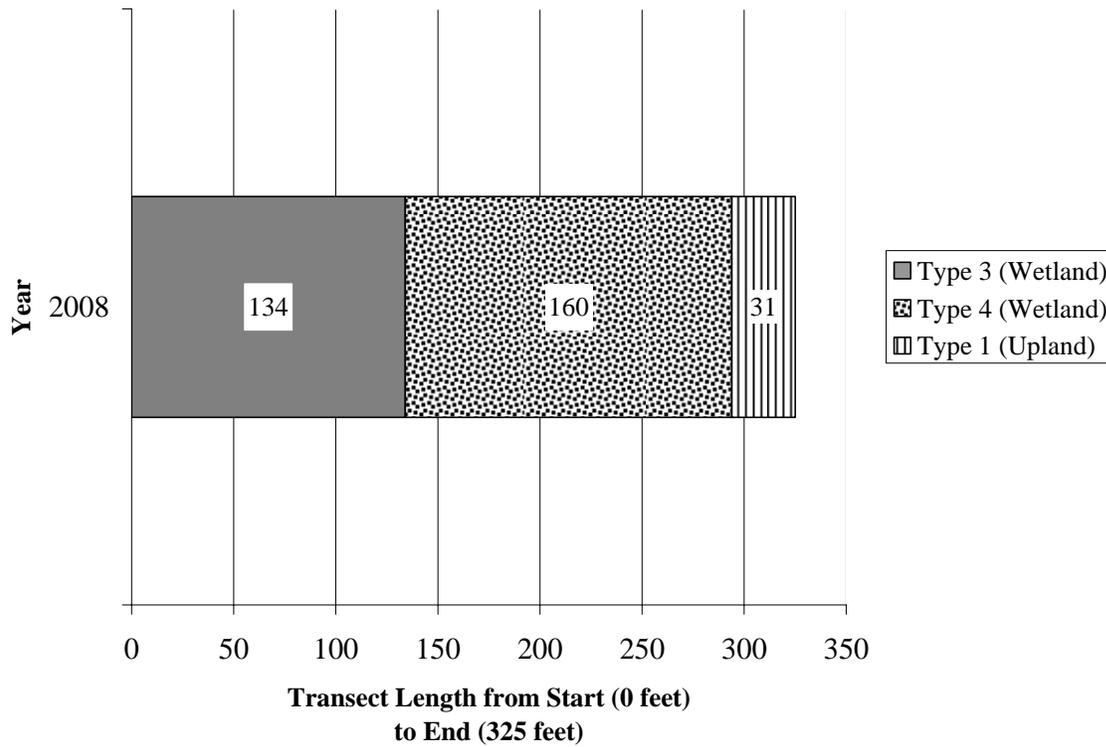
**Chart 14: Peterson: Transect 1 map showing vegetation types from the start of transect (0 feet) to the end of transect (144 feet) for 2008.**



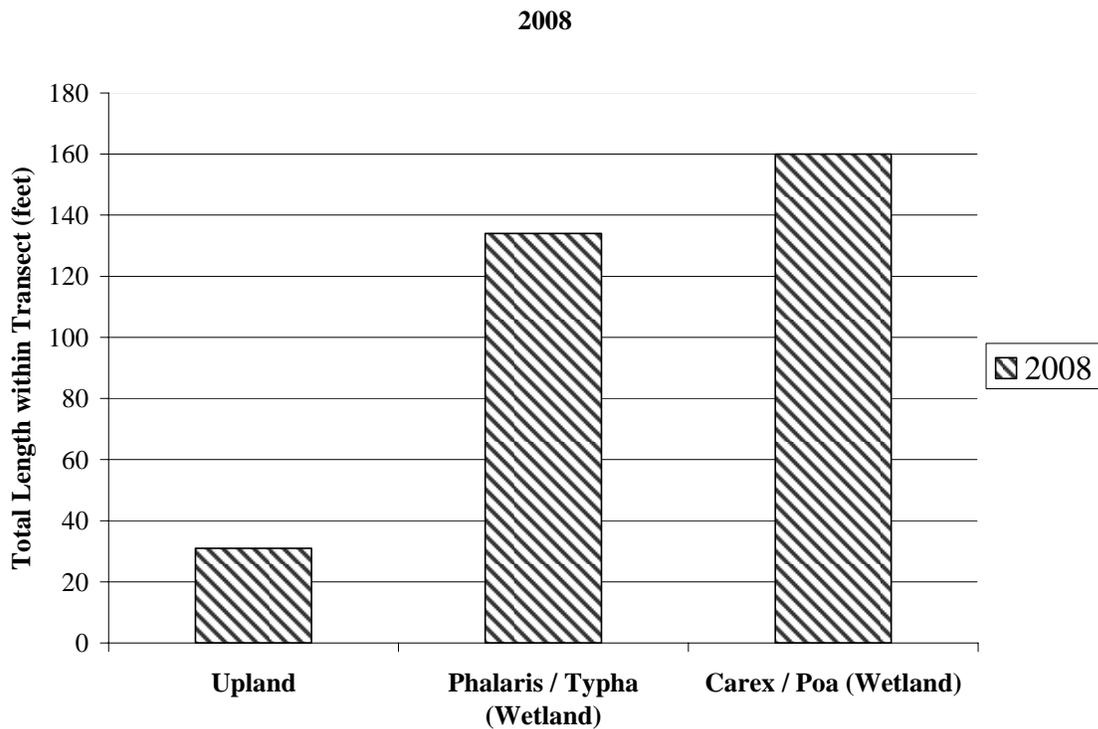
**Chart 15: Peterson: Length of vegetation communities within Transect 1 for 2008.**



**Chart 16: Peterson: Transect 2 map showing vegetation types from the start of transect (0 feet) to the end of transect (325 feet) for 2008.**



**Chart 17: Peterson: Length of vegetation communities within Transect 2 for 2008.**



### 3.4.3 Soils

Soils at the Peterson site are mapped in the Lake County Soil Survey as Colake silt loam, 0 to 1 percent slopes, Ronan silty clay loam, 4 to 8 percent slopes, Ronan silty clay loam, 2 to 4 percent slopes, and Post silty clay loam, 2 to 4 percent slopes (NRCS 2008). The Colake series was listed as hydric and is poorly drained. Colake series are associated with till plain type landforms and parent material consisting of calcareous alluvium. The Colake series polygon boundary at the Peterson site coincides with the long shallow topographic wetland swale that comprises the mitigation site. The remaining three soil series were located in the areas outside the wetland swale and were not considered hydric. The two Ronan silty clay loam series and the Post silty clay loam series are all well drained soils and are associated with lake plains and moraines.

Wetland soils observed during monitoring and documented on the Routine Wetland Determination form were mostly loams and silt loams with very low chroma colors (1 or 2) within 2 inches of the surface. Redoximorphic features were not present in soil profiles.

### 3.4.4 Wetland Delineation

Wetland were delineated and their boundaries mapped (**Peterson Figure 3** in **Appendix A**). Soils, vegetation, and hydrology are discussed in preceding sections and on the **COE Forms** (**Appendix B**). Approximately 3.71 wetland acres currently occur within the monitoring area (**Table 28; Peterson Figure 3** in **Appendix A**).

Pre-construction wetland area was not available for a direct comparison. The site currently contains 3.71 acres of aquatic habitat (**Peterson Figure 3** in **Appendix A**).

**Table 28: Wetland conditions identified at the Peterson site during 2008 monitoring.**

CONDITION	2008 (acre)
Wetland Area	3.71
<b>Total Aquatic Habitat Area</b>	<b>3.71</b>

### 3.4.5 Wildlife

Wildlife species, or evidence of wildlife, observed on the site during the 2008 monitoring efforts were compiled (**Table 29**). Specific evidence observed, as well as activity codes pertaining to birds, is provided on the **Monitoring Form** (**Appendix B**). This site provided habitat for a variety of wildlife species. Four mammals and seven bird species were noted at the mitigation site during the 2008 site visits (**Table 29**). Many other wildlife species presumably use the site but were not observed during the monitoring visits.

**Table 29: Fish and wildlife species observed at the Peterson Wetland Mitigation Site during 2008.**

<b>FISH</b>	
None	
<b>AMPHIBIAN</b>	
None	
<b>REPTILE</b>	
None	
<b>BIRD</b>	
Barn Swallow ( <i>Hirundo rustica</i> ) Canada Goose ( <i>Branta canadensis</i> ) Mourning Dove ( <i>Zenaida macroura</i> ) Red-Winged blackbird ( <i>Agelaius phoeniceus</i> )	Ring-necked Pheasant ( <i>Phasianus colchicus</i> ) Vesper Sparrow ( <i>Pooecetes gramineus</i> ) Western Meadowlark ( <i>Sturnella neglecta</i> )
<b>MAMMAL</b>	
Black Bear ( <i>Ursus americanus</i> ) Deer ( <i>Odocoileus</i> spp.)	Muskrat ( <i>Ondatra zibethicus</i> ) Raccoon ( <i>Procyon lotor</i> )

3.4.6 Macroinvertebrates

Macroinvertebrate sampling was not conducted at the Peterson Site.

3.4.7 Functional Assessment

The completed 2008 functional assessment form is included in **Appendix B**. The Peterson site was assessed as one area (AA-1), which currently rates as a Category III site.

Based on functional assessment results, approximately 25.23 functional units occur at the Peterson mitigation site (**Table 30**). Baseline functional assessment results are also provided for comparative purposes (**Table 30**). The baseline assessment and the 2008 assessment were completed using the 1999 MDT MWAM. Mitigation crediting systems required that a pre-and post-project functional assessment using the 1999 methods be conducted to assess a functional shift to higher score.

**Table 30: Summary of baseline and 2008 wetland function/value ratings and functional points at the Peterson Wetland Mitigation Project.**

Function and Value Parameters from the MDT Montana Wetland Assessment Method	Baseline (AA-1) <sup>1</sup>	2008 (AA-1) <sup>2</sup>
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)
MTNHP Species Habitat	Low (0.1)	Low (0.1)
General Wildlife Habitat	Low (0.5)	Mod (0.7)
General Fish/Aquatic Habitat	Low (0.1)	NA
Flood Attenuation	Low (0.2)	Mod (0.4)
Short and Long Term Surface Water Storage	Mod (0.4)	High (0.8)
Sediment/Nutrient/Toxicant Removal	High (0.9)	High (0.9)
Sediment/Shoreline Stabilization	High (0.7)	High (1.0)
Production Export/Food Chain Support	High (0.8)	High (0.8)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Low (0.3)
Recreation/Education Potential	Low (0.1)	Mod (0.5)
<b>Actual Points / Possible Points</b>	<b>5.3 / 12</b>	<b>6.8 / 11</b>
<b>% of Possible Score Achieved</b>	<b>44%</b>	<b>61%</b>
<b>Overall Category</b>	<b>III</b>	<b>III</b>
<b>Total Acreage of Assessed Wetlands and Open Water within Easement (ac)</b>	Unknown	<b>3.71</b>
<b>Total Functional Units (acreage x actual points) (fu)</b>	Unknown	<b>25.23</b>
<b>Net Acreage Gain (ac)</b>	NA	Unknown
<b>Net Functional Unit Gain (fu)</b>	NA	Unknown

<sup>1</sup> The baseline assessment was performed by Herrera Environmental Consultants using the 1999 MDT Montana Wetland Assessment Method.

<sup>2</sup> Performed by PBS&J during 2008 using the 1999 MDT MWAM because the mitigation crediting systems required a direct comparisons of pre- and post-project functions. The completed forms are in **Appendix B**.

### 3.4.8 Photographs

Representative photographs were taken in 2008 from established photo-points and transect ends (**Appendix C**).

### 3.4.9 Revegetation Efforts

Wetland and riparian vegetation enhancements were implemented in 2007. **Appendix G** presents the different planting specification for the herbaceous and containerized shrub plantings. These enhancements included planting of native containerized and cutting shrubs, and grass-like seedlings. Plants were installed along the constructed log crib structures, excavated oxbow depressions, fringe of the wetlands and disturbed areas.

Shrub planting survival data were collected along six (lengths varied) 2 meter wide belt transects. Transects were established along the edges of the wetland draw encompassing creation and enhancement mitigation areas. One transect was placed along a log crib structure. Species survival was based on visual estimates and counts for each live species. The original planting numbers were referenced from Peterson Tract Wetland Mitigation Site –Planting Summary (**Appendix G**). Actual planting numbers and prescribed species may vary from the original plan. Three species were found that were not listed in the original planting summary.

Post- design changes for planting prescriptions may have been adjusted during the construction phase due to availability of seedlings. Overall, survival ratings are considered moderate to high based on visual assessment. Plant growth was vigorous and looked healthy with few discolored leaves. Browse protection was intact and properly functioning.

#### 3.4.10 Maintenance Needs/Recommendations

Two Category 1 noxious weeds were present at low to high cover values and should be treated: Canada thistle and whitetop (**Figure 3, Appendix A**). A Category 3 noxious weed, yellowflag iris, was also present within the mitigation site. Noxious weeds should be controlled in accordance with the *Noxious Weed Management Guidelines, Species and Control Methods for US 93 Evaro to Polson Wetland Mitigation Sites* contained in the mitigation plan (Herrera 2004).

Log crib structures were assessed for general functionality and were generally considered to be operational, with shallow inundation observed behind the impoundments. However, undercutting and substantive leakage between logs was observed at many of the structures, which should be addressed in order to maximize impoundment extent.

#### 3.4.11 Current Credit Summary

As of 2008, approximately 3.71 acres of wetland occur on the mitigation site. The channel was included in the wetland totals. Additional acreage may form with additional time and continued increase in hydrology levels. The site scores approximately 25.23 functional units as of 2008.

To determine the current crediting acres for the Peterson site, the total wetland acreage was separated into the individual mitigation type zones, acreages were calculated for each type, and credit ratios were applied for both the CSKT and Corps crediting systems. The Peterson site mitigation types consisted of creation and rehabilitation (Corps) / secondary restoration (CSKT).

The following equation calculates the enhancement ratio for the rehabilitation activities based on functional assessment scores described in preceding **Table 30**:

$$\text{Enhancement factor} = [(F_{\text{post}} - F_{\text{pre}}) / F_{\text{pre}}]$$

$$\text{Enhancement factor} = [(6.8 - 5.3) / 5.3]; \text{ Enhancement factor} = 0.28$$

$$\text{Enhancement Ratio} = 1 / 0.28; \text{ Enhancement Ratio} = 3.57$$

**Table 31** lists the current credits based on COE and CSKT credit ratios, including this year's calculated ratio for the rehabilitation areas at the Peterson site. Current credits have exceeded the expected credits, assuming that wetlands delineated outside of the targeted creation and rehabilitation areas were created by project implementation. The site is predicted to continue gaining functional points as the wetlands continue to develop.

**Table 31: Current credits at the Peterson Property Mitigation Site.**

Targeted Mitigation Type	Current Wetland (Acre)	Credit Ratio		Current Credit (Acre)		Expected Credit (Acre)	
		COE	CSKT	COE	CSKT	COE	CSKT
Creation	2.46 <sup>1</sup>	1:1	3.36:1	2.46	0.73	2.14	0.64
Rehabilitation / secondary restoration	1.25	3.57:1	1.86:1	0.35	0.67	0.25	0.67
<b>TOTAL</b>	<b>3.71</b>	--	--	<b>2.81</b>	<b>1.40</b>	<b>2.39</b>	<b>1.31</b>

<sup>1</sup> Includes wetlands delineated outside of targeted creation and rehabilitation areas and assumed to have been created by project implementation.

#### 4.0 REFERENCES

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## **Appendix A**

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### **FIGURES 2 & 3:**

**BOUCHARD**

**JOCKO RIVER BRIDGE**

**JOCKO SPRING CREEK**

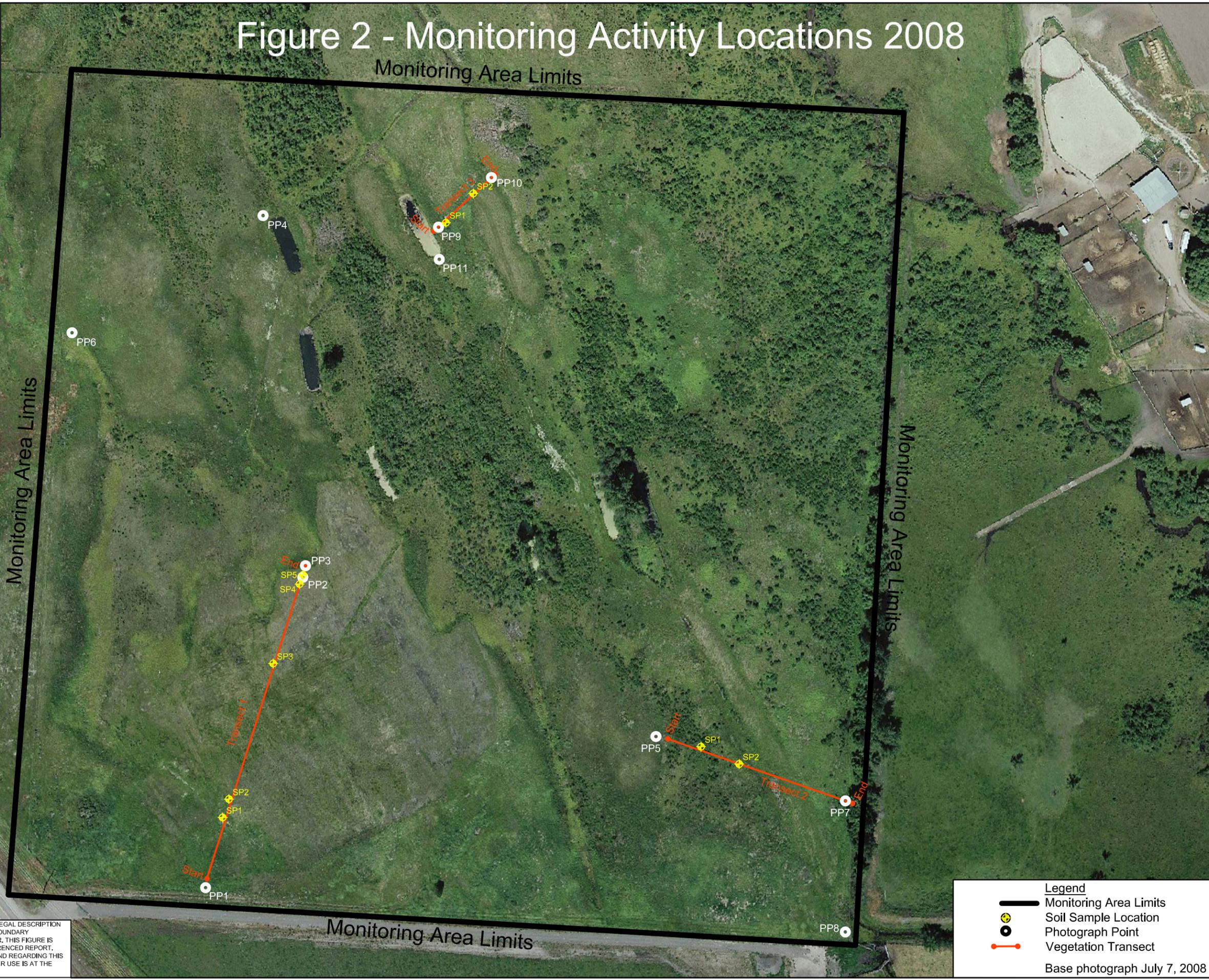
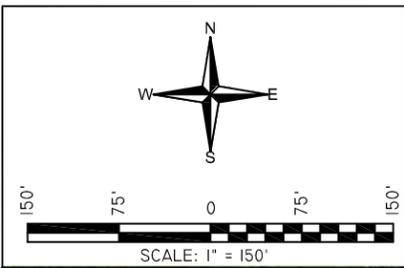
**PETERSON PROPERTY**

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*US Highway 93 Onsite: Bouchard, Jocko River Bridge, Jocko Spring Creek, and Peterson Property*

# Figure 2 - Monitoring Activity Locations 2008

Monitoring Area Limits



Monitoring Area Limits

Monitoring Area Limits

Monitoring Area Limits

**Legend**

- Monitoring Area Limits
- Soil Sample Location
- Photograph Point
- Vegetation Transect

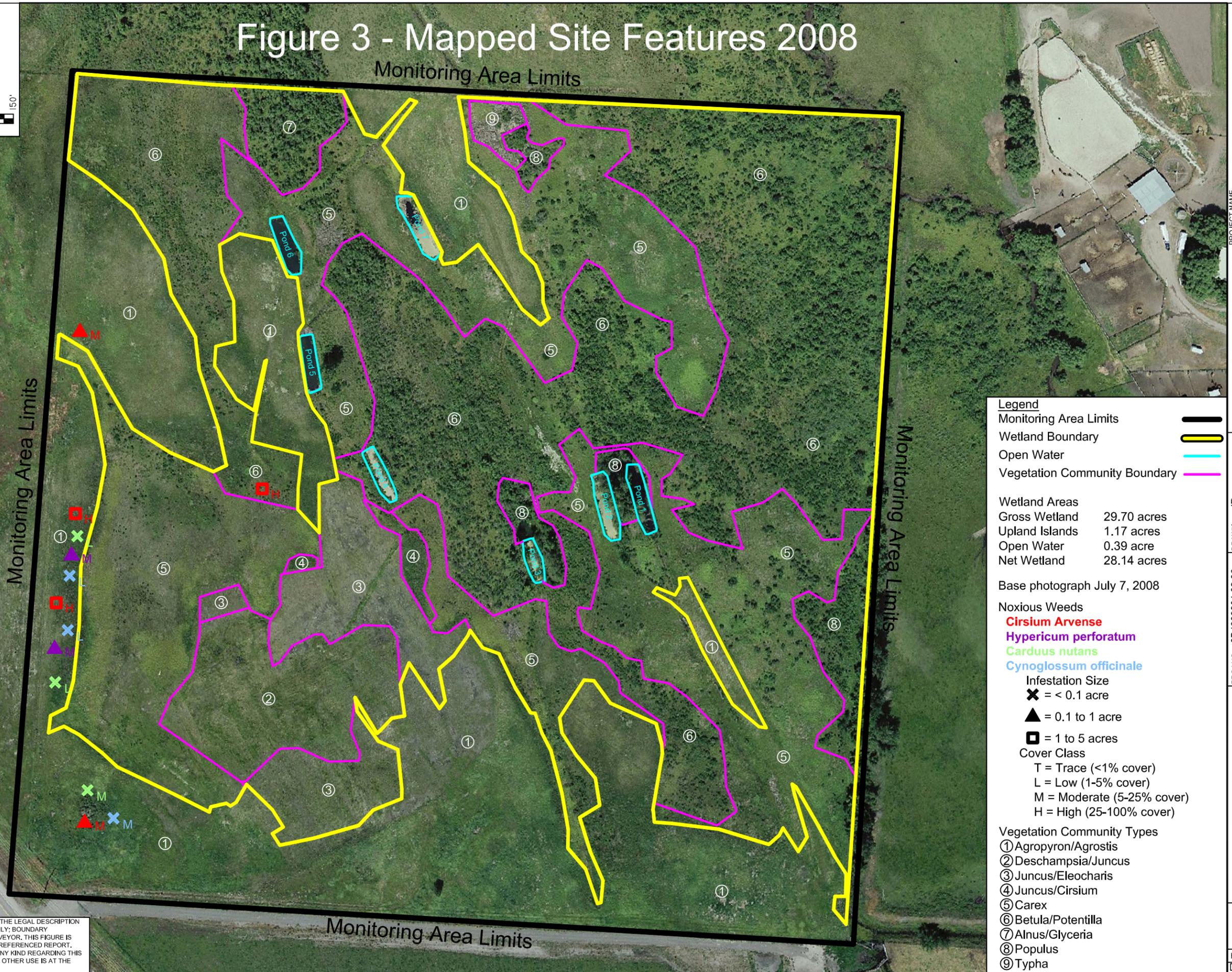
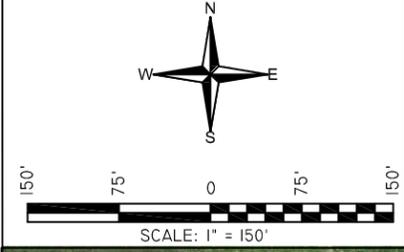
Base photograph July 7, 2008

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.

PROJECT NAME	MDT BOUCHARD WETLAND MITIGATION	
DRAWING TITLE	MONITORING ACTIVITY LOCATIONS 2008	
PROJ NO:	0B4308801 02.06	DRAWN: JR
LOCATION:	ARLEE, MT	PROJ MGR: J. BERGLUND
SCALE:	NOTED	CHECKED: GH APPVD: JB
FILE NAME:	2008Monitoring.dwg	
1120 Cedar Missoula, MT 59802		
<b>PBS&amp;J</b>		
FIGURE	2	OF
REV -		
Dec/22/2008		

# Figure 3 - Mapped Site Features 2008

Monitoring Area Limits



### Legend

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

Wetland Areas	
Gross Wetland	29.70 acres
Upland Islands	1.17 acres
Open Water	0.39 acre
Net Wetland	28.14 acres

Base photograph July 7, 2008

### Noxious Weeds

- Cirsium Arvense**
- Hypericum perforatum**
- Carduus nutans**
- Cynoglossum officinale**

- Infestation Size
- = < 0.1 acre
  - = 0.1 to 1 acre
  - = 1 to 5 acres

- Cover Class
- T = Trace (<1% cover)
  - L = Low (1-5% cover)
  - M = Moderate (5-25% cover)
  - H = High (25-100% cover)

### Vegetation Community Types

- ① Agropyron/Agrostis
- ② Deschampsia/Juncus
- ③ Juncus/Eleocharis
- ④ Juncus/Cirsium
- ⑤ Carex
- ⑥ Betula/Potentilla
- ⑦ Alnus/Glyceria
- ⑧ Populus
- ⑨ Typha

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PROJECT NAME  
**MDT BOUCHARD WETLAND MITIGATION**

DRAWING TITLE  
**MAPPED SITE FEATURES 2008**

PROJ NO: 0B4308801 02.06  
LOCATION: ARLEE, MT  
SCALE: NOTED  
FILE NAME: 2008Monitoring.dwg

DRAWN: JR  
PROJ MGR: J. BERGLUND  
CHECKED: GH  
APPVD: JB

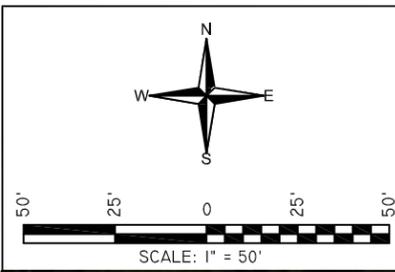
1120 Cedar  
Missoula, MT 59802

**PBS&J**

FIGURE  
**3** OF

REV -  
Dec/22/2008

# Figure 2 - Monitoring Activity Locations 2008



**Legend**

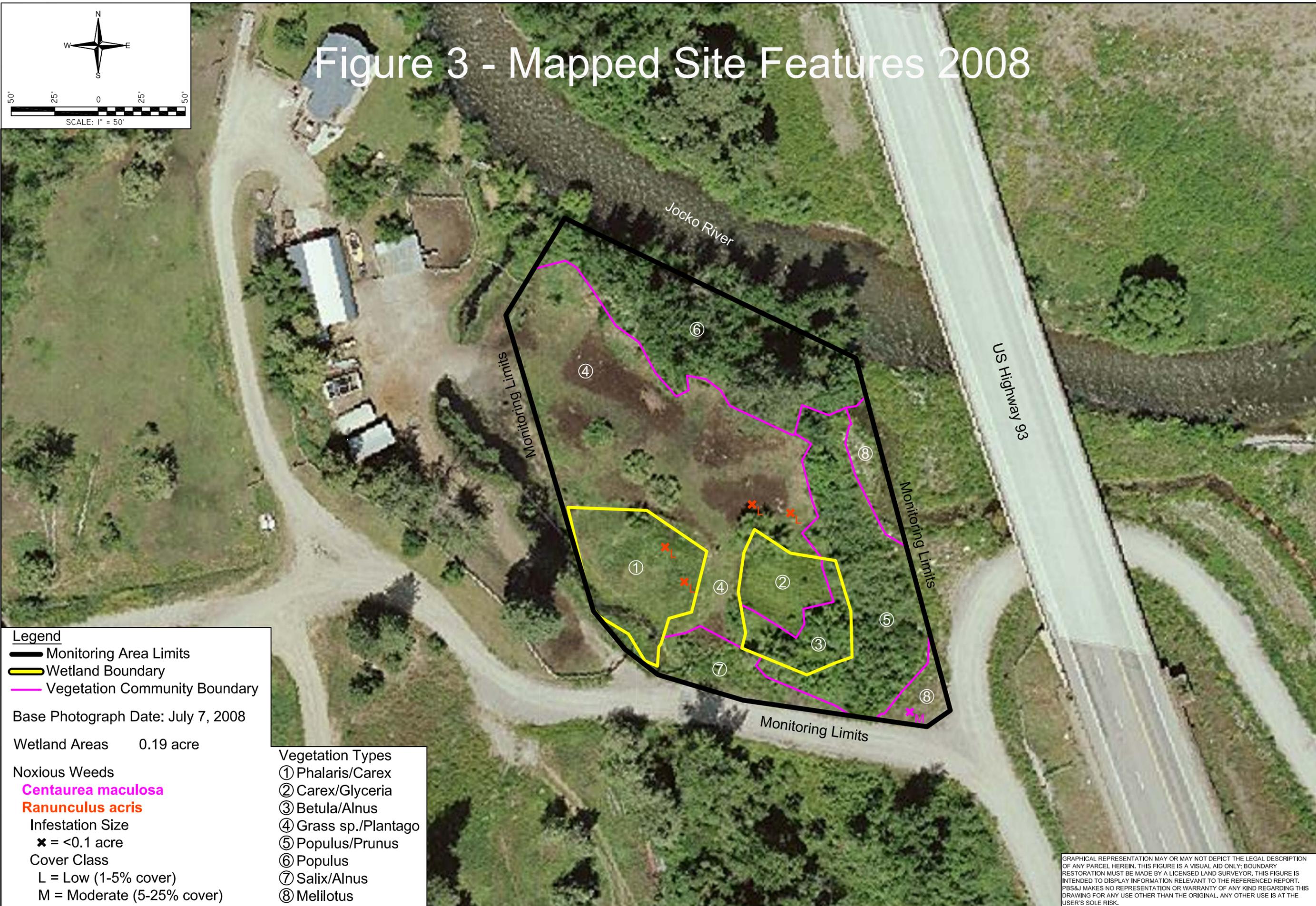
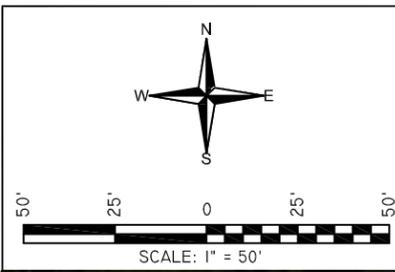
- Monitoring Area Limits
- Photograph Point
- Vegetation Transect

Base Photograph Date: July 7, 2008

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.

PROJECT NAME <b>MDT JOCKO RIVER BRIDGE WETLAND MITIGATION</b>	
DRAWING TITLE <b>MONITORING ACTIVITY LOCATIONS 2008</b>	
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LOCATION: ARLEE, MT	PROJ MGR: J. BERGLUND
SCALE: NOTED	CHECKED: GH APPVD: JB
FILE NAME: 2008 Wetlands.dwg	
1120 Cedar Missoula, MT 59802	
<b>PBS&amp;J</b>	
FIGURE <b>2</b> OF	
REV - Dec/22/2008	

# Figure 3 - Mapped Site Features 2008



**Legend**  
 — Monitoring Area Limits  
 — Wetland Boundary  
 — Vegetation Community Boundary

Base Photograph Date: July 7, 2008

Wetland Areas 0.19 acre

Noxious Weeds

**Centaurea maculosa**

**Ranunculus acris**

Infestation Size

x = <0.1 acre

Cover Class

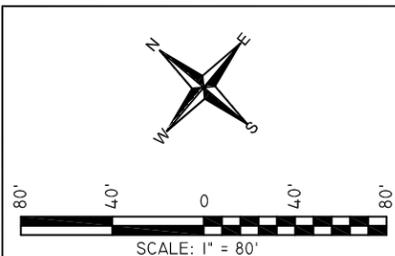
L = Low (1-5% cover)

M = Moderate (5-25% cover)

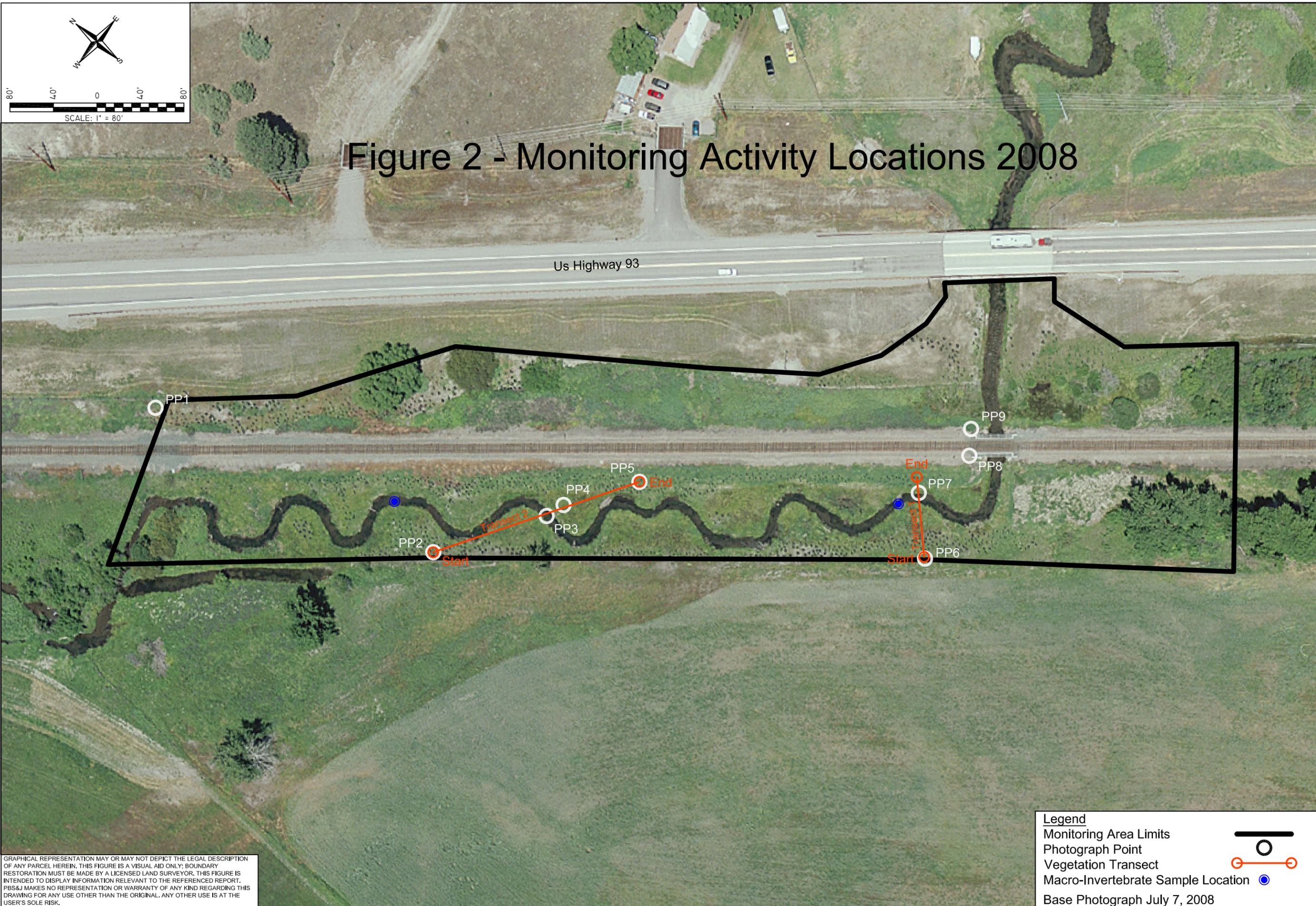
- Vegetation Types**
- ① Phalaris/Carex
  - ② Carex/Glyceria
  - ③ Betula/Alnus
  - ④ Grass sp./Plantago
  - ⑤ Populus/Prunus
  - ⑥ Populus
  - ⑦ Salix/Alnus
  - ⑧ Melilotus

PROJECT NAME <b>MDT JOCKO RIVER BRIDGE WETLAND MITIGATION</b>	
DRAWING TITLE <b>MAPPED SITE FEATURES 2008</b>	
PROJ NO: 0B4308801 02.06	DRAWN: JR
LOCATION: ARLEE, MT	PROJ MGR: J. BERGLUND
SCALE: NOTED	CHECKED: GH APPVD: JB
FILE NAME: 2008 Wetlands.dwg	
1120 Cedar Missoula, MT 59802	
	
FIGURE <b>3</b> OF	
REV - Dec/22/2008	

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.



# Figure 2 - Monitoring Activity Locations 2008



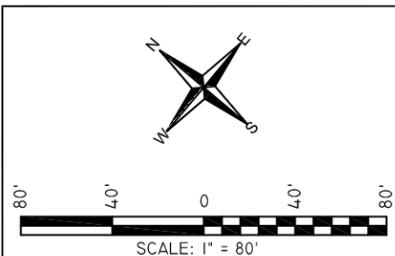
GRAPHICAL REPRESENTATION MAY OR MAY NOT DEPICT THE LEGAL DESCRIPTION OF ANY PARCEL HEREIN. THIS FIGURE IS A VISUAL AID ONLY; BOUNDARY RESTORATION MUST BE MADE BY A LICENSED LAND SURVEYOR. THIS FIGURE IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. PBS&J MAKES NO REPRESENTATION OR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

**Legend**

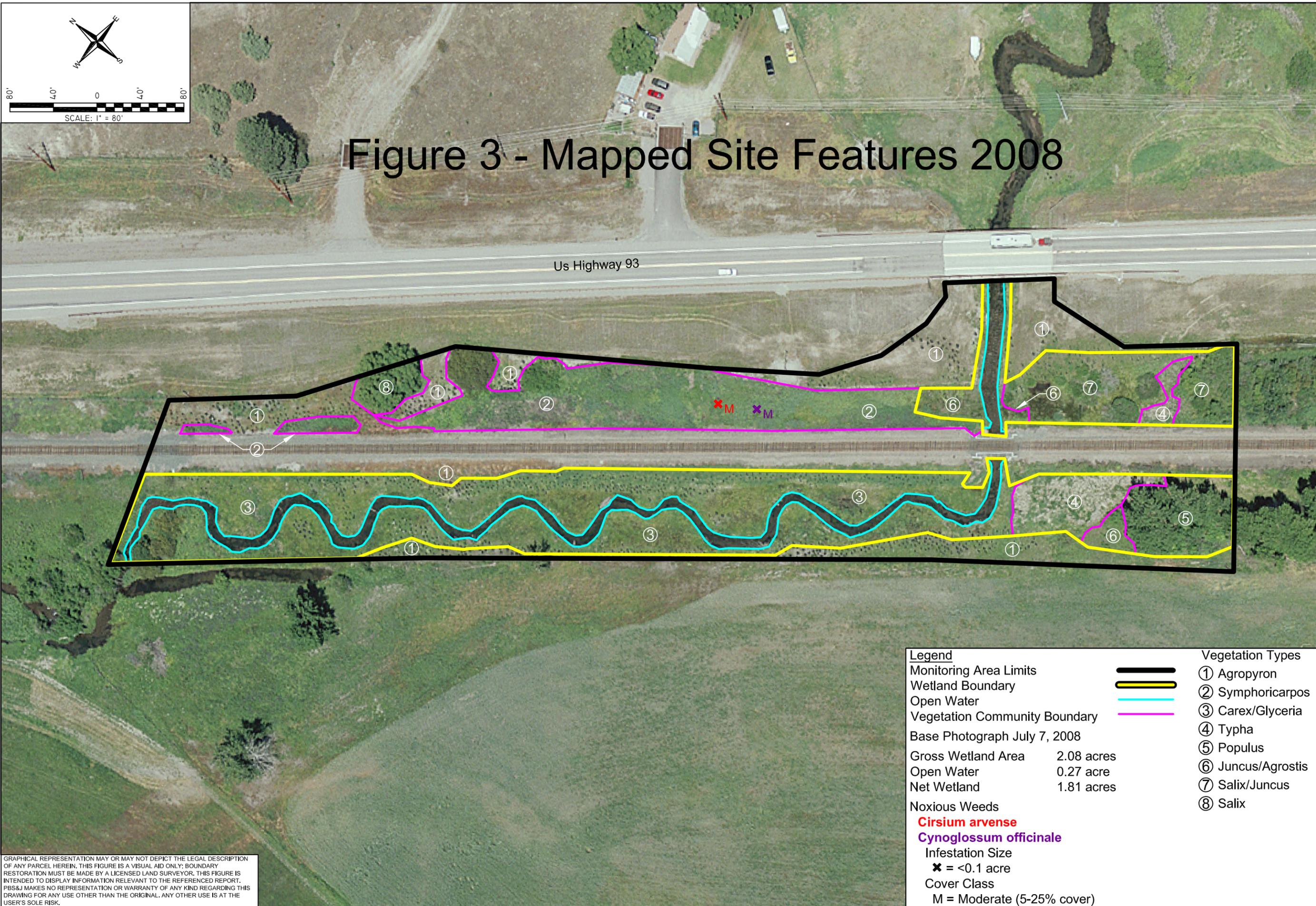
- Monitoring Area Limits
- Photograph Point
- Vegetation Transect
- Macro-Invertebrate Sample Location

Base Photograph July 7, 2008

PROJECT NAME	MDT JOCKO SPRING CREEK WETLAND MITIGATION		
DRAWING TITLE	MONITORING ACTIVITY LOCATIONS 2008		
PROJ NO:	0B4308801 02.06	DRAWN:	JR
LOCATION:	RAVALLI, MT	PROJ MGR:	J. BERGLUND
SCALE:	NOTED	CHECKED:	GH
FILE NAME:	BASE 2008.dwg	APPV'D:	JB
1120 Cedar Missoula, MT 59802			
<b>PBS&amp;J</b>			
FIGURE	2 OF		
REV -	Dec/24/2008		



# Figure 3 - Mapped Site Features 2008

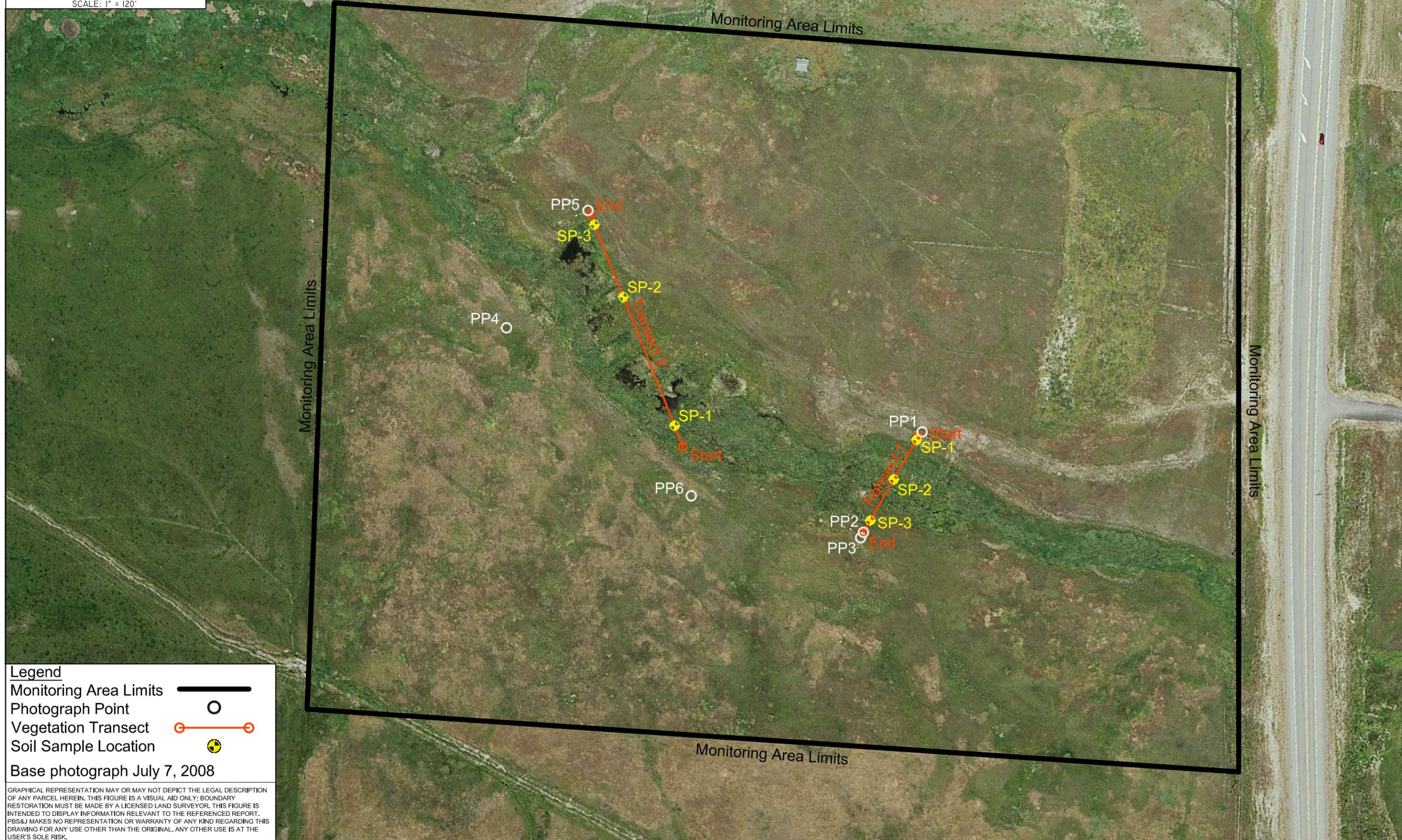
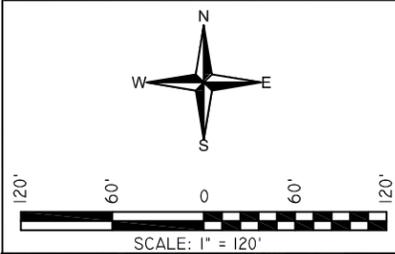


<b>Legend</b>		<b>Vegetation Types</b>	
Monitoring Area Limits		① Agropyron	
Wetland Boundary		② Symphoricarpos	
Open Water		③ Carex/Glyceria	
Vegetation Community Boundary		④ Typha	
Base Photograph July 7, 2008			
Gross Wetland Area	2.08 acres	⑤ Populus	
Open Water	0.27 acre	⑥ Juncus/Agrostis	
Net Wetland	1.81 acres	⑦ Salix/Juncus	
<b>Noxious Weeds</b>		⑧ Salix	
<b>Cirsium arvense</b>			
<b>Cynoglossum officinale</b>			
<b>Infestation Size</b>			
x = <0.1 acre			
<b>Cover Class</b>			
M = Moderate (5-25% cover)			

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.

PROJECT NAME		MDT JOCKO SPRING CREEK WETLAND MITIGATION	
DRAWING TITLE		MAPPED SITE FEATURES 2008	
PROJ NO:	0B4308801 02.06	DRAWN:	JR
LOCATION:	RAVALLI, MT	PROJ MGR:	J. BERGLUND
SCALE:	NOTED	CHECKED:	GH
FILE NAME:	BASE 2008.dwg	APPVD:	JB
1120 Cedar Missoula, MT 59802			
FIGURE			
<b>3</b> OF			
REV -			
Dec/22/2008			

# Figure 2 - Monitoring Activity Locations 2008



**Legend**

- Monitoring Area Limits
- Photograph Point
- Vegetation Transect
- Soil Sample Location

Base photograph July 7, 2008

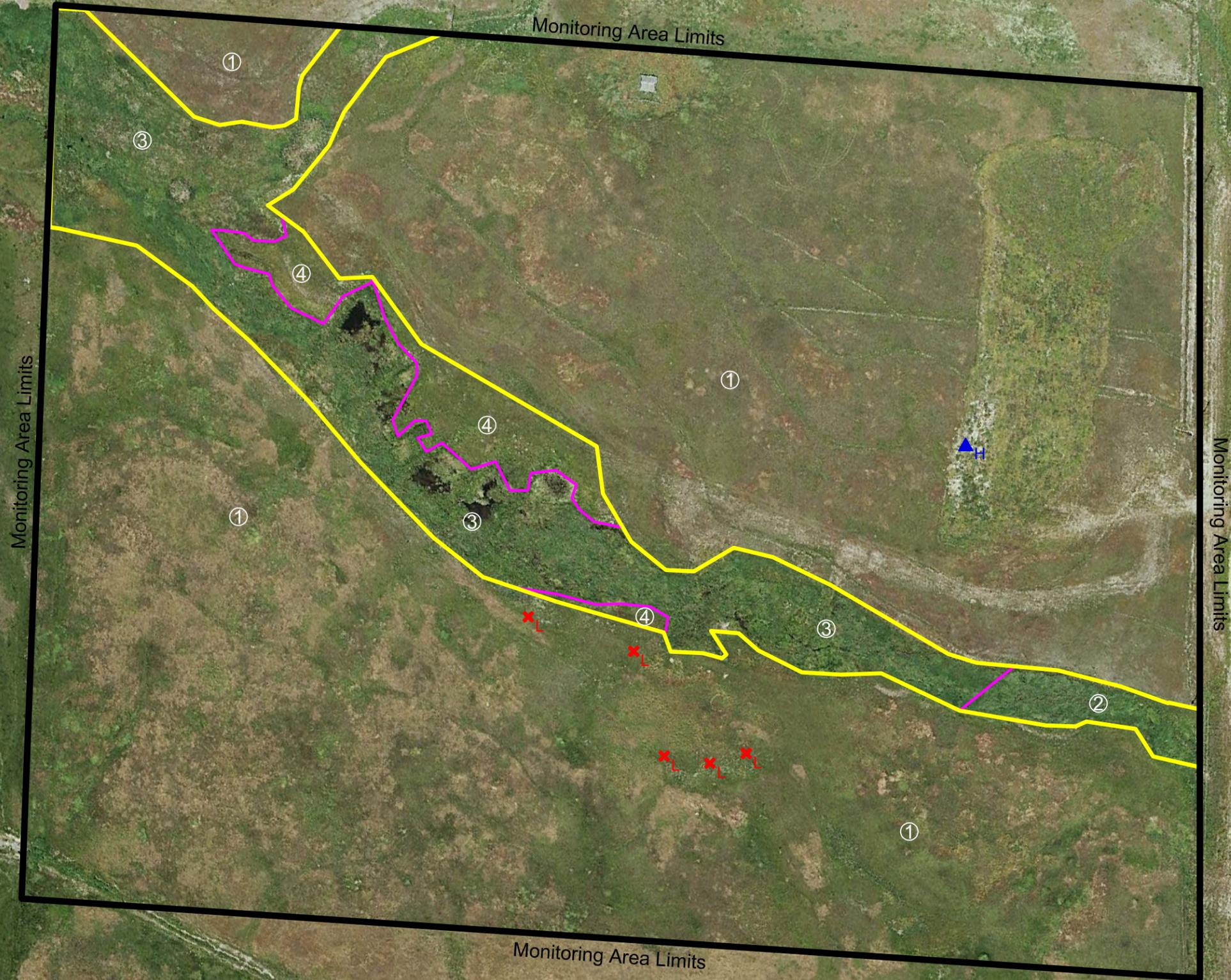
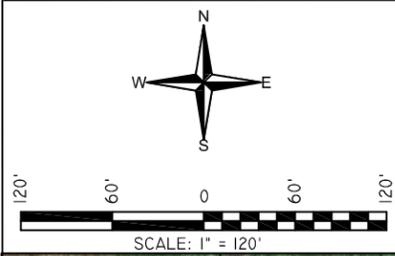
GRAPHICAL REPRESENTATION MAY OR MAY NOT DEPICT THE LEGAL DESCRIPTION OF ANY PARCEL HEREIN. THIS FIGURE IS A VISUAL AID ONLY; BOUNDARY RESTORATION MUST BE MADE BY A LICENSED LAND SURVEYOR. THIS FIGURE IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. PBS&J MAKES NO REPRESENTATION OR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

<b>PROJECT NAME</b>	MDT PETERSON WETLAND MITIGATION		
<b>DRAWING TITLE</b>	MONITORING ACTIVITY LOCATIONS 2008		
<b>PROJ NO:</b>	0B4308801	<b>DATE:</b>	02.06
<b>LOCATION:</b>	ST. IGNATIUS, MT	<b>DRAWN:</b>	JR
<b>SCALE:</b>	NOTED	<b>PROJ MGR:</b>	J. BERGLUND
<b>FILE NAME:</b>	BASE 2008.dwg	<b>CHECKED:</b>	GH
		<b>APPVD:</b>	JB
<b>FIGURE</b>	2 OF 2		
<b>REV</b>	-		
<b>DATE</b>	Dec/22/2008		



1120 Cedar  
Missoula, MT 59802

# Figure 3 - Mapped Site Features 2008



- Legend**
- Monitoring Area Limits
  - Wetland Boundary
  - Vegetation Community Boundary
- Base photograph July 7, 2008
- Wetland Area 3.71 acres
- Noxious Weeds
- Cirsium arvense**
  - Cardaria draba**
- Infestation Size
- ✕ = < 0.1 acre
  - ▲ = 0.1 to 1 acre
- Cover Class
- L = Low (1-5% cover)
  - H = High (25-100% cover)
- Vegetation Types
- ① Agropyron
  - ② Phalaris
  - ③ Phalaris/Typha
  - ④ Carex/Poa

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.

PROJECT NAME	MDT PETERSON WETLAND MITIGATION		
DRAWING TITLE	MAPPED SITE FEATURES 2008		
PROJ NO:	DRAWN:	PROJ MGR:	APPVD:
0B4308801 02.06	JR	J. BERGLUND	JB
LOCATION:	SCALE:	CHECKED:	FILE NAME:
ST. IGNATIUS, MT	NOTED	GH	BASE 2008.dwg
1120 Cedar Missoula, MT 59802			
<b>PBS&amp;J</b>			
FIGURE			
<b>3</b> OF			
REV -			
Dec/22/2008			

## **Appendix B**

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**2008 WETLAND MITIGATION SITE MONITORING FORMS**

**2008 BIRD SURVEY FORMS**

**2008 COE WETLAND DELINEATION FORMS**

**2008 MDT FUNCTIONAL ASSESSMENT FORMS**

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*US Highway 93 Onsite: Bouchard, Jocko River Bridge, Jocko Spring  
Creek, and Peterson Property*

**PBS&J / MDT WETLAND MITIGATION SITE MONITORING FORM**

Project Name: **Bouchard** Project Number: **430081**  
 Assessment Date: **July 29, 2008** Person(s) conducting the assessment: **G. Howard**  
 Location: **Arlee** MDT District: **Missoula** Milepost: \_\_\_\_\_  
 Legal Description: T **17N** R **20W** Section **26**  
 Weather Conditions: \_\_\_\_\_ Time of Day: \_\_\_\_\_  
 Initial Evaluation Date: **July 29, 2008** Monitoring Year: **1** # Visits in Year: **2**  
 Size of evaluation area: **40 acres** Land use surrounding wetland: **Agriculture and residential**

**HYDROLOGY**

Surface Water Source: **groundwater (Spring Creek)**  
 Inundation: **Present** Average Depth: **0.5 feet** Range of Depths: **0.5 - 4ft/**  
 Percent of assessment area under inundation: **25%**  
 Depth at emergent vegetation-open water boundary: \_\_\_\_\_ **feet**  
 If assessment area is not inundated then are the soils saturated within 12 inches of surface: **—**  
 Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc.):  
 \_\_\_\_\_

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:**

**The mitigation site consists of a 40-acre parcel dominated by emergent, scrub-shrub and forested vegetation types. Site does not receive any direct surface water. Site is influenced by groundwater. Several small ponds exist that are also sourced by groundwater. These areas were previously sourced by irrigation water from the spring creek that is located adjacent to the southeast corner of the parcel. The values specified for the range of depths includes both constructed shallow depression and existing small ponds. The constructed shallow depression has an average depth of approximately 6 inches.**

## VEGETATION COMMUNITIES

Community Number: 1 Community Title (main spp): Agropyron / Agrostis

Dominant Species	% Cover	Dominant Species	% Cover
AGRTRA	4 = 21-50%	LYNALB	+ = < 1%
ACHMIL	2 = 6-10%	CARNUT	1 = 1-5%
AGRREP	2 = 6-10%		
AGRALB	3 = 11-20%		
CIRARV	2 = 6-10%		
CYNOFF	1 = 1-5%		

Comments / Problems: Upland plant community surrounding wetland areas. Several noxious weeds present and location illustrated on Figure 3. Weedy fringe around wetlands.

Community Number: 2 Community Title (main spp): Deschampsia / Juncus

Dominant Species	% Cover	Dominant Species	% Cover
DESCES	5 = > 50%	CARSTI	+ = < 1%
AGRALB	2 = 6-10%	CORSTO (P)	1 = 1-5%
ALOPRA	+ = < 1%	ALNINC (P)	1 = 1-5%
JUNENS	+ = < 1%	SALBEB (P)	1 = 1-5%
JUNTEN	2 = 6-10%		
CARPRA	1 = 1-5%		

Comments / Problems: Vegetation community located within the wetland creation areas. Type 2 dominated by herbaecous species.

Community Number: 3 Community Title (main spp): Juncus / Eleocharis

Dominant Species	% Cover	Dominant Species	% Cover
AGRALB	2 = 6-10%	ALOPRA	+ = < 1%
JUNENS	4 = 21-50%	CORSTO (P)	+ = < 1%
JUNTEN	3 = 11-20%	ELESPP	3 = 11-20%
AGRTRA	+ = < 1%		
ACHMIL	1 = 1-5%		
CIRARV	1 = 1-5%		

Comments / Problems: Vegetation community located within the wetland creation areas. Type 2 dominated by herbaecous species.

Community Number: 4 Community Title (main spp): Juncus / Cirsium

Dominant Species	% Cover	Dominant Species	% Cover
JUNBAL	4 = 21-50%		
AGRALB	3 = 11-20%		
CIRARV	3 = 11-20%		
CYNOFF	1 = 1-5%		
GEUMAC	2 = 6-10%		
SONARV	1 = 1-5%		

Comments / Problems: Existing wetland areas with high cover value of weedy species. One noxious weed species present.

## VEGETATION COMMUNITIES (continued)

Community Number: **5** Community Title (main spp): **Carex**

Dominant Species	% Cover	Dominant Species	% Cover
CARUTR	4 = 21-50%	JUNBAL	2 = 6-10%
CARVES	3 = 11-20%	GLYSTR	1 = 1-5%
SOLSPP	1 = 1-5%	CARLAN	1 = 1-5%
SALBEB	2 = 6-10%	CARNEB	2 = 6-10%
CORSTO	1 = 1-5%	GEUMAC	1 = 1-5%
BETOCC	1 = 1-5%		

Comments / Problems: **Unaltered wetland area dominated by emergent vegetation.**

Community Number: **6** Community Title (main spp): **Betula / Potentilla**

Dominant Species	% Cover	Dominant Species	% Cover
BETOCC	5 = > 50%		
POTFRU	3 = 11-20%		
SALBEB	2 = 6-10%		
CARNEB	1 = 1-5%		
JUNBAL	4 = 21-50%		
HYPSP	2 = 6-10%		

Comments / Problems: **Existing wetlands dominated by scrub-shrub and emergent vegetation types.**

Community Number: **7** Community Title (main spp): **Alnus / Glyceria**

Dominant Species	% Cover	Dominant Species	% Cover
ALNINC	5 = > 50%	GEUMAC	1 = 1-5%
CORSTO	2 = 6-10%	CARUTR	2 = 6-10%
CARVES	2 = 6-10%		
GLYGRA	3 = 11-20%		
SOLDAL	+ = < 1%		
BETOCC	2 = 6-10%		

Comments / Problems: **Existing wetlands dominated by scrub-shrub and emergent vegetation types.**

Community Number: **8** Community Title (main spp): **Populus**

Dominant Species	% Cover	Dominant Species	% Cover
POPTRI	5 = > 50%		
POPTRE	3 = 11-20%		

Comments / Problems: **Small forested stands surrounding and near the shallow open-water ponds.**

**VEGETATION COMMUNITIES (continued)**

Community Number: **9** Community Title (main spp): **Typha**

Dominant Species	% Cover	Dominant Species	% Cover
TYPLAT	5 = > 50%		

Comments / Problems: **Area dominated by a monoculture of cattails.**

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: \_\_\_\_\_

Community Number: \_\_\_\_\_ Community Title (main spp): \_\_\_\_\_

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: \_\_\_\_\_

**Additional Activities Checklist:**

- Record and map vegetative communities on aerial photograph.

## COMPREHENSIVE VEGETATION LIST

Plant Species	Vegetation Community Number (s)	Plant Species	Vegetation Community Number (s)
<i>Achillea millefolium</i>	1,3,	<i>Hordeum jubatum</i>	1
<i>Agrostis alba</i>	1,2,3,4	<i>Hypericum perforatum</i>	1
<i>Agropyron repens</i>	1	<i>Juncus balticus</i>	4,5,6
<i>Agropyron trachycaulum</i>	1	<i>Juncus ensifolius</i>	2,3
<i>Alnus incana</i>	7	<i>Juncus tenuis</i>	2,3
<i>Alopecurus pratensis</i>	2,3	<i>Juniperus scopulorum</i>	1
<i>Alyssum alyssoides</i>	1	<i>Juncus spp.</i>	2,3
<i>Anthemis cotula</i>	1	<i>Lactuca serriola</i>	1
<i>Artemisia ludoviciana</i>	1	<i>Lychnis alba</i>	1
<i>Betula occidentalis</i>	5,6	<i>Mentha arvensis</i>	5,6
<i>Bromus carinatus</i>	1	<i>Medicago Sativa</i>	1
<i>Bromus tectorum</i>	1	<i>Mimulus guttatus</i>	5,6,7
<i>Calamagrostis canadensis</i>	5,6,7	<i>Nepeta cataria</i>	5
<i>Campanula rotundifolia</i>	5	<i>Phalaris arundinacea</i>	2,3,5
<i>Carduus nutans</i>	1,4	<i>Phleum pratense</i>	1
<i>Carex lanuginose</i>	5	<i>Plantago major</i>	1
<i>Carex nebrascensis</i>	2,3,5,6,7,	<i>Poa palustris</i>	2,3
<i>Carex praegracilis</i>	5	<i>Poa pratensis</i>	1
<i>Carex utriculata</i>	5,6,7	<i>Polygonum amphibium</i>	2,3
<i>Carex stipata</i>	5,6	<i>Populus tremuloides</i>	8
<i>Carex retrorsa</i>	5,6,7	<i>Populus trichocarpa</i>	8
<i>Carex vesicaria</i>	5,6	<i>Potentilla anserina</i>	5,6
<i>Centaurea maculosa</i>	1	<i>Potentilla fruticosa</i>	5,6
<i>Chenopodium album</i>	1	<i>Ranunculus spp.</i>	5,6
<i>Chrysanthemum leucanthemum</i>	1	<i>Ribes spp.</i>	6
<i>Cichorium intybus</i>	1	<i>Rosa woodsii</i>	1,6
<i>Cirsium arvense</i>	1,4	<i>Rubus idaeus</i>	1,6
<i>Cornus stolonifera</i>	2,3,6	<i>Rumex crispus</i>	1,2,3
<i>Crataegus douglasii</i>	2,3	<i>Salix bebbiana</i>	2,3,6,7
<i>Cynoglossum officinale</i>	1,4	<i>Salix exigua</i>	2,3,6
<i>Deschampsia cespitosa</i>	2,3	<i>Salix geyeriana</i>	2,3,6
<i>Dodecatheon spp.</i>	5,6	<i>Salix lutea</i>	2,3,6
<i>Eleocharis palustris</i>	2,3	<i>Solanum dulcamara</i>	5,6
<i>Eleocharis spp.</i>	2,3	<i>Solidago missouriensis</i>	1,4,5,6

<i>Epilobium ciliatum</i>	2,3,4,5	<i>Sonchus arvensis</i>	1,4,5
<i>Epilobium spp.</i>	2,3,4,5	<i>Symphoricarpos albus</i>	1,6
<i>Equisetum arvense</i>	2,3,5	<i>Typha latifolia</i>	2,3,9
<i>Geum macrophyllum</i>	2,3,5,6,7	<i>Verbascum thapsus</i>	1
<i>Glyceria grandis</i>	5,7	<i>Vicia spp.</i>	1
<i>Glyceria striata</i>	5,7		

**Comments / Problems:** \_\_\_\_\_

**PLANTED WOODY VEGETATION SURVIVAL**

Plant Species	Number Originally Planted	Number Observed	Mortality Causes
ALNINC	--	58	Plantings looked healthy with vigorous growth for the season with few discolored leaves. Browse protection were intact and properly functioning. Water birch and red-osier dogwood species had the highest counts within transects.
BET OCC	817	130	
CORSTO	408	117	
RIBHUD	245	16	
ROSWOO	--	2	
SALSPP	408	64	
SYMALB	--	3	

**Comments / Problems:** Shrub planting survival data was collected along ten (240 feet long) 2 meter wide belt transects that totaled approximately 0.35 acres (15,600 sq. ft.). Transects were randomly established across the wetland creation area perpendicular to southern boundary. Transects were walked from south to north across this mitigation type. During the 2008 monitoring, species survival was based on visual estimates and counts for each live species. The original plantings numbers as listed above were referenced from Bouchard Wetland – Wetland Planting Summary (**Appendix G**). Actual planting numbers and prescribed species may vary from the original plan. Three species were found that were not listed in the original planting summary. Post design changes for planting prescriptions were adjusted during the construction phase due to availability of seedlings. Overall survival ratings are considered moderate to high based on visual assessment. Plant growth was vigorous and looked healthy with few discolored leaves. Browse protection were intact and properly functioning.

## 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
Coyotes	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Deer		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Meadow vole	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Spotted frogs	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Muskrats	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

### Additional Activities Checklist:

**NA** Macroinvertebrate Sampling (if required)

**Comments / Problems:** \_\_\_\_\_

## 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	1.0	View looking north.	0
PP1	1.1	View looking north.	0
PP2	1.0	View looking north.	0
PP3	1.0	View looking west.	270
PP3	1.0	View looking southeast to southwest.	180
PP4	1.1	View looking southeast.	135
PP5	1.0	View looking east.	90
PP5	1.1	View looking north.	0
PP5	1.2	View looking east.	90
PP6	1.0	View looking southeast.	135
PP7	1.0	View looking east.	90
PP7	1.1	View looking west.	270
PP7	1.2	View looking west.	270
PP8	1.0	View looking north.	0
PP8	1.1	View looking east.	90
PP9	1.0	View looking southwest.	225
PP9	1.1	View looking southeast.	135
PP9	1.2	View looking northeast.	45
PP9	1.3	View looking northwest.	315
PP10	1.0	View looking southeast.	135
PP10	1.1	View looking northeast.	45
PP11	1.0	View looking northwest.	315

**Comments / Problems:** Refer to photopage for a decription of each photo point.

## 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: **FA completed using 1999 MDT Montana Wetland Assessment Method. Mitigation credit system requires direct comparison between pre-and post-project using the 1999 methods to show a functional shift.**

## 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: **Bouchard** Date: **07/29/08** Examiner: **G. Howard**

Transect Number: **1** Approximate Transect Length: **526 feet** Compass Direction from Start: **0°** Note: \_\_\_\_\_

Vegetation Type E: <b>C.T. 4 - Juncus / Cirsium (Wetland)</b>	
Length of transect in this type: 8 feet	
Plant Species	Cover
AGRALB	4 = 21-50%
JUNBAL	4 = 21-50%
GLYSTR	1 = 1-5%
CIRARV	2 = 6-10%
SONARV	2 = 6-10%
CYNOFF	+ = < 1%
SOLDUL	2 = 6-10%
GEUMAC	+ = < 1%
CIRVUL	+ = < 1%
Total Vegetative Cover:	95%

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

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

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

Site: **Bouchard** Date: **07/29/08** Examiner: **G. Howard**

Transect Number: **2** Approximate Transect Length: **313 feet** Compass Direction from Start: **90°** Note: \_\_\_\_\_

Vegetation Type E: <b>C.T. 6 - Betula / Potentilla (Wetlands)</b>	
Length of transect in this type: 98 feet	
Plant Species	Cover
BETOCC	4 = 21-50%
SALBEB	3 = 11-20%
JUNBAL	2 = 6-10%
CIRARV	1 = 1-5%
SOLSPP	2 = 6-10%
CARUTR	2 = 6-10%
AGRALB	2 = 6-10%
CIRVUL	+ = < 1%
GEUMAC	2 = 6-10%
Total Vegetative Cover:	100%

Vegetation Type F: <b>C.T. 5 - Carex (Wetland)</b>	
Length of transect in this type: 215 feet	
Plant Species	Cover
CARUTR	4 = 21-50%
AGRALB	2 = 6-10%
TYPLAT	1 = 1-5%
JUNBAL	3 = 11-20%
GLYGRA	1 = 1-5%
GLYSTR	2 = 6-10%
JUNTEN	1 = 1-5%
CARLAN	1 = 1-5%
CARSTI	1 = 1-5%
ALOPRA	2 = 6-10%
CIRARV	1 = 1-5%
Total Vegetative Cover:	95%

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

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

**MDT WETLAND MONITORING – VEGETATION TRANSECT  
MDT WETLAND MONITORING – VEGETATION TRANSECT**

Site: **Bouchard** Date: **July 29, 2008** Examiner: **G. Howard**

Transect Number: **3** Approximate Transect Length: **133 feet** Compass Direction from Start: **45°** Note: \_\_\_\_\_

Vegetation Type I: C.T. 4 - Juncus / Cirsium (Wetland)	
Length of transect in this type: 10 feet	
Plant Species	Cover
CARNUT	4 = 21-50%
AGRREP	4 = 21-50%
CIRARV	3 = 11-20%
GEUMAC	1 = 1-5%
VERTHA	+ = < 1%
CYNOFF	2 = 6-10%
ACHMIL	+ = < 1%
BROTEC	1 = 1-5%
TYPLAT	+ = < 1%
Total Vegetative Cover:	95%

Vegetation Type J: C.T. 1 - Agropyron (Upland)	
Length of transect in this type: 123 feet	
Plant Species	Cover
ALOPRA	2 = 6-10%
AGRREP	4 = 21-50%
POAPRA	2 = 6-10%
JUNBAL	3 = 11-20%
CIRARV	2 = 6-10%
SONARV	1 = 1-5%
GEUMAC	+ = < 1%
Total Vegetative Cover:	95%

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

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

## MDT WETLAND MONITORING – VEGETATION TRANSECT

### Cover Estimate

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

### Indicator Class

+ = Obligate  
- = Facultative/Wet  
0 = Facultative

### Source

P = Planted  
V = Volunteer

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): \_\_\_\_%

Establish transects perpendicular to the shoreline (or saturated perimeter). The transect should begin in the upland area. Permanently mark this location with a standard metal fencepost. Extend the imaginary transect line towards the center of the wetland, ending at the 3 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: \_\_\_\_\_











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

<b>Project/Site:</b> Bouchard Property	<b>Project No:</b> B4308801	<b>Date:</b> 29-Jul-2008
<b>Applicant/Owner:</b> Montana Department of Transportation	<b>County:</b> Lake	
<b>Investigators:</b> G. Howard	<b>State:</b> Montana	
	<b>Plot ID:</b> T1 - SP5	

<b>Do Normal Circumstances exist on the site?</b>	<input checked="" type="radio"/> Yes <input type="radio"/> No	<b>Community ID:</b> EM
<b>Is the site significantly disturbed (Atypical Situation)?</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No	<b>Transect ID:</b> 1
<b>Is the area a potential Problem Area?</b> (If needed, explain on the reverse side)	<input type="radio"/> Yes <input checked="" type="radio"/> No	<b>Field Location:</b> Transect # 1

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

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
<i>Agrostis alba</i> Redtop	Herb	FACW	<i>Cirsium arvense</i> Thistle,Creeping	Herb	FACU+
<i>Juncus balticus</i> Rush,Baltic	Herb	OBL	<i>Sonchus arvensis</i> Sowthistle,Field	Herb	FACU+
<i>Glyceria striata</i> Grass,Fowl Manna	Herb	OBL	<i>Solanum dulcamara</i> Nightshade,Climbing	Herb	FAC

<b>Percent of Dominant Species that are OBL, FACW or FAC:</b> (excluding FAC-) 4/6 = 66.67%	<b>FAC Neutral:</b> 3/5 = 60.00%
	<b>Numeric Index:</b> 15/6 = 2.50
<b>Remarks:</b> Area dominated by hydrophytic vegetation.	

**HYDROLOGY**

<u>NO</u> Recorded Data(Describe in Remarks): <u>N/A</u> Stream, Lake or Tide Gauge <u>N/A</u> Aerial Photographs <u>N/A</u> Other  <b>YES</b> No Recorded Data	<b>Wetland Hydrology Indicators</b> <b>Primary Indicators</b> <u>NO</u> Inundated <b>YES</b> Saturated in Upper 12 Inches <u>NO</u> Water Marks <u>NO</u> Drift Lines <u>NO</u> Sediment Deposits <u>NO</u> Drainage Patterns in Wetlands <b>Secondary Indicators</b> <u>NO</u> Oxidized Root Channels in Upper 12 Inches <u>NO</u> Water-Stained Leaves <u>NO</u> Local Soil Survey Data <b>YES</b> FAC-Neutral Test <u>NO</u> Other(Explain in Remarks)
<b>Field Observations</b>  <b>Depth of Surface Water:</b> N/A (in.) <b>Depth to Free Water in Pit:</b> N/A (in.) <b>Depth to Saturated Soil:</b> = 8 (in.)	
<b>Remarks:</b> Hydrology indicator present with soils saturated within the upper 12 of the profile.	

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

<b>Project/Site:</b> Bouchard Property	<b>Project No:</b> B4308801	<b>Date:</b> 29-Jul-2008
<b>Applicant/Owner:</b> Montana Department of Transportation	<b>County:</b> Lake	
<b>Investigators:</b> G. Howard	<b>State:</b> Montana	
	<b>Plot ID:</b> T1 - SP5	

<b>Map Unit Name (Series and Phase):</b> Lamoose loam, 0 to 2 percent slope	<b>Mapped Hydric Inclusion?</b>
<b>Map Symbol:</b> 93 <b>Drainage Class:</b> poorly drained	<b>Field Observations Confirm Mapped Type?</b> Yes <input checked="" type="radio"/> No
<b>Taxonomy (Subgroup):</b>	
<b>Profile Description</b>	

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
0-6	A/B	10YR3/3	N/A	N/A N/A	Loam
6-10+	A	10YR2/1	N/A	N/A N/A	Clay loam

<b>Hydric Soil Indicators:</b> <u>NO</u> Histosol <u>NO</u> Histic Epipedon <u>NO</u> Sulfidic Odor <u>NO</u> Aquic Moisture Regime <u>NO</u> Reducing Conditions <b>YES</b> Gleyed or Low Chroma Colors	<u>NO</u> Concretions <u>NO</u> High Organic Content in Surface Layer in Sandy Soils <u>NO</u> Organic Streaking in Sandy Soils <b>YES</b> Listed on Local Hydric Soils List <u>NO</u> Listed on National Hydric Soils List <u>NO</u> Other (Explain in Remarks)
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<b>Remarks:</b> Hydric soil indicator present with low-chroma colors.
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**WETLAND DETERMINATION**

Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	Is the Sampling Point within the Wetland? <input checked="" type="radio"/> Yes <input type="radio"/> No
Wetland Hydrology Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	
Hydric Soils Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	

<b>Remarks:</b> Sampling point considered within a wetland area. Existing wetlands adjacent to created wetland areas.
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**DATA FORM**  
**ROUTINE WETLAND DETERMINATION**  
**(1987 COE Wetlands Delineation Manual)**

<b>Project/Site:</b> Bouchard Property	<b>Project No:</b> B4308801	<b>Date:</b> 29-Jul-2008
<b>Applicant/Owner:</b> Montana Department of Transportation	<b>County:</b> Lake	<b>State:</b> Montana
<b>Investigators:</b> G. Howard	<b>Plot ID:</b> T2 - SP2	

<b>Do Normal Circumstances exist on the site?</b>	<input checked="" type="radio"/> Yes <input type="radio"/> No	<b>Community ID:</b> EM
<b>Is the site significantly disturbed (Atypical Situation)?</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No	<b>Transect ID:</b> 1
<b>Is the area a potential Problem Area?</b> (If needed, explain on the reverse side)	<input type="radio"/> Yes <input checked="" type="radio"/> No	<b>Field Location:</b> Transect # 2

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

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
<i>Carex utriculata</i> beaked sedge	Herb	OBL	<i>Glyceria maxima</i> Meadowgrass, Reed	Herb	OBL
<i>Agrostis alba</i> Redtop	Herb	FACW	<i>Juncus tenuis</i> Rush, Slender	Herb	FAC
<i>Typha latifolia</i> Cattail, Broad-Leaf	Herb	OBL	<i>Alopecurus pratensis</i> Foxtail, Meadow	Herb	FACW
<i>Juncus balticus</i> Rush, Baltic	Herb	OBL			

<b>Percent of Dominant Species that are OBL, FACW or FAC:</b> (excluding FAC-) 7/7 = 100.00%	<b>FAC Neutral:</b> 6/6 = 100.00%
	<b>Numeric Index:</b> 11/7 = 1.57
<b>Remarks:</b> Area dominated by hydrophytic vegetation.	

**HYDROLOGY**

<u>NO</u> Recorded Data(Describe in Remarks): <u>N/A</u> Stream, Lake or Tide Gauge <u>N/A</u> Aerial Photographs <u>N/A</u> Other	<b>Wetland Hydrology Indicators</b>
<b>YES</b> No Recorded Data	<b>Primary Indicators</b>
<b>Field Observations</b>	<u>NO</u> Inundated
<b>Depth of Surface Water:</b> N/A (in.)	<b>YES</b> Saturated in Upper 12 Inches
<b>Depth to Free Water in Pit:</b> N/A (in.)	<u>NO</u> Water Marks
<b>Depth to Saturated Soil:</b> = 0 (in.)	<u>NO</u> Drift Lines
	<u>NO</u> Sediment Deposits
	<u>NO</u> Drainage Patterns in Wetlands
	<b>Secondary Indicators</b>
	<u>NO</u> Oxidized Root Channels in Upper 12 Inches
	<u>NO</u> Water-Stained Leaves
	<u>NO</u> Local Soil Survey Data
	<b>YES</b> FAC-Neutral Test
	<u>NO</u> Other(Explain in Remarks)
<b>Remarks:</b> Hydrology indicator present with low-chroma colors.	

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

<b>Project/Site:</b> Bouchard Property	<b>Project No:</b> B4308801	<b>Date:</b> 29-Jul-2008
<b>Applicant/Owner:</b> Montana Department of Transportation	<b>County:</b> Lake	<b>State:</b> Montana
<b>Investigators:</b> G. Howard	<b>Plot ID:</b> T2 - SP2	

<b>Map Unit Name (Series and Phase):</b> Borochemists, 0 to 1 percent slopes	<b>Mapped Hydric Inclusion?</b>
<b>Map Symbol:</b> 19 <b>Drainage Class:</b> very poorly drained	<b>Field Observations Confirm Mapped Type?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>
<b>Taxonomy (Subgroup):</b>	
<b>Profile Description</b>	

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
0-10+	A	10YR2/1	N/A	N/A N/A	Loam

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

<b>Remarks:</b> Hydric soil indicators present with low-chroma colors. Area also mapped as Hydric Soil.
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**WETLAND DETERMINATION**

Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	Is the Sampling Point within the Wetland? <input checked="" type="radio"/> Yes <input type="radio"/> No
Wetland Hydrology Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	
Hydric Soils Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	

<b>Remarks:</b> Sampling point considered within a wetland area.
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**DATA FORM  
ROUTINE WETLAND DETERMINATION  
(1987 COE Wetlands Delineation Manual)**

<b>Project/Site:</b> Bouchard Property	<b>Project No:</b> B4308801	<b>Date:</b> 29-Jul-2008
<b>Applicant/Owner:</b> Montana Department of Transportation	<b>County:</b> Lake	<b>State:</b> Montana
<b>Investigators:</b> G. Howard	<b>Plot ID:</b> T3 - SP1	

<b>Do Normal Circumstances exist on the site?</b>	<input checked="" type="radio"/> Yes <input type="radio"/> No	<b>Community ID:</b> EM
<b>Is the site significantly disturbed (Atypical Situation)?</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No	<b>Transect ID:</b> 1
<b>Is the area a potential Problem Area?</b> (If needed, explain on the reverse side)	<input type="radio"/> Yes <input checked="" type="radio"/> No	<b>Field Location:</b> Transect # 3

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

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
<i>Carduus nutans</i> Musk thistle	Herb	NI	<i>Geum macrophyllum</i> Avens, Large-Leaf	Herb	FACW+
<i>Agropyron repens</i> Quackgrass	Herb	FACU	<i>Typha latifolia</i> Cattail, Broad-Leaf	Herb	OBL
<i>Cirsium arvense</i> Thistle, Creeping	Herb	FACU+	<i>Juncus balticus</i> Rush, Baltic	Herb	OBL

<b>Percent of Dominant Species that are OBL, FACW or FAC:</b> (excluding FAC-) 3/5 = 60.00%	<b>FAC Neutral:</b> 3/5 = 60.00%
	<b>Numeric Index:</b> 12/5 = 2.40
<b>Remarks:</b> Hydrophytic vegetation marginal, area considered wetland. Weedy fringe around shallow ponds.	

**HYDROLOGY**

<u>NO</u> Recorded Data(Describe in Remarks): <u>N/A</u> Stream, Lake or Tide Gauge <u>N/A</u> Aerial Photographs <u>N/A</u> Other <b>YES</b> No Recorded Data	<b>Wetland Hydrology Indicators</b> <b>Primary Indicators</b> <u>NO</u> Inundated <b>YES</b> Saturated in Upper 12 Inches <u>NO</u> Water Marks <u>NO</u> Drift Lines <u>NO</u> Sediment Deposits <u>NO</u> Drainage Patterns in Wetlands <b>Secondary Indicators</b> <u>NO</u> Oxidized Root Channels in Upper 12 Inches <u>NO</u> Water-Stained Leaves <u>NO</u> Local Soil Survey Data <b>YES</b> FAC-Neutral Test <u>NO</u> Other(Explain in Remarks)
<b>Field Observations</b>  <b>Depth of Surface Water:</b> N/A (in.) <b>Depth to Free Water in Pit:</b> N/A (in.) <b>Depth to Saturated Soil:</b> = 10 (in.)	
<b>Remarks:</b> Hydrology indicators present with saturated soils.	

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

<b>Project/Site:</b> Bouchard Property	<b>Project No:</b> B4308801	<b>Date:</b> 29-Jul-2008
<b>Applicant/Owner:</b> Montana Department of Transportation	<b>County:</b> Lake	<b>State:</b> Montana
<b>Investigators:</b> G. Howard	<b>Plot ID:</b> T3 - SP1	

<b>Map Unit Name (Series and Phase):</b> Borochemists, 0 to 1 percent slopes	<b>Mapped Hydric Inclusion?</b>
<b>Map Symbol:</b> 19 <b>Drainage Class:</b> very poorly drained	<b>Field Observations Confirm Mapped Type?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>
<b>Taxonomy (Subgroup):</b>	
<b>Profile Description</b>	

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
0-10	A	10YR2/1	N/A	N/A N/A	Loam

<b>Hydric Soil Indicators:</b> <u>NO</u> Histosol <u>NO</u> Histic Epipedon <u>NO</u> Sulfidic Odor <u>NO</u> Aquic Moisture Regime <u>NO</u> Reducing Conditions <b>YES</b> Gleyed or Low Chroma Colors	<u>NO</u> Concretions <u>NO</u> High Organic Content in Surface Layer in Sandy Soils <u>NO</u> Organic Streaking in Sandy Soils <b>YES</b> Listed on Local Hydric Soils List <u>NO</u> Listed on National Hydric Soils List <u>NO</u> Other (Explain in Remarks)
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<b>Remarks:</b> Hydric soil indicators present with low-chroma colors and area mapped as a Hydric Soil.
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**WETLAND DETERMINATION**

Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	Is the Sampling Point within the Wetland? <input checked="" type="radio"/> Yes <input type="radio"/> No
Wetland Hydrology Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	
Hydric Soils Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	

<b>Remarks:</b> Sampling point considered with a wetland area. Vegetation marginal, high abundance of weedy species around fringe of pond.
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**14A. HABITAT FOR FEDERALLY LISTED OR PROPOSED THREATENED OR ENDANGERED PLANTS AND ANIMALS**

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

- Primary or Critical habitat (list species)  D  S \_\_\_\_\_
- Secondary habitat (list species)  D  S \_\_\_\_\_
- Incidental habitat (list species)  D  S Grizzly Bear, Gray wolf, Canada Lynx
- No usable habitat  D  S \_\_\_\_\_

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

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	---	---	---	---	.3 (L)	---

If documented, list the source (e.g., observations, records, etc.): Montana Natural Heritage Program.

**14B. HABITAT FOR PLANTS AND ANIMALS RATED AS S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM.**

**Do not include species listed in 14A(i).**

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

- Primary or Critical habitat (list species)  D  S \_\_\_\_\_
- Secondary habitat (list species)  D  S \_\_\_\_\_
- Incidental habitat (list species)  D  S Bald Eagle, Townsend's Big-eared Bat, Western Toad
- No usable habitat  D  S \_\_\_\_\_

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

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

If documented, list the source (e.g., observations, records, etc.): Montana Natural Heritage Program.

**14C. General Wildlife Habitat Rating**

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

**Substantial** (based on any of the following)

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

**Low** (based on any of the following)

- few or no wildlife observations during peak use periods
- little to no wildlife sign
- sparse adjacent upland food sources
- interviews with local biologists with knowledge of AA

**Moderate** (based on any of the following)

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

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

Structural Diversity (from #13)	<input checked="" type="checkbox"/> High								<input type="checkbox"/> Moderate								<input type="checkbox"/> Low			
Class Cover Distribution (all vegetated classes)	<input type="checkbox"/> Even				<input checked="" type="checkbox"/> Uneven				<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> 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
<b>Low</b> disturbance at AA (see #12)	--	--	--	--	--	E	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>Moderate</b> disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>High</b> disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

Evidence of Wildlife Use from 14C(i)	Wildlife Habitat Features Rating from 14C(ii)			
	<input checked="" type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Substantial	--	--	--	--
Moderate	.9 (H)	--	--	--
Low	--	--	--	--

Comments: \_\_\_\_\_

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

If the AA is not or was not historically used by fish due to lack of habitat, excessive gradient, then check the NA box above.

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

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

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

ii. **Modified Habitat Quality:** Is fish use of the AA precluded or significantly reduced by a culvert, dike, other man-made structure or activity or is the waterbody included on the 'MDEQ list of waterbodies in need of TMDL development' with 'Probable Impaired Uses' listed as cold or warm water fishery or aquatic life support?

Y  N If yes, reduce the rating from 14D(i) by one level and check the modified habitat quality rating:  E  H  M  L

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

Types of Fish Known or Suspected Within AA	Modified Habitat Quality from 14D(ii)			
	<input type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Native game fish	--	--	--	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: \_\_\_\_\_

**14E. FLOOD ATTENUATION**  NA (proceed to 14G)

Applies only to wetlands subject to flooding via in-channel or overbank flow.

If wetlands in AA do not flooded from in-channel or overbank flow, check NA above.

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

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

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

Y  N Comments: \_\_\_\_\_

**14F. SHORT AND LONG TERM SURFACE WATER STORAGE**  NA (proceed to 14G)

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.

If no wetlands in the AA are subject to flooding or ponding, check NA above.

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

Abbreviations: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral.

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	<input checked="" type="checkbox"/> >5 acre feet			<input type="checkbox"/> <5, >1 acre feet			<input type="checkbox"/> ≤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	--	.9 (H)	--	--	--	--	--	--	--
Wetlands in AA flood or pond < 5 out of 10 years	--	--	--	--	--	--	--	--	--

Comments: \_\_\_\_\_

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

Applies to wetlands with potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input.

If no wetlands in the AA are subject to such input, check NA above.

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

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
% cover of wetland vegetation in AA	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Evidence of flooding or ponding in AA	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
AA contains <b>no or restricted outlet</b>	1 (H)	--	--	--	--	--	--	--
AA contains <b>unrestricted outlet</b>	--	--	--	--	--	--	--	--

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 that is subject to wave action. If this does not apply, check NA above.

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

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	Duration of Surface Water Adjacent to Rooted Vegetation		
	<input type="checkbox"/> Permanent / Perennial	<input type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
≥ 65 %	--	--	--
35-64 %	--	--	--
< 35 %	--	--	--

Comments: \_\_\_\_\_

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

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

A = acreage of vegetated component in the AA. B = structural diversity rating from #13. C = Yes (Y) or No (N) as to whether or not the AA contains a surface or subsurface outlet; P/P = permanent/perennial; S/I = seasonal/intermittent; T/E/A = temporary/ephemeral/absent.

A	<input checked="" type="checkbox"/> Vegetated component >5 acres						<input type="checkbox"/> Vegetated component 1-5 acres						<input type="checkbox"/> Vegetated component <1 acre					
B	<input checked="" type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low	
C	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N
P/P	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S/I	.9H	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments: \_\_\_\_\_

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

i.  **Discharge Indicators**

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

ii.  **Recharge Indicators**

- Permeable substrate presents without underlying impeding layer.
- Wetland contains inlet but not outlet.
- Other \_\_\_\_\_

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

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

Comments: \_\_\_\_\_

**14K. UNIQUENESS**

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

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

Comments: \_\_\_\_\_

**14L. RECREATION / EDUCATION POTENTIAL**

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

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

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

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

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

Ownership	Disturbance at AA from #12(i)	
	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Moderate
Public ownership	--	.5(M)
Private ownership	--	--

Comments: \_\_\_\_\_

**FUNCTION, VALUE SUMMARY, AND OVERALL RATING**

Function and Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	Low	0.30	1	
B. MT Natural Heritage Program Species Habitat	Low	0.10	1	
C. General Wildlife Habitat	High	0.90	1	
D. General Fish/Aquatic Habitat	NA		--	
E. Flood Attenuation	NA		--	
F. Short and Long Term Surface Water Storage	High	0.90	1	
G. Sediment/Nutrient/Toxicant Removal	High	1.00	1	
H. Sediment/Shoreline Stabilization	NA		--	
I. Production Export/Food Chain Support	High	0.90	1	
J. Groundwater Discharge/Recharge	High	1.00	--	
K. Uniqueness	Mod	0.60	1	
L. Recreation/Education Potential	Mod	0.5	1	
<b>Totals:</b>		<b><u>6.20</u></b>	<b><u>8.00</u></b>	
<b>Percent of Total Possible Points:</b>			<b>78%</b> (Actual / Possible) x 100 [rd to nearest whole #]	

<p><b>Category I Wetland:</b> (Must satisfy <b>one</b> of the following criteria. If not proceed to Category II.)</p> <p><input type="checkbox"/> Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; <b>or</b></p> <p><input type="checkbox"/> Score of 1 functional point for Uniqueness; <b>or</b></p> <p><input type="checkbox"/> Score of 1 functional point for Flood Attenuation <b>and</b> answer to Question 14E(ii) is "yes"; <b>or</b></p> <p><input type="checkbox"/> Percent of total Possible Points is &gt; 80%.</p>
<p><b>Category II Wetland:</b> (Criteria for Category I not satisfied <b>and</b> meets any <b>one</b> of the following Category II criteria. If not satisfied, proceed to Category IV.)</p> <p><input type="checkbox"/> Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; <b>or</b></p> <p><input checked="" type="checkbox"/> Score of .9 or 1 functional point for General Wildlife Habitat; <b>or</b></p> <p><input type="checkbox"/> Score of .9 or 1 functional point for General Fish/Aquatic Habitat; <b>or</b></p> <p><input type="checkbox"/> "High" to "Exceptional" ratings for <b>both</b> General Wildlife Habitat <b>and</b> General Fish / Aquatic Habitat; <b>or</b></p> <p><input type="checkbox"/> Score of .9 functional point for Uniqueness; <b>or</b></p> <p><input checked="" type="checkbox"/> Percent of total possible points is &gt; 65%.</p>
<p><input type="checkbox"/> <b>Category III Wetland:</b> (Criteria for Categories I, II, or IV not satisfied.)</p>
<p><b>Category IV Wetland:</b> (Criteria for Categories I or II are not satisfied <b>and</b> <u>all</u> of the following criteria are met; If not satisfied, proceed to Category III.)</p> <p><input type="checkbox"/> "Low" rating for Uniqueness; <b>and</b></p> <p><input type="checkbox"/> "Low" rating for Production Export / Food Chain Support; <b>and</b></p> <p><input type="checkbox"/> Percent of total possible points is &lt; 30%.</p>

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

I       II       III       IV

**PBS&J / MDT WETLAND MITIGATION SITE MONITORING FORM**

Project Name: **Jocko River Bridge** Project Number: **B4300881**  
 Assessment Date: **July 28, 2008** Person(s) conducting the assessment: **G. Howard**  
 Location: **Arlee** MDT District: **Missoula** Milepost: \_\_\_\_\_  
 Legal Description: T **16N** R **20W** Section **2**  
 Weather Conditions: **Sunny, Temps in low 80's** Time of Day: **12-4**  
 Initial Evaluation Date: **7/25/07** Monitoring Year: **2** # Visits in Year: **1**  
 Size of evaluation area: **1 acres** Land use surrounding wetland: **Agriculture and residential**

**HYDROLOGY**

Surface Water Source: **Jocko Spring Brook**  
 Inundation: **Absent** Average Depth: **0.5 feet** Range of Depths: **0-1 ft.**  
 Percent of assessment area under inundation: **80%**  
 Depth at emergent vegetation-open water boundary: \_\_\_\_\_ **feet**  
 If assessment area is not inundated then are the soils saturated within 12 inches of surface: **-**  
 Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc.):  
 \_\_\_\_\_

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:**

**Mitigation site has a small wetland area, site mostly disturbed riparian. Mitigation efforts included riparian and wetland vegetation enhancements. The mitigation site is heavily impacted from adjacent land owner's horses grazing within the site. The gate between easment and adjacent parcel was left open - horses roaming freely between the mitigation site and neighbor's. Most to all plantings have been destroyed from grazing. Little evidence of any riparian plantings observed during the 2008 field visit. Plantings within the wetland have been impacted, but not as heavily as other areas.**

## VEGETATION COMMUNITIES

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

Dominant Species	% Cover	Dominant Species	% Cover
PHARARU	5 = > 50%	VIOSPP	1 = 1-5%
EQUARV	+ = < 1%	CARUTR	2 = 6-10%
RANACR	1 = 1-5%	TYPLAT	1 = 1-5%
JUNENS	+ = < 1%	ELEPAL	2 = 6-10%
MIMGUT	1 = 1-5%	MENARV	+ = < 1%

Comments / Problems: **Small wetland area dominated by emergent vegetation. Herbaceous plants heavily grazed.**

Community Number: **2** Community Title (main spp): **Carex / Glyceria**

Dominant Species	% Cover	Dominant Species	% Cover
CARUTR	3 = 11-20%	SOLSPP	+ = < 1%
CARSTI	3 = 11-20%	RANACR	+ = < 1%
GLYSPP	3 = 11-20%	MENARV	+ = < 1%
PHAARU	2 = 6-10%	ELEPAL	2 = 6-10%
ALNINC	1 = 1-5%	EQUARV	+ = < 1%
BETOCC	2 = 6-10%		

Comments / Problems: **Small wetland area dominated by emergent vegetation and larger mature wetland type shrubs around the fringe.**

Community Number: **3** Community Title (main spp): **Betula / Alnus**

Dominant Species	% Cover	Dominant Species	% Cover
BETOCC	5 = > 50%		
ALNINC	4 = 21-50%		
SALBEB	2 = 6-10%		
PHAARU	2 = 6-10%		

Comments / Problems: **Small wetland area dominated by scrub-shrub vegetation type.**

Community Number: **4** Community Title (main spp): **Grass spp. / Plantago**

Dominant Species	% Cover	Dominant Species	% Cover
Grass spp.	4 = 21-50%	LYNALB	+ = < 1%
PLAMAJ	2 = 6-10%	ANTCOT	1 = 1-5%
SYMALB	2 = 6-10%		
CYNOFF	+ = < 1%		
AGRREP	+ = < 1%		

Comments / Problems: **Areas consisting of the riparian vegetation enhancement. Areas of mulch (bark dust) with no vegetation cover. Weed mats exposed and shredded. Remanent woody species plantings present; area devastated by neighbors horses.**

**VEGETATION COMMUNITIES (continued)**

Community Number: **5** Community Title (main spp): **Populus / Prunus**

Dominant Species	% Cover	Dominant Species	% Cover
POPTRE	4 = 21-50%		
PRUVIR	4 = 21-50%		
ROSWOO	3 = 11-20%		
SYMALB	3 = 11-20%		
BETOCC	2 = 6-10%		

Comments / Problems: **Riparian vegetation dominated by quaking aspen and other riparian shrubs.**

Community Number: **6** Community Title (main spp): **Populus**

Dominant Species	% Cover	Dominant Species	% Cover
POPTRI	5 = > 50%		
PINPON	3 = 11-20%		
SYMALB	4 = 21-50%		
ROSWOO	4 = 21-50%		

Comments / Problems: **Forested stand of black cottonwood and understory of shrubs adjacent to the Jocko River - undisturbed riparian vegetation.**

Community Number: **7** Community Title (main spp): **Salix / Alnus**

Dominant Species	% Cover	Dominant Species	% Cover
SALDRU	4 = 21-50%	ACHMIL	+ = < 1%
SALEXI	2 = 6-10%	AGRREP	1 = 1-5%
CORSTO	1 = 1-5%	RANACR	+ = < 1%
ALNINC	4 = 21-50%	PLAMAJ	+ = < 1%
SALBEB	2 = 6-10%	POPTRE	1 = 1-5%

Comments / Problems: **Planting area installed with wetter shrub species, but located within an upland or riparian area.**

Community Number: **8** Community Title (main spp): **Melilotus**

Dominant Species	% Cover	Dominant Species	% Cover
MELOFF	4 = 21-50%	VERTHA	+ = < 1%
MELALB	4 = 21-50%		
CENMAC	1 = 1-5%		
ACHMIL	1 = 1-5%		
AGRREP	2 = 6-10%		
AGRALB	1 = 1-5%		

Comments / Problems: **Dry weedy fringe around the mitigation site on east side.**

## COMPREHENSIVE VEGETATION LIST

Plant Species	Vegetation Community Number (s)	Plant Species	Vegetation Community Number (s)
<i>Achillea millefolium</i>	4	<i>Prunus virginiana</i>	5,6
<i>Agropyron repens</i>	4	<i>Ranunculus acris</i>	1,2,4
<i>Alnus incana</i>	2,3	<i>Rosa woodsii</i>	5,6
<i>Alyssum alyssoides</i>	4	<i>Salix bebbiana</i>	7
<i>Anthemis cotula</i>	4	<i>Salix drummondiana</i>	7
<i>Berteroa incana</i>	4	<i>Salix exigua</i>	1,7
<i>Betula occidentalis</i>	3,5	<i>Sambucus racemosa</i>	4
<i>Bromus tectorum</i>	4,8	<i>Sisymbrium altissimum</i>	8
<i>Carex utriculata</i>	1,2	<i>Solidago missouriensis</i>	2,3,7
<i>Carex stipata</i>	2	<i>Symphoricarpos albus</i>	5,6
<i>Centaurea maculosa</i>	8	<i>Taraxacum officinale</i>	4,7
<i>Chenopodium album</i>	8	<i>Thlaspi arvense</i>	4
<i>Cynoglossum officinale</i>	4	<i>Typha latifolia</i>	1
<i>Dactylis glomerata</i>	4	<i>Veronica americana</i>	1,2
<i>Eleocharis palustris</i>	2	<i>Verbascum thapsus</i>	7,8
<i>Equisetum arvense</i>	1,2	<i>Viola spp.</i>	2,4
<i>Festuca pratensis</i>	4	<i>Xanthium strumarium</i>	4
<i>Geum macrophyllum</i>	1,2		
	1,2		
<i>Glyceria striata</i>	1,2		
<i>Impatiens ecalcarata</i>	1,2		
<i>Juncus ensifolius</i>	1,2		
<i>Lychnis alba</i>	4		
	8		
<i>Melilotus alba</i>	8		
<i>Melilotus officinalis</i>	8		
<i>Mentha arvensis</i>	2,3		
<i>Mimulus guttatus</i>	1,2		
<i>Phalaris arundinacea</i>	1,2		
<i>Plantago major</i>	4		
<i>Poa pratensis</i>	4		
<i>Populus tremuloides</i>	5		
<i>Populus trichocarpa</i>	6		
<i>Pinus ponderosa</i>	6		

**Comments / Problems:** \_\_\_\_\_

## PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number Observed	Mortality Causes
ACEGLA	56	0	Plantings areas heavily impacted by grazing horses that belong to neighboring parcel. The riparian / upland planting areas had low survival counts. With majority of the plants being completely removed from the ground. The plantings located outside the fenced boundary looked healthy with moderate to vigorous growth for the season with few discolored leaves. Wetland shrubs located within the fenced area were heavily grazed, but were maintaining health.
ALNINC	80	25	
AMEALN	24	0	
BETOCC	80	1	
CORSTO	40	1	
POPTRE	22	12	
POPTRI	17	2	
PRUVIR	24	2	
ROSWOO	14	0	
RUBIDA	14	0	
SALBEB	32	8	
SALDRU	72	10	
SALEXI	60	36	
SAMRAC	24	4	
SYMALB	24	2	

**Comments / Problems:** Shrub planting survival data was collected along one (260 ft long) 2 meters wide belt transect that totaled approximately 0.03 acres (1,690 sq. ft.). Transect was established along the vegetation transect that runs across the entire site. During the 2008 monitoring, species survival was based on visual estimates and counts for each live species. The original plantings numbers as listed above were referenced from Wetland Mitigation Planting Details and Schedule (Appendix G). Actual planting numbers and prescribed species may vary from the original plan. Post design changes for planting prescriptions may have been adjusted during the construction phase due to availability of seedlings. Overall survival ratings are considered low based on visual assessment. Mitigation heavily impacted from grazing of local horses from neighboring parcel. Majority of the plantings within the riparian / upland plantings areas were gone. A few of the larger containerized quaking aspen and black cottonwood did survive the browse. Wetland shrubs were heavily browsed, but were maintaining health.

## 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
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

### Additional Activities Checklist:

**NA** Macroinvertebrate Sampling (if required)

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.
- NA** 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: **FA completed using the 1999 MDT Montana Wetland Assessment Method. Mitigation crediting system requires a direct comparison between pre- and post-project functional assessment to evaluate mitigation site progress with a functional shift.**

## MAINTENANCE

Were man-made nesting structure installed at this site? **NA**

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? **NA**

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: **Jocko River Bridge** Date: **July 28, 2008** Examiner: **G. Howard**

Transect Number: **1** Approximate Transect Length: **260 feet** Compass Direction from Start: **0°** Note: \_\_\_\_\_

<b>Vegetation Type A: C.T. 7 - Salix / Alnus (Upland)</b>	
Length of transect in this type: 26 feet	
<b>Plant Species</b>	<b>Cover</b>
SALDRU	3 = 11-20%
SALEXI	3 = 11-20%
ALNINC	2 = 6-10%
POPTRE	1 = 1-5%
CORSTO	1 = 1-5%
AGRREP	3 = 11-20%
RANACR	1 = 1-5%
EQUARV	+ = < 1%
ACHMIL	+ = < 1%
FESPRA	2 = 6-10%
POAPRA	2 = 6-10%
Total Vegetative Cover:	95%

<b>Vegetation Type B: C.T. 1 - Phalaris / Carex (Wetland)</b>	
Length of transect in this type: 75 feet	
<b>Plant Species</b>	<b>Cover</b>
PHAARU	5 = > 50%
ELEPAL	2 = 6-10%
POAPRA	1 = 1-5%
VIOSPP	+ = < 1%
RANACR	+ = < 1%
BETOCC	1 = 1-5%
Total Vegetative Cover:	95%

<b>Vegetation Type C: C.T. 4 - Grass sp. / Plantago (Upland)</b>	
Length of transect in this type: 159 feet	
<b>Plant Species</b>	<b>Cover</b>
AGRREP	4 = 21-50%
ACHMIL	1 = 1-5%
SAMRAC	2 = 6-10%
POAPRA	1 = 1-5%
ROSWOO	1 = 1-5%
CHEALB	+ = < 1%
POPTRI	+ = < 1%
SALEXI	+ = < 1%
Total Vegetative Cover:	55%

<b>Vegetation Type D:</b>	
Length of transect in this type:        feet	
<b>Plant Species</b>	<b>Cover</b>
Total Vegetative Cover:	%

## MDT WETLAND MONITORING – VEGETATION TRANSECT

### Cover Estimate

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

### Indicator Class

+ = Obligate  
- = Facultative/Wet  
0 = Facultative

### Source

P = Planted  
V = Volunteer

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): \_\_\_\_%

Establish transects perpendicular to the shoreline (or saturated perimeter). The transect should begin in the upland area. Permanently mark this location with a standard metal fencepost. Extend the imaginary transect line towards the center of the wetland, ending at the 3 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: \_\_\_\_\_











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

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

- Primary or Critical habitat (list species)  D  S \_\_\_\_\_
- Secondary habitat (list species)  D  S \_\_\_\_\_
- Incidental habitat (list species)  D  S Grizzly bear, Gray wolf
- No usable habitat  D  S \_\_\_\_\_

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

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	---	---	---	---	.3 (L)	---

If documented, list the source (e.g., observations, records, etc.): Montana Natural Heritage Program.

**14B. HABITAT FOR PLANTS AND ANIMALS RATED AS S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM.**

**Do not include species listed in 14A(i).**

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

- Primary or Critical habitat (list species)  D  S \_\_\_\_\_
- Secondary habitat (list species)  D  S \_\_\_\_\_
- Incidental habitat (list species)  D  S Bald Eagle.
- No usable habitat  D  S \_\_\_\_\_

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

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

If documented, list the source (e.g., observations, records, etc.): Montana Natural Heritage Program.

**14C. General Wildlife Habitat Rating**

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

**Substantial** (based on any of the following)

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

**Low** (based on any of the following)

- few or no wildlife observations during peak use periods
- little to no wildlife sign
- sparse adjacent upland food sources
- interviews with local biologists with knowledge of AA

**Moderate** (based on any of the following)

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

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

Structural Diversity (from #13)	<input type="checkbox"/> High								<input checked="" type="checkbox"/> Moderate								<input type="checkbox"/> Low			
Class Cover Distribution (all vegetated classes)	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> Even				<input checked="" type="checkbox"/> Uneven				<input type="checkbox"/> 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
<b>Low</b> disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>Moderate</b> disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>High</b> disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	M	--	--	--	--	--	--	--

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

Evidence of Wildlife Use from 14C(i)	<b>Wildlife Habitat Features Rating from 14C(ii)</b>			
	<input type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input checked="" type="checkbox"/> Moderate	<input type="checkbox"/> Low
Substantial	--	--	--	--
Moderate	--	--	.5 (M)	--
Low	--	--	--	--

Comments: \_\_\_\_\_

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

If the AA is not or was not historically used by fish due to lack of habitat, excessive gradient, then check the NA box above.

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

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

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

ii. **Modified Habitat Quality:** Is fish use of the AA precluded or significantly reduced by a culvert, dike, other man-made structure or activity or is the waterbody included on the 'MDEQ list of waterbodies in need of TMDL development' with 'Probable Impaired Uses' listed as cold or warm water fishery or aquatic life support?

Y  N If yes, reduce the rating from 14D(i) by one level and check the modified habitat quality rating:  E  H  M  L

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

Types of Fish Known or Suspected Within AA	Modified Habitat Quality from 14D(ii)			
	<input type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Native game fish	--	--	--	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: \_\_\_\_\_

**14E. FLOOD ATTENUATION**  NA (proceed to 14G)

Applies only to wetlands subject to flooding via in-channel or overbank flow.

If wetlands in AA do not flooded from in-channel or overbank flow, check NA above.

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

Estimated wetland area in AA subject to periodic flooding	<input type="checkbox"/> ≥ 10 acres			<input type="checkbox"/> <10, >2 acres			<input checked="" type="checkbox"/> ≤2 acres		
% of flooded wetland classified as forested, scrub/shrub, or both	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains <b>no outlet or restricted outlet</b>	--	--	--	--	--	--	--	--	--
AA contains <b>unrestricted outlet</b>	--	--	--	--	--	--	--	--	.1 (L)

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

Y  N Comments: \_\_\_\_\_

**14F. SHORT AND LONG TERM SURFACE WATER STORAGE**  NA (proceed to 14G)

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.

If no wetlands in the AA are subject to flooding or ponding, check NA above.

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

Abbreviations: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral.

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	<input type="checkbox"/> >5 acre feet			<input type="checkbox"/> <5, >1 acre feet			<input checked="" type="checkbox"/> ≤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	--	--	--	--	--	--	.4 (M)	--	--
Wetlands in AA flood or pond < 5 out of 10 years	--	--	--	--	--	--	--	--	--

Comments: \_\_\_\_\_

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

Applies to wetlands with potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input.

If no wetlands in the AA are subject to such input, check NA above.

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

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
% cover of wetland vegetation in AA	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Evidence of flooding or ponding in AA	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
AA contains <b>no or restricted outlet</b>	--	--	--	--	--	--	--	--
AA contains <b>unrestricted outlet</b>	.9 (H)	--	--	--	--	--	--	--

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 that is subject to wave action. If this does not apply, check NA above.

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

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	Duration of Surface Water Adjacent to Rooted Vegetation		
	<input checked="" type="checkbox"/> Permanent / Perennial	<input type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
≥ 65 %	1 (H)	--	--
35-64 %	--	--	--
< 35 %	--	--	--

Comments: \_\_\_\_\_

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

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

A	<input type="checkbox"/> Vegetated component >5 acres				<input type="checkbox"/> Vegetated component 1-5 acres				<input checked="" type="checkbox"/> Vegetated component <1 acre					
B	<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low			
C	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N
P/P	--	--	--	--	--	--	--	--	--	--	--	--	.6M	--
S/I	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments: \_\_\_\_\_

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

i.  **Discharge Indicators**

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

ii.  **Recharge Indicators**

- Permeable substrate presents without underlying impeding layer.
- Wetland contains inlet but not outlet.
- Other \_\_\_\_\_

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

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

Comments: \_\_\_\_\_

**14K. UNIQUENESS**

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

Replacement Potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland or plant association listed as "S1" by the MTNHP.			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MTNHP.			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate.		
	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input checked="" type="checkbox"/> common	<input type="checkbox"/> abundant
Estimated Relative Abundance from #11	--	--	--	--	--	--	--	--	--
Low disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--
High disturbance at AA (#12i)	--	--	--	--	--	--	--	.2L	--

Comments: \_\_\_\_\_

**14L. RECREATION / EDUCATION POTENTIAL**

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

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

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

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

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

Ownership	Disturbance at AA from #12(i)		
	<input type="checkbox"/> Low	<input type="checkbox"/> Moderate	<input checked="" type="checkbox"/> High
Public ownership	--	--	--
Private ownership	--	--	.1(L)

Comments: \_\_\_\_\_

**FUNCTION, VALUE SUMMARY, AND OVERALL RATING**

Function and Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	Low	0.30	1	
B. MT Natural Heritage Program Species Habitat	Low	0.10	1	
C. General Wildlife Habitat	Mod	0.50	1	
D. General Fish/Aquatic Habitat	NA		--	
E. Flood Attenuation	Low	0.10	1	
F. Short and Long Term Surface Water Storage	Mod	0.4	1	
G. Sediment/Nutrient/Toxicant Removal	High	0.90	1	
H. Sediment/Shoreline Stabilization	High	1.00	1	
I. Production Export/Food Chain Support	Mod	0.60	1	
J. Groundwater Discharge/Recharge	High	1.00	1	
K. Uniqueness	Low	0.20	1	
L. Recreation/Education Potential	Low	0.10	1	
<b>Totals:</b>		<b><u>5.20</u></b>	<b><u>11.00</u></b>	
<b>Percent of Total Possible Points:</b>			<b>47%</b> (Actual / Possible) x 100 [rd to nearest whole #]	

<p><b>Category I Wetland:</b> (Must satisfy <b>one</b> of the following criteria. If not proceed to Category II.)</p> <input type="checkbox"/> Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; <b>or</b> <input type="checkbox"/> Score of 1 functional point for Uniqueness; <b>or</b> <input type="checkbox"/> Score of 1 functional point for Flood Attenuation <b>and</b> answer to Question 14E(ii) is "yes"; <b>or</b> <input type="checkbox"/> Percent of total Possible Points is > 80%.
<p><b>Category II Wetland:</b> (Criteria for Category I not satisfied <b>and</b> meets any <b>one</b> of the following Category II criteria. If not satisfied, proceed to Category IV.)</p> <input type="checkbox"/> Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; <b>or</b> <input type="checkbox"/> Score of .9 or 1 functional point for General Wildlife Habitat; <b>or</b> <input type="checkbox"/> Score of .9 or 1 functional point for General Fish/Aquatic Habitat; <b>or</b> <input type="checkbox"/> "High" to "Exceptional" ratings for <b>both</b> General Wildlife Habitat <b>and</b> General Fish / Aquatic Habitat; <b>or</b> <input type="checkbox"/> Score of .9 functional point for Uniqueness; <b>or</b> <input type="checkbox"/> Percent of total possible points is > 65%.
<p><input checked="" type="checkbox"/> <b>Category III Wetland:</b> (Criteria for Categories I, II, or IV not satisfied.)</p>
<p><b>Category IV Wetland:</b> (Criteria for Categories I or II are not satisfied <b>and</b> <u>all</u> of the following criteria are met; If not satisfied, proceed to Category III.)</p> <input type="checkbox"/> "Low" rating for Uniqueness; <b>and</b> <input type="checkbox"/> "Low" rating for Production Export / Food Chain Support; <b>and</b> <input type="checkbox"/> Percent of total possible points is < 30%.

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

**I**     
 **II**     
 **III**     
 **IV**

**PBS&J / MDT WETLAND MITIGATION SITE MONITORING FORM**

Project Name: Jocko Spring Creek Project Number: 4300881  
 Assessment Date: August 11, 2008 Person(s) conducting the assessment: G. Howard  
 Location: Arlee MDT District: Missoula Milepost: \_\_\_\_\_  
 Legal Description: T 17N R 20W Section 16  
 Weather Conditions: Sunny, Temps in low 80's Time of Day: 12-4  
 Initial Evaluation Date: August 11, 2008 Monitoring Year: 2 # Visits in Year: 1  
 Size of evaluation area: 3 acres Land use surrounding wetland: highway, railroad, agriculture

**HYDROLOGY**

Surface Water Source: Jocko Spring Creek  
 Inundation: Present Average Depth: 0.3 feet Range of Depths: 0 -0.5  
 Percent of assessment area under inundation: 60%  
 Depth at emergent vegetation-open water boundary: 2 feet  
 If assessment area is not inundated then are the soils saturated within 12 inches of surface:     
 Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc.):  
 \_\_\_\_\_

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:**

Mitigation site consists of the newly constructed Jocko Spring Creek channel, adjacent wetlands, and upland vegetation restoration areas. The wetland areas of the mitigation site are dominated by emergent vegetation and small area of remnant scrub-shrub and forested areas. Hydrology source is the perennial Jocko Spring Creek. Wetlands inundated from overbank flow of the creek onto the adjacent wetland pads.

## VEGETATION COMMUNITIES

Community Number: **1** Community Title (main spp): **Agropyron (Upland)**

Dominant Species	% Cover	Dominant Species	% Cover
AGRTRA	4 = 21-50%	POAPRA	3 = 11-20%
AGRREP	2 = 6-10%	BROTEC	2 = 6-10%
LEPPER	2 = 6-10%	SISALT	+ = < 1%
FESIDA	2 = 6-10%	VERTHA	2 = 6-10%
PHAARU	1 = 1-5%	PHLPRA	1 = 1-5%

Comments / Problems: **Upland on North side of railroad grade.**

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

Dominant Species	% Cover	Dominant Species	% Cover
SYMALB	5 = > 50%	SOLSPP	2 = 6-10%
DISSYL	2 = 6-10%	SISALT	1 = 1-5%
CIRARV	1 = 1-5%		
CYNOFF	1 = 1-5%		
AGRREP	2 = 6-10%		
BROTEC	1 = 1-5%		

Comments / Problems: **Thick snowberry (Symphoricarpos albus) patch adjacent to railroad grade.**

Community Number: **3** Community Title (main spp): **Carex / Glyceria**

Dominant Species	% Cover	Dominant Species	% Cover
CARUTR	4 = 21-50%	AGRALB	2 = 6-10%
CARBEB	2 = 6-10%	DISSYL	1 = 1-5%
PHAARU	2 = 6-10%	GLYGRA	3 = 11-20%
TYPLAT	1 = 1-5%	MENARV	
JUNSPP	2 = 6-10%		
JUNENS	2 = 6-10%		

Comments / Problems: **Wetland areas adjacent to the creek and throughout the topographic basin of the new channel.**

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

Dominant Species	% Cover	Dominant Species	% Cover
TYPLAT	5 = > 50%		
PHAARU	2 = 6-10%		

Comments / Problems: **Existing wetland dominated by a monoculture of cattail with a minor inclusion of reed canarygrass.**

**VEGETATION COMMUNITIES (continued)**

Community Number: **5** Community Title (main spp): **Populus**

Dominant Species	% Cover	Dominant Species	% Cover
POPTRI	5 = > 50%		
SALBEB	2 = 6-10%		
PHAARU	2 = 6-10%		

Comments / Problems: **Small stand of black cottonwood located on the south side of mitigation project.**

Community Number: **6** Community Title (main spp): **Juncus / Agrostis**

Dominant Species	% Cover	Dominant Species	% Cover
JUNBAL	4 = 21-50%	CARUTR	2 = 6-10%
AGRALB	4 = 21-50%		
VERTHA	2 = 6-10%		
DISSYL	1 = 1-5%		
SOLSPP	2 = 6-10%		

Comments / Problems: **Emergent wetlands along the channel above the banks.**

Community Number: **7** Community Title (main spp): **Salix / Juncus**

Dominant Species	% Cover	Dominant Species	% Cover
SALBEB	4 = 21-50%	CARUTR	1 = 1-5%
JUNBAL	4 = 21-50%		
AGRALB	2 = 6-10%		
PHAARU	1 = 1-5%		
VERTHA	+ = < 1%		

Comments / Problems: **Existing emergent and scrub-shrub vegetation types on the south.**

Community Number: **8** Community Title (main spp): **Salix**

Dominant Species	% Cover	Dominant Species	% Cover
SALAMY	5 = > 50%		

Comments / Problems: **Large willow trees along the old channel that was removed.**

## COMPREHENSIVE VEGETATION LIST

Plant Species	Vegetation Community Number (s)	Plant Species	Vegetation Community Number (s)
<i>Achillea millefolium</i>	1	<i>Mimulus guttatus</i>	3
<i>Agrostis alba</i>	3	<i>Nepeta cataria</i>	3
<i>Agropyron repens</i>	1	<i>Phalaris arundinacea</i>	3,4,5,7
<i>Agropyron trachycaulum</i>	1	<i>Phleum pratense</i>	1
<i>Alnus incana</i>	3	<i>Poa pratensis</i>	1
<i>Bromus tectorum</i>	1	<i>Polygonum amphibium</i>	3
<i>Carex aquatilis</i>	3	<i>Polygonum spp.</i>	3
<i>Carex bebbii</i>	3	<i>Populus trichocarpa</i>	5
<i>Carex lanuginose</i>	3	<i>Prunus americana</i>	1
<i>Carex nebrascensis</i>	3	<i>Rorippa nasturtium-aquaticum</i>	3
<i>Carex spp.</i>	3	<i>Rosa woodsii</i>	1
<i>Carex stipata</i>	3	<i>Rumex crispus</i>	3
<i>Carex utriculata</i>	3,6,7	<i>Salix amygdaloides</i>	8
<i>Centaurea maculosa</i>	1,2	<i>Salix bebbiana</i>	7
<i>Chrysanthemum leucanthemum</i>	1,2	<i>Salix drummondiana</i>	3
<i>Cirsium arvense</i>	2	<i>Salix lutea</i>	3
<i>Cornus stolonifera</i>	3	<i>Scirpus microcarpus</i>	3
<i>Crataegus douglasii</i>	3	<i>Sisymbrium altissimum</i>	1,2
<i>Cynoglossum officinale</i>	1,2	<i>Solanum dulcamara</i>	1,2,3
<i>Deschampsia cespitosa</i>	3	<i>Solidago missouriensis</i>	2
<i>Dipsacus sylvestris</i>	2,3	<i>Symphoricarpos albus</i>	2
<i>Epilobium ciliatum</i>	3	<i>Thlaspi arvense</i>	1,2
<i>Festuca idahoensis</i>	1,2	<i>Typha latifolia</i>	3,4
<i>Geum macrophyllum</i>	3	<i>Veronica americana</i>	3
<i>Glyceria grandis</i>	3	<i>Verbascum thapsus</i>	1,2
<i>Impatiens ecalcarata</i>	3		
<i>Juncus ensifolius</i>	3		
<i>Juncus spp.</i>	3		
<i>Lactuca serriola</i>	1		
<i>Lepidium perfoliatum</i>	1,2		
<i>Lychnis alba</i>	1,2		
<i>Mentha arvensis</i>	3		

**Comments / Problems:** \_\_\_\_\_

## PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number Observed	Mortality Causes
ALNINC	605	15	Plantings looked healthy with vigorous growth for the season with few discolored leaves. Browse protection were intact and properly functioning. Bebb willow and common snowberry had the highest counts. Planting located within the wetland areas and along the fringe were inundated – plants receiving adequate hydrology.
CRADOU	388	6	
CORSTO	106	20	
PRUAME	323	26	
RHAALN	42	0	
ROSWOO	85	9	
SALBEB	386	44	
SALLUT	193	1	
SYMALB	234	37	

**Comments / Problems:** Shrub planting survival data was collected along three (lengths varied) 2 meter wide belt transects that totaled approximately 0.15 acres (6,000 sq. ft.). Transects were established along the edges of the created and enhanced wetland mitigation areas on the south-side of railroad grade. Another transect was placed along the upland restoration area on the north side of railroad grade. During the 2008 monitoring, species survival was based on visual estimates and counts for each live species. The original plantings numbers as listed above were referenced from Wetland Plant Summary – Spring Creek Wetlands (Appendix G). Actual planting numbers and prescribed species may vary from the original plan. Post design changes for planting prescriptions were adjusted during the construction phase due to availability of seedlings. Overall survival ratings are considered high based on visual assessment. Plant growth was vigorous and looked healthy with few discolored leaves. Browse protection were intact and properly functioning. Wetland planting sites were inundated and plantings receiving adequate hydrology.

## 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
Raccoon		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Muskrat		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Deer		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

### Additional Activities Checklist:

**NA** Macroinvertebrate Sampling (if required)

Comments / Problems: \_\_\_\_\_

## 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	1.0	View looking southeast.	135
PP2	1.0	View looking southeast.	135
PP2	1.1	View looking northwest.	315
PP2	1.2	View looking southeast.	135
PP2	1.3	View looking north.	0
PP2	1.4	View looking southwest.	225
PP3	1.0	View looking east.	90
PP3	1.1	View looking east.	90
PP3	1.2	View looking west.	270
PP4	1.0	View looking east.	90
PP4	1.1	View looking east.	90
PP4	1.2	View looking west.	270
PP5	1.0	View looking west.	270
PP5	1.1	View looking southeast.	135
PP5	1.2	View looking west.	270
PP6	1.0	View looking northeast.	45
PP6	1.1	View looking northwest.	315
PP7	1.0	View looking southwest.	225
PP7	1.1	View looking northeast.	45
PP7	1.2	View looking west.	270
PP7	1.3	View looking west.	270
PP7	1.4	View looking southeast.	135
PP8	1.0	View looking northwest.	315
PP8	1.1	View looking west.	270
PP8	1.2	View looking southeast.	135
PP9	1.0	View looking north.	0
PP9	1.1	View looking east.	90

**Comments / Problems:** Refer to photopage for a more detailed description of the photo points.

## 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.
- NA** 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: **FA completed using the 1999 MDT MWAM. Mitigation crediting system requires a pre- and post-project functional assessment that requires a direct comparison using the 1999 methods for functional shift.**

:

## 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? **NA**

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: \_\_\_\_\_ Date: \_\_\_\_\_ Examiner: \_\_\_\_\_  
 Transect Number: \_\_\_\_\_ Approximate Transect Length: \_\_\_\_\_ **feet** Compass Direction from Start: \_\_\_\_\_° Note: \_\_\_\_\_

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

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

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

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

## MDT WETLAND MONITORING – VEGETATION TRANSECT

### Cover Estimate

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

### Indicator Class

+ = Obligate  
- = Facultative/Wet  
0 = Facultative

### Source

P = Planted  
V = Volunteer

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): \_\_\_\_%

Establish transects perpendicular to the shoreline (or saturated perimeter). The transect should begin in the upland area. Permanently mark this location with a standard metal fencepost. Extend the imaginary transect line towards the center of the wetland, ending at the 3 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: \_\_\_\_\_











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

<b>Project/Site:</b> Jocko Spring Creek	<b>Project No:</b>	<b>Date:</b> 11-Aug-2008
<b>Applicant/Owner:</b> Montana Department of Transportation		<b>County:</b> Lake
<b>Investigators:</b> G. Howard		<b>State:</b> Montana
		<b>Plot ID:</b> T2 - SP2

<b>Do Normal Circumstances exist on the site?</b>	<input checked="" type="radio"/> Yes <input type="radio"/> No	<b>Community ID:</b> EM
<b>Is the site significantly disturbed (Atypical Situation)?</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No	<b>Transect ID:</b> 1
<b>Is the area a potential Problem Area?</b> (If needed, explain on the reverse side)	<input type="radio"/> Yes <input checked="" type="radio"/> No	<b>Field Location:</b> Transect # 2

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

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
<i>Phalaris arundinacea</i>	Herb	FACW	<i>Carex aquatilis</i>	Herb	OBL
Grass, Reed Canary			Sedge, Water		
<i>Agrostis alba</i>	Herb	FACW	<i>Juncus effusus</i>	Herb	FACW+
Redtop			Rush, Soft		
<i>Carex nebrascensis</i>	Herb	OBL	<i>Agrostis alba</i>	Herb	FACW
Sedge, Nebraska			Redtop		
<i>Carex utriculata</i>	Herb	OBL	<i>Polygonum amphibium</i>	Herb	OBL
beaked sedge			Smartweed, Water		

<b>Percent of Dominant Species that are OBL, FACW or FAC:</b> (excluding FAC-) 8/8 = 100.00%	<b>FAC Neutral:</b> 8/8 = 100.00%
	<b>Numeric Index:</b> 12/8 = 1.50
<b>Remarks:</b> Area dominated by hydrophytic vegetation.	

**HYDROLOGY**

<u>NO</u> Recorded Data(Describe in Remarks): <u>N/A</u> Stream, Lake or Tide Gauge <u>N/A</u> Aerial Photographs <u>N/A</u> Other  <b>YES</b> No Recorded Data	<b>Wetland Hydrology Indicators</b> <b>Primary Indicators</b> <u>NO</u> Inundated <b>YES</b> Saturated in Upper 12 Inches <u>NO</u> Water Marks <u>NO</u> Drift Lines <u>NO</u> Sediment Deposits <u>NO</u> Drainage Patterns in Wetlands <b>Secondary Indicators</b> <u>NO</u> Oxidized Root Channels in Upper 12 Inches <u>NO</u> Water-Stained Leaves <u>NO</u> Local Soil Survey Data <b>YES</b> FAC-Neutral Test <u>NO</u> Other(Explain in Remarks)
<b>Field Observations</b>  <b>Depth of Surface Water:</b> N/A (in.) <b>Depth to Free Water in Pit:</b> N/A (in.) <b>Depth to Saturated Soil:</b> = 0 (in.)	
<b>Remarks:</b> Hydrology indicators present with soils saturated to ground surface.	

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

<b>Project/Site:</b> Jocko Spring Creek	<b>Project No:</b>	<b>Date:</b> 11-Aug-2008
<b>Applicant/Owner:</b> Montana Department of Transportation		<b>County:</b> Lake
<b>Investigators:</b> G. Howard		<b>State:</b> Montana
		<b>Plot ID:</b> T2 - SP2

<b>Map Unit Name (Series and Phase):</b> Jocko gravelly loam, 0 to 4 % slope	<b>Map Symbol:</b> 81	<b>Drainage Class:</b> somewhat excessively drained	<b>Mapped Hydric Inclusion?</b>
<b>Taxonomy (Subgroup):</b>	<b>Field Observations Confirm Mapped Type?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>		
<b>Profile Description</b>			

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
0-10+	A	10YR2/1	N/A	N/A N/A	Loam

<b>Hydric Soil Indicators:</b> <u>NO</u> Histosol <u>NO</u> Histic Epipedon <u>NO</u> Sulfidic Odor <u>NO</u> Aquic Moisture Regime <u>NO</u> Reducing Conditions <b>YES</b> Gleyed or Low Chroma Colors	<u>NO</u> Concretions <u>NO</u> High Organic Content in Surface Layer in Sandy Soils <u>NO</u> Organic Streaking in Sandy Soils <u>NO</u> Listed on Local Hydric Soils List <u>NO</u> Listed on National Hydric Soils List <u>NO</u> Other (Explain in Remarks)
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<b>Remarks:</b> Hydric soils indicator present with low-chroma colors.
---

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	Is the Sampling Point within the Wetland? <input checked="" type="radio"/> Yes <input type="radio"/> No
Wetland Hydrology Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	
Hydric Soils Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	

<b>Remarks:</b> Sampling point considered within a wetland area.
---

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

<b>Project/Site:</b> Jocko Spring Creek	<b>Project No:</b>	<b>Date:</b> 11-Aug-2008
<b>Applicant/Owner:</b> Montana Department of Transportation	<b>County:</b> Lake	<b>State:</b> Montana
<b>Investigators:</b> G. Howard	<b>Plot ID:</b> T2 - SP3	

<b>Do Normal Circumstances exist on the site?</b>	<input checked="" type="radio"/> Yes <input type="radio"/> No	<b>Community ID:</b> EM
<b>Is the site significantly disturbed (Atypical Situation)?</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No	<b>Transect ID:</b> 1
<b>Is the area a potential Problem Area?</b> (If needed, explain on the reverse side)	<input type="radio"/> Yes <input checked="" type="radio"/> No	<b>Field Location:</b> Transect # 2

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

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
<i>Carex utriculata</i> beaked sedge	Herb	OBL	<i>Carex stipata</i> saw-beak sedge	Herb	OBL
<i>Typha latifolia</i>	Herb	OBL	<i>Phalaris arundinacea</i> Grass, Reed Canary	Herb	FACW
Cattail, Broad-Leaf					
<i>Agrostis alba</i> Redtop	Herb	FACW	<i>Glyceria maxima</i> Meadowgrass, Reed	Herb	OBL
<i>Dipsacus sylvestris</i> Teasel	Herb	NI	<i>Juncus effusus</i> Rush, Soft	Herb	FACW+
<i>Carex bebbii</i> Sedge, Bebb's	Herb	OBL	<i>Mentha arvensis</i> Mint, Field	Herb	FAC

<b>Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-)</b> 9/9 = 100.00%	<b>FAC Neutral:</b> 8/8 = 100.00%
	<b>Numeric Index:</b> 14/9 = 1.56
<b>Remarks:</b> Area dominated by hydrophytic vegetation.	

**HYDROLOGY**

<u>NO</u> Recorded Data(Describe in Remarks): <u>N/A</u> Stream, Lake or Tide Gauge <u>N/A</u> Aerial Photographs <u>N/A</u> Other	<b>Wetland Hydrology Indicators</b>
<b>YES</b> No Recorded Data	<b>Primary Indicators</b>
<b>Field Observations</b>	<input checked="" type="radio"/> YES Inundated
<b>Depth of Surface Water:</b> = 6 (in.)	<input checked="" type="radio"/> YES Saturated in Upper 12 Inches
<b>Depth to Free Water in Pit:</b> N/A (in.)	<input type="radio"/> NO Water Marks
<b>Depth to Saturated Soil:</b> N/A (in.)	<input type="radio"/> NO Drift Lines
	<input type="radio"/> NO Sediment Deposits
	<input type="radio"/> NO Drainage Patterns in Wetlands
	<b>Secondary Indicators</b>
	<input type="radio"/> NO Oxidized Root Channels in Upper 12 Inches
	<input type="radio"/> NO Water-Stained Leaves
	<input type="radio"/> NO Local Soil Survey Data
	<input checked="" type="radio"/> YES FAC-Neutral Test
	<input type="radio"/> NO Other(Explain in Remarks)

**Remarks:**  
hydrology indicator present with shallow inundation and soils saturated to ground surface.

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

<b>Project/Site:</b> Jocko Spring Creek	<b>Project No:</b>	<b>Date:</b> 11-Aug-2008
<b>Applicant/Owner:</b> Montana Department of Transportation	<b>County:</b> Lake	<b>State:</b> Montana
<b>Investigators:</b> G. Howard	<b>Plot ID:</b> T2 - SP3	

**SOILS**

<b>Map Unit Name (Series and Phase):</b> Jocko gravelly loam, 0 to 4 % slope	<b>Map Symbol:</b> 81	<b>Drainage Class:</b> somewhat excessively drained	<b>Mapped Hydric Inclusion?</b>
<b>Taxonomy (Subgroup):</b>			<b>Field Observations Confirm Mapped Type?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>
<b>Profile Description</b>			

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
0-10+	A	10YR2/1	N/A	N/A N/A	Loam

**Hydric Soil Indicators:**

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

**Remarks:**  
Hydric soil indicator present with low-chroma colors.

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	Is the Sampling Point within the Wetland? <input checked="" type="radio"/> Yes <input type="radio"/> No
Wetland Hydrology Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	
Hydric Soils Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	

**Remarks:**  
Sampling point considered within a wetland area.



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

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

- Primary or Critical habitat (list species)  D  S \_\_\_\_\_
- Secondary habitat (list species)  D  S \_\_\_\_\_
- Incidental habitat (list species)  D  S Bull trout, Gray wolf
- No usable habitat  D  S \_\_\_\_\_

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

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	---	---	---	---	.3 (L)	---

If documented, list the source (e.g., observations, records, etc.): Montana Natural Heritage Program.

**14B. HABITAT FOR PLANTS AND ANIMALS RATED AS S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM.**

**Do not include species listed in 14A(i).**

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

- Primary or Critical habitat (list species)  D  S \_\_\_\_\_
- Secondary habitat (list species)  D  S Westslope Cutthroat
- Incidental habitat (list species)  D  S Bald Eagle
- No usable habitat  D  S \_\_\_\_\_

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

Highest Habitat Level:	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	---	---	.6 (M)	---	---	---

If documented, list the source (e.g., observations, records, etc.): Montana Natural Heritage Program.

**14C. General Wildlife Habitat Rating**

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

- Substantial** (based on any of the following)
  - observations of abundant wildlife #s or high species diversity (during any period)
  - abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
  - presence of extremely limiting habitat features not available in the surrounding area
  - interviews with local biologists with knowledge of the AA
- Low** (based on any of the following)
  - few or no wildlife observations during peak use periods
  - little to no wildlife sign
  - sparse adjacent upland food sources
  - interviews with local biologists with knowledge of AA
- Moderate** (based on any of the following)
  - observations of scattered wildlife groups or individuals or relatively few species during peak periods
  - common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
  - adequate adjacent upland food sources
  - interviews with local biologists with knowledge of the AA

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

Structural Diversity (from #13)	<input checked="" type="checkbox"/> High								<input type="checkbox"/> Moderate								<input type="checkbox"/> Low			
Class Cover Distribution (all vegetated classes)	<input type="checkbox"/> Even				<input checked="" type="checkbox"/> Uneven				<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> 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
<b>Low</b> disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>Moderate</b> disturbance at AA (see #12)	--	--	--	--	H	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>High</b> disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

Evidence of Wildlife Use from 14C(i)	<b>Wildlife Habitat Features Rating from 14C(ii)</b>			
	<input type="checkbox"/> Exceptional	<input checked="" type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Substantial	--	--	--	--
Moderate	--	.7 (M)	--	--
Low	--	--	--	--

Comments: \_\_\_\_\_

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

If the AA is not or was not historically used by fish due to lack of habitat, excessive gradient, then check the NA box above.

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

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

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

ii. **Modified Habitat Quality:** Is fish use of the AA precluded or significantly reduced by a culvert, dike, other man-made structure or activity or is the waterbody included on the 'MDEQ list of waterbodies in need of TMDL development' with 'Probable Impaired Uses' listed as cold or warm water fishery or aquatic life support?

Y  N If yes, reduce the rating from 14D(i) by one level and check the modified habitat quality rating:  E  H  M  L

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

Types of Fish Known or Suspected Within AA	Modified Habitat Quality from 14D(ii)			
	<input type="checkbox"/> Exceptional	<input checked="" type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Native game fish	--	.9 (H)	--	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: \_\_\_\_\_

**14E. FLOOD ATTENUATION**  NA (proceed to 14G)

Applies only to wetlands subject to flooding via in-channel or overbank flow.

If wetlands in AA do not flooded from in-channel or overbank flow, check NA above.

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

Estimated wetland area in AA subject to periodic flooding	<input type="checkbox"/> ≥ 10 acres			<input type="checkbox"/> <10, >2 acres			<input checked="" type="checkbox"/> ≤2 acres		
% of flooded wetland classified as forested, scrub/shrub, or both	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains <b>no outlet or restricted outlet</b>	--	--	--	--	--	--	--	--	--
AA contains <b>unrestricted outlet</b>	--	--	--	--	--	--	--	--	.1 (L)

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

Y  N Comments: \_\_\_\_\_

**14F. SHORT AND LONG TERM SURFACE WATER STORAGE**  NA (proceed to 14G)

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.

If no wetlands in the AA are subject to flooding or ponding, check NA above.

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

Abbreviations: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral.

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	<input type="checkbox"/> >5 acre feet			<input checked="" type="checkbox"/> <5, >1 acre feet			<input type="checkbox"/> ≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ≥ 5 out of 10 years	--	--	--	.8 (H)	--	--	--	--	--
Wetlands in AA flood or pond < 5 out of 10 years	--	--	--	--	--	--	--	--	--

Comments: \_\_\_\_\_

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

Applies to wetlands with potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input.

If no wetlands in the AA are subject to such input, check NA above.

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

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
% cover of wetland vegetation in AA	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Evidence of flooding or ponding in AA	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
AA contains <b>no or restricted outlet</b>	--	--	--	--	--	--	--	--
AA contains <b>unrestricted outlet</b>	.9 (H)	--	--	--	--	--	--	--

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 that is subject to wave action. If this does not apply, check NA above.

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

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	Duration of Surface Water Adjacent to Rooted Vegetation		
	<input checked="" type="checkbox"/> Permanent / Perennial	<input type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
≥ 65 %	1 (H)	--	--
35-64 %	--	--	--
< 35 %	--	--	--

Comments: \_\_\_\_\_

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

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

A	<input type="checkbox"/> Vegetated component >5 acres						<input checked="" type="checkbox"/> Vegetated component 1-5 acres						<input type="checkbox"/> Vegetated component <1 acre					
B	<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input checked="" type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low	
C	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N
P/P	--	--	--	--	--	--	.9H	--	--	--	--	--	--	--	--	--	--	--
S/I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments: \_\_\_\_\_

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

i.  **Discharge Indicators**

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

ii.  **Recharge Indicators**

- Permeable substrate presents without underlying impeding layer.
- Wetland contains inlet but not outlet.
- Other \_\_\_\_\_

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

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

Comments: \_\_\_\_\_

**14K. UNIQUENESS**

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

Replacement Potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland or plant association listed as "S1" by the MTNHP.			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MTNHP.			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate.		
	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input checked="" type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant
Estimated Relative Abundance from #11	--	--	--	--	--	--	--	--	--
Low disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (#12i)	--	--	--	--	.5M	--	--	--	--
High disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--

Comments: \_\_\_\_\_

**14L. RECREATION / EDUCATION POTENTIAL**

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

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

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

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

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

Ownership	Disturbance at AA from #12(i)		
	<input type="checkbox"/> Low	<input type="checkbox"/> Moderate	<input type="checkbox"/> High
Public ownership	--	--	--
Private ownership	--	--	--

Comments: \_\_\_\_\_

## FUNCTION, VALUE SUMMARY, AND OVERALL RATING

Function and Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	Low	0.30	1	
B. MT Natural Heritage Program Species Habitat	Mod	0.60	1	
C. General Wildlife Habitat	Mod	0.70	1	
D. General Fish/Aquatic Habitat	High	0.90	1	
E. Flood Attenuation	low	0.10	1	
F. Short and Long Term Surface Water Storage	High	0.80	1	
G. Sediment/Nutrient/Toxicant Removal	High	0.90	1	
H. Sediment/Shoreline Stabilization	High	1.00	1	
I. Production Export/Food Chain Support	High	0.9	1	
J. Groundwater Discharge/Recharge	High	1.00	1	
K. Uniqueness	Mod	0.50	1	
L. Recreation/Education Potential	High	1.00	1	
<b>Totals:</b>		<b><u>8.70</u></b>	<b><u>12.00</u></b>	
<i>Percent of Total Possible Points:</i>			<b>73%</b> (Actual / Possible) x 100 [rd to nearest whole #]	

<p><b>Category I Wetland:</b> (Must satisfy <b>one</b> of the following criteria. If not proceed to Category II.)</p> <p><input type="checkbox"/> Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; <b>or</b></p> <p><input type="checkbox"/> Score of 1 functional point for Uniqueness; <b>or</b></p> <p><input type="checkbox"/> Score of 1 functional point for Flood Attenuation <b>and</b> answer to Question 14E(ii) is "yes"; <b>or</b></p> <p><input type="checkbox"/> Percent of total Possible Points is &gt; 80%.</p>
<p><b>Category II Wetland:</b> (Criteria for Category I not satisfied <b>and</b> meets any <b>one</b> of the following Category II criteria. If not satisfied, proceed to Category IV.)</p> <p><input type="checkbox"/> Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; <b>or</b></p> <p><input type="checkbox"/> Score of .9 or 1 functional point for General Wildlife Habitat; <b>or</b></p> <p><input checked="" type="checkbox"/> Score of .9 or 1 functional point for General Fish/Aquatic Habitat; <b>or</b></p> <p><input type="checkbox"/> "High" to "Exceptional" ratings for <b>both</b> General Wildlife Habitat <b>and</b> General Fish / Aquatic Habitat; <b>or</b></p> <p><input type="checkbox"/> Score of .9 functional point for Uniqueness; <b>or</b></p> <p><input checked="" type="checkbox"/> Percent of total possible points is &gt; 65%.</p>
<p><input type="checkbox"/> <b>Category III Wetland:</b> (Criteria for Categories I, II, or IV not satisfied.)</p>
<p><b>Category IV Wetland:</b> (Criteria for Categories I or II are not satisfied <b>and</b> <u>all</u> of the following criteria are met; If not satisfied, proceed to Category III.)</p> <p><input type="checkbox"/> "Low" rating for Uniqueness; <b>and</b></p> <p><input type="checkbox"/> "Low" rating for Production Export / Food Chain Support; <b>and</b></p> <p><input type="checkbox"/> Percent of total possible points is &lt; 30%.</p>

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

**I**                     
  **II**                     
  **III**                     
  **IV**

**PBS&J / MDT WETLAND MITIGATION SITE MONITORING FORM**

Project Name: **Peterson** Project Number: **B4308801**  
 Assessment Date: **August 15, 2008** Person(s) conducting the assessment: **G. Howard**  
 Location: **St. Ignatius** MDT District: **Missoula** Milepost: \_\_\_\_\_  
 Legal Description: T **19N** R **20W** Section **35**  
 Weather Conditions: **Clear & temps in low 90's** Time of Day: **12-4**  
 Initial Evaluation Date: **August 15, 2008** Monitoring Year: **1** # Visits in Year: **1**  
 Size of evaluation area: **5-6 acres** Land use surrounding wetland: **Agriculture & residences**

**HYDROLOGY**

Surface Water Source: **Unnamed perennial creek**  
 Inundation: **Present** Average Depth: **0.5. feet** Range of Depths: **0-1 ft.**  
 Percent of assessment area under inundation: \_\_\_\_\_ %  
 Depth at emergent vegetation-open water boundary: \_\_\_\_\_ **feet**  
 If assessment area is not inundated then are the soils saturated within 12 inches of surface: **\_**  
 Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc.):  
 \_\_\_\_\_

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:**

**Mitigation site consists of a long draw running east to west with hydrology source from unnamed drainage or tributary to Post Creek. Site dominated by emergent vegetation. Mitigation efforts implemented including construction of log crib structures to impound water, and shrub and herbaecous plug plantings. Wetland areas inundated with shallow waters.**

## VEGETATION COMMUNITIES

Community Number: **1** Community Title (main spp): **Agrovron - Upland**

Dominant Species	% Cover	Dominant Species	% Cover
AGRREP		POTREC	
POLBIS		SISALY	
POAPRA			
LEPPER			
DISSYL			
BROTEC			

Comments / Problems: **Upland plant community on either sides of the wetland**

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

Dominant Species	% Cover	Dominant Species	% Cover
PHAARU	5 = > 50%		
DISSYL	1 = 1-5%		

Comments / Problems: **Wetland community type dominated by a monoculture of reed canarygrass.**

Community Number: **3** Community Title (main spp): **Phalaris / Typha**

Dominant Species	% Cover	Dominant Species	% Cover
PHAARU	4 = 21-50%	SCIMIC	1 = 1-5%
TYPLAT	4 = 21-50%		
JUNSP	2 = 6-10%		
CARUTR	2 = 6-10%		
GLYGRA	2 = 6-10%		
IMPECA	1 = 1-5%		

Comments / Problems: **Wetland communitiy type dominated by a variety of species.**

Community Number: **4** Community Title (main spp): **Carex / Poa**

Dominant Species	% Cover	Dominant Species	% Cover
CARNEB	5 = > 50%		
POAPAL	4 = 21-50%		
PHAARU	1 = 1-5%		
DISSYL	1 = 1-5%		
POLBIS	1 = 1-5%		

Comments / Problems: **Wetland community type located near the vegetation transition between the wetland and upland boundary.**

## COMPREHENSIVE VEGETATION LIST

Plant Species	Vegetation Community Number (s)	Plant Species	Vegetation Community Number (s)
<i>Achillea millefolium</i>	1	<i>Iris pseudacorus</i>	3,4
<i>Agrostis alba</i>	1,2	<i>Juncus balticus</i>	3,4
<i>Agropyron repens</i>	1	<i>Juncus ensifolius</i>	3,4
<i>Agropyron smithii</i>	1	<i>Juncus spp.</i>	3,4
<i>Agropyron spp.</i>	1	<i>Lactuca serriola</i>	1
<i>Agropyron trachycaulum</i>	1	<i>Lemna minor</i>	3
<i>Alnus incana</i>	3,4	<i>Lepidium campestre</i>	1
<i>Bidens cernua</i>	3,4	<i>Lepidium perfoliatum</i>	1
<i>Bromus inermis</i>	1	<i>Lychnis alba</i>	1
<i>Bromus japonicus</i>	1	<i>Malva neglecta</i>	1
<i>Bromus tectorum</i>	1	<i>Medicago Sativa</i>	1
<i>Cardaria draba</i>	1	<i>Melilotus officinalis</i>	1
<i>Carex bebbii</i>	3,4	<i>Nepeta cataria</i>	3
<i>Carex nebrascensis</i>	3,4	<i>Oenanthe spp.</i>	3
<i>Carduus nutans</i>	1	<i>Phalaris arundinacea</i>	2,3,3
<i>Carex spp.</i>	3,4	<i>Poa pratensis</i>	4
<i>Carex stipata</i>	3,4	<i>Poa spp.</i>	4
<i>Carex utriculata</i>	3,4	<i>Polygonum bistortoides</i>	3,4
<i>Chrysanthemum leucanthemum</i>	1,4	<i>Polygonum spp.</i>	3
<i>Cirsium arvense</i>	1	<i>Potentilla recta</i>	2
<i>Cirsium vulgare</i>	1	<i>Rorippa nasturtium-aquaticum</i>	3
<i>Cornus stolonifera</i>	3,4	<i>Rosa woodsii</i>	1
<i>Dactylis glomerata</i>	1	<i>Rumex crispus</i>	3
<i>Descurainia sophia</i>	1	<i>Salix bebbiana</i>	1,3
<i>Dipsacus sylvestris</i>	1	<i>Salix drummondiana</i>	1,3
<i>Eleocharis palustris</i>	3,4	<i>Scirpus microcarpus</i>	3
<i>Epilobium ciliatum</i>	3,4	<i>Sonchus arvensis</i>	1
<i>Erodium cicutarium</i>	1	<i>Thlaspi arvense</i>	1
<i>Festuca arundinacea</i>	1	<i>Tragopogon dubius</i>	1
<i>Festuca spp.</i>	1	<i>Trifolium pratense</i>	1
<i>Glyceria grandis</i>	3,4	<i>Trifolium spp.</i>	1
<i>Impatiens ecalcarata</i>	3,4	<i>Typha latifolia</i>	3

**Comments / Problems:** \_\_\_\_\_

## PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number Observed	Mortality Causes
ALNINC	1,163	27	Plantings looked healthy with moderate to vigorous growth for the season with few discolored leaves. Browse protection were intact and properly functioning. Some of the planted seedlings were installed higher than recommended. The base of the main caliper (stem) and associated roots were sticking out of the ground instead of flush with the ground. Thinleaf alder and woods rose had the highest counts.
CORSTO	226	14	
CRADOU	75	8	
PRUAME	226	9	
RHAALN	207	0	
ROSWOO	450	47	
SASLBEB	394	6	
SALEXI	--	6	
SALLUT	375	3	
SAMCER	19	0	
SYMALB	56	3	

**Comments / Problems:** Shrub planting survival data was collected along six (lengths varied) 2 meter wide belt transects that totaled approximately 0.17 acres (7,500 sq. ft.). Transects were established along the edges of the wetland draw encompassing creation and enhancement mitigation areas. One transect was placed along a log crib structure. During the 2008 monitoring, species survival was based on visual estimates and counts for each live species. The original plantings numbers as listed above were referenced from Peterson Tract Wetland Mitigation Site –Planting Summary (**Appendix G**). Actual planting numbers and prescribed species may vary from the original plan. One species was found that was not listed in the original planting summary. Post design changes for planting prescriptions may have been adjusted during the construction phase due to availability of seedlings. Overall survival ratings are considered moderate to high based on visual assessment. Plant growth was vigorous and looked healthy with few discolored leaves. Browse protection were intact and properly functioning.

**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
Bear		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Deer		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Muskrat		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Raccoon		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

**Additional Activities Checklist:**

NA Macroinvertebrate Sampling (if required)

**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.
- NA** 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: **Functional Assessment completed in 2008 using the 1999 MDT Montana Wetland Assessment Method. The mitigation credit system requires a pre-and post-project functional assessment using the 1999 methods for a direct comparison of scores to show functional shift at the mitigation site that determines enhancement ratio to be applied.**

## MAINTENANCE

Were man-made nesting structure installed at this site? **NA**

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? **Yes**

If yes, are the structures working properly and in good working order? **Yes**

If no, describe the problems below.

Comments / Problems: **General inspection of log crib structures. Log cribs generally working correctly with induration above the crib and surface flow over crib spill over. However, undercutting and substantive leakage between logs was observed at many of the structures, which should be addressed in order to maximize impoundment extent.**



**MDT WETLAND MONITORING – VEGETATION TRANSECT**

Site: **Peterson** Date: **August 15, 2008** Examiner: **G. Howard**

Transect Number: **2** Approximate Transect Length: \_\_\_\_\_ **feet** Compass Direction from Start: **0°** Note: \_\_\_\_\_

Vegetation Type E: <b>C.T. 3 - Phalaris / Typha (Wetlands)</b>	
Length of transect in this type: 0- feet	
Plant Species	Cover
PHAARU	4 = 21-50%
CARNEB	3 = 11-20%
DISSYL	2 = 6-10%
LEPPER	1 = 1-5%
SCIMIC	2 = 6-10%
GLYGRA	2 = 6-10%
CIRARV	+ = < 1%
JUNSP	+ = < 1%
EPICIL	+ = < 1%
Total Vegetative Cover:	%

Vegetation Type F: <b>C.T. 4 - Carex / Poa (Wetland)</b>	
Length of transect in this type: _____ feet	
Plant Species	Cover
POAPAL	4 = 21-50%
POLBIS	4 = 21-50%
DISSYL	2 = 6-10%
ALNINC	1 = 1-5%
ROSWOO	1 = 1-5%
LEPPER	1 = 1-5%
CARNEB	2 = 6-10%
JUNBAL	2 = 6-10%
Total Vegetative Cover:	%

Vegetation Type G: <b>C.T.1 - Agropyron (Upland)</b>	
Length of transect in this type: _____ feet	
Plant Species	Cover
LEPPER	4 = 21-50%
OENSPP	2 = 6-10%
POLBIS	2 = 6-10%
BROTEC	2 = 6-10%
LACSER	3 = 11-20%
POTREC	1 = 1-5%
MEDSAT	2 = 6-10%
POASPP	1 = 1-5%
Total Vegetative Cover:	%

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

## MDT WETLAND MONITORING – VEGETATION TRANSECT

### Cover Estimate

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

### Indicator Class

+ = Obligate  
- = Facultative/Wet  
0 = Facultative

### Source

P = Planted  
V = Volunteer

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): **100%**

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: \_\_\_\_\_



## **Appendix C**

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### **2008 REPRESENTATIVE PHOTOGRAPHS**

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*US Highway 93 Onsite: Bouchard, Jocko River Bridge, Jocko Spring Creek, and Peterson Property*

## BOUCHARD PROPERTY MITIGATION SITE 2008



Photo Point No. 1: View facing north along vegetation Transect # 1. Upland vegetation transitioning into created wetlands (Type 2).



Photo Point No. 2: View facing north towards the end of Transect # 1.



Photo Point No. 5: View facing east along Transect # 2 at scrub-shrub and emergent wetlands.



Photo Point No. 7: View facing east at the end of Transect # 2 and eastern side of parcel.



Photo Point No. 7: View facing west along Transect # 2 at emergent and scrub-shrub vegetation types with the wetland.



Photo Point No. 9: View facing southwest at the start of Transect # 3. Shallow open-water located in background and weedy vegetation around the fringe.

**BOUCHARD PROPERTY MITIGATION SITE 2008**



Photo Point No. 9: View facing northwest along the fringe of the ponds. Area dominated by weedy / aggressive



Photo Point No. 9: View facing northeast along Transect # 3. Area dominated by emergent vegetation type.



Photo Point No. 9: View facing southeast along the weedy fringe of ponds. Area dominated by musk thistle a weedy species.



Photo Point No. 11: View facing northwest across the shallow open-water pond.

## BOUCHARD PROPERTY MITIGATION SITE 2008



Photo Point No. 3: View facing west across the transition between the wetland creation (Type 2 and 3) and the existing rehabilitation areas (Type 5).



Photo Point No. 3: Panoramic view facing south across the wetland creation areas (Type 2, and 3).

## BOUCHARD PROPERTY MITIGATION SITE 2008



Photo Point No. 4: View facing south along a shallow open-water pond and adjacent emergent vegetation types. Community Type 6 in the background with areas dominated by scrub-shrub vegetation types.



Photo Point No.5: View facing north across wetland transition between emergent (Type 5) and scrub-shrub (Type 6) vegetation types.

## BOUCHARD PROPERTY MITIGATION SITE 2008



Photo Point No. 6: View facing southeast along another wetland transition zone between upland (Type 1) and emergent vegetation type (Type 5). Wetland areas considered mitigation type wetland rehabilitation.



Photo Point No. 7: View facing west across the mitigation site from the southeast side of the parcel. Wetland area dominated by emergent and scrub-shrub vegetation types.



Photo Point No. 8: View facing north from the southeast corner of the parcel. Spring creek runs adjacent to parcel along boundary. This area was previously an inlet to the Bouchard Property for irrigation waters. Inlet plugged and ditches filled as part of the mitigation efforts.

## JOCKO RIVER BRIDGE WETLAND MITIGATION SITE 2008



Photo Point 1: View facing north along Transect # 1 across mitigation site. Wetland area in the foreground.



Photo Point 2: View facing south at the start of Transect 1. Wetland areas to the left of view and the surviving wetland plants.



Photo Point 2: View facing east at a small wetland dominated by emergent vegetation and surrounded with a fringe of mature wetland shrubs.

## JOCKO RIVER BRIDGE WETLAND MITIGATION SITE 2008



Photo Point 3: View facing northwest across the riparian enhancement areas. Site heavily disturbed by grazing horses. Existing mature riparian vegetation along the northern side of the mitigation limits along the Jocko River.



Photo Point 4: View facing south across the site. Several planted shrubs surviving on the northern side of project. Majority of the site is heavily grazed, little indication that the site was planted.

## JOCKO RIVER BRIDGE WETLAND MITIGATION SITE 2008



Photo Point 5: View facing north along the outer boundary of the mitigation site. Area dominated by white and yellow sweetclover, and some spotted knapweed. Dry upland community along roadside.



Photo Point 5: View facing west towards the mitigation site from the southeast corner. View shows riparian and wetland areas on the south side of the project dominated by scrub-shrub vegetation (Type 3 and 5).

## JOCKO SPRING CREEK MITIGATION SITE 2008



Photo Point No. 1: View facing southeast along the route of the old Jocko Spring Creek channel. Old channel filled and site planted with upland / riparian species.



Photo Point No. 2: View facing southeast at the start of Transect # 1.



Photo Point No. 2: View facing northwest at mitigation boundary. Vegetation transition between upland and wetland



Photo Point No. 2: View facing southeast along Transect # 2.



Photo Point No. 2: View facing southwest at adjacent parcel. Site dominated by weedy species.

## JOCKO SPRING CREEK MITIGATION SITE 2008



Photo Point No. 3: View facing southeast along Transect # 2 where it crosses the channel. Wetlands dominated by emergent vegetation.



Photo Point No.3: View facing northwest along Transect # 2. Area dominated by emergent vegetation type.



Photo Point No. 4: View facing southeast along Transect # 2 from the other side of the channel.



Photo Point No. 4: View facing northwest across channel back towards the start of the Transect # 2.



Photo Point No. 5: View facing south across mitigation site.



Photo Point No. 5: View facing northwest along Transect # 2 from the end point.



Photo Point No. 6: View facing northeast along Transect # 1. Area dominated by emergent vegetation type and shrub plantings.



Photo Point No. 6: View facing north along the mitigation boundary. Shrub plantings seen in the foreground.



Photo Point No. 7: View facing southwest along Transect # 1 towards starting point and across channel.



Photo Point No. 7: View facing northeast at Transect # 1 ending point.



Photo Point No. 7: View facing southeast along channel towards southeast end of the project site.

## JOCKO SPRING CREEK MITIGATION SITE 2008



Photo Point No. 3: View facing northwest across mitigation site. View showing transition between upland and emergent wetland areas. Shrub planting throughout the area.



Photo Point No. 3: Panoramic view facing southeast across channel and emergent vegetation types.

## JOCKO SPRING CREEK MITIGATION SITE 2008



Photo Point No. 7: View facing northwest along channel and adjacent emergent vegetation types.



Photo Point No.8: View facing northwest along mitigation site and adjacent railroad grade. Areas to the left of the view consist of created and enhanced wetlands. Shrub plantings along the outer fringe of the mitigation site.

## JOCKO SPRING CREEK MITIGATION SITE 2008



Photo Point No. 8: View facing southwest across mitigation site towards newly constructed channel, emergent vegetation type and shrub plantings along the outer fringe.



Photo Point No. 8: View facing southeast across the southern end of the mitigation site. Remnant cattail and small stand of black cottonwood within the mitigation area.



Photo Point No. 9: View facing north across mitigation areas on the north side of the railroad grade at emergent wetlands and upland shrub plantings.

## JOCKO SPRING CREEK MITIGATION SITE 2008



Photo Point No. 9: View facing southeast across newly constructed channel, and scrub-shrub and emergent vegetation types.

## PETERSON WETLAND MITIGATION SITE 2008



Photo Point 1: View facing southwest along Transect # 1. Wetland area dominated by emergent vegetation type. Foreground view shows vegetation transition between upland to wetland.



Photo Point 2: View facing northeast along of Transect # 1 and across the mitigation site.



Photo Point 3 View facing northeast at the start of Transect # 1. Large rock represents the starting point.

## PETERSON WETLAND MITIGATION SITE 2008



Photo Point 1: Panoramic view facing southwest across the mitigation site. Wetland site consists of draw dominated by emergent vegetation type. Unnamed drainage of Post Creek flows through the site. Mitigation efforts included reconstructing the channel and drainage.



Photo Point 2: View facing northeast across the site and along Transect # 1.

**PETERSON WETLAND MITIGATION SITE 2008**



Photo Point 2: View facing southeast along the wetland and upland boundary.



Photo Point 4: View facing north across the site western side of site or lower end of the project.

## PETERSON WETLAND MITIGATION SITE 2008



Photo Point 4: View facing east across the mitigation site. Area dominated by emergent vegetation.



Photo Point 5: View facing southeast at the end of Transect # 2. Vegetation transition between wetland and upland boundaries.



Photo Point 6: View facing north at the start of Transect # 2.

## **Appendix D**

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### **ORIGINAL SITE PLANS**

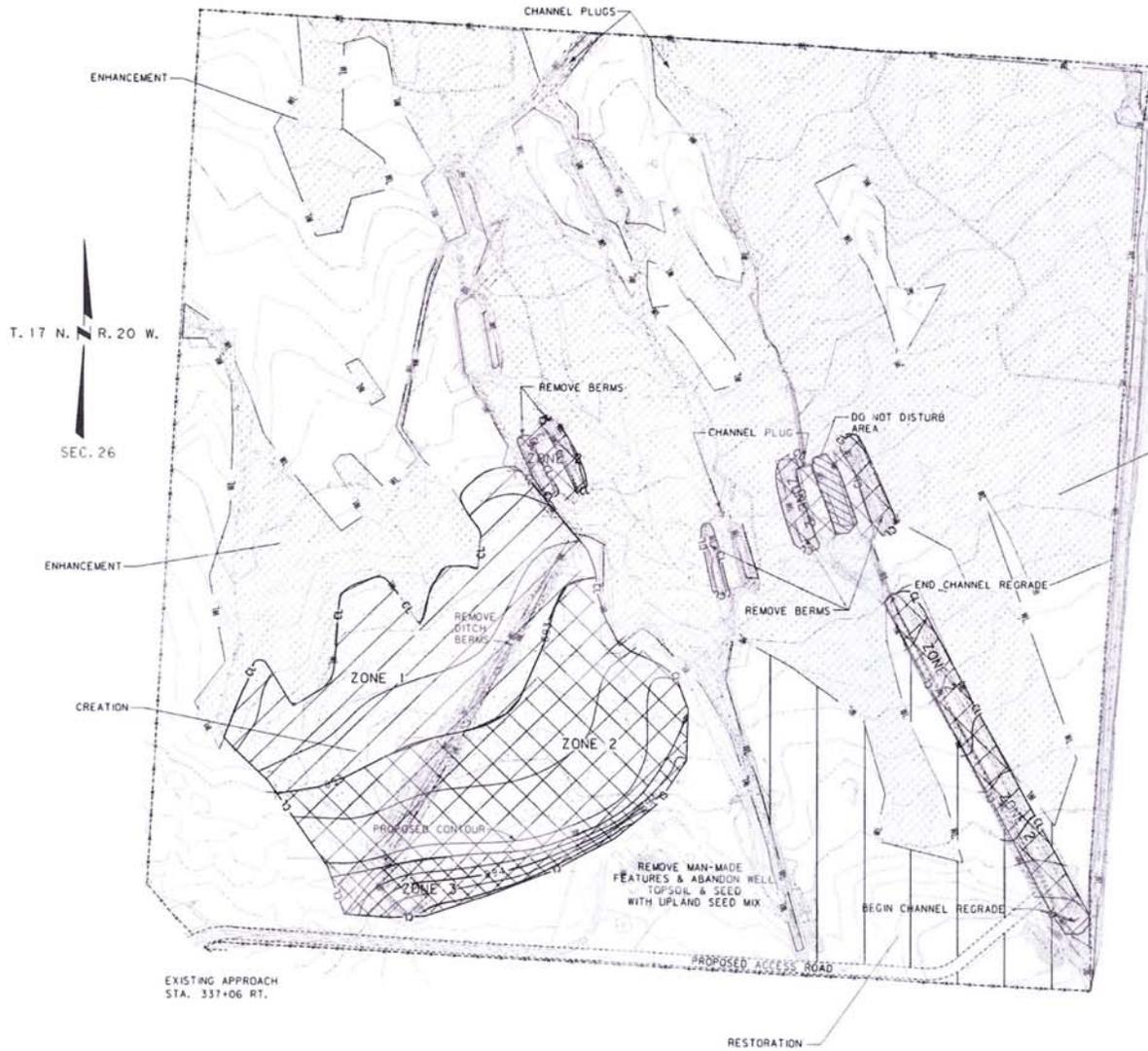
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*US Highway 93 Onsite: Bouchard, Jocko River Bridge, Jocko Spring Creek, and Peterson Property*

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 5-24120120	L-3A

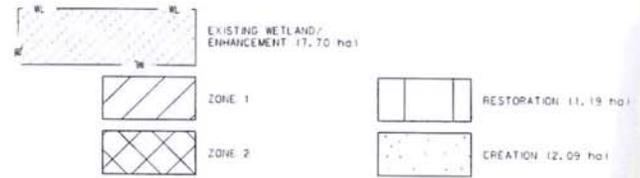
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# DETAIL



- PLANTING NOTES:**
1. PLANT WOODY & HERBACEOUS MATERIAL IN THE SPECIFIC HYDROLOGIC REGIME LISTED IN THE PLANT LIST (PLANTING ZONES 1-3)
  2. USE 64 mm POT PERENNIAL HERBACEOUS PLANT MATERIAL IN WETLAND CREATION AREAS.
  3. USE NUMBER ONE CONTAINER SHRUB MATERIAL FOR WETLAND PLANTINGS, EXCEPT FOR THE WILLOW (SALIX) SPECIES.
  4. PLANT WILLOW (SALIX) SPECIES WITH 250 mm CYLINDER CONTAINER STOCK.
  5. INSTALL SPRING PLANTED PERENNIAL PLANTS AND SHRUBS NO LATER THAN APRIL 15.
  6. PLANT FALL PLANTED SHRUBS BETWEEN SEPTEMBER 15 AND OCTOBER 15.
  7. SEED BETWEEN OCTOBER 1 AND APRIL 15 PROVIDED THE GROUND IS NOT FROZEN.
  8. PLACE WOOD CHIP MULCH AROUND ALL #1 CONTAINER SHRUBS TO A DEPTH OF 150 mm AT THE SURFACE, 0.6 m IN DIAMETER, SURROUNDING THE BASE OF THE PLANT.
  9. SEED LIPLAND AREAS DISTURBED DURING WETLAND CONSTRUCTION IN THE WETLAND MITIGATION AREA WITH THE FESCUE PRAIRIE MIX DEVELOPED FOR HIGHWAY 93 ROADSIDE SEEDING.
  10. PLACE WETLAND CREATION SHRUBS AT 1.2 m ON CENTER. SEE WETLAND PLANTING DETAIL.
  11. APPLY SEED BY BROADCAST METHODS. RAKE OR HARROW THE SEED.
  12. PLACE WETLAND CREATION HERBACEOUS PLUGS AT 0.5 m ON CENTER.

- GENERAL NOTES:**
1. PRIOR TO CONSTRUCTION COMMENCING, CONDUCT A PRE-CONSTRUCTION MEETING ON THE SITE BETWEEN THE CONTRACTOR, PROJECT MANAGER, MDT STAFF WETLANDS SPECIALIST AND WETLANDS ECOLOGIST TO DISCUSS THE DESIGN INTENT OF THE WETLANDS.
  2. PLANT SCRUB/SHRUB, HERBACEOUS EMERGENT AND HERBACEOUS WET MEADOW SPECIES FOR WETLAND COMMUNITIES TO BE ESTABLISHED IN WETLAND CREATION AREAS.
  3. PLACE PLANT MATERIAL IN THE APPROPRIATE ZONE AS DESCRIBED IN THE PLANT TABULATION COLUMN "PLANTING ZONE"
  4. PLANT ZONES SHOWN ON THE PLANTING PLAN ARE APPROXIMATE AND MAY CHANGE BASED ON CONDITIONS AFTER FINAL GRADING.



**CONTOURS:**  
 MAJOR INTERVAL: 1.0 m  
 MINOR INTERVAL: 0.2 m

SEE CONSTRUCTION PLANS FOR GRADING, WETLAND CREATION & RESTORATION DETAILS

**BOUCHARD WETLAND DEVELOPMENT DETAIL**

COE PERMITTING

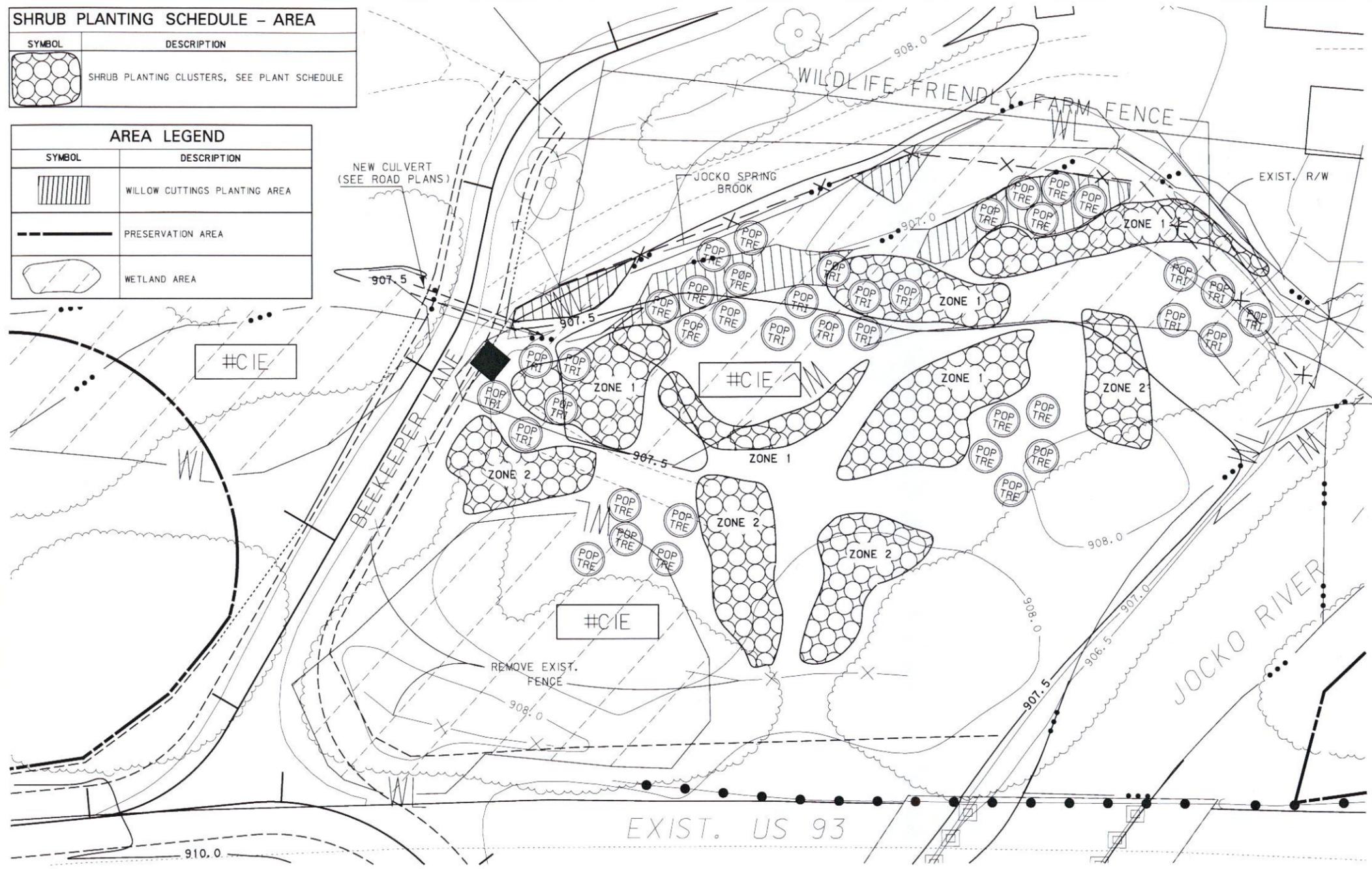
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# DETAIL

CN N744  
N OF ARLEE-VIC WHITE COYOTE RD

SYMBOL	DESCRIPTION
	SHRUB PLANTING CLUSTERS, SEE PLANT SCHEDULE

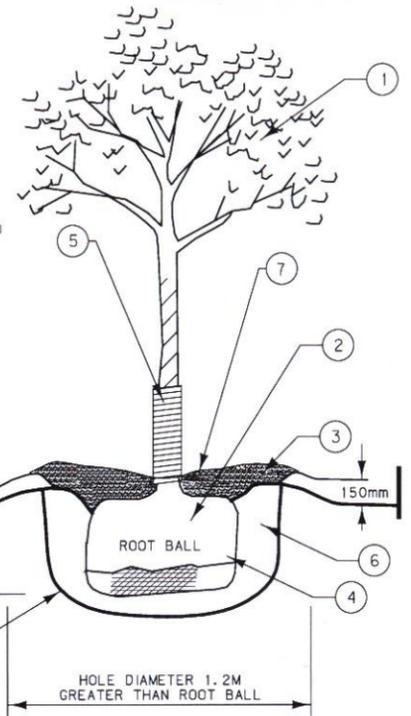
SYMBOL	DESCRIPTION
	WILLOW CUTTINGS PLANTING AREA
	PRESERVATION AREA
	WETLAND AREA



### TREE PLANTING NOTES:

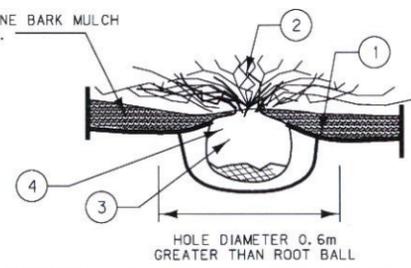
1. PRUNE DEAD WOOD FROM CROWN
2. SET TOP OF ROOT BALL 75mm ABOVE FINISH GRADE. MOUND 150mm TO FORM WATER SAUCER AROUND BASE OF TREE.
3. 150mm DEPTH MULCH IN 1.2m DIA. SAUCER AROUND BASE OF TREE.
4. REMOVE ALL WIRES, TWINE, BASKETS, AND OTHER BINDING MATERIALS PRIOR TO BACKFILLING. PEEL BACK BURLAP ROOT BALL COVER TO EXPOSE ROOTS TO SOIL.
5. PROVIDE TREE WRAP PROTECTION AT BASE OF TREE TO A MINIMUM HEIGHT OF 450mm.
6. APPROVED PLANTING MIX.
7. FINE BARK MULCH

### PLANTING DETAILS



TREE PLANTING DETAILS  
NO SCALE

2 YEAR FLOOD ELEV. = 907.73



SHRUB PLANTING DETAILS  
NO SCALE

### SHRUB PLANTING NOTES:

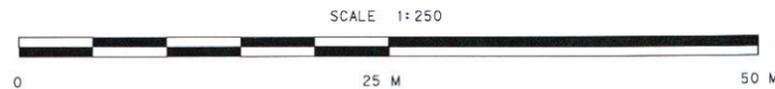
1. PLANT SHRUBS IN MULCH PLANTING BED AS SHOWN ON PLANS.
2. PRUNE DEAD WOOD FROM CROWN
3. SET TOP OF ROOT BALL 50mm ABOVE FINISH GRADE. MOUND TO FORM WATER SAUCER AROUND BASE OF SHRUB.
4. REMOVE ALL WIRES, TWINE, BASKETS, AND OTHER BINDING MATERIALS PRIOR TO BACKFILLING.

### WETLAND MITIGATION PLANTING DETAILS & SCHEDULE

### LANDSCAPING QUANTITY SUMMARY

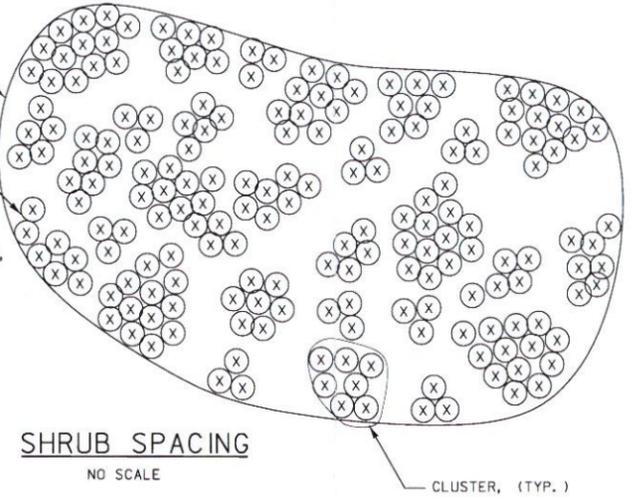
### TREES and SHRUBS SCHEDULE

SPECIES NAME	COMMON NAME	FORM	SIZE	HGT.	SPACING	ZONE1	ZONE2	TOTAL	UNIT
Populus tremuloides	Quaking Aspen	Tree	5L	1M	see plan			22	↑
Populus trichocarpa	Black Cottonwood	Tree	5L	1M	see plan			17	
Acer glabrum	Rocky Mt. Maple	Shrub	3.8L	.5M	1-3M	16	12	28	↓ LUMP SUM
Alnus incana	Thimbleleaf Alder	Shrub	3.8L	.5M	1-3M	24	16	40	
Amelanchier alnifolia	Western Serviceberry	Shrub	3.8L	.5M	1-3M	16	12	28	
Betula occidentalis	Water Birch	Shrub	3.8L	.5M	1-3M	16	24	40	
Cornus stolonifera	Red-Osier Dogwood	Shrub	3.8L	.5M	1-3M	16	12	28	
Prunus virginiana	Common Chokecherry	Shrub	3.8L	.5M	1-3M		12	12	
Rosa woodsii	Woodsii Rose	Shrub	3.8L	.5M	1-3M		7	7	
Rubus idaeus	Red Raspberry	Shrub	3.8L	.5M	1-3M		7	7	
Salix bebbiana	Bebb Willow	Shrub	3.8L	.5M	1-3M	16		16	
Sambucus cerulea	Blue Elderberry	Shrub	3.8L	.5M	1-3M		12	12	
Salix drummondiana	Drummond Willow	Shrub	3.8L	.5M	1-3M	36		36	
Salix exigua	Sandbar Willow	Shrub	3.8L	.5M	1-3M	30		30	
Symphoricarpos albus	Common Snowberry	Shrub	3.8L	.5M	1.2M		12	12	



### NOTES:

1. PLANT SHRUBS IN CLUSTERS OF THREE, FIVE, SEVEN, NINE, ELEVEN, OR THIRTEEN SHRUBS.
2. PLACE ONE SPECIES IN A CLUSTER OF THREE, FIVE OR SEVEN SHRUBS.
3. COMBINE TWO SPECIES IN CLUSTERS OF THIRTEEN SHRUBS.
4. PLACE SHRUBS 1.2 m ON CENTER WITHIN EACH CLUSTER.
5. EVENLY SPACE CLUSTERS THROUGHOUT PLANTING AREA.
6. PLANT 300 WILLOW CUTTINGS IN CLUSTERS PER SHRUB SPACING DETAIL.



SHRUB SPACING  
NO SCALE

MONTANA DEPARTMENT OF TRANSPORTATION

WGM GROUP, INC.

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 04/02/04 REVIEWED BY  
 03:31:45 PM CHECKED BY  
 WGM Group, Inc.

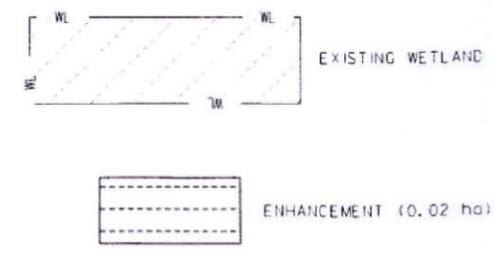
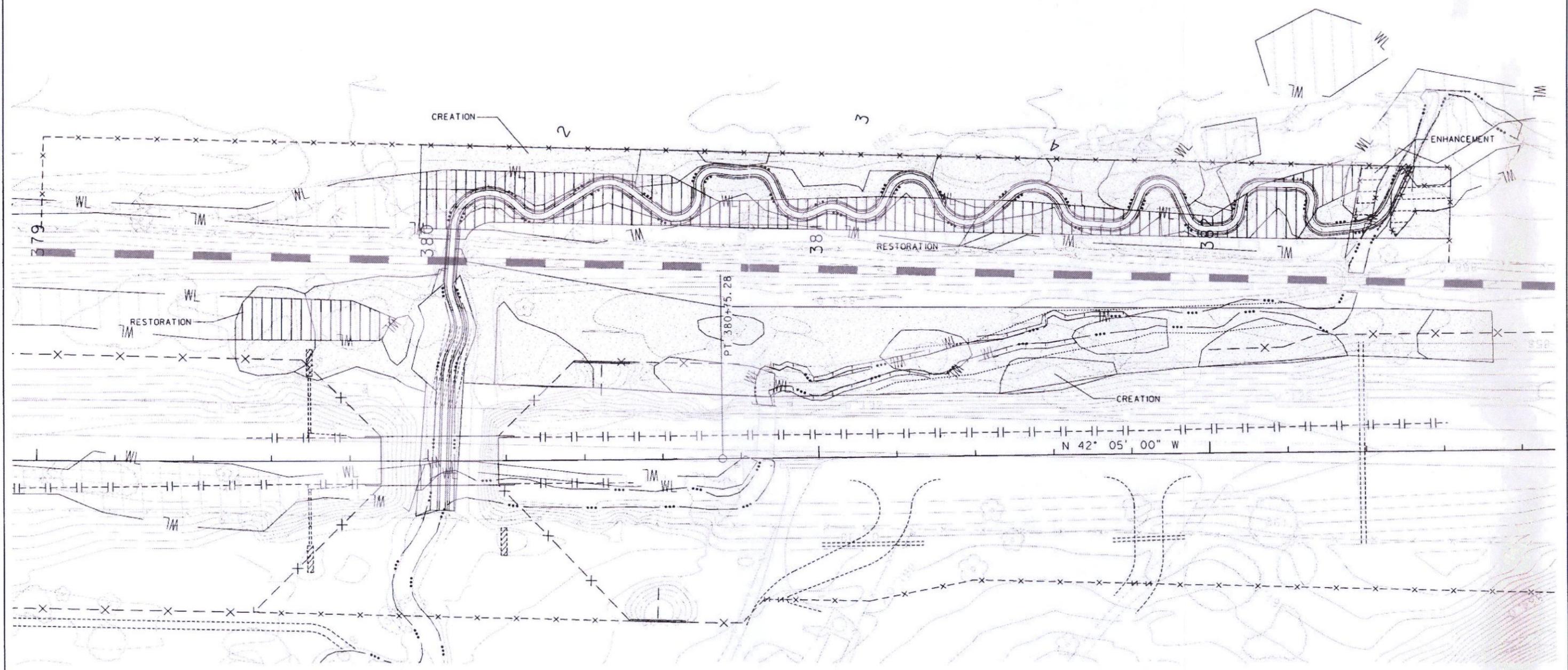
# DETAIL

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 5-2(120)20	L-8A
CSF - 0.99926000		



GEOM ENVIRONMENTAL CONSULTING, INC.

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CONTOURS:  
MAJOR INTERVAL 2.0 m  
MINOR INTERVAL 0.1 m

SPRING CREEK  
WETLAND  
DEVELOPMENT  
DETAIL

COE PERMITTING

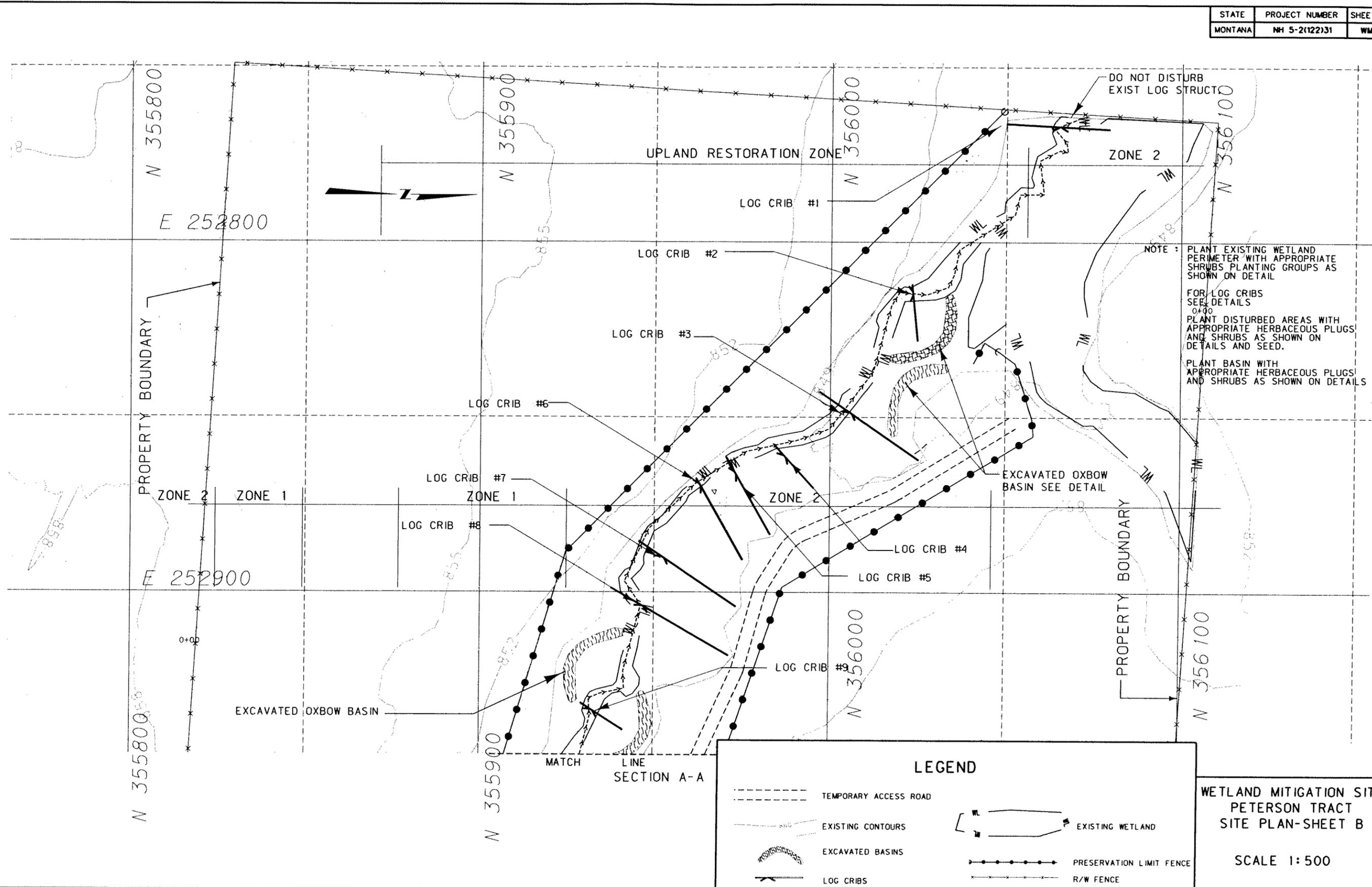
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STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 5-2(122)31	WM-11



DATE	BY
10/10/2008	OW/PDB
REVIEWED BY	
CHECKED BY	



NOTE :  
 PLANT EXISTING WETLAND PERIMETER WITH APPROPRIATE SHRUBS PLANTING GROUPS AS SHOWN ON DETAIL  
 FOR LOG CRIBS SEE DETAILS 0400  
 PLANT DISTURBED AREAS WITH APPROPRIATE HERBACEOUS PLUGS AND SHRUBS AS SHOWN ON DETAILS AND SEED.  
 PLANT BASIN WITH APPROPRIATE HERBACEOUS PLUGS AND SHRUBS AS SHOWN ON DETAILS

**LEGEND**

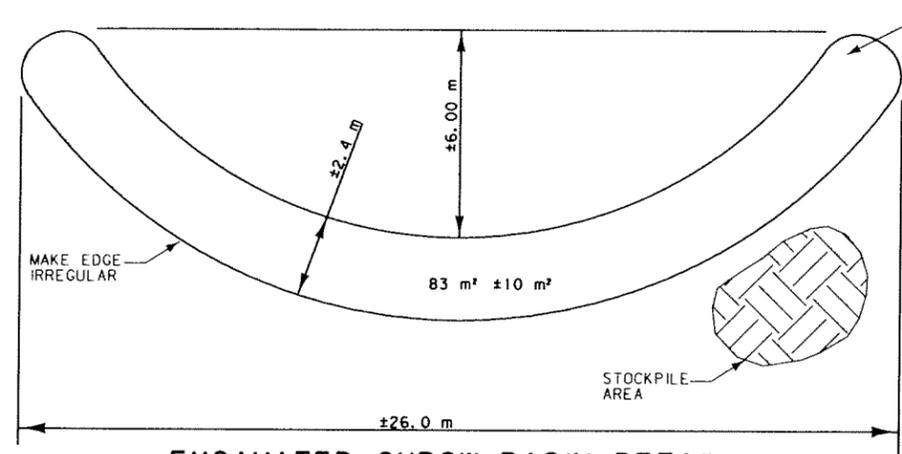
	TEMPORARY ACCESS ROAD		PRESERVATION LIMIT FENCE
	EXISTING CONTOURS		R/W FENCE
	EXCAVATED BASINS		EXISTING WETLAND
	LOG CRIBS		

**WETLAND MITIGATION SITE  
 PETERSON TRACT  
 SITE PLAN-SHEET B**

SCALE 1:500

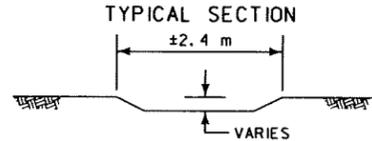
# PETERSON TRACT WETLAND MITIGATION DETAILS

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 5-2(122)31	WM-7



**EXCAVATED OXBOW BASIN DETAIL**  
7 LOCATIONS

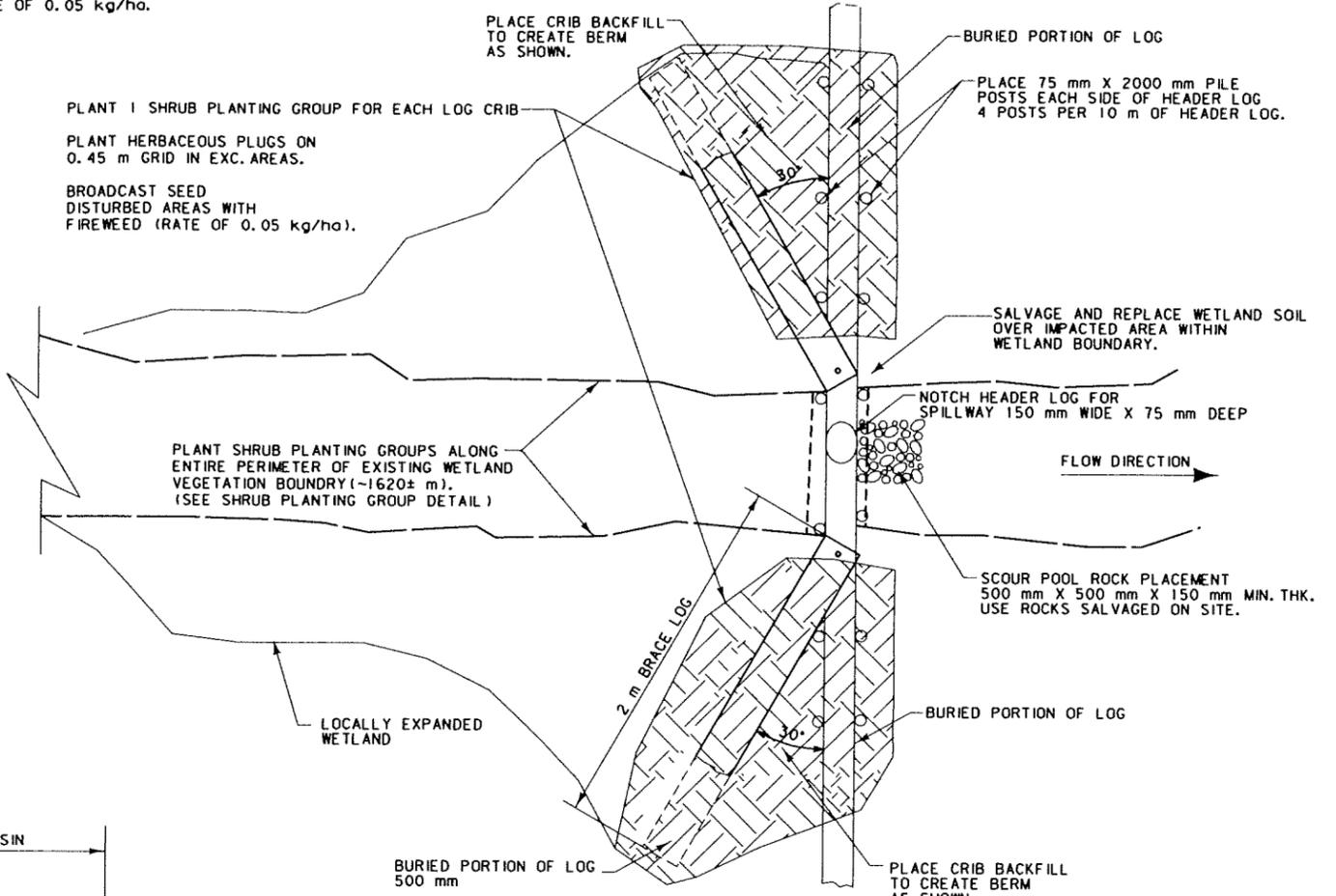
NOTE:  
EXCAVATE APPROXIMATELY 12-18 m<sup>3</sup> PER SITE AS DIRECTED BY PROJECT MANAGER. INCLUDE 100 mm OF TOPSOIL BELOW FINISHED GRADE.  
SALVAGE & PLACE 8 m<sup>3</sup> OF TOPSOIL PER SITE.  
VARY DEPTH BETWEEN 150mm AND 300 mm.  
MINIMUM OF 2 m OF SEPARATION BETWEEN EXCAVATION AREA AND ZONE 1.



NOTE:  
SEE SHEET WM-6 FOR PLANTING GROUP AND PLANTING DETAILS.  
SEE SHEET WM-4 FOR LOG CRIB AND OXBOW SUMMARY.

PLANT 300 HERBACEOUS PLUGS AT 0.45 m SPACING.  
PLANT 2 SHRUB PLANTING GROUPS IN EACH BASIN.  
SEED WITH FIREWEED AT A RATE OF 0.05 kg/ha.

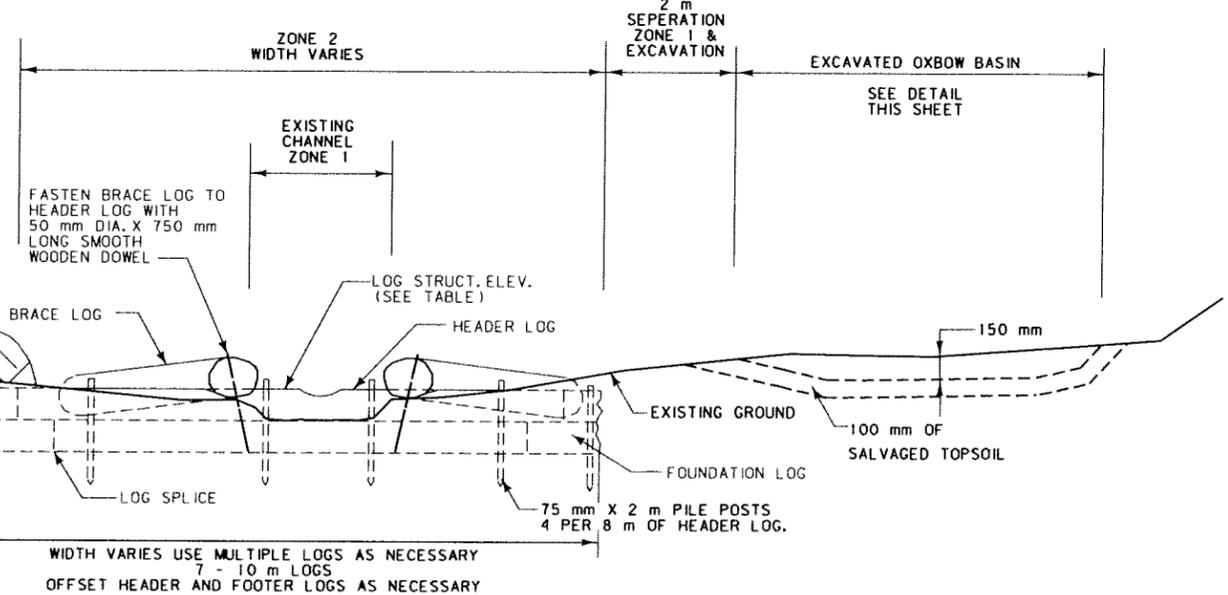
PLANT 1 SHRUB PLANTING GROUP FOR EACH LOG CRIB.  
PLANT HERBACEOUS PLUGS ON 0.45 m GRID IN EXC. AREAS.  
BROADCAST SEED DISTURBED AREAS WITH FIREWEED (RATE OF 0.05 kg/ha).



**PLAN VIEW - LOG CRIB**

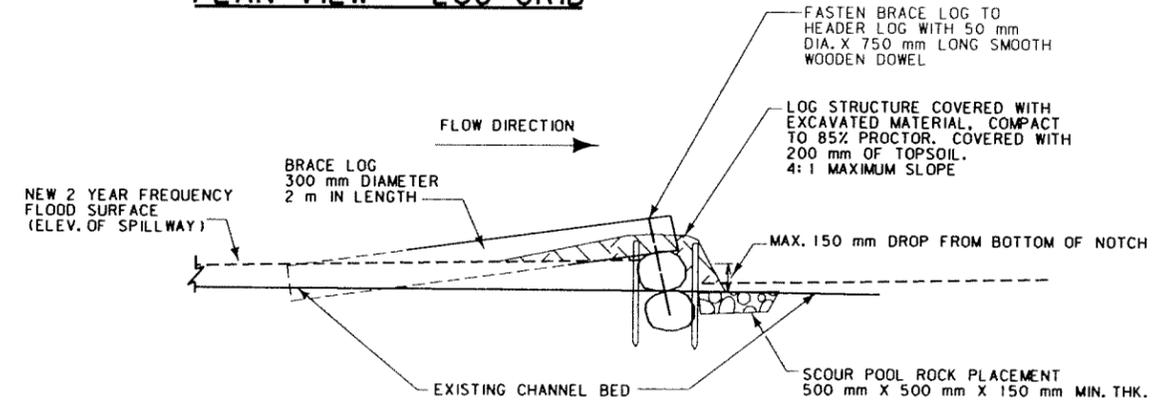
NOTE: FOR LOG CRIBS

SALVAGE & PLACE 16 m<sup>3</sup> ± OF TOPSOIL PER SITE.  
PLACE TOPSOIL AT 200 mm DEPTH ON CRIB BACKFILL.



**SECTION VIEW - LOG CRIB**

LOOKING DOWNSTREAM  
SEE SUMMARY INFORMATION ON WM-4



**PROFILE VIEW - LOG CRIB**

WETLAND MITIGATION SITE  
PETERSON TRACT  
LOG CRIB AND OXBOW  
DETAILS  
SCALE N. T. S.

MONTANA DEPARTMENT OF TRANSPORTATION  
 MONTANA CADD  
 SEED  
 15/10/2008  
 3:12:43 PM  
 01/10/08

## **Appendix E**

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### **BIRD SURVEY PROTOCOL GPS PROTOCOL**

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*US Highway 93 Onsite: Bouchard, Jocko River Bridge, Jocko Spring  
Creek, and Peterson Property*

## 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

## BIRD SURVEY PROTOCOL (continued)

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**

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### **2008 MACROINVERTEBRATE SAMPLING PROTOCOL AND DATA**

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*US Highway 93 Onsite: Bouchard, Jocko River Bridge, Jocko Spring Creek, and Peterson Property*

# 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 – 2008**

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. Over all years of sampling, a total of 210 invertebrate samples have been collected. Table 1 lists the currently monitored sites at which aquatic invertebrates were collected in 2008, and summarizes the sampling history of each.

## **METHODS**

### **Sample processing**

Aquatic invertebrate samples were collected at mitigated wetland sites in the summer months of 2001, 2002, 2003, 2004, 2005, 2006, 2007, and 2008 by personnel of PBS&J (Table 1). 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 2) tested and recommended by Stribling et al. (1995) in a report to the Montana Department of Health and Environmental Science. In that study, it was determined that some of the metrics were of limited use in some geographic regions, and for some wetland types. Despite that finding, all 12 metrics are used in this evaluation of mitigated wetlands, since detailed geographic information and wetland classifications were unavailable. Scoring criteria for 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 75<sup>th</sup> percentile (for those metrics that decrease in value in response to stress) or below the 25<sup>th</sup> percentile (for metrics that respond to stress by an increase in value) of all scores. Additional scoring ranges were established by bisecting the range below the 75<sup>th</sup> percentile for decreasing scores (or above the 25<sup>th</sup> 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 in all years. Data from a total of 167 samples 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 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, %Orthocladinae 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 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 2008 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 is 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 Arctopsyche 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 those sites sampled in 2008 are included. An asterisk indicates lotic sites.

Site Identifier	2001	2002	2003	2004	2005	2006	2007	2008
Roundup	+	+	+	+	+	+	+	+
Hoskins Landing MS-1		+	+	+	+	+	+	+
Peterson Ranch Pond 2		+		+	+	+	+	+
Peterson Ranch Pond 4		+	+	+	+	+	+	+
Perry Ranch		+			+			+
Camp Creek MS-1*		+	+	+	+	+	+	+
Camp Creek MS-2*						+	+	+
Cloud Ranch Pond				+	+		+	+
Cloud Ranch Stream*				+			+	+
Jack Creek – Pond				+	+	+	+	+
Jack Creek – McKee*							+	+
Norem				+	+	+	+	+
Rock Creek Ranch					+	+	+	+
Wagner Marsh					+	+	+	+
Alkali Lake 1						+	+	+
West Fork of Charley Creek							+	+
Woodson Pond MI 1							+	+
Woodson Stream MI 2*							+	+
Little Muddy Creek							+	+
Selkirk Ranch							+	+
DH Ranch							+	+
Jocko Spring Creek MS-1								+
Jocko Spring Creek MS-2								+
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 – 2008.

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 – 2008 sampling.

<b>METRIC</b>	<b>Roundup</b>	<b>Hoskins Landing MS 1</b>	<b>Peterson Ranch Pond 2</b>	<b>Peterson Ranch Pond 4</b>	<b>Perry Ranch</b>	<b>Cloud Ranch Pond</b>	<b>Jack Creek Pond</b>	<b>Norem</b>
Total taxa	9	18	13	25	11	27	21	14
POET	0	2	1	3	0	5	2	0
Chironomidae taxa	4	5	3	6	5	14	7	6
Crustacea + Mollusca	3	6	3	5	2	4	6	2
% Chironomidae	80.37%	17.00%	3.70%	13.21%	88.79%	49.53%	42.86%	34.69%
Orthocladinae/Chir	0.63	0.18	1.50	0.21	0.82	0.66	0.40	0.53
% Amphipoda	0.00%	8.00%	0.00%	0.00%	0.00%	6.54%	15.24%	0.00%
% Crustacea + % Mollusca	15.89%	48.00%	86.11%	43.40%	6.54%	10.28%	30.48%	26.53%
HBI	8.01	7.62	7.85	7.40	7.37	5.94	8.17	7.61
% Dominant taxon	50.47%	27.00%	84.26%	25.47%	62.62%	13.08%	19.05%	26.53%
% Collector-Gatherers	31.78%	54.00%	87.96%	20.75%	20.56%	56.07%	65.71%	44.90%
% Filterers	2.80%	10.00%	0.00%	1.89%	0.00%	3.74%	1.90%	0.00%
Total taxa	1	3	1	5	1	5	5	1
POET	1	1	1	3	1	5	1	1
Chironomidae taxa	3	3	3	3	3	5	5	3
Crustacea + Mollusca	1	5	1	3	1	3	5	1
% Chironomidae	1	5	5	5	1	1	1	3
Orthocladinae/Chir	5	1	5	3	5	5	3	5
% Amphipoda	5	3	5	5	5	3	3	5
% Crustacea + % Mollusca	5	3	1	3	5	5	5	5
HBI	1	1	1	3	3	5	1	1
% Dominant taxon	1	5	1	5	1	5	5	5
% Collector-Gatherers	1	3	5	1	1	3	3	1
% Filterers	3	1	3	3	3	3	3	3
<b>Total Score</b>	<b>28</b>	<b>34</b>	<b>32</b>	<b>42</b>	<b>30</b>	<b>48</b>	<b>40</b>	<b>34</b>
<b>Percent of Maximum Score</b>	<b>46.67%</b>	<b>56.67%</b>	<b>53.33%</b>	<b>70.00%</b>	<b>50.00%</b>	<b>80.00%</b>	<b>66.67%</b>	<b>56.67%</b>
<b>Impairment Classification</b>	<b>poor</b>	<b>sub-optimal</b>	<b>sub-optimal</b>	<b>good</b>	<b>poor</b>	<b>good</b>	<b>sub-optimal</b>	<b>sub-optimal</b>

**Table 4b.** Metric values and scores for wetland (lentic) sites in the MDT mitigated wetland study – 2008 sampling.

METRIC	Rock Creek Ranch	Wagner Marsh	Alkali Lake	West Fork of Charley Creek	Woodson Pond	Woodson Stream	Little Muddy Creek	Selkirk Ranch
Total taxa	23	11	10	9	13	7	14	17
POET	1	4	0	0	1	3	1	1
Chironomidae taxa	5	2	2	1	7	0	2	8
Crustacea + Mollusca	5	2	3	3	2	2	3	5
% Chironomidae	28.97%	2.83%	5.41%	0.91%	60.00%	0.00%	55.00%	23.38%
Orthoclaadiinae/Chir	0.97	0.00	0.00	0.00	0.52	0	0.64	0.33
% Amphipoda	0.00%	0.00%	0.00%	67.27%	0.00%	7.69%	0.00%	5.19%
% Crustacea + % Mollusca	28.97%	39.62%	32.43%	70.91%	25.45%	15.38%	17.00%	48.05%
HBI	6.91	7.45	8.57	8.19	8.14	4.62	6.97	7.76
% Dominant taxon	22.43%	48.11%	48.65%	67.27%	25.45%	30.77%	35.00%	32.47%
% Collector-Gatherers	30.84%	52.83%	21.62%	68.18%	86.36%	23.08%	29.00%	16.88%
% Filterers	1.87%	0.00%	0.00%	0.00%	0.00%	30.77%	0.00%	32.47%
Total taxa	5	1	1	1	1	1	1	3
POET	1	5	1	1	1	3	1	1
Chironomidae taxa	3	1	1	1	5	1	1	5
Crustacea + Mollusca	3	1	1	1	1	1	1	3
% Chironomidae	3	5	5	5	1	5	1	3
Orthoclaadiinae/Chir	5	1	1	1	5	Not Scored	5	3
% Amphipoda	5	5	5	1	5	3	5	3
% Crustacea + % Mollusca	5	3	5	1	5	5	5	3
HBI	3	3	1	1	1	5	3	1
% Dominant taxon	5	3	3	1	5	5	3	5
% Collector-Gatherers	1	3	1	3	5	1	1	1
% Filterers	3	3	3	3	3	1	3	1
<b>Total Score</b>	<b>42</b>	<b>34</b>	<b>28</b>	<b>20</b>	<b>38</b>	<b>31</b>	<b>30</b>	<b>32</b>
<b>Percent of Maximum Score</b>	<b>70.00%</b>	<b>56.67%</b>	<b>46.67%</b>	<b>33.33%</b>	<b>63.33%</b>	<b>56.36%</b>	<b>50.00%</b>	<b>53.33%</b>
<b>Impairment Classification</b>	<b>good</b>	<b>sub-optimal</b>	<b>poor</b>	<b>poor</b>	<b>sub-optimal</b>	<b>sub-optimal</b>	<b>poor</b>	<b>sub-optimal</b>

**Table 4c.** Metric values and scores for wetland (lentic) sites in the MDT mitigated wetland study – 2008 sampling.

METRIC	DH Ranch	Sportsman's Campground Site # 1	Sportsman's Campground Site # 2	Sportsman's Campground Site # 3	Lonepine # 1	Lonepine # 2
Total taxa	15	16	9	12	18	4
POET	1	1	0	0	2	0
Chironomidae taxa	6	6	3	7	12	3
Crustacea + Mollusca	2	5	3	4	1	1
% Chironomidae	52.29%	10.91%	41.18%	69.09%	81.82%	57.14%
Orthoclaadiinae/Chir	0.09	0.17	0.00	0.25	0.13	0.00
% Amphipoda	0.00%	24.55%	5.88%	27.27%	0.00%	0.00%
% Crustacea + % Mollusca	30.28%	83.64%	23.53%	29.09%	7.27%	42.86%
HBI	7.33	7.55	8.76	7.55	7.60	8.14
% Dominant taxon	33.03%	56.36%	29.41%	25.45%	25.45%	42.86%
% Collector-Gatherers	49.54%	20.91%	11.76%	57.27%	55.45%	28.57%
% Filterers	0.92%	63.64%	11.76%	25.45%	22.73%	42.86%
Total taxa	3	3	1	1	3	1
POET	1	1	1	1	1	1
Chironomidae taxa	3	3	3	5	5	3
Crustacea + Mollusca	1	3	1	3	1	1
% Chironomidae	1	5	3	1	1	1
Orthoclaadiinae/Chir	1	1	1	3	1	1
% Amphipoda	5	1	3	1	5	5
% Crustacea + % Mollusca	5	1	5	5	5	3
HBI	3	3	1	3	3	1
% Dominant taxon	5	1	5	5	5	3
% Collector-Gatherers	3	1	1	3	3	1
% Filterers	3	1	1	1	1	1
<b>Total Score</b>	<b>34</b>	<b>24</b>	<b>26</b>	<b>32</b>	<b>34</b>	<b>22</b>
<b>Percent of Maximum Score</b>	<b>56.67%</b>	<b>40.00%</b>	<b>43.33%</b>	<b>53.33%</b>	<b>56.67%</b>	<b>36.67%</b>
<b>Impairment Classification</b>	<b>sub-optimal</b>	<b>poor</b>	<b>poor</b>	<b>sub-optimal</b>	<b>sub-optimal</b>	<b>poor</b>

**Table 5.** Metric values and scores for stream (lotic) sites in the MDT mitigated wetland study – 2008 sampling.

METRIC	Camp Creek MS-1	Camp Creek MS-2	Cloud Ranch Stream	Jack Creek – McKee Spring	Jocko Spring Creek MS-1	Jocko Spring Creek MS-2
<b>E Richness</b>	7	5	4	1	0	1
<b>P Richness</b>	2	2	0	0	0	1
<b>T Richness</b>	4	6	5	3	2	5
<b>Pollution Sensitive Richness</b>	0	1	0	0	0	0
<b>Filterer Percent</b>	29.00%	37.00%	5.00%	40.00%	15.00%	11.00%
<b>Pollution Tolerant Percent</b>	5.00%	3.00%	28.00%	1.00%	62.00%	15.00%
<b>E Richness</b>	3	2	2	0	0	0
<b>P Richness</b>	2	2	0	0	0	1
<b>T Richness</b>	2	3	3	2	1	3
<b>Pollution Sensitive Richness</b>	0	1	0	0	0	0
<b>Filterer Percent</b>	1	0	3	0	1	1
<b>Pollution Tolerant Percent</b>	3	3	0	3	0	1
<b>Total score</b>	<b>11</b>	<b>11</b>	<b>8</b>	<b>5</b>	<b>2</b>	<b>6</b>
<b>Percent of maximum score</b>	<b>61%</b>	<b>61%</b>	<b>44%</b>	<b>28%</b>	<b>11%</b>	<b>33%</b>
<b>Impairment classification</b>	<b>slight</b>	<b>slight</b>	<b>moderate</b>	<b>moderate</b>	<b>severe</b>	<b>moderate</b>

#### LITERATURE CITED

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Brandt, D. 2001. Temperature Preferences and Tolerances for 137 Common Idaho Macroinvertebrate Taxa. Report to the Idaho Department of Environmental Quality, Coeur d’ Alene, Idaho.

Caton, L. W. 1991. Improving subsampling methods for the EPA’s “Rapid Bioassessment” benthic protocols. Bulletin of the North American Benthological Society, 8(3): 317-319.

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: MDT08PBSJ  
RAI No.: MDT08PBSJ021

RAI No.: MDT08PBSJ021

Sta. Name: Jocko Spring Creek MS 1

Client ID:

Date Coll.: 7/28/2008

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
<b>Non-Insect</b>							
Lymnaeidae							
<i>Pseudosuccinea</i> sp.	4	15.38%	Yes	Unknown		6	SC
Physidae							
Physidae	1	3.85%	Yes	Unknown		8	SC
<b>Trichoptera</b>							
Brachycentridae							
<i>Brachycentrus occidentalis</i>	16	61.54%	Yes	Larva		2	CF
Lepidostomatidae							
<i>Lepidostoma</i> sp.	1	3.85%	Yes	Larva		1	SH
<b>Coleoptera</b>							
Elmidae							
<i>Cleptelmis addenda</i>	1	3.85%	Yes	Larva		4	CG
<i>Optioservus</i> sp.	1	3.85%	Yes	Adult		5	SC
<i>Optioservus</i> sp.	2	7.69%	No	Larva		5	SC
<b>Sample Count</b>	<b>26</b>						

# Metrics Report

Project ID: MDT08PBSJ  
 RAI No.: MDT08PBSJ021  
 Sta. Name: Jocko Spring Creek MS 1  
 Client ID:  
 STORET ID:  
 Coll. Date: 7/28/2008

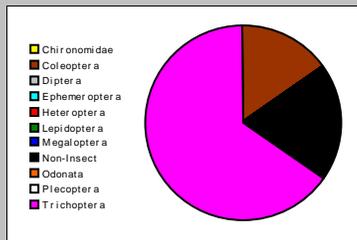
## Abundance Measures

Sample Count: 26  
 Sample Abundance: 26.00 100.00% of sample used

Coll. Procedure:  
 Sample Notes:

## Taxonomic Composition

Category	R	A	PRA
Non-Insect	2	5	19.23%
Odonata			
Ephemeroptera			
Plecoptera			
Heteroptera			
Megaloptera			
Trichoptera	2	17	65.38%
Lepidoptera			
Coleoptera	2	4	15.38%
Diptera			
Chironomidae			

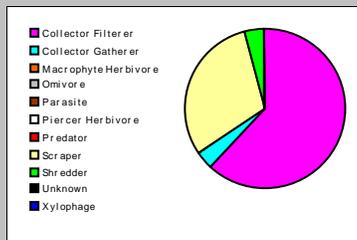


## Dominant Taxa

Category	A	PRA
Brachycentrus occidentalis	16	61.54%
Pseudosuccinea	4	15.38%
Optioservus	3	11.54%
Physidae	1	3.85%
Lepidostoma	1	3.85%
Cleptelmis addenda	1	3.85%

## Functional Composition

Category	R	A	PRA
Predator			
Parasite			
Collector Gatherer	1	1	3.85%
Collector Filterer	1	16	61.54%
Macrophyte Herbivore			
Piercer Herbivore			
Xylophage			
Scraper	3	8	30.77%
Shredder	1	1	3.85%
Omnivore			
Unknown			

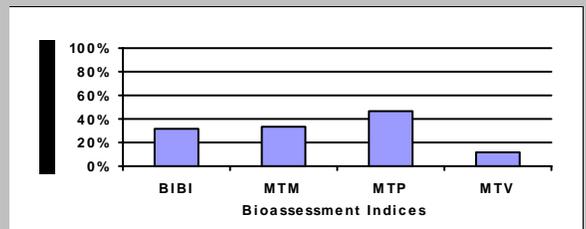


## Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
<i>Composition</i>					
Taxa Richness	6	1	0		0
Non-Insect Percent	19.23%				
E Richness	0	1		0	
P Richness	0	1		0	
T Richness	2	1		1	
EPT Richness	2		0		0
EPT Percent	65.38%		3		2
Oligochaeta+Hirudinea Percent					
Baetidae/Ephemeroptera	0.000				
Hydropsychidae/Trichoptera	0.000				
<i>Dominance</i>					
Dominant Taxon Percent	61.54%		0		0
Dominant Taxa (2) Percent	76.92%				
Dominant Taxa (3) Percent	88.46%	1			
Dominant Taxa (10) Percent	100.00%				
<i>Diversity</i>					
Shannon H (log <sub>e</sub> )	1.099				
Shannon H (log <sub>2</sub> )	1.585		0		
Margalef D	1.573				
Simpson D	0.457				
Evenness	0.141				
<i>Function</i>					
Predator Richness	0		0		
Predator Percent	0.00%	1			
Filterer Richness	1				
Filterer Percent	61.54%			0	
Collector Percent	65.38%		2		2
Scraper+Shredder Percent	34.62%		3		1
Scraper/Filterer	0.500				
Scraper/Scraper+Filterer	0.333				
<i>Habit</i>					
Burrower Richness	0				
Burrower Percent	0.00%				
Swimmer Richness	0				
Swimmer Percent	0.00%				
Clinger Richness	3	1			
Clinger Percent	76.92%				
<i>Characteristics</i>					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness					
Hemoglobin Bearer Percent					
Air Breather Richness	0				
Air Breather Percent	0.00%				
<i>Voltinism</i>					
Univoltine Richness	2				
Semivoltine Richness	3	3			
Multivoltine Percent	0.00%		3		
<i>Tolerance</i>					
Sediment Tolerant Richness	0				
Sediment Tolerant Percent	0.00%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	3.190				
Pollution Sensitive Richness	0	1		0	
Pollution Tolerant Percent	15.38%	5		1	
Hilsenhoff Biotic Index	3.231		3		2
Intolerant Percent	65.38%				
Supertolerant Percent	3.85%				
CTQa	71.600				

## Bioassessment Indices

BiIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	16	32.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	14	46.67%	Moderate
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	2	11.11%	Severe
MTM	Montana DEQ Mountains (Bukantis 1998)	7	33.33%	Moderate



# Taxa Listing

Project ID: MDT08PBSJ  
RAI No.: MDT08PBSJ020

RAI No.: MDT08PBSJ020

Sta. Name: Jocko Spring Creek MS 2

Client ID:

Date Coll.: 7/28/2008

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
<b>Non-Insect</b>							
Lymnaeidae							
Lymnaeidae	2	1.82%	No	Immature		6	SC
<i>Stagnicola</i> sp.	1	0.91%	Yes	Unknown		6	SC
Physidae							
Physidae	1	0.91%	Yes	Unknown		8	SC
Sphaeriidae							
Sphaeriidae	6	5.45%	Yes	Unknown		8	CF
<b>Ephemeroptera</b>							
Ephemerellidae							
<i>Ephemerella inermis</i>	1	0.91%	Yes	Larva		4	SH
<b>Plecoptera</b>							
Perlodidae							
<i>Kogotus</i> sp.	1	0.91%	Yes	Larva		1	PR
<b>Heteroptera</b>							
Corixidae							
Corixidae	5	4.55%	No	Larva		10	PH
Corixidae	1	0.91%	Yes	Adult	Damaged	10	PH
<b>Trichoptera</b>							
Brachycentridae							
<i>Brachycentrus americanus</i>	1	0.91%	Yes	Larva		1	CF
<i>Brachycentrus occidentalis</i>	6	5.45%	Yes	Larva		2	CF
Hydroptilidae							
<i>Hydroptila</i> sp.	1	0.91%	Yes	Larva		6	PH
Lepidostomatidae							
<i>Lepidostoma</i> sp.	3	2.73%	Yes	Larva		1	SH
Limnephilidae							
<i>Psychoglypha</i> sp.	2	1.82%	Yes	Larva		0	CG
<b>Coleoptera</b>							
Dytiscidae							
Dytiscidae	1	0.91%	No	Larva		5	PR
<i>Oreodytes</i> sp.	2	1.82%	Yes	Adult		5	PR
Elmidae							
<i>Cleptelmis addenda</i>	1	0.91%	Yes	Adult		4	CG
<i>Cleptelmis addenda</i>	1	0.91%	No	Larva		4	CG
<i>Optioservus</i> sp.	5	4.55%	No	Larva		5	SC
<i>Optioservus</i> sp.	1	0.91%	Yes	Adult		5	SC
<b>Diptera</b>							
Tipulidae							
<i>Dicranota</i> sp.	1	0.91%	Yes	Larva		3	PR

# Taxa Listing

Project ID: MDT08PBSJ  
RAI No.: MDT08PBSJ020

RAI No.: MDT08PBSJ020

Sta. Name: Jocko Spring Creek MS 2

Client ID:

Date Coll.: 7/28/2008

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
<b>Chironomidae</b>							
Chironomidae							
Chironomidae	7	6.36%	No	Pupa		10	CG
<i>Cricotopus (Cricotopus) sp.</i>	10	9.09%	Yes	Larva		7	SH
<i>Cricotopus bicinctus</i>	5	4.55%	Yes	Larva		7	SH
<i>Cricotopus trifascia</i>	1	0.91%	Yes	Larva		7	SH
<i>Eukiefferiella Claripennis</i> Gr.	1	0.91%	Yes	Larva		8	CG
<i>Micropsectra sp.</i>	7	6.36%	Yes	Larva		4	CG
Orthoclaadiinae	2	1.82%	No	Larva	Early Instar	6	CG
<i>Orthocladus sp.</i>	20	18.18%	Yes	Larva		6	CG
<i>Pagastia sp.</i>	3	2.73%	Yes	Larva		1	CG
<i>Phaenopsectra sp.</i>	2	1.82%	Yes	Larva		7	SC
<i>Rheotanytarsus sp.</i>	1	0.91%	Yes	Larva		6	CF
<i>Synorthocladus sp.</i>	1	0.91%	Yes	Larva		2	CG
<i>Tanytarsus sp.</i>	2	1.82%	Yes	Larva		6	CF
<i>Thienemanniella sp.</i>	3	2.73%	Yes	Larva		6	CG
<i>Tvetenia Bavarica</i> Gr.	2	1.82%	Yes	Larva		5	CG
<b>Sample Count</b>	<b>110</b>						

# Metrics Report

Project ID: MDT08PBSJ  
 RAI No.: MDT08PBSJ020  
 Sta. Name: Jocko Spring Creek MS 2  
 Client ID:  
 STORET ID:  
 Coll. Date: 7/28/2008

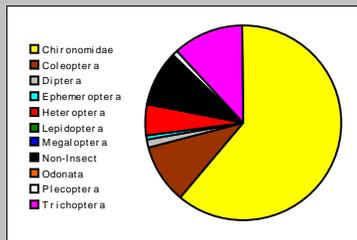
## Abundance Measures

Sample Count: 110  
 Sample Abundance: 1,100.00 10.00% of sample used

Coll. Procedure:  
 Sample Notes:

## Taxonomic Composition

Category	R	A	PRA
Non-Insect	3	10	9.09%
Odonata			
Ephemeroptera	1	1	0.91%
Plecoptera	1	1	0.91%
Heteroptera	1	6	5.45%
Megaloptera			
Trichoptera	5	13	11.82%
Lepidoptera			
Coleoptera	3	11	10.00%
Diptera	1	1	0.91%
Chironomidae	13	67	60.91%

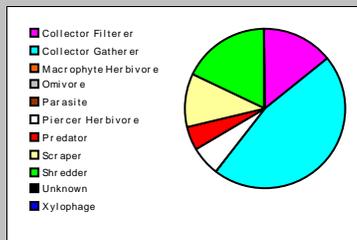


## Dominant Taxa

Category	A	PRA
Orthocladus	20	18.18%
Cricotopus (Cricotopus)	10	9.09%
Micropsectra	7	6.36%
Chironomidae	7	6.36%
Sphaeriidae	6	5.45%
Optioservus	6	5.45%
Corixidae	6	5.45%
Brachycentrus occidentalis	6	5.45%
Cricotopus bincinctus	5	4.55%
Thienemanniella	3	2.73%
Paqastia	3	2.73%
Lepidostoma	3	2.73%
Tvetenia Bavarica Gr.	2	1.82%
Tanytarsus	2	1.82%
Cleptelmis addenda	2	1.82%

## Functional Composition

Category	R	A	PRA
Predator	3	5	4.55%
Parasite			
Collector Gatherer	9	50	45.45%
Collector Filterer	5	16	14.55%
Macrophyte Herbivore			
Piercer Herbivore	2	7	6.36%
Xylophage			
Scraper	4	12	10.91%
Shredder	5	20	18.18%
Omnivore			
Unknown			

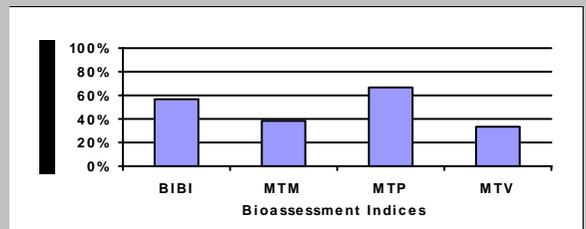


## Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
<i>Composition</i>					
Taxa Richness	28	3	3		2
Non-Insect Percent	9.09%				
E Richness	1	1		0	
P Richness	1	1		1	
T Richness	5	3		3	
EPT Richness	7		2		0
EPT Percent	13.64%		1		0
Oligochaeta+Hirudinea Percent					
Baetidae/Ephemeroptera	0.000				
Hydropsychidae/Trichoptera	0.000				
<i>Dominance</i>					
Dominant Taxon Percent	18.18%		3		3
Dominant Taxa (2) Percent	27.27%				
Dominant Taxa (3) Percent	33.64%	5			
Dominant Taxa (10) Percent	69.09%				
<i>Diversity</i>					
Shannon H (loge)	2.823				
Shannon H (log2)	4.073		3		
Margalef D	6.046				
Simpson D	0.083				
Evenness	0.056				
<i>Function</i>					
Predator Richness	3		1		
Predator Percent	4.55%	1			
Filterer Richness	5				
Filterer Percent	14.55%			1	
Collector Percent	60.00%		2		2
Scraper+Shredder Percent	29.09%		2		1
Scraper/Filterer	0.750				
Scraper/Scraper+Filterer	0.429				
<i>Habit</i>					
Burrower Richness	1				
Burrower Percent	0.91%				
Swimmer Richness	2				
Swimmer Percent	7.27%				
Clinger Richness	13	3			
Clinger Percent	35.45%				
<i>Characteristics</i>					
Cold Stenotherm Richness	1				
Cold Stenotherm Percent	1.82%				
Hemoglobin Bearer Richness	1				
Hemoglobin Bearer Percent	1.82%				
Air Breather Richness	2				
Air Breather Percent	3.64%				
<i>Voltinism</i>					
Univoltine Richness	9				
Semivoltine Richness	5	5			
Multivoltine Percent	61.82%		1		
<i>Tolerance</i>					
Sediment Tolerant Richness	2				
Sediment Tolerant Percent	3.64%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	3.913				
Pollution Sensitive Richness	0				
Pollution Tolerant Percent	10.91%		1		0
Hilsenhoff Biotic Index	5.745		2		0
Intolerant Percent	15.45%				
Supertolerant Percent	19.09%				
CTQa	80.190				

## Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	28	56.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	20	66.67%	Slight
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	6	33.33%	Moderate
MTM	Montana DEQ Mountains (Bukantis 1998)	8	38.10%	Moderate



## **Appendix G**

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### **REVEGETATION PLANS**

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*US Highway 93 Onsite: Bouchard, Jocko River Bridge, Jocko Spring Creek, and Peterson Property*

# WETLAND PLANTING SUMMARY

MONTANA DEPARTMENT OF TRANSPORTATION  
CADD

EPAW INC.

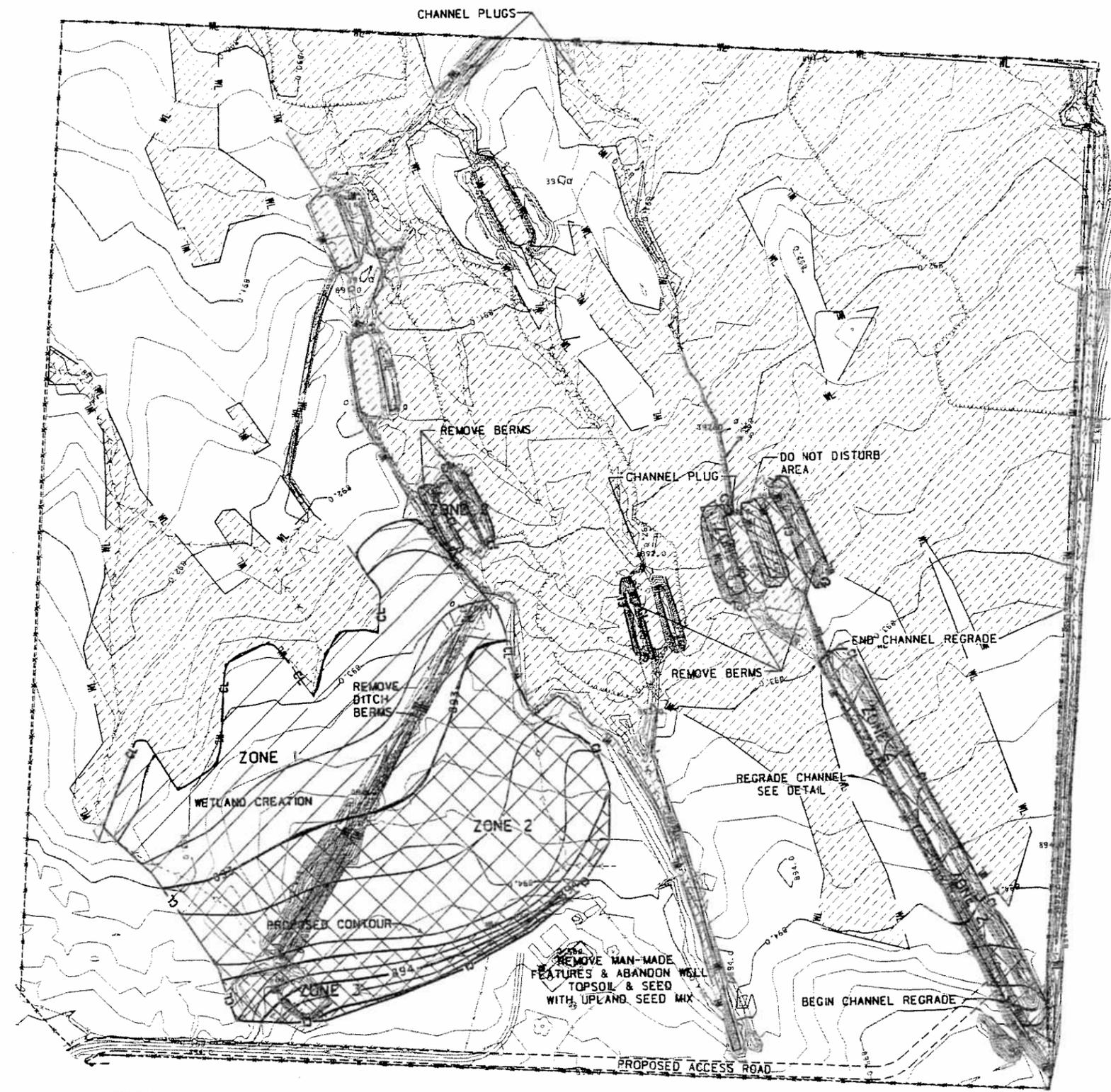
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PLANTINGS - BOUCHARD WETLAND Δ									
2.67 ha TREATMENT AREA									
GENUS	SPECIES	COMMON NAME	CODE	SIZE	PLANTING ZONE	SPACING (m)	TOTAL	MULCH (m <sup>2</sup> )	
HERBACEOUS PLUGS									
CALAMAGROSTIS	CANADENSIS	BLUEJOINT GRASS	CALCAN	64 mm POT	1	1.0	1,853		
CAREX	LASIOCARPA	WOOL-FRUITED SEDGE	CARLAS	64 mm POT	1	1.0	1,853		
CAREX	NEBRASCENSIS	NEBRASKA SEDGE	CARNEB	64 mm POT	1	1.0	3,758		
CAREX	UTRICULATA	BEAKED SEDGE	CARUTR	64 mm POT	1	1.0	9,528		
CAREX	VESICARIA	INFLATED SEDGE	CARVES	64 mm POT	1	1.0	2,118		
ELEOCHARIS	PALUSTRIS	COMMON SPIKERUSH	ELOPAL	64 mm POT	1	1.0	1,853		
JUNCUS	BALTICUS	BALTIC RUSH	JUNBAL	64 mm POT	1	1.0	3,441		
SUBTOTAL							24,404		
JUNCUS	BALTICUS	BALTIC RUSH	JUNBAL	64 mm POT	2	1.0	4,234		
CALAMAGROSTIS	CANADENSIS	BLUEJOINT GRASS	CALCAN	64 mm POT	2	1.0	4,234		
CAREX	FLAVA	YELLOW SEDGE	CARFLA	64 mm POT	2	1.0	3,441		
CAREX	LENTICULARIS	LENTIL-FRUITED SEDGE	CARLEN	64 mm POT	2	1.0	4,234		
CAREX	PRATICOLA	MEADOW SEDGE	CARPRA	64 mm POT	2	1.0	4,234		
JUNCUS	LONGISTYLIS	LONGSTYLE RUSH	JUNLON	64 mm POT	2	1.0	3,441		
SUBTOTAL							23,818		
ADDITIONAL PLUGS *							2,500		
TOTAL							50,722		
SHRUBS - CONTAINER									
BETULA	GLANDULOSA	BOG BIRCH	BETGLA	#1 CTN	1	1.8	817		
CORNUS	STOLONIFERA	RED-OSIER DOGWOOD	CORSTO	#1 CTN	1	1.8	408		
RIBES	HUDSONIANUM	BLACK CURRANT	RIBHUD	#1 CTN	1	1.9	245		
SALIX	LUTEA	YELLOW WILLOW	SALLUT	250 mm CYLINDER	1	1.8	408		
TOTAL							1,878	108	

\* TO BE USED AT THE PROJECT MANAGER'S DISCRETION  
 Δ INCLUDED IN LUMP SUM BID ITEM "WETLAND SITE"

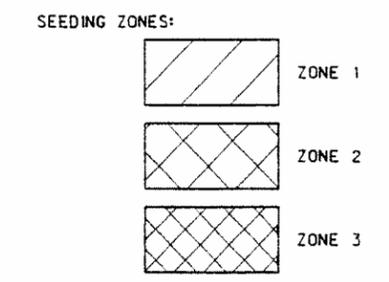
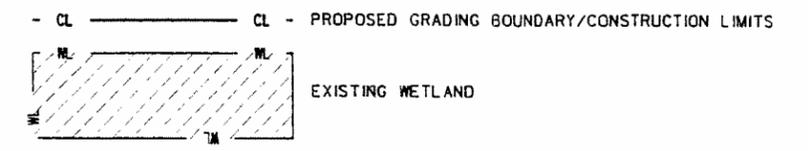
SEEDING - BOUCHARD WETLAND Δ							
SCIENTIFIC NAME	COMMON NAME	PLS kg PER ha			kg		
		ZONE 1	ZONE 2	ZONE 3	ZONE 1	ZONE 2	ZONE 3
ACHILLEA MILLEFOLIUM	YARROW		1.1	1.1		1.7	0.3
CALAMAGROSTIS CANADENSIS	BLUEJOINT REEDGRASS	1.1			1.2		
DESCHAMPSIA CESPITOSA	TUFTED HAIRGRASS	1.1	1.1		1.2	1.7	
AGROPYRON TRACHYCAULUM	SLENDER WHEATGRASS			15.9			3.8
TOTAL		2.2	2.2	17.0	2.4	3.4	4.1

# DETAIL



- PLANTING NOTES:**
1. PLANT WOODY & HERBACEOUS MATERIAL IN THE SPECIFIC HYDROLOGIC REGIME LISTED IN THE PLANT LIST (PLANTING ZONES 1-3)
  2. USE 64 mm POT PERENNIAL HERBACEOUS PLANT MATERIAL IN WETLAND CREATION AREAS. (ZONES 1 & 2)
  3. USE NUMBER ONE CONTAINER SHRUB MATERIAL FOR WETLAND PLANTINGS, EXCEPT FOR THE WILLOW (SALIX) SPECIES.
  4. PLANT WILLOW (SALIX) SPECIES WITH 250 mm CYLINDER CONTAINER STOCK.
  5. INSTALL SPRING PLANTED PERENNIAL PLANTS AND SHRUBS NO LATER THAN APRIL 15.
  6. PLANT FALL PLANTED SHRUBS BETWEEN SEPTEMBER 15 AND OCTOBER 15.
  7. SEED BETWEEN OCTOBER 1 AND APRIL 15 PROVIDED THE GROUND IS NOT FROZEN.
  8. PLACE WOOD CHIP MULCH AROUND ALL #1 CONTAINER SHRUBS TO A DEPTH OF 102 mm AT THE SURFACE, 0.6 m IN DIAMETER, SURROUNDING THE BASE OF THE PLANT.
  9. SEED UPLAND AREAS DISTURBED DURING WETLAND CONSTRUCTION IN THE WETLAND MITIGATION AREA WITH THE FESCUE PRAIRIE MIX DEVELOPED FOR HIGHWAY 93 ROADSIDE SEEDING.
  10. PLACE WETLAND CREATION SHRUBS AT 1.8 m ON CENTER. SEE WETLAND PLANTING DETAIL.
  11. APPLY SEED BY BROADCAST METHODS. RAKE OR HARROW THE SEED. SEED BERM REMOVAL AREAS WITH ZONE 2 SEED MIX.
  12. PLACE WETLAND CREATION HERBACEOUS PLUGS AT 1.0 m ON CENTER.

- GENERAL NOTES:**
1. PRIOR TO CONSTRUCTION COMMENCING, CONDUCT A PRE-CONSTRUCTION MEETING ON THE SITE BETWEEN THE CONTRACTOR, PROJECT MANAGER, MDT STAFF WETLANDS SPECIALIST AND WETLANDS ECOLOGIST TO DISCUSS THE DESIGN INTENT OF THE WETLANDS.
  2. PLANT SCRUB/SHRUB, HERBACEOUS EMERGENT AND HERBACEOUS WET MEADOW SPECIES FOR WETLAND COMMUNITIES TO BE ESTABLISHED IN WETLAND CREATION AREAS.
  3. PLACE PLANT MATERIAL IN THE APPROPRIATE ZONE AS DESCRIBED IN THE PLANT TABULATION COLUMN "PLANTING ZONE".
  4. PLANT ZONES SHOWN ON THE PLANTING PLAN ARE APPROXIMATE AND MAY CHANGE BASED ON CONDITIONS AFTER FINAL GRADING.



**CONTOURS:**  
 MAJOR INTERVAL 1.0 m  
 MINOR INTERVAL 0.2 m

SEE CONSTRUCTION PLANS FOR GRADING, WETLAND CREATION & RESTORATION DETAILS

**BOUCHARD WETLAND DEVELOPMENT DETAIL**

PLANTING PLAN

SCALE = 1:1000

MONTANA DEPARTMENT OF TRANSPORTATION

EDAW INC.

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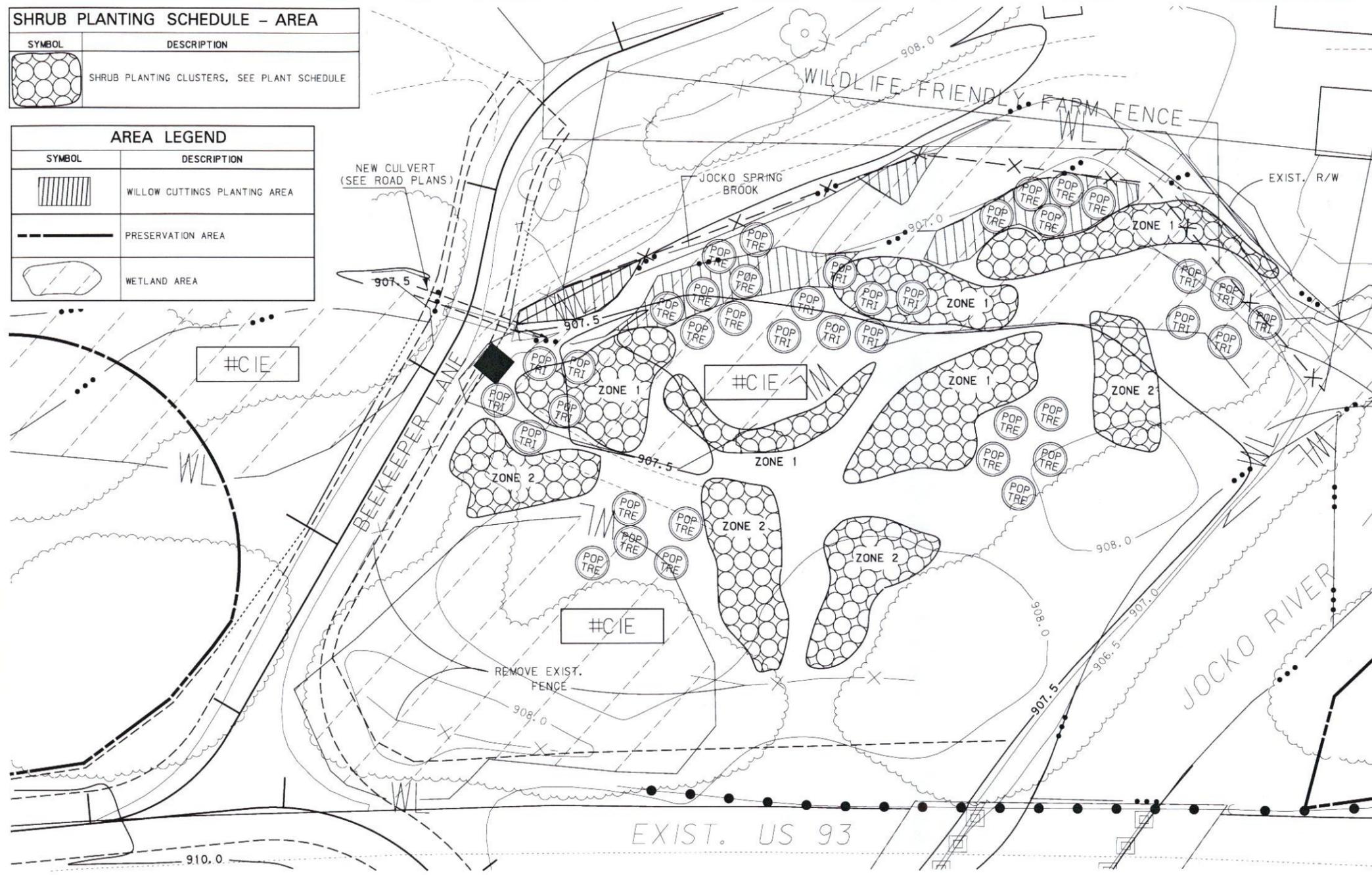
EXISTING APPROACH  
 STA. 337+06 RT.

# DETAIL

CN N744  
N OF ARLEE-VIC WHITE COYOTE RD

SHRUB PLANTING SCHEDULE - AREA	
SYMBOL	DESCRIPTION
	SHRUB PLANTING CLUSTERS, SEE PLANT SCHEDULE

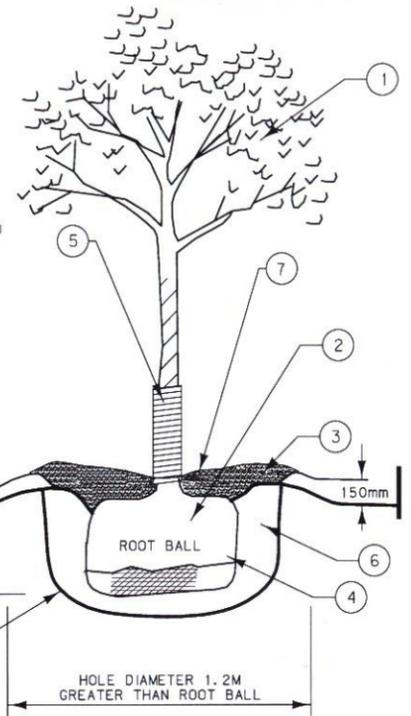
AREA LEGEND	
SYMBOL	DESCRIPTION
	WILLOW CUTTINGS PLANTING AREA
	PRESERVATION AREA
	WETLAND AREA



### TREE PLANTING NOTES:

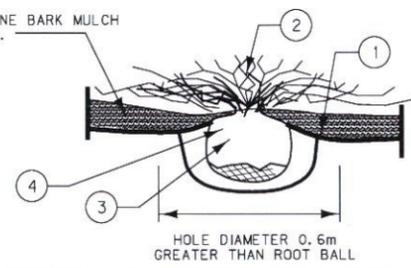
1. PRUNE DEAD WOOD FROM CROWN
2. SET TOP OF ROOT BALL 75mm ABOVE FINISH GRADE. MOUND 150mm TO FORM WATER SAUCER AROUND BASE OF TREE.
3. 150mm DEPTH MULCH IN 1.2m DIA. SAUCER AROUND BASE OF TREE.
4. REMOVE ALL WIRES, TWINE, BASKETS, AND OTHER BINDING MATERIALS PRIOR TO BACKFILLING. PEEL BACK BURLAP ROOT BALL COVER TO EXPOSE ROOTS TO SOIL.
5. PROVIDE TREE WRAP PROTECTION AT BASE OF TREE TO A MINIMUM HEIGHT OF 450mm.
6. APPROVED PLANTING MIX.
7. FINE BARK MULCH

### PLANTING DETAILS



TREE PLANTING DETAILS  
NO SCALE

2 YEAR FLOOD ELEV. = 907.73



SHRUB PLANTING DETAILS  
NO SCALE

### SHRUB PLANTING NOTES:

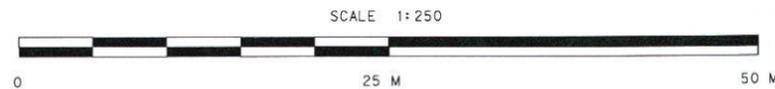
1. PLANT SHRUBS IN MULCH PLANTING BED AS SHOWN ON PLANS.
2. PRUNE DEAD WOOD FROM CROWN
3. SET TOP OF ROOT BALL 50mm ABOVE FINISH GRADE. MOUND TO FORM WATER SAUCER AROUND BASE OF SHRUB.
4. REMOVE ALL WIRES, TWINE, BASKETS, AND OTHER BINDING MATERIALS PRIOR TO BACKFILLING.

### WETLAND MITIGATION PLANTING DETAILS & SCHEDULE

### LANDSCAPING QUANTITY SUMMARY

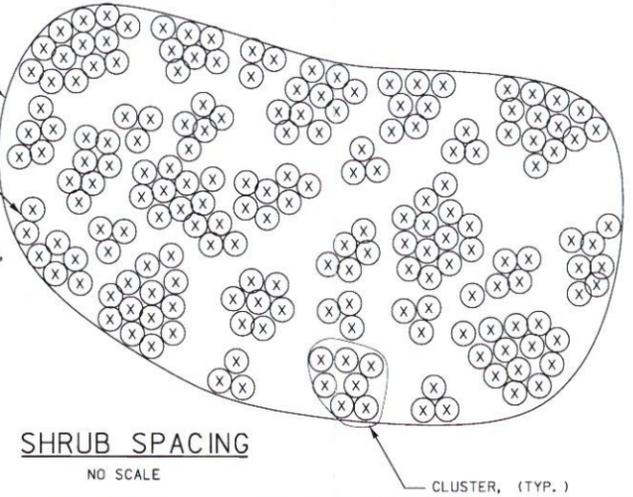
### TREES and SHRUBS SCHEDULE

SPECIES NAME	COMMON NAME	FORM	SIZE	HGT.	SPACING	ZONE1	ZONE2	TOTAL	UNIT
Populus tremuloides	Quaking Aspen	Tree	5L	1M	see plan			22	↑
Populus trichocarpa	Black Cottonwood	Tree	5L	1M	see plan			17	
Acer glabrum	Rocky Mt. Maple	Shrub	3.8L	.5M	1-3M	16	12	28	↓ LUMP SUM
Alnus incana	Thimbleleaf Alder	Shrub	3.8L	.5M	1-3M	24	16	40	
Amelanchier alnifolia	Western Serviceberry	Shrub	3.8L	.5M	1-3M	16	12	28	
Betula occidentalis	Water Birch	Shrub	3.8L	.5M	1-3M	16	24	40	
Cornus stolonifera	Red-Osier Dogwood	Shrub	3.8L	.5M	1-3M	16	12	28	
Prunus virginiana	Common Chokecherry	Shrub	3.8L	.5M	1-3M		12	12	
Rosa woodsii	Woodsii Rose	Shrub	3.8L	.5M	1-3M		7	7	
Rubus idaeus	Red Raspberry	Shrub	3.8L	.5M	1-3M		7	7	
Salix bebbiana	Bebb Willow	Shrub	3.8L	.5M	1-3M	16		16	
Sambucus cerulea	Blue Elderberry	Shrub	3.8L	.5M	1-3M		12	12	
Salix drummondiana	Drummond Willow	Shrub	3.8L	.5M	1-3M	36		36	
Salix exigua	Sandbar Willow	Shrub	3.8L	.5M	1-3M	30		30	
Symphoricarpos albus	Common Snowberry	Shrub	3.8L	.5M	1.2M		12	12	



### NOTES:

1. PLANT SHRUBS IN CLUSTERS OF THREE, FIVE, SEVEN, NINE, ELEVEN, OR THIRTEEN SHRUBS.
2. PLACE ONE SPECIES IN A CLUSTER OF THREE, FIVE OR SEVEN SHRUBS.
3. COMBINE TWO SPECIES IN CLUSTERS OF THIRTEEN SHRUBS.
4. PLACE SHRUBS 1.2 m ON CENTER WITHIN EACH CLUSTER.
5. EVENLY SPACE CLUSTERS THROUGHOUT PLANTING AREA.
6. PLANT 300 WILLOW CUTTINGS IN CLUSTERS PER SHRUB SPACING DETAIL.



SHRUB SPACING  
NO SCALE

MONTANA DEPARTMENT OF TRANSPORTATION

WGM GROUP, INC.

...N744R0012.17...DESIGNED BY  
04/02/04 REVIEWED BY  
03/31/05 PH CHECKED BY  
2  
1

# DETAIL

## PLANTINGS - SPRING CREEK WETLAND Δ

				ZONE 1			ZONE 2A			ZONE 2B			ZONE 3A			ZONE 3B		
TREATMENT AREA (HA) Δ				0.34			0.32			0.13			0.83			0.46		
GENUS	SPECIES	COMMON NAME	SIZE	PERCENT	SPACING (m)	TOTAL												
<b>HERBACEOUS PLUGS</b>																		
CAREX	LANUGINOSA	WOOLY SEDGE	50 cm <sup>2</sup> PLUGS	10%	1	340	10%	1	320	0%	0.5	0	5%	1	415	5%	1	230
CAREX	NEBRASCENSIS	NEBRASKA SEDGE	50 cm <sup>2</sup> PLUGS	10%	1	340	30%	1	960	0%	0.5	0	30%	1	2490	30%	1	1380
CAREX	UTRICULATA	BEAKED SEDGE	50 cm <sup>2</sup> PLUGS	30%	1	1020	0%	1	0	0%	0.5	0	5%	1	415	5%	1	230
ELEOCHARIS	PALUSTRIS	COMMON SPIKERUSH	50 cm <sup>2</sup> PLUGS	10%	1	340	0%	1	0	0%	0.5	0	0%	1	0	0%	1	0
JUNCUS	BALTICUS	BALTIC RUSH	50 cm <sup>2</sup> PLUGS	10%	1	340	30%	1	960	0%	0.5	0	10%	1	830	10%	1	460
JUNCUS	EFFUSUS	SOFT RUSH	50 cm <sup>2</sup> PLUGS	10%	1	340	0%	1	0	0%	0.5	0	10%	1	830	10%	1	460
JUNCUS	LONGISTYLIS	LONGSTYLE RUSH	50 cm <sup>2</sup> PLUGS	0%	1	0	20%	1	640	0%	0.5	0	20%	1	1660	20%	1	920
JUNCUS	TENUIS	SLENDER RUSH	50 cm <sup>2</sup> PLUGS	0%	1	0	0%	1	0	0%	0.5	0	20%	1	1660	20%	1	920
SCIRPUS	MICROCARPUS	SMALL-FLOWERED BULRUSH	50 cm <sup>2</sup> PLUGS	20%	1	680	0%	1	0	0%	0.5	0	0%	1	0	0%	1	0
GEUM	MACROPHYLLUM	LARGE-LEAVED AVENS	50 cm <sup>2</sup> PLUGS	0%	1	0	10%	1	320	0%	0.5	0	0%	1	0	0%	1	0
SUBTOTAL						3400			3200			0			8300			4600
ADDITIONAL PLUGS *						170			160			0			415			230
TOTAL						3570			3360			0			8715			4830
<b>SHRUBS - CONTAINER</b>																		
ALNUS	INCANA	THINLEAF ALDER	10X10X36 cm CTN	20%	2.3	129	15%	2.3	91	15%	2.3	37	0%	2.3	0	40%	2.3	348
CORNUS	STOLONIFERA	RED-OSIER DOGWOOD	10X10X36 cm CTN	20%	2.3	129	10%	2.3	60	10%	2.3	25	0%	2.3	0	20%	2.3	174
CRATAGEUS	DOUGLASHII	DOUGLAS HAWTHORNE	10X10X36 cm CTN	10%	2.3	64	5%	2.3	30	5%	2.3	12	0%	2.3	0	0%	2.3	0
PRUNUS	VIRGINIANA	COMMON CHOKECHERRY	10X10X36 cm CTN	10%	2.3	64	10%	2.3	60	10%	2.3	25	0%	2.3	0	20%	2.3	174
RHAMNUS	ALNIFOLIA	ALDER BUCKTHORN	10X10X36 cm CTN	0%	2.3	0	5%	2.3	30	5%	2.3	12	0%	2.3	0	0%	2.3	0
ROSA	WOODSII	WOOD'S ROSE	10X10X36 cm CTN	0%	2.3	0	10%	2.3	60	10%	2.3	25	0%	2.3	0	0%	2.3	0
SALIX	BEBBIANA	BEBB WILLOW	10X10X36 cm CTN	20%	2.3	129	20%	2.3	121	20%	2.3	43	0%	2.3	0	10%	2.3	87
SALIX	LUTEA	YELLOW WILLOW	10X10X36 cm CTN	10%	2.3	64	5%	2.3	30	5%	2.3	12	0%	2.3	0	10%	2.3	87
SYMPHORICARPOS	OCCIDENTALIS	WESTERN SNOWBERRY	10X10X36 cm CTN	10%	2.3	64	20%	2.3	121	20%	2.3	49	0%	2.3	0	0%	2.3	0
TOTAL				100%		643	100%		603	100%		246	0%		0	100%		870

\* TO BE USED AT THE PROJECT MANAGER'S DISCRETION  
 Δ INCLUDED IN LUMP SUM BID ITEM "WETLAND SITE"

### BIO-ENGINEERING STREAMBANK TREATMENT PLANT MIXES - SPRING CREEK WETLAND Δ

GENUS	SPECIES	COMMON NAME	SIZE	PERCENT
<b>PRE-VEGETATED COIR MAT PLANT MIX #</b>				
<b>HERBACEOUS PLUGS</b>				
CAREX	LANUGINOSA	WOOLY SEDGE	50 cm <sup>2</sup> PLUGS	10%
CAREX	UTRICULATA	BEAKED SEDGE	50 cm <sup>2</sup> PLUGS	30%
ELEOCHARIS	PALUSTRIS	COMMON SPIKERUSH	50 cm <sup>2</sup> PLUGS	10%
JUNCUS	EFFUSUS	SOFT RUSH	50 cm <sup>2</sup> PLUGS	20%
SCIRPUS	MICROCARPUS	SMALL-FLOWERED BULRUSH	50 cm <sup>2</sup> PLUGS	30%
100%				
<b>SHRUB PLUGS</b>				
SALIX	BEBBIANA	BEBB WILLOW	50 cm <sup>2</sup> PLUGS	50%
SALIX	EXIGUA	SANDBAR WILLOW	50 cm <sup>2</sup> PLUGS	50%
100%				
<b>VEGETATED SOIL LIFT PLANT MIX</b>				
SALIX	EXIGUA	SANDBAR WILLOW	1 m LONG CUTTINGS	100%

# ACTUAL SIZE AND SPACING OF PLANTS GROWN IN PRE-VEGETATED COIR MATS WILL BE AT THE DISCRETION OF THE GROWER  
 Δ QUANTITIES INCLUDED IN PLANTINGS FRAME

### SEEDING - SPRING CREEK WETLAND Δ

GENUS	SPECIES	COMMON NAME	PLS kg/ha	SEEDS/kg	SEEDS/m <sup>2</sup>	SEEDS/ha	% OF MIX
AGROPYRON	RIPARIUM	STREAMBANK WHEATGRASS	4.48	339,500	150	1,520,000	11.10%
CALAMAGROSTIS	CANADENSIS	BLUEJOINT REEDGRASS	1.12	5,005,000	560	5,610,000	40.98%
ELYMUS	TRACHYCAULUS	SLENDER WHEATGRASS	7.84	350,000	280	2,750,000	20.09%
ACHILLEA	MILLEFOLIUM	COMMON YARROW	0.28	6,100,000	172	1,710,000	12.49%
EPILOBIUM	ANGUSTIFOLIUM	FIREWEED	0.11	18,740,000	215	2,100,000	15.34%
TOTAL			13.83		1377	13,690,000	100.00%

Δ INCLUDED IN LUMP SUM BID ITEM "WETLAND SITE"

### ADDITIONAL ITEMS - SPRING CREEK WETLAND Δ

ITEM	UNIT	QUANTITY	REMARKS
PRE-VEGETATED COIR MATS	EACH	13	INCLUDES WOODEN STAKES
VEGETATED SOIL LIFTS	EACH	6	INCLUDES WOODEN STAKES
BROWSE PROTECTORS	EACH	2363	
WEED MATS	EACH	2363	INCLUDES STAPLES
WILLOW CUTTINGS	EACH	400	

Δ INCLUDED IN LUMP SUM BID ITEM "WETLAND SITE"

MONTANA DEPARTMENT OF TRANSPORTATION

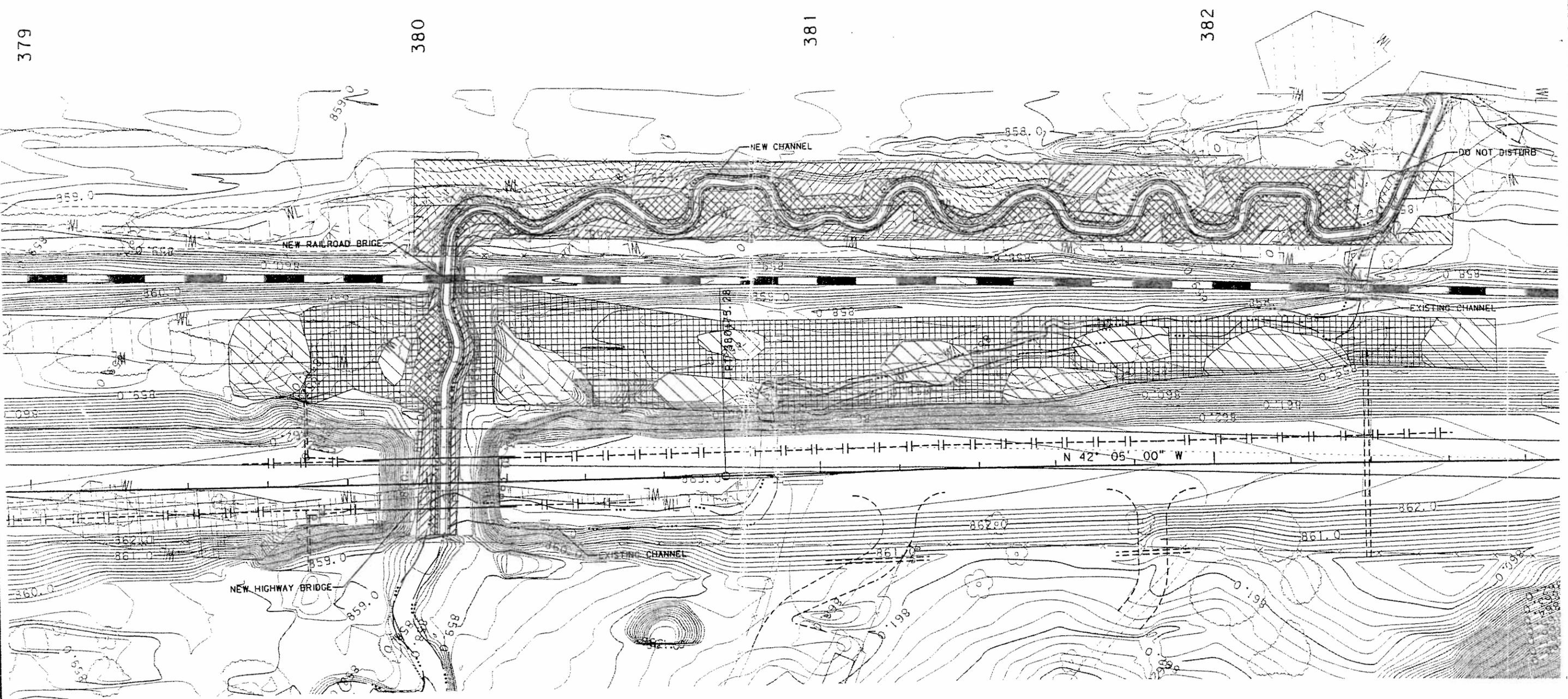
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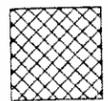
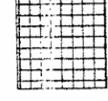
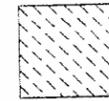
GEUM ENVIRONMENTAL CONSULTING, INC.

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# DETAIL

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 5-2(120)20	L-8
CSF - 0.99926000		



-  ZONE 1  
TOTAL AREA - 0.34 HECTARES
-  ZONE 2A  
TOTAL AREA - 0.32 HECTARES
-  ZONE 3A  
TOTAL AREA - 0.83 HECTARES
-  ZONE 2B  
TOTAL AREA - 0.13 HECTARES
-  ZONE 3B  
TOTAL AREA - 0.46 HECTARES

CONTOURS:  
MAJOR INTERVAL 1.0 m  
MINOR INTERVAL 0.2 m

SPRING CREEK  
WETLAND  
DEVELOPMENT  
DETAIL

PLANTING PLAN

SCALE = 1:500

MONTANA DEPARTMENT OF TRANSPORTATION

MONTANA CADD

GELUM ENVIRONMENTAL CONSULTING, INC.

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# PETERSON TRACT WETLAND MITIGATION SITE

## SUMMARY AND CONSTRUCTION NOTES

### STATION 576+94.5

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 5-2(122)31	WM-6

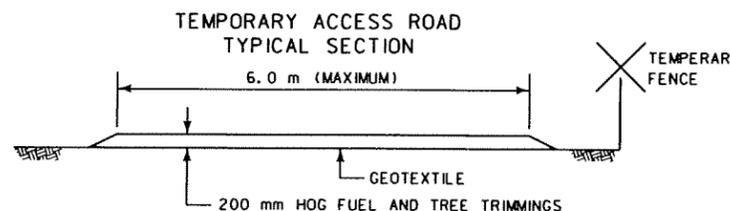
MONTANA DEPARTMENT OF TRANSPORTATION

MONTANA CADD

S&S ENGINEERING ASSOCIATES

TOPSOIL SALVAGE/PLACE (m³)	EXCAVATION (m³) ***	EMB+ (m³)	LOG CRIBS (each)	PRESERVATION FENCE (m)	EROSION CONTROL BLANKETS (m²)	PLANTING		TEMPORARY ROAD CONSTRUCTION AND REMOVAL	SEEDING (kg)	REMARKS
						PLUGS (each)	SHRUBS *** (each)			
280	201	135	12	900	200	4 000	2 750	1	0.05	
<b>Total</b>						<b>0.65 LUMP SUM</b>				

\* ESTIMATED QUANTITIES FOR INFORMATIONAL PURPOSES ONLY  
 \*\* USE UNCLASSIFIED EXCAVATION (102 m³) PLUS EMB+ (91 m³) FOR A TOTAL NEED OF 193 m³ OF EMB+  
 \*\*\* INCLUDES CONTAINERIZED STOCK AND CUTTINGS.



- NOTES:
1. CONSTRUCT TEMPORARY ACCESS ROADS ONLY IN LOCATIONS INDICATED ON THE PLANS, OR THE APPROVED SITE ACCESS PLAN, OR AS APPROVED BY THE PROJECT MANAGER.
  2. DO NOT EXCEED A MAXIMUM WIDTH OF 6 METERS FOR TEMPORARY ACCESS ROADS.
  3. MOW EXISTING VEGETATION, INCLUDING SHRUBS, TO A HEIGHT OF 100 mm PRIOR TO CONSTRUCTION.
  4. PLACE A GEOTEXTILE FOR SEPARATION OVER THE MOWN VEGETATION. PLACE A MINIMUM OF 200 mm OF HOG FUEL AND TREE TRIMMINGS SHALL BE PLACED OVER THE GEOTEXTILE.
  5. AT THE COMPLETION OF THE CONSTRUCTION PROJECT, AS INDICATED BY THE PROJECT MANAGER, REMOVE ALL TEMPORARY CONSTRUCTION ROAD MATERIAL AND DISPOSE OF IT LEGALLY OFF SITE.
  6. THE PROJECT MANAGER WILL IDENTIFY COMPACTED AREAS AND MAY REQUIRE THE CONTRACTOR TO DETERMINE COMPACTION AT ANY TIME. IF THE COMPACTION IS FOUND TO BE COMPACTED TO A DENSITY GREATER THAN 85% OF THE MAXIMUM DRY UNIT WEIGHT, AS DETERMINED BY ASTM D-1557, PROVIDE THE PROJECT MANAGER WITH A PROPOSED METHOD TO RESTORE THE AREA TO APPROPRIATE COMPACTION PRIOR TO SEEDING OR PLANTING AT NO COST TO THE DEPARTMENT.

#### PETERSON TRACT WETLAND MITIGATION

##### General notes:

1. A MDT Project Manager must be on site prior to the commencement of grading and planting activities.
2. Conduct a survey under the direction of the Project Manager to establish planting and seeding areas log structure and basin locations.
3. Mitigation site work includes installation of log cribs, excavation, seeding and planting.
4. Install protection fencing prior to any construction activity. Construct temporary access road and stream crossing. Remove culvert, road and protection fencing following construction.
5. Minimize impact to existing wetlands through the use of established travelways and wetland crossings routes. Keep vehicles out of wetland areas except at log crib construction areas.
6. Sequence log crib construction down stream to upstream (west to east).

##### Grading Notes:

1. Prior to crib construction remove yellowflag iris, using a backhoe. Dispose in County woody debris disposal site as directed by the Project Manager. (Excavation estimated at 15 m³.)
2. Install twelve log cribs as shown on the plans at locations surveyed or identified by the Project Manager. Location shall maximize ponding. Use multiple logs as necessary.
3. Wood material used for crib construction will be Douglas-Fir or Western Larch.
4. Excavate seven basins (approximately 20.7 m³) each as shown on the plans or identified by the Project Manager. Utilize excess material from basins on roadway, crib embankments, or crib backfill, as directed by Project Manager.

##### Planting Notes:

1. Planting will be done under the supervision of the Project Manager.
2. Seed disturbed areas with 0.05 kg of fireweed (epolobium angustifolium).
3. Place Erosion Control Blanket as directed by the Project Manager.
4. Plant herbaceous plugs on grid 0.45 m (1.5 ft) on center in all disturbed areas.
5. Plant shrubs in clusters of the same species along existing wetland boundary as shown on plans.
6. Decompact soils to 85% of standard proctor and drill seed access route and staging area with Fescue Prairie Mix.

Scientific Name	Common Name	Total#
<b>Herbaceous Plugs (66 cc)*</b>		
<i>Carex lanuginosa</i>	Woolly sedge	364
<i>Carex nebrascensis</i>	Nebraska sedge	1 378
<i>Carex utriculata</i>	Beaked sedge	297
<i>Eleocharis palustris</i>	Common spikesedge	77
<i>Juncus balticus</i>	Baltic rush	1 225
<i>Juncus effusus</i>	Soft rush	221
<i>Scirpus microcarpus</i>	Small-fruited bulrush	77
<b>Total</b>		<b>3 639</b>
<b>Shrubs Containerized (3.8L)**</b>		
<i>Alnus incana</i>	Thinleaf alder	1 163
<i>Cornus stolonifera</i>	Red-osier dogwood	226
<i>Crataegus douglasii</i>	Douglas hawthorne	75
<i>Prunus americana</i>	American plum	226
<i>Rhamnus alnifolia</i>	Alder buckthorn	207
<i>Rosa woodsii</i>	Wood rose	450
<i>Salix bebbiana</i>	Bebb willow	394
<i>Salix lutea</i>	Yellow willow	375
<i>Sambucus cerulea</i>	Blue elderberry	19
<i>Symphoricarpos occidentalis</i>	Western snowberry	56
<b>Total</b>		<b>3 191</b>
<b>Shrub Cuttings (650 - 750 mm)***</b>		
<i>Cornus stolonifera</i>	Red-osier dogwood	188
<i>Salix bebbiana</i>	Bebb willow	375
<i>Salix lutea</i>	Yellow willow	375
<b>Total</b>		<b>938</b>

\* SEE HERBACEOUS PLUG PLANTING DETAIL IN PLANTINGS DETAILS (WM-7).  
 \*\* SEE SHRUB PLANTING DETAIL IN PLANTINGS DETAILS (WM-7).  
 \*\*\* SEE LIVE STAKE CUTTING DETAIL IN PLANTINGS DETAILS (WM-7).

LOG CRIB NUMBER	SOUTH END		NORTH END		LOG CRIB ELEV. AT TOP OF LOG	meters		cubic meters
	NORTHING	EASTING	NORTHING	EASTING		WIDTH OF LOG CRIB	LENGTH OF LOGS **	
1	356 049.8833	252 766.1116	356 079.3447	252 767.6773	848.200	30	64	5.5
2	356 023.1940	252 812.0507	356 024.8634	252 828.1484	848.590	16	36	2.7
3	355 996.9310	252 842.7526	356 025.3760	252 862.1991	848.891	34	72	34.8
4	355 984.0754	252 857.9921	355 995.3551	252 870.2482	849.193	17	38	18.9
5	355 970.4899	252 861.4632	355 983.0141	252 883.5058	849.495	25	54	13.0
6	355 961.9700	252 867.4978	355 975.1914	252 890.7674	849.797	27	58	18.3
7	355 945.7019	252 885.4671	355 973.4367	252 904.0584	850.099	34	72	32.7
8	355 937.6148	252 898.7277	355 971.4261	252 918.0648	850.401	39	82	23.5
9	355 929.0536	252 931.6429	355 941.3300	252 939.3417	850.703	15	34	2.1
10	355 913.7509	252 955.3505	355 931.0075	252 963.5216	851.005	19	42	9.0
11	355 911.2928	252 986.8447	355 929.3303	252 994.4639	851.307	20	44	4.8
12	355 905.2450	252 996.8014	355 926.3884	253 006.8130	851.610	23	50	7.5
<b>TOTAL</b>	~	~	~	~	~	~	~	<b>169.7</b>

\* FIELD VERIFY LOCATIONS.  
 \*\* LOG LENGTHS, MINIMUM 7 m - MAXIMUM 10 m.

OXBOW BASIN LOCATION		cubic meters
meters		
NORTHING	EASTING	EXCAVATION
356 031.234	252 828.603	
356 020.988	252 840.164	
355 928.312	252 917.486	
355 945.102	252 943.482	
355 908.144	252 984.702	
355 896.037	253 021.438	
355 881.489	253 076.323	
<b>TOTAL</b>		<b>145 M³</b>

\* BASIN LOCATIONS ARE APPROXIMATE. FIELD VERIFY.

**WETLAND MITIGATION SITE  
 PETERSON TRACT**

**SUMMARIES AND  
 CONSTRUCTION NOTES**

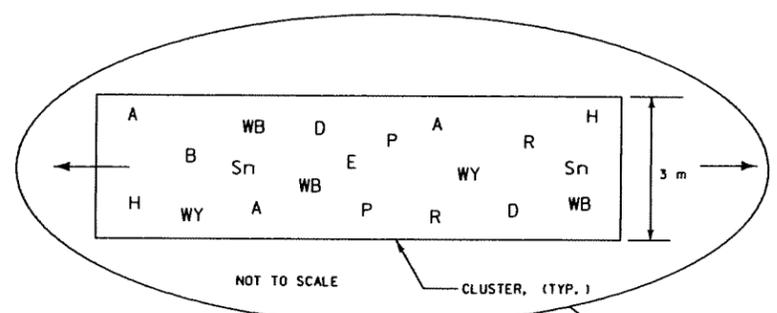
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# PETERSON WETLAND PLANTING DETAIL

MONTANA DEPARTMENT OF TRANSPORTATION  
MONTANA CADD

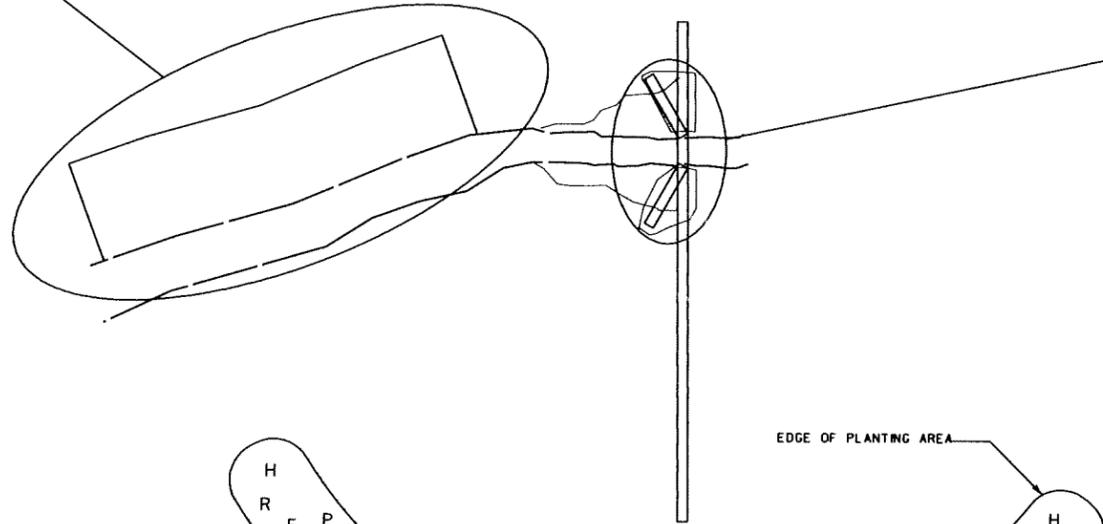
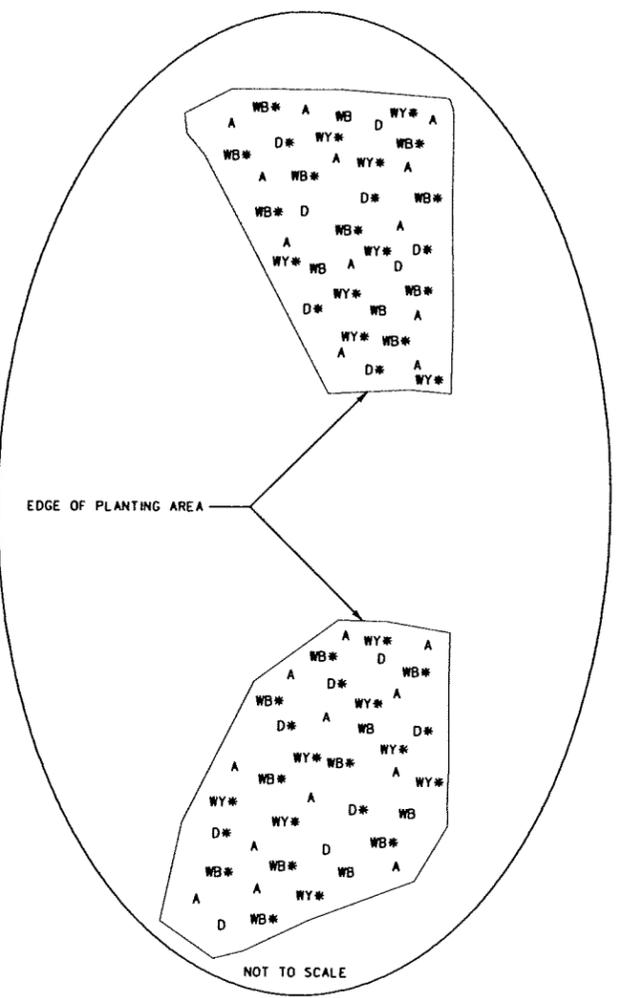
## SHRUB SPACING - EXISTING WETLAND PERIMETER

PLANT SHRUBS AT 1.2 m ON CENTER



SHRUB PLANTING GROUP * FOR PERIMETER OF EXISTING WETLAND			
SYMBOL	SCIENTIFIC NAME	COMMON NAME	NUM/GROUP
A	<i>Alnus incana</i>	Thinleaf alder	3
D	<i>Cornus stolonifera</i>	Red-osier dogwood	2
H	<i>Crataegus douglasii</i>	Douglas hawthorne	2
P	<i>Prunus americana</i>	American plum	2
B	<i>Rhamnus alnifolia</i>	Alder buckthorn	1
R	<i>Rosa woodsii</i>	Wood rose	2
WB	<i>Salix bebbiana</i>	Bebb willow	3
WY	<i>Salix lutea</i>	Yellow willow	2
E	<i>Sambucus cerulea</i>	Blue elderberry	1
Sn	<i>Symphoricarpos occidentalis</i>	Western snowberry	2
Total			20

\* 101 Planting Groups required.



NOT TO SCALE

SYMBOL	SCIENTIFIC NAME	COMMON NAME	NO. PER GROUP
A	ALNUS INCANA	THINLEAF ADER	12
D	CORNUS STOLONIFERA	RED-OSIER DOGWOOD	3/5*
WB	SALIX BEBBIANA	BEBB WILLOW	3/9*
WY	SALIX LUTEA	YELLOW WILLOW	8*
TOTAL			40

\* CUTTINGS USED.

## SHRUB SPACING - LOG CRIB

PLANT SHRUBS AT 1.2 m ON CENTER

SYMBOL	SCIENTIFIC NAME	COMMON NAME	NO. PER OXBOW
H	CRATAEGUS DOUGLASII	DOUGLAS HAWTHORN	7
P	PRUNUS AMERICANA	AMERICAN PLUM	7
B	RHMNUS ALNIFOLIA	ALDER BUCKTHORN	3
R	ROSA WOODSII	WOOD ROSE	7
E	SAMBUCUS CERULES	BLUE ELDERBERRY	7
Sn	SYMPHORICARPUS OCCIDENTALIA	WESTERN SNOWBERRY	3
TOTAL			34

## SHRUB SPACING FOR OXBOW BASINS

PLANT SHRUBS AT 1.5 m ON CENTER

WETLAND MITIGATION SITE  
PETERSON TRACT  
SITE PLAN-SHEET B

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## **Appendix H**

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### **MITIGATION CREDITING SYSTEMS**

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*US Highway 93 Onsite: Bouchard, Jocko River Bridge, Jocko Spring Creek, and Peterson Property*



**U.S. ARMY CORPS OF ENGINEERS**

HELENA REGULATORY OFFICE  
10 WEST 15TH STREET, SUITE 2200  
HELENA, MONTANA 59626

December 18, 2002

REPLY TO  
ATTENTION OF:

Helena Regulatory Office  
(406) 441-1375 Phone  
(406) 441-1380 Fax

Subject: Corps File Number 2001-90-416  
US Highway 93: Evaro to Polson  
Compensatory Wetland Mitigation Crediting

Mr. Tom Parker  
Herrera Environmental Consultants, Inc.  
101 East Broadway, Suite 610  
Missoula, Montana 59802

Dear Mr. Parker:

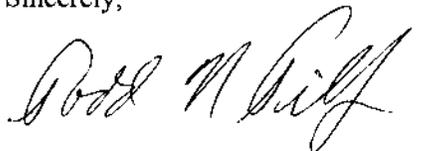
The purpose of this letter is to outline a compensatory wetland mitigation crediting scheme for the Montana Department of Transportation (MDT) Evaro – Polson US 93 project. The project is being split into at least nine separate segments for the purposes of design and construction, but the corridor was the subject of a single integrated Environmental Impact Statement.

1. Compensatory mitigation must be developed for all unavoidable, non-isolated aquatic impacts on the entire Evaro-Polson project. Unavoidable impacts and a compensatory mitigation package will be reviewed on a watershed and corridor basis for all design segments.
2. All compensatory mitigation sites recognized by the US Army Corps of Engineers (Corps) must be protected by a perpetual conservation easement or similar permanent land use restriction.
3. Use the methods in the 1987 Corps Wetland Delineation Manual to determine whether or not an area is a wetland.
4. All compensatory mitigation for the corridor should be within the limits of the watershed described by USGS Hydrologic Unit Code 17010212, Lower Flathead River, Montana.
5. All wetland impacts must be assessed using the 1999 MDT Montana Wetland Assessment Method.
6. Wetland compensatory mitigation ratios will be based on use of the 1999 MDT Montana Wetland Assessment Method to assign a functional score. The baseline (pre-project) mitigation site assessment score will be compared to the post-project rating, as described in your December 3, 2002 Draft Memorandum to this office. The basis for awarding credit will be the same for on- and off-site mitigation areas. While the crediting method presented was generally acceptable, a review of the proposal has resulted on the following limits on mitigation crediting:
  - 7.1 **Creation:** The establishment of a wetland or other aquatic resource where one did not formerly exist. Creation of wetlands will result in a mitigation ratio of 1:1, with one acre of satisfactory wetland creation compensating for one acre of unavoidable wetland impact.

- 7.2 **Restoration:** Re-establishment of wetland and/or other aquatic resource characteristics and function(s) at a site where there were wetlands existed historically, but have been modified so that they are now considered non-wetland or exist in a substantially degraded state.
- 7.2.1 **Restoration (re-establishment)** of wetland characteristics to existing non-wetland areas that were historically wetlands will also result in a mitigation ratio of 1:1, with one acre of satisfactory wetland restoration of this type compensating for one acre of unavoidable wetland impact.
- 7.2.2 **Restoration (rehabilitation)** of wetland functions at existing wetland areas that exist in a substantially degraded state will result in a mitigation ratio of not less than 1½:1, with a minimum of one and a half acres of satisfactory wetland restoration of this type required to compensate for one acre of unavoidable wetland impact. For example, if the calculated crediting ratio for this type of site was calculated at 1.84:1, that is the ratio that would be used. If the calculation showed 1.34:1, the limit of 1½:1 would be used.
- 7.3 **Enhancement:** Altering the physical characteristics of an existing jurisdictional wetland such that it permanently modifies and improves one or more specific wetland functions with no corresponding decrease in any other functions. Examples include restoring normal hydrology to a partially drained wetland, or restoring a high level of species diversity to a monotypic plant community. Enhancement of existing wetland areas that are not substantially degraded will result in a mitigation ratio of not less than 3:1, with a minimum of three acres of satisfactory wetland enhancement of this type required to compensate for one acre of unavoidable wetland impact. For example, if the calculated crediting ratio for this type of site was calculated at 4.23:1, that is the ratio that would be used. If the calculation showed 2.23:1, the limit of 3:1 would be used.

This information is provided in response to our recent meeting and the December 3, 2002 Draft Memorandum on US 93 Wetland Mitigation Crediting provided by Herrera, Inc. Additional input from this office will be provided as necessary and as the plan for mitigation crediting matures. If you have questions feel free to call me at (406) 441-1375, and reference Corps File Number 2001-90-416.

Sincerely,



Todd N. Tillinger, P.E.  
Project Manager

Cc: Gordon Stockstad – MDT Environmental Services, Helena, Montana  
Scott Jackson – U.S. Fish and Wildlife Service, Helena, Montana  
Craig Genzlinger – U.S. Federal Highway Administration, Helena, Montana  
Steve Potts – U.S. Environmental Protection Agency, Helena, Montana

*Herrera Environmental Consultants, Inc.*

**Memorandum**

*To* U.S. Army Corps of Engineers, Helena Office  
*cc* Montana Department of Transportation  
*From* Tom Parker, Herrera Environmental Consultants  
*Date* December 3, 2002  
*Subject* US 93 Wetland Mitigation Crediting

**Introduction**

Compensatory wetland mitigation, as credited by the Army Corps of Engineers, is often evaluated based on area ratios of mitigated wetlands to impacted wetlands. *Mitigated wetlands* include all wetland areas that are created, enhanced or preserved to compensate for impacted wetlands. Created wetlands are often credited at a 1:1 ratio, while existing wetlands that are enhanced or preserved may be credited at ratios ranging from 3:1 to 10:1.

Many opportunities exist along the US 93 corridor to enhance existing wetlands using combinations of active re-vegetation, land management change, weed management and other restoration actions. Often, it is difficult to determine the appropriate wetland credit ratio that should be assigned for a given wetland enhancement project. A quantitative basis for calculating appropriate enhancement ratios would benefit all participants in the wetland regulatory process. We understand that the regulatory agency has final authority to determine wetland mitigation credits.

**Proposed Approach**

We propose using the MDT Wetland Functional Assessment Method (MDT 1999) as a tool to measure the projected shift in wetland functions and values based on wetland mitigation activities. This method, which was used to assess functions and values of impacted wetlands along the corridor, evaluates 12 wetland functions and values (Tables 1 and 2). Using the procedure documented in MDT (1999), a wetland specialist assigns scores of 0 or 0.1 (low) to 1.0 (high) to each of the 12 categories at a particular site. These scores are totaled, resulting in a functional score for the site.

An evaluator measures projected shift in wetland functions and values by first assessing existing conditions on the site, then estimating changes in scores that would occur as a result of mitigation activities, and finally calculating the difference between these scores.

The shift in wetland function at a mitigation site could then be used to determine a crediting ratio for enhancement projects. Using this approach, the process for calculating wetland mitigation credits at a given site would have two components. First, a wetland creation component, assuming a 1:1 ratio for created wetlands, would be equal to the number of created wetland acres at a mitigation site. This creation component could be expressed as:

$$A_{created} = \text{Created wetland acres} \quad (1)$$

Second, an enhancement component would be the number of existing wetland acres to be enhanced, multiplied by an enhancement factor. The enhancement factor represents the ratio of functional shift (the difference between pre-project functional score and projected post-project functional score) to the pre-project functional score. The enhancement factor can be expressed as:

$$\text{Enhancement factor} = \left( \frac{F_{post} - F_{pre}}{F_{pre}} \right) \quad (2)$$

**where:**

$F_{post}$  = Projected post-mitigation project functional score

$F_{pre}$  = Pre-project functional score

**Note:** The enhancement ratio is the inverse  $\left(\frac{1}{x}\right)$  of the enhancement factor. The enhancement ratio is the term most frequently used to discuss crediting ratios for wetland mitigation projects. For example, an enhancement factor of 0.25 would be equal to an enhancement ratio of 4:1. This means that four enhanced acres at a particular site would be worth one acre of credit to offset wetland acres impacted by the project.

The enhancement component of the equation can then be expressed as:

$$A_{existing} \left( \frac{F_{post} - F_{pre}}{F_{pre}} \right) \quad (3)$$

**where:**

$A_{existing}$  = Existing wetland acres to be enhanced

$F_{post}$  = Projected post-mitigation project functional score

$F_{pre}$  = Pre-project functional score

The following equation, which includes both a creation and enhancement component, can then be used to calculate wetland mitigation credits expressed as acres:

$$A_{credited} = A_{created} + A_{existing} \left( \frac{F_{post} - F_{pre}}{F_{pre}} \right) \quad (4)$$

**where:**

- $A_{credited}$  = Wetland mitigation credits expressed as acres
- $A_{created}$  = Wetland creation acres
- $A_{existing}$  = Existing wetland acres to be enhanced
- $F_{post}$  = Projected post-mitigation project functional score
- $F_{pre}$  = Pre-project functional score

To demonstrate how these equations can be applied in the context of US 93 wetland mitigation, we have selected two proposed wetland mitigation sites as examples. The Bouchard property (Example 1) is a 40-acre parcel north of Arlee. The Ludwig property (Example 2) includes slightly less than 20 acres and is two miles north of St. Ignatius.

### Example 1

The Bouchard property has been acquired recently by MDT. This site is near the headwaters of Spring Creek and supports a mixture of upland, emergent wetland and scrub/shrub wetland. A proposed wetland mitigation project at this site will include approximately 8 acres of wetland creation and up to 20 acres of wetland enhancement. A summary of pre- and post-project wetland functional scores is provided in Table 1.

**Table 1. Expected change in wetland functions and values, Bouchard site.**

	Functional Points Pre-Project	Functional Points Post-Project	Factors Affecting Score
A. Listed/proposed T&E species habitat	.3	.3	No populations in area, not likely corridor
B. Habitat for S1, S2, or S3 plants or animals	.1	.1	No populations in area
C. General wildlife habitat	.8	1	Decreased disturbance
D. General fish/aquatic habitat	N/A	N/A	Not historic fish habitat
E. Flood attenuation	N/A	N/A	No channel
F. Short- and long-term surface water storage	.8	.8	Seasonal surface water
G. Sediment/nutrient/toxicant retention and removal	N/A	N/A	Does not receive excess sediment, nutrient, toxicant inputs
H. Sediment/shoreline stabilization	N/A	N/A	No channel
I. Production export/food chain support	.9	.9	Vegetation at site already diverse
J. Ground water discharge/recharge	1	1	Discharge/recharge indicators present
K. Uniqueness	.6	.8	Decreased disturbance
L. Recreation/education potential	.1	1	Decreased disturbance
Totals	4.6	5.9	

The following example assumes that 8 ( $A_{created}$ ) new wetland acres are created and the functional score of 20 ( $A_{existing}$ ) existing wetland acres shifts from 4.6 ( $F_{pre}$ ) to 5.9 ( $F_{post}$ ). Using Equation (2):

$$\text{Enhancement factor} = \left( \frac{F_{post} - F_{pre}}{F_{pre}} \right) = \left( \frac{5.9 - 4.6}{4.6} \right) = 0.28$$

In this case, the enhancement factor equals 0.28. The corresponding enhancement ratio (1/0.28) would be 3.5 and would be expressed as 3.5 to 1, indicating 3.5 acres of enhancement replaces 1 impacted wetland acre.

Next, applying equation (3), it is possible to calculate the mitigation credits for the 20 acres of existing wetland that would be enhanced at the Bouchard site:

$$A_{existing} \left( \frac{F_{post} - F_{pre}}{F_{pre}} \right) = 20(0.28) = 5.6 \text{ acres of credit for enhancement portion}$$

Finally, applying equation (4), it is possible to calculate total mitigation credits at the Bouchard site.

$$A_{credited} = A_{created} + A_{existing} \left( \frac{F_{post} - F_{pre}}{F_{pre}} \right) = 8 + 20(0.28) = \mathbf{13.65 \text{ total acres of credit}}$$

## Example 2

The Montana Department of Transportation has requested an assessment of wetland mitigation potential on the Ludwig property north of St. Ignatius, Montana. Because the decision to acquire this property partly depends upon how many wetland mitigation credits it is feasible to generate there, we decided to use the Ludwig property as an example of how one might use a functional score approach to calculate an appropriate crediting ratio for enhancement projects. Tables 1 and 2 include summaries of functional scores for (1) existing conditions and (2) estimated post-mitigation project conditions at each of the two proposed mitigation projects on the Ludwig property. A tributary to Post Creek runs through the property and was assessed as one wetland site (Table 2). The second wetland site consists of a created stock pond and small adjacent wetlands supported by the pond (Table 3). Both sites are impacted by livestock grazing and altered hydrology.

*Stream Site.* The Post Creek portion of the site would increase from an estimated 1.3 ( $A_{existing}$ ) acres of wetland to 5.2 acres, resulting in 3.9 ( $A_{created}$ ) created wetland acres. From Table 2, the functional score would shift from 5.4 ( $F_{pre}$ ) to 9.5 ( $F_{post}$ ). Using Equation (2):

$$\text{Enhancement factor} = \left( \frac{F_{post} - F_{pre}}{F_{pre}} \right) = \left( \frac{9.5 - 5.4}{5.4} \right) = 0.76$$

**Table 2. Expected change in wetland functions and values, Ludwig property, Post Creek Tributary.**

MDT Assessment Method Functions and Values	Functional Points Pre-Project	Functional Points Post-Project	Factors Affecting Score
A. Listed/proposed T&E species	.3	.8	Grizzly, Sus/inc. to Doc/secondary
B. Habitat for S1, S2, or S3 plants or animals	.1	.7	Grizzly, Sus/inc. to Doc/secondary
C. General wildlife habitat	.5	.9	Increased cover
D. General fish/aquatic habitat	.1	.3	Increased cover and connectivity, but unlikely fish habitat
E. Flood attenuation	.2	.7	Increased size, woody component
F. Short- and long-term surface water storage	.4	.8	Increased size
G. Sediment/nutrient/toxicant removal	.9	.9	Close to highway, cattle removal
H. Sediment/shoreline stabilization	.7	1	Increase deep binding root mass
I. Production export/food chain support	.9	1	Increased size
J. Ground water discharge/recharge	1	1	
K. Uniqueness	.2	.4	Shift to shrub community
L. Recreation/education potential	.1	1	Not likely site
Total Functional Points	5.4	9.5	

**Table 3. Expected change in wetland functions and values, Ludwig property, stock pond and adjacent wetlands.**

MDT Assessment Functions and Values	Functional Points Pre-Project	Functional Points Post-Project	Factors Affecting Score
A. Listed/proposed T&E species	.3	.7	Grizzly bear use adjacent areas, increased cover may increase use
B. Habitat for S1, S2, or S3 plants or animals	.2	.2	No known occurrence
C. General wildlife habitat	.3	.9	Increased cover
D. General fish/aquatic habitat	N/A	N/A	No habitat
E. Flood attenuation	N/A	N/A	No overbank flow
F. Short- and long-term surface water storage	.7	.8	
G. Sediment/nutrient/toxicant removal	1	1	Close to highway, cattle removal
H. Sediment/shoreline stabilization	N/A	N/A	
I. Production export/food chain support	.6	.7	Increased structural diversity
J. Ground water discharge/recharge	1	1	
K. Uniqueness	.1	.4	Shift to shrub
L. Recreation/education potential	.1	1	Not likely site
Total Functional Points	4.3	6.7	

In this case, the enhancement factor equals 0.76. The corresponding enhancement ratio (1/0.76) would be 1.32 and would be expressed as 1.32 to 1, indicating 1.32 acres of enhancement replaces 1 impacted wetland acre.

Next, applying equation (3), it is possible to calculate the mitigation credits for the 1.3 acres of existing wetland that would be enhanced at the Ludwig stream channel site:

$$A_{existing} \left( \frac{F_{post} - F_{pre}}{F_{pre}} \right) = 1.3(0.76) = 0.98 \text{ acres of credit for enhancement portion}$$

Finally, applying equation (4), it is possible to calculate total mitigation credits at the Ludwig stream channel site.

$$A_{credited} = A_{created} + A_{existing} \left( \frac{F_{post} - F_{pre}}{F_{pre}} \right) = 3.9 + 1.3(0.76) = \mathbf{4.9 \text{ total acres of credit}}$$

*Stock Pond Site.* The stock pond portion of the site would increase from an estimated 0.35 ( $A_{existing}$ ) acres of wetland to 1.8 acres, resulting in 1.45 ( $A_{created}$ ) created wetland acres. From Table 3, the functional score would shift from 4.3 ( $F_{pre}$ ) to 6.7 ( $F_{post}$ ). Using Equation (2):

$$\text{Enhancement factor} = \left( \frac{F_{post} - F_{pre}}{F_{pre}} \right) = \left( \frac{6.7 - 4.3}{4.3} \right) = 0.56$$

In this case, the enhancement factor equals 0.56. The corresponding enhancement ratio (1/0.56) would be 1.79 and would be expressed as 1.79 to 1, indicating 1.79 acres of enhancement replaces 1 impacted wetland acre.

Next, applying equation (3), it is possible to calculate the mitigation credits for the 0.35 acres of existing wetland that would be enhanced at the Ludwig stock pond site:

$$A_{existing} \left( \frac{F_{post} - F_{pre}}{F_{pre}} \right) = 0.35(0.56) = 0.20 \text{ acres of credit for enhancement portion}$$

Finally, applying equation (4), it is possible to calculate total mitigation credits at the Ludwig stock pond site.

$$A_{credited} = A_{created} + A_{existing} \left( \frac{F_{post} - F_{pre}}{F_{pre}} \right) = 1.45 + 0.35(0.56) = \mathbf{1.64 \text{ total acres of credit}}$$

## CSKT Mitigation Ratios from Wetlands Conservation Plan (pre-project only)

*Prepared by Tom Parker, Ecologist, Herrera Environmental Consultants, Inc.  
May 2, 2002*

Impacted Wetland Type	Mitigation Type			
	<i>Preservation</i>	<i>Restoration</i>	<i>Enhancement</i>	<i>Creation</i>
Forested and Shrub	3:1	2.5:1	4:1	4:1
Emergent and Open Water	2:1	1.5:1	3:1	3:1

Equation for calculating required mitigation acres based on CSKT Mitigation Guidelines.

$$\text{Required mitigation acres} = P(3 I_{sf} + 2 I_{oe}) + R(2.5 I_{sf} + 1.5 I_{oe}) + E(4 I_{sf} + 3 I_{oe}) + C(4 I_{sf} + 3 I_{oe})$$

Where:

$I_{sf}$  = # of scrub/shrub or forested impact acres = 18

$I_{oe}$  = # of emergent or open water impact acres = 32

P = estimated **Preservation** proportion of mitigation area

R = estimated **Restoration** proportion of mitigation area

E = estimated **Enhancement** proportion of mitigation area

C = estimated **Creation** proportion of mitigation area

**Example 1:** To find required mitigation acres, assuming that mitigation projects will be distributed as follows based on area: Preservation = 30 percent; Restoration = 50 percent; Enhancement = 10 percent; Creation = 10 percent.

$$.3 (3*18 + 2*32) + .5(2.5*18+1.5*32) + .1(3*18 + 4*32) + .1(3*18 + 4*32) = 104.2 \text{ required acres}$$

**Example 2:** To find required mitigation acres, assuming that mitigation projects will be distributed as follows based on area: Preservation = 10 percent; Restoration = 90 percent; Enhancement = 0 percent; Creation = 0 percent.

$$.1 (3*18 + 2*32) + .9(2.5*18+1.5*32) + 0(3*18 + 4*32) + 0(3*18 + 4*32) = 96.0 \text{ required acres}$$

**Example 3:** Given 18 impacted acres (36% of total) of shrub or forested and 32 impacted acres (64 percent of total) of open water or emergent, what is the weighted ratio for restoration projects?

$$2.5(.36) + 1.5(.64) = 1.86$$

**Therefore:** A 20-acre restoration project will mitigate for  $20/1.86 = 10.75$  impacted acres.