MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2008

Lonepine Wetland Mitigation Project
Flathead Indian Reservation, Montana

Prepared for:

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

Prepared by:

POST, BUCKLEY, SCHUH, AND JERNIGAN
801 North Last Chance Gulch, Suite 101
Helena, MT 59601-3360

December 2008

PBS&J Project No: 0B4308801.02.04

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TABLE OF CONTENTS

1.0 INTRODUCTION....1

2.0 METHODS....5

2.1 Monitoring Dates and Activities....5

2.2 Hydrology....5

2.3 Vegetation....6

2.4 Soils....6

2.5 Wetland Delineation....6

2.6 Mammals, Reptiles, and Amphibians....7

2.7 Birds....7

2.8 Macroinvertebrates....7

2.9 Functional Assessment....7

2.10 Photographs....7

2.11 GPS Data....8

2.12 Maintenance Needs....8

3.0 RESULTS....8

3.1 Hydrology....8

3.2 Vegetation....9

3.3 Soils....14

3.4 Wetland Delineation....14

3.5 Wildlife....14

3.6 Macroinvertebrates....15

3.7 Functional Assessment....16

3.8 Photographs....16

3.9 Maintenance Needs/Recommendations....17

3.10 Current Credit Summary....18

4.0 REFERENCES....20

TABLES

Table 1 *Final Confederated Salish and Kootenai Tribes (CSKT) and Corps of Engineers (COE) credit ratios for the Lonepine Wetland Mitigation Project.*

Table 2 *2008 Lonepine Wetland Mitigation Site vegetation species list.*

Table 3 *2008 vegetation Ttransect 1 data summary.*

Table 4 *2008 vegetation Transect 2 data summary.*

Table 5 *2008 observed survival of planted woody species at the Lonepine Wetland Mitigation Site.*

Table 6 *2003 and 2008 soil sampling results from the Lonepine Wetland Mitigation Site.*

Table 7 *Fish and wildlife species observed at the Lonepine Wetland Mitigation Site in 2008.*

Table 8 *Summary of pre-project and 2008 wetland function/value ratings and functional points at the Lonepine Wetland Mitigation Site.*

Table 9 *2008 Tribal and Corps of Engineers maximum interim credits at the Lonepine Wetland Mitigation Site.*

FIGURES

Figure 1 *Project Site Location Map*

Figure 2 *Monitoring Activity Locations 2008*

Figure 3 *Mapped Site Features 2008*

CHARTS

Chart 1 *Transect 1 map showing vegetation types from the start to the end of transect for 2008.*

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

Chart 3 *Transect 2 map showing vegetation types from the start to the end of transect for 2008.*

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

Chart 5 *Macroinvertebrate bioassessment scores using the wetland index for the Lonepine Wetland Mitigation Site.*

TABLE OF CONTENTS (Continued)

APPENDICES

Appendix A *Figures 2 & 3*

Appendix B *2008 Wetland Mitigation Site Monitoring Forms*
2008 Bird Survey Form
2008 COE Wetland Delineation Forms
2008 Functional Assessment Forms
2008 Soil Sampling Results

Appendix C *2008 Representative Photographs*

Appendix D *Plan Sheet*

Appendix E *GPS Protocol*

Appendix F *2008 Macroinvertebrate Sampling Protocol and Data*

1.0 INTRODUCTION

This report presents the results of the initial (2008) wetland monitoring at the Lonepine wetland mitigation project. This mitigation site was constructed between the summer of 2007 and early summer of 2008 in Sanders County, Montana, simultaneously with re-construction of the Lower Dry Fork Reservoir dam. The goals are to develop approximately 23.85 acres of US Army Corps of Engineers (COE)-approved wetland credit and 11.86 acres of Confederated Salish & Kootenai Tribes (CSKT)-approved wetland credit at this 80-acre site. The project is primarily intended to mitigate for wetland impacts associated with the proposed MDT Lonepine North & East highway reconstruction project, with any leftover wetland credits to be held in reserve for application against future MDT highway projects in the area. The Lonepine mitigation site was constructed on property owned by MDT.

The site occurs at an elevation of approximately 2,840 feet above mean sea level and is located near the west edge of the Flathead Indian Reservation, approximately 1.5 miles west of Lonepine and immediately south of the Lower Dry Fork Reservoir dam (**Figure 1**). It can be found on the Lonepine U.S. Geologic Survey 7.5 minute topographic quadrangle in the NW ¼ of Section 3, Township 22 North, Range 24 West (**Figure 1**).

The approximate site boundary is illustrated on **Figures 2** and **3** (**Appendix A**) and on the plan sheet in **Appendix D**. The primary target wetland class to be provided at the mitigation site is emergent, with aquatic bed and scrub-shrub (including non-wetland riparian) classes to be provided at a lesser extent. Primary target wetland functions include wildlife habitat; sediment / nutrient / toxicant removal; surface water storage; and production export / food chain support.

The project includes a series of five wetland cells supplied primarily by Lower Dry Fork Reservoir via the Camas C Canal with some minimal contributions from precipitation. A general mitigation site layout is provided in **Appendix D**. The objectives of the project include the following:

- Maximize emergent wetland development, associated wildlife habitat, nutrient / toxicant removal functions, surface water storage functions, and production export / food chain support on the site by constructing several large interconnected cells that flood to a maximum depth of approximately 1 foot.
- Restore sinuosity and connectivity to ditched and straightened segments of Dry Fork Creek, including reactivation of a cutoff meander loop.
- Provide a riparian scrub-shrub component by revegetating restored Dry Fork Creek channel margins, and inter-cell watercourses, with riparian shrub species.
- Enhance and protect uplands and existing wetlands along Dry Fork Creek by removing grazing from the site, planting upland shrubs, prohibiting development, and fencing.
- Minimize operational maintenance and promote a self-sustaining system by placing permanent spillways at all cell outlets to control water elevations.

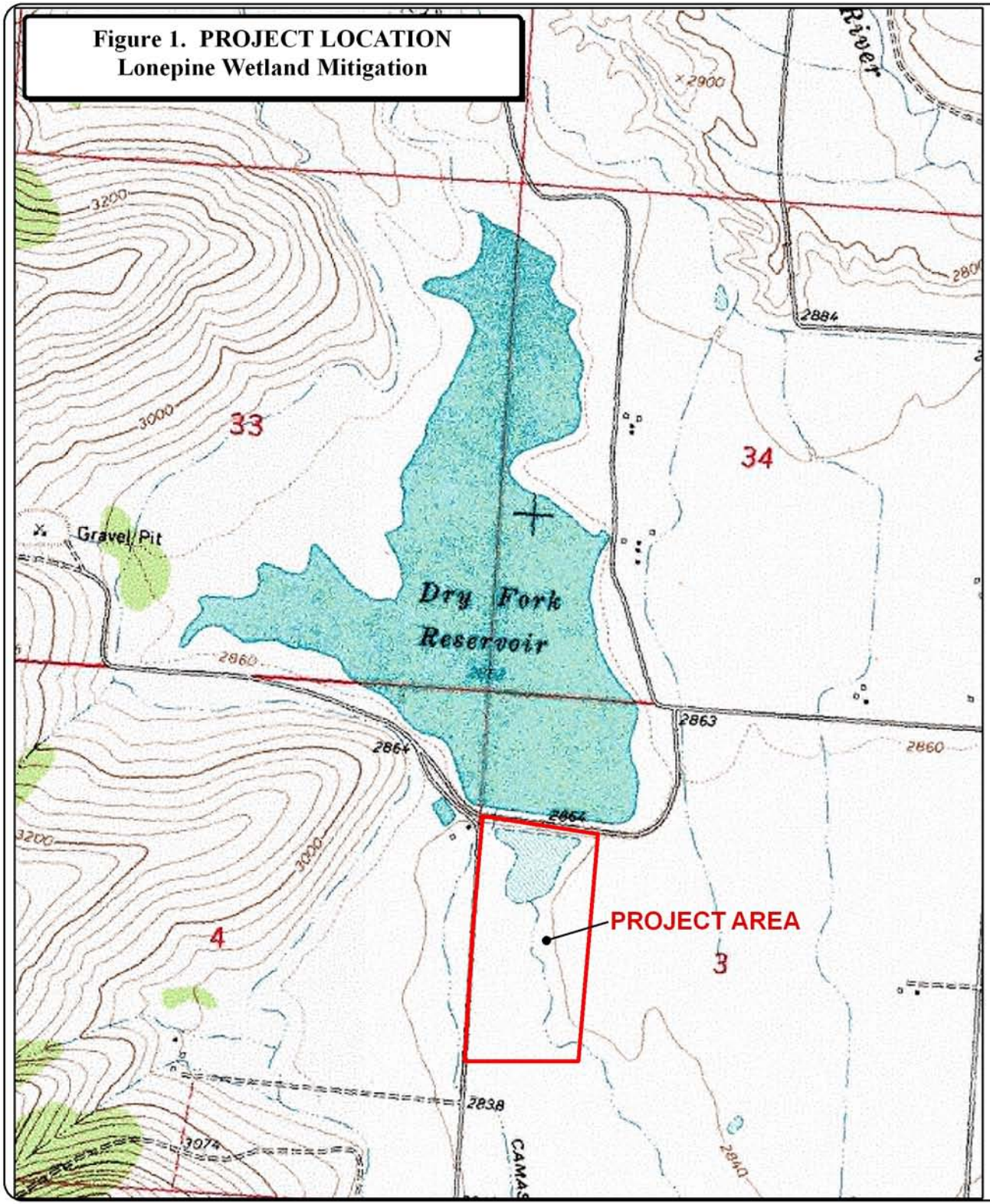
Crediting aspects of this project were coordinated with the COE and the CSKT Shoreline Protection Office (**Table 1**).

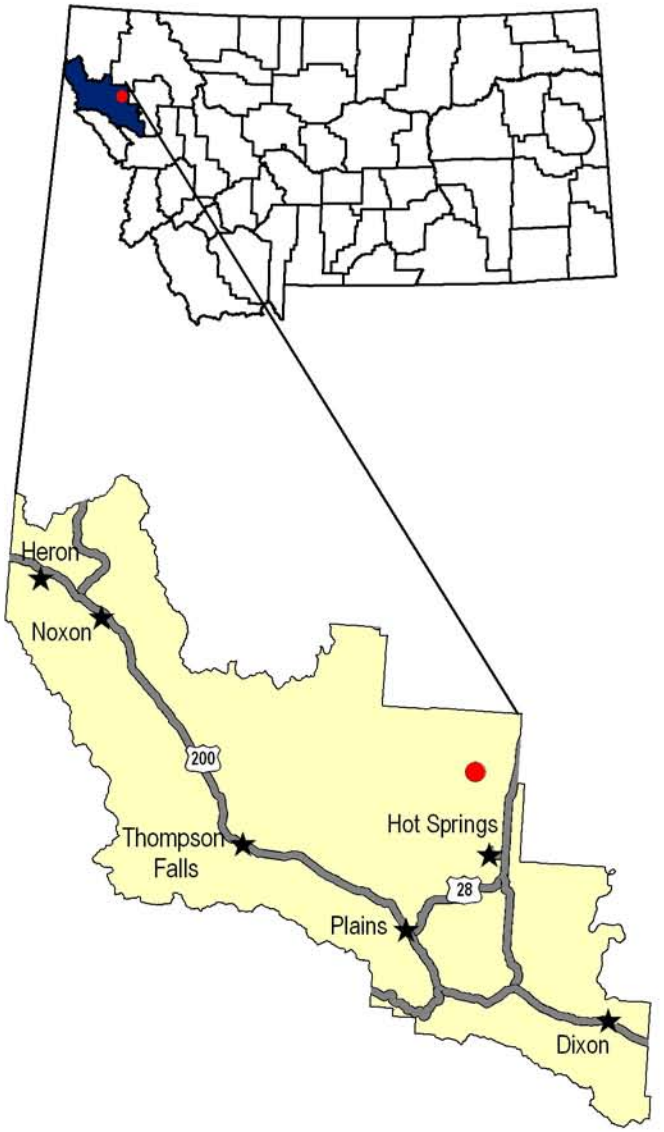
Table 1: ***Final Confederated Salish and Kootenai Tribes (CSKT) and US Army Corps of Engineers (COE) credit ratios for the Lonepine Wetland Mitigation Project.***

PROPOSED MITIGATION FEATURE	TYPE OF MITIGATION USING CSKT DEFINITIONS[1]	TYPE OF MITIGATION USING COE DEFINITIONS[2]	MITIGATION SITE ESTABLISHED PRIOR TO IMPACTS	
			CSKT Credit Ratio Credit Acreage[3]	COE Credit Ratio Credit Acreage[2]
Approximately 21.35 acres (ac) of new emergent wetland / open water at five shallow wetland cells and one excavation area.	Creation	Creation	1:3.04 ratio 7.02 acres credit	1:1 ratio 21.35 acres credit (OW credit limited to amount equaling 10% of total wetland area)
Approximately 0.30 ac at Dry Fork Creek stream channel and wetland/riparian fringe re-constructed through upland between the Camas C Canal and Wetland 1, and between Wetland 1 (ditched Dry Fork Creek segment) and Wetland 3 (historic meander channel).	Primary Restoration	Re-establishment	1:1.54 ratio 0.19 acre credit	1:1 ratio 0.30 acre credit
Approximately 0.04 ac of re-constructed Dry Fork Creek channel within Wetland 1 (ditched Dry Fork Creek segment).	Primary Restoration	Rehabilitation	1:1.54 ratio 0.03 acre credit	1:1.5 ratio 0.03 acre credit
Dry Fork Creek channel restoration plus restoration of hydrologic function at 0.26 ac Wetland 3 (historic meander channel).	Primary Restoration	Rehabilitation	1:1.54 ratio 0.17 acre credit	1:1.5 ratio 0.17 acre credit
Protection of and grazing removal at approximately 6.64 wetland acres that will remain on the project site following Lower Dry Fork Dam rehabilitation.	Secondary Restoration	Minor Rehabilitation	1:1.54 ratio 4.31 acres credit	1:5 ratio 1.33 acres credit
Approximately 0.43 ac of new riparian swales between wetland cells.	No Definition	No Definition	1:3.04 ratio 0.14 acre credit	1:4 ratio 0.11 acre credit
Approximately 4.45 ac of upland buffer between Wetland 1 and the farmed slope to the east of the project.	None (no planting proposed, thus, no CSKT credit)	Upland Buffer	None (no planting proposed, thus, no CSKT credit)	1:4 ratio on maximum 50-foot width (2.23 acres) 0.56 acre credit
		TOTAL	**11.86 acres**	**23.85 acres**

[1] From Price (1999), *Wetland Mitigation Guidelines for the Flathead Reservation.*
[2] From COE (2003), *Mitigation Ratios, Montana Regulatory Program*.
[3] From Price (2003), *Compensatory Wetland Crediting Example* and Price (1999).

Figure 1. PROJECT LOCATION
Lonepine Wetland Mitigation





Project No: 0B4308801 Task: 02.04.02
Date: June 2008
Location:
Project Manager: J. Berglund
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The following performance standards are reflective of the primary project goals and objectives and were developed in conjunction with and approved by the Corps of Engineers:

Wetland Hydrology and Open Water Success will be achieved where wetland hydrology is present as per the technical guidelines in the 1987 COE Wetland Delineation Manual. Hydrologic success will also require that constructed channels be stable in wetlands that include channel reconstruction as described below.

Hydric Soil Success will be achieved where hydric soil conditions are present (per the most recent NRCS definitions for hydric soil) or appear to be forming, the soil is sufficiently stable to prevent erosion, and the soil is able to support plant cover. Since typical hydric soil indicators may require long periods to form, a lack of distinctive hydric soil features will not be considered a failure if hydrologic and vegetation success is achieved. Soils receiving gypsum treatment will be sampled yearly during drawdown in order to monitor the effectiveness of the experimental treatment in reducing baseline slickspot conditions (pH of 10.6; 357 meq/l sodium; SAR of 500; electrical conductivity of 23.1 mmhos/cm).

Hydrophytic Vegetation Success will be achieved in areas not receiving gypsum treatment where combined aerial cover of facultative or wetter species is $\geq$ 80% and noxious weeds do not exceed 10% cover. Hydrophytic vegetation success will be achieved in areas receiving gypsum treatment where combined aerial cover of facultative or wetter species is $\geq$ 50% and noxious weeds do not exceed 10% cover. Cattail basal coverage is not to exceed 50% in any cell except Cell #2.

Wetlands will be delineated as per the technical guidelines in the 1987 COE Wetland Delineation Manual. The following concept of "dominance", as defined in the 1987 Army COE wetland delineation manual, will be employed during future routine wetland determinations in created / restored wetlands: "*Subjectively determine the dominant species by estimating those having the largest relative basal area (woody overstory), greatest height (woody understory), greatest percentage of aerial cover (herbaceous understory), and/or greatest number of stems (woody vines).*"

Stream Channel Restoration Success will be evaluated in terms of revegetation success and bank stability success. Revegetation will be considered successful if noxious weeds do not exceed 10% cover, cuttings exhibit 50% survival after 3 years, and planted shrubs exhibit 75% survival after 5 years (or planted shrub densities are increased to accomplish the same projected net survival of individuals at a 50% survival rate over 5 years).

Bank stability success will be evaluated by identifying a reference reach along an adjacent, undisturbed portion of the channel below the restoration. The percentage of eroding channel and bed elevation will be evaluated for both restoration and reference channels. For this purpose "eroding bank" will be defined as any bank greater than two feet in length that is more than 50% bare mineral soil and has no roots, surface vegetation, or other stabilizing structure (e.g. rock, woody debris) to inhibit erosion. Bank stability success will be achieved when, following restoration, less than 25% of banks are unstable or the percent stability of the restored channel is within 5% of the reference reach. Vertical stability success will be achieved when, following

restoration, vertical movement of the new channel is no greater than 10% of vertical movement at the reference reach.

Intercell Swale Success will be evaluated in terms of revegetation success if wetlands do not develop. Revegetation will be considered successful if noxious weeds do not exceed 10% cover and planted shrubs exceed 75% survival after 5 years. If wetlands develop, success will be evaluated in terms of wetland hydrology, hydric soil, and hydrophytic vegetation success described above.

Secondary Restoration / Minor Rehabilitation Success will be achieved when the site is fenced and grazing is removed from existing wetlands.

Upland Buffer Success will be achieved when the site is fenced and noxious weeds do not exceed 10% cover within the buffer. Any area within the creditable buffer area disturbed by project construction must have at least 50% aerial cover of non-weed species by the end of the monitoring period.

2.0 METHODS

2.1 Monitoring Dates and Activities

A reconnaissance site visit was performed with MDT on June 30, 2008 and the site was monitored on July 25, 2008 (mid-season visit). The mid-season visit was conducted to document vegetation, soil, and hydrologic conditions used to map wetlands. The majority of the information contained on the Wetland Mitigation Site Monitoring Form (**Appendix B**) was collected at this time. Activities and information conducted/collected included: wetland delineation; wetland/open water boundary mapping; vegetation community mapping; vegetation transects; soils data; hydrology data; bird and general wildlife use; photograph points; macroinvertebrate sampling; functional assessment; and survival of planted woody vegetation.

2.2 Hydrology

Hydrologic indicators were evaluated during the mid-season visit. Wetland hydrology indicators were recorded using procedures outlined in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) and hydrology data were recorded on COE Routine Wetland Delineation Data Forms (**Appendix B**). If located within 18 inches of the ground surface (soil pit depth for purposes of delineation), groundwater depths were documented on the routine wetland delineation data form at each data point.

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

2.3 Vegetation

General dominant species-based vegetation community types were delineated on an aerial photograph during the July visit. Standardized community mapping was not employed as many of these systems are geared towards climax vegetation and may not reflect yearly changes. Estimated percent cover of the dominant species in each community type was listed on the site monitoring form (**Appendix B**).

Two 10-foot wide belt transects were established **(Figure 2** in **Appendix A)**. Within the transect, percent cover was estimated for each vegetative species for each vegetation community encountered within the "belt" using the following values: + (<1%); 1 (1-5%); 2 (6-10%); 3 (11-20%); 4 (21-50%); and 5 (>50%).

The purpose of the transects is to evaluate changes over time, especially the establishment and increase of hydrophytic vegetation. The transect locations were marked on the aerial photo and all data recorded on the mitigation site monitoring form. Transect endpoint locations were recorded with a global positioning system (GPS) unit. Photos of the transects were taken from both ends during the mid-season visit. A comprehensive plant species list for the site was compiled.

Several woody species were planted at this mitigation site. Observers recorded the number of live individuals for each species observed.

2.4 Soils

Soils were evaluated during the mid-season visit according to hydric soils determination procedures outlined in the COE 1987 Wetland Delineation Manual. Soil data were recorded for each wetland determination point on the COE Routine Wetland Delineation Data Form (**Appendix B**). Two soil samples were taken and analyzed for pH, electrical conductivity, calcium, magnesium, sodium and sodium absorption ration (SAR). Soil sampling locations were mapped using a global positioning system (GPS).

2.5 Wetland Delineation

A wetland delineation of the mitigation site was conducted during the 2008 mid-season visit according to the 1987 COE of Engineers 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 this site in 2008. Wetland and upland areas within the monitoring area were investigated for the presence of wetland hydrology, hydrophytic vegetation and hydric soils. The indicator status of vegetation was derived from the *National List of Plant Species that occur in Wetlands: Northwest (Region 9)* (Reed 1988).

The information was recorded on COE Routine Wetland Delineation Data Forms (**Appendix B**). The wetland/upland boundary was delineated with a resource grade GPS. The wetland/upland boundary in combination with the wetland/open water habitat boundary was used to calculate the wetland area that has developed within the monitoring area.

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 visit. Indirect use indicators, including tracks; scat; burrows; eggshells; skins; bones; etc., were also recorded. Observations were recorded as the observer traversed the site while conducting other required activities. Direct sampling methods, such as snap traps, live traps, and pitfall traps, were not implemented. A comprehensive list of observed species was compiled.

2.7 Birds

Bird observations were recorded during the visit. 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. Observations were categorized by species, activity code, and general habitat association (**Appendix B**).

2.8 Macroinvertebrates

Two macroinvertebrate sample were collected during the mid-season visit in Cells 2 and 4. The sample was collected and preserved according to the Macroinvertebrate Sampling Protocol (**Appendix F**). Laboratory analysis of the sample and reporting were conducted by Rhithron Associates, Inc. in Missoula, Montana (**Appendix F**). The sampling locations were mapped using a GPS.

2.9 Functional Assessment

Pre-construction wetland functional conditions were assessed in 2003 using the 1999 MDT Montana Wetland Assessment Method (MWAM). Functional assessment forms were completed in 2008 for the site within the monitoring area using the 2008 MDT Montana Wetland Assessment Method (Berglund and McEldowney 2008) (**Appendix B**). Field data necessary for this assessment were collected during the mid-season site visit. Direct comparisons cannot be made between the two functional assessment methods, but general trends in wetland functional development can still be determined.

2.10 Photographs

Photographs were taken during the mid-season visit showing the current land use surrounding the site, the upland buffer, the monitored area, macroinvertebrate sampling locations, and the vegetation transects (**Appendix C**). Each photograph point location was recorded with a GPS. All photographs were taken using a digital camera, with no optical zoom used. A description

and compass bearing for each photograph was recorded on the wetland monitoring form. All figures in **Appendix A** are based on a July 7, 2008 aerial photograph.

2.11 GPS Data

During the 2008 monitoring season, data were collected with a resource grade Magellan Mobile Mapper unit at the vegetation transect beginning and ending locations, at all photograph locations, wetland sample points, and at aerial photograph reference points. Procedures used for GPS mapping and aerial photography referencing are included in **Appendix E.**

2.12 Maintenance Needs

Where encountered, current or potential future problems were documented and conveyed to MDT.

3.0 RESULTS

3.1 Hydrology

Water for the project is supplied primarily by Lower Dry Fork Reservoir via the Camas C Canal. Dry Fork Creek and the Camas C Canal were flowing during the July monitoring visit.

According to the delineation manual, areas inundated or saturated to the surface for more than 12.5 percent of the growing season are wetlands, while areas inundated/saturated for 5 to 12.5 percent of the growing season are sometimes wetlands. Areas inundated/saturated for less than five percent of the growing season are non-wetlands. Based on the available temperature data between 1918 and 1969 for Lonepine, there is a 50 percent probability that approximately 146 consecutive days will occur at above 28.5 degrees F (WRCC 2008). Consequently, a 146-day growing season is assumed for the project area. Five to 12.5 percent of this growing season equates to approximately seven to 18 days.

Inundation was present to various extents at all wetland cells within the monitoring area during the mid-season visit, and appeared to have been present at virtually all cells well in excess of the minimum seven days required to achieve wetland hydrology. No “designed” open water areas were mapped on the site since the design is intended to produce shallow, emergent wetland types, although inundated areas with only traces of vegetation were present during this initial monitoring episode. Water depths ranged from 0 to roughly 1.5 feet, with an average depth of approximately 0.75 feet. No groundwater monitoring wells are present. All constructed streambanks were stable, with no eroding banks observed.

No current precipitation data was available for the Lonepine or Hot Springs weather stations (WRCC 2008).

3.2 Vegetation

Vegetation species identified on the site are presented in **Table 2** and on the **Monitoring Form** (**Appendix B**). Construction of the site was initially completed in June 2008 and much of the site had not yet revegetated (nor was this expected) by the July monitoring visit. A total of eight community types were documented at the site. One of these community types is a vegetated wetland community type and four are inundated transitional types that are expected to develop into wetland over time.

The wetland and transitional community types that were identified and mapped are: *Typha/Scirpu/Carex; Inundated Agropyron; Inundated and Unvegetated; Inundated Agropron/Scirpus*; and *Inundated Agropyron/Hordeum* (**Figure 3** in **Appendix A**). Dominant species within each of these communities are listed on the **Monitoring Form** (**Appendix B**).

Planned wetland creation areas (cells) were just becoming established in July of 2008 and many were dominated by what was conservatively identified as thickspike wheatgrass (*Agropyron dasystachyum*). However, slender wheatgrass (*Agropyon trachycaulum)* was also likely present. Due to the difficulty in distinguishing between these species under wet conditions, samples will be submitted to a herbarium in 2009 for a conclusive determination. According to MDT, streambank wheatgrass was substituted for the prescribed thickspike wheatgrass in the upland seed mix because the latter species was unavailable. Slender wheatgrass, Nebraska sedge (*Carex nebrascensis*), and American sloughgrass (*Beckmannia syzigachne*) were substituted for alkaligrass (*Puccinellia airoides*), seaside arrowgrass (*Triglochin maritimum*), and Baltic rush (*Juncus balticus*) in the wetland seed mix. Nebraska sedge was substituted for Baltic rush in the streambank seed mix.

The upland communities differed from transitional wetland communities by having a distinctly different water regime and a prevalence of facultative, facultative-upland, and upland plant species. The upland areas are not expected to develop into wetlands.

Vegetation community data were recorded from two 10-foot wide belt transects (**Monitoring Forms** in **Appendix B**) and are summarized in **Tables 3** and **4**. In this first year of monitoring, vegetation was in a state of transition. If a similar hydrologic regime is perpetuated in future years as was observed on the site in 2008, it is expected that the total number of hydrophytic plant species will increase, number of upland species will decrease, and total vegetative cover will increase. **Charts 1-4** show the results of the transect monitoring graphically.

Prescribed species to be installed as plugs in the cells were substituted during construction. MDT approved substituting 10-cubic inch Baltic rush for 10 and 40 cubic inc Olney's bulrush (*Scirpus americanus*); the rush is unlikely to survive the designed inundation period. Due to the saline soil conditions, the beaked sedge (*Carex utriculata*) that was substituted for the Nebraska sedge (without MDT approval) may also not survive. Further, many plug installations were apparently performed incompletely, with portions of some plugs protruding above the ground surface. Conversely, the hard-stem bulrush (*Scirpus acutus*) root mats that were salvaged and placed within Cell # 2 appeared to be establishing.

Table 2: ***2008 Lonepine Wetland Mitigation Site vegetation species list.***

Scientific Name	1988 Region 9 (Northwest) Wetland Indicator[1]	Scientific Name	1988 Region 9 (Northwest) Wetland Indicator[1]
Achillea millifolium	FACU	*Hordeum jubatum*	FAC+
Agropyron cristatum	---	*Juncus balticus*	OBL
Agropyron dasystachyum	FACU-	*Kochia scoparia*	FAC
Agropyron dasystachyum	FACU-	*Kochia scoparia*	FAC
Agropyron dasystachyum	FACU-	*Lactuca serriola*	FAC-
Agropyron dasystachyum	FACU-	*Lepidium densiflorum*	FAC-
Agropyron repens	FACU	*Lepidium perfoliatum*	FACU+
Agrostis alba	FACW	*Malva neglecta*	---
Alopecurus arundinaceus	NI	*Matricaria perforata*	NI
Amelanchier alnifolia	FACU	*Medicago* spp.	---
Anthemis cotula	FACU	*Melilotus alba*	FACU
Artemisia frigida	---	*Melilotus officinalis*	FACU
Bassia hyssopifolia	FACW	*Phalaris arundinacea*	FACW
Bromus inermis	---	*Phleum pretense*	FACU
Bromus tectorum	---	*Poa pratensis*	FACU+
Capsella bursa-pastoris	FAC-	*Polygonum amphibium*	OBL
Cardaria chalapensis	---	*Polygonum persicaria* / *P. lapathifolium*	FACW / FACW+
Cardaria draba	---	*Polygonum* spp.	---
Carex lanuginosa	OBL	*Populus balsamifera* syn. *Populus trichocarpa*	FAC
Carex praegracilis	FACW	*Populus deltoides*	FAC
Carex utricularia	OBL	*Potentilla fruticosa*	FAC-
Carex vulpinoidea	OBL	*Puccinellia cusickii*	---
Centaurea maculosa	---	*Ribes* spp.	---
Chenopodium album	FAC	*Rosa* spp.	FACU
Chrysothamnus nauseosus	---	*Rumex crispus*	FACW
Cichorium intybus	---	*Salix alba*	FACW
Cirsium arvense	FACU+	*Salix exigua*	OBL
Cirsium vulgare	FACU	*Salix* spp.	---
Crataegus columbiana	---	*Sarcobatus vermiculatus*	FACU+
Deschampsia cespitosa	FACW	*Scirpus acutus*	OBL
Descurainia sophia	---	*Scirpus americanus*	OBL
Distichlis spicata	FAC+	*Scirpus microcarpus*	OBL
Eleochorus palustris	OBL	*Sisymbrium altissimum*	FACU-
Elymus varnensis (syn. *Agropyron elongatum*)	---	*Solidago* spp.	---
Festuca spp.	---	*Sparganium emersum*	OBL
Glyceria maxima	OBL	*Symphoricarpos* spp.	FACU
Glycyrrhiza lepidota	FAC+	*Thlaspi arvense*	NI
Grindelia squarrosa	FACU	*Tragopogon dubois*	---
Halogeton glomeratus	---	*Typha latifolia*	OBL

[1] from Reed (1988):
OBL = Obligate Wetland – almost always occur in wetlands (probability >99%).
FACW = Facultative Wetland – usually occur in wetlands (probability 67-99%), but also occur in uplands.
FAC = Facultative – equally likely to occur in wetlands or uplands.
FACU = Facultative Upland – usually occur in uplands (probability 67-99%), but also occur in wetlands.
UPL = Obligate Upland - almost always occur in uplands (probability >99%) in the region specified.
NI = No Indicator - can occur in wetlands, but indicator status undetermined
--- = unlisted

Table 3: ***2008 vegetation Transect 1 data summary.***

Monitoring Year	2008
Transect Length (feet)	150
# Vegetation Community Transitions along Transect	1
# Vegetation Communities along Transect	0
# Hydrophytic Vegetation Communities along Transect	0
Total Vegetative Species	2
Total Hydrophytic Species	2
Total Upland Species	0
Estimated % Total Vegetative Cover	1
% Transect Length Comprised of Hydrophytic Vegetation Communities	0
% Transect Length Comprised of Upland Vegetation Communities	0
% Transect Length Comprised of Unvegetated Open Water	100
% Transect Length Comprised of Bare Substrate	0

Table 4: ***2008 vegetation Transect 2 data summary.***

Monitoring Year	2008
Transect Length (feet)	300
# Vegetation Community Transitions along Transect	2
# Vegetation Communities along Transect	3
# Hydrophytic Vegetation Communities along Transect	0
Total Vegetative Species	3
Total Hydrophytic Species	2
Total Upland Species	1
Estimated % Total Vegetative Cover	9
% Transect Length Comprised of Hydrophytic Vegetation Communities	0
% Transect Length Comprised of Upland Vegetation Communities	34
% Transect Length Comprised of Unvegetated Open Water	66
% Transect Length Comprised of Bare Substrate	0

Table 5: ***2008 observed survival of planted woody species at the Lonepine Wetland Mitigation Site.***

PLANT SPECIES	NUMBER ALIVE
Amelanchier alnifolia	26
Chrysothamnus nauseosus	15
Populus tricocarpa	20
Potentilla fruticosa	27
Ribes spp.	48
Salix spp. - sprigs	218
Salix spp. - containerized	112
Shrub – species unknown	18
TOTAL	**484**

Chart 1: ***Transect 1 map showing vegetation types from the start to end of transect in 2008.***

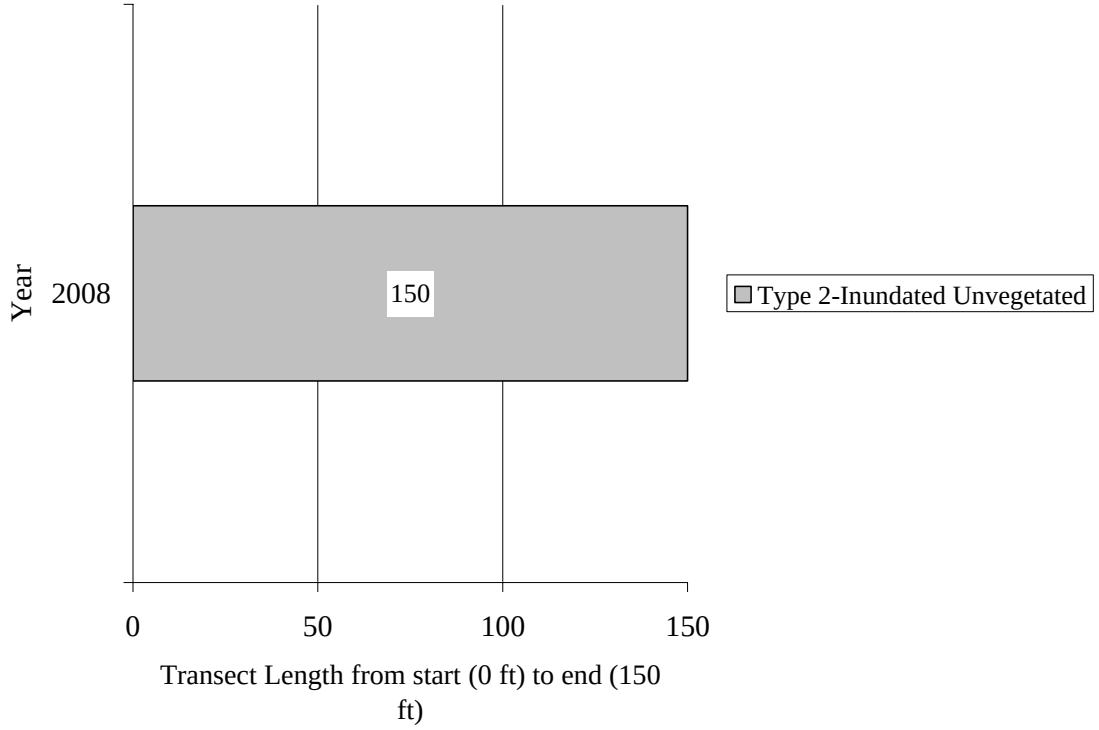


Chart 2: ***Length of vegetation communities within Transect 1 for 2008.***

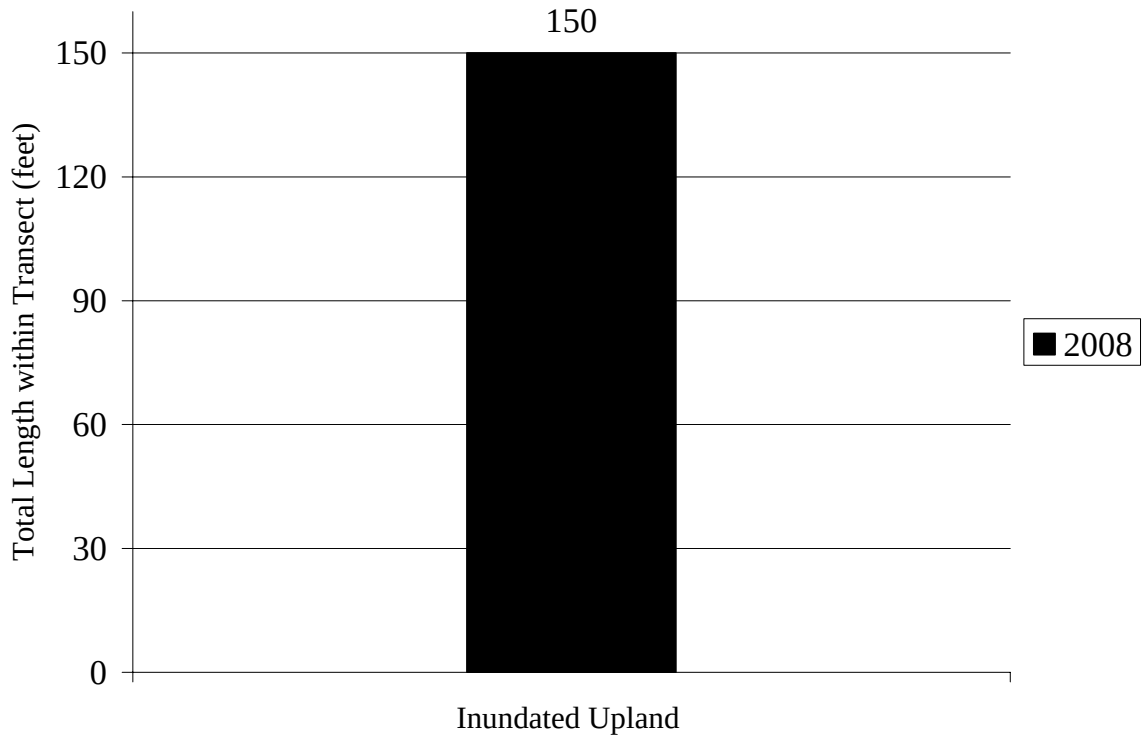


Chart 3: ***Transect 2 map showing vegetation types from the start to end of transect in 2008.***

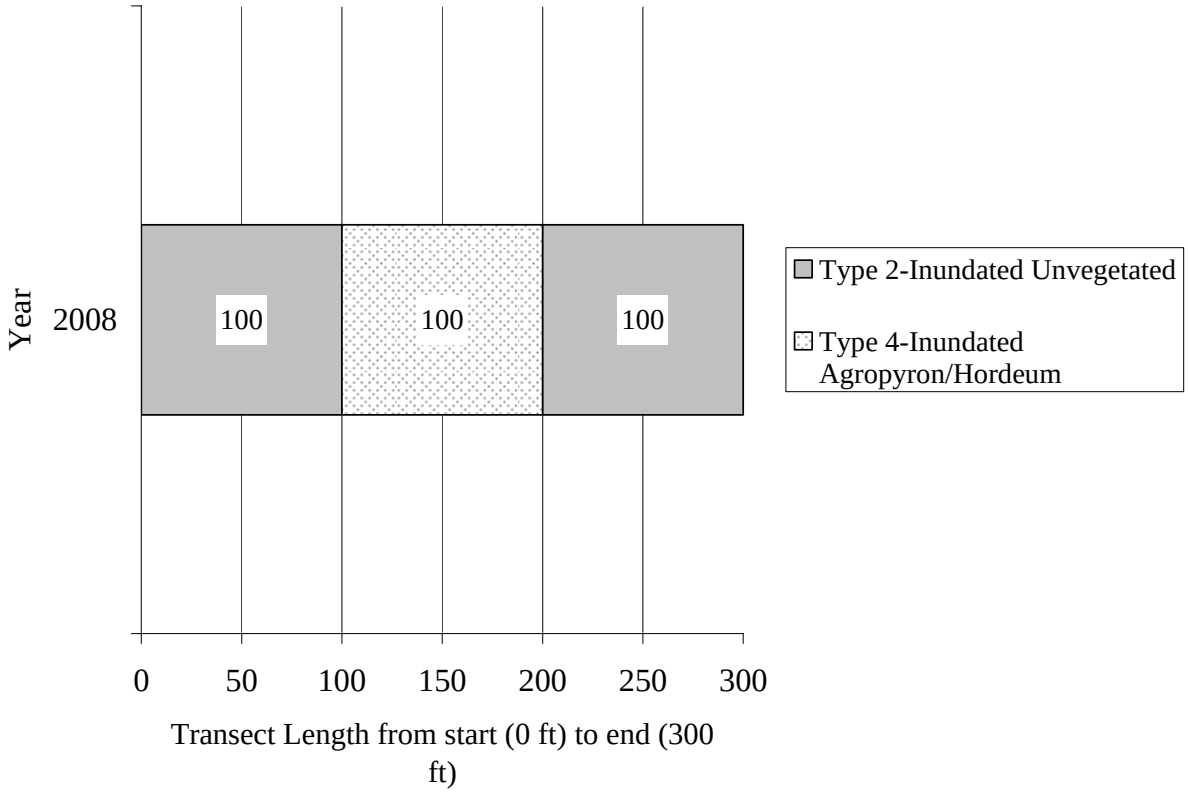
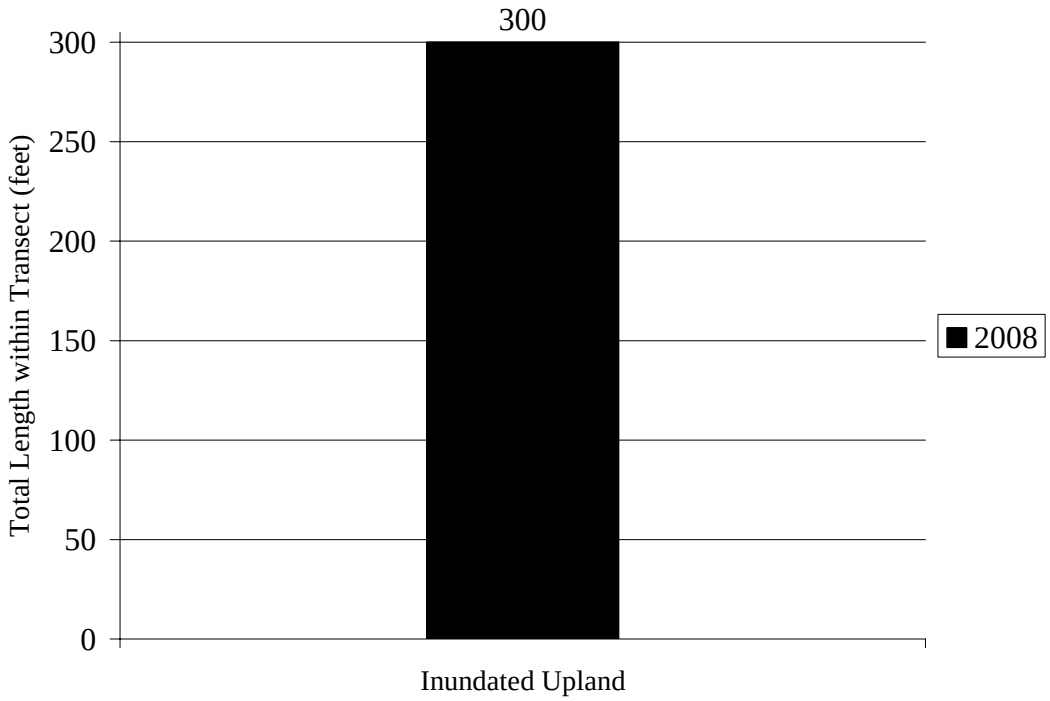


Chart 4: ***Length of vegetation communities within Transect 2 for 2008.***



The vegetation plan for this site called for 1,080 woody plantings (shrubs) including 500 willow sprigs (cuttings). A total of 484 woody plantings were identified onsite, mainly willow. Observed survival of planted woody vegetation species was recorded in detail on the **Monitoring Form** (**Appendix B**) and summarized (**Table 5**). Root systems were exposed on many of the planted containerized shrubs, apparently due to soil displacement during watering, and likely resulted in the succumbing of many plants. Subsequent to monitoring , approximately 270 dead willow cuttings were replaced along Dry Fork Creek in November 2008.

3.3 Soils

Since the site was excavated and graded in spring/early summer 2008, soils were highly disturbed throughout the site. Soils sampled in wetland areas were inundated and had textures of silty clay loam and clay loam (**COE Forms** in **Appendix B**). The most common matrix color was 10 YR 4/2 with no evidence of mottles (**Figure 3** in **Appendix A**) . Two soil samples were collected and analyzed for pH, electrical conductivity (EC), calcium, magnesium, sodium, and sodium absorption ration (SAR) (**Table 6; Appendix B**). Sample S1 was taken from Cell 2 and sample S2 from Cell 4. All parameters indicate an abundance of salts in both samples; however, levels are far lower than those sampled in what is now Cell 2 in 2003, prior to soil treatment enacted to reduce salinity. Both samples have EC above 4 which indicates a high sodium content; this could impede plant growth for species sensitive to this condition.

Table 6: ***2003 and 2008 soil sampling results from the Lonepine Wetland Mitigation Site.***

Year and Soil Sample	pH (s.u.)	Electrical Conductivity (mmhos/cm)	Calcium (meq/L)	Magnesium (meq/L)	Sodium (meq/L)	SAR (unitless)
2003 Baseline-Cell 2	10.6	23.1	0.8	0.22	357	500
2008 SS-1	7.6	4.87	25.5	14.4	28.3	6.34
2008 SS-2	7.7	5.24	26.9	10.5	36.5	8.43

3.4 Wetland Delineation

Wetland boundaries were delineated onto the 2008 aerial photographs (**Figure 3** in **Appendix A**). Soils, vegetation, and hydrology were discussed in preceding sections and on the COE Forms (**Appendix B**). In 2008, approximately 7.13 acres of essentially pre-existing wetlands were delineated, with an additional 21.58 acres of transitional or inundated communities/areas that had not yet developed wetland characteristics (**Figure 3** in **Appendix A**). These transitional areas were inundated for the first time in June 2008, and are expected to develop into emergent wetlands with continued, consistent inundation. Interim credits that have developed to date are discussed in *Section 3.10.*

3.5 Wildlife

Though only constructed in 2008, the developing wetland complex has created habitat for several wildlife species. Two mammal and eight bird species were observed at the site during the 2008 monitoring visit (**Table 7**). The habitat value of the site is expected to increase as vegetation continues to establish and diversify.

Table 7: ***Fish and wildlife species observed at the Lonepine Wetland Mitigation Site in 2008.***

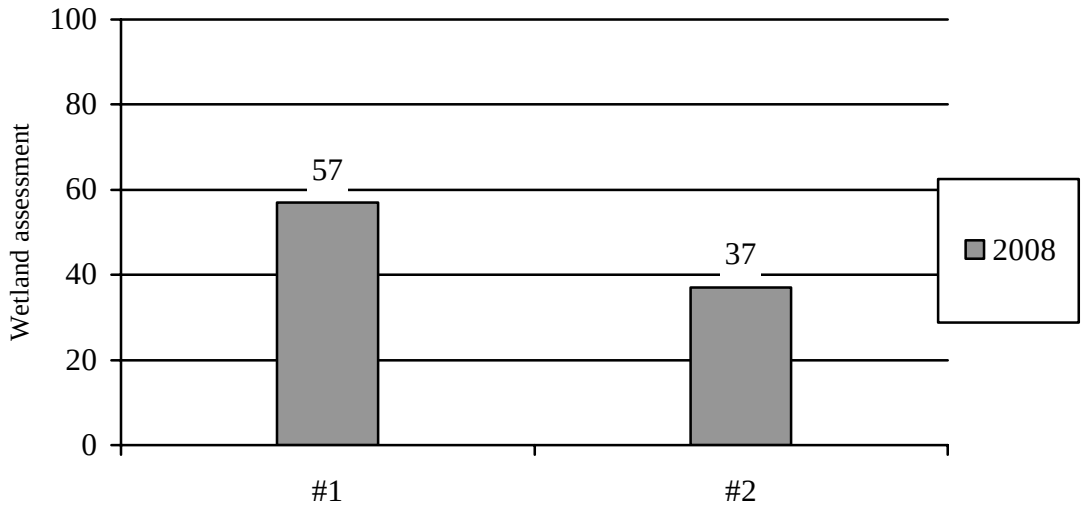
AMPHIBIAN None	
REPTILE None	
BIRD American White Pelican (*Pelecanus erythrorhynchos*) Bald Eagle (*Haliaeetus leucocephalus)* Brown-headed Cowbird (*Molothrus ater*) Canada Goose (*Branta canadensis*)	 Killdeer (*Charadrius vociferous*) Long-billed Curlew (*Numenius americanus*) Mallard (*Anas platyrhynchos*) Red-winged Blackbird (*Agelaius phoeniceus*)
MAMMAL Coyote (*Canis latrans*) Deer (*Odocoileus* sp.)	

3.6 Macroinvertebrates

Macroinvertebrates were sampled at Cell 2 and Cell 4 (**Figure 2** in **Appendix A**). The results are typical of a newly constructed mitigation site (**Appendix F**). The macroinvertebrate results were summarized by Rhithron Associates, Inc in the italicized section and in **Chart 5** (Bollman 2008).

> **Lonepine Sample #1 (Cell 2).** *The diversity of the invertebrate assemblage was moderately high at this site. Invertebrates were also abundant. Two mayfly taxa (*Callibaetis *sp. and* Caenis *sp.) were among the animals present in the sample. These findings suggest that aquatic habitats were complex; macrophytes probably contributed to habitat diversity. Although the thermal preference (18.1ºC) of the assemblage suggested only moderately warm water temperatures, hemoglobin-bearing midges (especially* Apedilum *sp. and* Cladopelma *sp.) were very abundant, implying hypoxic sediments. The fauna was functionally complex and included ample gatherers and predators. There was also a significant number of filterers, mostly the midge* Tanytarsus *sp., which suggests the possibility of nutrient enrichment.*
>
> **Lonepine Sample #2 (Cell 4).** *Only 7 individuals in 4 distinct taxa were present in the sample collected at this site. This extremely low abundance and diversity suggests poor instream habitats, frequent and prolonged drying, or very poor water quality. Thermal preference could not be calculated, and habitat inferences could not be drawn, due to the depauperate fauna.*

Chart 5: ***Macroinvertebrate bioassessment scores using the wetland index for the Lonepine Wetland Mitigation Site.***



3.7 Functional Assessment

Pre-construction (2003) conditions were assessed using the 1999 MDT Montana Wetland Assessment Method (MWAM) while post-construction conditions were assessed using the 2008 MDT MWAM (**Functional Assessment Forms** in **Appendix B**). Despite this, general trends in wetland functional development can still be determined.

The 2003 and 2008 functional assessment results were summarized (**Table 8**). The site was separated into two assessment areas (AAs): Dry Fork Creek and inter-connected Cells 1-5. Although very small and technically unmapped, Cells 1-5 contained a trace of wetland that allowed all inundated areas to be considered in the functional assessment. Both AAs currently rate as Category III sites, and although differing functional assessment methods were applied pre- and post-project, the site as a whole has gained aquatic habitat acreage and over 100 functional units. Prominent functions include general wildlife habitat, surface water storage, sediment/nutrient/toxicant removal, and production export / food chain support.

3.8 Photographs

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

Table 8: ***Summary of pre-project and 2008 wetland function/value ratings and functional points at the Lonepine Wetland Mitigation Site.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	Pre-Project Dry Fork Ck 2003[1]	Pre-Project Isolated Wetland Patches 2003[1]	Post-Project Dry Fork Ck 2008[2]	Post-Project Cells 1-5 2008[2]
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.0)	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Low (0.1)	Low (0.1)	Mod (0.6)	Mod (0.6)
General Wildlife Habitat	Low (0.3)	Low (0.1)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	Mod (0.4)	NA	Mod (0.4)	NA
Flood Attenuation	Mod (0.5)	NA	Mod (0.6)	NA
Short and Long Term Surface Water Storage	Mod (0.6)	Low (0.3)	Mod (0.6)	High (0.9)
Sediment/Nutrient/Toxicant Removal	Mod (0.7)	NA	Mod (0.7)	Mod 0.7
Sediment/Shoreline Stabilization	Mod (0.6)	NA	Mod (0.6)	Low (0.2)
Production Export/ Food Chain Support	High (0.8)	Low (0.1)	High (0.8)	Mod (0.5)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	Mod (0.7)	Mod (0.4)
Uniqueness	Low (0.2)	Low (0.2)	Mod (0.4)	Mod (0.4)
Recreation/Education Potential	Low (0.1)	Low (0.1)	NA	NA
Actual Points / Possible Points	**5.0 / 12**	**1.9 / 8**	**6.1 / 11**	**4.4 / 9**
% of Possible Score Achieved	**47%**	**24%**	**56%**	**49%**
Overall Category	**III**	**IV**	**III**	**III**
Acreage of Assessed Aquatic Habitats within Easement (ac)	**6.87**[3]	**0.31**[3]	**7.13**	**21.58**
Functional Units (acreage x actual points) (fu)	**34.35**	**0.59**	**43.49**	**94.95**
Net Acreage Gain (ac)	NA		**21.53**	
Net Functional Unit Gain (fu)	NA		**103.50**	

[1] Assessed using the 1999 MDT Montana Wetland Assessment Method (MWAM).
[2] Assessed using the 2008 MDT MWAM. The completed forms are in **Appendix B**.
[3] Outside of the recently expanded Lower Dry Fork Dam footprint.

3.9 Maintenance Needs/Recommendations

Several problems with inlet/outlet structures were identified in June, and were for the most part repaired prior to site monitoring in July. The exception to this was the Cell 5 outlet, which according to MDT has since been repaired. Fencing was not complete and all gates were found open during the July monitoring, leaving the potential for livestock to enter the site. No livestock were present during monitoring. Fencing and gate construction has since been completed, with a fifth smooth wire added to the existing four-strand fence in order to more effectively discourage use of the site by neighboring domestic goats.

Erosion along the eastern edges of all the wetland cells was observed and is minor at this stage of the project, but needs to be monitored in the future, specifically where the berms are relatively narrow between wetland cells. Until vegetation establishes along these edges, this may be a continuing issue. MDT is investigating the possibility salvaging bulrushes from an adjacent wetland near the site and planting the bulrush along the eroding edges of the wetland cells to speed up vegetative growth, damper wave action, and reduce erosion.

In late June, the outlet between Cell # 2 and Cell # 3 became clogged with organic debris (a remnant of the wetland soils salvaging and placement). CSKT sent workers out to clear the debris accumulating at the outlet due to its effect of raising water levels and potentially increasing erosion along the eastern edge of Cell # 2. This may have been a one time occurrence due to the use of salvaged wetland soils and plant materials within Cell # 2. The debris was the relic vegetative matter from the salvaged soils, which was floating through the outlet channel. This issue will continue to be monitored.

Approximately 3.5 acres of bare uplands were re-seeded (drill seeded) during fall 2008, including all haul roads and access points. Cell inlets / outlets were also re-seeded (broadcast seeded). Additionally, approximately 270 dead willow cuttings were replaced along Dry Fork Creek in November 2008.

Noxious weeds are present on the site. Canada thistle occurs mainly in small, scattered patches across the site and should be controlled, especially since there is much bare soil exposed. Whitetop is present in a large patch in the southwest corner of the site and should also be controlled. Kochia is another weedy species occurring on the site, especially on the disturbed upland portions, but is not on the noxious weed list.

3.10 Current Credit Summary

Approximately 7.13 acres of essentially pre-existing wetland were delineated on the site in 2008, with an additional 21.58 acres of transitional, inundated communities / areas that had not for the most part yet developed wetland characteristics. These transitional areas were inundated for the first time in June 2008, and are expected to develop into emergent wetlands with continued, consistent inundation. Similarly, vegetation along the new Dry Fork Creek channel segments is developing and banks are stable.

As construction was essentially completed in June 2008, and monitoring commenced in July 2008, the site has had very little chance to develop. The CSKT and Corps will ultimately determine / authorize credit at the site. However, as shown in **Table 9**, up to 12.26 CSKT and 2.6 Corps interim credit-acres have developed on the site in the absence of full ultimate performance standard application.

The pre-construction project site provided a total of 35 functional units within the monitoring area. As of 2008 the post-project site provides 138 functional units, for a conservative gain of approximately 103 functional units over pre-construction conditions.

Table 9: ***2008 Tribal (CSKT) and Corps of Engineers (COE) maximum interim credits at the Lonepine Wetland Mitigation Site.***

PROPOSED FEATURE	2008 DELINEATED ACRES	CSKT CREDIT RATIO 2008 INTERIM CALCULATED CREDIT	CSKT CREDIT TARGET	COE CREDIT RATIO 2008 INTERIM CALCULATED CREDIT[A]	COE CREDIT TARGET	COMMENTS
Wetland cells and excavation	21.58	1:3.04 credit ratio 7.1 credit ac	7.02 credit ac	1:1 credit ratio (OW limited to 10% of wetlands) 0 credit ac	21.35 credit ac	These aquatic habitats are transitional and developing, but not yet "wetlands". Interim CSKT credit was tentatively assigned, but no Corps credit due to open water limitation.
New Dry Fork channel & wetland fringe	0.3	1:1.54 credit ratio 0.19 credit ac	0.19 credit ac	1:1 credit ratio 0.3 credit ac	0.3 credit ac	Constructed and developing; some shrub replacement implemented in November 2008 subsequent to monitoring.
New Dry Fork Creek channel in pre-existing Wetland 1	0.04	1:1.54 credit ratio 0.03 credit ac	0.03 credit ac	1:1.5 credit ratio 0.03 credit ac	0.03 credit ac	Constructed and developing;.
Dry Fork Creek meander re-activation	0.26	1:1.54 credit ratio 0.17 credit ac	0.17 credit ac	1:1.5 credit ratio 0.17 credit ac	0.17 credit ac	Constructed and developing; some shrub replacement implemented in November 2008 subsequent to monitoring.
Protection / grazing removal at pre-existing wetlands	7.13	1:1.54 credit ratio 4.63 credit ac	4.31 credit ac	1:5 credit ratio 1.43 credit ac	1.33 credit ac	Fencing and grazing exclusion completed.
Riparian swales	0.43	1:3.04 credit ratio 0.14 credit ac	0.14 credit ac	1:4 credit ratio 0.11 credit ac	0.11 credit ac	Constructed and planted; long-term survival of planted shrubs is questionable, but areas may progress to wetlands.
Upland buffer	4.45	0 credit ac (no planting)	0.00 credit ac	1:4 credit ratio (on max. 50-ft width) 0.56 credit ac	1:4 credit ratio on max. 50-ft width (2.23 ac) 0.56 credit ac	Noxious weed cover far less than 10% (few small patches).
TOTAL		**12.26 interim credit ac[a]**	11.86 credit ac	**2.6 credit ac[a]**	23.85 credit ac	Construction completed June 2008; monitoring conducted July 2008 and reflects initial "as-built" conditions.

[a] Maximum credits as of 2008. Final credits are subject to compliance with the performance standards at the end of the monitoring period (see *Section 1.0*).

4.0 REFERENCES

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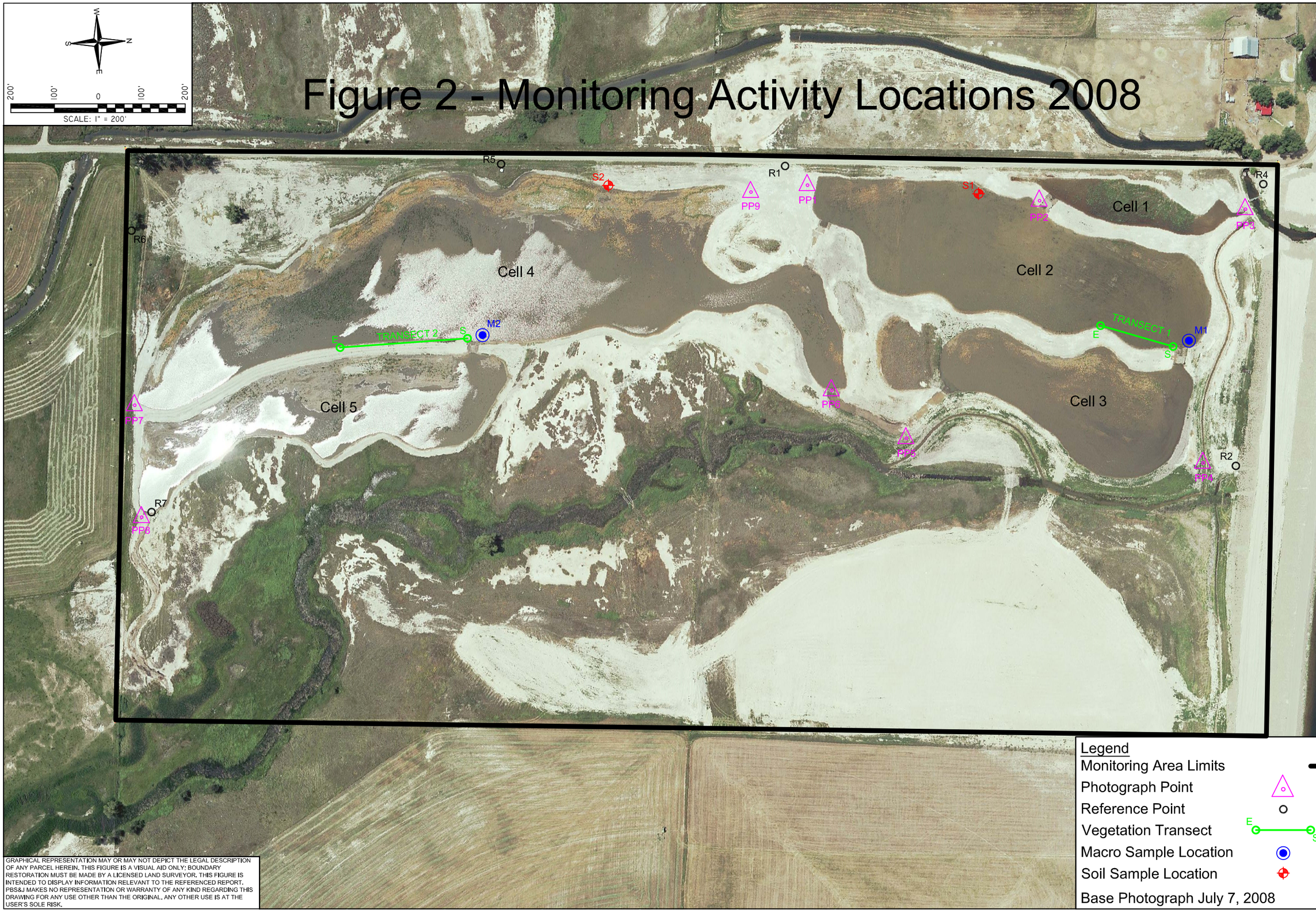
Appendix A

FIGURES 2 & 3

MDT Wetland Mitigation Monitoring
Lonepine Wetland Mitigation Project
Flathead Indian Reservation, Montana

Figure 2 - Monitoring Activity Locations 2008



Legend

- Monitoring Area Limits
- Photograph Point
- Reference Point
- Vegetation Transect
- Macro Sample Location
- 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.

PROJECT NAME
MDT LONEPINE WETLAND MITIGATION

DRAWING TITLE
MONITORING ACTIVITY LOCATIONS 2008

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

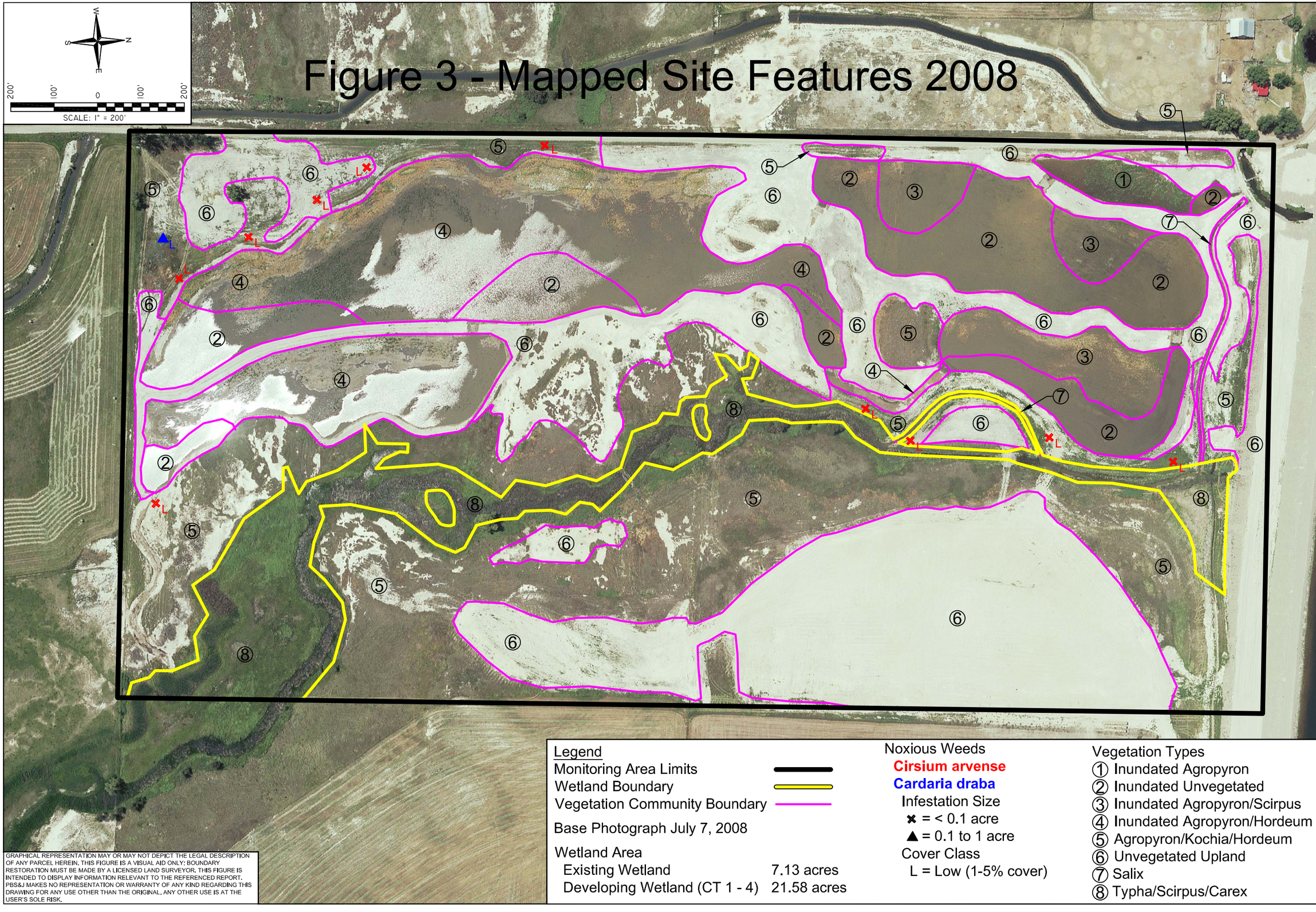
PROJ NO: 0B4308801 02.04
LOCATION: LONEPINE, MT
SCALE: NOTED
FILE NAME: Lonepine2008.dwg

PBSJ
1120 Cedar
Missoula, MT 59802

FIGURE
2 OF .

REV -
Dec/17/2008

Figure 3 - Mapped Site Features 2008



Legend

Monitoring Area Limits

Wetland Boundary

Vegetation Community Boundary

Base Photograph July 7, 2008

Wetland Area

Existing Wetland	7.13 acres
Developing Wetland (CT 1 - 4)	21.58 acres

Noxious Weeds

Cirsium arvense

Cardaria draba

Infestation Size

✖ = < 0.1 acre

▲ = 0.1 to 1 acre

Cover Class

L = Low (1-5% cover)

Vegetation Types

① Inundated Agropyron
② Inundated Unvegetated
③ Inundated Agropyron/Scirpus
④ Inundated Agropyron/Hordeum
⑤ Agropyron/Kochia/Hordeum
⑥ Unvegetated Upland
⑦ Salix
⑧ Typha/Scirpus/Carex

PROJECT NAME
MDT LONEPINE WETLAND MITIGATION

DRAWING TITLE
MAPPED SITE FEATURES 2008

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

PROJ NO: 0B4308801 02.04
LOCATION: LONEPINE, MT
SCALE: NOTED
FILE NAME: Lonepine2008.dwg

1120 Cedar
Missoula, MT 59802
PBSJ

FIGURE
3 OF .

REV -
Dec/18/2008

Appendix B

2008 WETLAND MITIGATION SITE MONITORING FORMS
2008 BIRD SURVEY FORM
2008 COE WETLAND DELINEATION FORMS
2008 FUNCTIONAL ASSESSMENT FORMS
2008 SOIL SAMPLING RESULTS

MDT Wetland Mitigation Monitoring
Lonepine Wetland Mitigation Project
Flathead Indian Reservation, Montana

PBS&J / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **Lonepine Wetland Mitigation Site** Project Number: **0B4308801.02.04**
Assessment Date: **July 25, 2008** Person(s) conducting the assessment: **B. Dutton**
Location: **Lonepine** MDT District: **Missoula** Milepost: _____
Legal Description: T **22N** R **24W** Section **3**
Weather Conditions: **clear sky** Time of Day: **8:00am to 6:00pm**
Initial Evaluation Date: **July 25, 2008** Monitoring Year: **1** # Visits in Year: **1**
Size of evaluation area: **80 acres** Land use surrounding wetland: **agriculture; reservoir**

HYDROLOGY

Surface Water Source: **Lower Dry Fork Reservoir via the Camas C Canal**
Inundation: **Present** Average Depth: **1 foot** Range of Depths: **0-1.5 feet**
Percent of assessment area under inundation: **20-25%**
Depth at emergent vegetation-open water boundary: **NA 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.):
drift lines and water marks

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:
Cells 1, 3, and 4 were 60% inundated, Cell 2 was 75% inundated, and Cell 5 was 20% inundated during site visit, although inundation at all cells was observed during June 30 reconnaissance visit. The non-inundated areas of each cell were mostly dry and not saturated. MDT was notified of the lack of water via electronic mail on July 28, 2008. Irrigation water had been halted in order to facilitate repair of the outlet in Cell 5.

VEGETATION COMMUNITIES

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

Dominant Species	% Cover	Dominant Species	% Cover
Agropyron dasystachyum	5 = > 50%		

Comments / Problems: **Inundated cell with a pure stand of thickspike wheatgrass with 80% cover.**

Community Number: **2** Community Title (main spp): **Inundated Unvegetated**

Dominant Species	% Cover	Dominant Species	% Cover
Scirpus acutus	+ = < 1%		
Typha latifolia	+ = < 1%		
Agropyron dasystachyum	+ = < 1%		

Comments / Problems: **Inundated area with scattered bulrush and cattail.**

Community Number: **3** Community Title (main spp): **Inundated Agropyron / Scirpus**

Dominant Species	% Cover	Dominant Species	% Cover
Agropyron dasystachyum	4 = 21-50%	Kochia scoparia	+ = < 1%
Scirpus acutus	1 = 1-5%	Matricaria perforata	+ = < 1%
Lepidium desiflorum	3 = 11-20%		
Alopecurus pratensis	1 = 1-5%		
Phleum pratense	+ = < 1%		
Cirsium arvense	+ = < 1%		

Comments / Problems: _____

Community Number: **4** Community Title (main spp): **Inundated Agropyron / Hordeum**

Dominant Species	% Cover	Dominant Species	% Cover
Agropyron dasystachyum	4 = 21-50%	Agrostis alba	+ = < 1%
Hordeum jubatum	1 = 1-5%	Cirsium arvense	+ = < 1%
Lepidium desiflorum	1 = 1-5%		
Alopecurus pratensis	+ = < 1%		
Polygonum amphibium	+ = < 1%		
Kochia scoparia	+ = < 1%		

Comments / Problems: _____

VEGETATION COMMUNITIES (continued)

Community Number: **5** Community Title (main spp): **Agropyron / Kochia / Hordeum**

Dominant Species	% Cover	Dominant Species	% Cover
Agropyron dasystachyum	4 = 21-50%	Anthemis cotula	+ = < 1%
Hordeum jubatum	2 = 6-10%	Agrostis alba	+ = < 1%
Lepidium desiflorum	1 = 1-5%	Rumex crispus	+ = < 1%
Alopecurus pratensis	+ = < 1%	Capsella bursa-pastoris	+ = < 1%
Polygonum amphibium	+ = < 1%	Bromus inermis	+ = < 1%
Kochia scoparia	1 = 1-5%	Cichorium intybus	+ = < 1%
Cardaria draba	+ = < 1%		

Comments / Problems: _____

Community Number: **6** Community Title (main spp): **Sparsely Vegetated Upland**

Dominant Species	% Cover	Dominant Species	% Cover
Agrostis alba	+ = < 1%	Alopecurus pratensis	1 = 1-5%
Kochis scoparia	+ = < 1%	Carex nebrascensis	1 = 1-5%
Phleum pratense	+ = < 1%	Rumex crispus	+ = < 1%
Capsella bursa-pastoris	+ = < 1%		
Agropyron repens	+ = < 1%		
Bromus tectorum	+ = < 1%		

Comments / Problems: _____

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

Dominant Species	% Cover	Dominant Species	% Cover
Salix exigua	1 = 1-5%		
Salix spp.	1 = 1-5%		
Ribes spp.	1 = 1-5%		
Populus trichocarpa	+ = < 1%		
Amelanchier alnifolia	+ = < 1%		

Comments / Problems: _____

Community Number: **8** Community Title (main spp): **Typha / Scirpus / Carex**

Dominant Species	% Cover	Dominant Species	% Cover
Phleum pratense	+ = < 1%	Typha latifolia	5 = > 50%
Agrostis alba	1 = 1-5%	Scirpus acutus	4 = 21-50%
Hordeum jubatum	2 = 6-10%	Alopecurus pratensis	2 = 6-10%
Juncus balticus	2 = 6-10%	Carex nebrascensis	2 = 6-10%

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)
Achillea millefolium	5	Rumex crispus	5-6
Agropyron dasystachyum	1-5	Salix exigua	7
Agropryon repens	5-6	Salix spp.	7
Agropyron smithii	5	Scirpus acutus	2, 3, 8
Agropyron trachycaulum	2, 4	Sisymbrium altissimum	5
Agrostis alba	4-6, 8	Thlaspi arvense	5
Alopecurus pratensis	3-6, 8	Typha latifolia	2, 8
Amelanchier alnifolia	7		
Anthemis cotula	5		
Bromus inermis	5		
Bromus tectorum	6		
Capsella bursa-pastoris	5-6		
Cardaria chalapensis	5		
Carex nebrascensis	6, 8		
Centaurea maculosa	5		
Chenopodium album	5		
Chrysothamnus nauseosus	2, 4		
Cichorium intybus	5		
Cirsium arvense	3-4		
Descurainia sophia	5		
Hordeum jubatum	4-5, 8		
Juncus balticus	8		
Kochia scoparia	3-6		
Lepidium desiflorum	3-5		
Malva neglecta	5		
Matricaria perforata	3		
Medicago spp.	5		
Melilotus officinalis	5		
Phleum pratense	3, 6, 8		
Poa pratensis	5		
Polygonum amphibium	4-5		
Polygonum spp.	4-5		
Populus trichocarpa	7		
Potentilla fruticosa	2-4		
Ribes spp.	7		

Comments / Problems: _____

PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number of Live Plants	Mortality Cause / Comment
CELL 1			
Amelanchier alnifolia		3	
Populus trichocarpa		16	
Ribes spp.		31	
Salix spp. - sprig		105	
Salix spp. - container		59	
Shrub - species unknown		11	
Cell Total		**225**	See below.
CELL 2			
Amelanchier alnifolia		12	
Populus trichocarpa		3	
Ribes spp.		16	
Salix spp. - sprig		113	
Salix spp. - container		53	
Cell Total		**197**	See below.
CELL 3			
Amelanchier alnifolia		8	
Populus trichocarpa		1	
Ribes spp.		1	
Shrub - species unknown		7	
Cell Total		**17**	See below.
CELL 4			
Chrysothamnus nauseosus		15	
Potentilla fruticosa		27	
Cell Total		**42**	See below.
CELL 5			
Amelanchier alnifolia		3	
Cell Total		**3**	See below.

Comments / Problems: **Many dead shrubs, especially willow sprigs. Most mortality appears to be related to moisture and heat stress. Many of the willow sprigs, especially the dead ones are much taller than is normal to ensure survival.**

WILDLIFE

Birds

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

Mammals and Herptiles

Mammal and Herptile Species	Number Observed	Indirect Indication of Use			
		Tracks	Scat	Burrows	Other
Deer		☒	☐	☐	
Coyote		☒	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	

Additional Activities Checklist:
Yes Macroinvertebrate Sampling (if required)

Comments / Problems: Two macroinvertebrate samples were collected in Cells 2 and 4.

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 (°)
1	1	View looking east.	90
1	2	View looking north.	0
2	3	View looking east.	90
2	4	View looking northwest.	270
3	5-7	View looking south and southeast.	100-180
4	8-10	View looking west and southwest.	200-270
5	11	View looking north.	0
6	12	View looking northwest.	0
7	13-15	View looking northwest and west.	270-310
8	16	View looking northwest and west.	270-310
9	18	T1 Start looking south	
10	19	T1 End looking north.	
11	20	T2 Start looking south.	
12	21	T2 End looking north.	

Comments / Problems: _____

GPS SURVEYING

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

GPS Checklist:

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

Comments / Problems: _____

WETLAND DELINEATION

(attach COE delineation forms)

At each site conduct these checklist items:

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

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

Comments / Problems: _____

FUNCTIONAL ASSESSMENT

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

Comments / Problems: _____

MAINTENANCE

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

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

Comments / Problems: **Perimeter fencing is not complete as of July 25th. Gates were all left open with the potential for livestock to enter. Noxious weeds (Canada thistle and whitetop) occur in small, scattered patches across the site and need control, especially where soil is barren. Kochia is another main weed that needs control, especially where upland was disturbed.**

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Lonepine Wetland Mitigation Site** Date: **July 25, 2008** Examiner: **Barry Dutton**
Transect Number: **1** Approximate Transect Length: **150 feet** Compass Direction from Start: **285˚** Note: _____

Vegetation Type A: **Type 2 - Inundated Unvegetated**	
Length of transect in this type: 150 feet	
Plant Species	**Cover**
Scirpus acutus	+ = < 1%
Typha latifolia	+ = < 1%
Total Vegetative Cover:	1%

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

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

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

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Lonepine Wetland Mitigation Site** Date: **July 25, 2008** Examiner: **Barry Dutton**
Transect Number: **2** Approximate Transect Length: **300 feet** Compass Direction from Start: **260˚** Note: _____

Vegetation Type E: **Type 2 - Inundated Unvegetated**	
Length of transect in this type: 100 feet	
Plant Species	**Cover**
Agropyron trachycaulum	+ = < 1%
Total Vegetative Cover:	1%

Vegetation Type F: **Type 4 - Inundated Agropyron / Hordeum**	
Length of transect in this type: 100 feet	
Plant Species	**Cover**
Agropyron trachycaulum	4 = 21-50%
Rumex crispus	+ = < 1%
Hordeum jubatum	+ = < 1%
Total Vegetative Cover:	25%

Vegetation Type G: **Type 2 - Inundated Unvegetated**	
Length of transect in this type: 100 feet	
Plant Species	**Cover**
Agropyron trachycaulum	+ = < 1%
Total Vegetative Cover:	1%

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

MDT WETLAND MONITORING – VEGETATION TRANSECT

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

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): **Cells 1 and 2 are 25%; Cells 3, 4, and 5 are 90%.**

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

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

Comments: _____

BIRD SURVEY – FIELD DATA SHEET

Site: **Lonepine** Date: **7/25/08**
Survey Time: **9:00 am** to **3:30 pm**

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Killdeer	30	F	MF UP				
American Pelican	2	F	MA				
Bald Eagle	1	FO	UP MF MA				
Mallard	6	L	OW US				
Brown-headed Cowbird	2	FO	UP MA US				
Canada Goose	26	FO	UP MA US				
Curlew	10	L	MF				
Red-winged Blackbird	4	L	SS UP				

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

HABITAT CODES
AB = Aquatic bed
FO = Forested
I = Island
MA = Marsh
MF = Mud Flat
OW = Open Water
SS = Scrub/Shrub
UP = Upland buffer
WM = Wet meadow
US = Unconsolidated shore

Weather: _____

Notes: **Cells 1, 3, and 4 were 60% inundated; Cell 2 was 75% inundated; and Cell 5 was 20% inundated.**

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

Project / Site: **Lonepine Wetland Mitigation Site**	Date: **July 25, 2008**
Applicant / Owner: **Montana Department of Transportation**	County: **Sanders**
Investigator: **Barry Dutton**	State: **Montana**

Do Normal Circumstances exist on the site? **Yes** Is the site significantly disturbed (Atypical Situation)? **No** Is the area a potential Problem Area? **No** (If needed, explain on reverse side)	Community ID: **Upland - Herbaceous** Transect ID: **Cell 1** Plot ID: ____

VEGETATION

Dominant Species	Stratum	Indicator	Dominant Species	Stratum	Indicator
1. *Agropyron dasystachyum*	Herb	FACU-	11.		
2.			12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		
Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): **0** / **1** = **0**%			FAC Neutral: / = %		
Remarks: **This grass probably came from the adjacent upland that was seeded. Grass cover is about 80%.**					

HYDROLOGY

No Recorded Data (Describe in Remarks): **N/A** Stream, Lake, or Tide Gauge **N/A** Aerial Photographs **N/A** Other **Yes** No Recorded Data	Wetland Hydrology Indicators Primary Indicators: **YES** Inundated **NO** Saturated in Upper 12 Inches **YES** Water Marks **YES** Drift Lines **NO** Sediment Deposits **NO** Drainage Patterns in Wetland
Field Observations: Depth of Surface Water = **0-24** (in.) Depth to Free Water in Pit **N/A** ____ (in.) Depth to Saturated Soil **N/A** ____ (in.)	Secondary Indicators (2 or more required): **NO** Oxidized Root Channels in Upper 12 inches **NO** Water-Stained Leaves **NO** Local Soil Survey Data **NO** FAC-Neutral Test **NO** Other (Explain in Remarks)
Remarks: **Cell 1 is 60% inundated with open water. Open water is not deeper than 24 inches.**	

SOILS

Map Unit Name (Series and Phase): **Marklepass, Dry Fork, Whitearth**
Map Symbol: **5B, 112A, 12A** Drainage Class: **all are well drained** Mapped Hydric Inclusion? **Yes**
Taxonomy (Subgroup): **See below.** Field Observations confirm Mapped Type? **No**

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color(s) (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	10 YR 4/2	/ /	N/A N/A	
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	

Hydric Soil Indicators:

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

Remarks: **All soil types are mapped by the NRCS as "partially hydric". Inundated over 60% in Cell 1; therefore, soils meet NRCS hydric soils criteria #3, "Soils that are frequently ponded for long duration or very long duration during the growing season." Other hydric soil indicators have not developed. Marklepass: Fine, mixed, superactive, frigid Typic Natrixeralfs. Dry Fork: Coarse-silty, mixed, active, frigid Calcic Haploxerepts. Whitearth: fine, silty, mixed, superactive frigid Typic Natrixeralfs.**

WETLAND DETERMINATION

Hydrophytic Vegetation Present? **NO** Wetland Hydrology Present? **YES** Hydric Soils Present? **YES**	Is this Sampling Point within a Wetland? **NO**

Remarks: **Site was recently constructed. Wetland characteristics have not fully developed. Wetland soil and hydrology present on 60% of cell due to inundation.**

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

Project / Site: **Lonepine Wetland Mitigation Site**	Date: **July 25, 2008**
Applicant / Owner: **Montana Department of Transportation**	County: **Sanders**
Investigator: **Barry Dutton**	State: **Montana**

Do Normal Circumstances exist on the site? **Yes** Is the site significantly disturbed (Atypical Situation)? **No** Is the area a potential Problem Area? **No** (If needed, explain on reverse side)	Community ID: **Upland - Herbaceous** Transect ID: **Cell 2** Plot ID: ____

VEGETATION

Dominant Species	Stratum	Indicator	Dominant Species	Stratum	Indicator
1. *Agropyron dasystachyum*	Herb	FACU-	11.		
2. *Lepidium densiflorum*	Herb	FAC-	12.		
3. *Scirpus acutus*	Herb	OBL	13.		
4. *Alopecurus pratensis*	Herb	FACW	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		
Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): **2** / **4** = **50**%			FAC Neutral: / = %		
Remarks: **Vegetation cover is about 20%.**					

HYDROLOGY

No Recorded Data (Describe in Remarks): **N/A** Stream, Lake, or Tide Gauge **N/A** Aerial Photographs **N/A** Other **Yes** No Recorded Data	Wetland Hydrology Indicators Primary Indicators: **YES** Inundated **NO** Saturated in Upper 12 Inches **YES** Water Marks **YES** Drift Lines **NO** Sediment Deposits **NO** Drainage Patterns in Wetland
Field Observations: Depth of Surface Water = **0-24** (in.) Depth to Free Water in Pit **N/A** ____ (in.) Depth to Saturated Soil **N/A** ____ (in.)	Secondary Indicators (2 or more required): **NO** Oxidized Root Channels in Upper 12 inches **NO** Water-Stained Leaves **NO** Local Soil Survey Data **NO** FAC-Neutral Test **NO** Other (Explain in Remarks)
Remarks: **Cell 2 is about 75% inundated. Open water is not greater than 24 inches deep.**	

SOILS

Map Unit Name (Series and Phase): **Marklepass, Dry Fork, Whitearth**
Map Symbol: **5B, 112A, 12A** Drainage Class: **all are well drained** Mapped Hydric Inclusion? **Yes**
Taxonomy (Subgroup): _____ Field Observations confirm Mapped Type? **No**

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color(s) (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	10 YR 4/2	/ /	N/A N/A	Silty Clay Loam
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	

Hydric Soil Indicators:

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

Remarks: **All soil types are mapped as "partially hydric". Inundated over 75% in Cell 2; therefore, soils meet NRCS hydric soils criteria #3, "Soils that are frequently ponded for long duration or very long duration during the growing season." Other hydric soil indicators have not developed. Marklepass: Fine, mixed, superactive, frigid Typic Natrixeralfs. Dry Fork: Coarse-silty, mixed, active, frigid Calcic Haploxerepts. Whitearth: fine, silty, mixed, superactive frigid Typic Natrixeralfs.**

WETLAND DETERMINATION

Hydrophytic Vegetation Present? **NO** Wetland Hydrology Present? **YES** Hydric Soils Present? **YES**	Is this Sampling Point within a Wetland? **NO**

Remarks: **Site was recently constructed. Wetland characteristics have not fully developed. Wetland soils and hydrology present on 75% of cell due to inundation.**

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

Project / Site: **Lonepine Wetland Mitigation Site**	Date: **July 25, 2008**
Applicant / Owner: **Montana Department of Transportation**	County: **Sanders**
Investigator: **Barry Dutton**	State: **Montana**

Do Normal Circumstances exist on the site? **Yes** Is the site significantly disturbed (Atypical Situation)? **No** Is the area a potential Problem Area? **No** (If needed, explain on reverse side)	Community ID: **Upland - Herbaceous** Transect ID: **Cell 3** Plot ID: ____

VEGETATION

Dominant Species	Stratum	Indicator	Dominant Species	Stratum	Indicator
1. *Agropyron dasystachyum*	Herb	FACU-	11.		
2. *Lepidium densiflorum*	Herb	FAC-	12.		
3. *Scirpus acutus*	Herb	OBL	13.		
4. *Alopecurus pratensis*	Herb	FACW	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		
Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): **2** / **4** = **50**%			FAC Neutral: / = %		
Remarks: **Vegetation cover is about 30%.**					

HYDROLOGY

No Recorded Data (Describe in Remarks): **N/A** Stream, Lake, or Tide Gauge **N/A** Aerial Photographs **N/A** Other **Yes** No Recorded Data	Wetland Hydrology Indicators Primary Indicators: **YES** Inundated **NO** Saturated in Upper 12 Inches **YES** Water Marks **YES** Drift Lines **NO** Sediment Deposits **NO** Drainage Patterns in Wetland
Field Observations: Depth of Surface Water = **0-24** (in.) Depth to Free Water in Pit **N/A** ____ (in.) Depth to Saturated Soil **N/A** ____ (in.)	Secondary Indicators (2 or more required): **NO** Oxidized Root Channels in Upper 12 inches **NO** Water-Stained Leaves **NO** Local Soil Survey Data **NO** FAC-Neutral Test **NO** Other (Explain in Remarks)
Remarks: **Cell 3 is about 60% inundated. Open water is not greater than 24 inches deep.**	

SOILS

Map Unit Name (Series and Phase): **Marklepass, Dry Fork, Whitearth**
Map Symbol: **5B, 112A, 12A** Drainage Class: **all are well drained** Mapped Hydric Inclusion? **Yes**
Taxonomy (Subgroup): _____ Field Observations confirm Mapped Type? **No**

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color(s) (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	10 YR 4/3	/ /	N/A N/A	
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	

Hydric Soil Indicators:

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

Remarks: **All soil types are mapped as "partially hydric". Inundated over 60% in Cell 3; therefore, soils meet NRCS hydric soils criteria #3, "Soils that are frequently ponded for long duration or very long duration during the growing season." Other hydric soil indicators have not developed. Marklepass: Fine, mixed, superactive, frigid Typic Natrixeralfs. Dry Fork: Coarse-silty, mixed, active, frigid Calcic Haploxerepts. Whitearth: fine, silty, mixed, superactive frigid Typic Natrixeralfs.**

WETLAND DETERMINATION

Hydrophytic Vegetation Present? **NO** Wetland Hydrology Present? **YES** Hydric Soils Present? **YES**	Is this Sampling Point within a Wetland? **NO**

Remarks: **Site was recently constructed. Wetland characteristics have not fully developed. Wetland soils and hydrology present on 60% of cell due to inundation.**

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

Project / Site: **Lonepine Wetland Mitigation Site**	Date: **July 25, 2008**
Applicant / Owner: **Montana Department of Transportation**	County: **Sanders**
Investigator: **Barry Dutton**	State: **Montana**

Do Normal Circumstances exist on the site? **Yes** Is the site significantly disturbed (Atypical Situation)? **No** Is the area a potential Problem Area? **No** (If needed, explain on reverse side)	Community ID: **Upland - Herbaceous** Transect ID: **Cell 4** Plot ID: ____

VEGETATION

Dominant Species	Stratum	Indicator	Dominant Species	Stratum	Indicator
1. *Agropyron dasystachyum*	Herb	FACU-	11.		
2. *Lepidium densiflorum*	Herb	FAC-	12.		
3. *Cirsium arvense*	Herb	FACU+	13.		
4. *Alopecurus pratensis*	Herb	FACW	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): **1** / **4** = **25**%	FAC Neutral: / = %

Remarks: **Vegetation cover is about 40%. Agropyron has likely blown in from the adjacent upland that was seedied.**

HYDROLOGY

No Recorded Data (Describe in Remarks): **N/A** Stream, Lake, or Tide Gauge **N/A** Aerial Photographs **N/A** Other **Yes** No Recorded Data	Wetland Hydrology Indicators Primary Indicators: **YES** Inundated **NO** Saturated in Upper 12 Inches **YES** Water Marks **YES** Drift Lines **NO** Sediment Deposits **NO** Drainage Patterns in Wetland
Field Observations: Depth of Surface Water = **0-24** (in.) Depth to Free Water in Pit **N/A** ____ (in.) Depth to Saturated Soil **N/A** ____ (in.)	Secondary Indicators (2 or more required): **NO** Oxidized Root Channels in Upper 12 inches **NO** Water-Stained Leaves **NO** Local Soil Survey Data **NO** FAC-Neutral Test **NO** Other (Explain in Remarks)

Remarks: **Cell 4 is about 60% inundated. Open water is not greater than 24 inches deep.**

SOILS

Map Unit Name (Series and Phase): **Marklepass, Dry Fork, Whitearth**
Map Symbol: **5B, 112A, 12A** Drainage Class: **all are well drained** Mapped Hydric Inclusion? **Yes**
Taxonomy (Subgroup): _____ Field Observations confirm Mapped Type? **No**

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color(s) (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	10 YR 4/2	/ /	N/A N/A	
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	

Hydric Soil Indicators:

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

Remarks: **All soil types are mapped as "partially hydric". Inundated over 60% in Cell 4; therefore, soils meet NRCS hydric soils criteria #3, "Soils that are frequently ponded for long duration or very long duration during the growing season." Other hydric soil indicators have not developed. Marklepass: Fine, mixed, superactive, frigid Typic Natrixeralfs. Dry Fork: Coarse-silty, mixed, active, frigid Calcic Haploxerepts. Whitearth: fine, silty, mixed, superactive frigid Typic Natrixeralfs.**

WETLAND DETERMINATION

Hydrophytic Vegetation Present? **NO**
Wetland Hydrology Present? **YES**
Hydric Soils Present? **YES**

Is this Sampling Point within a Wetland? **NO**

Remarks: **Site was recently constructed. Wetland characteristics have not fully developed. Wetland soils and hydrology present on 60% of cell due to inundation.**

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

Project / Site: **Lonepine Wetland Mitigation Site**	Date: **July 25, 2008**
Applicant / Owner: **Montana Department of Transportation**	County: **Sanders**
Investigator: **Barry Dutton**	State: **Montana**

Do Normal Circumstances exist on the site? **Yes** Is the site significantly disturbed (Atypical Situation)? **No** Is the area a potential Problem Area? **No** (If needed, explain on reverse side)	Community ID: **Upland - Herbaceous** Transect ID: **Cell 5** Plot ID: _____

VEGETATION

Dominant Species	Stratum	Indicator	Dominant Species	Stratum	Indicator
1. *Agropyron dasystachyum*	Herb	FACU-	11.		
2. *Lepidium densiflorum*	Herb	FAC-	12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		
Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): **0** / **2** = **0**%			FAC Neutral: / = %		
Remarks: **Vegetation cover is about 25%.**					

HYDROLOGY

No Recorded Data (Describe in Remarks): **N/A** Stream, Lake, or Tide Gauge **N/A** Aerial Photographs **N/A** Other **Yes** No Recorded Data	Wetland Hydrology Indicators Primary Indicators: **YES** Inundated **NO** Saturated in Upper 12 Inches **YES** Water Marks **YES** Drift Lines **NO** Sediment Deposits **NO** Drainage Patterns in Wetland
Field Observations: Depth of Surface Water = **0-12** (in.) Depth to Free Water in Pit **N/A** ____ (in.) Depth to Saturated Soil **N/A** ____ (in.)	Secondary Indicators (2 or more required): **NO** Oxidized Root Channels in Upper 12 inches **NO** Water-Stained Leaves **NO** Local Soil Survey Data **NO** FAC-Neutral Test **NO** Other (Explain in Remarks)
Remarks: **Cell 5 is about 20% inundated. Open water is not greater than 24 inches deep.**	

SOILS

Map Unit Name (Series and Phase): **Marklepass, Dry Fork, Whitearth**
Map Symbol: **5B, 112A, 12A** Drainage Class: **all are well drained** Mapped Hydric Inclusion? **Yes**
Taxonomy (Subgroup): **See below.** Field Observations confirm Mapped Type? **No**

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color(s) (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12	A	10 YR 4/2	/ /	N/A N/A	
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	

Hydric Soil Indicators:

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

Remarks: **All soil types are mapped as "partially hydric". Inundated over 20% in Cell 5. Other hydric soil indicators have not developed. Marklepass: Fine, mixed, superactive, frigid Typic Natrixeralfs. Dry Fork: Coarse-silty, mixed, active, frigid Calcic Haploxerepts. Whitearth: fine, silty, mixed, superactive frigid Typic Natrixeralfs.**

WETLAND DETERMINATION

Hydrophytic Vegetation Present? **NO** Wetland Hydrology Present? **NO** Hydric Soils Present? **NO**	Is this Sampling Point within a Wetland? **NO**

Remarks: **Site was recently constructed. Wetland characteristics have not fully developed. Wetland soils and hydrology present on 20% of cell due to inundation.**

MDT MONTANA WETLAND ASSESSMENT FORM (revised March 2008)

1. Project Name: Lonepine Wetland Mitigation **2. MDT Project #:** STPX (45)33 **3. Control #:** 4729

3. Evaluation Date: 7/25/2008 **4. Evaluator(s):** Dutton **5. Wetland/Site #(s):** Lonepine Mitigation Dry Fork Creek

6. Wetland Location(s): Township 22 N, Range 24 W, Section 3; Township ___N, Range ___E, Section _____

Approximate Stationing or Roadposts: East of Lonepine, below Lower Dry Fork Reservoir

Watershed: 3 - Lower Clark Fork **County:** _ _ Sanders _____

7. Evaluating Agency: MDT

Purpose of Evaluation:

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

8. Wetland Size (acre): 7.13 (visually estimated)
_____ (measured, e.g. GPS)

9. Assessment Area (AA) Size (acre): _____ (visually estimated)
(see manual for determining AA) 7.13 (measured, e.g. GPS)

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

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% OF AA
Riverine	Unconsolidated Bottom		Seasonal / Intermittent	40
Riverine	Emergent Wetland		Seasonal / Intermittent	55
Riverine	Scrub-Shrub Wetland		Seasonal / Intermittent	5

Comments: SS component very minor at this time

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

12. GENERAL CONDITION OF AA

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

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

Comments (types of disturbance, intensity, season, etc.)**:** Adjacent lands subject to livestock grazing and cultivation

ii. Prominent noxious, aquatic nuisance, and other exotic vegetation species: CIR ARV, CAR DRA present in small amounts, as is KOC SCO.

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: AA includes largely pre-existing wetlands associated with Dry Fork Creek, as well as re-activated meander loop (SS area).

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

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

Comments: SS component is very minor at this time - species sprigged in 2008.

Wetland/Site #(s): Lonepine Wetland Dry Fork Creek

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

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

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

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

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

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

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

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

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

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

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
S1 Species Functional Point/Rating	---	---	---	---	---	---	---
S2 and S3 Species Functional Point/Rating	---	---	.6M	---	---	---	---

Sources for documented use (e.g. observations, records): Nest on Lower DF Reservoir; obseved foraging at mitigation site 2008.

14C. GENERAL WILDLIFE HABITAT RATING

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

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

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

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

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

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

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

Evidence of Wildlife Use (i)	**Wildlife Habitat Features Rating (ii)**			
	☐ **Exceptional**	☒ **High**	☐ **Moderate**	☐ **Low**
☐ **Substantial**	---	---	---	---
☒ **Moderate**	---	.7M	---	---
☐ **Minimal**	---	---	---	---

Comments: Use expected to increase as nearby created wetlands develop.

Wetland/Site #(s): Lonepine Wetland Dry Fork Creek

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

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

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

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

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

Duration of Surface Water in AA	☐ **Permanent / Perennial**						☒ **Seasonal / Intermittent**						☐ **Temporary / Ephemeral**					
Aquatic Hiding / Resting / Escape Cover	☐ **Optimal**		☐ **Adequate**		☐ **Poor**		☐ **Optimal**		☒ **Adequate**		☐ **Poor**		☐ **Optimal**		☐ **Adequate**		☐ **Poor**	
Thermal Cover: optimal / suboptimal	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**	**O**	**S**
FWP Tier I fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier II or **Native Game** fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier III or **Introduced Game** fish	---	---	---	---	---	---	---	---	.5M	---	---	---	---	---	---	---	---	---
FWP Non-Game Tier IV or **No** fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Sources used for identifying fish spp. potentially found in AA: Northern Pike known to occasionally use DFC - CSKT Fisheries

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

a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity, ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* ☒ **YES**, reduce score in **i** by 0.1 = 0.40 or ☐ **N0**

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

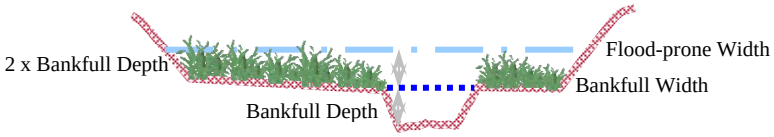
iii. Final Score and Rating: .4M **Comments:** Dam precludes natural migration / use.

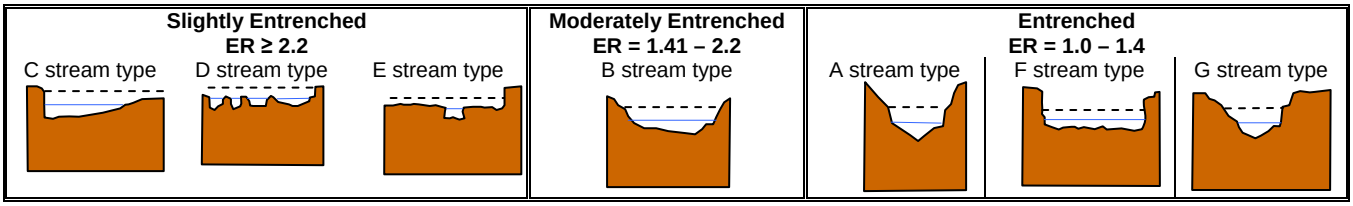
14E. FLOOD ATTENUATION ☐ **NA** (proceed to 14F)

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

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

_____ / _____ = _____
flood prone width / bankfull width = entrenchment ratio





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

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	☐ Slightly Entrenched C, D, E stream types			☐ Moderately Entrenched B stream type			☐ Entrenched A, F, G stream types		
Percent of Flooded Wetland Classified as Forested and/or Scrub/Shrub	☐ 75%	☐ 25-75%	☒ <25%	☐ 75%	☐ 25-75%	☐ <25%	☐ 75%	☐ 25-75%	☐ <25%
AA contains **no outlet or restricted outlet**	---	---	.6M	---	---	---	---	---	---
AA contains **unrestricted outlet**	---	---	---	---	---	---	---	---	---

ii. Are ≥10 acres of wetland in the AA subject to flooding AND are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA? ☐ YES ☒ NO **Comments:** _____

Wetland/Site #(s): Lonepine Wetland Dry Fork Creek

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

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, then check the NA box and proceed to 14G.

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

Estimated Maximum Acre Feet of Water Contained in Wetlands within the AA that are Subject to Periodic Flooding or Ponding	☐ **>5 acre feet**			☒ **1.1 to 5 acre feet**			☐ **≤1 acre foot**		
Duration of Surface Water at Wetlands within the AA	☐ **P/P**	☐ **S/I**	☐ **T/E**	☐ **P/P**	☒ **S/I**	☐ **T/E**	☐ **P/P**	☐ **S/I**	☐ **T/E**
Wetlands in AA flood or pond **≥ 5 out of 10 years**	---	---	---	---	.6M	---	---	---	---
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 wetland with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input.
If no wetlands in the AA are subject to such input, check the NA box and proceed to 14H.

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

Sediment, Nutrient, and Toxicant Input Levels within AA	**AA receives or surrounding land use has potential to deliver sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.**				**Waterbody is on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.**			
% Cover of Wetland Vegetation in AA	☐ **≥ 70%**		☒ **< 70%**		☐ **≥ 70%**		☐ **< 70%**	
Evidence of Flooding / Ponding in AA	☐ **Yes**	☐ **No**	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	---	---	.7M	---	---	---	---	---
AA contains **unrestricted outlet**	---	---	---	---	---	---	---	---

Comments: _____

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

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

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

Comments: _____

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

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

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

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

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

Wetland/Site #(s): Lonepine Wetland Dry Fork Creek

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

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

Vegetated Upland Buffer: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, AND that is not subjected to periodic mechanical mowing or clearing (unless for weed control).
Is there an average ≥ 50-foot wide vegetated upland buffer around ≥ 75% of the AA's perimeter? ☒ **YES**, add 0.1 to score in **ii** = 0.80 ☐ **NO**

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

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

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

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

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

Criteria	Duration of Saturation at AA Wetlands ***FROM GROUNDWATER DISCHARGE*** or ***WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM***			
	☐ **P/P**	☒ **S/I**	☐ **T**	☐ **None**
☒ **Groundwater Discharge or Recharge**	---	.7M	---	---
☐ **Insufficient Data/Information**	---			

Comments: Occurs at base of dam and likely receives seepage.

14K. UNIQUENESS

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

Replacement Potential	**AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland** OR **plant association listed as "S1" by the MTNHP**			**AA does not contain previously cited rare types** AND **structural diversity (#13) is high** OR **contains plant association listed as "S2" by the MTNHP**			**AA does not contain previously cited rare types** OR **associations** AND **structural diversity (#13) is low-moderate**		
Estimated Relative Abundance (#11)	☐ Rare	☐ Common	☐ Abundant	☐ Rare	☐ Common	☐ Abundant	☐ Rare	☒ Common	☐ Abundant
☒ **Low Disturbance** at AA (#12i)	---	---	---	---	---	---	---	.4M	---
☐ **Moderate Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---
☐ **High Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---

Comments: _____

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

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

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

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

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

Comments: _____

15. GENERAL SITE NOTES: _____

Wetland/Site #(s): Lonepine Wetland Dry Fork Creek

Function & Value Variables	Rating – Actual Functional Points	Possible Functional Points	Functional Units: Actual Points x Estimated AA Acreage	Indicate the Four Most Prominent Functions with an Asterisk
A. Listed / Proposed T&E Species Habitat	low 0.00	1.00		
B. MT Natural Heritage Program Species Habitat	mod 0.60	1.00		
C. General Wildlife Habitat	mod 0.70	1.00		
D. General Fish Habitat	mod 0.40	1.00		
E. Flood Attenuation	mod 0.60	1.00		
F. Short and Long Term Surface Water Storage	mod 0.60	1.00		
G. Sediment / Nutrient / Toxicant Removal	mod 0.70	1.00		
H. Sediment / Shoreline Stabilization	mod 0.60	1.00		
I. Production Export / Food Chain Support	high 0.80	1.00		
J. Groundwater Discharge / Recharge	mod 0.70	1.00		
K. Uniqueness	mod 0.40	1.00		
L. Recreation / Education Potential (bonus point)	NA			
Total Points	**6.1**	**11**	**Total Functional Units**	
Percent of Possible Score 56% (round to nearest whole number)				

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

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

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

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if not go to Category III)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
- ☐ Percent of possible score < 35% (round to nearest whole #).

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

☐ **I** ☐ **II** ☒ **III** ☐ **IV**

MDT MONTANA WETLAND ASSESSMENT FORM (revised March 2008)

1. Project Name: Lonepine Wetland Mitigation **2. MDT Project #:** STPX (45)33 **3. Control #:** 4729

3. Evaluation Date: 7/25/2008 **4. Evaluator(s):** Dutton **5. Wetland/Site #(s):** Lonepine Mitigation - Cells1-5

6. Wetland Location(s): Township 22 N, Range 24 W, Section 3; Township ___N, Range ___E, Section _____

Approximate Stationing or Roadposts: East of Lonepine, below Lower Dry Fork Reservoir

Watershed: 3 - Lower Clark Fork **County:** _ _ Sanders _____

7. Evaluating Agency: MDT

Purpose of Evaluation:

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

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

9. Assessment Area (AA) Size (acre): _____ (visually estimated)
(see manual for determining AA) 28.71 (measured, e.g. GPS)

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

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% OF AA
Depressional	Unconsolidated Bottom	Impounded	Seasonal / Intermittent	99
Depressional	Emergent Wetland	Impounded	Seasonal / Intermittent	1

Comments: EM component very minor & too small to map at this time

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

12. GENERAL CONDITION OF AA

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

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

Comments (types of disturbance, intensity, season, etc.)**:** Adjacent lands subject to livestock grazing and cultivation

ii. Prominent noxious, aquatic nuisance, and other exotic vegetation species: CIR ARV, CAR DRA present in small amounts, as is KOC SCO.

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: AA includes shallow inundated, although largely currently unvegetated, created cells intended to develop as wetlands.

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

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

Comments: Wetland veg component very minor at this time - mostly trace of scirpus.

Wetland/Site #(s): Lonepine Wetland Cells 1-5

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

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

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

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

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

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

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

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

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

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

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
S1 Species Functional Point/Rating	---	---	---	---	---	---	---
S2 and S3 Species Functional Point/Rating	---	---	.6M	---	---	---	---

Sources for documented use (e.g. observations, records): Nest on Lower DF Reservoir; obseved foraging at mitigation site 2008.

14C. GENERAL WILDLIFE HABITAT RATING

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

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

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

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

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

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

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

Evidence of Wildlife Use (i)	**Wildlife Habitat Features Rating (ii)**			
	☐ **Exceptional**	☒ **High**	☐ **Moderate**	☐ **Low**
☐ **Substantial**	---	---	---	---
☒ **Moderate**	---	.7M	---	---
☐ **Minimal**	---	---	---	---

Comments: Use expected to increase as created wetlands develop.

Wetland/Site #(s): Lonepine Wetland Cells 1-5

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

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

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

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

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

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

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

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

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

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

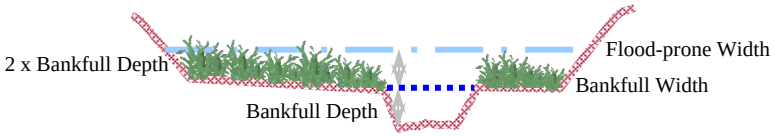
iii. Final Score and Rating: _ **Comments:** _____

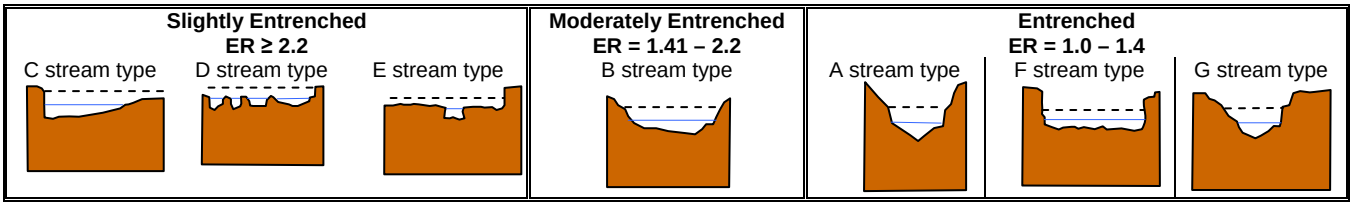
14E. FLOOD ATTENUATION ☒ **NA** (proceed to 14F)

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

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

_____ / _____ = _____
flood prone width / bankfull width = entrenchment ratio





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

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	☐ Slightly Entrenched C, D, E stream types			☐ Moderately Entrenched B stream type			☐ Entrenched A, F, G stream types		
Percent of Flooded Wetland Classified as Forested and/or Scrub/Shrub	☐ 75%	☐ 25-75%	☐ <25%	☐ 75%	☐ 25-75%	☐ <25%	☐ 75%	☐ 25-75%	☐ <25%
AA contains **no outlet or restricted outlet**	---	---	---	---	---	---	---	---	---
AA contains **unrestricted outlet**	---	---	---	---	---	---	---	---	---

ii. Are ≥10 acres of wetland in the AA subject to flooding AND are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA? ☐ YES ☐ NO **Comments:** _____

Wetland/Site #(s): Lonepine Wetland Cels 1-5

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

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, then check the NA box and proceed to 14G.

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

Estimated Maximum Acre Feet of Water Contained in Wetlands within the AA that are Subject to Periodic Flooding or Ponding	☒ **>5 acre feet**			☐ **1.1 to 5 acre feet**			☐ **≤1 acre foot**		
Duration of Surface Water at Wetlands within the AA	☐ **P/P**	☒ **S/I**	☐ **T/E**	☐ **P/P**	☐ **S/I**	☐ **T/E**	☐ **P/P**	☐ **S/I**	☐ **T/E**
Wetlands in AA flood or pond **≥ 5 out of 10 years**	---	.9H	---	---	---	---	---	---	---
Wetlands in AA flood or pond **< 5 out of 10 years**	---	---	---	---	---	---	---	---	---

Comments: _____

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

Applies to wetland with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input.
If no wetlands in the AA are subject to such input, check the NA box and proceed to 14H.

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

Sediment, Nutrient, and Toxicant Input Levels within AA	**AA receives or surrounding land use has potential to deliver sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.**				**Waterbody is on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.**			
% Cover of Wetland Vegetation in AA	☐ **≥ 70%**		☒ **< 70%**		☐ **≥ 70%**		☐ **< 70%**	
Evidence of Flooding / Ponding in AA	☐ **Yes**	☐ **No**	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	---	---	.7M	---	---	---	---	---
AA contains **unrestricted outlet**	---	---	---	---	---	---	---	---

Comments: _____

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

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

% Cover of Wetland Streambank or Shoreline by Species with Stability Ratings of ≥6 (see Appendix F).	**Duration of Surface Water Adjacent to Rooted Vegetation**		
	☐ **Permanent / Perennial**	☒ **Seasonal / Intermittent**	☐ **Temporary / Ephemeral**
☐ **≥ 65%**	---	---	---
☐ **35-64%**	---	---	---
☒ **< 35%**	---	.2L	---

Comments: Subject to wave action

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

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

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

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

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

Wetland/Site #(s): Lonepine Wetland Cells 1-5

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

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

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

iv. Final Score and Rating: .5M **Comments:** _____

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

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

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

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

Criteria	Duration of Saturation at AA Wetlands ***FROM GROUNDWATER DISCHARGE*** or ***WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM***			
	☐ **P/P**	☐ **S/I**	☒ **T**	☐ **None**
☒ **Groundwater Discharge or Recharge**	---	---	.4M	---
☐ **Insufficient Data/Information**	---			

Comments: _____

14K. UNIQUENESS

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

Replacement Potential	**AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland** OR **plant association listed as "S1" by the MTNHP**			**AA does not contain previously cited rare types** AND **structural diversity (#13) is high** OR **contains plant association listed as "S2" by the MTNHP**			**AA does not contain previously cited rare types** OR **associations** AND **structural diversity (#13) is low-moderate**		
Estimated Relative Abundance (#11)	☐ Rare	☐ Common	☐ Abundant	☐ Rare	☐ Common	☐ Abundant	☐ Rare	☒ Common	☐ Abundant
☒ **Low Disturbance** at AA (#12i)	---	---	---	---	---	---	---	.4M	---
☐ **Moderate Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---
☐ **High Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---

Comments: _____

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

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

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

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

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

Comments: _____

15. GENERAL SITE NOTES: _____

Wetland/Site #(s): Lonepine Wetland Cells 1-5

Function & Value Variables	Rating – Actual Functional Points	Possible Functional Points	Functional Units: Actual Points x Estimated AA Acreage	Indicate the Four Most Prominent Functions with an Asterisk
A. Listed / Proposed T&E Species Habitat	low 0.00	1.00		
B. MT Natural Heritage Program Species Habitat	mod 0.60	1.00		
C. General Wildlife Habitat	mod 0.70	1.00		
D. General Fish Habitat	NA	NA		
E. Flood Attenuation	NA	NA		
F. Short and Long Term Surface Water Storage	high 0.90	1.00		
G. Sediment / Nutrient / Toxicant Removal	mod 0.70	1.00		
H. Sediment / Shoreline Stabilization	low 0.20	1.00		
I. Production Export / Food Chain Support	mod 0.50	1.00		
J. Groundwater Discharge / Recharge	mod 0.40	1.00		
K. Uniqueness	mod 0.40	1.00		
L. Recreation / Education Potential (bonus point)	NA			
Total Points	**4.4**	**9**	**Total Functional Units**	
Percent of Possible Score 49% (round to nearest whole number)				

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

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

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

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if not go to Category III)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
- ☐ Percent of possible score < 35% (round to nearest whole #).

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

☐ **I** ☐ **II** ☒ **III** ☐ **IV**

ENERGY LABORATORIES, INC. * 1120 S 27th St * PO Box 30916 * Billings, MT 59107-0916
Toll Free 800.735.4489 * 406.252.6325 * FAX 406.252.6069 * eli@energylab.com

LABORATORY ANALYTICAL REPORT

Client: PBS and J
Project: Lonepine
Lab ID: B08091823-001
Client Sample ID: S1

Report Date: 10/01/08
Collection Date: 07/28/08 13:00
DateReceived: 09/18/08
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
SATURATED PASTE							
pH, sat. paste	7.60	s.u.		0.10		ASAM10-3.2	09/25/08 11:17 / srm
Conductivity, sat. paste	4.87	mmhos/cm		0.01		ASA10-3	09/25/08 11:17 / srm
Calcium, sat. paste	25.5	meq/L		0.05		SW6010B	09/25/08 14:01 / rlh
Magnesium, sat. paste	14.4	meq/L		0.08		SW6010B	09/25/08 14:01 / rlh
Sodium, sat. paste	28.3	meq/L		0.04		SW6010B	09/25/08 14:01 / rlh
Sodium Adsorption Ratio (SAR)	6.34	unitless		0.01		Calculation	09/30/08 08:45 / srm

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

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Toll Free 800.735.4489 * 406.252.6325 * FAX 406.252.6069 * eli@energylab.com

LABORATORY ANALYTICAL REPORT

Client: PBS and J
Project: Lonepine
Lab ID: B08091823-002
Client Sample ID: S2

Report Date: 10/01/08
Collection Date: 07/28/08 14:00
DateReceived: 09/18/08
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
SATURATED PASTE							
pH, sat. paste	7.70	s.u.		0.10		ASAM10-3.2	09/25/08 11:17 / srm
Conductivity, sat. paste	5.24	mmhos/cm		0.01		ASA10-3	09/25/08 11:17 / srm
Calcium, sat. paste	26.9	meq/L		0.05		SW6010B	09/25/08 14:05 / rlh
Magnesium, sat. paste	10.5	meq/L		0.08		SW6010B	09/25/08 14:05 / rlh
Sodium, sat. paste	36.5	meq/L		0.04		SW6010B	09/25/08 14:05 / rlh
Sodium Adsorption Ratio (SAR)	8.43	unitless		0.01		Calculation	09/30/08 08:45 / srm

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

Appendix C

2008 REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Lonepine Wetland Mitigation Project
Flathead Indian Reservation, Montana

LONEPINE WETLAND MITIGATION SITE 2008

Photo Point 1: View facing east. Cell 2 at left.

Photo Point 1: View facing north at Cell 2.

Photo Point 2: View facing east at Cell 2.

Photo Point 2: View facing northwest at Cell 1.

Photo Point 3: View facing south and southeast. Cell 1 to right, restored Dry Fork Creek to left.

Photo Point 4: View facing west and southwest.

Photo Point 5: View facing north.

Photo Point 6: View facing northwest.

Photo Point 7: View facing northwest and west at Cell 4.

Photo Point 8: View facing northwest and west across Cell 5.

Photo Point 8: View facing east down Cell 5 outlet channel.

View of landscape and pre-existing wetland at dam toe in NE corner.

View of dam surface facing west with project site on left.

View of reservoir north of project site.

View of reservoir north of project site.


Transect 1 Start facing south. Cell 2 to right.


Transect 1 End facing north. Cell 2 to left.


Transect 2 Start facing south. Cell 4 on photo right.


Transect 2 End facing north. Cell 4 on photo left.

Appendix D

PLAN SHEET

MDT Wetland Mitigation Monitoring
Lonepine Wetland Mitigation Project
Flathead Indian Reservation, Montana

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	STPX 45(33)	8

LONEPINE WETLAND MITIGATION

PROPOSED DAM OUTLET WORKS & CANAL MODIFICATIONS

POT 10+00.00

POT 18+06.35

NEW FENCE AROUND WELL

CONTROL LINE

NEW GATE

N 0° 28' 16" W

NEW FENCE

Proposed Wetland Cell 4

Proposed Wetland Cell 1

Proposed Wetland Cell 2

Proposed Wetland Cell 3

Proposed Wetland Cell 5

OUTLET 2a

OUTLET 1

OUTLET 2b

OUTLET 3

OUTLET 4

OUTLET 5

INLET 1

INLET 4

WETLAND 2

WETLAND 3

WETLAND 4

IRRIGATION TURNOUT STRUCTURES INVERT ELEV. 864.40 [2 835.96ft] (CELL 1) 863.83 [2 834.09ft] (CHANNEL 3)

44+85.41 END CHANNEL 3

REMOVE FENCE

TEMPORARY FENCE

DO NOT DISTURB

31+04.44 END CHANNEL 2

30+08.47 BEG. CHANNEL 2

CHANNEL 2

WETLAND 1

CREEK

DRY FORK

40+12.00 BEG. CHANNEL 3

Proposed Wetland Excavation A

CHANNEL PLUG

CHANNEL 3

21+51.02 END CHANNEL 1

CHANNEL 1

20+00.00 BEG. CHANNEL 1

OFFSITE WETLAND 1

DAM SAFETY PROJECT LIMIT OF CONSTRUCTION

DAM SAFETY PROJECT BUFFER ZONE

27 m

15 m

LEGEND

- EXISTING WETLANDS
- PERMITTED WETLAND IMPACTS
- PROPOSED WETLAND CELLS
- PROPOSED UPLAND BUFFER
- PROPOSED CHANNEL CENTERLINE
- PROPOSED BERM
- NEW FENCE

SCALE 1:1200

0 60M 120M

SITE PLAN

MONTANA DEPARTMENT OF TRANSPORTATION

MONTANA CADD

WGM GROUP, INC.

LAND & WATER CONSULTING

A Division Of: PBS

w:\projects\020606\design rd\4129rdwld202.dgn
7/28/2006
2:21:28 PM
3 WGM Group Inc.
2

Appendix E

GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Lonepine Wetland Mitigation Project
Flathead Indian Reservation, Montana

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

2008 MACROINVERTEBRATE SAMPLING PROTOCOL AND DATA

MDT Wetland Mitigation Monitoring
Lonepine Wetland Mitigation Project
Flathead Indian Reservation, Montana

AQUATIC INVERTEBRATE SAMPLING PROTOCOL

Equipment List

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

Site Selection

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

Sampling Procedure

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

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

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

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

Photograph each macroinvertebrate sampling site.

Sample Handling/Delivery

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

MDT Mitigated Wetland Monitoring Project: Aquatic Invertebrate Monitoring
Summary 2001 – 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 75th percentile (for those metrics that decrease in value in response to stress) or below the 25th percentile (for metrics that respond to stress by an increase in value) of all scores. Additional scoring ranges were established by bisecting the range below the 75th percentile for decreasing scores (or above the 25th percentile for increasing scores) into "sub-optimal" and "poor" assessment categories. A score of 5, 3, or 1 was assigned to good, sub-optimal, and poor metric performance, respectively. In this way, metric values were translated into normalized metric scores, and scores for all metrics were summed to produce a total bioassessment score, which is expressed as a percentage of the maximum possible score (60). Total bioassessment scores were classified according to a similar process, using the ranges and distributions of total scores for all sites studied 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, %Orthocladiinae of Chironomidae, %Crustacea + %Mollusca, and %Amphipoda) measure the relative contributions of certain taxonomic groups that may have significant responses to habitat and/or water quality impacts. For example, amphipods have been demonstrated to increase in abundance in alkaline conditions. Short-lived, relatively mobile taxa such as chironomids dominate ephemeral environments; many are hemoglobin-bearers capable of tolerating de-oxygenated conditions.

Two tolerance metrics (Hilsenhoff Biotic Index 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 Arctopsychid caddisflies (*Arctopsyche* spp. and *Parapsyche* spp.) build silken nets with large mesh sizes that capture small organisms such as chironomids and early-instar mayflies. Here they are considered predators, and, in this study, their abundance does not contribute to the percent filter feeders metric.

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

Table 1. Montana Department of Transportation Mitigated Wetlands Monitoring Project sites: sampling history. Only 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.

METRIC	Roundup	Hoskins Landing MS 1	Peterson Ranch Pond 2	Peterson Ranch Pond 4	Perry Ranch	Cloud Ranch Pond	Jack Creek Pond	Norem
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%
Orthocladiinae/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
Orthocladiinae/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
Total Score	**28**	**34**	**32**	**42**	**30**	**48**	**40**	**34**
Percent of Maximum Score	**46.67%**	**56.67%**	**53.33%**	**70.00%**	**50.00%**	**80.00%**	**66.67%**	**56.67%**
Impairment Classification	**poor**	**sub-optimal**	**sub-optimal**	**good**	**poor**	**good**	**sub-optimal**	**sub-optimal**

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%
Orthocladiinae/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
Orthocladiinae/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
Total Score	**42**	**34**	**28**	**20**	**38**	**31**	**30**	**32**
Percent of Maximum Score	**70.00%**	**56.67%**	**46.67%**	**33.33%**	**63.33%**	**56.36%**	**50.00%**	**53.33%**
Impairment Classification	**good**	**sub-optimal**	**poor**	**poor**	**sub-optimal**	**sub-optimal**	**poor**	**sub-optimal**

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%
Orthocladiinae/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
Orthocladiinae/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
Total Score	**34**	**24**	**26**	**32**	**34**	**22**
Percent of Maximum Score	**56.67%**	**40.00%**	**43.33%**	**53.33%**	**56.67%**	**36.67%**
Impairment Classification	**sub-optimal**	**poor**	**poor**	**sub-optimal**	**sub-optimal**	**poor**

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
E Richness	7	5	4	1	0	1
P Richness	2	2	0	0	0	1
T Richness	4	6	5	3	2	5
Pollution Sensitive Richness	0	1	0	0	0	0
Filterer Percent	29.00%	37.00%	5.00%	40.00%	15.00%	11.00%
Pollution Tolerant Percent	5.00%	3.00%	28.00%	1.00%	62.00%	15.00%
E Richness	3	2	2	0	0	0
P Richness	2	2	0	0	0	1
T Richness	2	3	3	2	1	3
Pollution Sensitive Richness	0	1	0	0	0	0
Filterer Percent	1	0	3	0	1	1
Pollution Tolerant Percent	3	3	0	3	0	1
Total score	**11**	**11**	**8**	**5**	**2**	**6**
Percent of maximum score	**61%**	**61%**	**44%**	**28%**	**11%**	**33%**
Impairment classification	**slight**	**slight**	**moderate**	**moderate**	**severe**	**moderate**

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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.: MDT08PBSJ028

RAI No.: MDT08PBSJ028 **Sta. Name:** MDT Lonepine # 1 MS 1 LP 1
Client ID:
Date Coll.: 7/25/2008 **No. Jars:** 1 **STORET ID:**

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Acari	1	0.91%	Yes	Unknown		5	PR
Cladocera	8	7.27%	Yes	Unknown		8	CF
Ephemeroptera							
Baetidae							
Callibaetis sp.	3	2.73%	Yes	Larva		9	CG
Caenidae							
Caenis sp.	1	0.91%	Yes	Larva		7	CG
Heteroptera							
Corixidae							
Corixidae	2	1.82%	Yes	Larva		10	PH
Coleoptera							
Hydrophilidae							
Berosus sp.	5	4.55%	Yes	Larva		5	PR
Chironomidae							
Chironomidae							
Ablabesmyia sp.	2	1.82%	Yes	Larva		8	CG
Apedilum sp.	28	25.45%	Yes	Larva		11	CG
Chironomidae	1	0.91%	No	Pupa		10	CG
Chironomus sp.	2	1.82%	Yes	Larva		10	CG
Cladopelma sp.	14	12.73%	Yes	Larva		9	CG
Cladotanytarsus sp.	4	3.64%	Yes	Larva		7	CG
Cricotopus (Isocladius) sp.	9	8.18%	Yes	Larva		7	SH
Dicrotendipes sp.	2	1.82%	Yes	Larva		8	CG
Endochironomus sp.	1	0.91%	Yes	Larva		10	SH
Paratanytarsus sp.	1	0.91%	Yes	Larva		6	CG
Procladius sp.	6	5.45%	Yes	Larva		9	PR
Psectrocladius sp.	3	2.73%	Yes	Larva		8	CG
Tanytarsus sp.	17	15.45%	Yes	Larva		6	CF
Sample Count	**110**						

Metrics Report

Project ID: MDT08PBSJ
RAI No.: MDT08PBSJ028
Sta. Name: MDT Lonepine # 1 MS 1 LP 1
Client ID:
STORET ID:
Coll. Date: 7/25/2008

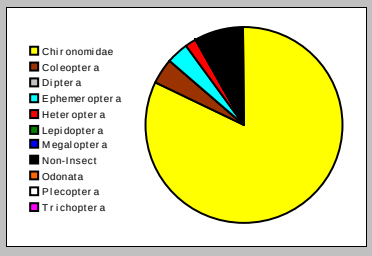
Abundance Measures

Sample Count: 110
Sample Abundance: 733.33 15.00% of sample used

Coll. Procedure:
Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	2	9	8.18%
Odonata			
Ephemeroptera	2	4	3.64%
Plecoptera			
Heteroptera	1	2	1.82%
Megaloptera			
Trichoptera			
Lepidoptera			
Coleoptera	1	5	4.55%
Diptera			
Chironomidae	12	90	81.82%

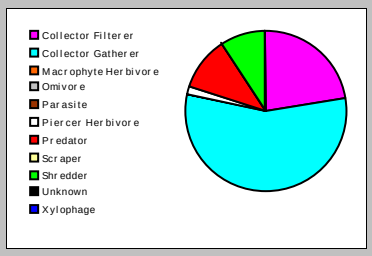


Dominant Taxa

Category	A	PRA
Apedilum	28	25.45%
Tanytarsus	17	15.45%
Cladopelma	14	12.73%
Cricotopus (Isocladius)	9	8.18%
Cladocera	8	7.27%
Procladius	6	5.45%
Berosus	5	4.55%
Cladotanytarsus	4	3.64%
Psectrocladius	3	2.73%
Callibaetis	3	2.73%
Dicrotendipes	2	1.82%
Corixidae	2	1.82%
Chironomus	2	1.82%
Ablabesmyia	2	1.82%
Caenis	1	0.91%

Functional Composition

Category	R	A	PRA
Predator	3	12	10.91%
Parasite			
Collector Gatherer	10	61	55.45%
Collector Filterer	2	25	22.73%
Macrophyte Herbivore			
Piercer Herbivore	1	2	1.82%
Xylophage			
Scraper			
Shredder	2	10	9.09%
Omivore			
Unknown			

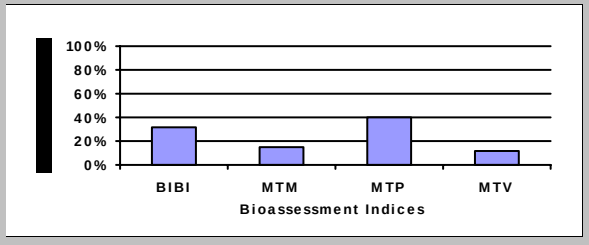


Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
Composition					
Taxa Richness	18	1	2		0
Non-Insect Percent	8.18%				
E Richness	2	1		1	
P Richness	0	1		0	
T Richness	0	1		0	
EPT Richness	2		0		0
EPT Percent	3.64%		0		0
Oligochaeta+Hirudinea Percent					
Baetidae/Ephemeroptera	0.750				
Hydropsychidae/Trichoptera	0.000				
Dominance					
Dominant Taxon Percent	25.45%		3		2
Dominant Taxa (2) Percent	40.91%				
Dominant Taxa (3) Percent	53.64%	3			
Dominant Taxa (10) Percent	88.18%				
Diversity					
Shannon H (loge)	2.386				
Shannon H (log2)	3.442		3		
Margalef D	3.624				
Simpson D	0.121				
Evenness	0.080				
Function					
Predator Richness	3		1		
Predator Percent	10.91%	3			
Filterer Richness	2				
Filterer Percent	22.73%			1	
Collector Percent	78.18%		2		1
Scraper+Shredder Percent	9.09%		1		0
Scraper/Filterer	0.000				
Scraper/Scraper+Filterer	0.000				
Habit					
Burrower Richness	3				
Burrower Percent	16.36%				
Swimmer Richness	3				
Swimmer Percent	9.09%				
Clinger Richness	2	1			
Clinger Percent	23.64%				
Characteristics					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	7				
Hemoglobin Bearer Percent	50.00%				
Air Breather Richness	1				
Air Breather Percent	4.55%				
Voltinism					
Univoltine Richness	2				
Semivoltine Richness	1	1			
Multivoltine Percent	92.73%		0		
Tolerance					
Sediment Tolerant Richness	0				
Sediment Tolerant Percent	0.00%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	3.476				
Pollution Sensitive Richness	0	1		0	
Pollution Tolerant Percent	39.09%	3		0	
Hilsenhoff Biotic Index	7.598		0		0
Intolerant Percent	0.00%				
Supertolerant Percent	40.00%				
CTQa	100.800				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	16	32.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	12	40.00%	Moderate
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	2	11.11%	Severe
MTM	Montana DEQ Mountains (Bukantis 1998)	3	14.29%	Severe



Taxa Listing

Project ID: MDT08PBSJ
RAI No.: MDT08PBSJ027

RAI No.: MDT08PBSJ027 **Sta. Name:** MDT Lonepine # 2
Client ID:
Date Coll.: 7/25/2008 **No. Jars:** 1 **STORET ID:**

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Cladocera	3	42.86%	Yes	Unknown		8	CF
Chironomidae							
Chironomidae							
Cladotanytarsus sp.	2	28.57%	Yes	Larva		7	CG
Parachironomus sp.	1	14.29%	Yes	Larva		10	PR
Procladius sp.	1	14.29%	Yes	Larva		9	PR
Sample Count	**7**						

Metrics Report

Project ID: MDT08PBSJ
RAI No.: MDT08PBSJ027
Sta. Name: MDT Lonepine # 2
Client ID:
STORET ID:
Coll. Date: 7/25/2008

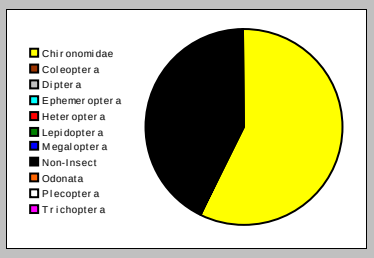
Abundance Measures

Sample Count: 7
Sample Abundance: 7.00 100.00% of sample used

Coll. Procedure:
Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	1	3	42.86%
Odonata			
Ephemeroptera			
Plecoptera			
Heteroptera			
Megaloptera			
Trichoptera			
Lepidoptera			
Coleoptera			
Diptera			
Chironomidae	3	4	57.14%

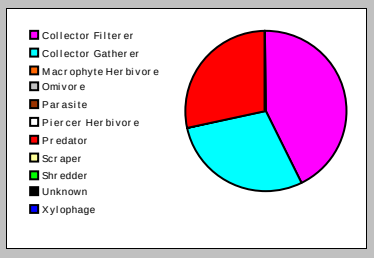


Dominant Taxa

Category	A	PRA
Cladocera	3	42.86%
Cladotanytarsus	2	28.57%
Procladius	1	14.29%
Parachironomus	1	14.29%

Functional Composition

Category	R	A	PRA
Predator	2	2	28.57%
Parasite			
Collector Gatherer	1	2	28.57%
Collector Filterer	1	3	42.86%
Macrophyte Herbivore			
Piercer Herbivore			
Xylophage			
Scraper			
Shredder			
Omivore			
Unknown			



Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
Composition					
Taxa Richness	4	1	0		0
Non-Insect Percent	42.86%				
E Richness	0	1		0	
P Richness	0	1		0	
T Richness	0	1		0	
EPT Richness	0		0		0
EPT Percent	0.00%		0		0
Oligochaeta+Hirudinea Percent					
Baetidae/Ephemeroptera	0.000				
Hydropsychidae/Trichoptera	0.000				
Dominance					
Dominant Taxon Percent	42.86%		2		1
Dominant Taxa (2) Percent	71.43%				
Dominant Taxa (3) Percent	85.71%	1			
Dominant Taxa (10) Percent	100.00%				
Diversity					
Shannon H (loge)	1.277				
Shannon H (log2)	1.842		1		
Margalef D	1.542				
Simpson D	0.190				
Evenness	0.243				
Function					
Predator Richness	2		0		
Predator Percent	28.57%	5			
Filterer Richness	1				
Filterer Percent	42.86%			0	
Collector Percent	71.43%		2		1
Scraper+Shredder Percent	0.00%		0		0
Scraper/Filterer	0.000				
Scraper/Scraper+Filterer	0.000				
Habit					
Burrower Richness					
Burrower Percent					
Swimmer Richness					
Swimmer Percent					
Clinger Richness					
Clinger Percent					
Characteristics					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	2				
Hemoglobin Bearer Percent	28.57%				
Air Breather Richness	0				
Air Breather Percent	0.00%				
Voltinism					
Univoltine Richness	0				
Semivoltine Richness	0	1			
Multivoltine Percent	100.00%		0		
Tolerance					
Sediment Tolerant Richness	0				
Sediment Tolerant Percent	0.00%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	3.750				
Pollution Sensitive Richness	0	1		0	
Pollution Tolerant Percent	57.14%	1		0	
Hilsenhoff Biotic Index	8.143		0		0
Intolerant Percent	0.00%				
Supertolerant Percent	71.43%				
CTQa	108.000				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	13	26.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	5	16.67%	Severe
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	0	0.00%	Severe
MTM	Montana DEQ Mountains (Bukantis 1998)	2	9.52%	Severe