MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2010

I-90 East Bozeman
Gallatin County, Montana



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MORRISON MAIERLE, INC.
An Employee-Owned Company

December 2010

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I-90 East Bozeman
Gallatin County, Montana

MDT Project Number STPX-0016(057)
Control Number 5710

SPA # MDT-R3-62-2007
Corps #: NWO-2007-3408-MTH

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December 2010

CCI Project No: MDT.004

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1. INTRODUCTION

The I-90 East Bozeman Wetland Mitigation 2010 Monitoring Report presents the results of the first of five years of monitoring at the East Bozeman mitigation site. The proposed wetland and stream mitigation site was constructed on a 15-acre parcel owned by the Montana Department of Transportation (MDT), located in the northwest corner of the interchange between I-90 and East Main Street in Bozeman, Montana (Figure 1). The project is located in the southeast quarter, northwest quarter of Section 8 in Township 2 South, Range 6 East, Gallatin County.

The wetland/stream restoration project was partially constructed in 1999 by Rajah and Associates under an MDT Lease Agreement (MDT 2006). Construction was halted when the company went bankrupt. The MDT worked with the MDT Design Team at Montana State University (MSU) to develop plans for the completion of the restoration project (MDT 2006). Project construction was initiated in 2009 and completed in 2010 (Figure 2, Appendix A). Monitoring may be discontinued if the success criteria are met and recognized by the US Army Corps of Engineers (USACE) prior to the fifth and possibly final year of monitoring (USACE 2008).

Figures 2 and 3 (Appendix A) show the mapped site features and monitoring activity locations, respectively. Appendix B contains the Montana Department of Transportation (MDT) Mitigation Monitoring Forms, the US Army Corps of Engineers (USACE) Routine Wetland Determination Data Forms (Environmental Laboratory 1987), and the MDT Wetland Assessment Forms. Appendix C contains relevant site photographs and Appendix D includes the project plan sheet.

The wetland and stream restoration site lies within the boundaries of Watershed 6, the Upper Missouri River Basin. A wetland delineation completed in 2005 identified 3.47 acres of wetlands, an increase from the 0.2 acres identified in 1997. The additional wetlands developed in part as a result of the partial channel reconstruction in 1999 that allowed surface water to flow across the site. The existing Story Ditch conveys water along the west and north boundaries of the MDT property. The Story Ditch was channelized historically for agricultural purposes. It is incised with little to no fisheries habitat. An unnamed perennial spring creek flows into the site at the southwest boundary from the culvert outlet that crosses East Main Street. The stream exits the property at the northwest corner. The unnamed creek conveys spring flows from the hillsides to the south and runoff from ephemeral drainages to the southwest of the site and includes stormwater runoff from residential and commercial development located west and south of the site. The unnamed spring creek formerly converged with the Story Ditch on the north boundary of the project site. The main channel flows under the Montana Rail Line railroad and I-90 into Rocky Creek, ultimately draining to the East Fork of the Gallatin River.

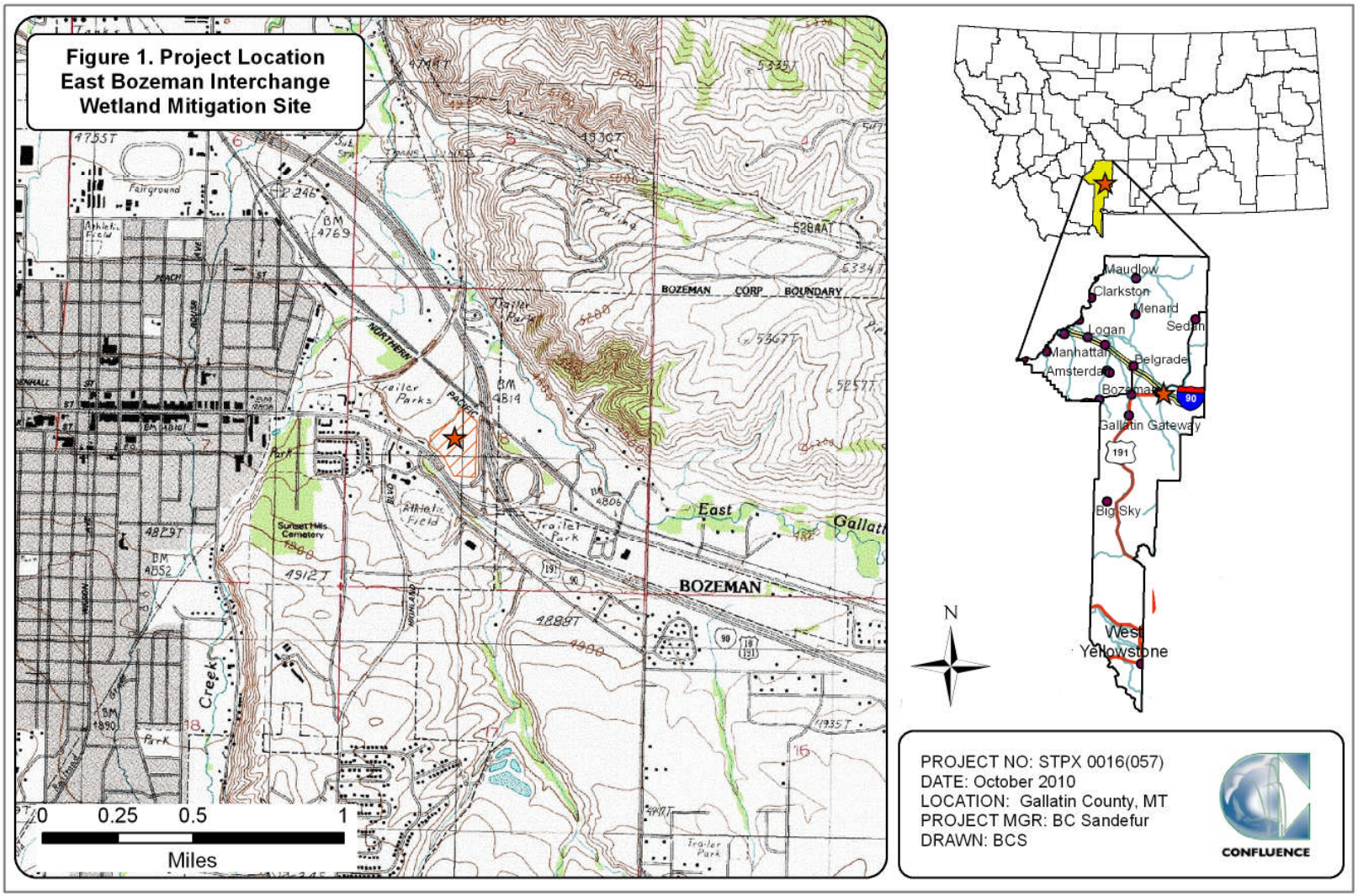


Figure 1. Project location East Bozeman I-90 Interchange Wetland Mitigation Site.

The USACE 404 permit authorized the following work addressed in their May 14, 2008, correspondence to MDT (USACE 2008).

- Create wetlands and a new stream channel in upland areas by excavation and revegetation.
- The new 885 linear feet of channel will be 2 to 3 feet wide, 0.5 to 1.0 foot deep, and will create 0.95 acres of open water riverine habitat with a wetland fringe.
- Four new wetland depressions will be created totaling 5.15 acres.
- MDT is requesting acknowledgement of mitigation credit in the amount of 9.77 acres.
  Topsoil will be salvaged and replaced where possible
- Vegetation will be established by seeding and planting of wetland species trees and shrubs.
- Weeds will be controlled in both the wetland and upland areas.

The USACE acknowledged an available credit of 5.51 acres for the site as summarized below (USACE 2008):

- 3.51 acres of wetlands that have developed since 2000;
- 0.17 acres of upland buffer; and
- 30 percent of the expected 6.1 acres of created wetlands or 1.83 acres.

The USACE will review the monitoring reports and adjust the amount of credit available at the site as appropriate based on the monitoring results. The USACE will acknowledge full credit for the site if the success criteria are met at the end of the monitoring period (USACE 2008).

The intent of the project is to increase the amount of wetlands within the site and restore the area to some semblance of the historical condition as a wet meadow and scrub/shrub wetland that encompasses a meandering stream. The approved success/performance standards are listed verbatim from MDT correspondence below (MDT 2008).

1. **Wetland Characteristics**: All restored, created, enhanced, and preserved wetlands within the project limits will meet the three parameter criteria for hydrology, vegetation, and soils established for determining wetland areas as outlined in the 1987 *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and *2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (USACE 2010) for the Determination of Wetlands.
   a) **Wetland Hydrology Success** will be achieved where wetland hydrology is present as per the technical guidelines in the 1987 USACE Manual and the 2010 Regional Supplement.
      (i) Soil saturation will be present for at least 12.5 percent of the growing season.

(ii) Groundwater wells will be left undisturbed within the site for the purpose of monitoring groundwater elevations during the growing season.

(iii) Depressional wetlands excavated into the upland areas will be monitored to determine if groundwater hydrology is filling cells and establishing vegetation communities.

(iv) Hydrologic success will also require that the constructed stream channel be stable in the wetlands.

b) **Hydric Soil Success** will be achieved where hydric soil conditions are present (per the most recent NRCS definitions for hydric soil) or appear to be forming, the soil is sufficiently stable to prevent erosion, and the soil is able to support plant cover. Soil sampling will be conducted during the course of the monitoring period to determine if wetland areas are exhibiting characteristics of hydric soils per the 1987 USACE Manual and 2010 Regional Supplement. Since typical hydric soil indicators may require long periods to form, a lack of distinctive hydric soil features will not be considered a failure if hydrologic and vegetation success is achieved.

c) **Hydrophytic Vegetation Success** will be achieved through the delineation of developing wetlands utilizing the technical guidelines established in the 1987 USACE Manual and the 2010 Regional Supplement. The following concept of "dominance", as defined in the 1987 USACE Manual, will be applied during future routine wetland determinations in created/restored wetlands: "*Subjectively determine the dominant species by estimating those having the largest relative basal area (woody overstory), greatest height (woody understory), greatest percentage of aerial cover (herbaceous understory), and/or greatest number of stems (woody vines).*"

i. **Woody Plants** – Trees and shrubs were installed at various locations to provide structural diversity within the site at the direction of the MDT Reclamation Specialist. Survival of woody plant species planted within the site will be evaluated to determine survival rates and success of the planting each year of the monitoring period. Success of these planted species will be determined by stem counts each year to determine survival rates of the various planted woody species and will also include the evaluation of naturally recruited woody plant species within the site.

ii. **Herbaceous Plants** – At the conclusion of the monitoring period, ocular coverage of desirable hydrophytic vegetation (wetland plants listed as OBL, FACW and FAC) will be at least 80 percent. A wetland seed mix was prepared for this site that included tufted hairgrass (*Deschampsia cespitosa* – FACW), beaked sedge (*Carex utriculata* - OBL), Baltic rush (*Juncus balticus* – OBL), American sloughgrass (*Beckmannia*

syzigachne – OBL), American mannagrass (*Glyceria grandis* – FACW+), and bluejoint reedgrass (*Calamagrostis canadensis* – FACW+).

2. **Wetland Acreage Development** is projected to provide 9.77 acres of emergent and scrub/shrub wetlands within the project site (Table 1, Project Plan Sheet in Appendix D).
    a) Emergent wetlands will comprise approximately 90 to 95 percent of the site.
    b) Scrub/shrub wetland and riparian areas will comprise 5 to10 percent of the site primarily along the proposed stream corridor and between created wetlands. The previously constructed stream corridor completed in 1999 to 2000 immediately downstream of the proposed channel will be utilized as bio-reference comparison for the developing stream channel and wetlands.
    c) Maintain 3.51 acres of wetlands that have developed as a result of the incomplete project within the MDT site. The original delineation of the site in 1997 indicated that the MDT site had 0.21 acres of wetlands existing on the site prior to the implementation of construction in1999 to 2000.
    d) Create approximately 6.10 acres of new wetlands in current upland areas through the excavation of a new stream channel and depressional wetlands.
    e) Develop 0.21 acres of upland buffer credit through a buffer area approximately 50 feet in width from the edge of the proposed wetland areas.
    f) Open water will comprise between 1 to 2 percent of the total wetland area within the site after final monitoring.

3. **Stream Channel Restoration Success** will be evaluated in terms of revegetation and bank stability success.
    a) The stream corridor will be considered stable when the banks are vegetated with a majority of deep-rooting riparian and wetland plant species.
    b) Bank pins were established at appropriate locations along the newly restored relic floodplain channel to monitor channel stability and to measure stream migration.
    c) Bank stability success will be evaluated by utilizing the previously constructed stream channel downstream from the new channel construction as a reference reach as it is directly adjacent to and is relatively undisturbed and vegetated with a mixture of woody and herbaceous riparian and wetland plant species.
    d) Bank stability success will be achieved when, following restoration, less than 25 percent of the banks are unstable or the percent stability of the restored channel is within 5 percent of the downstream reference reach.

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

5. **Weed Control** will be based upon annual monitoring and will be conducted by MDT forces to minimize and/or eliminate the intrusion of State Listed Noxious weed species within the site as it develops. MDT plans to control current weed problems prior to the initiation of wetland construction activities within the site.

6. **Fencing** will be installed to protect the integrity of the wetland from disturbance.

7. **Monitoring** of this MDT mitigation site will be based upon the MDT standard monitoring protocols utilized for all MDT wetland mitigation sites for a minimum period of 3 to 5 years or longer, according to the USACE Montana Regulatory Office's review of annual monitoring reports for the site and whether or not the site has met the wetland success criteria.

2. METHODS

The first year of monitoring was initiated on August 27, 2010. Information for the Wetland Mitigation Site Monitoring Form and the Wetland Data Form was entered electronically in the field on a personal digital assistant (PDA) palmtop computer during the field investigation (Appendix B). Monitoring activity locations were mapping using a global positioning system (GPS) (Figure 2, Appendix A). Information collected included wetland delineation, vegetation community mapping, vegetation transect monitoring, planted woody species survival assessment, bank stability baseline data, soil data collection, hydrology data collection, bird and wildlife use documentation, photographs, and a non-engineering examination of the infrastructure established within the mitigation project area.

2.1. Hydrology

Technical criteria for wetland hydrology guidelines have been established as "permanent or periodic inundation, or soil saturation within 12 inches of the ground surface for a significant period (usually 14 days or more or 12.5 percent) during the growing season" (USACE 2010). Systems with continuous inundation or saturation for greater than 12.5 percent of the growing season are considered wetlands. The growing season is defined for purposes of this report as the number of days where there is a 50 percent probability that the minimum daily temperature is greater than or equal to 28 degrees Fahrenheit (Environmental Laboratory 1987). The growing season recorded for the meteorological station at Bozeman MSU (Montana State University – 241044) extends from May 5 through October 1 for a total of 149 days (NRCS 2010). Areas defined as

wetlands would require 19 day s of inundation or saturation within 12 inches of the ground surface to meet the hydrology criteria and performance standards.

Hydrological indicators as outlined on the USACE wetland determination data form were documented at four data points (BZ-1 to BZ-4) established within the project area. Hydrologic assessments allow evaluation of mitigation goals addressing inundation/saturation requirements. The hydrologic indicators were evaluated according to features observed during the site visit. The data were recorded on electronic field data sheets (Appendix B). Areas of surface inundation were delineated during the growing season via aerial photography, staff gage pool elevation measurements, general observations, and GPS measurements of the wetted perimeter during field visits. Water depths in the constructed depression wetlands were measured and recorded.

The location of two onsite groundwater monitoring wells is shown on Figure 2 (Appendix A). Water levels were measured with a Solinst water level meter in 2010. The water surface level was recorded electronically on the mitigation monitoring data form (Appendix B). Soil pits excavated during the wetland delineation were used to evaluate groundwater levels within 18 inches of the ground surface. The data were recorded electronically on the wetland data form (Appendix B).

2.2. Vegetation

The boundaries of dominant species-based vegetation communities were determined in the field during the active growing season and subsequently delineated on aerial photographs. The percent cover of dominant species within a community type was estimated and recorded using the following values: 0 (less than 1 percent), 1 (1 to 5 percent), 2 (6 to 10 percent), 3 (11 to 20 percent), 4 (21 to 50 percent), and 5 (greater than 50 percent) (Appendix B).

Temporal changes in vegetation were evaluated through annual assessments of a static belt transect established in summer 2010 (Figure 2, Appendix A). Vegetation composition was assessed and recorded along one vegetation belt transect approximately 10 feet wide and 544 feet long (Figure 2, Appendix A). Spatial changes in the dominant vegetation communities were recorded along the stationed transect. The percent aerial cover of each vegetation species within the belt transect was estimated using the same values and cover ranges listed for the community polygon data. A cumulative plant species list was developed for each annual monitoring report. Photographs were taken at the endpoints of the transect during the monitoring event (Appendix C). The survival of woody species installed onsite was recorded during monitoring. Survival will be assessed annually.

The location of noxious weeds was noted in the field and mapped on the aerial photo (Figure 3, Appendix A). The noxious weed species identified are color-coded. The locations are denoted with the symbol “+”, “▲”, or “■” representing 0 to 0.1 acre, 0.1 to 1.0 acre, or greater than 1.0 acre in extent, respectively.

Cover classes listed on Figure 3 (Appendix A) are represented by T, L, M, or H, corresponding to less than 1 percent, 1 to 5 percent, 2 to 25 percent, and 25 to 100 percent, respectively.

2.3. Soil

Soil information was obtained from the *Soil Survey for Gallatin County Area* accessed from the Natural Resource Conservation Service (NRCS) official soil description website (USDA 2010) and *in situ* soil descriptions. Soil cores were excavated using a hand auger and evaluated according to procedures outlined in the USACE 1987 manual. A description of the soil profile, including hydric indicators when present, was recorded on the USACE wetland determination form for each profile (Appendix B).

2.4. Wetland Delineation

Waters of the US including jurisdictional wetlands and special aquatic sites were delineated throughout the project area in accordance with criteria established in the 1987 USACE wetland manual and the 2010 Regional Supplement. In order to delineate a representative area as wetland, the technical criteria for hydrophytic vegetation, hydric soil, and wetland hydrology, as described in the 1987 Manual, must be satisfied. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1988). A Routine Level-2 On-site Determination Method (Environmental Laboratory 1987) was used to delineate jurisdictional areas within the project boundaries. The information was recorded electronically on the wetland determination form (Appendix B).

The wetland boundary was determined in the field based on changes in plant communities and/or hydrology, and changes in soil characteristics. Topographic relief boundaries within the project area were also examined and cross referenced with soil and vegetation communities as supportive information for this delineation. Vegetation composition, soil characteristics, and hydrology were assessed at likely wetland and adjacent upland locations. If all three parameters met the criteria, the area was designated as wetland and mapped by vegetation community type. When any one of the parameters did not exhibit positive wetland indicators, the area was determined to be upland unless the site was classified as an atypical situation, potential problem area, or special aquatic site, i.e. mud flat. The wetland boundary was surveyed to resource grade accuracy. Wetland areas reported were determined using geographic information system (GIS) methodology.

2.5. Wildlife

Observations and other positive indicators of use of mammal, reptile, amphibian, and bird species were recorded on the wetland monitoring form during the site visit. Indirect use indicators, including tracks, scat, burrow, eggshells, skins, and bones, were also recorded. These signs were recorded while traversing the site for other required activities. Direct sampling methods, such as snap traps, live traps, and pitfall traps, were not used. A list of wildlife species observed in 2010 was compiled.

2.6. Functional Assessment

The 2008 MDT Montana Wetland Assessment Method (Berglund and McEldowney 2008) was used to evaluate functions and values on the site in 2010. This method provides an objective means of assigning wetlands an overall rating and provides regulators a means of assessing mitigation success based on wetland functions. Functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society and relate to ecological significance without regard to subjective human values (Berglund and McEldowney 2008).

Field data for this assessment were collected during the site visit. A Functional Assessment Form was completed for each wetland or group of wetlands [Assessment Areas (AA)] (Appendix B).

2.7. Photo Documentation

Monitoring at photo points provided supplemental information documenting wetland condition, trends, current land use surrounding the site, the upland buffer, the mitigation area, and the vegetation transects. Photographs were taken at established photo points throughout the mitigation site during the site visit (Appendix C). Photo point locations were recorded with a resource grade GPS unit (Figure 2, Appendix A).

2.8. GPS Data

Site features and survey points were collected with a resource grade Thales Pro Mark III GPS unit during the 2010 monitoring season. Points were collected using WAAS-enabled differential corrected satellites, typically improving resolution to sub-meter accuracy. The collected data were then transferred to a personal computer, imported into GIS, and drawn in Montana State Plane Single Zone NAD 83 meters. In addition to GPS, some site features within the mitigation area were hand-mapped onto an aerial photograph and then digitized. Site features and survey points that were mapped included fence boundaries, photograph points, transect beginnings and endings, wetland boundaries, and vegetation community boundaries.

2.9. Maintenance Needs

Channels, engineered structures, fencing, and other features were examined during the site visit for obvious signs of breaching, damage, or other problems. A cursory examination was completed that did not constitute an engineering-level structural inspection.

3. RESULTS

3.1. Hydrology

Climate data from the MSU weather station recorded an average total annual precipitation rate of 18.46 inches from 1892 to 2010 (WRCC 2010). Annual precipitation for 2009 was 23.67 inches. Monthly precipitation totals from January to June in 2009 were 13.15 inches and for the same period in 2010 were 14.04 inches.

Groundwater levels were measured in two wells, MW-1 and MW-2, with a Solinst water level meter. Groundwater levels in MW-3 were not measured, as the well was locked and is monitored by the USGS as a continuous water level recorder. The well locations are shown on Figure 2 (Appendix A). Well MW-1 is located in upland in the southeast corner of the site. Well MW-2 is located between the northernmost constructed wetland cell and the established channel along the wetland/upland interface. Groundwater levels were 3.15 feet below the ground surface (bgs) in MW-1 and 1.05 feet bgs in MW-2. Soils were saturated to the surface in several areas. The average surface water depth across the site was 0.6 feet. The depth of water in the constructed cells ranged from 0 to 3 feet. Approximately 20 percent of the assessment area was inundated.

Four data points, BZ-1 through BZ-4, were assessed to determine the upland/wetland boundaries (Wetland Data Forms, Appendix B). The data point locations are shown on Figure 2 (Appendix A). Photos of data points BZ-1, BZ-2 and BZ-3 are included on page C-4 of Appendix C. Data points BZ-1, BZ-3, and BZ-4 were located within areas that met the wetland criteria. A water table within 12 inches bgs and saturation at 2 inches bgs were positive indicators of wetland hydrology at BZ-1. Indicators present at BZ-3 included saturation evident at 7 inches bgs. Saturation at 10 inches bgs was present at BZ-4. No hydrological indicators were observed at BZ-2.

Two baseline stream cross-sections were surveyed in 2010 at permanent locations to assess bank stability and lateral migration throughout the monitoring period. These data are presented in Appendix E. Photographs of the cross-sections are shown on pages C-2 through C-4 of Appendix C. The surveys will be replicated during subsequent monitoring events to determine stream movement.

3.2. Vegetation

A comprehensive list of the 60 vegetation species identified at the East Bozeman I-90 mitigation site in 2010 is presented on Table 2 and the Monitoring Forms (Appendix B). Ten vegetation community types, seven wetland and three upland, were identified on August 27, 2010 (Figure 3, Appendix A). The vegetation communities were Type 1 – Upland, Type 2 – *Bromus inermis* Upland, Type 3 – *Thlaspi arvense*/*Epilobium ciliatum* Upland, Type 4 – *Typha latifolia* Wetland, Type 5 – *Typha latifolia/Poa palustris* Wetland, Type 6 – *Carex species* (spp.)/*Scirpus microcarpus* Wetland, Type 7 – *Typha latifolia/Carex* spp. Wetland, Type 8 – *Carex spp./Polygonum persicaria* Wetland, Type 9 – *Salix exigua/Carex* spp. Wetland, and Type 10 – *Salix lasiandra* Wetland. The open water below the ordinary high water mark (OHWM) of the channel was defined by polygon 11 (Figure 3, Appendix A). Dominant species are listed below for each type in descending order of abundance.

Upland community Type 1 characterized the fill pile located on the south edge of the site adjacent to the freeway. This area was used to place the spoil material from the construction of the wetland complex. Field pennycress (*Thlaspi*

arvense), Western wheatgrass (*Agropyron smithii*), fireweed (*Epilobium angustifolium*), and strawberry clover (*Trifolium fragiferum*) dominated the plant species.

Type 2 – *Bromus inermis* (smooth brome) was located in the undisturbed upland areas outside the footprint of the constructed wetland cells. Smooth brome, slender wheatgrass (*Agropyron trachycaulum*), and spreading bentgrass (*Agrostis stolonifera*) dominated the community. Beaked sedge (*Carex rostrata*), Nebraska sedge (*Carex nebrascensis*), reed canary grass (*Phalaris arundinacea*), and fowl bluegrass (*Poa palustris*) each provided between one and five percent cover.

Upland community Type 3 – *Thlaspi arvense*/*Epilobium ciliatum* has colonized the disturbed upper banks of the constructed wetland cells. Field pennycress and hairy willow herb (*Epilobium ciliatum*) dominate the vegetation species. Bare ground encompassed between 21 and 50 percent of total cover.

Wetland community Type 4 – *Typha latifolia* (broad-leaf cattail) characterized the constructed wetland cells. Broad-leaf cattail and fowl bluegrass were the predominant species throughout this community. Approximately 11 to 20 percent of the total cover was bare ground. The majority of the area within the wetland cells was inundated. The plant cover in the constructed cells is expected to increase long-term and likely to continue to be dominated by broad-leaf cattail.

Wetland community Type 5 – *Typha latifolia/Poa palustris* was identified along the banks of the reconstructed channel located in the south half of the site. The dominant species were broad-leaf cattail and fowl bluegrass, both identified at 6 to 10 percent cover. Bare ground encompassed 11 to 20 percent of total cover.

Table 1. Vegetation species observed in 2010 at the I-90 East Bozeman Wetland Mitigation Site.

Agropyron smithii	wheatgrass,western	FACU
Agropyron trachycaulum	wheatgrass,slender	FAC
Agrostis alba	redtop	FACW
Agrostis stolonifera	bentgrass,spreading	FAC+
Alisma gramineum	water-plantain,narrow-leaf	OBL
Alopecurus pratensis	foxtail,meadow	FACW
Beckmannia syzigachne	sloughgrass,American	OBL
Bromus inermis	smooth brome	NL
Carduus nutans		NL
Carex aquatilis	sedge,water	OBL
Carex nebrascensis	sedge,Nebraska	OBL
Carex rostrata	sedge,beaked	OBL
Carex rostrata (utriculata)*	beaked sedge	OBL
Chenopodium leptophyllum	goosefoot,narrow-leaf	FACU
Cirsium arvense	thistle,creeping	FACU+
Cirsium vulgare	thistle,bull	FACU
Cornus stolonifera	dogwood,red-osier	FACW
Elaeagnus commutata	silver-berry,American	NI
Eleocharis palustris	spikerush,creeping	OBL
Epilobium angustifolium	fireweed	FACU+
Epilobium ciliatum	willow-herb,hairy	FACW-
Equisetum arvense	horsetail,field	FAC
Erigeron formosissimus	fleabane,beautiful	UPL
Geum macrophyllum	avens,large-leaf	FACW+
Glyceria grandis	mannagrass, American	NL
Helianthus annuus	sunflower,common	FACU+
Juncus balticus	rush,Baltic	OBL
Juncus bufonius	rush,toad	FACW+
Juncus tenuis	rush,slender	FAC
Lactuca serriola	lettuce,prickly	FAC-
Lemna minor	duckweed,lesser	OBL

[1]**Region 9 Northwest (Reed 1988).**
*** Commonly accepted name not included in 1988 list.**

Table 1 (Continued). Vegetation species observed in 2010 at the I-90 East Bozeman Wetland Mitigation Site.

Melilotus officinalis	sweetclover,yellow	FACU
Mentha arvensis	mint,field	FAC
Phalaris arundinacea	grass,reed canary	FACW
Phleum pratense	timothy	FACU
Poa palustris	bluegrass,fowl	FAC
Poa pratensis	bluegrass, Jentucky	FACU+
Polygonum amphibium	smartweed,water	OBL
Polygonum persicaria	thumb,lady's	FACW
Populus tremula (*tremuloides**)	aspen,quaking	FAC+
Ribes aureum	currant,golden	FAC+
Rosa woodsii	rose,woods	FACU
Rudbeckia occidentalis	coneflower,western	FAC-
Rumex occidentalis	dock,western	FACW+
Salix bebbiana	willow, Bebb	FACW
Salix exigua	willow,sandbar	OBL
Salix lasiandra	willow, Pacific	FACW+
Scirpus cyperinus	wool-grass	NI
Scirpus microcarpus	bulrush,small-fruit	OBL
Sonchus arvensis	sowthistle,field	FACU+
Sparganium eurycarpum	burreed,giant	OBL
Stellaria umbellata	starwort,umbellate	FAC+
Smphoricarpos occidentalis	snowberry,Western	NL
Tanacetum vulgare	tansy,common	NL
Taraxacum officinale	dandelion,common	FACU
Thlaspi arvense	penny-cress,field	NI
Trifolium fragiferum	clover,strawberry	FACU
Trifolium hybridum	clover,alsike	FACU+
Typha latifolia	cattail, broad-leaf	OBL
Verbascum blattaria	mullein,moth	UPL

Region 9 Northwest (Reed 1988).
* Commonly accepted name not included in 1988 list.

Type 6 – *Carex* spp./*Scirpus microcarpus* (small-fruited bulrush) characterized the wetland areas located in the north half of the site that formed between 2000 and 2009. Beaked sedge, water sedge (*Carex aquatilis*), Nebraska sedge, small-fruited bulrush, and lady's thumb (*Polygonum persicaria*) dominated the vegetation species.

Community 7 – *Typha latifolia/Carex* spp. was found in the undisturbed riverine fringe along the pre-existing channel and in the pre-existing wetland located along the northern boundary of the mitigation site. The dominant species were broad-leaf cattail, beaked sedge, Nebraska sedge, and lady's thumb. Isolated sandbar willow (*Salix exigua*), Bebb willow (*Salix bebbiana*), and Pacific willow

(*Salix lasiandra*) shrubs (less than 10 percent cover) paralleled the stream banks within community 7.

Type 8 – *Carex* spp./*Polygonum persicaria* was an existing wetland established from the prior work completed on the site in 1999. Beaked sedge, Nebraska sedge, and lady's thumb dominated the vegetation species. Canada thistle (*Cirsium arvense*) and common tansy (*Tanacetum vulgare*) were each recorded at 6 to 10 percent cover.

Community 9 – *Salix exigua/Carex* spp. was identified in a small pre-existing wetland located along the northern boundary where the constructed channel bisecting the project area drains into the Story Ditch. The wetland was dominated by a woody overstory consisting of sandbar willow with an understory of beaked sedge and American sloughgrass (*Beckmannia syzigachne*).

Wetland community 10 – *Salix lasiandra* was identified in an existing wetland located at the west edge of the mitigation site. Pacific willow dominated the woody overstory and reed canary grass dominated the understory.

Data were collected in 2010 along one vegetation transect at the I-90 East Bozeman Wetland Mitigation Site (Figure 2, Appendix A). The data recorded along Transect 1 (Monitoring Forms, Appendix B) is summarized in tabular and graphical formats (Table 2, Chart 1, and Chart 2). Photographs taken at the transect end points are located on page C-2 of Appendix C.

The transect traversed the site from west to east across two constructed wetland cells and a portion of the pre-existing wetland. The transect intersected wetland communities 4, 6, and 8 and upland communities 2 and 3. Hydrophytic vegetation species dominated ninety-three percent of the transect.

Table 2. Data summary for Transect 1 in 2010 at the I-90 East Bozeman Wetland Mitigation Site.

Vegetation Community Transitions along Transect	5
Vegetation Communities along Transect	5
Hydrophytic Vegetation Communities along Transect	3
Total Vegetative Species	27
Total Hydrophytic Species	18
Total Upland Species	9
% Transect Length Comprising Hydrophytic Vegetation Communities	93
% Transect Length Comprising Upland Vegetation Communities	7
% Transect Length Comprising Unvegetated Open Water	0
% Transect Length Comprising Bare Substrate	0

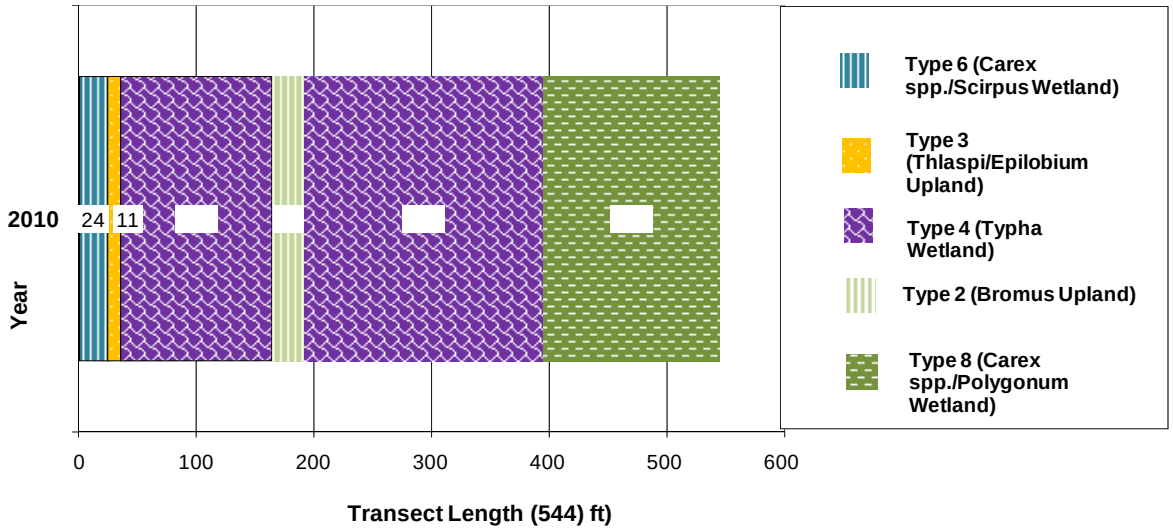


Chart 1. Transect map showing community types on Transect 1 in 2010 from start (0 feet) to end (544 feet).

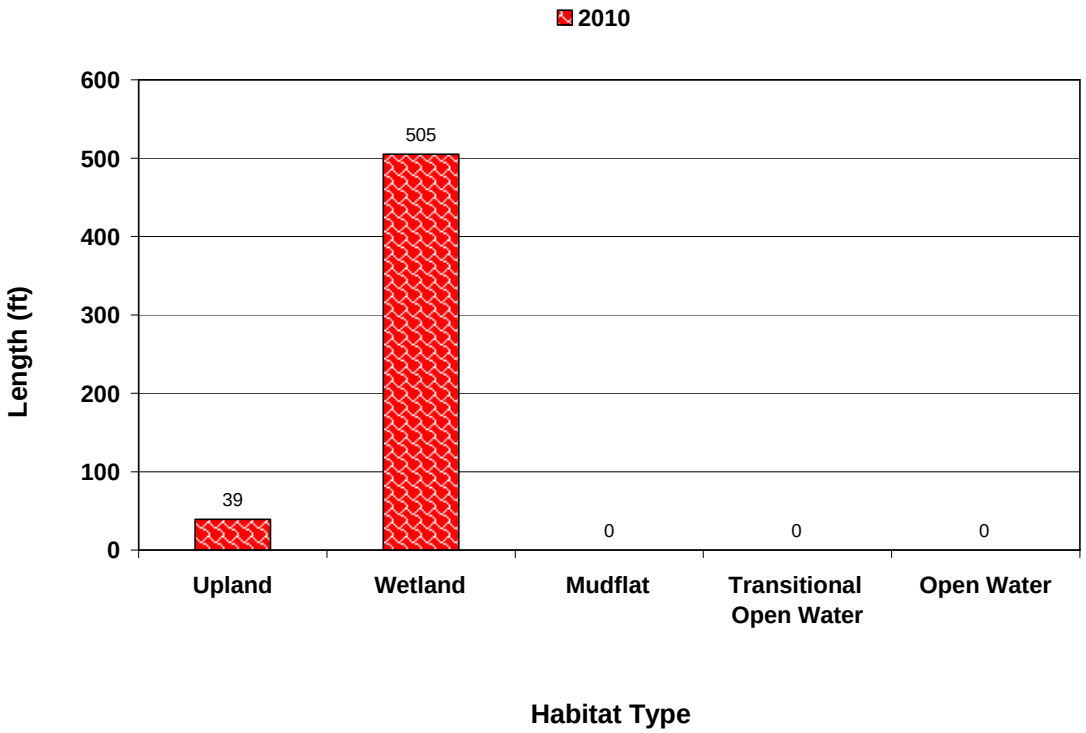


Chart 2. Length of habitat types within Transect 1 in 2010.

The location of infestations of common tansy and Canada thistle were mapped on Figure 3 (Appendix A). The weeds were located primarily in the upland areas

outside the constructed cells and in isolated areas of the pre-existing wetlands. The size of the common tansy infestations were less than 0.1 acre. The cover ranged from 5 to 25 percent. Canada thistle infestations were recorded in 11 areas and ranged in size from less than 0.1 acre to 0.1 to 1.0 acre. Percent cover in the individual infestations ranged from 1 to 5 percent to 5 to 25 percent. Weed control was conducted on July 20, 2010 and the effectiveness was noted during the August 27 site visit as a number of thistle and common tansy stems were dying or desiccated.

Several live woody plants were observed during the initial monitoring event, primarily on the upland berms located between the constructed wetland cells. Approximately 50 to 75 willow cuttings were installed along the stream bank around the entrance channel into the site and at the outlet, west to the Story Ditch. First year survival of the planted woody species appeared to be greater than 90 percent.

3.3. Soil

The project site is mapped in the *Gallatin County Soil Survey* (USDA 2010) as the Enbar-Nythar loam found on 0 to 4 percent slopes. The Enbar and Nythar series comprise somewhat poorly drained loam found on floodplains. The Enbar loam is classified as non-hydric soil and the Nythar loam is considered a hydric soil.

The test pits at BZ-1, BZ-3, and BZ-4 were located in areas defined as wetlands. The soil profile at BZ-1 revealed a clay loam (5 G 2/1) with redoximorphic depletions (7.5 YR 3/2) in the matrix. The redox dark surface provided a positive indication of hydric soil, likely the result of relic conditions exposed through recent excavation. The soil at BZ-3 was a black (10 YR 2/1) clay loam with dark yellowish brown (10 YR 3/4) redox concentrations supporting a redox dark surface, an indication of hydric soil. Test pit BZ-4 revealed a gray clay loam (10 YR 5/1) with redox concentrations (10 YR 4/4) in the depleted matrix, evidence of a hydric soil. The soil in test pit BZ-2 was a clay loam (10 YR 2/2) without redox features in the upper 12 inches that did not meet the wetland criteria. Below the upper horizons, redox concentrations were observed, supporting the location of the wetland boundary between data points BZ-2 and BZ-3.

3.4. Wetland Delineation

Four data points were used to characterize the vegetation, soil, and hydrology of site wetlands (BZ-1 through BZ-4, Figure 2 in Appendix A; USACE wetland forms in Appendix B). The August 2010 delineation identified 3.51 acres of pre-existing wetland, 4.98 acres of wetland created in the constructed cells and adjacent to the wetlands previously identified, and 0.34 acres of open water riverine habitat associated with the constructed channel (Table 3).

Table 3. Total wetland acres delineated in August 2010.

Prexisting Wetland Area	3.51	3.51
Created Wetland Depressions and Additional Wetland Development	---	4.98
Open Water Riverine Habitat	---	0.34
TOTAL WETLAND HABITAT	**3.51**	**8.83**

3.5. Wildlife

A comprehensive list of wildlife species observed during the 2010 monitoring visit is presented in Table 4**.** Twenty-seven bird species were identified in 2010. A Meadow vole (*Microtus pennsylvanicus*) was observed and tracks of raccoon (*Procyon lotor*) and white-tailed deer (*Odocoileus virginianus*) were noted.

3.6. Functional Assessment

Functions and values of the I-90 East Bozeman mitigation wetlands were evaluated in 2010. Two assessment areas (AA), the created wetland depressions and channel, and the pre-existing wetlands, were evaluated, the wetlands constructed in 2009 encompassed 5.32 acres and received a Category III rating with 53.6 percent of the total points possible. High ratings were achieved for short and long term surface water storage, sediment/nutrient/toxicant removal, and groundwater discharge/recharge. The wetlands established before 2009 were rated as Category II with 64.6 percent of the total points possible. Ratings were high for the functional variables short and long term surface water storage, sediment/nutrient/toxicant removal, sediment/shoreline stabilization, production export/food chain support, and ground/discharge/recharge. The site was evaluated as secondary habitat for the great blue heron (*Ardea herodias*) yielding a moderate rating for Montana Natural Heritage Program (MTNHP) species habitat. Table 5 summarizes the functional parameters and ratings.

3.7. Photo Documentation

Photographs taken of photo points one through five (PP1 through PP5, Figure 2, Appendix A) are shown on pages C-1 and C-2 of Appendix C. Transect end points are shown on page C-2 of Appendix C. The stream cross sections are included on pages C-2 through C-4 and the data points are shown on C-4 (Appendix C).

Table 4. Wildlife species observed at the I-90 East Bozeman Mitigation Site in 2010.

BIRD	
American Crow	*Corvus brachyrhynchos*
American Goldfinch	*Spinus tristus*
American Robin	*Turdus migratorius*
Bank Swallow	*Riparia riparia*
Barn Swallow	*Hirundo rustica*
BLACK-BILLED MAGPIE	*Pica hudsonia*
Black-capped Chickadee	*Poecile atricapillus*
Blue-winged Teal	*Anas discors*
Canada Goose	*Branta canadensis*
Eastern Kingbird	*Tyrannus tyrannus*
GRAY PARTRIDGE	***Perdix perdix***
GREEN-WINGED TEAL	***Anas crecca***
HOODED MERGANSER	***Lophodytes cucullatus***
Killdeer	*Charadrius vociferus*
Mallard	*Anas platyrhynchos*
NORTHERN SHOVELER	***Anas clypeata***
RED-TAILED HAWK	***Buteo jamaicensis***
Red-winged Blackbird	*Agelaius phoeniceus*
Sandhill Crane	*Grus canadensis*
Song Sparrow	*Melospiza melodia*
SPOTTED SANDPIPER	***Actitis macularius***
TREE SWALLOW	***Tachycineta bicolor***
Western Meadowlark	*Sturnella neglecta*
Wilson's Phalarope	*Phalaropus tricolor*
Wilson's Snipe	*Gallinago delicata*
Yellow Warbler	*Dendroica petechia*
YELLOW-RUMPED WARBLER	***Dendroica coronata***
MAMMAL	
Meadow Vole	*Microtus pennsylvanicus*
MOUNTAIN COTTONTAIL	***Sylvilagus nuttallii***
Raccoon	*Procyon lotor*
White-tailed Deer	*Odocoileus virginianus*
FISH	
YELLOWSTONE CUTTHROAT TROUT	***Oncorhynchus clarkii bouvieri***

Species identified by MDT in 2010 are listed in **CAPS**.

Table 5. Functions and Values of the I-90 East Bozeman wetlands.

Function and Value Parameters from the 2008 MDT Montana Wetland Assessment Method[1]	2010 Created Wetland Depressions	2010 Pre-Existing Wetland
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Mod (0.5)	Mod (0.5)
General Wildlife Habitat	Low (0.3)	Mod (0.7)
General Fish/Aquatic Habitat	Low (0.2)	Mod (0.4)
Flood Attenuation	Mod (0.5)	Mod (0.6)
Short and Long Term Surface Water Storage	High (0.8)	High (0.8)
Sediment/Nutrient/Toxicant Removal	High (1.0)	High (0.9)
Sediment/Shoreline Stabilization	Mod (0.7)	High (1.0)
Production Export/ Food Chain Support	Mod (0.6)	High (0.8)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Low (0.3)
Recreation/Education Potential (bonus points)	Mod (0.1)	Mod (0.1)
Actual Points / Possible Points	**5.9 / 11**	**7.1 / 11**
% of Possible Score Achieved	**53.6%**	**64.6%**
Overall Category	**III**	**II**
Acreage of Assessed Aquatic Habitats within Easement (ac)	**5.32**	**3.51**
Functional Units (acreage x actual points) (f^1-)	**31.39**	**24.92**

[1]Berglund and McEldowney 2008 MDT MWAM.

3.8. Maintenance Needs

The location of infestations of common tansy and Canada thistle were mapped on Figure 3 (Appendix A). The weeds were located primarily in the upland areas outside the constructed cells and in isolated areas of the pre-existing wetlands. The MDT weed control plan should continue to be implemented to control and prevent the further spread of noxious weeds.

A rock vane was installed across the channel to restrict potential head cutting resulting from excavation of the ditch channel by the adjacent property owner. This anticipated head cut had not progressed onto MDT property and the grade-control structure was in good condition and stable during the 2010 monitoring event.

3.9. Current Credit Summary

Table 6 presents the 2010 summary of wetland credits. The allowable credits were addressed in a USACE May 2008 letter to MDT and included the acknowledgement of mitigation credit in the amount of 9.77 acres, including 0.95 acre of riverine wetland, 5.15 acres of created wetland depressions, and maintenance of 3.51 acres of wetland that has developed since 2000. Results of 2010 monitoring identified the development of 0.34 acres of riverine wetland along the newly constructed stream channel (885 ft) and 4.98 acres of wetland within the created depressions, and the maintenance of the 3.51 acres of emergent wetland developed as a result of the 2000 mitigation efforts. Full credit was assigned to the upland buffer surrounding the wetland habitat as it was intact (undisturbed), weed control had been conducted throughout the mitigation area in 2010, and the overall cover of noxious weeds were less than 10 percent.

Table 6. 2010 Summary of Wetland Credits.

Proposed Mitigation Features	Compensatory Mitigation Type	COE Mitigation Ratios	COE Approved Acres	MDT Final Credit Estimate (Acres)	2010 Delineated Wetland Acres
Creation of riverine wetland, 2 to 3 feet wide, one half to one foot deep	Creation	1:1	0.95	0.95	0.34
Creation of four wetland depressions	Creation	1:1	5.15	5.15	4.98
Maintain 3.51 acres of wetland developed since 2000.	Creation	1:1	3.51	3.51	3.51
Maintain upland buffer	Upland buffer	5:1	0.17	0.17	0.17
Total Available Credit			9.77		9.0

4. REFERENCES

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Appendix A

Figures 2 and 3

MDT Wetland Mitigation Monitoring
I-90 East Bozeman
Gallatin County, Montana

Figure 2: 2010 Monitoring Activity Locations

N

0 62.5 125 250

Feet

PP4

PP5

MW-1

BZ-2

MW-2

BZ-3

XS-2

T-1, End

PP2

PP3

BZ-4

BZ-1

PP6

MW-3

T-1, Start

XS-1

PP1

Legend

- Vegetation Transect
- Monitoring Limits
- DataPoints
- PhotoPoints
- Monitoring Wells
- Cross Section

Base Photography Date: July 17, 2010

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

LOCATION: Gallatin Co., MT

PROJ NO: STPX-0016(057)

FILE: Bozeman/Monitor2010.mxd

Project Name: East Bozeman I-90 Mitigation Site

Drawing Title: 2010 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
BCS	BV	JL

SCALE: Noted

Drawn: October 8, 2010

PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 2

REV -

Figure 3: 2010 Mapped Site Features

Wetlands and Other Special Aquatic Sites

Gross Wetland Area	8.83 acres
Existing Wetlands	3.51 acres
Open Water (11)	0.34 acres
Net Wetland Area	5.32 acres

N

0 62.5 125 250

Feet

Legend

Monitoring Limits

Wetland Limits

Vegetation Communities

Base Photography Date: July 17, 2010

Noxious Weeds

Tanacetum vulgare

Cirsium arvense

Infestation SIze

X = <0.1 acre

▲ = 0.1 to 1 acre

■ = 1 to 5 acre

Cover Class

T = Trace (<1% cover)

L = Low (1-5% cover(

M = Moderate (5-25% cover)

H = High (25-100% cover)

Vegetation Community Types

1 Upland
2 Bromus inermis
3 Thlaspi arvense/Epilobium ciliatum
4 Typha latifolia
5 Typha latifolia/Poa palustris
6 Carex spp/Scirpus microcarpus
7 Typha latifolia/Carex spp
8 Carex spp/Polygonum persicaria
9 Salix exigua/Carex spp
10 Salix lasiandra

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

LOCATION: Gallatin Co., MT

PROJ NO: STPX-0016(057)

FILE: Bozeman/Veg2010.mxd

Project Name: East Bozeman Interchange Wetland Mitigation Site

Drawing Title: 2010 Mapped Site Features

DRAWN	CHECKED	APPROVED
BCS	BV	XXX

SCALE: Noted

Drawn: October 8, 2010

PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 3

REV -

Appendix B

2010 Wetland Mitigation Site Monitoring Form
2010 USACE Wetland Delineation Form
2010 MDT Functional Assessment Form

MDT Wetland Mitigation Monitoring
I-90 East Bozeman
Gallatin County, Montana

MDT WETLAND MITIGATION SITE MONITORING FORM

Project Site: I-90 Assessment Date/Time 8/27/2010 9:02:01 AM

Person(s) conducting the assessment: B. Sandefur, B. Vaughn, J. Johnson

Weather: Clear and sunny Location: Bozeman, MT

MDT District: Butte Milepost: 0

Legal Description: T 2S R 6E Section(s) 8

Initial Evaluation Date: 8/27/2010 Monitoring Year: 1 #Visits in Year: 1

Size of Evaluation Area: 14.8 (acres)

Land use surrounding wetland:

Interstate corridor, commercial, undeveloped

HYDROLOGY

Surface Water Source: Story ditch/spring creek, seeps

Inundation: ☑ Average Depth: 0.6 **(ft)** Range of Depths: 0-3 **(ft)**

Percent of assessment area under inundation: 20 %

Depth at emergent vegetation-open water boundary: **(ft)**

If assessment area is not inundated then are the soils saturated within 12 inches of surface: Yes

Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc**:**

Surface water, saturation to surface

Groundwater Monitoring Wells

Record depth of water surface below ground

Well ID	Water Surface Depth
MW-2	1.05 **(ft)**
MW-1	3.15 **(ft)**

Additional Activities Checklist:

☑ Map emergent vegetation-open water boundary on aerial photograph.

☑ Observe extent of surface water during each site visit and look for evidence of past surface water elevations (drift lines, erosion, vegetation staining, etc.)

☑ Use GPS to survey groundwater monitoring well locations, if present.

Hydrology Notes:

Well-1 located in uplands adjacent to excavated deression, ground surface at well approx 2.5 feet higher than depression with groundwater level in depression less than 1 ft below surface. Well-2 in veg com 6, supports wetland hydrology.

VEGETATION COMMUNITIES

Site I-90

(Cover Class Codes **0** = < 1%, **1** = 1-5%, **2** = 6-10%, **3** = 11-20%, **4** = 21-50% , **5** = >50%)

* Indicates accepted spp name not on '88 list.

Community # 1 **Community Type:** Upland /

Species	Cover class	Species	Cover class
Agropyron smithii	4	Carduus nutans	1
Cirsium arvense	1	Cirsium vulgare	1
Epilobium angustifolium	2	Helianthus annuus	1
Lactuca serriola	0	Phleum pratense	1
Thlaspi arvense	5	Trifolium fragiferum	2
Trifolium hybridum	1		

Comments:

Community # 2 **Community Type:** Bromus inermis /

Species	Cover class	Species	Cover class
Agropyron trachycaulum	2	Agrostis stolonifera	2
Bromus inermis	4	Carex nebrascensis	1
Carex rostrata	1	Cirsium arvense	1
Elaeagnus commutata	0	Erigeron formosissimus	1
Melilotus officinalis	1	Phalaris arundinacea	1
Poa pratensis	1	Polygonum persicaria	1
Rumex occidentalis	0	Symphoricarpos occidentali	0
Tanacetum vulgare	1		

Comments:

Community # 3 **Community Type:** Thlaspi arvense / Epilobium ciliatum

Species	Cover class	Species	Cover class
Agropyron smithii	1	Bare Ground	4
Bromus inermis	0	Cirsium arvense	0
Cirsium vulgare	1	Elaeagnus commutata	1
Epilobium ciliatum	2	Populus tremula	0
Ribes aureum	0	Tanacetum vulgare	1
Taraxacum officinale	1	Thlaspi arvense	4
Trifolium fragiferum	1	Trifolium hybridum	1

Comments:

Community # 4 Community Type: Typha latifolia /

Species	Cover class	Species	Cover class
Alisma gramineum	1	Bare Ground	3
Beckmannia syzigachne	1	Cornus stolonifera	0
Eleocharis palustris	1	Equisetum arvense	1
Juncus bufonius	0	Poa palustris	2
Polygonum amphibium	1	Typha latifolia	5

Comments:

Community # 5 Community Type: Typha latifolia / Poa palustris

Species	Cover class	Species	Cover class
Agropyron trachycaulum	1	Alopecurus pratensis	1
Bare Ground	3	Beckmannia syzigachne	1
Chenopodium leptophyllum	0	Chenopodium leptophyllum	0
Elaeagnus commutata	1	Eleocharis palustris	1
Epilobium ciliatum	1	Juncus balticus	1
Juncus bufonius	1	Phleum pratense	0
Poa palustris	2	Polygonum amphibium	1
Rudbeckia occidentalis	0	Salix exigua	0
Tanacetum vulgare	1	Trifolium fragiferum	1
Trifolium hybridum	1	Typha latifolia	2

Comments:

Community # 6 Community Type: Carex spp / Scirpus microcarpus

Species	Cover class	Species	Cover class
Agropyron trachycaulum	1	Agrostis alba	1
Carex aquatilis	1	Carex nebrascensis	1
Carex rostrata	4	Cirsium arvense	0
Cirsium vulgare	0	Geum macrophyllum	0
Juncus balticus	0	Phalaris arundinacea	2
Polygonum persicaria	3	Rosa woodsii	0
Rudbeckia occidentalis	1	Rumex occidentalis	0
Scirpus microcarpus	4	Tanacetum vulgare	1
Typha latifolia	1		

Comments:

Community # 7 Community Type: Typha latifolia / Carex spp

Species	Cover class	Species	Cover class
Carex nebrascensis	2	Carex rostrata	3
Cirsium arvense	0	Epilobium angustifolium	1
Epilobium ciliatum	1	Helianthus annuus	2
Juncus balticus	2	Juncus tenuis	1
Lemna minor	2	Mentha arvensis	0
Phalaris arundinacea	2	Polygonum persicaria	3
Populus tremula	0	Salix bebbiana	2
Salix exigua	1	Salix lasiandra	1
Scirpus cyperinus	0	Typha latifolia	5

Comments:

Community # 8 Community Type: Carex spp / Polygonum persicaria

Species	Cover class	Species	Cover class
Carex nebrascensis	1	Carex rostrata	5
Cirsium arvense	2	Epilobium ciliatum	1
Mentha arvensis	1	Poa pratensis	2
Polygonum persicaria	3	Rosa woodsii	0
Tanacetum vulgare	2	Verbascum blattaria	1

Comments:

Community # 9 Community Type: Salix exigua / Carex spp

Species	Cover class	Species	Cover class
Beckmannia syzigachne	3	Carex nebrascensis	1
Carex rostrata	4	Eleocharis palustris	2
Epilobium ciliatum	2	Salix exigua	5
Scirpus cyperinus	1	Tanacetum vulgare	2
Thlaspi arvense	1		

Comments:

Community # 10 Community Type: Salix lasiandra /

Species	Cover class	Species	Cover class
Epilobium ciliatum	1	Phalaris arundinacea	3
Salix lasiandra	5	Tanacetum vulgare	1

Comments:

Community # 11 **Community Type:** Open Water /

Species	Cover class	Species	Cover class
Open Water	5		

Comments:

VEGETATION TRANSECTS

Site: I-90 Date: 27/2010 9:02:01 AM

Transect Number: 1 **Compass Direction from Start:** 10

Interval Data:

Ending Station 24 **Community Type:** Carex spp / Scirpus microcarpus

Species	Cover class	Species	Cover class
Carex utriculata*	2	Eleocharis palustris	1
Epilobium ciliatum	2	Glyceria grandis	3
Mentha arvensis	1	Phalaris arundinacea	4
Rumex occidentalis	1	Scirpus microcarpus	5

Ending Station 35 **Community Type:** Thlaspi arvense / Epilobium ciliatum

Species	Cover class	Species	Cover class
Epilobium ciliatum	1	Lactuca serriola	1
Phleum pratense	2	Sparganium eurycarpum	0
Stellaria umbellata	0	Thlaspi arvense	5
Trifolium fragiferum	2		

Ending Station 164 **Community Type:** Typha latifolia /

Species	Cover class	Species	Cover class
Alisma gramineum	1	Bare Ground	4
Eleocharis palustris	1	Equisetum arvense	0
Lemna minor	0	Tanacetum vulgare	1
Typha latifolia	4		

Ending Station 192 **Community Type:** Bromus inermis /

Species	Cover class	Species	Cover class
Alopecurus pratensis	1	Bare Ground	3
Cirsium arvense	1	Epilobium angustifolium	2
Equisetum arvense	2	Tanacetum vulgare	1
Taraxacum officinale	3	Thlaspi arvense	4

Ending Station 395 **Community Type:** Typha latifolia /

Species	Cover class	Species	Cover class
Eleocharis palustris	1	Lemna minor	0
Polygonum amphibium	1	Shallow Water	3
Typha latifolia	5		

Ending Station 544 **Community Type:** Carex spp / Polygonum persicaria

Species	Cover class	Species	Cover class
Carex nebrascensis	2	Carex utriculata*	5
Cirsium arvense	4	Epilobium ciliatum	1
Mentha arvensis	1	Phalaris arundinacea	0
Polygonum persicaria	3	Sonchus arvensis	0

Transect Notes:

PLANTED WOODY VEGETATION SURVIVAL

I-90

Planting Type	#Planted	#Alive	Notes
Cornus stolonifera			Unknown numbers planted
Eleagnus commutata			Unknown numbers planted
Populus tremuloides			Unknown numbers planted
Willow cuttings	75		Cuttings appear to be taking and most had green stems

Comments

The plantings across the I-90 East Bozeman site typically included the installation of animal fencing around each stem or group of stems to protect from browse. There were no dead plantings observed within the plant cages during the 2010 monitoring efforts.

I-90

WILDLIFE

Birds

Were man-made nesting structures installed? Yes

If yes, type of structure: Bluebird and wood duck nest boxes

How many? 10

Are the nesting structures being used? Yes

Do the nesting structures need repairs? No

Nesting Structure Comments:

Species	#Observed	Behavior	Habitat
American Crow	1	FO	UP,
American Goldfinch	2		SS,UP,
American Robin	2	L	UP,
Bank Swallow	1	FO	MF
Barn Swallow	2	FO	MF
Black-capped Chickadee	2	L	SS,UP, WM
Blue-winged Teal	2	L	OW
Canada Goose	12	L	MA, MF, WM, US
Eastern Kingbird	1	FO	MA, WM
Killdeer	3	L	US
Mallard	10	FO, L	MA, MF, WM
Red-winged Blackbird	7		MA
Sandhill Crane	2	L	MA,UP, WM
Song Sparrow	1		SS
Western Meadowlark	1	FO	
Wilson's Phalarope	3		MF
Wilson's Snipe	4		MF, OW
Yellow Warbler	1	FO	SS,UP,

Bird Comments

BEHAVIOR CODES

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

HABITAT CODES

AB = Aquatic bed **SS** = Scrub/Shrub **FO** = Forested **UP** = Upland buffer **I** = Island

WM = Wet meadow **MA** = Marsh **US** = Unconsolidated shore **MF** = Mud Flat **OW** = Open Water

Mammals and Herptiles

Species	# Observed	Tracks	Scat	Burrows	Comments
Meadow Vole	11	No	No	No	
Mountain Cottontail		No	No	No	
Raccoon	0	Yes	No	No	
White-tailed Deer	0	Yes	Yes	No	
Yellowstone Cutthroat Trout		No	No	No	

Wildlife Comments:

goose scat common

I-90

PHOTOGRAPHS

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

Photograph Checklist:

☐ One photograph for each of the four cardinal directions surrounding the wetland.

☐ At least one photograph showing upland use surrounding the wetland. If more than one upland exists then take additional photographs.

☐ At least one photograph showing the buffer surrounding the wetland.

☐ One photograph from each end of the vegetation transect, showing the transect.

Photo #	Latitude	Longitude	Bearing	Description
6354			0	PP1, pano 6354-6357, 0-100deg PP1 PP1
6358			290	PP5, pano 6358-6363, 290-40deg
6365			200	PP4, pano 6365-6373, 200-340deg
6374				BZ-1
6375			310	XS-2, dwnstrm, pano 6375-6378
6379			150	XS-2, dwnstrm, pano 6379-6381
6382				BZ-2
6383				BZ-3
6384			350	xs1, 6384-6387, facing dwnstrm
6388			150	6388-8390, xs2 facing upstream
6394	45.677982	-111.015327	10	veg tran 11 start
6404			220	end of xsect

Comments:

ADDITIONAL ITEMS CHECKLIST

Hydrology

☐ Map emergent vegetation/open water boundary on aerial photos.
☐ Observe extent of surface water. Look for evidence of past surface water elevations (e.g. drift lines, vegetation staining, erosion, etc).

Photos

☐ One photo from the wetland toward each of the four cardinal directions
☐ One photo showing upland use surrounding the wetland.
☐ One photo showing the buffer around the wetland
☐ One photo from each end of each vegetation transect, toward the transect

Vegetation

☑ Map vegetation community boundaries

☑ Complete Vegetation Transects

Soils

☑ Assess soils

Wetland Delineations

☑ Delineate wetlands according to applicable USACE protocol (1987 form or Supplement)
☑ Delineate wetland – upland boundary onto aerial photograph.

Wetland Delineation Comments

Functional Assessments

☑ Complete and attach full MDT Montana Wetland Assessment Method field forms.

Functional Assessment Comments:

Maintenance

Were man-made nesting structure installed at this site? Yes

If yes, do they need to be repaired? No

If yes, describe the problems below and indicate if any actions were taken to remedy the problems

Were man-made structures built or installed to impound water or control water flow

into or out of the wetland? Yes

If yes, are the structures working properly and in good working order? No

If no, describe the problems below.

A rock vane was installed across the channel to arrest any potential headcut resulting from the adjacent property owner having excavated and lowered the ditch into which the Story ditch flows. During the 2010 field visit, no threats were identified to this grade-control structure.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: I-90 Bozeman | City/County: Gallatin | Sampling Date: 8/27/2010

Applicant/Owner: MDT | State: MT | Sampling Point: BZ-1

Investigator(s): B. Sandefur, B. Vaughn, J. Johnson | Section, Township, Range: S 8 T 2N R 6E

Landform (hillslope, terrace, etc.): Channel (active) | Local relief (concave, convex, none): concave | Slope (%):

Subregion (LRR): LRR E | Lat: 45.677536111 | Long: -111.014341667 | Datum: WGS 84

Soil Map Unit Name: Enbar-Nythar Loam | NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☑, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☑

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑ No ☐	**Is the Sampled Area within a Wetland?** Yes ☑ No ☐
Hydric Soil Present?	Yes ☑ No ☐	
Wetland Hydrology Present?	Yes ☑ No ☐	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0)	Absolute % Cover	Dominant Species?	Indicator Status
1. 0	0	☐	0
2. 0	0	☐	0
3. 0	0	☐	0
4. 0	0	☐	0
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 0)			
1. 0	0	☐	0
2. 0	0	☐	0
3. 0	0	☐	0
4. 0	0	☐	0
5. 0	0	☐	0
	0 = Total Cover		
Herb Stratum (Plot size: 5ft)			
1. Epilobium ciliatum	30	☑	FACW-
2. Juncus bufonius	10	☑	FACW+
3. Typha latifolia	10	☑	OBL
4. Eleocharis palustris	15	☑	OBL
5. Beckmannia syzigachne	10	☑	OBL
6. Tanacetum vulgare	10	☑	NL
7. Polygonum persicaria	5	☐	OBL
8. 0	0	☐	0
9. 0	0	☐	0
10. 0	0	☐	0
11. 0	0	☐	0
	90 = Total Cover		
Woody Vine Stratum (Plot size: 0)			
1. 0	0	☐	0
2. 0	0	☐	0
	0 = Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83.333 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	40	x 2 =	80
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		120 (B)

Prevalence Index = B/A = 1.5

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:
0

SOIL

Sampling Point: BZ-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	95	10YR 4/3	5	C	M	Silty Clay Loam	
5-12	5G 2/1	90	7.5YR 3/2	10	D	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☑ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): _____

Water Table Present? Yes ☑ No ☐ Depth (inches): 12

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 2

Wetland Hydrology Present? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: I-90 Bozeman | City/County: Gallatin | Sampling Date: 8/27/2010

Applicant/Owner: MDT | State: MT | Sampling Point: BZ-2

Investigator(s): B. Sandefur, B. Vaughn, J. Johnson | Section, Township, Range: S 8 T 2N R 6E

Landform (hillslope, terrace, etc.): Lowland | Local relief (concave, convex, none): flat | Slope (%): 0

Subregion (LRR): LRR E | Lat: 45.695005556 | Long: -111.013227778 | Datum: WGS 84

Soil Map Unit Name: Enbar-Nythar Loam | NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑	No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☑
Hydric Soil Present?	Yes ☐	No ☑	
Wetland Hydrology Present?	Yes ☐	No ☑	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0)	Absolute % Cover	Dominant Species?	Indicator Status
1. 0	0	☐	0
2. 0	0	☐	0
3. 0	0	☐	0
4. 0	0	☐	0
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 0)			
1. 0	0	☐	0
2. 0	0	☐	0
3. 0	0	☐	0
4. 0	0	☐	0
5. 0	0	☐	0
	0 = Total Cover		
Herb Stratum (Plot size: 5ft)			
1. Polygonum persicaria	20	☐	FACW
2. Bromus inermis	15	☐	NL
3. Phalaris arundinacea	60	☑	FACW
4. Cirsium arvense	10	☐	FACU+
5. 0	0	☐	0
6. 0	0	☐	0
7. 0	0	☐	0
8. 0	0	☐	0
9. 0	0	☐	0
10. 0	0	☐	0
11. 0	0	☐	0
	105 = Total Cover		
Woody Vine Stratum (Plot size: 0)			
1. 0	0	☐	0
2. 0	0	☐	0
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	
FACW species	80	x 2 =	160
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	90 (A)		200 (B)

Prevalence Index = B/A = 2.22222

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:
0

SOIL

Sampling Point: BZ-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	100					Clay Loam	
4-12	10YR 2/2	100					Clay Loam	
12-15	10YR 2/2	95	4/4	3	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☑

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): _____

Water Table Present? Yes ☐ No ☑ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☑ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☑

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: I-90 Bozeman | City/County: Gallatin | Sampling Date: 8/27/2010

Applicant/Owner: MDT | State: MT | Sampling Point: BZ-3

Investigator(s): B. Sandefur, B. Vaughn, J. Johnson | Section, Township, Range: S 8 T 2N R 6E

Landform (hillslope, terrace, etc.): Lowland | Local relief (concave, convex, none): flat | Slope (%): 0

Subregion (LRR): LRR E | Lat: 45.6784183333333 | Long: -111.01337 | Datum: WGS 84

Soil Map Unit Name: Enbar-Nythar Loam | NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑ No ☐	**Is the Sampled Area within a Wetland?** Yes ☑ No ☐
Hydric Soil Present?	Yes ☑ No ☐	
Wetland Hydrology Present?	Yes ☑ No ☐	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0)	Absolute % Cover	Dominant Species?	Indicator Status
1. 0	0	☐	0
2. 0	0	☐	0
3. 0	0	☐	0
4. 0	0	☐	0
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 0)			
1. 0	0	☐	0
2. 0	0	☐	0
3. 0	0	☐	0
4. 0	0	☐	0
5. 0	0	☐	0
	0 = Total Cover		
Herb Stratum (Plot size: 5ft)			
1. Carex rostrata var utriculata	50	☑	OBL
2. Polygonum persicaria	50	☑	FACW
3. 0	0	☐	0
4. 0	0	☐	0
5. 0	0	☐	0
6. 0	0	☐	0
7. 0	0	☐	0
8. 0	0	☐	0
9. 0	0	☐	0
10. 0	0	☐	0
11. 0	0	☐	0
	100 = Total Cover		
Woody Vine Stratum (Plot size: 0)			
1. 0	0	☐	0
2. 0	0	☐	0
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	50	x 1 =	
FACW species	50	x 2 =	100
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		150 (B)

Prevalence Index = B/A = 1.5

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:
0

SOIL

Sampling Point: BZ-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	100					Clay Loam	
4-12	10YR 2/1	95	10YR 3/4	5	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☑ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): _____

Water Table Present? Yes ☑ No ☐ Depth (inches): 12

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 7

Wetland Hydrology Present? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Near Well-2

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: I-90 Bozeman | City/County: Gallatin | Sampling Date: 8/27/2010

Applicant/Owner: MDT | State: MT | Sampling Point: BZ-4

Investigator(s): B. Sandefur, B. Vaughn, J. Johnson | Section, Township, Range: S 8 T 2N R 6E

Landform (hillslope, terrace, etc.): Lowland | Local relief (concave, convex, none): | Slope (%): 0

Subregion (LRR): LRR E | Lat: 45.678735 | Long: -111.013913333333 | Datum: WGS 84

Soil Map Unit Name: Enbar-Nythar Loam | NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑ No ☐	**Is the Sampled Area within a Wetland?** Yes ☑ No ☐
Hydric Soil Present?	Yes ☑ No ☐	
Wetland Hydrology Present?	Yes ☑ No ☐	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 0)	Absolute % Cover	Dominant Species?	Indicator Status
1. 0	0	☐	0
2. 0	0	☐	0
3. 0	0	☐	0
4. 0	0	☐	0
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 0)			
1. 0	0	☐	0
2. 0	0	☐	0
3. 0	0	☐	0
4. 0	0	☐	0
5. 0	0	☐	0
	0 = Total Cover		
Herb Stratum (Plot size: 5ft)			
1. Cirsium arvense	20	☐	FACU+
2. Polygonum amphibium	30	☑	OBL
3. Poa pratensis	10	☐	FACU+
4. Carex rostrata var utriculata	50	☑	OBL
5. Mentha arvensis	5	☐	FAC
6. 0	0	☐	0
7. 0	0	☐	0
8. 0	0	☐	0
9. 0	0	☐	0
10. 0	0	☐	0
11. 0	0	☐	0
	115 = Total Cover		
Woody Vine Stratum (Plot size: 0)			
1. 0	0	☐	0
2. 0	0	☐	0
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	30	x 4 =	120
UPL species	0	x 5 =	0
Column Totals:	115 (A)		215 (B)

Prevalence Index = B/A = 1.86957

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:
0

SOIL

Sampling Point: BZ-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	100					Silty Clay	
4-12	10YR 2/2	95	10YR 4/4	5	C	M	Clay Loam	
12-16	10YR 5/1	95	10YR 4/4	5	C	M	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☑ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): _____

Water Table Present? Yes ☐ No ☑ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 10

Wetland Hydrology Present? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

saturation at 10 in

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name East Bozeman Interchange Wetland **2. MDT project#** ARRA 16(73) **Control#**

3. Evaluation Date 8/27/2010 **4. Evaluators** B. Sandefur **5. Wetland/Site# (s)** East Bozeman-Creation

6. Wetland Location(s): **T** 2S **R** 6E **Sec1** 8 **T** **R** **Sec2**

Approx Stationing or Mileposts

Watershed 6-Upper Missouri **County** Gallatin Co.

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 5.32

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 5.32

☐ **Mitigation Wetlands: pre-construction**

How assessed: Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Riverine	Unconsolidated Bottom	Excavated	Permanent/Perennial	17
Depressional	Emergent Wetland	Excavated	Seasonal/Intermittant	83

11. Estimated Relative Abundance Common

12. General Condition of AA

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) lists)

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

Comments: (types of disturbance, intensity, season, etc)

Recent construction of the riverine and wetland depression wetland complex within the AA and high road density surrounding the AA contribute to high disturbance ratings.

ii. Prominent noxious, aquatic nuisance, other exotic species:

Canada thistle, common tansy

iii. Provide brief descriptive summary of AA and surrounding land use/habitat

The new 885 linear feet of stream channel and four newly excavated wetland depressions, plus some additional wetlands expanding beyond the existing wetlands created prior to recent efforts, have been included in this AA. Landuse surrounding the AA in clude I-90, East Main interchange, railroad corridor, and commercial structures.

13. Structural Diversity: (based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes], see #10 above)

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management preventing (passive) existence of additional vegetated classes?		Modified Rating
>=3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	<NO	YES>	L
1 class, monoculture (1 species comprises>=90% of total cover)	L	NA	NA	NA

Comments:

SECTION PERTAINING to FUNCTIONS_VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species) ◉ D ◉ S

Secondary habitat (list Species) ◉ D ◉ S

Incidental habitat (list species) ◉ D ◉ S

No usable habitat ☑ S

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
Functional Points and Rating	1H	.9H	.8H	.7M	.3L	.1L	0L

Sources for documented use USF&WS

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species) ◉ D ◉ S

Secondary habitat (list Species) ○ D ◉ S Great Blue Heron

Incidental habitat (list species) ◉ D ◉ S

No usable habitat ☐ S

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
S1 Species: *Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
S2 and S3 Species: *Functional Points and Rating*	.9H	.7M	.6M	.5M	.2L	.1L	0L

Sources for documented use MT NHP and observation of existing habitat

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (check substantial, moderate, or low based on supporting evidence):

Moderate

Substantial (based on any of the following [check]):

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

Minimal (based on any of the following [check]):

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

Moderate (based on any of the following [check]):

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

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

Structural diversity (see #13)									Moderate											
Class cover distribution (all vegetated classes)									Even				Uneven							
Duration of surface water in ≥ 10% of AA									P/P	S/I	T/E	A	P/P	S/I	T/E	A				
Low disturbance at AA (see #12i)																				
Moderate disturbance at AA (see #12i)																				
High disturbance at AA (see #12i)																				

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [check] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*											
				High						Low		
Substantial												
Moderate												
Minimal												

Comments Abundant use of AA by shore birds and waterfowl, transient ungulates observed.

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then check ☐ **NA** here and proceed to 14E.) Cold Water

Duration of surface water in AA									Seasonal / Intermittent											
Aquatic hiding / resting / escape cover									Optimal				Adequate				Poor			
Thermal cover optimal / suboptimal									O	S			O	S			O	S		
FWP Tier I fish species																				
FWP Tier II or Native Game fish species																				
FWP Tier III or Introduced Game fish																				
FWP Non-Game Tier IV or No fish species																				

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)
a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* **Y** ◉ **N** ○ *If yes, reduce score in* ***i*** *above by 0.1:* **Modified Rating** .2L

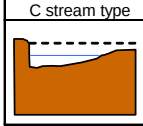
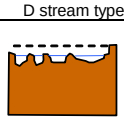
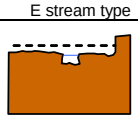
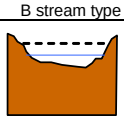
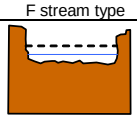
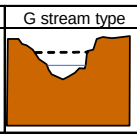
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ○ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

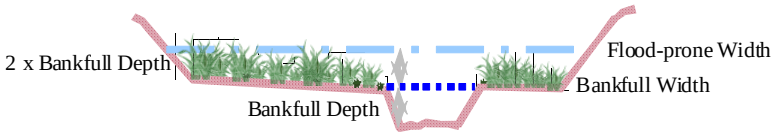
iii. Final Score and Rating: _____ **Comments:**

14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, click ☐ **NA** here and proceed to 14F.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% of flooded wetland classified as forested and/or scrub/shrub	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	.1L

Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						



Floodrpone width 40 **/** **Bankfull width** 25 **=** **Entrenchment ratio** 1.6

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (check)? **Y** ◉ **N** ○

Comments: Railroad and highway located downstream

14F. Short and Long Term Surface Water Storage: (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, click ☐ **NA** here and proceed to 14G.)

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

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			1.1 to 5 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond **≥ 5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments:

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, click ☐ **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating [H = high, M = moderate, or L = low])

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of				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 with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments:

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, click ☐ **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of ≥6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
≥ 65%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments: Vegetation along stream with only one growing season to establish when assessed.

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [check])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	L

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

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1E	.7H	.8H	.5M	.6M	.4M	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9H	.6M	.7H	.4	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB)**: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).

a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** ◉ **N** ○ *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:* **Modified Rating** .6M

Comments:

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

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

ii. Recharge Indicators

- ☑ Permeable substrate present without underlying impeding layer
- ☐ Wetland contains inlet but no outlet
- ☐ Stream is a known 'losing' stream; discharge volume decreases
- ☐ Other:

iii. Rating (use the information from i and ii above and the table below to arrive at [check] the functional points and rating)

	Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*			
Criteria	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information		NA		

Comments:

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MTNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MTNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7H	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments:

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (check) **Y** ◉ **N** ○ (if 'Yes' continue with the evaluation; if 'No' then click ☐ **NA** here and proceed to the overall summary and rating page)

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

iii. Rating (use the matrix below to arrive at [check] the functional points and rating)

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments:

Area used by local bird-watchers and MSU students

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): East Bozeman-Creation

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	0	1	0	☐
B. MT Natural Heritage Program Species Habitat	M	.5	1	2.66	☐
C. General Wildlife Habitat	L	.3	1	1.596	☐
D. General Fish Habitat	L	.2	1	1.064	☐
E. Flood Attenuation	M	.5	1	2.66	☐
F. Short and Long Term Surface Water Storage	H	.8	1	4.256	☑
G. Sediment/Nutrient/Toxicant Removal	H	1	1	5.32	☑
H. Sediment/Shoreline Stabilization	M	.7	1	3.724	☑
I. Production Export/Food Chain Support	M	.6	1	3.192	☐
J. Groundwater Discharge/Recharge	H	1	1	5.32	☑
K. Uniqueness	L	.2	1	1.064	☐
L. Recreation/Education Potential (bonus points)	M	.1	NA	0.532	☐
Totals:		5.9	11	31.388	
Percent of Possible Score			**53.64** %		

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

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

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

☑

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

OVERALL ANALYSIS AREA RATING:
(check appropriate category based on the criteria outlined above)

I	II	III	IV

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name East Bozeman Interchange Wetland **2. MDT project#** ARRA 16(73) **Control#**

3. Evaluation Date 8/27/2010 **4. Evaluators** B. Sandefur **5. Wetland/Site# (s)** East Bozeman-Pre-existing

6. Wetland Location(s): **T** 2S **R** 6E **Sec1** 8 **T** **R** **Sec2**

Approx Stationing or Mileposts

Watershed 6-Upper Missouri **County** Gallatin Co.

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 3.51

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 3.51

☐ **Mitigation Wetlands: pre-construction**

How assessed: Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Riverine	Emergent Wetland		Seasonal/Intermittant	65
Riverine	Scrub-Shrub Wetland		Seasonal/Intermittant	25
Riverine	Unconsolidated Bottom		Permanent/Perennial	10

11. Estimated Relative Abundance Common

12. General Condition of AA

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) lists)

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

Comments: (types of disturbance, intensity, season, etc)

AA includes well-vegetated wetlands created by MDT prior to additional construction activity in 2009.

ii. Prominent noxious, aquatic nuisance, other exotic species:

Canada thistle, common tansy

iii. Provide brief descriptive summary of AA and surrounding land use/habitat

AA includes 3.51 acres of wetland identified prior to 2009 construction, area contains the lower end of channel. No disturbance to AA. Landuse surrounding AA includes recently excavated wetland complex, high road density, and RR corridor.

13. Structural Diversity: (based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes], see #10 above)

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management preventing (passive) existence of additional vegetated classes?		Modified Rating
>=3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	<NO	YES>	L
1 class, monoculture (1 species comprises>=90% of total cover)	L	NA	NA	NA

Comments:

SECTION PERTAINING to FUNCTIONS_VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species) ◉ D ◉ S

Secondary habitat (list Species) ◉ D ◉ S

Incidental habitat (list species) ◉ D ◉ S

No usable habitat ☑ S

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
Functional Points and Rating	1H	.9H	.8H	.7M	.3L	.1L	0L

Sources for documented use USF&WS

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species) ◉ D ◉ S

Secondary habitat (list Species) ○ D ◉ S Great Blue Heron

Incidental habitat (list species) ◉ D ◉ S

No usable habitat ☐ S

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
S1 Species: *Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
S2 and S3 Species: *Functional Points and Rating*	.9H	.7M	.6M	.5M	.2L	.1L	0L

Sources for documented use MT NHP

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (check substantial, moderate, or low based on supporting evidence): Moderate

Substantial (based on any of the following [check]):

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

Minimal (based on any of the following [check]):

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

Moderate (based on any of the following [check]):

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

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

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [check] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1E	.9H	.8H	.7M
Moderate	.9H	.7M	.5M	.3L
Minimal	.6M	.4M	.2L	.1L

Comments

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then check ☐ **NA** here and proceed to 14E.) Cold Water

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [check the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)
a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* **Y** (●) **N** ( ) *If yes, reduce score in* ***i*** *above by 0.1:* **Modified Rating** .4M

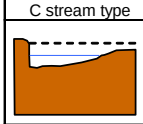
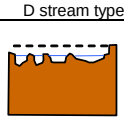
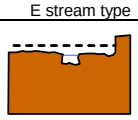
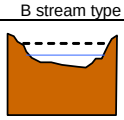
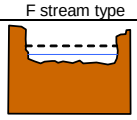
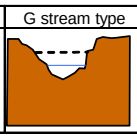
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ( ) **Y** (●) **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

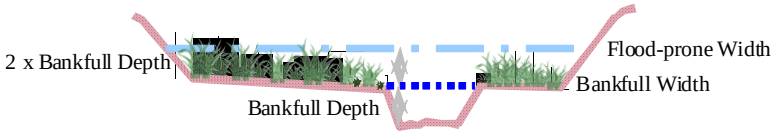
iii. Final Score and Rating: _____ **Comments:**

14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, click ☐ **NA** here and proceed to 14F.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)				Moderately entrenched – B stream type					
% of flooded wetland classified as forested and/or scrub/shrub				75%	25-75%	<25%			
AA contains **no outlet or restricted outlet**									
AA contains **unrestricted outlet**									

Slightly Entrenched ER = >2.2			Moderately Entrenched ER = 1.41 – 2.2	Entrenched ER = 1.0 – 1.4		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						



Floodrpone width 40 **/** **Bankfull width** 20 **=** **Entrenchment ratio** 2

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (check)? **Y** (●) **N** ( )

Comments: Railroad and highway located downstream

14F. Short and Long Term Surface Water Storage: (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, click ☐ **NA** here and proceed to 14G.)

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

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			1.1 to 5 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond **≥ 5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments:

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, click ☐ **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating [H = high, M = moderate, or L = low])

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody 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 with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M		.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments:

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, click ☐ **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of ≥6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
≥ 65%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments:

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [check])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	L

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

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1E	.7H	.8H	.5M	.6M	.4M	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9H	.6M	.7H	.4	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB)**: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).

a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** ◉ **N** ○ *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:* **Modified Rating** .8H

Comments:

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

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

ii. Recharge Indicators

- ☐ Permeable substrate present without underlying impeding layer
- ☐ Wetland contains inlet but no outlet
- ☐ Stream is a known 'losing' stream; discharge volume decreases
- ☐ Other:

iii. Rating (use the information from i and ii above and the table below to arrive at [check] the functional points and rating)

	Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*			
Criteria	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information		NA		

Comments:

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MTNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MTNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7H	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments:

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (check) **Y** ◉ **N** ○ (if 'Yes' continue with the evaluation; if 'No' then click ☐ **NA** here and proceed to the overall summary and rating page)

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

iii. Rating (use the matrix below to arrive at [check] the functional points and rating)

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments:

Area used by local bird-watchers and MSU students

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): East Bozeman-Pre-existing

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	0	1	0	☐
B. MT Natural Heritage Program Species Habitat	M	.5	1	1.755	☐
C. General Wildlife Habitat	M	.7	1	2.457	☐
D. General Fish Habitat	M	.4	1	1.404	☐
E. Flood Attenuation	M	.6	1	2.106	☐
F. Short and Long Term Surface Water Storage	H	.8	1	2.808	☑
G. Sediment/Nutrient/Toxicant Removal	H	.9	1	3.159	☑
H. Sediment/Shoreline Stabilization	H	1	1	3.51	☑
I. Production Export/Food Chain Support	H	.8	1	2.808	☐
J. Groundwater Discharge/Recharge	H	1	1	3.51	☑
K. Uniqueness	L	.3	1	1.053	☐
L. Recreation/Education Potential (bonus points)	M	.1	NA	0.351	☐
Totals:		7.1	11	24.921	
Percent of Possible Score			**64.55** %		

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

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

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

☐

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

OVERALL ANALYSIS AREA RATING:
(check appropriate category based on the criteria outlined above)

I	II	III	IV

Appendix C

Project Area Photographs

MDT Wetland Mitigation Monitoring
I-90 East Bozeman
Gallatin County, Montana



Photo Point 1 – *Photo 1*
Bearing: 0-100 Degrees

Location: "Welcome to Bozeman" sign
Taken in 2010



Photo Point 2 – *Photo 1*
Bearing: 350

Location: Just above Story Ditch
Taken in 2010



Photo Point 3 – *Photo 1*
Bearing: 170

Location: Just above Story Ditch
Taken in 2010



Photo Point 4 – *Photo 1*
Bearing: 200-340 Degrees

Location: West end
Taken in 2010



Photo Point 5 – *Photo 1*
Bearing: 290-40 Degrees

Location: MW-1
Taken in 2010



Transect 1 – *Start*
Bearing: 10 Degrees

Location: Veg Com 6
Taken in 2010



Transect 1 – *End*
Bearing: 220 Degrees

Location: Veg Com 8
Taken in 2010



Cross Section 1 – *Photo 1*
Bearing: 350 Degrees

Location: XS-1 looking downstream
Taken in 2010



Cross Section 1 – *Photo 2* **Location:** XS-1 looking upstream
Bearing: 150 Degrees **Taken in 2010**



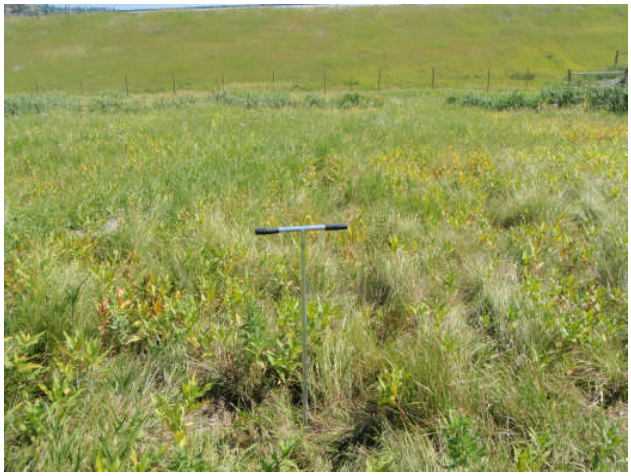
Cross Section 2 – *Photo 1* **Location:** XS-2 looking upstream
Bearing: 310 Degrees **Taken in 2010**



Cross Section 2 – *Photo 2* **Location:** XS-2 looking downstream
Bearing: 150 Degrees **Taken in 2010**



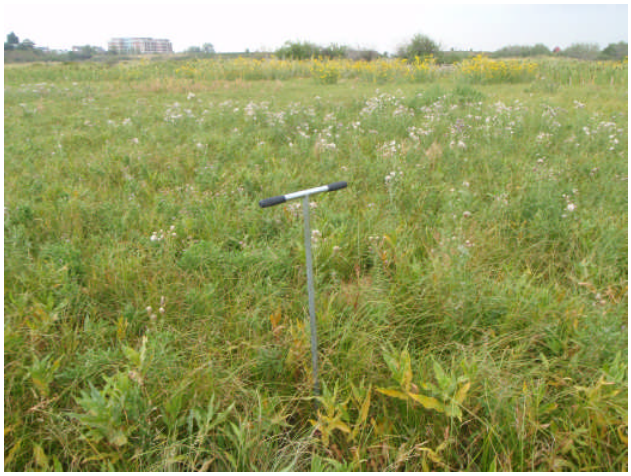
BZ 1 – *Photo 1*
Bearing: 90 degrees
Location: Veg Com 5
Taken in 2010



BZ 2 – *Photo 1*
Bearing: 90 degrees
Location: Veg Com 2
Taken in 2010



BZ 3 – *Photo 1*
Bearing: 350 degrees
Location: Veg Com 6
Taken in 2010

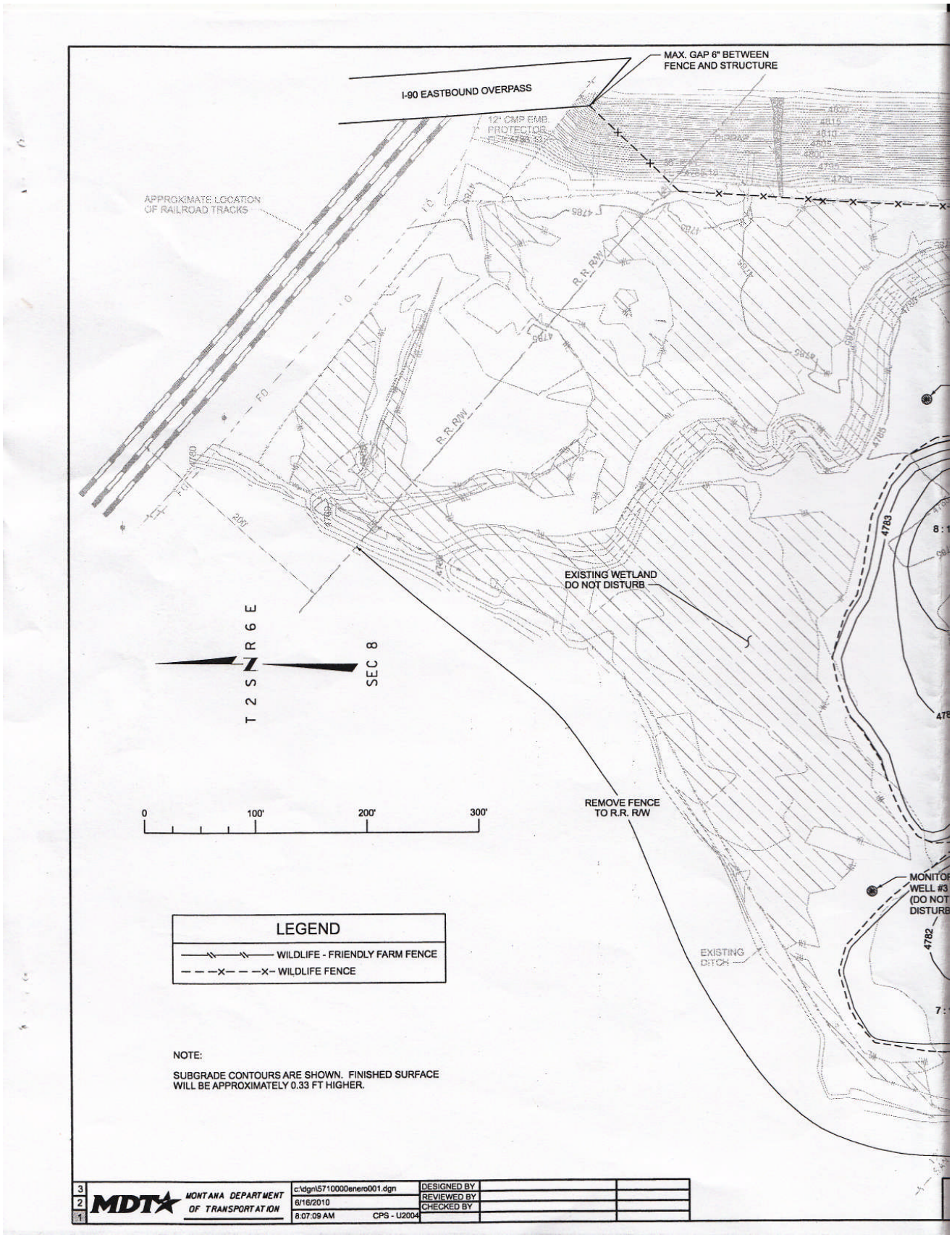


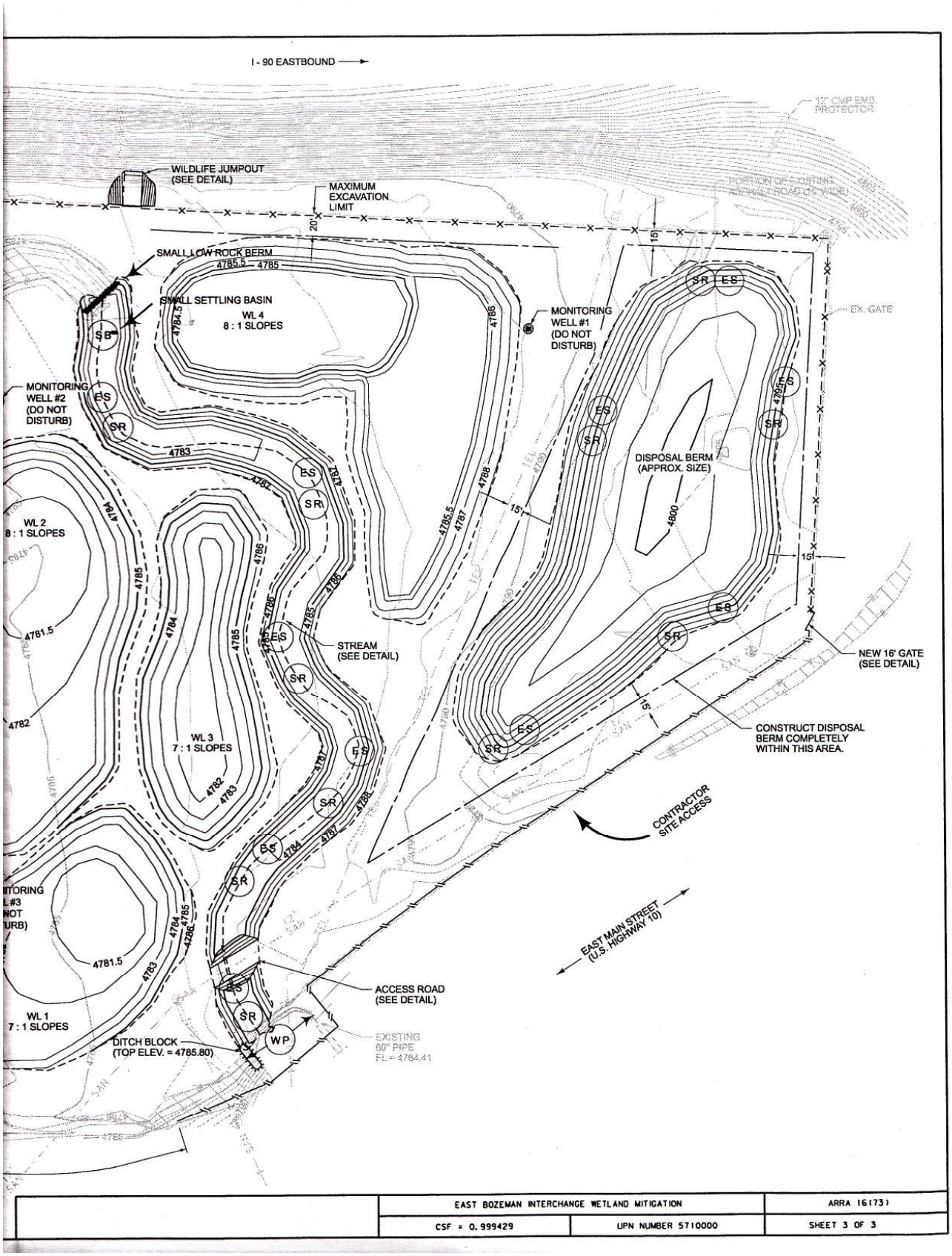
BZ 4 – *Photo 1*
Bearing: 0 degrees
Location: Veg Com 8
Taken in 2010

Appendix D

Project Plan Sheet

MDT Wetland Mitigation Monitoring
I-90 East Bozeman
Gallatin County, Montana

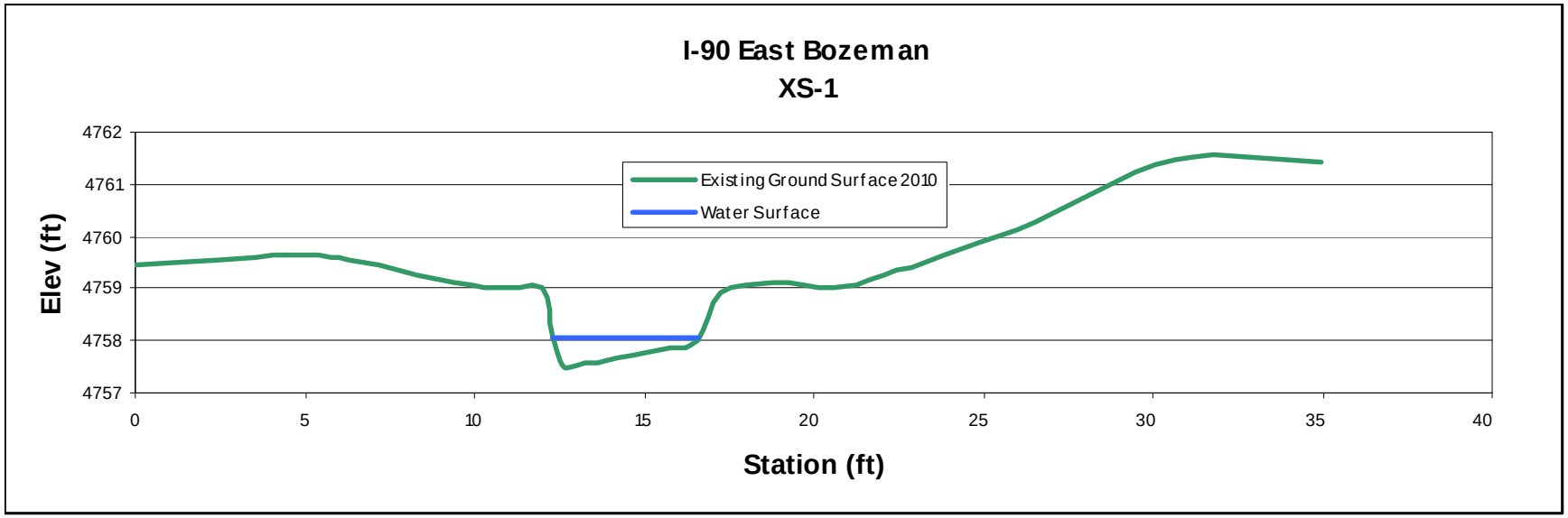

MAX. GAP 6" BETWEEN FENCE AND STRUCTURE
I-90 EASTBOUND OVERPASS
12" CMP EMB. PROTECTOR
APPROXIMATE LOCATION OF RAILROAD TRACKS
R.R. R/W
EXISTING WETLAND DO NOT DISTURB
T 2 S R 6 E
SEC 8
0
100'
200'
300'
REMOVE FENCE TO R.R. R/W
EXISTING DITCH
LEGEND
WILDLIFE - FRIENDLY FARM FENCE
WILDLIFE FENCE
NOTE:
SUBGRADE CONTOURS ARE SHOWN. FINISHED SURFACE WILL BE APPROXIMATELY 0.33 FT HIGHER.
MDT
MONTANA DEPARTMENT OF TRANSPORTATION
c:\dgn\5710000enero001.dgn
6/16/2010
8:07:09 AM
CPS - U2004
DESIGNED BY
REVIEWED BY
CHECKED BY

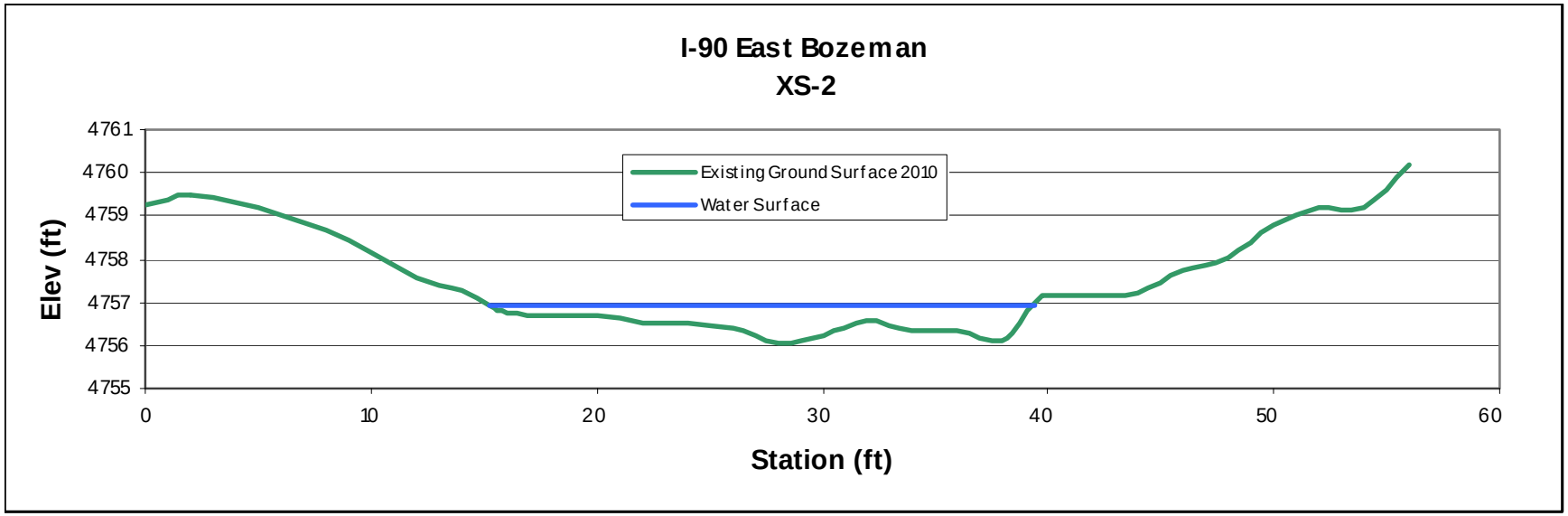

I - 90 EASTBOUND
WILDLIFE JUMPOUT (SEE DETAIL)
MAXIMUM EXCAVATION LIMIT
20'
15'
SMALL LOW ROCK BERM
4785.5 – 4785
SMALL SETTLING BASIN
WL 4
8 : 1 SLOPES
MONITORING WELL #1 (DO NOT DISTURB)
MONITORING WELL #2 (DO NOT DISTURB)
EX. GATE
DISPOSAL BERM (APPROX. SIZE)
WL 2
8 : 1 SLOPES
WL 3
7 : 1 SLOPES
WL 1
7 : 1 SLOPES
STREAM (SEE DETAIL)
NEW 16' GATE (SEE DETAIL)
CONSTRUCT DISPOSAL BERM COMPLETELY WITHIN THIS AREA.
CONTRACTOR SITE ACCESS
EAST MAIN STREET (U.S. HIGHWAY 10)
ACCESS ROAD (SEE DETAIL)
DITCH BLOCK (TOP ELEV. = 4785.80)
EXISTING 60" PIPE FL = 4784.41
EAST BOZEMAN INTERCHANGE WETLAND MITIGATION
ARRA 16(73)
CSF = 0.999429
UPN NUMBER 5710000
SHEET 3 OF 3

Appendix E

Stream Cross-section Surveys

MDT Wetland Mitigation Monitoring
I-90 East Bozeman
Gallatin County, Montana


I-90 East Bozeman
XS-1
Existing Ground Surface 2010
Water Surface
Elev (ft)
4762
4761
4760
4759
4758
4757
0
5
10
15
20
25
30
35
40
Station (ft)


I-90 East Bozeman
XS-2
Existing Ground Surface 2010
Water Surface
Elev (ft)
4761
4760
4759
4758
4757
4756
4755
0
10
20
30
40
50
60
Station (ft)