MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2009

Camp Creek
Sula, Montana

Prepared for:

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

Prepared by:

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Helena, MT 59601

December 2009

PBS&J Project No: 0B4308802.02.02

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1.0 INTRODUCTION

This report documents the seventh year (2009) of monitoring at the Camp Creek mitigation site. The Camp Creek project was developed to mitigate stream and wetland impacts associated with the Montana Department of Transportation (MDT) constructed Sula-North and South project, and to possibly function as a mitigation reserve to be applied against future MDT projects in the Bitterroot Valley. Camp Creek is located in Ravalli County, MDT Watershed # 3, in the Lower Clark Fork region. The mitigation site is located approximately three miles south of Sula, Montana (**Figure 1**). Elevations of the site range from 4,600 ft at the north boundary to 4,730 ft at the south boundary.

The approximate site boundary is illustrated on **Figure 2** (**Appendix A**) and on the original site plans (**Appendix D**). The project is located within the Sula Basin and along the historic Camp Creek floodplain. Camp Creek flows across the valley bottom, until eventually draining into the East Fork of the Bitterroot River. Seasonal flooding and perennial creek flow provide the primary hydrology source within the new channel/floodplain margins. Local groundwater systems serve as a secondary hydrology source, flowing through the deep alluvial substrate contained within the Sula Basin. Within the project limits, two smaller creeks drain into Camp Creek: Andrews and Praine Creeks.

Construction at the Camp Creek mitigation site was completed during the spring of 2002. The overall goals of this project were restoration of Camp Creek channel bottom, associated wetland functional restoration/enhancement and creation, and enhancement of heavily grazed and cleared riparian vegetation. Construction diagrams are presented in **Appendix D**. Project details for each of the three main goals are included in the following list:

Functional Restoration

- Return Camp Creek to its historic channel and establish new channel.
- Restore hydrology and vegetation, recreating high value wetland habitat along Camp Creek riparian corridor.
- Fill existing ditches.

Enhancement

- Riparian shrub and tree plantings throughout the created floodplain margins.
- Drier upland species planting in areas of created upland slopes.

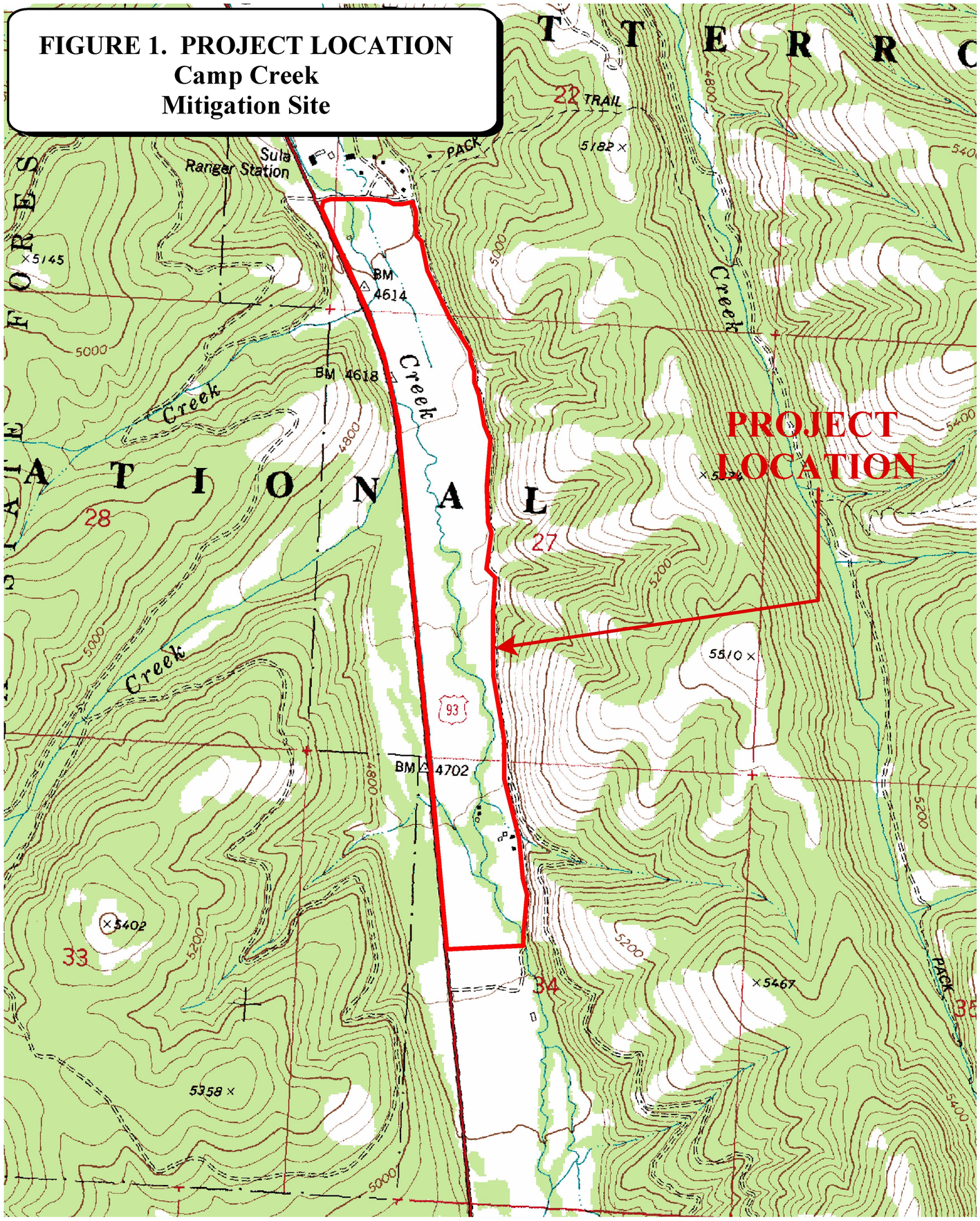
Creation

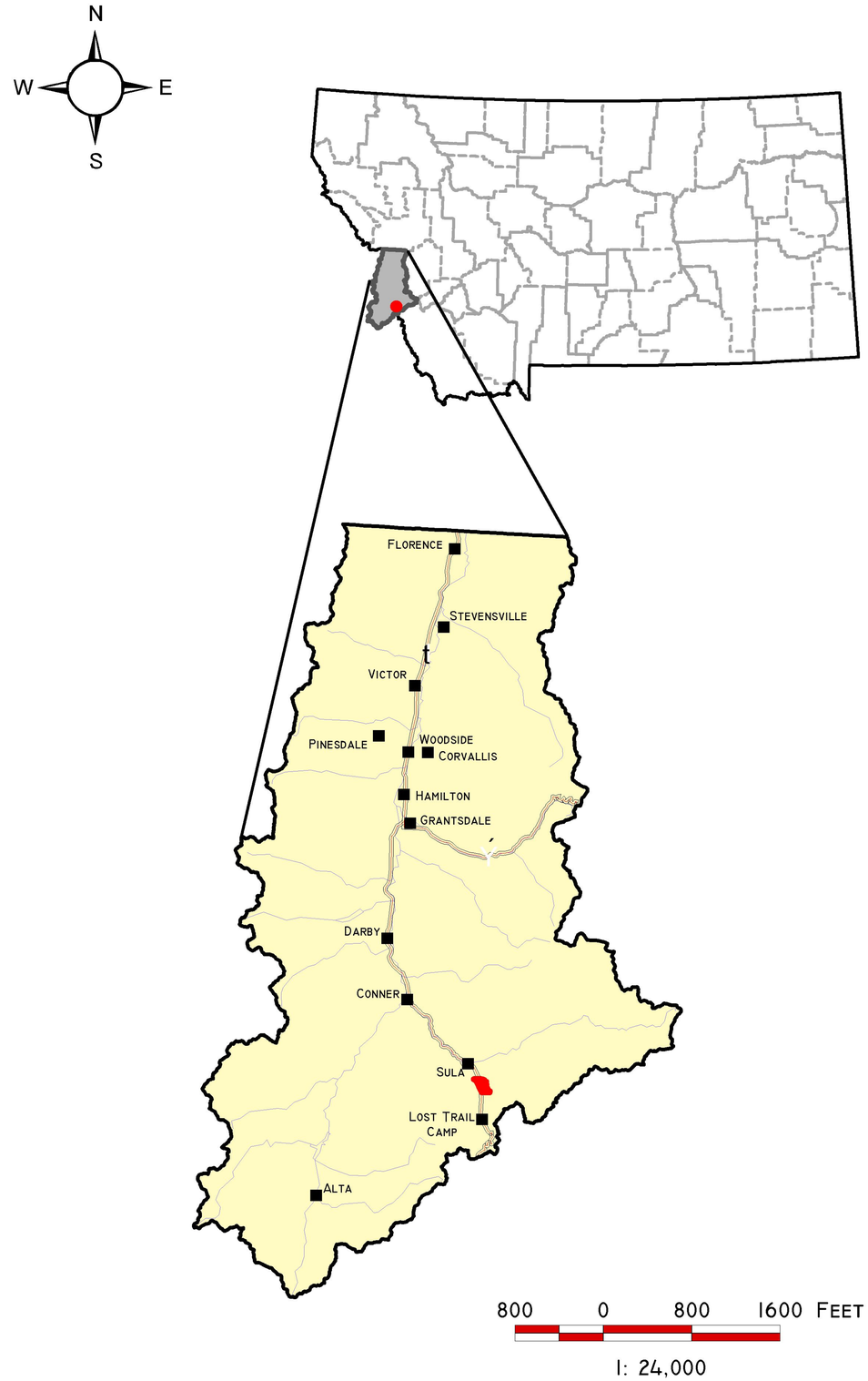
- Creation of emergent/scrub shrub wetlands along the floodplain margins of the new channel.

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

The credit allocation method for this site was worked out between MDT and COE in early 2006, and is functional unit-based, whereby wetland acreage for each AA is multiplied by the total score for that AA to arrive at an overall functional unit score. This is done both pre-project and post-project. The difference between these two numbers (the functional unit “gain”) is then

FIGURE 1. PROJECT LOCATION
Camp Creek
Mitigation Site





PROJECT #: 0B4308801
DATE: NOV 2008
LOCATION: RAVALLI CO
PROJECT MANAGER: J. BERGLUND
DRAWN BY: B. NOECKER

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divided by the post-project score to arrive at an approximate credit acreage for that AA. Credit acreages from each AA are summed to arrive at a total for the site.

The Camp Creek site is typically monitored once per year to document wetland and other biological attributes. The monitoring area is illustrated in **Figure 2** (**Appendix A**).

2.0 METHODS

2.1 Monitoring Dates and Activities

The site was visited on July 25th (mid-season) of 2009. Monitoring activities were conducted on the MDT-owned portion of the site, as well as within the fenced portion of the adjacent (upstream) Grasser property. Both parcels make up the mitigation site. The mid-season visit was conducted to document vegetation, soil, and hydrologic conditions that are used to map jurisdictional wetlands. All information contained on the Wetland Mitigation Site Monitoring Form (**Appendix B**) was collected at this time. Activities and information conducted or collected included: wetland delineation; wetland/open water/aquatic habitat boundary mapping; vegetation community mapping; vegetation transect ; soils data; hydrology data; bird and general wildlife use; photograph points; macroinvertebrate sampling; GPS data points; functional assessment; (non-engineering) examination of topographic features; and stream cross section data at two established transects.

2.2 Hydrology

Wetland hydrology indicators were recorded during the mid-season visit using procedures outlined in the COE 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Hydrology data were recorded on COE Routine Wetland Delineation Data Forms (**Appendix B**). Additional hydrologic data were recorded on the Wetland Mitigation Site Monitoring Form (**Appendix B**). Precipitation data from the Sula 3 ENE weather station, which is monitored by the Western Regional Climate Center (WRCC), was used to estimate precipitation at the project site. No groundwater monitoring wells were installed at the site.

Two cross section locations were established and surveyed across Camp Creek on the MDT-owned parcel: one upstream and one downstream of the Praine Creek confluence with Camp Creek. These are designated “XS 3-A” and “XS 4-A” on **Figure 2** (**Appendix A**). The cross sections are used to monitor potential lateral and vertical channel migration.

2.3 Vegetation

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

A 10-foot wide belt transect was sampled during the mid-season monitoring event to represent the range of current vegetation conditions (**Figure 2** in **Appendix A**). Percent cover was estimated for each vegetative species within each successive vegetative community encountered within the "belt" using the following values: T (few plants); P (1-5%), 1 (6-15%); 2 (16-25%); 3 (26-35%); 4 (36-45%); 5 (46-55%), 6 (56-65), 7 (66-75), 8 (76-85), and 9 (86-95). Transect endpoint locations were recorded with the global positioning system (GPS) unit in 2002. A photo was taken of the transect from both ends.

A comprehensive plant species list was maintained for the site. Revegetation enhancements were implemented in the spring of 2002. Survival rates for planted species were recorded during the mid-season monitoring visit.

2.4 Soils

Soils were evaluated during the mid-season site visit using the hydric soils determination procedures outlined in the COE 1987 Wetland Delineation Manual. Soil data were recorded for each wetland determination point on the COE Routine Wetland Delineation Data Forms (**Appendix B**). The most current terminology used by NRCS was used to describe hydric soils (USDA 2006).

2.5 Wetland Delineation

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

Wetland and upland areas within the monitoring area were investigated for the presence of wetland hydrology, hydrophytic vegetation and hydric soils. The information was recorded on COE Routine Wetland Delineation Data Forms (**Appendix B**). The wetland/upland boundary was originally delineated on the air photo and recorded with a resource grade GPS unit using the procedures outlined in **Appendix E**. Modifications to these boundaries in 2009 were accomplished by hand-mapping onto the 2009 aerial photograph. The wetland/upland boundary in combination with the wetland/open water boundary was used to calculate the final wetland acreage. Pre-project wetlands are shown on **Figure 4 (Appendix A).**

2.6 Fish and Wildlife

Fish, mammal, reptile, and amphibian species observations and indicators of their use (i.e, vocalizations, tracks, scat, burrows, eggshells, and bones) were recorded on the Wetland Mitigation Site Monitoring Form during the mid-season visit (**Appendix B**). These observations were recorded while conducting other required activities. Direct sampling methods (i.e., snap

traps, live traps, and pitfall traps) were not implemented. A comprehensive species list for the entire site has been maintained.

2.7 Birds

Bird observations were also recorded during the mid-season visit. No formal census plots, spot mapping, point counts, or strip transects were conducted. Observations were recorded incidental to other monitoring activities and were categorized by species, activity code, and general habitat association. Bird observations were recorded on the **Wetland Mitigation Site Monitoring Form** (**Appendix B**).

2.8 Macroinvertebrates

Two macroinvertebrate samples were collected during the mid-season site visit along Camp Creek (**Figure 2** in **Appendix A**). Samples were collected and preserved as outlined in the Macroinvertebrate Sampling Protocol (**Appendix F**). Samples were analyzed by Rhithron Associates, Inc. in Missoula, Montana.

2.9 Functional Assessment

Turnstone Biological completed a baseline functional assessment in 2001. Since 2001, a functional assessment for each delineated wetland was conducted using the 1999 MDT Montana Wetland Assessment Method (Berglund 1999) (**Appendix B**). Although the MDT Montana Wetland Assessment Method was revised in 2008 (Berglund and McEldowney 2008), application of the 1999 version was continued as crediting is tied to 1999 version. Field data necessary for this assessment were collected during the mid-season visit.

2.10 Photographs

The July 1, 2009 aerial photograph was used as a base for **Figures 2** and **3** (**Appendix A**). Photographs were taken to illustrate current land uses surrounding the site, the upland buffer, the monitored area, and the vegetation transects (**Appendix C**). Each photograph point location was recorded with a resource-grade GPS in 2002 and mapped onto the 2009 aerial photograph. All photographs were taken using a digital camera.

2.11 GPS Data

During the 2002 monitoring season, point data were collected with a resource-grade GPS unit at the vegetation transect beginning and ending locations and at all photograph point locations. Wetland boundaries were recorded with the resource-grade GPS unit. Procedures used for GPS mapping and aerial photograph referencing are included in **Appendix E**.

2.12 Maintenance Needs

Observations were made of existing structures and of erosion/sediment problems to identify maintenance needs. This did not constitute an engineering-level structural inspection, but rather

a cursory examination. Current or potential future problems were documented on the Wetland Mitigation Site Monitoring Form (**Appendix B**).

3.0 RESULTS

3.1 Hydrology

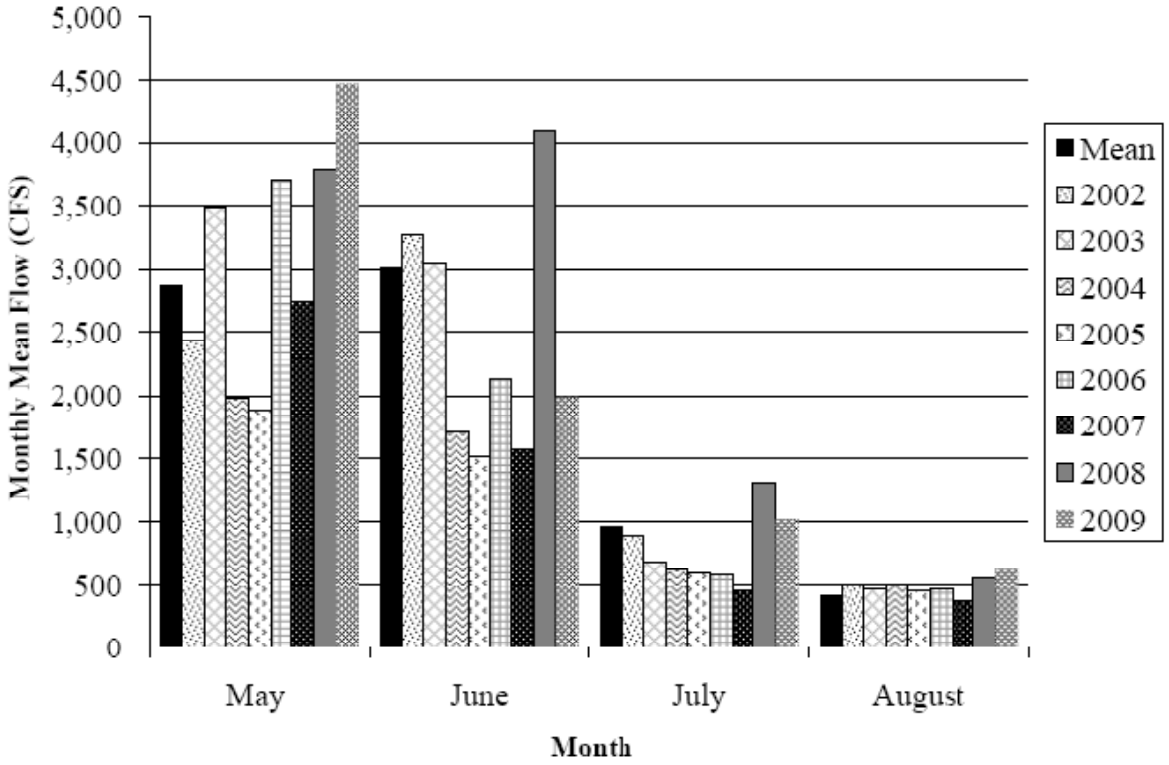
The main source of hydrology for this site is Camp Creek, a perennial stream draining out of the south end of the Bitterroot Mountains. Seasonal flooding of Camp Creek occurs during spring runoff. Secondary sources of hydrology include runoff from ephemeral drainages east of the site, the persistent movement of groundwater through course alluvium materials located throughout the valley bottom, and surface runoff. The mitigation site is located within the historic Camp Creek floodplain. The site consists of a constructed main channel, streambanks, and floodplain terraces. Depression wetlands are present, supported by seasonal overland flooding of Camp Creek and by groundwater flows. Where the creek enters Grasser's parcel, south of the MDT-owned parcel, it was once diverted into a channel running along the edge of Hwy 93. Several ditches designed to drain the wetland meadow complex were filled and closed during construction activities. Removal of drain ditches allowed the groundwater system to recharge and possibly provide higher storage functions. Average high water levels were recorded at 222 cfs (Turnstone Biological 2001). Lower water flows are on average 10 cfs (Turnstone Biological 2001).

The closest weather station to the project area is Sula 3 ENE. At the Sula station precipitation was slightly below "normal" from January through August 2009 (Western Regional Climate Center [WRCC] 2009). Precipitation during this period totaled 11.74 inches, which is 73% of the 15.93-inch mean for the January- August period from 1955 to 2009 (WRCC 2009).

Stream flow was sub-normal in 2007 and well above normal in 2008 (**Chart 1**). Stream flow for 2009 was well above normal in the month of May and then dropped below normal during June (**Chart 1**). Stream flows toward the end of the summer were above normal (**Chart 1**). In 2007 Ravalli County was assigned the "severe drought" status by the Montana Department of Natural Resources and Conservation. Drought maps for 2009 showed that Ravalli County was not in a drought condition (NRIS 2009).

A rock channel bottom occupied approximately 2.15 acres or 5% of the current 46-acre mitigation site (**Figure 3** in **Appendix A**). Depths of the creek ranged from 0.5 ft in the straight segments to two to three feet around the bends and meanders. Cross-section results are presented in **Figure 5** in **Appendix G**. These cross sections represent, in essence, post-project "baseline" (2002), as well as 2009 channel conditions. Cross section results measured during the 2009 monitoring show that major adjustments have taken place.

Chart 1: ***Mean monthly flows for May to August of 2002 to 2009 as compared to the long-term mean monthly flows (1937-2008) on the Bitterroot River near Darby, Montana.***



Cross Section 3-A is located below the Praine Creek confluence. During 2009 runoff, this cross-section changed shape. Camp Creek received a significant increase in annual flows during 2008 and 2009 seasonal runoffs, which contributed to channel and bank movement at this cross section location. The left bank was stable, remaining in the same location as in 2007. The channel bottom in the middle showed a moderate change with increased sand and gravel deposition. Significant changes were observed along the right bank with additional movement towards the east. Just upstream from the transect a large ponderosa pine fell into the creek during the 2008 spring runoff. The stream has significantly undercut the log. The addition of the large wood material in the channel and across the creek has lead to further changes in 2009.

Cross Section 4-A is located above the Praine Creek confluence. This cross section has changed during the 2009 runoff. Compared with 2008, the left bank has remained in a similar location and the channel bottom has slightly increased in depth. The right bank continued to move towards the east.

A shallow flood channel was excavated between the creek and existing swales during the fall of 2005. It was excavated to enhance the connectivity of these two systems during high water events. This channel functioned during 2009, supplementing and restoring hydrologic connectivity between the creek and the emergent wetland complex.

3.2 Vegetation

Eighty-nine plant species have been identified at the site (**Table 1**). The majority of these species are herbaceous and occur in wetland meadow complexes; tree and shrub coverage remains minor. Several remnant shrub patches exist along the dry oxbows of the historic Camp Creek. With the reintroduction of hydrology into these old channels, these shrub patches are now receiving water and should flourish over time. Large areas of wet meadows exist within the lower topography. These wet meadows are seasonally inundated and groundwater-fed. Several mature black cottonwood (*Populus trichocarpa*) stands are located amongst shrub patches on the Grasser property.

Three wetland and three upland community types were identified and mapped at the mitigation site (**Figure 3** in **Appendix A**). The three wetland community types included: Type 2-*Carex/Phalaris*, Type 3-*Agrostis/Deschampsia*, and Type 6-*Populus/Salix*. The three upland community types included: Type 1-*Agropyron/Trifolium*, Type 5-*Agropyron/Centaurea*, and Type 7-*Phalaris/Centaurea*. Plant species observed within each of these communities are listed on the **Monitoring Form** (**Appendix B**).

Wetland types 2 and 6 were present before construction of the main channel. A pre-construction wetland delineation mapped the majority of the site as emergent wetlands. Type 2 is a remnant wetland with heavy past alterations due to livestock grazing and historic clearing of riparian vegetation. Type 2 is the wettest community and occurs as emergent wetland in saturated to shallow water conditions. Type 6 consists of willow (*Salix*), alder (*Alnus*) and birch (*Betula*) shrubs along the old dry oxbows and depressions. Higher on the banks, just above the streambed, mature cottonwoods are present along the old terraces.

Community Type 3 was created during the channel reconstruction, and includes the geo-textile fabric wrapped streambanks and floodplain areas. Community Type 4-*Salix/Agropyron*, mapped during the 2002 monitoring, was included within the Type 3-*Agrostis/Deschampsia* community during 2003-2009 monitoring. Community type classification for Type 4 was based on the dominant grass species and willow sprigging used during construction efforts. During the 2003 monitoring the Type 4 grasses had changed from wheatgrass (*Agropyron*) to redtop (*Agrostis alba*) and tufted hairgrass (*Deschampsia cespitosa*). During the 2004-2009 monitoring these wetter type species have continued to increase in cover and now dominate the floodplain areas.

Revegetation efforts were implemented along the streambanks and floodplain margins during the 2002 construction and again in 2008 when willows were sprigged into several banks. The 2002 effort included planting of 10-cubic gallon shrubs and trees and sprigging of willows. Species planted for riparian enhancement included cottonwood, willows, dogwood (*Cornus stolonifera*), and aspen (*Populus tremuloides*). During the spring of 2008 five exposed banks were planted with 120 willow cuttings to promote stability. Survival data on the original 2002 plantings were recorded on the **Monitoring Form** (**Appendix B**).

Table 1: ***Vegetation species observed*** **from** ***2002 to 2009 at the Camp Creek Wetland Mitigation Site.***

Scientific Name[1]	Common Name[1]	Region 9 (Northwest) Wetland Indicator
Achillea millefolium	common yarrow	FACU
Agropyron repens	quackgrass	FACU
Agrostis alba	redtop	FAC+
Alnus incana	thin leaved alder	FACW
Alopecurus pratensis	meadow foxtail	FACW
Amelanchier alnifolia	service-berry	FACU
Aster integrifolius	thickstem aster	--
Betula occidentalis	water birch	FACW
Bromus inermis	smooth brome	--
Bromus japonicus	Japanese bromegrass	FACU
Bromus tectorum	cheatgrass	--
Calamagrostis canadensis	bluejoint reedgrass	FACW+
Carex aquatilis	water sedge	OBL
Carex bebbii	Bebb's sedge	OBL
Carex nebrascensis	Nebraska sedge	OBL
Carex crawfordii	Crawford's sedge	FAC
Carex lanuginose	wooly sedge	OBL
Carex praegracilis	clustered field sedge	FACW
Carex utriculata	beaked sedge	OBL
Centaurea maculosa	spotted knapweed	--
Cercocarpus ledifolius	mountain-mahogany	--
Chenopodium album	white goosefoot	FAC
Chrysanthemum leucanthemum	oxeye daisy	--
Cirsium arvense	Canada thistle	FACU+
Cirsium vulgare	bull thistle	FACU
Cornus stolonifera	red-osier dogwood	FACW
Crataegus douglasii	Douglas hawthorn	FAC
Crepis tectorum	annual hawksbeard	--
Cynoglossum officinale	hound's tongue	FACU
Danthonia spp.	oatgrass	--
Deschampsia cespitosa	tufted hairgrass	FACW
Epilobium ciliatum	hairy willow-herb	FACW+
Epilobium paniculatum	willow-herb	--
Equisetum arvense	field horsetail	FAC
Equisetum laevigatum	smooth scouring-rush	FACW
Festuca pratensis	meadow fescue	FACU+
Geum macrophyllum	big leafed avens	OBL
Glyceria elata	tall mannagrass	FACW+
Glyceria grandis	American mannagrass	OBL
Gnaphalium palustre	cudweed	FAC+
Juncus balticus	Baltic rush	FACW
Juncus bufonius	toad rush	FACW
Juncus confuses	Colorado rush	FAC
Juncus ensifolius	three-stamen rush	FACW
Lactuca serriola	prickly lettuce	FAC-
Lepidium perfoliatum	clasping pepper-grass	FACU+
Linaria vulgaris	butter and eggs	--
Lonicera involucrate	honeysuckle	FAC+

[1] **Bolded** species were documented in the analysis area for the first time in 2009.

Table 1 (continued): *Vegetation species observed* from *2002 to 2009 at the Camp Creek Wetland Mitigation Site.*

Scientific Name[1]	Common Name[1]	Region 9 (Northwest) Wetland Indicator
Lupinus wyethii	Wyeth's lupine	NI
Lychnis alba	white campion	--
Matricaria matricarioides	pineapple-weed	FACU
Melilotus officinalis	yellow sweet clover	FACU
Mentha arvensis	field mint	FAC
Mimulus guttatus	monkey-flower	OBL
Phalaris arundinacea	reed canarygrass	FACW
Phleum pretense	timothy	FACU
Pinus ponderosa	ponderosa pine	--
Plantago major	plantain	FACU+
Poa pratensis	Kentucky bluegrass	FACU+
Polygonum amphibium	water smartweed	OBL
Populus tremuloides	quaking aspen	FAC+
Populus trichocarpa	cottonwood	FAC
Potentilla fruticosa	shrubby cinquefoil	FAC-
Potentilla gracilis	northwest cinquefoil	FAC
Pseudotsuga menziesii	Douglas fir	FACU
Ranunculus aquatilis var. hispidulus	white-water buttercup	OBL
Ranunculus repens	buttercup	FACW
Rosa woodsii	woods rose	FACU
Rubus idaeus	wild raspberry	FACU
Rumex crispus	curly dock	FACW
Salix bebbiana	Bebb's willow	FACW
Salix boothii	Booth's willow	OBL
Salix drummondiana	Drummond willow	FACW
Salix exigua	sandbar willow	OBL
Salix geyeriana	Geyer willow	FACW+
Salix lutea	yellow willow	OBL
Scirpus microcarpus	small-fruit bulrush	OBL
Senecio vulgaris	common groundsel	FACU
Sium suave	water parsnip	OBL
Sisymbrium altissimum	tall tumble mustard	FACU-
Smilacina stellata	starry false-solomon's-seal	FAC-
Solidago canadensis	Canada goldenrod	FACU
Symphoricarpos albus	snowberry	FACU
Tanacetum vulgare	common tansy	NI
Taraxacum officinale	common dandelion	FACU
Thlaspi arvensis	pennycress	NI
Trifolium pretense	red clover	FACU
Verbascum thapsus	common mullein	--
Veronica Americana	American speedwell	OBL

[1] **Bolded** species indicate those documented in the analysis area for the first time in 2009.

Adjacent upland vegetation communities are dominated by rangeland and/or aggressive invasive species. Type 1 consists of several spoil piles created for upland vegetation enhancement. These areas were planted with a mix of 5-cubic gallon plantings and weed matting. Upland plantings included Douglas-fir (*Pseudotsuga menziesii*), lodgepole pine (*Pinus contorta*) ponderosa pine (*Pinus ponderosa*), serviceberry (*Amelanchier alnifolia*), shrubby potentilla (*Potentilla*

fruticosa), snowberry (*Symphoricarpos albus*), and woods rose (*Rosa woodsii*). Dominant species included pasture grasses and mostly weedy disturbance species such as quackgrass (*Agropyron repens*), pennycress (*Thlaspi arvensis*), dandelion (*Taraxacum officinale*), and tumble mustard (*Sisymbrium altissimum*). During monitoring, plantings did not contribute enough coverage to be considered significant in determining them as dominant in the community type.

Type 5 consisted of upland areas historically grazed and were dominated with pasture grasses, such as quackgrass, meadow foxtail (*Alopecurus pratensis*), and smooth brome (*Bromus inermis*). Type 5 also had a high abundance of spotted knapweed (*Centaurea maculosa*) located in the transition zone between wetland bottoms and open forest slopes.

Noxious weed locations observed during the 2009 field visit were mapped (**Figure 3** in **Appendix A)**. These were individual noxious weed locations or small patches and were not mapped as a community type. Noxious weeds found were: Canada thistle (*Cirsium arvense*), yellow toadflax (*Linaria vulgaris*), and spotted knapweed. Cover values for these noxious weeds can be found under their respective community type on the **Monitoring Form** (**Appendix B**). Ox-eye daisy (*Chrysanthemum leucanthemum*) and hound's-tongue (*Cynoglossum officinale*) noxious weeds were recorded only at the community level and therefore were not mapped onto **Figure 3** (**Appendix B**). Other invasive, but not noxious, weeds found included: bull thistle (*Cirsium vulgare*), common dandelion, lambsquarters (*Chenopodium album*), clasping pepper-grass (*Lepidium perfoliatum*), pennycress, tumbleweed and quackgrass.

Vegetation transect results are detailed in the **Monitoring Form** (**Appendix B**) and are summarized in tabular format (**Table 2**) and graphically illustrated (**Charts 2** and **3**). The previous year's transect summary data are included to compare changes among monitoring years (**Table 2**).

Table 2: ***Data summary for Transect 1 at the Camp Creek Wetland Mitigation Site.***

Monitoring Year	2002	2003	2004	2005	2006	2007	2008	2009
Transect Length (feet)	471	471	471	471	471	471	471	471
# Vegetation Community Transitions along Transect	4	4	4	4	4	4	4	4
# Vegetation Communities along Transect	3	3	3	3	3	3	3	3
# Hydrophytic Vegetation Communities along Transect	2	2	2	2	2	2	2	2
Total Vegetative Species	28	27	30	31	31	37	34	36
Total Hydrophytic Species	15	16	17	17	17	17	20	21
Total Upland Species	13	11	13	14	14	20	14	15
Estimated % Total Vegetative Cover	85	95	86	84	84	88	87	87
% Transect Length Comprised of Hydrophytic Vegetation Communities	59	59	59	60	60	60	60	60
% Transect Length Comprised of Upland Vegetation Communities	37	37	37	36	36	36	36	36
% Transect Length Comprised of Unvegetated Open Water	4	4	4	4	4	4	4	4
% Transect Length Comprised of Bare Substrate	0	0	0	0	0	0	0	0

Chart 2: ***Transect maps showing vegetation types from the start of transect (0 feet) to the end of transect (471 feet) for each year monitored.***

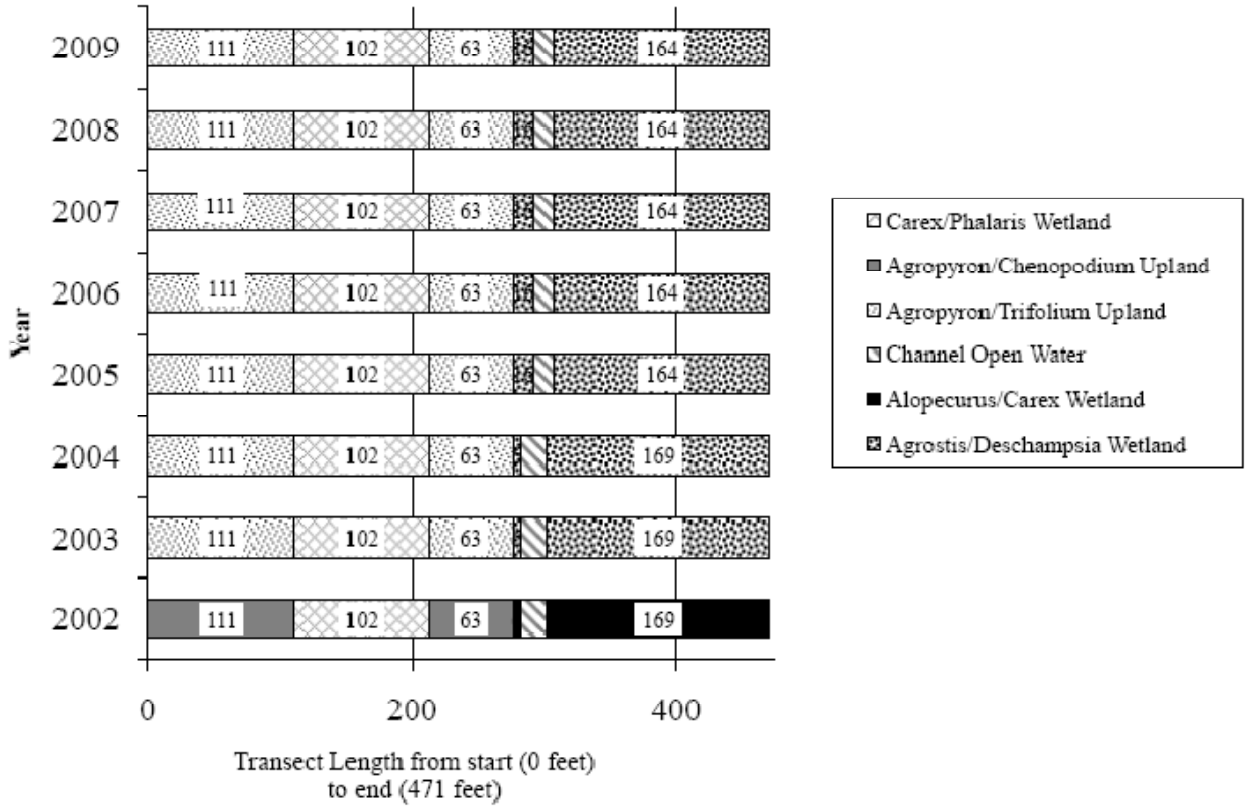
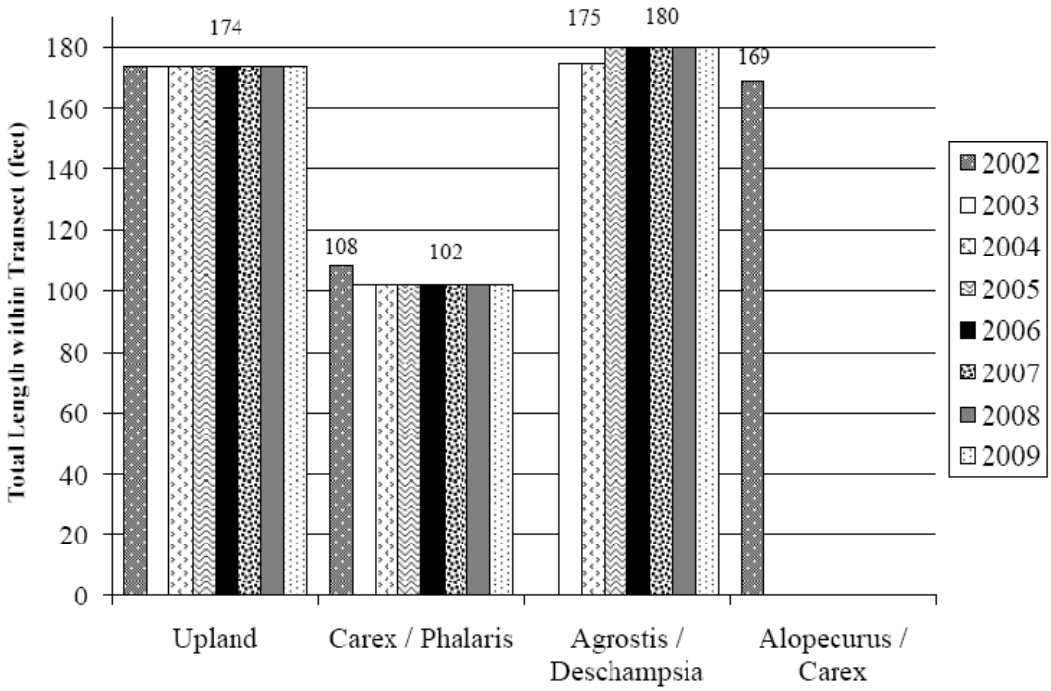


Chart 3: ***Length of vegetation communities within Transect 1 for each year monitored.***



3.3 Soils

The soils located at the Camp Creek site are mapped as Gallatin-shallow muck complex, gently sloping (SCS 1951). Soil characteristics at each wetland determination point were compared with those of the Gallatin-shallow muck complex and generally matched this classification. Wetland soils observed were mostly peat, loams, sandy loams, or sands with very low chromas (1 or 2) (**COE Forms** in **Appendix B**). Mottles or oxidized rhizospheres (redoximorphic features) were not present any of the profiles. Soil profiles in the wetlands meadow mostly consisted of deep A-horizons of peat or loamy materials with a sandy/gravelly layer underneath, saturated at approximately 8 inch depths. Several profiles had large cobbles, gravels and stones below a 6-8 inch A- horizon with matrix colors of 10YR 2/1. Created upland slopes were constructed with fill materials removed from channel excavation. Upland soil pits consisted of a mixture of large cobbles and loamy soil, with matrix colors of 10YR 2/2.

3.4 Wetland Delineation

Approximately 47.23 wetland acres and 1.5 open water channel acres occurred within the monitoring area prior to project implementation (**Figure 4** in **Appendix A**). Wetlands were delineated and mapped in 2009 (**Figure 3** in **Appendix A**). In 2009 the Wetland delineation found slightly fewer wetlands than were delineated in 2008 (**Table 3**).

Table 3: ***Summary of aquatic habitat acreages in 2000 (baseline) and from 2007 to 2009 at the Camp Creek Wetland Mitigation Site.***

HABITAT	ACREAGES							
	2009 MDT Property	2009 Grasser Property	2008 MDT Property	2008 Grasser Property	2007 MDT Property	2007 Grasser Property	2000 MDT Property	2000 Grasser Property
Wetland Area	32.33	6.93	32.44	6.93	34.84	6.93	42.61	4.62
Open Water Area	0.95	1.20	0.95	1.20	0.95	1.20	0.75	0.75
SUBTOTAL	33.28	8.13	33.39	8.13	35.79	8.13	43.36	5.37
Aquatic Habitat Total	**41.41**		**41.52**		**43.92**		**48.73**	

During the 2009 monitoring, total wetland acres slightly decreased due to separate mapping of a small weedy upland area within a larger wetland. During the 2008 monitoring, a significant change in wetland acres had been observed with a decrease of approximately 2.4 acres. These 2008 changes were observed in the following areas: southeast corner of the MDT parcel near the Grasser / MDT boundary; expansion of an upland island located north of the flood channel; and upstream from the inlet of Andrews Creek within remnant wetlands.

The decrease in the southeast corner is located up-gradient and east of the flood channel. These areas historically received more hydrology input from flood irrigation on the Grasser parcel. It is most likely that the change in irrigation practices on the east of Grasser property caused the overall decrease in wetlands acres. The flood channel has increased the hydrology at the wetlands located below this area, but the southeast corner is not receiving flood waters from the

excavated flood channel. The drainage pattern from the flood channel is confined to the lowest topography and drains north away from the east side of the valley floor. The expanded upland island is located on higher topography north of the flood channel and does not receive surface waters during seasonal runoff. Finally, the area upstream of the Andrews Creek inlet is located on the terrace above Camp Creek and its floodplain. These areas historically were flooded or saturated from irrigation practices prior to the reconstruction of the creek. Currently, this upper terrace is not receiving the same, albeit "artificial", hydrology as in the past.

Although a reversion to natural pre-irrigation conditions, these changes in wetland area near the southeast corner are considered permanent, unless irrigation practices change on the Grasser parcel. The other areas showing a decrease are also considered permanent due to location on the upper terrace and change in the associated hydrology.

3.5 Fish and Wildlife

A comprehensive list of fish and wildlife species (or their sign) observed at the site has been maintained from 2002 to 2009 (**Table 4**). For each bird species observed, information on their activity and habitat use were also recorded (**Bird Survey Form** in **Appendix B**). In 2009 two mammal and two bird species were observed at the mitigation site (**Table 4**).

The constructed channel offers habitat for several fish species, including westslope cutthroat, hybrid cutthroat x rainbow trout, brook trout and brown trout (**Table 4**). Pre-project and post-project surveys along Camp Creek on the MDT parcel were conducted by Montana Fish Wildlife and Parks (MFWP) during 1999, 2003, 2004-2007, and 2009. The 2007 survey documented 297 westslope cutthroat X rainbow trout ranging in size from 3 to 9+ inches (Clancy 2007). No fisheries data were collected during the 2008 monitoring season (Clancy 2008). The 2009 survey documented 344 westslope cutthroat X rainbow trout in the 3 to 9+ inch size range (Clancy 2009).

Table 4: ***Fish and wildlife species observed at the Camp Creek Mitigation Site from 2002 to 2009.***

FISH Brook Trout (*Salvelinus fontinalis*)[1] Westslope Cutthroat Trout (*Oncorhynchus clarki lewisi*)[1]	 Cutthroat X Rainbow Trout (*Oncorhynchus clarkii X mykiss)*[1] Brown Trout (*Salmo trutta*)[1]
AMPHIBIAN Spotted Frog (*Rana iuteiventris*)	
REPTILE None	

Table 4 (continued): ***Fish and wildlife species observed at the Camp Creek Mitigation Site from 2002 to 2009.***

BIRD	
American Crow (*Corvus brachyrhynchos*)	Cedar Waxwing (*Bombycilla cedrorum*)
American Dipper (*Cinclus mexicanus*)	Common Merganser (*Mergus merganser*)[2]
American Goldfinch (*Carduelis tristis*)	Common Raven (*Corvus corax)*
American Kestrel (*Falco sparverius*)[2]	Common Snipe (*Gallinago gallinago*)[2]
American Robin (*Turdus migratorius*)	European Starling (*Sturnus vulgaris*)
Bald Eagle (*Haliaeetus leucocephalus)*[2]	Grasshopper Sparrow (*Ammodramus savannarum*)
Black-billed Magpie (*Pica pica*)	**Killdeer (*Charadrius vociferus*)**
Blue Grouse (*Dendragapus obscurus*)[2]	Mallard (*Anas platyrhynchos*)
Brewer's Blackbird (*Euphagus cyanocephalus*)	Mountain Bluebird (*Sialia currucoides*)[2]
Brown-headed Cowbird (*Molothrus ater)*	Northern Harrier (*Circus cyaneus*)[2]
Canada Goose (*Branta canadensis*)	Red-tail Hawk (*Buteo jamaicensis*)
	Spotted Sandpiper (*Actitis macularia*)[2]
MAMMAL	
Bobcat (*Felis rufus*)	Mule Deer (*Odocoileus hemionus*)[2]
Coyote (*Canis latrans*)	Red Fox (*Vulpes vulpes*)[2]
Deer Mouse (*Peromyscus maniculatus*)[2]	Richardson's Ground Squirrel (*Spermophilus richardsonii*)[2]
Elk (*Cervus elaphus*)	**White-tailed Deer (*Odocoileus virginianus*)**
Meadow Vole (*Microtus pennsylvanicus*)[2]	
Moose (*Alces alces*)	

[1] Observed by Montana Fish, Wildlife & Parks.
[2] Observed by MDT
Bolded species were observed during the 2009 monitoring.

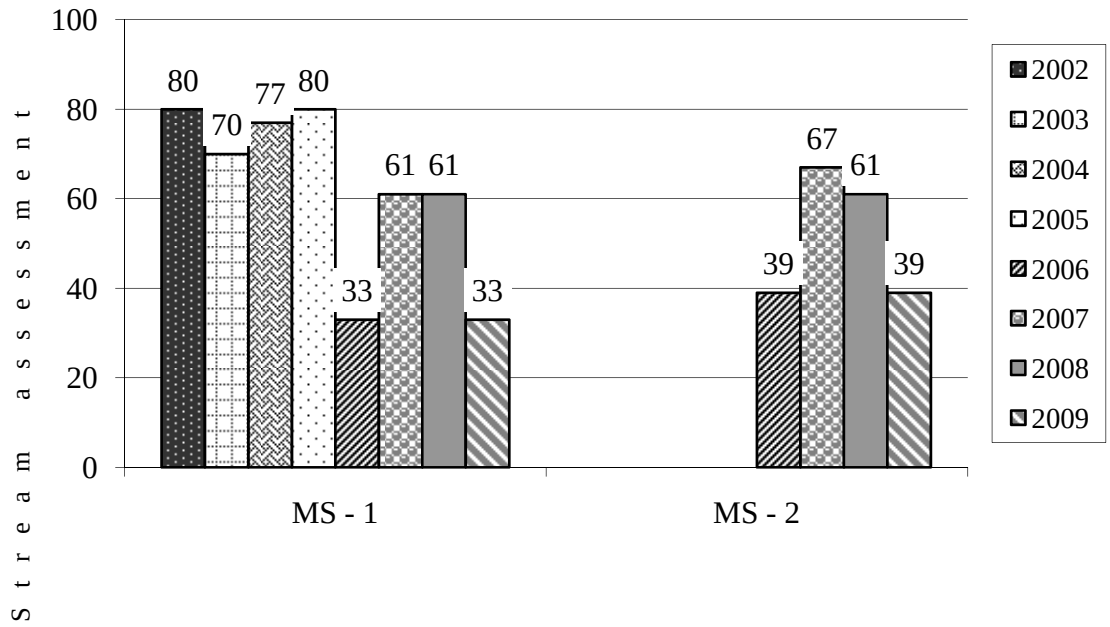
3.6 Macroinvertebrates

Macroinvertebrates were sampled at two locations along the creek (**Figure 2** in **Appendix A**). The complete macroinvertebrate sampling results are provided in **Appendix F.** Rhithron Associates, Inc. has summarized the results in the italicized sections below (Bollman 2009).

> *The sampled stream sites at Camp Creek supported rheophilic taxa characteristic of flowing water and cool water temperatures unlike conditions expected in wetlands. Scores indicated in **Chart 4** were derived by means of a metric battery and scoring criteria developed for lotic conditions (MVFP index: Bollman 1998).*
>
> **Site MS-1.** *High taxa richness at this site was primarily attributable to the diverse chironomid fauna collected here. Other faunal components were not well-represented, however, and the overall abundance of invertebrates was low. Mayflies were scarce, and the biotic index value was higher than expected; these findings suggest water quality impairment. There is evidence for fine sediment deposition in 2009, in sharp contrast with the findings of 2008. In spite of water quality and habitat limitations, all expected functional components were present. The thermal preference of the invertebrate assemblage was estimated at 15.3ºC, suggesting warmer water temperatures than in 2008. The assessment index indicated moderate impairment at this site (**Chart 4**).*

Site MS-2. *Moderate impairment was also indicated at the MS – 2 site on Camp Creek in 2009 (**Chart 4**). The overall abundance of invertebrates was higher here than at the MS – 1 site, and although the number of mayflies in the sample was low, diversity of this group was somewhat higher than at the other site. Similar to MS – 1, this site supported a large number of chironomids in 12 unique taxa. Some of the taxa among the chironomids suggested the presence of filamentous algae. Increased nutrient availability may have influenced the composition of the assemblage. The site supported all expected functional groups. Although a cold stenotherm taxon was present, the calculated temperature preference of the assemblage as a whole was 16.0ºC. It seems likely that sediment deposition did not appreciably limit colonization of stony substrates.*

Chart 4: ***Bioassessment scores using the stream index at the Camp Creek Wetland Mitigation Site.***



3.7 Functional Assessment

The MDT Montana Wetland Assessment Method(MWAM) was applied to the entire MDT parcel as one contiguous assessment area (AA) because the construction of the flood channel between the creek and the emergent complex restored their hydrologic connection.

The AA on the MDT parcel rated as Category I (high value) in 2009 based on point totals (**Functional Assessment Form** in **Appendix B**). This overall rating was primarily due to high ratings for Montana Natural Heritage Program (MTNHP) species habitat, general fish / aquatic species, surface water storage, sediment / nutrient / toxicant removal, sediment / shoreline stabilization, production export / food chain support, groundwater discharge/recharge, and recreation/education ratings (public ownership with excellent access); remaining parameters generally rated as moderate (**Functional Assessment Form** in **Appendix B**).

In 2006, MFWP decided to classify westslope cutthroat trout captured during surveys as westslope cutthroat / rainbow trout hybrids because they could not be told apart in the field (Clancy 2006). These were the same species that had been captured during 2003-2005 surveys. As such, a "suspected primary habitat", rather than a "documented primary habitat" MTNHP species habitat ranking for westslope cutthroat trout was conservatively assigned.

In 2007, functional scores increased slightly for general fish/aquatic species due to the increased shading along the streambank from the developing shrub communities; this remained consistent in 2009. Over time, the willow sprigs and plantings have continued to develop into larger, more robust shrubs that offer additional shade from overhanging branches. Enhancement of both wetland and upland vegetation should increase wildlife use throughout the site.

A MWAM was applied to the Grasser Property in 2009. The AA on the Grasser parcel is subject to a higher degree of disturbance (it is not within a conservation easement), and rated as a Category II (moderate value) during 2009 (**Functional Assessment Form** in **Appendix B**). This AA received high ratings for general fish/aquatic species, MTNHP species habitat (again due to west-slope cutthroat trout), sediment / shoreline stabilization, production export / food chain support, and groundwater discharge/recharge (**Functional Assessment Form** in **Appendix B**). All other parameters rated low to moderate. In 2007, the functional score increased slightly for general fish/aquatic species and sediment/shoreline stabilization due to the increase in shading and species with deep binding roots along the streambank over previous years. The willows and woody plantings along the creek within the Grasser parcel continue to develop in size, which increased the shading and rooting along the streambank.

The 2001 pre-project and 2009 post-project MWAM scores are presented in **Table 5**. Turnstone Biological conducted the initial MWAM for the Camp Creek Mitigation Site. In addition to the MDT property, Turnstone Biological separated the Grasser property into three assessment areas: emergent (Type I), scrub-shrub emergent (Type II), and rock bottom with narrow mixed wetland fringe (Type III) wetland classifications.

Overall, ratings have increased substantially on the MDT parcel for MTNHP species habitat (west-slope cutthroat trout), general wildlife habitat, general fish habitat, surface water storage, sediment/shoreline stabilization, production export/food chain support, uniqueness, and recreation/education potential (**Table 5**). Ratings have increased in the Grasser parcel for MTNHP species habitat (west-slope cutthroat trout), general fish habitat, surface water storage, and sediment/shoreline stabilization (**Table 5**).

Approximately 147.88 functional units (score x wetland acreage) have been gained thus far at the Camp Creek mitigation site, despite the decrease in wetland acres between pre-project and post-project assessments on the MDT parcel (**Table 5**). Approximately 110.50 functional units have been gained at the MDT parcel, and 37.38 have been gained on the Grasser parcel (**Table 5**).

Table 5: ***Summary of 2001 (baseline) and 2009 wetland function/value ratings and functional points at Camp Creek Wetland Mitigation Site.***

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2001[1] Type I, MDT Property	2001[1] Type III, MDT Property	2001[1] Type I, Grasser Property	2001[1] Type II, Grasser Property	2001[1] Type III, Grasser Property	2009[1] Grasser Property	2009[1] MDT Property
Listed/Proposed T&E Species Habitat	Mod (0.8)	Mod (0.8)	Mod (0.8)	Mod (0.8)	Mod (0.8)	Mod (0.8)	Mod (0.8)
MTNHP Species Habitat	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)	High (0.8)	High (0.8)
General Wildlife Habitat	Low (0.3)	Mod (0.5)	Low (0.3)	Mod (0.5)	Mod (0.5)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	Low (0.1)	Mod (0.5)	Low (0.1)	Low (0.1)	Mod (0.5)	High (0.9)	High (0.9)
Flood Attenuation	Mod (0.6)	Mod (0.4)	Mod (0.6)	Mod (0.5)	Mod (0.4)	Mod (0.4)	Mod (0.6)
Short and Long Term Surface Water Storage	Low (0.3)	High (0.8)	Low (0.3)	Low (0.3)	High (0.8)	Mod (0.6)	High (1.0)
Sediment/Nutrient/Toxicant Removal	Mod (0.7)	Mod (0.6)	Mod (0.7)	Mod (0.7)	Mod (0.6)	Mod (0.6)	High (0.9)
Sediment/Shoreline Stabilization	Low (0.2)	Low (0.3)	Low (0.2)	Mod (0.6)	Low (0.3)	High (1.0)	High (1.0)
Production Export/Food Chain Support	Mod (0.7)	High (0.9)	Mod (0.7)	Mod (0.7)	High (0.9)	High (0.9)	High (0.9)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Low (0.1)	Low (0.2)	Low (0.1)	Low (0.3)	Low (0.2)	Low (0.2)	Mod (0.4)
Recreation/Education Potential	Low (0.2)	Low (0.1)	Low (0.2)	Low (0.3)	Low (0.1)	Low (0.3)	High (1.0)
Actual Points / Possible Points	**5.1 / 12**	**6.2 / 12**	**5.1 / 12**	**5.9 / 12**	**6.2 / 12**	**8.20 / 12**	**10.0 / 12**
% of Possible Score Achieved	**42%**	**52%**	**42%**	**49%**	**52%**	**68%**	**83%**
Overall Category	**III**	**III**	**III**	**III**	**III**	**II**	**I**
Total Acreage of Assessed Wetlands and Open Water within Easement	**42.3**	**1.06[2]**	**3.51[2]**	**0.50[2]**	**1.36[2]**	**8.13**	**33.28**
Functional Units (fu) (acreage x actual points)	**215.73**	**6.57**	**17.90**	**2.95**	**8.43**	**66.66**	**332.80**
Functional Unit Gain to Date by Ownership	NA	NA	NA	NA	NA	**37.38[3]**	**110.50[3]**
Total Functional Unit Gain	NA	NA	NA	NA	NA	**147.88**	

[1] Assessed using the 1999 MDT Montana Wetland Assessment Method (MWAM); The completed 2009 MWAM is in **Appendix B**.

[2] Baseline acreages adjusted per subsequent study.

[3] Baseline Functional Units used to determine the 2009 Functional Unit Gain included the combined totals for the 2001 MDT (222.30 fu) and Grasser (29.28 fu) properties.

3.8 Photographs

Representative photographs taken in 2009 from established photo-points and transect ends are provided in **Appendix C**.

3.9 Revegetation

Upon completion of the new channel and floodplain construction, revegetation efforts were conducted in 2002 to enhance riparian and upland habitats. The streambanks were seeded with a grass mix designed by the MDT botanist and 20,480 willow cuttings were sprigged through the fabric work. Floodplain areas were planted with a mixture of native shrubs and trees associated with local riparian corridors. These included aspen, alder, black cottonwood, dogwood, and willows. Upland slopes were planted with Douglas-fir, lodgepole pine, ponderosa pine, serviceberry, shrubby potentilla, snowberry, and woods rose.

During the spring of 2008, five unstable sections of banks along the upper 1,000 feet of the Camp Creek channel were planted with 120 willow cuttings to promote future bank stability. The areas planted are illustrated on an aerial photograph included in **Appendix G**. Observations during the 2009 mid-season visit revealed that some of the sprigs had survived and sprouted new stems.

In 2009 the 2002 plantings were assessed for survivorship (**Monitoring Form** in **Appendix B)**. The belt transect used for vegetation monitoring was also used as the survival transect. A second survival transect was added to the south of the vegetation transect; it traverses the created and planted upland berms. A third survival transect was added in 2003 to assess the channel and floodplain vegetation enhancements.

The 2009 survival rates within the upland areas were similar to those observed during the 2004 to 2008 monitoring. Survival data recorded in 2004-2009 showed most upland species had a survival rate below 50%. In 2003, a majority of the survival rates ranged from 70% to 100%. Upland species that have survived include: woods rose, ponderosa pine, snowberry, shrubby potentilla and red-osier dogwood. Almost all the Douglas-fir observed had died after their initial planting.

In 2009, the wetter species planted along the streambank and floodplain margins had a survival rate ranging from 60% to 90%. These included alder, aspen, cottonwood, and willows. The willow sprigs planted during the 2002 efforts are spreading out along the banks, continuing to increase in size and density each growing season. Several other wetter planted shrubs had increased in overall stature and exhibited vigorous growth. These survival rates are based on a low number of total observations along transect and might misrepresent the true survival rate. The current survival rates are based on the “original” occurrences recorded in the transects during 2002 monitoring, following 2002 planting. The 2002 planting specifications are presented in **Appendix G**.

3.10 Maintenance Needs/Recommendations

The flood channel created by MDT to inundate the large emergent complex on the MDT parcel was examined during 2009 monitoring, and is in need of minor repair at the diversion feature. Significant scouring was observed directly downstream of the rock diversion. Continued scour during next season's runoff may affect the structural integrity of the diversion structure and ultimately reduce the functionality of the excavated channel.

Several Category 1 noxious weeds are present on both MDT and Grasser parcels including Canada thistle, oxeye daisy, spotted knapweed and yellow toadflax. Weed control and re-vegetation of disturbed sites is needed to prevent further weed spread, reduce the risk of new weeds invading, reduce wind and water erosion and reduce sediment input to surface waters. Survival of plantings will continue to be monitored, and supplemental planting may need to be implemented if success of current plantings is low.

The MDT parcel has the least amount of invasive species and distribution is primarily limited to upland areas that were not impacted during construction efforts (**Figure 3** in **Appendix A**). Small patches of weeds are present, but were *not mapped* onto **Figure 3**. Control measures for these areas were implemented and moderately observed during the 2009 monitoring. Even though the upland areas were sprayed, some knapweed still persists. Herbicide applications were observed to be highly inconsistent with many target weeds still thriving. Additional spraying is recommended for areas missed during the recent control activities. Herbicide applications should include both a boom application for areas accessible by equipment and a hose should be used in areas not directly accessible by boom. The Grasser parcel has several community types that are dominated by weed species. These areas were *not* individually mapped onto **Figure 3**.

Individual mapping includes larger patches of knapweed and also additional patches of smaller noxious weeds including thistle and yellow toadflax. These smaller areas were located in either the wet meadow or adjacent to the floodplain beyond the areas sprayed during the 2008 and will likely require hand spraying. Planted upland areas within the MDT parcel which were observed to have low survival rates should be replanted with appropriate native plant stock.

The Grasser parcel supports the majority of the noxious weed species with extensive distribution along the floodplain corridor. A weed management plan for this site should be developed and implemented to control the spread of noxious weeds. Areas of invading spotted knapweed, Canada thistle and yellow toadflax located along floodplain margins should be controlled and reseeded or planted with appropriate wetland species to help control further spread of invasive species. No weed control activity was observed on the Grasser parcel.

3.11 Current Credit Summary

Approximately 147.88 functional units (score x wetland acreage) have been gained thus far at the Camp Creek mitigation site. Approximately 110.50 functional units have been gained at the MDT parcel, and 37.38 have been gained on the Grasser parcel.

The credit allocation method for this site was worked out between MDT and COE in early 2006. The credit allocation is functional unit-based, whereby, wetland acreage for each AA is multiplied by the total score for that AA to arrive at an overall functional unit score. This is done both pre-project and post-project. The difference between these two numbers (the functional unit "gain") is then divided by the post-project score to arrive at an approximate credit acreage for that AA. Credit acreages from each AA are summed to arrive at a total for the site. This approach is illustrated below in **Table 6**. Using this approach, a current maximum of approximately 15.60 credit acres is assignable to the Camp Creek site as of 2009 (**Table 6**).

Table 6: ***2009 functional unit-based credit for the Camp Creek Wetland Mitigation Project.***

Property	2009 Wetland & Channel Acreage	2009 Score	2009 Functional Units	Baseline Functional Units	Functional Unit "Gain"	"Gain" Divided by Current Score (potential credit acres)
MDT	33.28	10	332.80	222.30	110.50	11.05
Grasser	8.13	8.2	66.66	29.28	37.38	4.55
Total	**41.41**	**--**	**399.46**	**251.58**	**147.88**	**15.60**

4.0 REFERENCES

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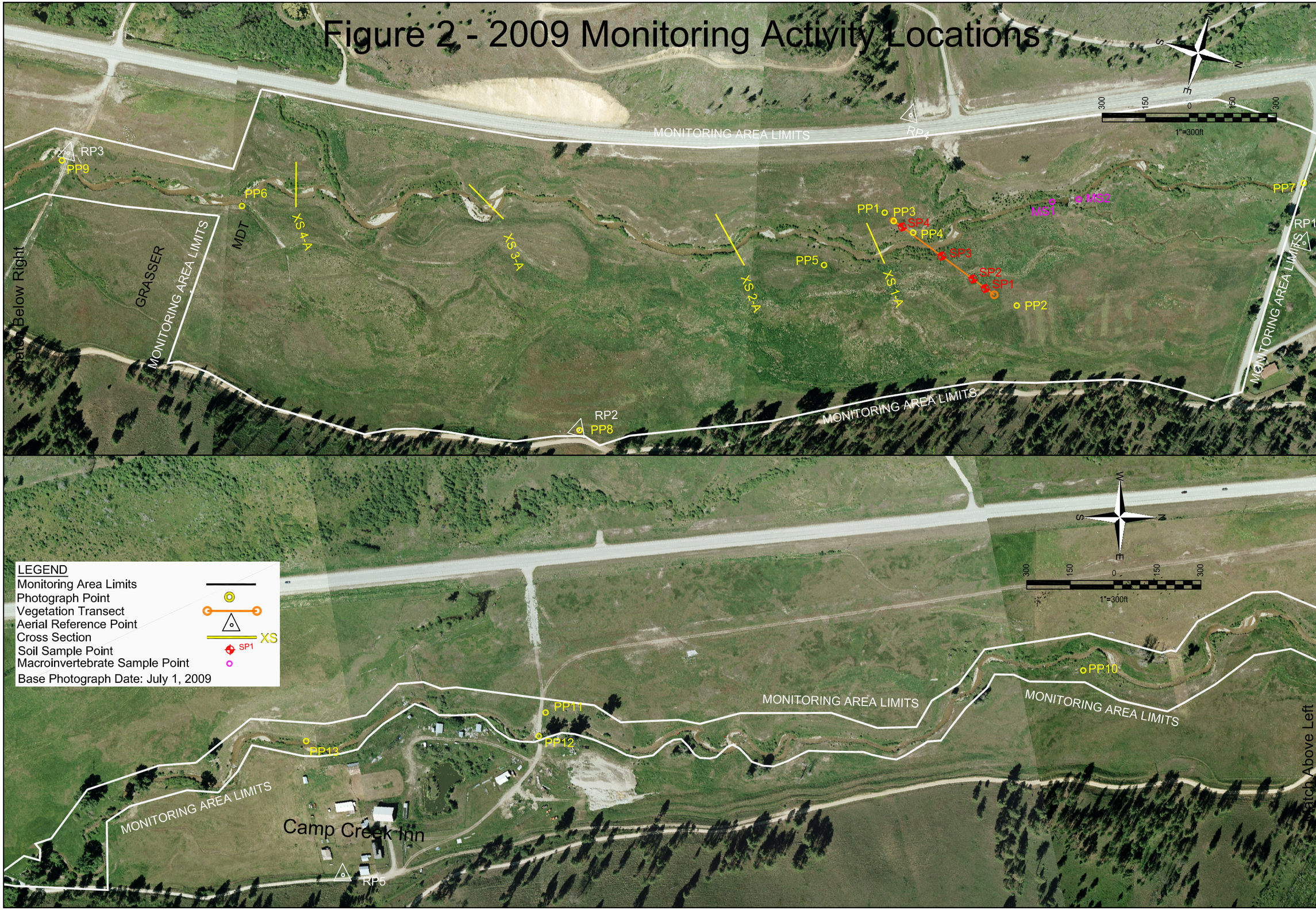
Appendix A

FIGURES 2, 3, & 4

MDT Wetland Mitigation Monitoring
Camp Creek
Sula, Montana

Figure 2 - 2009 Monitoring Activity Locations



PROJECT NAME
MDT CAMP CREEK WETLAND MITIGATION

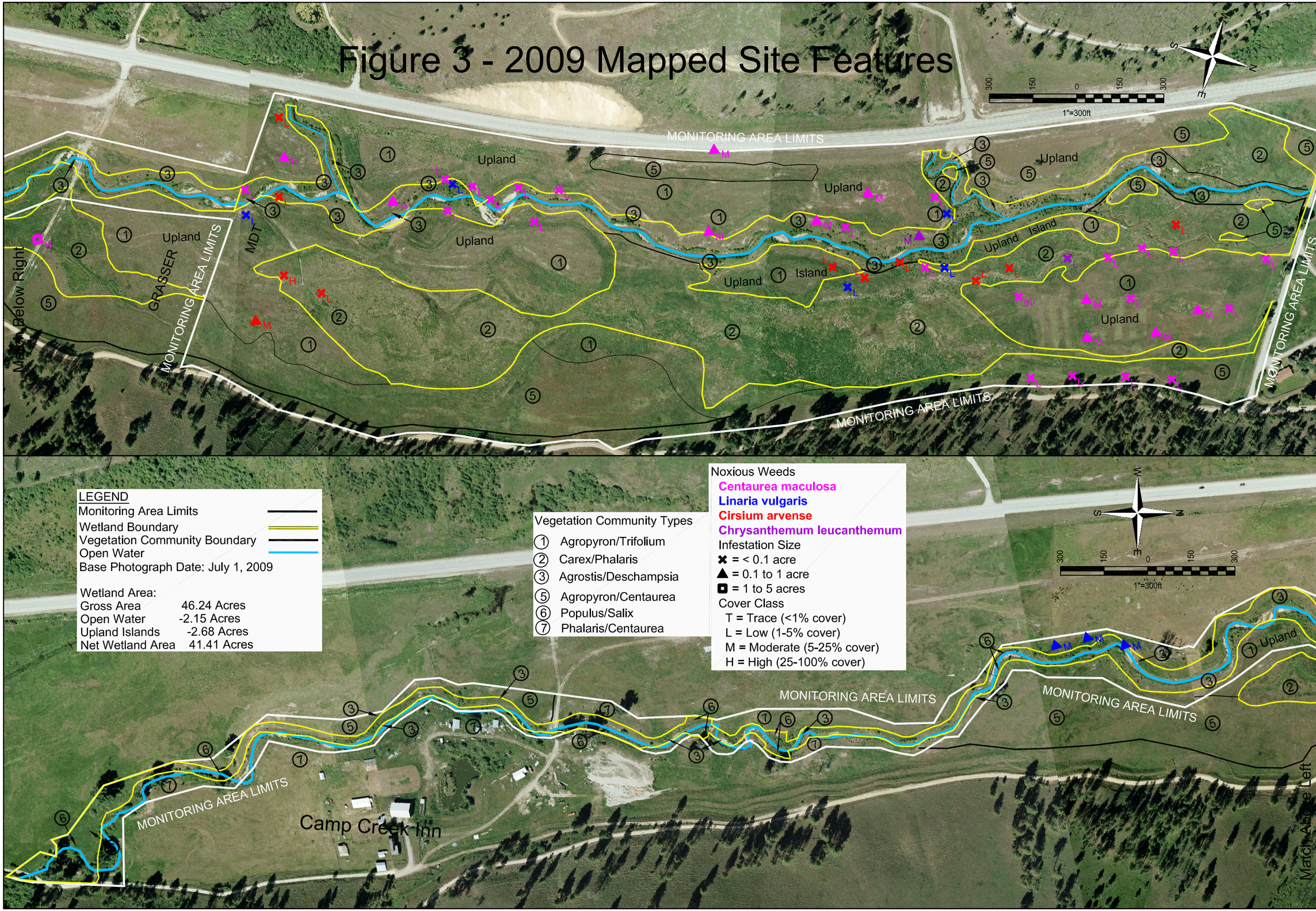
DRAWING TITLE
MONITORING ACTIVITY LOCATIONS 2009

PROJ NO: 0B4308802 02.02
DRAWN: LLL/JR
LOCATION: Sula,MT
PROJ MGR: J.BERGLUND
SCALE: 1"=300'
CHECKED: G.H.
APPV'D: J.B.
FILE NAME: BASE 2009.dwg

PBSJ
1120 Cedar
Missoula, MT 59802

FIGURE
2 OF 3
REV -
Oct/29/2009

Figure 3 - 2009 Mapped Site Features



PROJECT NAME
MDT CAMP CREEK WETLAND MITIGATION

DRAWING TITLE
MAPPED SITE FEATURES 2009

PROJ NO: 0B4308802 02.02
DRAWN: LLL/RAA/JR
LOCATION: Sula,MT
PROJ MGR: J.BERGLUND
SCALE: 1"=300'
CHECKED: G.H
APPV'D: J.B.
FILE NAME: BASE 2009.dwg

PBSJ
1120 Cedar
Missoula, MT 59802

FIGURE 3 OF 3
REV -
Nov/25/2009

Figure 4 - Pre-Developed Wetland

PROJECT NAME
MDT Camp Creek Wetland Mitigation
DRAWING TITLE
Pre-Developed Wetland

PROJ NO: B43054.00 0106	DRAWN: R.A.
FILE NAME: TASK106BASE	CHECKED: J.B.
SCALE: 1"=300ft	APPVD: J.B.
LOCATION: Sula, Mt.	PROJ MGR: J.B.

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

FIGURE
F4 OF
REV -
DATE: 6-13-05

Appendix B

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

MDT Wetland Mitigation Monitoring
Camp Creek
Sula, Montana

PBS&J / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: Camp Creek Project Number: 0B4308802 Assessment Date: 07/21/09
Location: Sula Valley MDT District: Lower Clark Fork Milepost:_____
Legal description: T 1 N R 19 W Section 27 & 34 Time of Day: Morning to early afternoon
Weather Conditions: mid 80's Person(s) conducting the assessment: Greg Howard
Initial Evaluation Date: 09/05/02 Visit #: 7 Monitoring Year: 2009
Size of evaluation area: 200 acres Land use surrounding wetland: Residential, agriculture (livestock grazing & pasture), & national forest.

HYDROLOGY

Surface Water Source: Camp Creek
Inundation**:** Present__X__ Absent ___Average depths: 0.5__ft Range of depths:___0 - 1___ft
Assessment area under inundation: 15 %
Depth at emergent vegetation-open water boundary: ____ft
If assessment area is not inundated are the soils saturated w/in 12" of surface**:** Yes X No
Other evidence of hydrology on site (drift lines, erosion, stained vegetation etc.): Hydrology on this site comes from Camp Creek. Areas of surface inundation observed within lower topography and undisturbed wetland meadows.

Groundwater
Monitoring wells: Present_____ Absent: X
Record depth of water below ground surface

Well #	Depth	Well #	Depth	Well #	Depth

Additional Activities Checklist:
__X__Map emergent vegetation-open water boundary on air photo
__X__Observe extent of surface water during each site visit and look for evidence of past surface water elevations (drift lines, erosion, vegetation staining etc.)
_____GPS survey groundwater monitoring wells locations if present

COMMENTS/PROBLEMS: Vegetation cover along floodplain and creek margins dominated by wetland species. Vegetation community types remained similar to 2008 monitoring. Some indication of weed control observed throughout MDT parcel. Refer to Figure 3 for weed mapping. Weed control application were inconsistent with many live and flowering spotted knapweed still observed during 2009. Scour observed behind the rock structure for flood inlet. Heavy sediment deposition observed at the mouth of the inlet. Inlet transferring surface waters throughout the length of the flood channel. Inlet channel becoming vegetated with *Phalaris arundinacea*, *Alopecurus pratensis*, *Rumex crispus*, *Phleum pratense*, and *Bromus inermis.* Grasser parcel remained similar to 2008 conditions with heavy coverage of spotted knapweed and other undesirable species within floodplain margins.

VEGETATION COMMUNITIES

Community No.: 1 Community Title (main species): Agropyron / Trifolium (Created upland)

Dominant Species	% Cover	Dominant Species	% Cover
Agropyron repens	40	Planted Species	P
Thlaspi arvensis	10	*Bromus tectorum*	10
Sisymbrium altissimum	30	*Centaurea maculosa*	10
Lychnis alba	P	*Alopecurus pratensis*	10
Agrostis alba	P		

COMMENTS/PROBLEMS: Created uplands, planted with several drier species: *Pinus ponderosa*, *Pseudotsuga menziesii*, *Symphoricarpos albus*, *Rosa woodsii*, *Potentilla fruticosa*, and *Amelanchier alnifolia*. Community No. 1 with similar condition as found in 2008 monitoring.

Community No.: 2 Community Title (main species): Carex / Phalaris (Undisturbed wetland)

Dominant Species	% Cover	Dominant Species	% Cover
Carex aquatilis	P	*Alopecurus pratensis*	10
Phalaris arundinacea	20	*Phleum pratense*	P
Carex utriculata	20	*Agrostis alba*	P
Carex nebrascensis	30	*Sisymbrium altissimum*	P
Geum macrophyllum	20	*Cirsium arvense*	T
Linaria vulgaris	T	*Agropyron repens*	P

COMMENTS/PROBLEMS: Open wetland meadow with extensive sedges, intermixed with a few drier grass species and pockets of undesirable species including yellow toadflax and Canadian thistle.

Community No.: 3 Community Title (main species): Agrostis / Deschampsia (Floodplain / Streambank)

Dominant Species	% Cover	Dominant Species	% Cover
Alopecurus pratensis	10	*Carex nebrascensis*	P
Populus trichocarpa - Planted	10	*Phalaris arundinacea*	10
Populus tremuloides - Planted	10	*Phleum pratense*	T
Mimulus guttatus	T	*Salix* – sprigged	20
Agrostis alba	30	*Alnus incana*	20
Deschampsia cespitosa	20	*Carex crawfordii*	10
Glyceria grandis	10	*Carex stipata*	P

COMMENTS/PROBLEMS: Vegetation communities along streambank and floodplain had similar conditions as observed during 2008. Saturated soils recorded along much of the floodplain margin. Shrub and tree plantings continue to show new and vigorous growth each year. Heights of several planted shrubs and trees ranging from 4 - 5 ft. tall.

Additional Activities Checklist:

_X_ Record and map vegetative communities on air photo

VEGETATION COMMUNITIES (continued)

Community No.: 4 Community Title (main species): Surface flow within channel

Dominant Species	% Cover	Dominant Species	% Cover
Ranunculus aquatilis var. hispidulus	10		

COMMENTS/PROBLEMS: Vegetation Community No. 4 combined with No. 3. Aquatic vegetation invading areas of slower moving water along creek. Volunteer Populus trichocarpa seedlings along cobble banks.

Community No.: 5 Community Title (main species): Agropyron / Centaurea

Dominant Species	% Cover	Dominant Species	% Cover
Centaurea maculosa	20	*Agropyron repens*	20
Sisymbrium altissimum	P	*Linaria vulgaris*	P
Bromus inermis	10	*Potentilla gracilis*	P
Bromus tectorum	10		
Alopecurus pratensis	P		

COMMENTS/PROBLEMS: Upland slopes observed on both the east and west sides of site. Weed control observed within the C.T, but many live plants still present during monitoring.

Community No.: 6 Community Title (main species): Populus / Salix

Dominant Species	% Cover	Dominant Species	% Cover
Populus trichocarpa	30	*Rosa woodsii*	10
Salix bebbiana	P	*Symphoricarpos albus*	P
Alnus incana	P	*Salix drummondiana*	P
Salix geyeriana	10	*Salix exigua*	P
Cornus stolonifera	T		

COMMENTS/PROBLEMS: Mature cottonwood and shrub communities found along the old channel.

Community No.: 7 Community Title (main species): Centaurea / Phalaris

Dominant Species	% Cover	Dominant Species	% Cover
Phalaris arundinacea	40	*Chrysanthemum leucanthemum*	10
Centaurea maculosa	40	*Trifolium pratense*	P
Verbascum thapsus	T	*Rumex crispus*	T
Bromus inermis	P	Plantings	10
Agropyron repens	10	*Linaria vulgaris*	P
Taraxacum officinale	T		

COMMENTS/PROBLEMS: Vegetation type found along the upland fringes of constructed floodplain on Grasser-owned parcels. Community No. 7 dominated by both reed canarygrass and spotted knapweed. No weed control observed within these areas.

COMPREHENSIVE VEGETATION LIST

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
Achillea millefolium	1,5	*Lactuca serriola*	1
Agropyron repens	1,3,5,7	*Lepidium perfoliatum*	1
Agrostis alba	2,3	*Linaria vulgaris*	1,2,5,7
Alnus incana	3,6	*Lonicera involucrata*	6
Alopecurus pratensis	2,3,5	*Lupinus wyethii*	1
Amelanchier alnifolia	1	*Lychnis alba*	1
Aster integrifolius	1	*Matricaria matricarioides*	1
Betula occidentalis	3	*Melilotus officinalis*	1,5
Bromus inermis	5,7	*Mentha arvensis*	2,3
Bromus japonicus	1,2	*Mimulus guttatus*	3
Bromus tectorum	1,5	*Phalaris arundinacea*	2,3,7
Calamagrostis canadensis	2	*Phleum pratense*	2,3
Carex aquatilis	2	*Pinus ponderosa*	1
Carex bebbii	2	*Plantago major*	1,3
Carex crawfordii	3	*Poa pratensis*	1,5
Carex lanuginosa	2,3	*Polygonum amphibium*	2
Carex nebrascensis	2,3	*Populus tremuloides*	3,4
Carex praegracilis	2	*Populus trichocarpa*	3,6
Carex stipata	3	*Potentilla fruticosa*	1
Carex utriculata	2	*Potentilla gracilis*	1,5
Centaurea maculosa	1,5,7	*Pseudotsuga menziesii*	1
Cercocarpus ledifolius	1	*Ranunculus aquatilis var. hispidulus*	4
Chenopodium album	1,3	*Ranunculus repens*	2
Chrysanthemum leucanthemum	1,5,7	*Rosa woodsii*	1,6
Cirsium arvense	1,2	*Rubus idaeus*	6
Cirsium vulgare	1,2	*Rumex crispus*	1,2,3,7
Cornus stolonifera	3,6	*Salix bebbiana*	3,6
Crataegus douglasii	1	*Salix boothii*	3
Crepis tectorum	1	*Salix drummondiana*	3,4,6
Cynoglossum officinale	1	*Salix exigua*	2,3,4,6
Danthonia spp.	1	*Salix geyeriana*	3,4,6
Deschampsia cespitosa	2,3	*Salix lutea*	3
Epilobium ciliatum	2,3	*Scirpus microcarpus*	3,4
Epilobium paniculatum	2,3	*Senecio vulgaris*	1
Equisetum arvense	2,3	*Sium suave*	3
Equisetum laevigatum	2,3	*Sisymbrium altissimum*	1,2,5
Festuca pratensis	1	*Smilacina stellata*	2
Geum macrophyllum	2,3	*Solidago canadensis*	2,3
Glyceria elata	2	*Symphoricarpos albus*	1,5,6
Glyceria grandis	3	*Tanacetum vulgare*	2,3
Gnaphalium palustre	1	*Taraxacum officinale*	1,2,3,4,5,7
Juncus balticus	2	*Thlaspi arvensis*	1,3,5
Juncus bufonius	2,3	*Trifolium pratense*	1,7
Juncus confusus	3	*Verbascum thapsus*	1,3,5,7
Juncus ensifolius	2,3	*Veronica americana*	2

COMMENTS/PROBLEMS: No new species identified during 2009 monitoring.

PLANTED WOODY VEGETATION SURVIVAL

Species	Number Originally Planted	Number Observed Alive	Mortality Causes
Amelanchier alnifolia	4	0	
Alnus incana	4	10	
Betula occidentalis	6	3	
Cornus stolonifera	22	0	
Pinus ponderosa	19	1	
Potentilla fruticosa	30	6	
Populus trichocarpa	55	20	
Populus tremuloides	11	21	
Pseudotsuga menziesii	17	0	
Rosa woodsii	8	0	
Salix bebbiana	-	10	
Salix boothii	-	2	
Salix drummondiana	-	6	
Salix exigua	-	3	
Salix geyeriana	-	5	
Salix lutea	3	3	
Symphoricarpos albus	17	0	
Willow suckers / sprouts	225	250+	

COMMENTS/PROBLEMS: Three transects were used to assess overall survival. Transect 1 was located along the same line as the vegetation monitoring transect, using the same belt width. Transect no. 2 starts at the beginning of transect no. 1, running towards the east (45°), approximately 165 ft long. Transect no. 2 bisects an area of created uplands and associated drier species plantings. Transect 3 is located near the end of vegetation transect, running south across the floodplain. Total species observed along transect does not reflect the actual number of original plantings. Plantings along the creek and within the floodplain have flourished in the last several years showing vigorous new growth each season. The plantings within upland areas have mostly died due to drier conditions in the last several years, except for shrubby potentilla.

WILDLIFE

BIRDS

Were man made nesting structures installed? Yes___ No X Type:_____ How many?_____ Are the nesting structures being utilized? Yes____ No____ Do the nesting structures need repairs? Yes____ No____

MAMMALS AND HERPTILES

Species	Number Observed	Indirect indication of use			
		Tracks	Scat	Burrows	Other
Deer		X	X		
Coyote		X	X		

Additional Activities Checklist:
X Macroinvertebrate sampling (if required)

COMMENTS/PROBLEMS: Small animal burrows observed. Few birds and /or wildlife species observed. Macroinvertebrate samples collected at two locations along Camp Creek. _

PHOTOGRAPHS

Using a camera with a 50 mm lenses and color film take photographs of the following permanent reference points listed in the checklist below. Record the direction of the photograph using a compass. (The first time at each site establish a permanent reference point by setting a ½ inch rebar or fencepost extending 2-3' above ground, survey the location with a resource grade GPS and mark the location on the air photo.)
Checklist:

_X_ One photo for each of the 4 cardinal directions surrounding wetland
_X_ At least one photo showing upland use surrounding wetland – if more than one upland use exists, take additional photos
_X_ At least one photo showing buffer surrounding wetland
_X_ One photo from each end of vegetation transect showing transect

Location	Frame #	Photograph Description	Compass Reading
1	R1 16	Looking north at transect end.	0°
1	R1 17	Looking south, uplands w/plantings.	180°
1	R1 18	Looking west, Hwy 93 and created uplands.	270°
1	R1 19	Looking northwest, upland and floodplain.	315°
2	R1 20	Looking southwest at start of vegetation transect.	225°
3	R1 21-22	Looking north along transect line.	0°
4	R1 23	Looking northwest, downstream along channel.	315°
4	R1 24	Looking south, upstream along channel.	180°
4	R1 25	Looking north, curve in creek, fabric failure.	0°
5	R1 26-31	Looking south to north, panoramic of channel & floodplain.	180° – 0°
6	R1 32	Looking east along survival transect.	45°
7	R1 34-35	Looking south, lower section, creek leaving MDT parcel.	180°
8	R2 1-5	Looking east, panoramic from west side.	180° – 0°
9	R2 6-8	Looking north, main channel entering culvert.	270° – 0°
9	R2 9-12	Looking south, main channel entering culvert.	135° – 225°
10	R2 13-14	Looking south, channel and floodplain.	180° – 225°
10	R2 15	Looking north, channel and floodplain.	0°
11	R2 16-19	Looking north, channel and floodplain, upper culvert.	0° – 315°
12	R2 20	Looking south, channel and floodplain, Grasser parcel.	180° – 225°
13	R2 21	Looking south, channel & floodplain.	180°
14	R2 22	Looking north, creek entering Grasser parcel.	225°

COMMENTS/PROBLEMS:

GPS SURVEYING

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

Checklist:

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

COMMENTS/PROBLEMS: GPS surveying completed during first year monitoring.

WETLAND DELINEATION

(Attach Corps of Engineers delineation forms)

At each site conduct the items on the checklist below:
_X_Delineate wetlands according to the 1987 Army Corps manual.
_X_ Delineate wetland-upland boundary on the air photo
____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 abbreviated field forms, if used)

COMMENTS/PROBLEMS: Functional assessments similar to 2008 monitoring. No dramatic changes or difference between monitoring periods, similar conditions exist.

MAINTENANCE

Were man-made nesting structures installed at this site? YES___ NO X
If yes, do they need to be repaired? YES____ NO____
If yes, describe 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 X NO____
If yes, are the structures working properly and in good working order? YES X NO __
If no, describe the problems below.

COMMENTS/PROBLEMS: _____

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Camp Creek Date: 07/21/09 Examiner: Greg Howard Transect # 1

Approx. transect length: 471 ft Compass Direction from Start (Upland): 225°

Vegetation type 1:	Agropyron / Trifolium (Community No. 1)	
Length of transect in this type:	111	feet
Species:		Cover:
Agropyron repens		60
Thlaspi arvensis		T
Potentilla fruticosa		P
Agrostis alba		10
Achillea millefolium		T
Alopecurus pratensis		10
Phalaris arundinacea		10
Centaurea maculosa		P
Bromus japonicus		P
	Total Vegetative Cover:	95%

Vegetation type 2:	Carex / Phalaris (Community No. 2)	
Length of transect in this type:	102	feet
Species:		Cover:
Carex nebrascensis		20
Carex utriculata		T
Phalaris arundinacea		40
Geum macrophyllum		P
Cirsium arvense		P
Centaurea maculosa		P
Agrostis alba		P
Salix exigua		P
Juncus ensifolius		T
Cirsium vulgare		10
Chrysanthemum leucanthemum		T
	Total Vegetative Cover:	80%

Vegetation type 3:	Agropyron / Trifolium (Community No. 1)	
Length of transect in this type:	63	feet
Species:		Cover:
Carex nebrascensis		P
Chrysanthemum leucanthemum		T
Epilobium ciliatum		P
Agropyron repens		10
Festuca pratensis		10
Phalaris arundinacea		P
Sisymbrium altissimum		T
Cirsium arvense		P
Centaurea maculosa		P
Deschampsia cespitosa		20
Poa pratensis		10
Linaria vulgaris		P
Bromus tectorum		P
	Total Vegetative Cover:	70%

Vegetation type 4:	Agrostis / Deschampsia (Community No. 3)	
Length of transect in this type:	16	feet
Species:		Cover:
Carex utriculata		10
Epilobium ciliatum		P
Agrostis alba		10
Scirpus microcarpus		P
Carex stipata		P
Juncus ensifolius		P
Trifolium pratense		20
Carex nebrascensis		T
Deschampsia cespitosa		10
Plantings (Populus tremuloides & Populus trichocarpa)		20
Willow Sprigs (Salix drummondiana & Salix bebbiana)		20
Phalaris arundinacea		P
Chrysanthemum leucanthemum		P
Alnus incana		10
	Total Vegetative Cover:	95%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Camp Creek Date: 07/21/09 Examiner: Greg Howard Transect # 1

Approx. transect length: 471 ft Compass Direction from Start (Upland): 225°

Vegetation type 5:	Open Water - Channel	
Length of transect in this type:	15	feet
Species:		Cover:

Vegetation type 6:	Agrostis / Deschampsia (Community No. 3)	
Length of transect in this type:	164	feet
Species:		Cover:
Agrostis alba		20
Deschampsia cespitosa		20
Chrysanthemum leucanthemum		15
Epilobium ciliatum		T
Juncus ensifolius		P
Carex stipata		T
Trifolium pratense		10
Glyceria grandis		P
Carex nebrascensis		T
Populus tremuloides		5
Populus trichocarpa		5
Salix spp. (Salix drummondiana, Salix boothii & Salix geyeriana)		10
Phalaris arundinacea		P
Carex crawfordii		10
Centaurea maculosa		T
	Total Vegetative Cover:	95%

MDT WETLAND MONITORING – VEGETATION TRANSECT (back of form)

Cover Estimate		**Indicator Class:**	**Source:**
+ = <1%	3 = 11-20%	+ = 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.

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

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

Notes:

3

BIRD SURVEY – FIELD DATA SHEET

Page__1_of_1__
Date: 7/21/09
Survey Time: 10:00-4:00

SITE: Camp Creek

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Killdeer	2	F	US, WM				
Brown-headed cow bird	5	L,FO	UP				

Note: Few bird observations.

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

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

DATA FORM

ROUTINE WETLAND DETERMINATION

(1987 COE Wetlands Delineation Manual)

Project/Site: Camp Creek	Date: 07/21/09
Applicant/Owner: MDT	County: Ravalli
Investigator: Greg Howard	State: MT
Do Normal Circumstances exist on the site: x Yes ___ No	Community ID: Upland
Is the site significantly disturbed (Atypical Situation)? ___ Yes x No	Transect ID: 1
Is the area a potential Problem Area? ___ Yes x No	Plot ID: 1
(If needed, explain on reverse.)	

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Agropyron repens*	H	FAC-				
2	*Agrostis alba*	H	FACW				
3	*Sisymbrium altissimum*	H	FACU-				
4	*Centaurea maculosa*	H	--				
5	*Potentilla fruticosa*	S	FAC-				
6							

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 1/5 = 20%

Area dominated by upland vegetation.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

X No Recorded Data Available

Field Observations:

Depth of Surface Water: - (in.)

Depth to Free Water in Pit: - (in.)

Depth to Saturated Soil: - (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:
No hydrology indicators present.

SOILS

Map Unit Name (Series and Phase):	Gallatin-Shallow Muck Complex Gallatin	Drainage Class:	Imperfectly and Poorly-drained
Taxonomy (Subgroup):		Field Observations Confirm Mapped Type?	X Yes ____ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 – 8+	A	10 YR 2/1	--	--	Loam with large cobbles

Hydric Soil Indicators:

- ____ Histosol
- ____ Histic Epipedon
- ____ Sulfidic Odor
- ____ Aquic Moisture Regime
- ____ Reducing Conditions
- ____ Gleyed or Low-Chroma Colors
- ____ Concretions
- ____ High Organic Content in surface Layer in Sandy Soils
- ____ Organic Streaking in Sandy Soils
- ____ Listed on Local Hydric Soils List
- ____ Listed on National Hydric Soils List
- ____ Other (Explain in Remarks)

Soil pit located in area of created upland habitat, soils consisting of fill material excavated from channel reconstruction and removed from historic wetland. No gleyed or low-chroma colors located below the A layer of the profile.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	____ Yes	X No	
Wetland Hydrology Present?	____ Yes	X No	
Hydric Soils Present?	____ Yes	X No	Is this Sampling Point Within a Wetland? ____ Yes X No

Remarks:
Sampling point considered within an upland area.

Approved by HQUSACE 2/92

DATA FORM

ROUTINE WETLAND DETERMINATION

(1987 COE Wetlands Delineation Manual)

Project/Site: Camp Creek	Date: 07/21/09
Applicant/Owner: MDT	County: Ravalli
Investigator: Greg Howard	State: MT
Do Normal Circumstances exist on the site: X Yes ___ No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)? ___ Yes x No	Transect ID: 1
Is the area a potential Problem Area?: ___ Yes x No	Plot ID: 2
(If needed, explain on reverse.)	

VEGETATION

	Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1	*Carex nebrascensis*	H	OBL			
2	*Phalaris arundinacea*	H	FACW			
3	*Geum macrophyllum*	H	OBL			
4	*Agrostis alba*	H	FACW			
5	*Salix exigua*	S	OBL			
6						
7						

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 5/6 = 83%

Area dominated by hydrophytic vegetation. Undesirable species including bull thistle starting to encroach on area.

HYDROLOGY

___ Recorded Data (Describe in Remarks):

___ Stream, Lake, or Tide Gauge

___ Aerial Photographs

___ Other

X No Recorded Data Available

Field Observations:

Depth of Surface Water: - (in.)

Depth to Free Water in Pit: - (in.)

Depth to Saturated Soil: 6 (in.)

Wetland Hydrology Indicators:

Primary Indicators:

___ Inundated

x Saturated in Upper 12 Inches

___ Water Marks

___ Drift Lines

___ Sediment Deposits

X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

___ Oxidized Root Channels in Upper 12 Inches

___ Water-Stained Leaves

___ Local Soil Survey Data

___ FAC-Neutral Test

___ Other (Explain in Remarks)

Remarks:

Hydrology indicators present with saturated soils and drainage patterns along areas of lower topography.

SOILS

Map Unit Name (Series and Phase):	Gallatin-Shallow Muck Complex Gallatin	Drainage Class:	Imperfectly and Poorly-drained
Taxonomy (Subgroup):		Field Observations Confirm Mapped Type?	X Yes ____ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 – 3	A	10 YR 2/1	--	--	Loam with roots & organics
5 – 12	B	10 YR 2/1-	--	--	Peat and sandy loam

Hydric Soil Indicators:

____	Histosol	____	Concretions
____	Histic Epipedon	X	High Organic Content in surface Layer in Sandy Soils
____	Sulfidic Odor	____	Organic Streaking in Sandy Soils
____	Aquic Moisture Regime	____	Listed on Local Hydric Soils List
____	Reducing Conditions	____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	____	Other (Explain in Remarks)

Hydric soils indicator present with low-chroma colors and high organic content (peat).

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X Yes	____ No	
Wetland Hydrology Present?	X Yes	____ No	
Hydric Soils Present?	X Yes	____ No	Is this Sampling Point Within a Wetland? X Yes ____ No

Remarks:
Sampling point is considered within a wetland. Topographic swale with low areas dominated by emergent vegetation type. Undisturbed wetlands mapped during initial delineation.

Approved by HQUSACE 2/92

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Camp Creek	Date: 07/21/09
Applicant/Owner: MDT	County: Ravalli
Investigator: Greg Howard	State: MT

Do Normal Circumstances exist on the site:	X	Yes		No	Community ID: Emergent / Rock Bottom
Is the site significantly disturbed (Atypical Situation)?		Yes	x	No	Transect ID: 1
Is the area a potential Problem Area?: (If needed, explain on reverse.)		Yes	x	No	Plot ID: 3

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	*Carex utriculata*	H	OBL	7	*Agrostis alba*	H	FACW
2	*Alopecurus pratensis*	H	FACW	8	*Salix drummondiana*	S	FACW
3	*Carex nebrascensis*	H	OBL	9	*Chrysanthemum leucanthemum*	H	--
4	*Phalaris arundinacea*	H	FACW	10	*Juncus ensifolius*	H	FACW
5	*Epilobium ciliatum*	H	FACW	11	*Trifolium pratense*	H	FACU
6	*Deschampsia cespitosa*	H	FACW				

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 9 / 11 = 81%

Area consisting of streambank, creek and floodplain margins dominated by hydrophytic vegetation.

HYDROLOGY

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

Remarks:
Hydrology indicator present with soils saturated to ground surface and drainage patterns.

SOILS

Map Unit Name (Series and Phase):	Gallatin-Shallow Muck Complex Gallatin	Drainage Class:	Imperfectly and Poorly-drained
Taxonomy (Subgroup):		Field Observations Confirm Mapped Type?	X Yes ____ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 – 8+	B	10 YR 2/1	--	--	Loam with large cobbles

Hydric Soil Indicators:

____	Histosol	____	Concretions
____	Histic Epipedon	____	High Organic Content in surface Layer in Sandy Soils
____	Sulfidic Odor	____	Organic Streaking in Sandy Soils
____	Aquic Moisture Regime	____	Listed on Local Hydric Soils List
____	Reducing Conditions	____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	____	Other (Explain in Remarks)

Hydric soil indicator present with low-chroma colors.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X	Yes	____	No
Wetland Hydrology Present?	X	Yes	____	No
Hydric Soils Present?	X	Yes	____	No

Is this Sampling Point Within a Wetland? X Yes ____ No

Remarks:
Sampling point considered within a wetland and Water of the U.S. Floodplain along Camp Creek developing into emergent and scrub-shrub wetland vegetation types.

Approved by HQUSACE 2/92

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Camp Creek	Date: 07/21/09
Applicant/Owner: MDT	County: Ravalli
Investigator: Greg Howard	State: MT
Do Normal Circumstances exist on the site: X Yes ___ No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)? ___ Yes x No	Transect ID: 1
Is the area a potential Problem Area?: ___ Yes x No	Plot ID: 4
(If needed, explain on reverse.)	

VEGETATION

	Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1	*Phalaris arundinacea*	H	FACW			
2	*Agrostis alba*	H	FACW			
3	*Carex lanuginosa*	H	OBL			
4	*Carex nebrascensis*	H	OBL			
5	*Deschampsia cespitosa*	H	FACW			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 5/5 = 100%

Area dominated by hydrophytic vegetation.

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other

X No Recorded Data Available

Field Observations:

Depth of Surface Water: ___ (in.)

Depth to Free Water in Pit: ___ (in.)

Depth to Saturated Soil: 8 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- X Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:
Hydrology indicators present with saturated soils and drainage patterns.

SOILS

Map Unit Name (Series and Phase):	Gallatin-Shallow Muck Complex Gallatin	Drainage Class:	Imperfectly and Poorly-drained
Taxonomy (Subgroup):		Field Observations Confirm Mapped Type?	X Yes ____ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 – 3	O	10 YR 2/1	--	--	Roots & organics
3 – 5	A	10 YR 2/1	--	--	Sandy loam & roots
5 – 7	B1	--	--	--	Sand with fine gravels
7 – 10+	B2	10 YR 2/1	--	--	Sandy loam with fine to medium gravels

Hydric Soil Indicators:

____	Histosol	____	Concretions
____	Histic Epipedon	X	High Organic Content in surface Layer in Sandy Soils
____	Sulfidic Odor	____	Organic Streaking in Sandy Soils
____	Aquic Moisture Regime	____	Listed on Local Hydric Soils List
____	Reducing Conditions	____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	____	Other (Explain in Remarks)

Hydric soil indicators present with low-chroma colors and high organic content in sandy soils.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	X	Yes	____	No
Wetland Hydrology Present?	X	Yes	____	No
Hydric Soils Present?	X	Yes	____	No

Is this Sampling Point Within a Wetland? X Yes ____ No

Remarks:
Sampling point is considered within an emergent wetland type. Located on upper terrace adjacent to created floodplain. Remnant wetlands not disturbed during construction efforts.

Approved by HQUSACE 2/92

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

1. Project Name: Camp Creek **2. Project #:** B4308802 02.02 **Control #:** _____

3. Evaluation Date: 7/21/2009 **4. Evaluator(s):** Greg Howard **5. Wetland / Site #(s):** AA-1, MDT Property

6. Wetland Location(s) i. T: 1 N **R:** 19 W **S:** 27 & 34 **T:** __ N **R:** __ E **S:** _____

ii. Approx. Stationing / Mileposts: _____

iii. Watershed: 3 - Lower Clark Fork **GPS Reference No. (if applies):** _____

Other Location Information: Located in Sula Basin; Reconstructed Camp Creek channel, floodplain, and adjacent emergent wetlands.

7. A. Evaluating Agency MDT

B. Purpose of Evaluation:

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

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

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

Comments: AA includes 0.95 acres of stream channel.

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA

HGM CLASS [1]	SYSTEM [2]	SUBSYSTEM [2]	CLASS [2]	WATER REGIME [2]	MODIFIER [2]	% OF AA
Riverine	Riverine	Upper Perennial	Rock Bottom	Permanently Flooded	---	3
Riverine	Palustrine	---	Emergent Wetland	Seasonally Flooded	---	82
Riverine	Palustrine	---	Scrub-Shrub Wetland	Seasonally Flooded	---	15
---	---	---	---	---	---	

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

Comments: _____

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

12. GENERAL CONDITION OF AA

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

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

Comments: (types of disturbance, intensity, season, etc.) Past disturbances include grazing, clearing, and hydrologic alterations; currently low disturbance.

ii. Prominent weedy, alien, & introduced species: Spotted knapweed, bull thistle, Canada thistle, hound' tongue, pennycress, common dandelion, tumble mustard and yellow toadflax.

iii. Briefly describe AA and surrounding land use / habitat: AA located in Sula Basin, Camp Creek, and adjacent wetlands. USFS land & private ownership. Surround land use includes pasture, livestock grazing, and logging.

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

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

Comments: _____

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

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

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

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

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point & Rating	---	---	.8 (M)	---	---	---	---

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

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

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

Primary or Critical habitat **(list species)**	☐ D	☒ S	west-slope cutthroat trout
Secondary habitat **(list species)**	☒ D	☐ S	bald eagle
Incidental habitat **(list species)**	☐ D	☐ S	_____
No usable habitat	☐ D	☐ S	_____

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

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point & Rating	---	.8 (H)	---	---	---	---	---

If documented, list the source (e.g., observations, records, etc.)**:** FWP records assume ws cuthroat x rainbow hydrids, so ws not officially "documented". Plus MDT observation of a pair of bald eagles hunting site in 2006.

14C. GENERAL WILDLIFE HABITAT RATING

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

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

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

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

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

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

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

Evidence of Wildlife Use from 14C(i)	**Wildlife Habitat Features Rating** from 14C(ii)			
	☐ **Exceptional**	☒ **High**	☐ **Moderate**	☐ **Low**
Substantial	--	--	--	--
Moderate	--	.7 (M)	--	--
Low	--	--	--	--

Comments: _____

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

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

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

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

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

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

Types of Fish Known or Suspected within AA	**Modified Habitat Quality** from 14D(ii)			
	☐ **Exceptional**	☒ **High**	☐ **Moderate**	☐ **Low**
Native game fish	--	.9 (H)	--	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: Reconstructed channel supports native fish populations. Enhancement of habitat: pools, riffles, and overhanging banks. Ratings will improve with establishment of woody vegetation.

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

Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA do not flood from in-channel or overbank flow, then check NA.

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

Estimated wetland area in AA subject to periodic flooding	☒ **≥ 10 acres**			☐ **<10, >2 acres**			☐ **≤2 acres**		
% of flooded wetland classified as forested, scrub/shrub, or both	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**
AA contains **no outlet or restricted outlet**	--	--	.6 (M)	--	--	--	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--	--

ii. Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA? (check)
☒**Y** ☐**N** **Comments:** USFS offices and residents downstream, adjacent parcel with MDT boundary.

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 NA above.

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

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

Comments: _____

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

Applies to wetlands with the potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input.
If no wetlands in the AA are subject to such input, check NA above.

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

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

Comments: Minor sedimentation due to logging and recent forest fires.

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

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

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

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

Comments: Increased density of willows and wetland grasses / grass-like plants along streambanks.

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

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

A	☒ Vegetated component >5 acres						☐ Vegetated component 1-5 acres						☐ Vegetated component <1 acre					
B	☐ High		☒ Moderate		☐ Low		☐ High		☐ Moderate		☐ Low		☐ High		☐ Moderate		☐ Low	
C	☐Y	☐N	☒Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N
P/P	--	--	.9H	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S/I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments: _____

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

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

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

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

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

Comments: Channel & floodplain located in Sula Basin. Steep slopes on both sides of basin. Wetland occuring along toe of slope.

14K. UNIQUENESS

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

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

Comments: _____

14L. RECREATION / EDUCATION POTENTIAL

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

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

iii. Based on the location, diversity, size, and other site attributes, is there a strong potential for recreational or educational use?
☒ **Yes** [Proceed to 14L (ii) and then 14L(iv)] ☐ **No** [Rate as low in 14L(iv)]

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

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

Comments: Site used for fishing. Good potential for additional recreation/education as mitigation site located along Highway 93.

FUNCTION, VALUE SUMMARY, AND OVERALL RATING

Function and Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	moderate	0.80	1	
B. MT Natural Heritage Program Species Habitat	high	0.80	1	
C. General Wildlife Habitat	moderate	0.70	1	
D. General Fish/Aquatic Habitat	high	0.90	1	
E. Flood Attenuation	moderate	0.60	1	
F. Short and Long Term Surface Water Storage	high	1.00	1	
G. Sediment/Nutrient/Toxicant Removal	high	0.9	1	
H. Sediment/Shoreline Stabilization	high	1.00	1	
I. Production Export/Food Chain Support	high	0.90	1	
J. Groundwater Discharge/Recharge	high	1.00	1	
K. Uniqueness	moderate	0.40	1	
L. Recreation/Education Potential	high	1.00	1	
	Total:	**10.00**	**12.00**	_____
	Percent of Total Possible Points:		**83%** (Actual / Possible) x 100 [rd to nearest whole #]	

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

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

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

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

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

☒ **I** ☐ **II** ☐ **III** ☐ **IV**

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

1. Project Name: Camp Creek **2. Project #:** B4308802.02.02 **Control #:** _____

3. Evaluation Date: 7/21/2009 **4. Evaluator(s):** Greg Howard **5. Wetland / Site #(s):** AA-2; Grasser Property

6. Wetland Location(s) i. T: 1 N **R:** 19 W **S:** 22, 27, & 34 **T:** __ N **R:** __ E **S:** _____

ii. Approx. Stationing / Mileposts: _____

iii. Watershed: 3 - Lower Clark Fork **GPS Reference No. (if applies):** _____

Other Location Information: Located in Sula Basin; Reconstructed Camp Creek channel, floodplain, and adjacent emergent wetlands.

7. A. Evaluating Agency MDT

B. Purpose of Evaluation:

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

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

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

Comments: AA includes 1.2 acres of stream channel.

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA

HGM CLASS [1]	SYSTEM [2]	SUBSYSTEM [2]	CLASS [2]	WATER REGIME [2]	MODIFIER [2]	% OF AA
Riverine	Palustrine	None	Emergent Wetland	Seasonally Flooded	---	80
Riverine	Riverine	Upper Perennial	Rock Bottom	Permanently Flooded	---	15
Riverine	Palustrine	None	Scrub-Shrub Wetland	Seasonally Flooded	---	5
---	---	---	---	---	---	

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

Comments: _____

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

12. GENERAL CONDITION OF AA

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

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

Comments: (types of disturbance, intensity, season, etc.) Historically and currently grazed.

ii. Prominent weedy, alien, & introduced species: Spotted knapweed, Canada thistle, hound' tongue, pennycress, common dandelion, and tumble mustard.

iii. Briefly describe AA and surrounding land use / habitat: Camp Creek and adjacent wetland within the Sula Basin. Land uses include pasture, logging, private, and USFS.

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

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

Comments: _____

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

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

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

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

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point & Rating	---	---	.8 (M)	---	---	---	---

If documented, list the source (e.g., observations, records, etc.)**:** FWP records and observations on MDT site.

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

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

Primary or Critical habitat **(list species)** ☐ D ☒ S west-slope cutthroat trout
Secondary habitat **(list species)** ☒ D ☐ S bald eagle
Incidental habitat **(list species)** ☐ D ☐ S _____
No usable habitat ☐ D ☐ S _____

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

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point & Rating	---	.8 (H)	---	---	---	---	---

If documented, list the source (e.g., observations, records, etc.)**:** FWP records assume westslope cutthroat x rainbow hydrids, so ws not officially "documented". Bald eagle observed by MDT.

14C. GENERAL WILDLIFE HABITAT RATING

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

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

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

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

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

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

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

Evidence of Wildlife Use from 14C(i)	**Wildlife Habitat Features Rating** from 14C(ii)			
	☐ **Exceptional**	☒ **High**	☐ **Moderate**	☐ **Low**
Substantial	--	--	--	--
Moderate	--	.7 (M)	--	--
Low	--	--	--	--

Comments: _____

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

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

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

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

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

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

Types of Fish Known or Suspected within AA	**Modified Habitat Quality** from 14D(ii)			
	☐ **Exceptional**	☒ **High**	☐ **Moderate**	☐ **Low**
Native game fish	--	.9 (H)	--	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: Reconstructed channel supports native fish populations. Enhancement of habitat: pools, riffles, and overhanging banks. Ratings will improve with establishment of woody vegetation.

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

Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA do not flood from in-channel or overbank flow, then check NA.

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

Estimated wetland area in AA subject to periodic flooding	☐ **≥ 10 acres**			☒ **<10, >2 acres**			☐ **≤2 acres**		
% of flooded wetland classified as forested, scrub/shrub, or both	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**
AA contains **no outlet or restricted outlet**	--	--	--	--	--	--	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	.4 (M)	--	--	--

ii. Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA? (check)
☒**Y** ☐**N** **Comments:** USFS offices and residents downstream & several other homes located nearby.

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 NA above.

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

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	☐ **>5 acre feet**			☒ **<5, >1 acre feet**			☐ **≤1 acre foot**		
Duration of surface water at wetlands within the AA	**P/P**	**S/I**	**T/E**	**P/P**	**S/I**	**T/E**	**P/P**	**S/I**	**T/E**
Wetlands in AA flood or pond **≥ 5 out of 10 years**	--	--	--	--	.6 (M)	--	--	--	--
Wetlands in AA flood or pond **< 5 out of 10 years**	--	--	--	--	--	--	--	--	--

Comments: _____

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

Applies to wetlands with the potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input.
If no wetlands in the AA are subject to such input, check NA above.

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

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	☐ **≥ 70%**		☒ **< 70%**		☐ **≥ 70%**		☐ **< 70%**	
Evidence of flooding or ponding in AA	☐ **Yes**	☐ **No**	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	--	--	--	--	--	--	--	--
AA contains **unrestricted outlet**	--	--	.6 (M)	--	--	--	--	--

Comments: Minor sediment from nearby burned forest. Potential nutrient input due to heavy livestock grazing in Sula Basin.

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

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

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

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

Comments: _____

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

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

A	☒ Vegetated component >5 acres						☐ Vegetated component 1-5 acres						☐ Vegetated component <1 acre					
B	☐ High		☒ Moderate		☐ Low		☐ High		☐ Moderate		☐ Low		☐ High		☐ Moderate		☐ Low	
C	☐Y	☐N	☒Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N
P/P	--	--	.9H	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S/I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments: _____

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

i. ☒ **Discharge Indicators**

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

ii. ☒ **Recharge Indicators**

- ☒ Permeable substrate presents without underlying impeding layer.
- ☐ Wetland contains inlet but not outlet.
- ☐ Other _____

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

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

Comments: _____

14K. UNIQUENESS

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

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

Comments: _____

14L. RECREATION / EDUCATION POTENTIAL

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

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

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

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

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

Ownership	Disturbance at AA from 12(i)		
	☐ Low	☒ Moderate	☐ High
Public ownership	--	--	--
Private ownership	--	.3(L)	--

Comments: Good potential for recreation/education as it is adjacent to Highway 93, though under private ownership.

FUNCTION, VALUE SUMMARY, AND OVERALL RATING

Function and Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	moderate	0.80	1	
B. MT Natural Heritage Program Species Habitat	high	0.80	1	
C. General Wildlife Habitat	moderate	0.70	1	
D. General Fish/Aquatic Habitat	high	0.90	1	
E. Flood Attenuation	moderate	0.40	1	
F. Short and Long Term Surface Water Storage	moderate	0.60	1	
G. Sediment/Nutrient/Toxicant Removal	moderate	0.60	1	
H. Sediment/Shoreline Stabilization	high	1.0	1	
I. Production Export/Food Chain Support	high	0.90	1	
J. Groundwater Discharge/Recharge	high	1.00	1	
K. Uniqueness	low	0.20	1	
L. Recreation/Education Potential	low	0.30	1	
	Total:	**8.20**	**12.00**	_____
	Percent of Total Possible Points:		**68%** (Actual / Possible) x 100 [rd to nearest whole #]	

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

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

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

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

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

☐ **I** ☒ **II** ☐ **III** ☐ **IV**

Appendix C

2009 REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Camp Creek
Sula, Montana

CAMP CREEK MITIGATION SITE 2009

Photo Point No. 1: View facing northeast along vegetation transect; end point in foreground. Camp Creek and floodplain margins located in background view.

Photo Point No. 2: View facing southwest along vegetation transect; starting point in foreground located in an upland community type.

Photo Point No. 3: View facing northeast of constructed Camp Creek channel and floodplain margins. Area dominated by wetland species.

Photo Point No. 4: View facing north of floodplain margins with emergent wetland and riparian vegetation.

Photo Point No. 5: Panoramic view facing west across MDT Parcel. Representative photo of channel and adjacent floodplains present at Camp Creek. Floodplain is dominated by wetland and riparian species and had saturated soils during the late summer visit. The shrub and tree plantings show continued annual growth.

CAMP CREEK MITIGATION SITE 2009

Photo Point No. 6: View facing north along the Camp Creek near the flood inlet. Flood inlet located on the right side of the channel or view. Inlet becoming more vegetated. Some back cutting and scour observed behind the rock feature installed to divert high water flows into the inlet.

Photo Point No. 7: View facing south along Camp Creek on the northern end of the monitoring area.

CAMP CREEK MITIGATION SITE 2009

Photo Point No. 8: View facing west across the mitigation site with upland community type in foreground and wetland community in background.

Photo Point No. 9: View facing north along the main channel just below the second culvert on Grasser parcel. Upland area is dominated by spotted knapweed and is heavily grazed by livestock.

CAMP CREEK MITIGATION SITE 2009

Photo Point No. 10: View facing west looking across the Camp Creek. Area is dominated by wetlands within the floodplain corridor. Areas outside the floodplain dominated by noxious weeds, such as spotted knapweed, and other undesirable species.

Photo Point No. 11: View facing north along creek at road crossing and culvert near Grasser complex. Area is dominated by spotted knapweed.

CAMP CREEK MITIGATION SITE 2009

Photo Point No. 12: View facing south along the channel near Grasser Complex. Healthy and vigorous shrub communities present along the banks and within the floodplain margins.

Photo Point No. 13: View facing south along the main channel located on the upper portion of Grasser parcel.

Appendix D

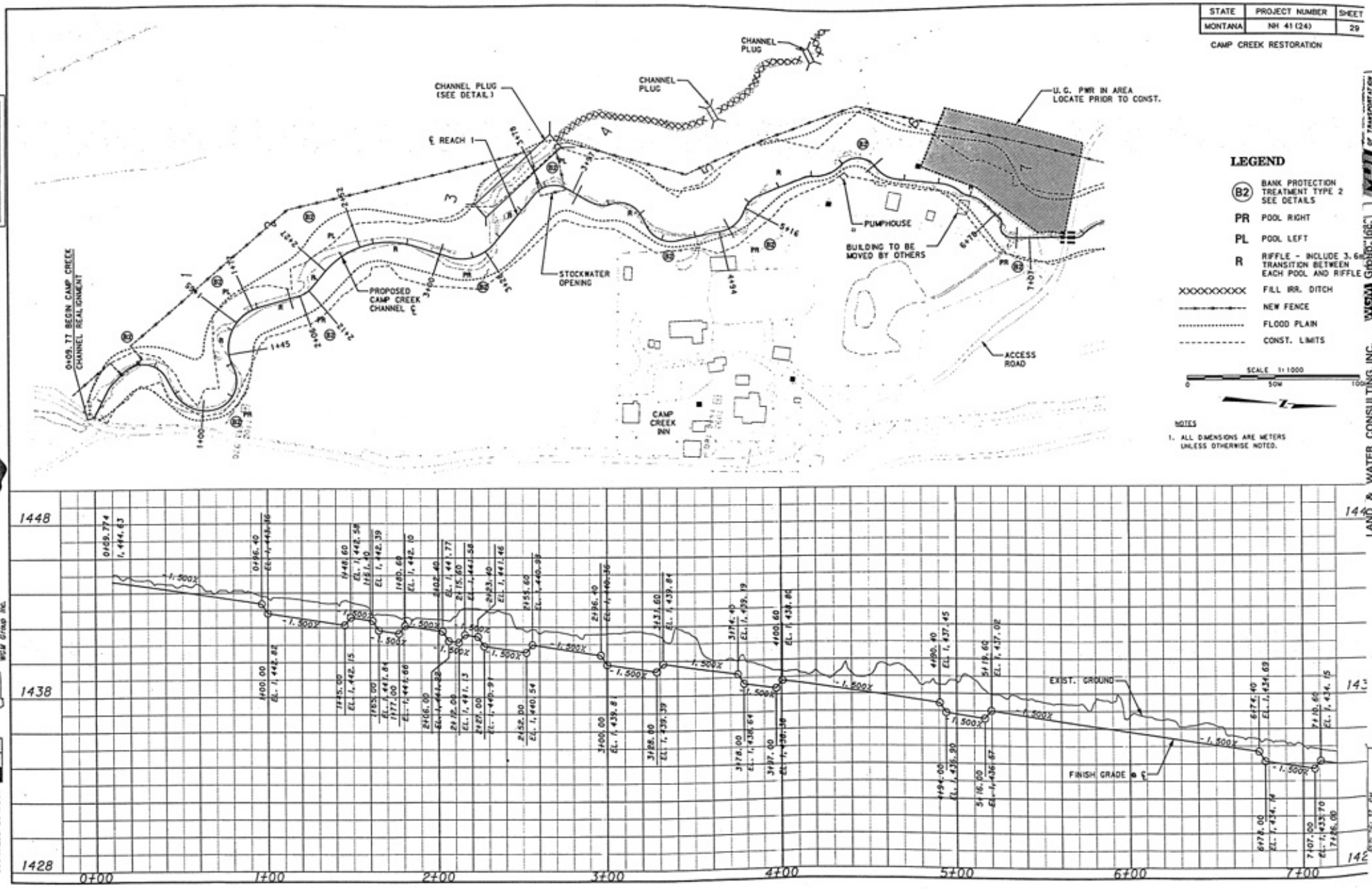
ORIGINAL SITE PLAN

MDT Wetland Mitigation Monitoring
Camp Creek
Sula, Montana

LAND & WATER D-1

STATE	PROJECT NUMBER	SHEET
MONTANA	NH 41 (24)	29

CAMP CREEK RESTORATION



LAND & WATER CONSULTING, INC.

WSM Group, Inc.

MONTANA DEPARTMENT OF TRANSPORTATION

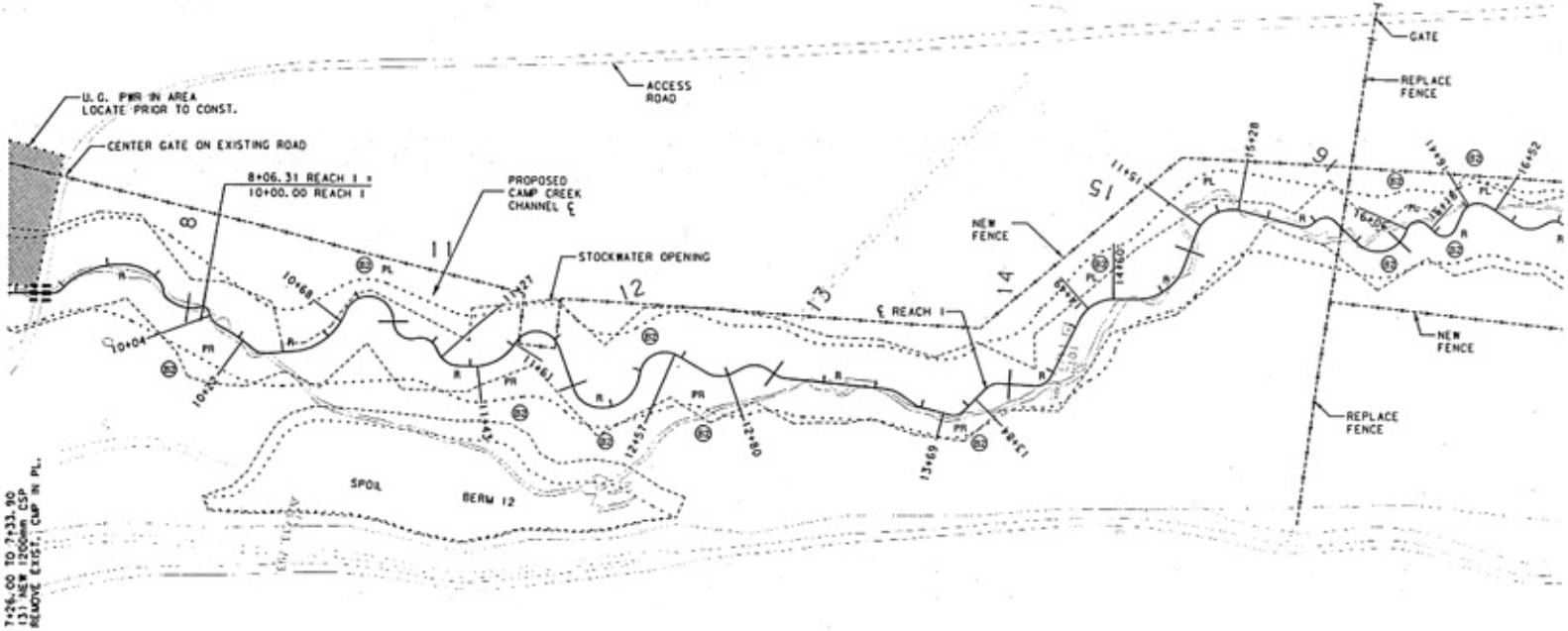
01 MAR 2001 WSM GROUP INC.

CADD

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 41(24)	30

CAMP CREEK RESTORATION

LAND & WATER D-2



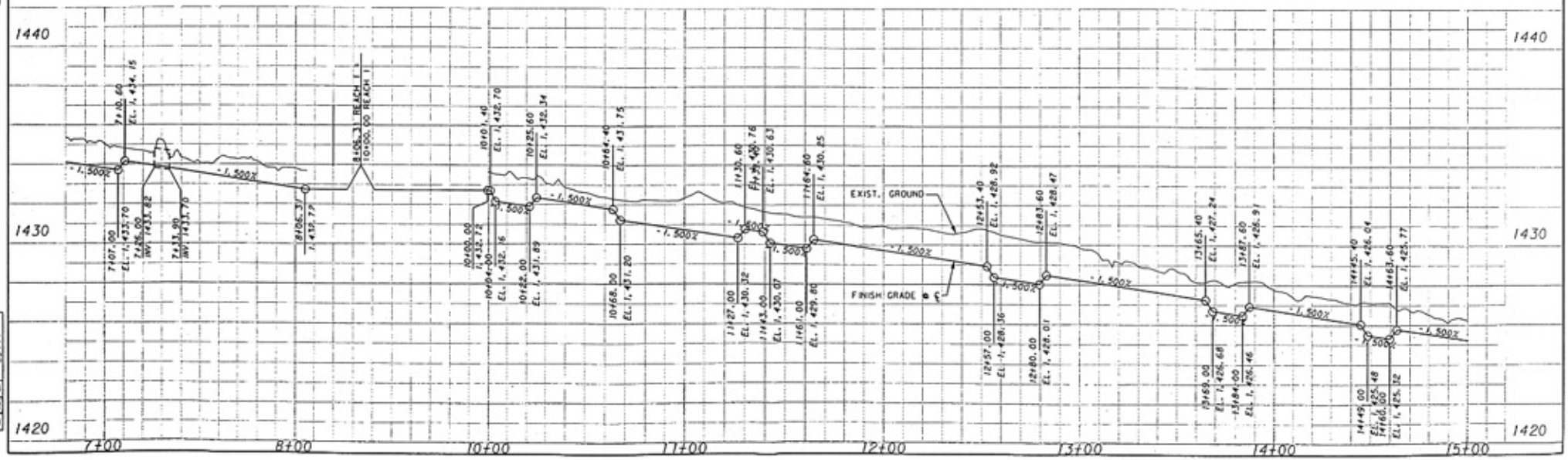
LEGEND

(B2)	BANK PROTECTION TREATMENT TYPE 2 SEE DETAILS
PR	POOL RIGHT
PL	POOL LEFT
R	RIFFLE - INCLUDE 3.6m TRANSITION BETWEEN EACH POOL AND RIFFLE
XXXXXXXXX	FILL IRR. DITCH
----------	NEW FENCE
. . . . .	FLOOD PLAIN
----------	CONST. LIMITS

NOTES

1. ALL DIMENSIONS ARE METERS UNLESS OTHERWISE NOTED.

SCALE 1:1000



LAND & WATER CONSULTING, INC.

STATE	PROJECT NUMBER	SH
MONTANA	NH 41 (24)	

CAMP CREEK RESTORATION

LAND & WATER D-J

STOCKWATER OPENING

REALIGN ACCESS ROAD

GATE

SPOIL BERM 15.

PROPOSED CAMP CREEK CHANNEL ℄

ACCESS ROAD

20+80.00 TO 20+87.90 (31) NEW 1200mm CSP REMOVE EXIST. CMP IN PL.

NEW FENCE

REPLACE FENCE

LEGEND

(B2)	BANK PROTECTION TREATMENT TYPE 2 SEE DETAILS
PR	POOL RIGHT
PL	POOL LEFT
R	RIFFLE - INCLUDE 3.6m TRANSITION BETWEEN EACH POOL AND RIFFLE
XXXXXXXXX	FILL IRR. DITCH
———	NEW FENCE
.....	FLOOD PLAIN
.....	CONST. LIMITS

SCALE 1:1000

0 50M

NOTES

1. ALL DIMENSIONS ARE METERS UNLESS OTHERWISE NOTED.

EXIST. GROUND

FINISH GRADE ℄

1430

1420

1410

15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00

MONTANA DEPARTMENT OF TRANSPORTATION

WGM GROUP INC.

LAND & WATER CONSULTING, INC.

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 41 (24)	32

CAMP CREEK RESTORATION

LAND & WATER D-4

23+52.71 REACH 1 =
30+00.00 REACH 2

30+49.51 REACH 2 =
101+37.52 PRAINE CR

N 8° 47' 01" W

US HWY. 93

GATE

REPLACE FENCE

NEW FENCE

SPOIL BERM 1

SPOIL BERM 15

SPOIL BERM 2

SPOIL BERM 3

SPOIL BERM 5

SPOIL BERM 6

PROPOSED CAMP CREEK CHANNEL ℄

LEGEND

(B2)	BANK PROTECTION TREATMENT TYPE 2 SEE DETAILS
PR	POOL RIGHT
PL	POOL LEFT
R	RIFFLE - INCLUDE 3.6m TRANSITION BETWEEN EACH POOL AND RIFFLE
XXXXXXXXXX	FILL IRR. DITCH
—+—+—	NEW FENCE
.....	FLOOD PLAIN
- - - - -	CONST. LIMITS

NOTES

1. ALL DIMENSIONS ARE METERS UNLESS OTHERWISE NOTED.

SCALE 1:1000

0 50M 100M

EXIST. GROUND

FINISH GRADE ℄

PRAINE CREEK ALIGNMENT

22+00 23+00 100+00 110+00 30+00 31+00 32+00 33+00 34+00 35+00

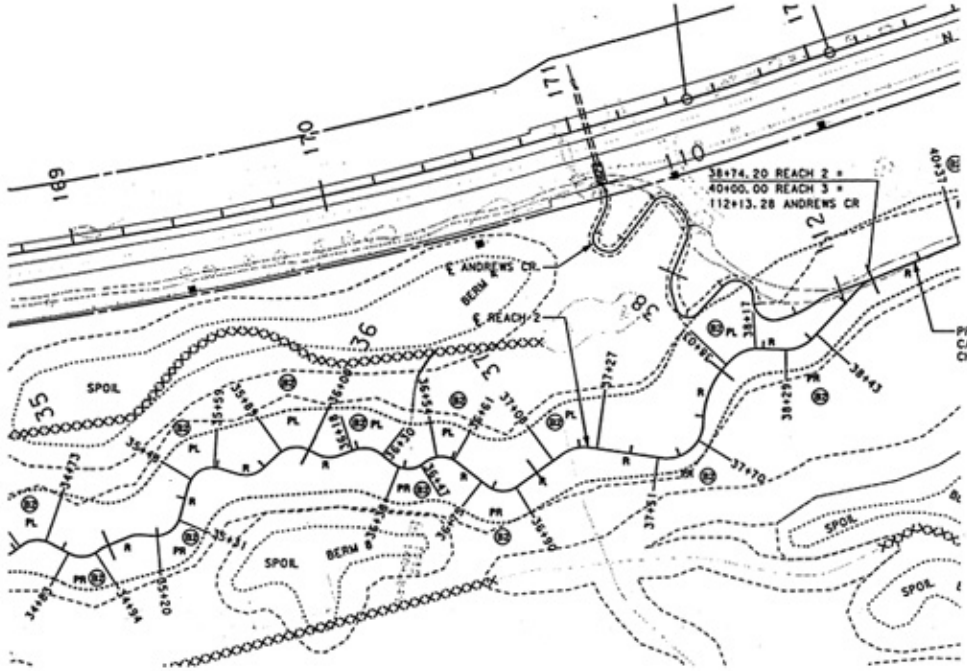
1410 1400

H1/sh/RD/A285PL02.DGN Mar. 01, 2001 16:14:02

STATE	PROJECT NUMBER	SHEET NO
MONTANA	NH 41 (24)	33

CAMP CREEK RESTORATION

LAND & WATER D-5



LEGEND

(B2)	BANK PROTECTION TREATMENT TYPE 2 SEE DETAILS
PR	POOL RIGHT
PL	POOL LEFT
R	RIFFLE - INCLUDE 3.6m TRANSITION BETWEEN EACH POOL AND RIFFLE
XXXXXXXXX	FILL IRR. DITCH
—·—·—	NEW FENCE
·····	FLOOD PLAIN
- - - -	CONST. LIMITS

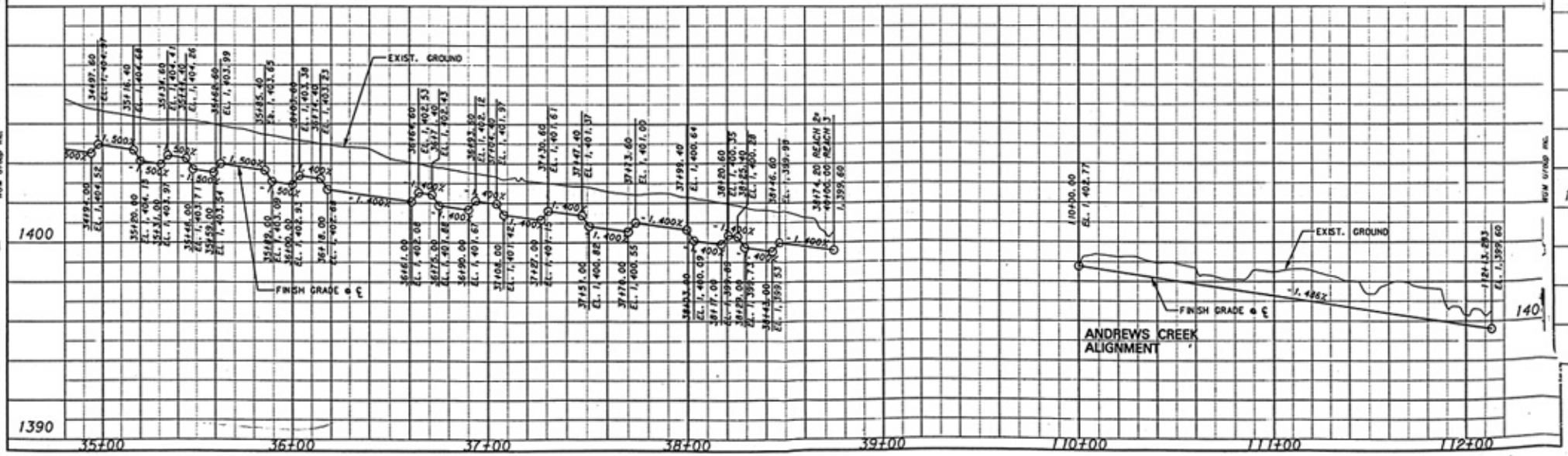
NOTES

1. ALL DIMENSIONS ARE METERS UNLESS OTHERWISE NOTED.

N

SCALE 1:1000

0 50M 100M



MONTANA DEPARTMENT OF TRANSPORTATION

WGM Group, Inc.

LAND & WATER CONSULTING, INC.

01 MAR 2001 WGM Group Inc.

MONTANA CADD

...\A285PL02.DGN

01001/sh/RD/A285PL02.DGN Mar. 01, 2001 16:14:21

Appendix E

BIRD SURVEY PROTOCOL
GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Camp Creek
Sula, Montana

BIRD SURVEY PROTOCOL

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

Survey Area

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

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

Survey Time

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

Data Recording

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

abbreviation at the bottom of the field data sheet. For example, unknown shorebird is UNSB; unknown brown bird is UNBR; unknown warbler is UNWA; and unknown waterfowl is UNWF. For a flyover of a flock of unknown species, use a term that describes the birds' general characteristics and include the approximate flock size in parenthesis; do not fill in the habitat column. For example, a flock of black, medium-sized birds could be coded as UNBB / FO (25).

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

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

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

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

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

Other Fields

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

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

Date: Record the date of the bird survey.

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

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

GPS MAPPING AND AERIAL PHOTO REFERENCING PROCEDURE

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

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

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

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

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

Appendix F

2009 MACROINVERTEBRATE SAMPLING PROTOCOL AND DATA

MDT Wetland Mitigation Monitoring
Camp Creek
Sula, Montana

AQUATIC INVERTEBRATE SAMPLING PROTOCOL

Equipment List

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

Site Selection

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

Sampling Procedure

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

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

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

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

Photograph each macroinvertebrate sampling site.

Sample Handling/Delivery

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

MDT Mitigated Wetland Monitoring Project: Aquatic Invertebrate Monitoring
Summary 2001 – 2009
Prepared for Post, Buckley, Schuh, and Jernigan (PBS&J)
Prepared by W.Bollman, Rhithron Associates, Inc.

INTRODUCTION

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

METHODS

Sampling and Sample Processing

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

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

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

Assessment

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

Scoring criteria for wetland metrics were developed by generally following the tactic used by Stribling et al. (1995). Boxplots were generated using a statistical software package (Statistica™), and distributions, median values, ranges, and quartiles for each metric were examined. For the wetland sites, “good” scores were generally

those that fell above the 75th percentile (for those metrics that decrease in value in response to stress) or below the 25th percentile (for metrics that respond to stress by an increase in value) of all scores. Additional scoring ranges were established by bisecting the range below the 75th percentile for decreasing scores (or above the 25th percentile for increasing scores) into "sub-optimal" and "poor" assessment categories. A score of 5, 3, or 1 was assigned to good, sub-optimal, and poor metric performance, respectively. In this way, metric values were translated into normalized metric scores, and scores for all metrics were summed to produce a total bioassessment score, which is expressed as a percentage of the maximum possible score (60). Total bioassessment scores were classified according to a similar process, using the ranges and distributions of total scores for all sites studied between 2001 and 2007. Data from a total of 167 sites were used to develop criteria.

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

The purpose of constructing an index from biological attributes or metrics is to provide a means of integrating information to facilitate the determination of whether management action is needed. However, the nature of the action needed is not determined solely by the index score or impairment classification, but by consideration of an analysis of the component metrics, the taxonomic composition of the assemblages, and other issues. The diagnostic functions of the metrics and taxonomic data need more study since our understanding of the interrelationships of natural environmental factors and anthropogenic disturbances is tentative. Thus, the bioassessment index used in this report may not be universally applicable to all wetland types, and in particular, to constructed wetlands. Scores and impairment classifications derived from the index may not be valid indications of impairment or non-impairment. In addition, the further interpretive remarks accompanying the raw taxonomic and metric data in this summary are offered cautiously. Year-to-year comparisons depend on an assumption that specific sites were revisited in each year, and that equivalent sampling methods were utilized at each site revisit.

Bioassessment metrics - wetlands

An index based on the performance of 12 metrics was constructed, as described above. Table 2 lists those metrics, describes their calculation and the expected response of each to increased degradation or impairment of the wetland.

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

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

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

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

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

Bioassessment metrics – lotic habitats

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

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

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

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

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

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

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

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

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

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

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

RESULTS

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

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

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

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

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

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

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

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Taxa Listing

Project ID: MDT09PBSJ
RAI No.: MDT09PBSJ008

RAI No.: MDT09PBSJ008 **Sta. Name:** Camp Creek MS 1
Client ID:
Date Coll.: 7/21/2009 **No. Jars:** 1 **STORET ID:**

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Acari	3	2.97%	Yes	Unknown		5	PR
Nematoda	6	5.94%	Yes	Unknown		5	PA
Turbellaria	2	1.98%	Yes	Unknown		4	PR
Enchytraeidae							
Enchytraeus sp.	1	0.99%	Yes	Unknown		4	CG
Fridericia sp.	1	0.99%	Yes	Unknown		11	CG
Mesenchytraeus sp.	4	3.96%	Yes	Unknown		4	CG
Sphaeriidae							
Sphaeriidae	1	0.99%	Yes	Unknown		8	CF
Ephemeroptera							
Baetidae							
Baetidae	1	0.99%	Yes	Larva	Damaged	4	CG
Ephemerellidae							
Attenella sp.	2	1.98%	Yes	Larva	Early Instar	2	CG
Ephemerellidae	1	0.99%	No	Larva	Early Instar	1	CG
Plecoptera							
Chloroperlidae							
Chloroperlidae	4	3.96%	Yes	Larva	Damaged	1	PR
Trichoptera							
Lepidostomatidae							
Lepidostoma sp.	5	4.95%	Yes	Larva		1	SH
Limnephilidae							
Limnephilidae	1	0.99%	Yes	Larva	Damaged	3	SH
Coleoptera							
Dytiscidae							
Neoporus sp.	1	0.99%	Yes	Adult		5	PR
Oreodytes sp.	3	2.97%	Yes	Adult		5	PR
Elmidae							
Optioservus sp.	12	11.88%	No	Larva		5	SC
Optioservus sp.	1	0.99%	Yes	Adult		5	SC
Diptera							
Ceratopogonidae							
Ceratopogoninae	6	5.94%	Yes	Larva		6	PR

Taxa Listing

Project ID: MDT09PBSJ
RAI No.: MDT09PBSJ008

RAI No.: MDT09PBSJ008 **Sta. Name:** Camp Creek MS 1
Client ID:
Date Coll.: 7/21/2009 **No. Jars:** 1 **STORET ID:**

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Chironomidae							
Chironomidae							
Cladotanytarsus sp.	1	0.99%	Yes	Larva		7	CG
Corynoneura sp.	1	0.99%	Yes	Pupa		7	CG
Cricotopus bicinctus	2	1.98%	Yes	Larva		7	SH
Eukiefferiella Claripennis Gr.	11	10.89%	Yes	Larva		8	CG
Heleniella sp.	2	1.98%	Yes	Larva		6	CG
Heterotrissocladius marcidus	4	3.96%	Yes	Larva		4	CG
Hydrobaenus sp.	5	4.95%	Yes	Larva		8	SC
Microtendipes sp.	2	1.98%	Yes	Larva		6	CF
Orthocladius sp.	2	1.98%	Yes	Larva		6	CG
Phaenopsectra sp.	1	0.99%	Yes	Larva		7	SC
Polypedilum sp.	1	0.99%	Yes	Larva		6	SH
Rheotanytarsus sp.	2	1.98%	No	Pupa		6	CF
Rheotanytarsus sp.	1	0.99%	Yes	Larva		6	CF
Tanytarsus sp.	6	5.94%	Yes	Larva		6	CF
Thienemannimyia Gr.	5	4.95%	Yes	Larva		5	PR
Sample Count	**101**						

Metrics Report

Project ID: MDT09PBSJ
RAI No.: MDT09PBSJ008
Sta. Name: Camp Creek MS 1
Client ID:
STORET ID:
Coll. Date: 7/21/2009

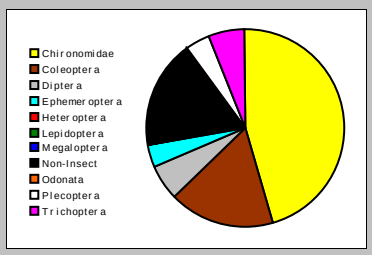
Abundance Measures

Sample Count: 101
Sample Abundance: 159.47 63.33% of sample used

Coll. Procedure:
Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	7	18	17.82%
Odonata			
Ephemeroptera	2	4	3.96%
Plecoptera	1	4	3.96%
Heteroptera			
Megaloptera			
Trichoptera	2	6	5.94%
Lepidoptera			
Coleoptera	3	17	16.83%
Diptera	1	6	5.94%
Chironomidae	14	46	45.54%

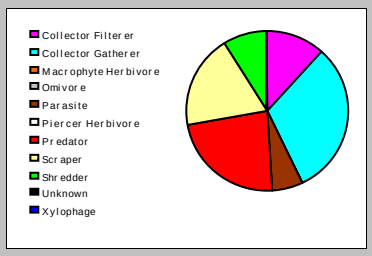


Dominant Taxa

Category	A	PRA
Optioservus	13	12.87%
Eukiefferiella Claripennis Gr.	11	10.89%
Tanytarsus	6	5.94%
Nematoda	6	5.94%
Ceratopogoninae	6	5.94%
Thienemannimyia Gr.	5	4.95%
Lepidostoma	5	4.95%
Hydrobaenus	5	4.95%
Mesenchytraeus	4	3.96%
Heterotrissocladius marcidus	4	3.96%
Chloroperlidae	4	3.96%
Rheotanytarsus	3	2.97%
Oreodytes	3	2.97%
Acari	3	2.97%
Heleniella	2	1.98%

Functional Composition

Category	R	A	PRA
Predator	7	24	23.76%
Parasite	1	6	5.94%
Collector Gatherer	11	31	30.69%
Collector Filterer	4	12	11.88%
Macrophyte Herbivore			
Piercer Herbivore			
Xylophage			
Scraper	3	19	18.81%
Shredder	4	9	8.91%
Omivore			
Unknown			

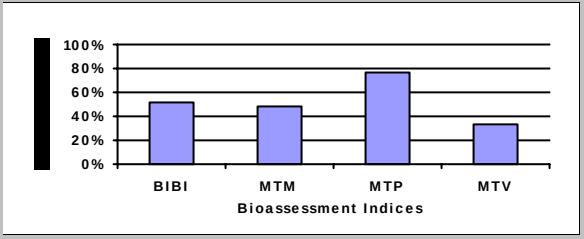


Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
Composition					
Taxa Richness	30	3	3		3
Non-Insect Percent	17.82%				
E Richness	2	1		1	
P Richness	1	1		1	
T Richness	2	1		1	
EPT Richness	5		1		0
EPT Percent	13.86%		1		0
Oligochaeta+Hirudinea Percent	5.94%				
Baetidae/Ephemeroptera	0.250				
Hydropsychidae/Trichoptera	0.000				
Dominance					
Dominant Taxon Percent	12.87%		3		3
Dominant Taxa (2) Percent	23.76%				
Dominant Taxa (3) Percent	29.70%	5			
Dominant Taxa (10) Percent	64.36%				
Diversity					
Shannon H (loge)	3.125				
Shannon H (log2)	4.509		3		
Margalef D	6.510				
Simpson D	0.044				
Evenness	0.044				
Function					
Predator Richness	7		3		
Predator Percent	23.76%	5			
Filterer Richness	4				
Filterer Percent	11.88%			1	
Collector Percent	42.57%		3		3
Scraper+Shredder Percent	27.72%		2		1
Scraper/Filterer	1.583				
Scraper/Scraper+Filterer	0.613				
Habit					
Burrower Richness	1				
Burrower Percent	5.94%				
Swimmer Richness	1				
Swimmer Percent	2.97%				
Clinger Richness	8	1			
Clinger Percent	30.69%				
Characteristics					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	3				
Hemoglobin Bearer Percent	3.96%				
Air Breather Richness	2				
Air Breather Percent	3.96%				
Voltinism					
Univoltine Richness	8				
Semivoltine Richness	3	3			
Multivoltine Percent	57.43%		2		
Tolerance					
Sediment Tolerant Richness	0				
Sediment Tolerant Percent	0.00%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	4.018				
Pollution Sensitive Richness	1	1		1	
Pollution Tolerant Percent	13.86%	5		1	
Hilsenhoff Biotic Index	5.230		2		0
Intolerant Percent	11.88%				
Supertolerant Percent	16.83%				
CTQa	98.696				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	26	52.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	23	76.67%	Slight
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	6	33.33%	Moderate
MTM	Montana DEQ Mountains (Bukantis 1998)	10	47.62%	Moderate



Tuesday, October 27, 2009

Taxa Listing

Project ID: MDT09PBSJ
RAI No.: MDT09PBSJ009

RAI No.: MDT09PBSJ009 **Sta. Name:** Camp Creek MS 2
Client ID:
Date Coll.: 7/21/2009 **No. Jars:** 1 **STORET ID:**

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Acari	2	1.83%	Yes	Unknown		5	PR
Turbellaria	2	1.83%	Yes	Unknown		4	PR
Enchytraeidae							
Fridericia sp.	2	1.83%	Yes	Unknown		11	CG
Naididae							
Naididae (Tubificinae) - with capillary setae	1	0.92%	Yes	Immature		11	CG
Nais sp.	1	0.92%	Yes	Unknown		8	CG
Ephemeroptera							
Ameletidae							
Ameletus sp.	1	0.92%	Yes	Larva		0	CG
Baetidae							
Diphetor hageni	1	0.92%	Yes	Larva		5	CG
Ephemerellidae							
Serratella tibialis	1	0.92%	Yes	Larva		2	CG
Heptageniidae							
Epeorus albertae	1	0.92%	Yes	Larva		2	SC
Trichoptera							
Brachycentridae							
Brachycentridae	2	1.83%	No	Pupa		1	CG
Brachycentrus americanus	9	8.26%	Yes	Larva		1	CF
Micrasema sp.	3	2.75%	Yes	Larva		1	SH
Lepidostomatidae							
Lepidostoma sp.	5	4.59%	Yes	Larva		1	SH
Uenoidae							
Neophylax rickeri	1	0.92%	Yes	Larva		3	SC
Coleoptera							
Elmidae							
Optioservus sp.	8	7.34%	No	Larva		5	SC
Optioservus sp.	5	4.59%	Yes	Adult		5	SC
Zaitzevia sp.	1	0.92%	Yes	Larva		5	CG
Diptera							
Simuliidae							
Simulium sp.	10	9.17%	Yes	Larva		6	CF

Taxa Listing

Project ID: MDT09PBSJ
RAI No.: MDT09PBSJ009

RAI No.: MDT09PBSJ009 **Sta. Name:** Camp Creek MS 2
Client ID:
Date Coll.: 7/21/2009 **No. Jars:** 1 **STORET ID:**

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Chironomidae							
Chironomidae							
Cricotopus (Nostococladius) sp.	4	3.67%	Yes	Larva		6	SH
Cricotopus bicinctus	8	7.34%	Yes	Larva		7	SH
Eukiefferiella sp.	1	0.92%	No	Pupa		8	CG
Eukiefferiella Brehmi Gr.	1	0.92%	Yes	Larva		8	CG
Eukiefferiella Claripennis Gr.	9	8.26%	Yes	Larva		8	CG
Eukiefferiella Devonica Gr.	10	9.17%	Yes	Larva		8	CG
Microtendipes sp.	3	2.75%	Yes	Larva		6	CF
Orthocladiinae	1	0.92%	No	Larva	Early Instar	6	CG
Orthocladius sp.	5	4.59%	Yes	Larva		6	CG
Rheotanytarsus sp.	1	0.92%	Yes	Pupa		6	CF
Tanytarsus sp.	1	0.92%	Yes	Larva		6	CF
Thienemanniella sp.	3	2.75%	Yes	Larva		6	CG
Thienemannimyia Gr.	1	0.92%	Yes	Larva		5	PR
Tvetenia Bavarica Gr.	5	4.59%	Yes	Larva		5	CG
Sample Count	**109**						

Metrics Report

Project ID: MDT09PBSJ
RAI No.: MDT09PBSJ009
Sta. Name: Camp Creek MS 2
Client ID:
STORET ID:
Coll. Date: 7/21/2009

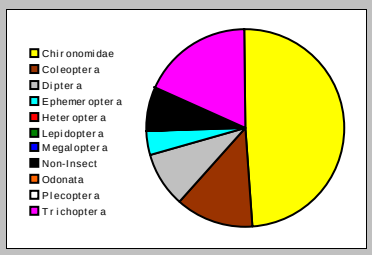
Abundance Measures

Sample Count: 109
Sample Abundance: 817.50 13.33% of sample used

Coll. Procedure:
Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	5	8	7.34%
Odonata			
Ephemeroptera	4	4	3.67%
Plecoptera			
Heteroptera			
Megaloptera			
Trichoptera	4	20	18.35%
Lepidoptera			
Coleoptera	2	14	12.84%
Diptera	1	10	9.17%
Chironomidae	12	53	48.62%

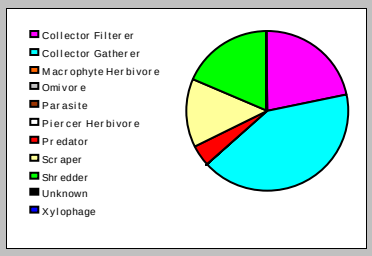


Dominant Taxa

Category	A	PRA
Optioservus	13	11.93%
Simulium	10	9.17%
Eukiefferiella Devonica Gr.	10	9.17%
Eukiefferiella Claripennis Gr.	9	8.26%
Brachycentrus americanus	9	8.26%
Cricotopus bicinctus	8	7.34%
Tvetenia Bavarica Gr.	5	4.59%
Orthocladius	5	4.59%
Lepidostoma	5	4.59%
Cricotopus (Nostococladius)	4	3.67%
Thienemanniella	3	2.75%
Microtendipes	3	2.75%
Micrasema	3	2.75%
Turbellaria	2	1.83%
Brachycentridae	2	1.83%

Functional Composition

Category	R	A	PRA
Predator	3	5	4.59%
Parasite			
Collector Gatherer	13	45	41.28%
Collector Filterer	5	24	22.02%
Macrophyte Herbivore			
Piercer Herbivore			
Xylophage			
Scraper	3	15	13.76%
Shredder	4	20	18.35%
Omivore			
Unknown			

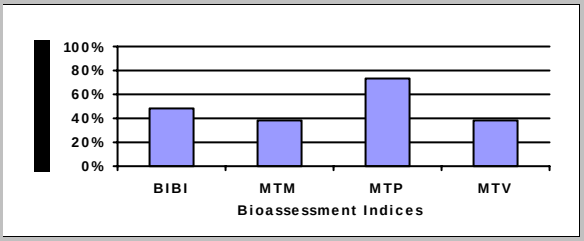


Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
Composition					
Taxa Richness	28	3	3		2
Non-Insect Percent	7.34%				
E Richness	4	1		2	
P Richness	0	1		0	
T Richness	4	1		2	
EPT Richness	8		2		0
EPT Percent	22.02%		1		0
Oligochaeta+Hirudinea Percent	3.67%				
Baetidae/Ephemeroptera	0.250				
Hydropsychidae/Trichoptera	0.000				
Dominance					
Dominant Taxon Percent	11.93%		3		3
Dominant Taxa (2) Percent	21.10%				
Dominant Taxa (3) Percent	30.28%	5			
Dominant Taxa (10) Percent	71.56%				
Diversity					
Shannon H (loge)	2.987				
Shannon H (log2)	4.309		3		
Margalef D	5.902				
Simpson D	0.053				
Evenness	0.049				
Function					
Predator Richness	3		1		
Predator Percent	4.59%	1			
Filterer Richness	5				
Filterer Percent	22.02%			1	
Collector Percent	63.30%		2		2
Scraper+Shredder Percent	32.11%		3		1
Scraper/Filterer	0.625				
Scraper/Scraper+Filterer	0.385				
Habit					
Burrower Richness	0				
Burrower Percent	0.00%				
Swimmer Richness	2				
Swimmer Percent	1.83%				
Clinger Richness	13	3			
Clinger Percent	53.21%				
Characteristics					
Cold Stenotherm Richness	1				
Cold Stenotherm Percent	3.67%				
Hemoglobin Bearer Richness	1				
Hemoglobin Bearer Percent	2.75%				
Air Breather Richness	0				
Air Breather Percent	0.00%				
Voltinism					
Univoltine Richness	8				
Semivoltine Richness	3	3			
Multivoltine Percent	53.21%		2		
Tolerance					
Sediment Tolerant Richness	0				
Sediment Tolerant Percent	0.00%				
Sediment Sensitive Richness	1				
Sediment Sensitive Percent	3.67%				
Metals Tolerance Index	4.408				
Pollution Sensitive Richness	1	1		1	
Pollution Tolerant Percent	12.84%	5		1	
Hilsenhoff Biotic Index	5.179		2		0
Intolerant Percent	20.18%				
Supertolerant Percent	20.18%				
CTQa	82.619				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	24	48.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	22	73.33%	Slight
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	7	38.89%	Moderate
MTM	Montana DEQ Mountains (Bukantis 1998)	8	38.10%	Moderate



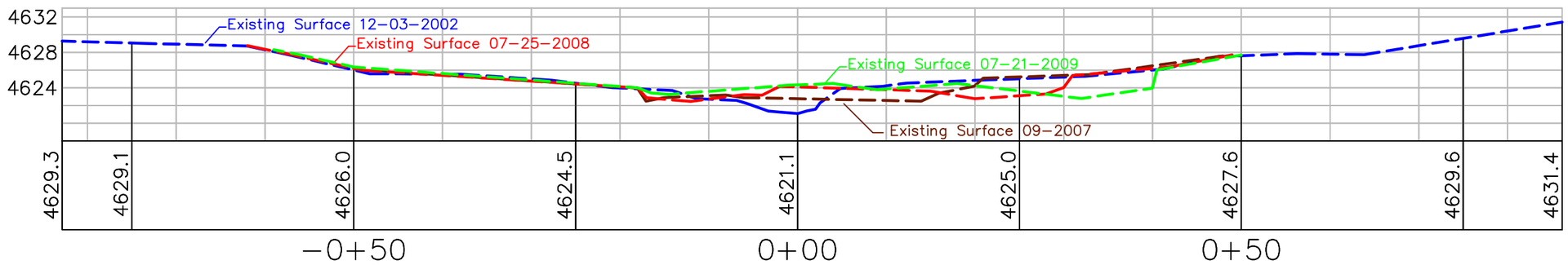
Tuesday, October 27, 2009

Appendix G

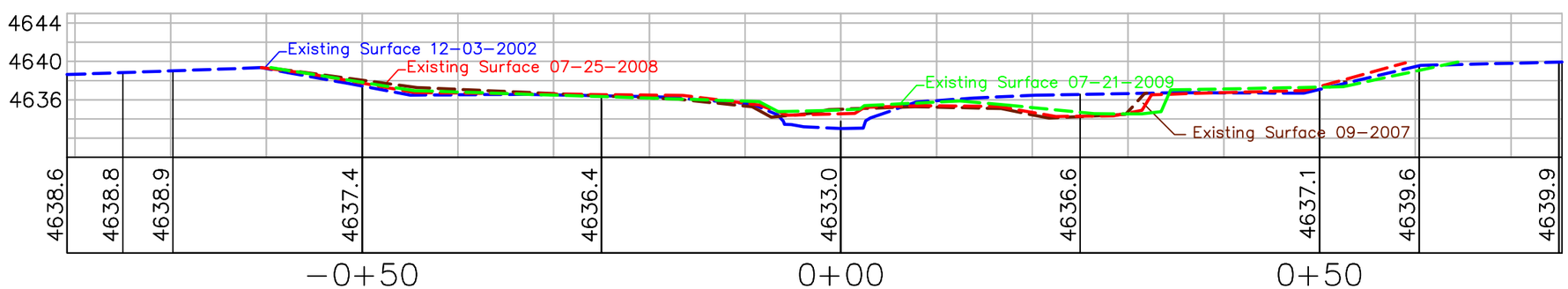
FIGURE 5 - CAMP CREEK CHANNEL CROSS SECTIONS
AERIAL PHOTOGRAPH - PLANTING LOCATIONS
PLANTING SPECIFICATIONS

MDT Wetland Mitigation Monitoring
Camp Creek
Sula, Montana

Figure 5 - Channel Cross Sections



Cross Section 3-A



Cross Section 4-A

LEGEND
- Existing Surface 07-2009
- Existing Surface 07-2008
- Existing Surface 09-2007
- Existing Surface 12-2002

PROJECT NAME
MDT CAMP CREEK WETLAND MITIGATION
DRAWING TITLE
CHANNEL CROSS SECTIONS

DRAWN: RAA/JR
PROJ MGR: J. BERGLUND
CHECKED: GH | APPV'D: JB

PROJ NO: 0B4308802 02.02
LOCATION: SULA, MT
SCALE: 1"=15ft
FILE NAME: XSECTIONS.dwg

PBSJ
1120 Cedar
Missoula, MT 59802

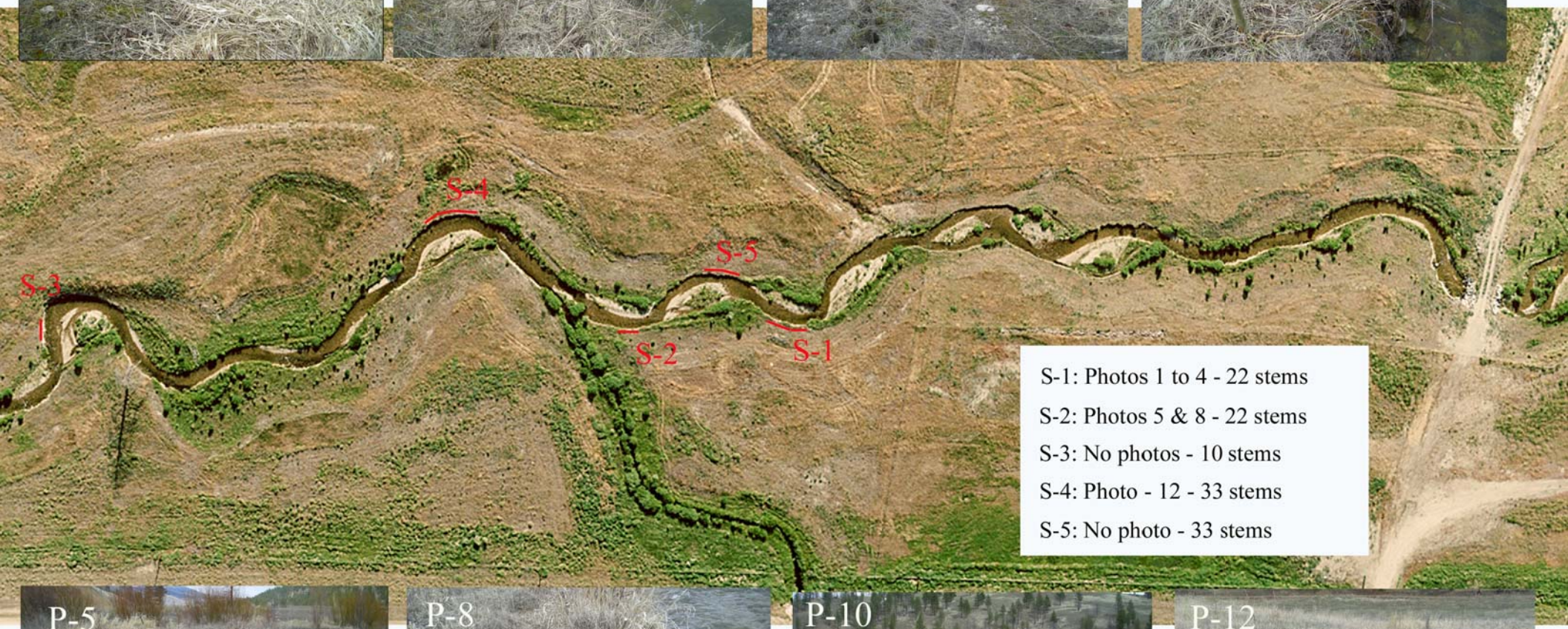
FIGURE
5 OF
REV -
Oct/29/2009

P-1

P-2

P-3

P-4


S-4
S-5
S-3
S-2
S-1
S-1: Photos 1 to 4 - 22 stems
S-2: Photos 5 & 8 - 22 stems
S-3: No photos - 10 stems
S-4: Photo - 12 - 33 stems
S-5: No photo - 33 stems

P-5

P-8

P-10

P-12

MONITORING

LAND & WATER F-2

Nature's Enhancement, Inc.

2980 Eastside Highway
Stevensville, Montana 59870
Phone: (406) 777-3560
FAX: (406) 777-3560

SOLD TO:
Department of Transportation
Project No:
NH7-1(58)9 F Sula-North & South
NH41(24) Camp Creek Restoration

SHIPPED TO:
Sula North & South/ Camp Creek Restoration
Project Site
Sula, Montana

INVOICE NUMBER	
PURCHASE ORDER #	
ORDER DATE	
SHIP DATE (EST.)	
TERMS	
DUE DATE	
SALES REP	Greg
SHIP VIA	NE

Quantity	Description			Unit Price	Amount
	CC5: REVEGETATION				
446	Alnus incana	1 Gallon	1-2'		
315	Alnus incana	5 Gallon	3-4'		
752	Amelanchier alnifolia	1 Gallon	1-2'		
374	Betula occidentalis	5 Gallon	3-4'		
667	Cornus stolonifera	1 Gallon	2-3'		
369	Cornus stolonifera	5 Gallon	4-5'		
213	Pinus contorta	1 Gallon	1-2'		
89	Pinus contorta	5 Gallon	2-3'		
213	Pinus ponderosa	1 Gallon	1-2'		
89	Pinus ponderosa	5 Gallon	2-3'		
303	Populus tremuloides	1 Gallon	18-24"SS		
15	Populus tremuloides	5 Gallon	4-5'SS		
791	Populus tremuloides	1 Gallon	18-24"MS		
311	Populus tremuloides	5 Gallon	4-5'MS		
500	Populus trichocarpa	1 Gallon	2-3'		
518	Populus trichocarpa	5 Gallon	5-6'		
2025	Potentilla fruticosa	1 Gallon	12-18"		
213	Pseudotsuga menziesii	1 Gallon	12-15"		
89	Pseudotsuga menziesii	5 Gallon	24-30"		
1178	Rosa woodsii	1 Gallon	2-3'		
1902	Willox (Salix spp.)	1 Gallon	2-3'MS		

LAND & WATER F-3

429	Willox (Salix spp.)	5 Gallon	4-5MS	
1178	Syphoricarpos albus	1 Gallon	18-24	
10681	Installation of above 1 Gallon Plants			
2598	Installation of above 5 Gallon Plants			
20,480	Willow Cuttings 12" long with a minimum ba of .75 inches(800/Hectare) Includes collection, installation	12" x .75 Base		
	WILLOW SALVAGE			
57	Tree Spade dig at a minimum diameter of 24", burlap, basket, crimp, tie			
	Storage of the above on site in .75m fine soil, to be provided by prime contractor			
	Replant willow clumps			

Shipping Charges:

Common Carrier (CMN):	billed COD from the trucking company.
Nature's Enhancement (NE):	billed from NE on the Final Invoice.
Nursery Pick Up (NPU):	no charge.

SUBTOTAL	
QTY. DISCOUNT	Included
SHIPPING (ESTIMATE)	Included
BOXING & HANDLING	Included
TOTAL	0.00

$0.00
PAY THIS AMOUNT

Questions concerning this order?
Call: PHONE: (406) 777-3560
FAX: (406) 777-3560

MAKE ALL CHECKS PAYABLE TO:
Nature's Enhancement, Inc.
2980 Eastside Highway
Stevensville, Montana 59870

THANK YOU FOR YOUR ORDER! WE LOOK FORWARD TO SERVING YOU AGAIN.

LAND & WATER F-4

SEED BLENDING REPORT
Dept. of Transportation, Great Falls, MT

1-Materials Bureau, (Pat Hoy)
1-District Lab Gt. Falls
1-E.P.M. T. BENEDIK — MISSOULA

PROJECT NO.: NH 41(24)

TERMINI: CAMP CREEK RESTORATION

BLENDING WITNESSED BY: JAMES O. BLOSSOM JB

DATE: 04/22/2002

LOCATION: Fairfield, Montana

SEED SUPPLIER: Treasure State Seed Inc.

Type Of Seed	Lot No.	~~Hectare~~ ACRES Area 1 1.25 LBS kg Pls Per ~~ha~~ AC.	(d) Total ~~kg~~ LBS Pls	(e) Total Bulk Seed Blended For Area 1	MSU Seed Laboratory test results (a) % Purity	(b) % Germ	(c) % Pls	Hectare Area 2 kg Pls Per ha	(d) Total kg Pls	(e) Total Bulk Seed Blended for Area 2	Mat'ls. Bureau Pretest Lab. No	MSU Test Date Expires
MEADOW BARLEY •	NBS-1-05331-1	0.5	0.6	0.7	93.59	97	90.78					
BLUEJOINT REEDGRASS •	CACA24204	0.3	0.4	0.6	85.85	77	66.13					
FOWL BLUEGRASS •	00-043	2.0	2.5	3.2	86.91	89	77.35					
TUFFED HAIRGRASS •	99-1438-75	2.0	2.5	2.7	94.2	99	93.25					
BLUE WILDRYE •	GBS-0-300	7.0	8.8	9.7	99.06	92	91.15					
BROMAR MOUNTAIN BROME	006-026-12A	6.0	7.5	7.8	98.85	97	95.88					
TOTAL				24.7	LBS							

BULK SEEDING RATE AREA 1 19.76 ~~KILOGRAMS~~ LBS (kg) PER ~~HECTARE~~ ACRE (ha). BULK AREA 2 _____ KILOGRAMS (kg) PER HECTARE (ha)

% PURITY (a) X % GERMINATION (b) = % PURE LIVE SEED © X 100.

TOTAL KILOGRAMS (kg) PURE LIVE SEED (d) = % PURE LIVE SEED © X 100 = BULK SEED NEEDED (e)

REMARKS: