MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2011

I-90 East Bozeman
Gallatin County, Montana

Prepared for:

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December 2011

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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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CCI Project No: MDT.004

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1. INTRODUCTION

The I-90 East Bozeman 2011 Wetland Mitigation Monitoring Report presents the results of the second year of monitoring at the East Bozeman mitigation site. The wetland and stream mitigation site was constructed on a 14.81 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, in Gallatin County.

The wetland/stream restoration project was partially constructed in 1999 by Rajah and Associates under an MDT Lease Agreement. Construction was halted when the company went bankrupt. The MDT subsequently 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 (Corps File Number NWO-2007-3408-MTH). Five years of monitoring are required unless the success criteria are met and recognized by the US Army Corps of Engineers (USACE) prior to the fifth year of monitoring (USACE 2008).

Figures 2 and 3 (Appendix A) show the Monitoring Activity Locations and Mapped Site Features, respectively. Appendix B contains the MDT Wetland Mitigation Site Monitoring Forms, the USACE Wetland Determination Data Forms for the Western Mountains, Valleys, and Coast Region (USACE 2010), and the 2008 MDT Montana Wetland Assessment Forms. Appendix C contains photographs of the project area and Appendix D includes the project plan sheet. Two cross-sections of the constructed stream channel are presented in Appendix E.

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. These additional wetlands developed in part as a result of 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 creek discharges from the culvert outlet that crosses under East Main Street into the site at the southwest boundary. The stream exits the property at the northwest corner, converging with the Story Ditch north of the project site. The unnamed creek conveys spring flows from the hills south of the site and runoff from ephemeral drainages southwest of the site converging with stormwater runoff from residential and commercial development located west and south of the site. The Story Ditch channel flows under the Montana Rail Line railroad and I-90 into Rocky Creek, ultimately draining to the East Fork of the Gallatin River.

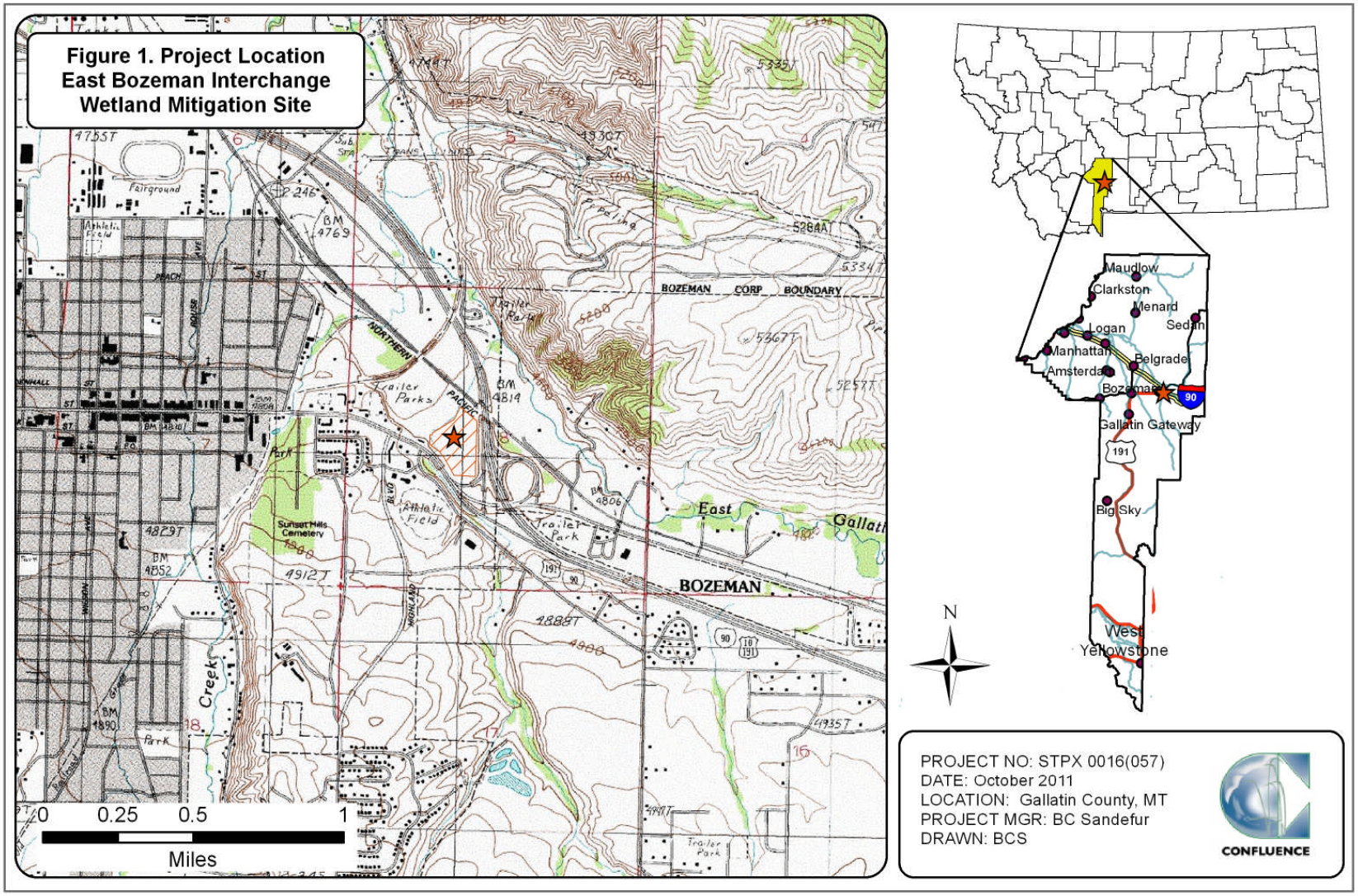

Figure 1. Project location East Bozeman I-90 Interchange Wetland Mitigation Site.

CONFLUENCE

The USACE 404 permit authorized the following work in May 14, 2008 (Corps File Number NWO-2007-3408-MTH).

- 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:

- 3.51 acres of wetlands that had 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.

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 encompassed a meandering stream. The approved success/performance standards are listed below.

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)* 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 planned to control current weed problems prior to the initiation of wetland construction activities within the site (Note: weed control activities are ongoing).
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 second year of monitoring was completed on July 18, 2011. Information for the Mitigation Monitoring Form and the Wetland Data Forms were entered electronically 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 entailed locating wetland boundaries, mapping vegetation communities, monitoring vegetation transects, assessing planted woody species survival, developing bank stability data, surveying steam cross-sections, collecting soil data, collecting hydrology data, documenting bird and wildlife use, taking photographs, and examining (non-engineering) 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 (241044) extends from May 5 through October 1 for a total of 149 days (NRCS 2010). Areas defined as wetlands would require 19 days 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 and 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 gauge 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 three onsite groundwater monitoring wells is shown on Figure 2 (Appendix A). Water levels were measured with a Solinst water level meter. The water surface elevation was recorded electronically on the Mitigation Monitoring 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 (Figure 3, Appendix A). 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). Community types were named based on the predominant vegetation species that characterized each mapped polygon (Figure 3, Appendix A).

Temporal changes in vegetation were evaluated through annual assessments of a static belt transect established in August 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 (Figure 3, Appendix A). A cumulative plant species list was developed for each yearly 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 "**X**", "▲", 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 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* and *in situ* soil descriptions, accessed from the Natural Resource Conservation Service (NRCS). 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 Wetland Data Form for each profile (Appendix B).

2.4. Wetland Delineation

Waters of the US (WUS) 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 Data 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 the 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 exhibited problematic vegetation, soil (i.e. recently developed), and/or hydrological indicators based on the guidance in the 2010 Regional Supplement. The wetland boundary was defined on 2011 aerial photographs of the site. Wetland areas reported were determined using geographic information system (GIS) methodology.

2.5. Wildlife

Observations and other positive indicators of use by mammal, reptile, amphibian, and bird species were recorded on the Mitigation 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. Each monitoring report contains a comprehensive list of wildlife species identified onsite during the current year and past years.

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. 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 Wetland 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 conditions, trends, current land use on the adjacent property, the upland buffer, mitigation site, and 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 2011 monitoring season. Points were collected using WAAS-enabled differential correction 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, then digitized. Site features and survey points that were mapped included fence boundaries, photograph points, transect beginnings and endings, wetland boundaries, wetland data points, 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 Bozeman, Montana State University Coop weather station, Montana (241044), recorded an average total annual precipitation rate of 18.51 inches from April 1892 to December 2010 (WRCC 2011). Annual precipitation for 2010 was 23.86 inches, 5.35 inches above the 118 year average. The total precipitation from January to June was 14.04 and 10.65 inches in 2010 and 2011 (NCDC), respectively.

Groundwater levels were measured in three wells, MW-1, MW-2, and MW-3, with a Solinst water level meter. 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. Well MW-3 was located on the east edge of the westernmost cell. Groundwater levels were 3.35 feet below the ground surface (bgs) in MW-1, 1.4 feet bgs in MW-2, and 2.25 feet bgs in MW-3. The existing stream, constructed stream, constructed cells, and portions of the existing wetland communities were inundated during the site investigation. The average surface water depth across the site was 0.5 feet. The depth of water within the constructed cells ranged from 0.1 to 1.5 feet. The water depth in the stream channel ranged from 0.5 to 2.0 feet deep. Approximately 30 percent of the assessment area was inundated. Areas delineated as wetlands that were not inundated were saturated to the ground surface or within 12 inches of the ground surface.

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 the data points are included on page C-7 of Appendix C. Data points BZ-1, BZ-2, and BZ-4 were located within areas that met the wetland criteria. Saturation within 12 inches bgs was a positive indicator of wetland hydrology at BZ-1. Hydrology indicators present at BZ-2 were a high water table at 11 inches bgs, saturation at 9 inches bgs, an algal mat, and surface soil cracks. A high water table at 1 inch bgs, saturation at 1 inch bgs, water marks, sediment deposits, and a sparsely vegetated concave surface was present at BZ-4. One secondary indicator, surface soil cracks, was observed at BZ-2, which was not a sufficient indication of wetland hydrology.

Table 1. Well data collected at I-90 East Bozeman Mitigation Site.

	WELL 1	WELL 2	WELL 3
07/2010	2.06	1.77	1.44
07/2011	3.02	2.47	2.14

Two baseline stream cross-sections were surveyed in 2010 at permanent locations to assess bank stability and lateral migration throughout the monitoring period. The cross-sections were measured again in 2011. The data are presented on Charts 1 and 2. Photographs of the cross-sections are shown on pages C-5 and C-6 of Appendix C. The cross-sections show minimal lateral movement of the channel at both locations. Cross-section 1 showed some aggradation of the left (west) side of the channel bottom. Cross-section 2 showed some degradation of the channel bottom at the left (west) side of the channel, which is located at the beginning of an outside bend. Some channel migration is expected as the newly constructed channel adjusts to annual high flow events. The surveys will be replicated during each monitoring events to assess stream movement.

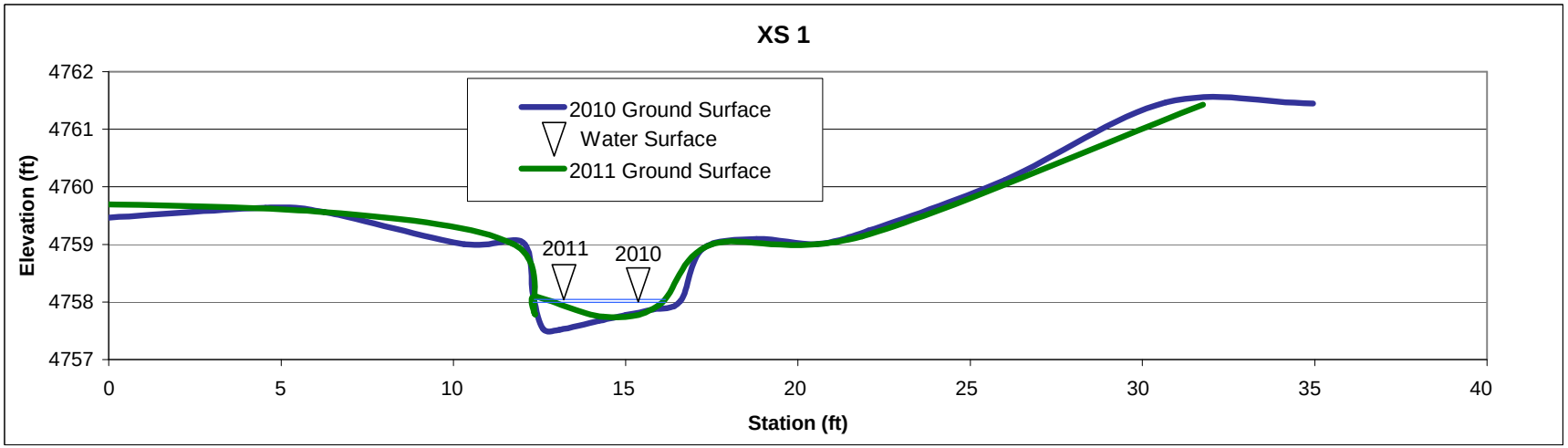

Chart 1. Survey data collected at cross-section 1 in 2010 and 2011.

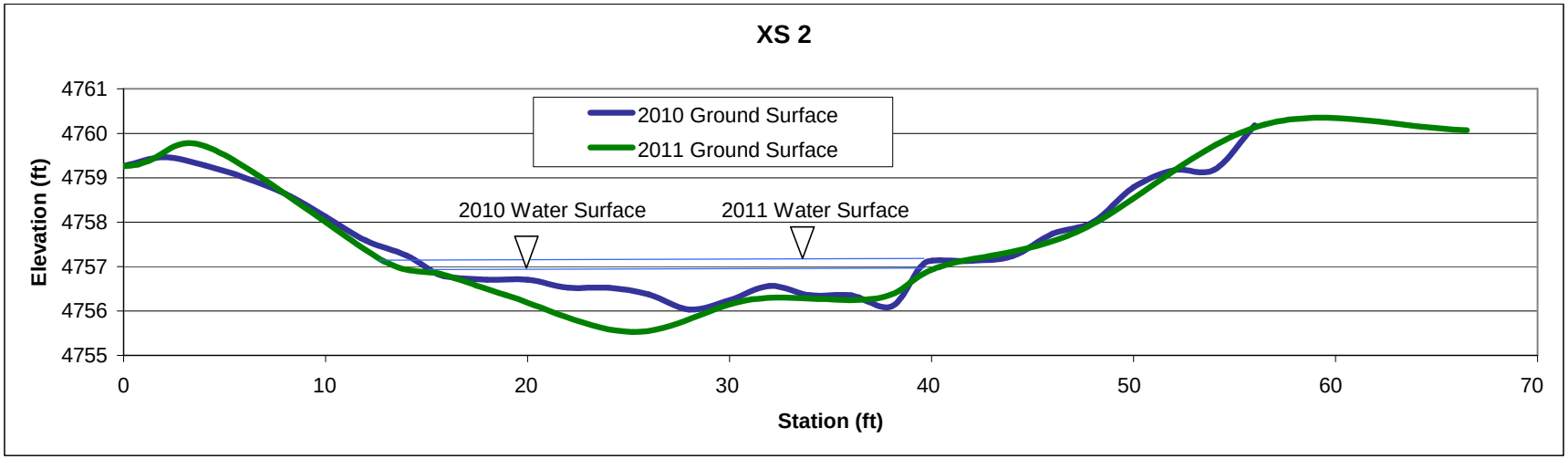

Chart 2. Survey data collected at cross-section 2 in 2010 and 2011.

3.2. Vegetation

A comprehensive list of 79 vegetation species identified at the East Bozeman I-90 mitigation site is presented on Table 2 and on the Mitigation Monitoring Forms (Appendix A). Nine vegetation community types, seven wetland and two upland, were identified on July 18, 2011 (Figure 3, Appendix A). The vegetation communities were 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 as a Water of the US and by polygon 11 (Figure 3, Appendix A). Some green algae and unidentified submerged aquatic plants were present in the slower-moving sections of this channel. Community 7 characterized the streambank vegetation. Dominant species are listed in descending order of abundance for each vegetation community type.

Upland community Type 2 – *Bromus inermis* (smooth brome) was located in the undisturbed upland areas outside the footprint of the constructed wetland cells and in the spoil pile located at the south edge of the site adjacent to the freeway. The spoil pile community was named Community 1 – Upland in 2010. The community was incorporated into Community 2 in 2011 as a result of increased vegetation diversity and cover. Smooth brome, slender wheatgrass (*Agropyron trachycaulum*), Agropyron smithii (*Western wheatgrass*), orchard grass (*Dactylis glomerata*), Agropyron repens (*quackgrass*), and yellow sweet clover (*Melilotus officinalis)* dominated the cover.

Upland community Type 3 – *Thlaspi arvense*/*Epilobium ciliatum* colonized the disturbed upper banks of the constructed wetland cells. Field pennycress and hairy willow herb (*Epilobium ciliatum*) dominated the vegetation species. Bare ground encompassed between 11 and 20 percent of total cover. The areal extent of this community type decreased in 2011 as the vegetation cover transitioned to wetland community Type 4.

Wetland community Type 4 – *Typha latifolia* (broad-leaf cattail) characterized the lowest contour of the constructed wetland cells. Broad-leaf cattail dominated the vegetation cover. Additional hydrophytic species observed on the perimeter of the cells included American sloughgrass (*Beckmannia syzigachne*), reed canary grass (*Phalaris arundinacea*), creeping spikerush (*Eleocharis palustris*), and American mannagrass (*Glyceria grandis*). Approximately 1 to 5 percent of the total cover was bare ground. Greater species diversity and less bare ground were observed in 2011. The majority of the area within the wetland cells was inundated with 2 to 8 inches of water during the investigation.

Table 2. Vegetation species observed from 2010 to 2011 at the I-90 East Bozeman Wetland Mitigation Site.

SCIENTIFIC NAME	COMMON NAME	REGION 9 INDICATOR STATUS[1]
Agropyron repens	**quackgrass**	**FACU**
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
Amelanchier alnifolia	**service-berry,Saskatoon**	**FACU**
Beckmannia syzigachne	sloughgrass,American	OBL
Brassica kaber	**wild mustard**	**NL**
Bromus inermis	smooth brome	NL
Carduus nutans	musk thistle	NL
Carex aquatilis	sedge,water	OBL
Carex nebrascensis	sedge,Nebraska	OBL
Carex rostrata	sedge,beaked	OBL
Carex stipata	**awlfruit sedge**	**NL**
*Carex utriculata**	beaked sedge	OBL
Chenopodium leptophyllum	goosefoot,narrow-leaf	FACU
Cicuta douglasii	**water-hemlock,western**	**OBL**
Cirsium arvense	thistle,creeping	FACU+
Cirsium vulgare	thistle,bull	FACU
Conium maculatum	**poison-hemlock**	**FACW-**
Cornus stolonifera	dogwood,red-osier	FACW
Dactylis glomerata	**grass,orchard**	**FACU**
Deschampsia cespitosa	**hairgrass,tufted**	**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
Festuca pratensis	**fescue,meadow**	**FACU+**
Geum macrophyllum	avens,large-leaf	FACW+
Glyceria grandis	American mannagrass	NL
Helianthus annuus	sunflower,common	FACU+
Heracleum lanatum	**cow-parsnip**	**FAC**
Hordeum brachyantherum	**barley,meadow**	**FACW**
Juncus articulatus	**rush,jointed**	**OBL**
Juncus balticus	rush,Baltic	OBL
Juncus bufonius	rush,toad	FACW+

[1]Region 9 Northwest (Reed 1988).
*Commonly accepted name not included in 1988 list.
Species first observed in 2011 are listed in bold type.

Table 1 (Continued). Vegetation species observed from 2010 to 2011 at the I-90 East Bozeman Wetland Mitigation Site.

SCIENTIFIC NAME	COMMON NAME	REGION 9 INDICATOR STATUS[1]
Juncus ensifolius	**rush,three-stamen**	**FACW**
Juncus tenuis	rush,slender	FAC
Lactuca serriola	lettuce,prickly	FAC-
Lemna minor	duckweed,lesser	OBL
Medicago lupulina	**medic,black**	**FAC**
Melilotus officinalis	sweetclover,yellow	FACU
Mentha arvensis	mint,field	FAC
Mimulus guttatus	**monkey-flower,common large**	**OBL**
Phalaris arundinacea	grass,reed canary	FACW
Phleum pratense	timothy	FACU
Poa palustris	bluegrass,fowl	FAC
Poa pratensis	bluegrass,Kentucky	FACU+
Polygonum amphibium	smartweed,water	OBL
Polygonum persicaria	thumb,lady's	FACW
Populus tremula	aspen,quaking	FAC+
Populus tremuloides*	**quaking aspen**	**FAC+**
Ribes aureum	currant,golden	FAC+
Rosa woodsii	rose,Wood's	FACU
Rudbeckia occidentalis	coneflower,western	FAC-
Rumex crispus	**dock,curly**	**FACW**
Rumex occidentalis	dock,western	FACW+
Salix bebbiana	willow,Bebb	FACW
Salix boothii	**willow,Booth's**	**OBL**
Salix exigua	willow,sandbar	OBL
Salix lasiandra	willow,Pacific	FACW+
Scirpus acutus	**bulrush,hard-stem**	**OBL**
Scirpus cyperinus	wool-grass	NI
Scirpus microcarpus	bulrush,small-fruit	OBL
Shepherdia canadensis	**buffalo-berry,Canada**	**NI**
Sonchus arvensis	sowthistle,field	FACU+
Sparganium eurycarpum	burreed,giant	OBL
Stachys palustris	**hedgenettle,marsh**	**FACW+**
Stellaria umbellata	starwort,umbellate	FAC+
Symphoricarpos albus	**snowberry**	**FACU**
Symphoricarpos 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

Region 9 Northwest (Reed 1988).
*Commonly accepted name not included in 1988 list.
Species first observed in 2011 are listed in bold type.

Table 1 (Continued). Vegetation species observed from 2010 to 2011 at the I-90 East Bozeman Wetland Mitigation Site.

SCIENTIFIC NAME	COMMON NAME	REGION 9 INDICATOR STATUS[1]
Trifolium hybridum	clover,alsike	FACU+
Trifolium pratense	**clover,red**	**FACU**
Typha latifolia	cattail,broad-leaf	OBL
Urtica dioica	**nettle,stinging**	**FAC+**
Verbascum blattaria	mullein,moth	UPL
Veronica americana	**speedwell,American**	**OBL**
Veronica peregrina	**speedwell,purslane**	**OBL**

Region 9 Northwest (Reed 1988).
Species first observed in 2011 are listed in bold type.

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 species diversity and vegetation cover increased in 2011. The dominant species were American mannagrass, reed canary grass, meadow foxtail (*Alopecurus pratensis*), creeping spikerush, meadow fescue (*Festuca palustris*), yellow sweet clover, and broad-leaf cattail. Bare ground encompassed 6 to 10 percent of total cover. The open water below the OHWM of the channel was labeled as Polygon 11.

Wetland Type 6 – *Carex spp./Scirpus microcarpus* (small-fruited bulrush) characterized the wetland areas located in the north half of the site that developed between 2000 and 2009. Small-fruited bulrush, beaked sedge, water sedge (*Carex aquatilis*), Nebraska sedge, lady's thumb (*Polygonum persicaria*), and reed canary grass dominated the vegetation species. The community was inundated with 2 to 4 inches of water in several areas.

Wetland community 7 – *Typha latifolia/Carex* spp. was found in the undisturbed riverine fringe along the pre-existing, unnamed perennial stream and in the pre-existing wetland located along the west boundary of the mitigation site. The dominant species were broad-leaf cattail, beaked sedge, water sedge, Nebraska sedge, reed canary grass, meadow foxtail, toad rush, and lesser duck weed. Isolated sandbar willow (*Salix exigua*), Bebb willow (*Salix bebbiana*), Booth willow, and Pacific willow (*Salix lasiandra*) shrubs (less than 10 percent cover) paralleled the stream banks within community 7. The channel terminates in Community 9 within the property boundary.

Wetland Type 8 – *Carex* spp*./Polygonum persicaria* was identified in the pre-existing wetland established as a result of construction activities completed in 1999. Meadow foxtail, beaked sedge, lady's thumb, Nebraska sedge, water sedge, Baltic rush, and small-fruited bulrush dominated the vegetation species. The cover of meadow foxtail increased in 2011. Canada thistle (*Cirsium arvense*) was recorded at 6 to 10 percent cover.

Wetland community 9 – *Salix exigua/Carex* spp. was identified in a small pre-existing wetland located along the northwest boundary where the constructed channel discharges into the Story Ditch. The wetland was dominated by a woody overstory consisting of sandbar willow and quaking aspen (*Populus tremuloides*) with an understory of beaked sedge, American sloughgrass, reed canary grass, broad-leaf cattail, creeping spikerush, and common tansy (*Tanacetum vulgare*).

Wetland community 10 – *Salix lasiandra* was identified in the existing wetland located at the southwest edge of the mitigation site. Pacific willow, sandbar willow, Bebb willow, and Booth willow dominated the woody overstory and reed canary grass, smooth brome, and water hemlock (*Cicuta douglasii*) dominated the understory.

Data were collected in 2011 along one vegetation transect at the I-90 East Bozeman site (Figure 2, Appendix A). The data recorded along Transect 1 (Mitigation Monitoring Form, Appendix AB) 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-3 and C-4 of Appendix C.

The transect traversed the site from southwest to northeast across WL-1 and WL-2 (wetlands cells identified on the Project Plan Sheet in Appendix D) and a portion of the pre-existing wetland. The transect intersected wetland communities 4, 6, and 8 and upland community 2 (Appendix B). Hydrophytic vegetation species dominated 97.8 percent of the transect intervals. The increase in wetland and corresponding decrease in upland from 2010 to 2011 was the result of the expansion of vegetation community 4 (wetland) to the upper slopes of the constructed wetland cells.

Table 3. Data summary for Transect 1 in 2011 at the I-90 East Bozeman Wetland Mitigation Site.

Monitoring Year	**2010**	**2011**
Transect Length (feet)	**544**	**544**
Vegetation Community Transitions along Transect	5	4
Vegetation Communities along Transect	5	4
Hydrophytic Vegetation Communities along Transect	3	3
Total Vegetative Species	27	26
Total Hydrophytic Species	18	17
Total Upland Species	9	9
% Transect Length Comprising Hydrophytic Vegetation Communities	93	97.8
% Transect Length Comprising Upland Vegetation Communities	7	2.2
% Transect Length Comprising Unvegetated Open Water	0	0
% Transect Length Comprising Bare Substrate	0	0

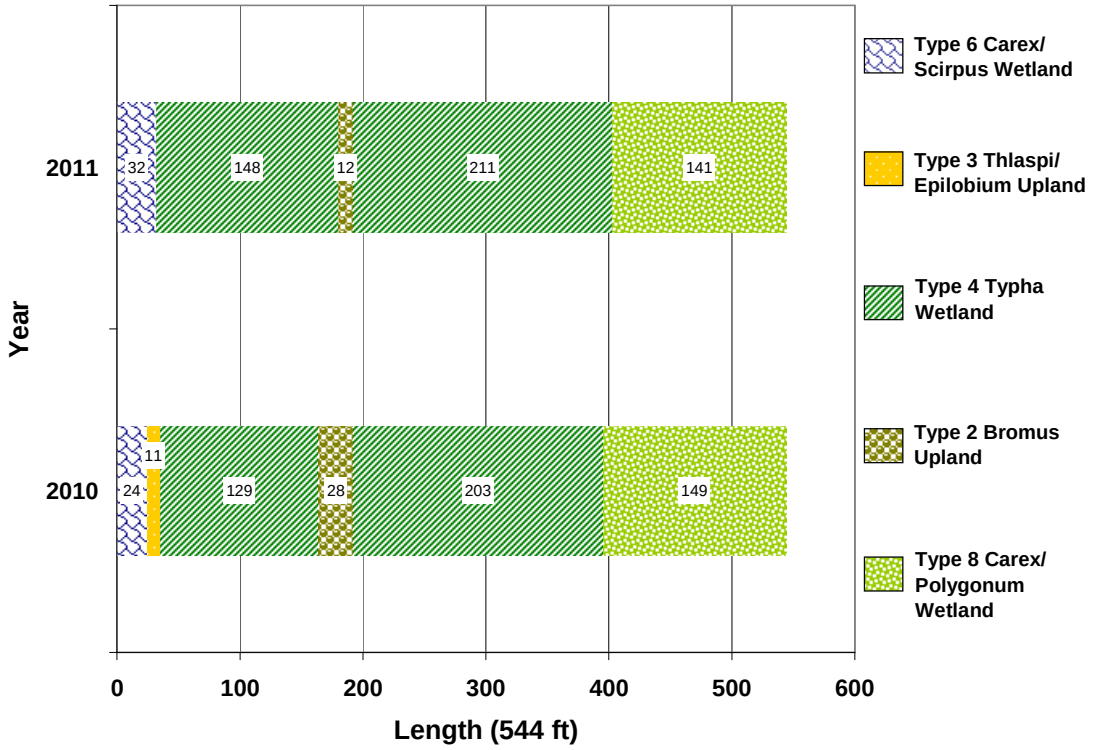

Chart 3. Transect map showing community types on Transect 1 in 2011 from start (0 feet) to finish (544 feet).

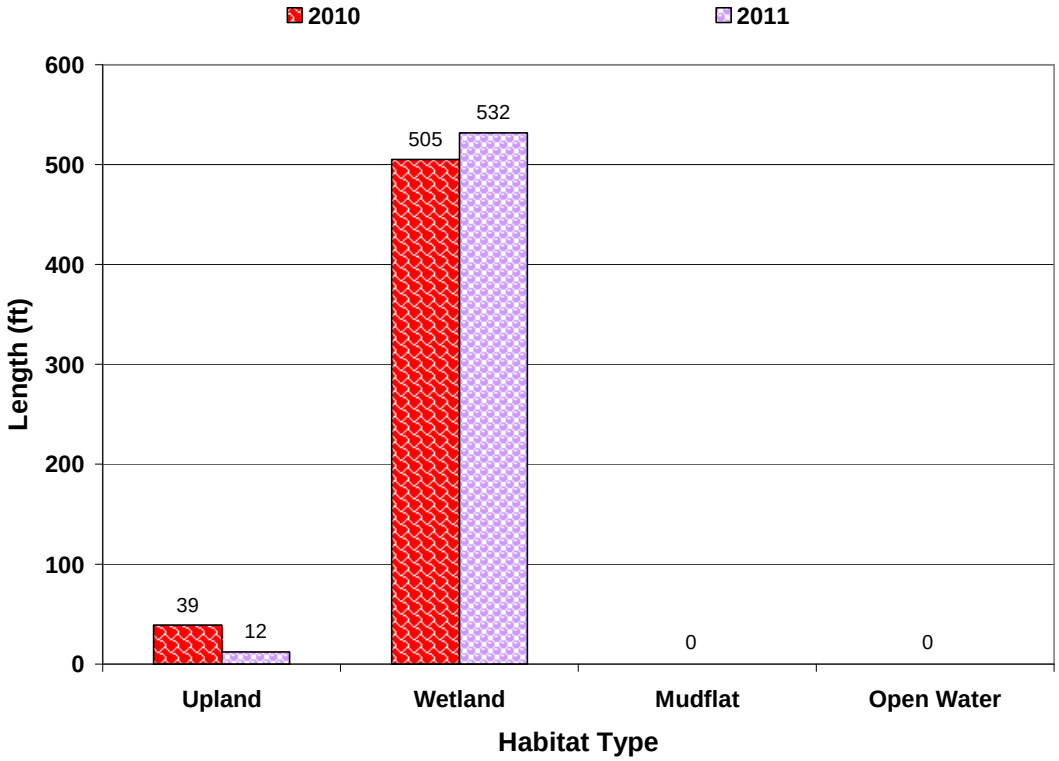

Chart 4. Length of habitat types within Transect 1 in 2011.

The location of infestations of common tansy and Canada thistle, Priority 2B weeds, were mapped on Figure 3 (Appendix A). The cover of Canada thistle increased notably from 2010 to 2011 across the site. The size of each of the common tansy infestations was less than 0.1 acre, ranging in cover from trace to moderate (less than 1 to 25 percent). Canada thistle infestations were recorded in 17 areas and ranged in size from less than 0.1 acre to 0.1 to 1.0 acre. Percent cover within the individual infestations ranged from trace to high (less than 1 to 100 percent). Infestations of Canada thistle and common tansy were sprayed in August 2011 following the monitoring event. Three acres of the site infested with Canada thistle were targeted. The extent of common tansy decreased from 2010 to 2011 as a result of the herbicide spraying effort completed in 2010.

Several live planted woody species were observed on the perimeter of the constructed wetland cells during the 2011 monitoring event. Approximately 50 to 75 willow cuttings were installed on the stream banks at the upgradient end of the channel and at the outlet near the Story Ditch. Three Western service berry (*Amelanchier alnifolia*), six American silverberry (*Eleagnus communtata*), six live quaking aspen (three dead), four dead Salix spp., one Canada buffaloberry (*Shepherdia canadensis*), and one common snowberry (*Symphoricarpus alba*) were observed. The location and quantity of the containerized plants installed at the site has not been verified.

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 are comprised of somewhat poorly drained loam soils found in floodplains. The Enbar loam is considered a non-hydric soil and is taxonomically classified as a frigid Cumulic Haplustolls and the Nythar loam is classified as a hydric soil, taxonomically classified as a frigid Cumulic Endoaquolls. The wetland test pit soils generally confirmed the mapped unit.

The test pits at BZ-1, BZ-2, and BZ-4 were located in areas defined as wetlands (Figure 2, Appendix A). The soil profile at BZ-1 revealed a silty clay loam (10 YR 3/1) with redoximorphic concentrations (10 YR 4/4) in the matrix. The redox dark surface provided a positive indication of hydric soil. The soil at BZ-2 was a dark brown (10 YR 3/1) silty clay loam with a matrix containing 30 percent dark yellowish brown (10 YR 4/4) redox concentrations meeting the criteria for a redox dark surface. Test pit BZ-4 was a problematic area with clay loam (10 YR 3/1) soil that did not exhibit redox concentrations. The soil in the constructed channel was classified as hydric based on the recent soil development, saturation to the ground surface, and high percentage of clay. Test pit BZ-3 was located on the upper slope of a constructed wetland cell in Community 3. The data point did not meet the criteria for wetland vegetation. The soil profile was a silty clay loam (10 YR 3/2) with 5 percent redox concentrations (10 YR 4/4) in the matrix, meeting the criteria for a redox dark surface and hydric soil.

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, Appendix A; Wetland Data Forms, Appendix B). Three data points, BZ-1, BZ-2, and BZ-4, were located within areas that met the wetland criteria. The July 2011 delineation identified 9.14 acres of waters of the US (WUS) including wetlands. The total acreage of wetlands included 3.51 acres of pre-existing wetland (Communities 6, 7, 8, 9, and 10); 4.74 acres of wetlands that have developed within the constructed cells (Community 4) and within existing wetlands located adjacent to the stream channel (Communities 6 and 8); and 0.89 acres of riverine wetland (Community 5) that encompasses 0.23 acres of open water/WUS (Community 11) located within the OHWM of the constructed channel (Table 3). Upland areas encompass 5.67 acres onsite that include the 5.16 acre upland buffer (Community 2) and 0.51 acre upland community 3 located on the upper slopes of the constructed channel.

Table 4.Total wetland acres delineated in August 2011.

Habitat	2000	2010	2011
Prexisting Wetland Area (acres)	3.51	3.51	3.51
Created Wetland Depressions and Additional Wetland Development (acres)	---	4.98	4.74
Open Water Riverine Habitat (acres)	---	0.34	0.89
TOTAL WETLAND HABITAT	**3.51**	**8.83**	**9.14**

3.5. Wildlife

A comprehensive list of wildlife species observed during the 2010 and 2011 monitoring visits is presented in Table 4. Twenty-seven bird species were identified in 2010 and six birds were identified in 2011. Tracks of a raccoon (*Procyon lotor*) and deer sp (*Odocoileus sp*) were observed in 2011. Several unidentified tadpoles were noted in the constructed channel. The temperature during the 2011 investigation was 97 degrees Fahrenheit, which likely limited wildlife use during the timeframe of the site visit.

Table 5. Wildlife species observed at the I-90 East Bozeman Mitigation Site in 2011.

SCIENTIFIC NAME	COMMON NAME
AMPHIBIAN	
Frog sp.	
BIRD	
American Crow*	*Corvus brachyrhynchos*
American Goldfinch	*Spinus tristus*
American Robin*	*Turdus migratorius*
American Wigeon*	*Anas americana*
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***
Cinnamon Teal*	*Anas cyanoptera*
Cliff Swallow*	*Petrochelidon pyrrhonota*
Eastern Kingbird	*Tyrannus tyrannus*
Gray Partridge	*Perdix perdix*
Green-winged Teal	*Anas crecca*
Hooded Merganser	*Lophodytes cucullatus*
Killdeer*	***Charadrius vociferus***
Mallard*	***Anas platyrhynchos***
Marsh Wren*	*Cistothorus palustris*
Northern Shoveler*	*Anas clypeata*
Red-tailed Hawk*	*Buteo jamaicensis*
Red-winged Blackbird*	***Agelaius phoeniceus***
Sandhill Crane*	*Grus canadensis*
Song Sparrow	***Melospiza melodia***
Sora*	
Spotted Sandpiper*	*Actitis macularius*
Starling*	*Porzana carolina*
Tree Swallow*	*Tachycineta bicolor*
Western Meadowlark	*Sturnella neglecta*
Wilson's Phalarope	*Phalaropus tricolor*
Wilson's Snipe*	*Gallinago delicata*
Yellow Warbler	*Dendroica petechia*
Yellow-headed Blackbird*	***Xanthocephalus xanthocephalus***
Yellow-rumped Warbler	*Dendroica coronata*
MAMMAL	
Deer sp.	**Odocoileus sp.**
Meadow Vole*	*Microtus pennsylvanicus*
Mountain Cottontail	*Sylvilagus nuttallii*
Muskrat*	*Ondatra zibethicus*
Raccoon*	***Procyon lotor***
Red Fox*	*Vulpes vulpes*
White-tailed Deer*	*Odocoileus virginianus*
FISH	
Yellowstone Cutthroat Trout	***Oncorhynchus clarkii bouvieri***

Species identified in 2011 are bolded.

*Species identified by MDT staff in 2011.

3.6. Functional Assessment

Functions and values of the I-90 East Bozeman mitigation wetlands were evaluated in 2011 (Berglund and McEldowney 2008). The created wetland depressions, channel, and expanded riverine wetlands were evaluated as one assessment area (AA). The creation AA encompassed 5.63 acres and received a Category III rating with 62.7 percent of the total points possible. High ratings were achieved for short and long term surface water storage, sediment/nutrient/toxicant removal, production export/food chain support, and groundwater discharge/recharge.

The second AA encompassed 3.51 acres of pre-existing wetlands, the credit acreage acknowledged by the USACE for the wetlands constructed prior to 2009. The pre-existing wetlands were rated as a Category II with 66.4 percent of the total points possible. Ratings were high for the functional variables of short and long term surface water storage, sediment/nutrient/toxicant removal, sediment/shoreline stabilization, production export/food chain support, and ground/discharge/recharge.

The entire site was rated as suspected 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. Ratings increased slightly in the categories of flood attenuation and sediment/nutrient/toxicant removal for the pre-existing wetland AA based on the increase in inundation levels in 2011. The percent possible score increased from 64.6 percent to 66.4 percent from 2010 to 2011. The percent possible score of the created AA increased from 53.6 percent to 62.7 percent, the result of an overall increase in wetland vegetation cover, decrease in bare ground, and increase in inundation levels, which increased the ratings for general wildlife habitat, short and long term water storage, and production export/food chain support.

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 to C-3 of Appendix C. Transect end points are shown on pages C-3 and C-4. The stream cross sections are included on pages C-3 through C-6 and the data points are shown on C-7 (Appendix C).

3.8. Maintenance Needs

The location of infestations of common tansy and Canada thistle were mapped on Figure 3 (Appendix A). As mentioned in Section 3.2, the cover of Canada thistle increased notably in 2011. Canada thistle was located in the upland areas between the constructed cells, along the stream channel, and in isolated areas of the pre-existing wetlands. Common tansy was primarily observed near the entrance to the site and along the upgradient ends of the constructed and existing channel. Three acres of Canada thistle along the channel and west boundary were sprayed in 2011 after the site was monitored. Common tansy

was confined to the channel edges in 2011. The spraying completed in 2010 was effective in reducing the extent of common tansy.

A rock vane was installed across the channel to restrict potential head cutting that might result from excavation of the ditch channel by the adjacent property owner. No head cutting was observed on MDT property in 2011. The grade-control structure was in good condition and stable. The wildlife jumpout for I-90 along the east fence boundary of the mitigation site was collapsed and in need of repair.

Four wood duck boxes and four bluebird boxes were observed on the site. The nesting structures were in good condition and were being used. A song sparrow was occupying one of the bluebird boxes.

Table 6.Functions and Values of the I-90 East Bozeman wetlands.

Function and Value Parameters from the 2008 MDT Montana Wetland Assessment Method[1]	2010 Pre-Existing Wetland	2011 Pre-Existing Wetland	2010 Created Wetland Depressions	2011 Created Wetland Depressions
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Mod (0.5)	Mod (0.5)	Mod (0.5)	Mod (0.5)
General Wildlife Habitat	Mod (0.7)	Mod (0.7)	Low (0.3)	Mod (0.7)
General Fish/Aquatic Habitat	Mod (0.4)	Mod (0.4)	Low (0.2)	Low (0.2)
Flood Attenuation	Mod (0.6)	Mod (0.7)	Mod (0.5)	Mod (0.5)
Short and Long Term Surface Water Storage	High (0.8)	High (0.8)	High (0.8)	High (1.0)
Sediment/Nutrient/Toxicant Removal	High (0.9)	High (1.0)	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	High (1.0)	High (1.0)	Mod (0.7)	Mod (0.7)
Production Export/ Food Chain Support	High (0.8)	High (0.8)	Mod (0.6)	High (0.9)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Low (0.3)	Low (0.3)	Low (0.2)	Low (0.3)
Recreation/Education Potential (bonus points)	Mod (0.1)	Mod (0.1)	Mod (0.1)	Mod (0.1)
Actual Points / Possible Points	**7.1 / 11**	**7.3 / 11**	**5.9 / 11**	**6.9 / 11**
% of Possible Score Achieved	**64.6%**	**66.4%**	**53.6%**	**62.7%**
Overall Category	**II**	**II**	**III**	**III**
Acreage of Assessed Aquatic Habitats within Easement (ac)	**3.51**	**3.51**	**5.32**	**5.63**
Functional Units (acreage x actual points) (f^1-)	**24.92**	**25.62**	**31.39**	**38.85**

[1]Berglund and McEldowney 2008 MDT MWAM.

3.9. Current Credit Summary

Table 6 presents the 2011 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 5.51 acres. This available credit was based on 3.51 acres of wetland that was developed on the site since 2000, maintenance of a 50-foot upland buffer yielding 0.17 acres of credit, and 30% of the expected 6.1 acres of created wetland yielding 1.83 acres. Based on the results of the 2011 monitoring, 9.31 credit acres have developed on site to

date. The USACE stated that the amount of credit available at the site could be adjusted as appropriate based on the monitoring results.

The 2011 monitoring identified the creation of 0.89 acres of riverine wetland within the newly constructed stream channel, the creation of 4.74 acres of wetland within and adjacent to the constructed depressions, the preservation of 3.51 acres of emergent wetland developed as a result of the 2000 mitigation efforts, and 0.17 acres of credit for the upland buffer. Full credit at a 1:1 ratio was assigned for the maintenance of the existing wetlands based on the presence of a hydrophytic vegetation cover of at least 80 percent and a weed cover of less than 10 percent. Full credit at a 1:1 ratio was also assigned to the wetlands that have created as a result of the 2009 construction. The 0.17 acre of upland credit was based on a 50-foot upland buffer around the expected wetland areas. This value will be recalculated as wetlands develop to the full extent within the site.

Based on the success criteria presented in Section 1, the areas currently defined as wetland met the criteria for hydrophytic vegetation, hydric soil, and hydrology. The cover of desirable hydrophytic plants in a majority of the footprint of the created wetland cells and the expanded riverine wetlands is at least 80 percent. The percent hydrophytic vegetation cover on the streambanks of the constructed channel increased from approximately 50 percent to 70 percent from 2010 to 2011. The upland buffer exhibits greater than 50 percent areal cover of desirable vegetation and less than 10 percent weed cover. The woody overstory site wide and streambank vegetation associated with the constructed stream channel continue to develop.

Table 7. 2011 Summary of Wetland Credits.

Proposed Mitigation Features	Compensatory Mitigation Type	USACE Mitigation Ratios	MDT Final Credit Estimate (Acres)	USACE Acknowledged Credit*	2010 Delineated Wetland Acres**	2010 Credit Acres	2011 Delineated Wetland Acres	2011 Credit Acres
Creation of riverine wetland, 2 to 3 feet wide, one half to one foot deep	Creation	1:1	0.95	1.83	0.34	0.34	0.89	0.89
Creation of four wetland depressions	Creation	1:1	5.15		4.98	4.98	4.74	4.74
Maintain 3.51 acres of wetland developed since 2000.	Creation	1:1	3.51	3.51	3.51	3.51	3.51	3.51
Maintain upland buffer	Upland buffer	5:1	0.17	0.17	--	0.17	--	0.17
Total Available Credit			9.78	5.51	8.83	9.00	9.14	9.31

*USACE acknowledged credit for 30% of the total created (6.1 acres) from 2008 correspondance.

**Wetland fringe associated with the riverine wetland was included in 2010 Wetland Depressions. This area was included in riverine creation in 2011.

4. REFERENCES

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Appendix A

Figures 2 – Monitoring Activity Locations
Figure 3 – Mapped Site Features

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

Figure 2: 2011 Monitoring Activity Locations

N

0 62.5 125 250

Feet

PP4

PP5

MW-1

MW-2

XS-2

T-1 Finish

PP2

PP3

BZ-1

BZ-2

BZ-3

BZ-4

PP6

MW-3

T-1 Start

XS-1

PP1

Legend

- Vegetation Transect
- Monitoring Limits
- Data Points
- Photo Points
- Monitoring Wells
- Cross Section

Base Photography Date: August 17, 2011

LOCATION: Gallatin Co., MT

PROJ NO: STPX-0016(057)

FILE: Bozeman/Monitor2011.mxd

Project Name: East Bozeman I-90 Mitigation Site

Drawing Title: 2011 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
BV	BCS	JJ

SCALE: Noted

Drawn: September 8, 2011

PROJ MGR: B Sandefur

CONFLUENCE consulting Incorporated

Figure 2

REV -

Figure 3: 2011 Mapped Site Features

ACREAGES

Project Area	14.81 acres
WUS inc. Wetlands	9.14 acres
Existing Wetlands	3.51 acres
WUS (11)	0.34 acres
Created Wetlands	5.29 acres
Upland	5.67 acres

N

0 62.5 125 250

Feet

Legend

Monitoring Limits

Wetland Limits

Vegetation Communities

Base Photography Date: August 17, 2011

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

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

LOCATION: Gallatin Co., MT

PROJ NO: STPX-0016(057)

FILE: Bozeman/Veg2011.mxd

Project Name: East Bozeman Interchange Wetland Mitigation Site

Drawing Title: 2011 Mapped Site Features

DRAWN	CHECKED	APPROVED
BV	BCS	JJ

SCALE: Noted

Drawn: September 8, 2011

PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 3

REV -

Appendix B

2011 MDT Wetland Mitigation Site Monitoring Form
2011 USACE Wetland Determination Data Form
2011 MDT Montana Wetland Assessment Form

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

MDT WETLAND MITIGATION SITE MONITORING FORM

Project Site: I-90 East Bozeman Assessment Date/Time 7/18/2011 8:54:01 AM

Person(s) conducting the assessment: B. Vaughn, L. Soderquist

Weather: Sunny, clear, 97 deg F. 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: 2 #Visits in Year: 1

Size of Evaluation Area: 14.8 (acres)

Land use surrounding wetland:

interstate corridor, commercial, undeveloped

HYDROLOGY

Surface Water Source: Groundwater, Unnamed Trib, Story Ditch

Inundation: ☑ Average Depth: 0.5 **(ft)** Range of Depths: 0.1 to 2.0 **(ft)**

Percent of assessment area under inundation: 30 %

Depth at emergent vegetation-open water boundary: 0.5 **(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 soil cracks, algal mat.

Groundwater Monitoring Wells

Record depth of water surface below ground surface, in feet.

Well ID	Water Surface Depth (ft)
MW 1	3.35
MW 2	1.4
MW 3	2.25

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:

Saturation within 12" of gs observed in wetlands that were not inundated. All constructed cells either saturated to surface or inundated with 0.1 to 1.5ft of water. Water level in existing stream (downgradient end), up to 2 feet deep. Depth of water through thalweg of constructed channel ranges from 1 to 2.0ft.

VEGETATION COMMUNITIES

Site I-90 East Bozeman

(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 # 2 **Community Type:** Bromus inermis / Agropyron spp. **Acres** 5.16

Species	Cover class	Species	Cover class
Agropyron repens	3	Agropyron smithii	3
Agropyron trachycaulum	4	Agrostis alba	1
Alopecurus pratensis	1	Brassica kaber	0
Bromus inermis	5	Carduus nutans	0
Cirsium arvense	2	Conium maculatum	0
Dactylis glomerata	3	Deschampsia cespitosa	0
Hordeum brachyantherum	1	Lactuca serriola	0
Medicago lupulina	0	Melilotus officinalis	3
Phalaris arundinacea	0	Phleum pratense	2
Poa pratensis	2	Polygonum persicaria	2
Sparganium eurycarpum	0	Symphoricarpos albus	1
Tanacetum vulgare	1	Taraxacum officinale	3
Thlaspi arvense	1	Trifolium hybridum	0

Comments:

Community # 3 **Community Type:** Thlaspi arvense / Epilobium ciliatum **Acres** 0.51

Species	Cover class	Species	Cover class
Agropyron smithii	0	Agropyron trachycaulum	0
Alopecurus pratensis	0	Bare ground	3
Bromus inermis	1	Cirsium arvense	0
Deschampsia cespitosa	0	Elaeagnus commutata	1
Epilobium ciliatum	2	Festuca pratensis	0
Hordeum brachyantherum	1	Melilotus officinalis	1
Phleum pratense	1	Phleum pratense	0
Polygonum persicaria	0	Polygonum persicaria	1
Stachys palustris	0	Tanacetum vulgare	0
Taraxacum officinale	1	Thlaspi arvense	3
Trifolium pratense	0		

Comments:

The area of Comm 3 located at the outer perimeter of the constructed cells decreased in 2011. Comm 3 shifting to Comm 4.

Community # 4 Community Type: Typha latifolia / **Acres** 3.39

Species	Cover class	Species	Cover class
Alisma gramineum	0	Alopecurus pratensis	1
Amelanchier alnifolia	0	Bare ground	1
Beckmannia syzigachne	3	Carduus nutans	0
Carex aquatilis	0	Cirsium arvense	0
Deschampsia cespitosa	1	Elaeagnus commutata	0
Eleocharis palustris	2	Epilobium ciliatum	0
Equisetum arvense	0	Glyceria grandis	2
Hordeum brachyantherum	1	Juncus balticus	1
Juncus tenuis	0	Mentha arvensis	0
Mimulus guttatus	1	Phalaris arundinacea	3
Phleum pratense	0	Polygonum amphibium	1
Polygonum persicaria	0	Populus tremuloides*	0
Rumex crispus	1	Salix exigua	0
Scirpus acutus	0	Trifolium hybridum	0
Typha latifolia	5	Veronica americana	0

Comments:

American silverberry, Western silverberry, and quaking aspen planted from containerized. Greater diversity in 2011 and less bare ground.

Community # 5 Community Type: Typha latifolia / Poa palustris **Acres** 0.9

Species	Cover class	Species	Cover class
Agrostis alba	0	Alopecurus pratensis	3
Bare ground	2	Beckmannia syzigachne	2
Carex aquatilis	1	Carex utriculata*	1
Cirsium arvense	0	Eleocharis palustris	3
Epilobium ciliatum	1	Festuca pratensis	3
Glyceria grandis	4	Juncus balticus	2
Juncus tenuis	0	Melilotus officinalis	3
Phalaris arundinacea	3	Poa palustris	0
Polygonum amphibium	1	Rumex crispus	2
Thlaspi arvense	2	Typha latifolia	3

Comments:

Species diversity increased in 2011. Greater dominance of Alo pra, Eleo pal, Gly gran, Phal arun. Open water below OHWM in stream channel labeled as Comm. 11.

Community # 6 Community Type: Carex spp. / Scirpus microcarpus **Acres** 2.79

Species	Cover class	Species	Cover class
Agropyron trachycaulum	2	Bromus inermis	1
Carex aquatilis	2	Carex nebrascensis	2
Carex utriculata*	2	Cirsium arvense	0
Eleocharis palustris	0	Geum macrophyllum	1
Glyceria grandis	1	Helianthus annuus	1
Phalaris arundinacea	3	Polygonum amphibium	2
Polygonum persicaria	3	Rosa woodsii	0
Rumex crispus	0	Scirpus microcarpus	5
Tanacetum vulgare	0	Typha latifolia	0
Verbascum blattaria	0	Veronica americana	2

Comments:

Existing wetland community. Inundation 2 to 4 inches deep in some areas.

Community # 7 Community Type: Typha latifolia / Carex spp. **Acres** 0.85

Species	Cover class	Species	Cover class
Alopecurus pratensis	2	Carex aquatilis	3
Carex nebrascensis	2	Carex stipata	0
Carex utriculata*	3	Cirsium arvense	0
Deschampsia cespitosa	1	Eleocharis palustris	1
Epilobium ciliatum	0	Equisetum arvense	0
Geum macrophyllum	0	Glyceria grandis	1
Juncus articulatus	0	Juncus balticus	1
Juncus bufonius	2	Juncus ensifolius	1
Juncus tenuis	0	Lemna minor	2
Mentha arvensis	0	Phalaris arundinacea	2
Polygonum persicaria	1	Rosa woodsii	1
Salix bebbiana	0	Salix boothii	0
Salix exigua	1	Salix lasiandra	0
Shepherdia canadensis	0	Stachys palustris	1
Typha latifolia	5		

Comments:

Wetland community assoc. w/ existing stream.

Community # 8 **Community Type:** Carex spp. / Polygonum persicaria **Acres** 0.79

Species	Cover class	Species	Cover class
Agrostis alba	1	Alopecurus pratensis	5
Beckmannia syzigachne	1	Carex aquatilis	2
Carex nebrascensis	2	Carex utriculata*	2
Cirsium arvense	2	Deschampsia cespitosa	0
Epilobium ciliatum	1	Geum macrophyllum	0
Juncus balticus	2	Phalaris arundinacea	1
Polygonum persicaria	3	Rosa woodsii	1
Scirpus microcarpus	2	Typha latifolia	1

Comments:

Saturation levels ranged from ground surface to 12 inches bgs.

Community # 9 **Community Type:** Salix exigua / Carex spp. **Acres** 0.09

Species	Cover class	Species	Cover class
Agrostis alba	0	Beckmannia syzigachne	2
Carex nebrascensis	1	Carex utriculata*	2
Deschampsia cespitosa	1	Eleocharis palustris	2
Epilobium ciliatum	0	Juncus tenuis	1
Phalaris arundinacea	2	Populus tremuloides*	1
Salix exigua	5	Scirpus microcarpus	0
Sparganium eurycarpum	1	Tanacetum vulgare	1
Typha latifolia	2	Veronica peregrina	0

Comments:

Characterized by woody overstory at onsite source of Story Ditch.

Community # 10 **Community Type:** Salix lasiandra / **Acres** 0.33

Species	Cover class	Species	Cover class
Bromus inermis	3	Cicuta douglasii	3
Heracleum lanatum	1	Phalaris arundinacea	3
Rosa woodsii	0	Salix bebbiana	1
Salix boothii	2	Salix exigua	2
Salix lasiandra	5	Urtica dioica	0

Comments:

Total Vegetation Community Acreage **14.81**

(Note: some area within the project bounds may be open water or other non-vegetative ground cover.)

VEGETATION TRANSECTS

Site: I-90 East Bozeman Date: 7/18/2011 8:54:01 AM

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

Interval Data:

Ending Station 32 **Community Type:** Carex spp. / Scirpus microcarpus

Species	Cover class	Species	Cover class
Carex nebrascensis	3	Cirsium arvense	2
Eleocharis palustris	1	Epilobium ciliatum	2
Glyceria grandis	3	Phalaris arundinacea	3
Rumex crispus	1	Scirpus microcarpus	4
Typha latifolia	1		

Ending Station 180 **Community Type:** Typha latifolia /

Species	Cover class	Species	Cover class
Alopecurus pratensis	1	Beckmannia syzigachne	2
Carduus nutans	0	Cirsium arvense	0
Deschampsia cespitosa	1	Eleocharis palustris	2
Epilobium ciliatum	0	Glyceria grandis	1
Hordeum brachyantherum	1	Rumex crispus	0
Typha latifolia	5		

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

Species	Cover class	Species	Cover class
Alopecurus pratensis	2	Bromus inermis	2
Deschampsia cespitosa	0	Hordeum brachyantherum	1
Poa pratensis	1	Tanacetum vulgare	1
Taraxacum officinale	1	Thlaspi arvense	0

Ending Station 403 **Community Type:** Typha latifolia /

Species	Cover class	Species	Cover class
Beckmannia syzigachne	1	Carex aquatilis	1
Deschampsia cespitosa	1	Eleocharis palustris	2
Epilobium ciliatum	0	Glyceria grandis	1
Hordeum brachyantherum	0	Juncus balticus	0
Trifolium hybridum	0	Typha latifolia	5

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

Species	Cover class	Species	Cover class
Agrostis alba	1	Beckmannia syzigachne	0
Carex aquatilis	2	Carex nebrascensis	3
Carex utriculata*	3	Cirsium arvense	3
Epilobium ciliatum	1	Geum macrophyllum	0
Juncus balticus	1	Polygonum persicaria	3
Typha latifolia	1		

Transect Notes:

PLANTED WOODY VEGETATION SURVIVAL

I-90 East Bozeman

Planting Type	#Planted	#Alive	Notes
Amelanchier alnifolia		3	
Crataegus douglasii.	50		Not all individuals planted noted.
Eleagnus communtata	200	6	Not all individuals planted noted.
Populus sp.	200		Not all individuals planted noted.
Populus tremuloides		9	3 dead
Salix spp.			4 dead
Shepherdia canadensis	100	1	Not all individuals planted noted.
Symphoricarpus alba		1	

Comments

All of the plantings were distributed and installed along the edges of the various wetland cells. Between 50-75 willow cuttings were placed at the downstream end of the stream connection to the Story Ditch and at the upstream end at its connection with the culvert under East Main Street. Supplemental plantings of red-osier dogwood (50) and peach-leafed willows (50) were installed in November along the stream channel and the southern edges of the two cells adjacent to the north stream bank.

WILDLIFE

Birds

Were man-made nesting structures installed? Yes

If yes, type of structure: 4 wood duck boxes, 4 bluebird boxes

How many? 8

Are the nesting structures being used? Yes

Do the nesting structures need repairs? No

Nesting Structure Comments:
Song sparrow was occupying bluebird box.

Species	#Observed	Behavior	Habitat
Barn Swallow	1	F, FO, L, N	MF, OW, SS, UP, WM
Canada Goose	12	F, L, N	MA, MF, OW, SS
Killdeer	3	F, L	MA, MF, OW
Mallard	1	F, FO	MA, OW
Red-winged Blackbird	1	FO	MA, OW, SS
Song Sparrow	3	N	MA, SS
Yellow-headed Blackbird	4	F, L, N	MA, SS, WM

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
Deer sp.		Yes	No	No	
Frog spp	2	No	No	No	
Raccoon		Yes	No	No	

Wildlife Comments:

Very hot (97 deg F) during the field investigation likely limiting wildlife use during daytime hours.

I-90 East Bozeman

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
1111-1114	45.677662	-111.01561	0	PP-1, 0-100
1116-1120	45.678104	-111.012634	200	PP-4, 200-340
1122			310	XS 2 looking upstream
1126			150	XS 2 looking downstream
1128			350	XS 1 looking downstream
1132			150	XS 1 looking upstream
1133-1137			290	PP 5, 290-340
1140			170	PP 3 looking downstream
1141			350	PP 2 looking upstream
1142			10	T-1 start
1143			0	BZN-1
1144			290	BZN-2
1145			290	BZN-3
1146			100	PP-6
1151			315	BZN-4
1280			220	T-1 end

Comments:

I-90 East Bozeman

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

4 data points, BZN-1 to BZN-4

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? No

If yes, are the structures in need of repair?

If yes, describe the problems below.

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

Project/Site: I-90 East Bozeman | City/County: Gallatin | Sampling Date: 7/19/2011

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

Investigator(s): B. Vaughn, L. Soderquist | Section, Township, Range: S 8 T 2S R 6E

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

Subregion (LRR): LRR E | Lat: | Long: | 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:
Data point 2 feet from edge of constructed wetland cell. Community 6 is an existing wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5 feet radius)			
1. Typha latifolia	5	☐	OBL
2. Polygonum persicaria	20	☑	FACW
3. Alopecurus pratensis	15	☑	FACW
4. Eleocharis palustris	15	☑	OBL
5. Epilobium ciliatum	1	☐	FACW-
6. Glyceria grandis	15	☑	OBL
7. Deschampsia cespitosa	5	☐	FACW
8. Beckmannia syzigachne	2	☐	OBL
9. Cirsium arvense	1	☐	FACU+
10. Carex aquatilis	10	☐	OBL
11. Carex nebrascensis	15	☑	OBL
	104 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	15	☐	
2.	0	☐	
	15 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 5 (B)

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	45	x 1 =	45
FACW species	35	x 2 =	70
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		115 (B)

Prevalence Index = B/A = 1.4

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:
Community 4/8 boundary.

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
0-11	10YR 2/1	100		0			Silty Clay Loam	
11-14	10YR 3/1	70	10YR 4/4	30	C	M	Silty 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): 12

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks:

No other hydrology indicators.

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

Project/Site: I-90 East Bozeman | City/County: Gallatin | Sampling Date: 7/19/2011

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

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

Landform (hillslope, terrace, etc.): Toeslope | Local relief (concave, convex, none): concave | Slope (%): 5

Subregion (LRR): LRR E | Lat: | Long: | 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:
Constructed wetland cell. Hydric soil indicators present although recently excavated (2 years ago).

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. Epilobium ciliatum	20	☑	FACW-
2. Phleum pratense	5	☐	FACU
3. Beckmannia syzigachne	20	☑	OBL
4. Polygonum persicaria	15	☑	FACW
5. Deschampsia cespitosa	15	☑	FACW
6. Juncus balticus	10	☐	OBL
7. Juncus tenuis	5	☐	FAC
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	90 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
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:	70 (A)		120 (B)

Prevalence Index = B/A = 1.7

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:
Veg Comm 4

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
0-7	10YR 3/1	95	10YR 3/4	5	C	M	Silt Loam	
7-13	10YR 3/1	70	10YR 4/4	30	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:

Clay percentage increases with depth.

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): 11

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 9

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks:

2" in elevation above inundation level of constructed cell.

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

Project/Site: I-90 East Bozeman | City/County: Gallatin | Sampling Date: 7/19/2011

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

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

Landform (hillslope, terrace, etc.): Flat | Local relief (concave, convex, none): concave | Slope (%): 5

Subregion (LRR): LRR E | Lat: | Long: | 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:
Within the side slopes of the constructed cell. Transitioning from Comm 3 to 4. Wetland cell constructed 2 years ago. Hydric soil indicators already developed although cell was recently constructed.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. Thlaspi arvense	20	☑	NL
2. Polygonum persicaria	15	☑	FACW
3. Tanacetum vulgare	10	☑	NL
4. Phleum pratense	10	☑	FACU
5. Alopecurus pratensis	10	☑	FACW
6. Bromus inermis	5	☐	NL
7. Agopyron smithii	5	☐	FACU
8. Melilotus officinalis	5	☐	FACU
9.	0	☐	
10.	0	☐	
11.	0	☐	
	80 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	30	x 5 =	150
Column Totals:	65 (A)		240 (B)

Prevalence Index = B/A = 3.7

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:
Comm 3 transitioning to 4. Thlapsi and Tanacetum considered UPL

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
0-6	10YR 3/3	100					Silt Loam	
6-14	10YR 3/2	95	10YR 4/4	5	C	M	Silty 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:

Dry test pit. Surface soil cracks only primary indicator.

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

Project/Site: I-90 East Bozeman | City/County: Gallatin | Sampling Date: 7/19/2011

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

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

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

Subregion (LRR): LRR E | Lat: | Long: | 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:
Sediment bar in reconstructed channel (<2 years since construction). Comm 5. No hydric soil indicators have developed in soil profile (problematic). Soil profile fully saturated. High clay content.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5 feet radius)			
1. Typha latifolia	40	☑	OBL
2. Eleocharis palustris	25	☑	OBL
3. Poa palustris	15	☑	FAC
4. Agrostis alba	15	☑	FACW
5. Glyceria grandis	10	☐	OBL
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	105 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	65	x 1 =	65
FACW species	15	x 2 =	30
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	95 (A)		140 (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:

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
0-5	10YR 3/2	100					Silty Clay Loam	
5-16	10YR 3/1	100					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:

Low chroma matrix although no redox features. Recently developed soil (problematic). Fully saturated to surface. High clay content.

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): 1

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 1

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks:

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name I-90 East Bozeman **2. MDT project#** STPX-0016(057) **Control#**

3. Evaluation Date 7/18/2011 **4. Evaluators** B.Vaughn **5. Wetland/Site# (s)** I-90 East Bozeman, Pre-Existing

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

Approx Stationing or Mileposts

Watershed 10020008 **Watershed/County** Upper Missouri Watershed/Gallatin County

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 a pre-existing overstory associated with Story Ditch and tributary and well-vegetated wetlands (wet meadows) created 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 4.85 acres of wetland identified prior to 2009 construction and downgradient end of channel. No recent disturbance has occurred to AA. AA managed in conservation easement. Surrounding landuse includes highway interchange, East Main Street, and railroad 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: shrub-scrub and emergent classes

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 not listed by Township and Range on FWP database.

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 MTNHP listed for this Township and Range.

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 Moderate disturbance, P/P regime, uneven veg classes and moderate use of animals including seven bird species, deer, and raccoon during the site visit.

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

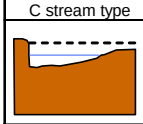
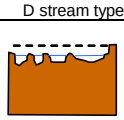
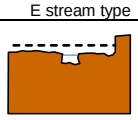
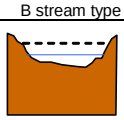
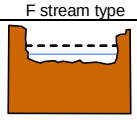
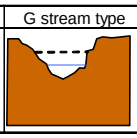
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ( ) **Y** (●) **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

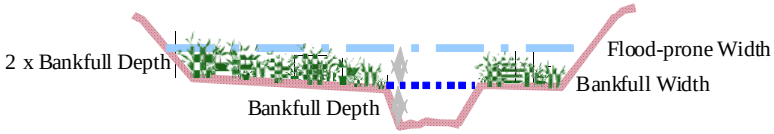
iii. Final Score and Rating: .4 M **Comments:** Culvert Inlet and Outlet at upgradient and downgradient ends. The existing stream channel exhibits a well-developed vegetation cover including small willows.

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** 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: Culverted railroad and highway crossings located downstream. Subject to overflow from channel. Approx. 30% of site forested and scrub/shrub.

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: Assumes approx. 3.51 A of wetland inundated to a depth of 1.0 foot.

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	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments: Existing stream and adjacent wetlands flooded in 2011.

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: Streambank vegetated with Baltic rush, beaked sedge, creeping spikerush, Nebraska sedge, water sedge, mannagrass, Bebb willow, and sandbar willow.

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	.9	.6M	.7H	.4	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8	.5M	.6M	.3	.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: Mod ratings for fish and wildlife bio activity. Surface outlet provided by channel. P/P regime.

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: Site saturated to surface during 2011 site visit.

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:

Limited access to site resulting from roads/highways. Bird watching and MSU students (design team).

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): I-90 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	.7	1	2.457	☐
F. Short and Long Term Surface Water Storage	H	.8	1	2.808	☑
G. Sediment/Nutrient/Toxicant Removal	H	1	1	3.51	☑
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:		7.3	11	25.623	
Percent of Possible Score			**66.36** %		

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

I	II	III	IV

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name I-90 East Bozeman **2. MDT project#** STPX-0016(057) **Control#**

3. Evaluation Date 7/18/2011 **4. Evaluators** B. Vaughn **5. Wetland/Site# (s)** I-90 East BZN-Creation

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

Approx Stationing or Mileposts

Watershed 10020008 **Watershed/County** Upper Missouri Watershed/Gallatin County

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 5.63

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 5.63

☐ **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	21
Depressional	Emergent Wetland	Excavated	Permanent/Perennial	79

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)

Site currently managed in a natural state although show signs of construction within the last 2 years. Bare areas on wetland cell perimeter. Site access currently restricted and protected by easement. Surrounded by commercial real estate and highway.

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

Canada thistle, musk thistle (isolated plants), and common tansy.

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

A new 885 foot stream channel and four wetland depressions were constructed two years ago. The mitigation wetland is surrounded by I-90, East Main, a railroad corridor, and commercial buildings. Cover of Canada thistle across the site increased notably in 2011.

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: Emergent vegetation class

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 not listed on 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 (S3)

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 Listed on MTNHP list for this Township and Range. Suitable habitat is present onsite.

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 Moderate wildlife use during 2011 site visit by seven bird species, deer, and raccoon. Temperatures were greater than 95 deg. F during visit.

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** .2L

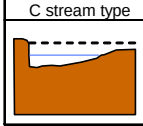
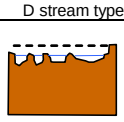
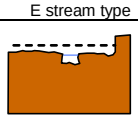
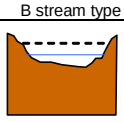
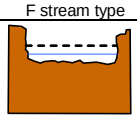
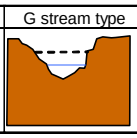
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ( ) **Y** (●) **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

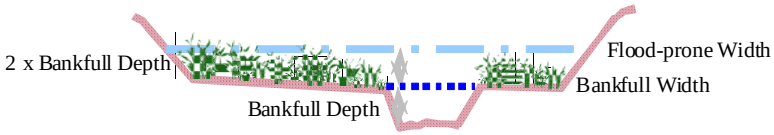
iii. Final Score and Rating: .2 L **Comments:** Culvert at upgradient and downgradient ends of stream channel. Newly constructed channel. Vegetation not well-developed.

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: Culvert at upgradient and downgradient ends of stream channel. No outlet on depression cells. Subject to overflow from channel. Less than 25% forested or scrub/shrub cover.

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: Constructed cells and existing wetland subject to flooding and ponding from in-channel flow, precip, upland surface flow, and groundwater flow. Assumes 3.51 A flooded to 1.5 ft depth. Flooded in 2011 and 2010.

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	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments: No outlet in cells. Greater than 70% cover and evidence of ponding in 2011.

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: Stability based on dominance of meadow foxtail, American mannagrass, and creeping spikerush on constructed channel.

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	.9	.6M	.7H	.4	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8	.5M	.6M	.3	.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** .9H

Comments: Mod bio activity. Moderate structural diversity and P/P regime. Surface outlet via overland flow to channel.

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: Site saturated to surface during site visit. Vegetation growing in early Sept. Wetland occurs at toe of slope.

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:

Limited access resulting from proximity to freeway and roads. MSU uses for education and scientific study.

General Site Notes

Constructed wetland cells and stream. Vegetation cover increased notably from 2010 to 2011. Water levels high in 2011 partially the result of high spring precipitation and surface water groundwater levels. Herbaceous plant diversity increased notably in 2011.

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): I-90 East BZN-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	2.815	☐
C. General Wildlife Habitat	M	.7	1	3.941	☐
D. General Fish Habitat	L	.2	1	1.126	☐
E. Flood Attenuation	M	.5	1	2.815	☐
F. Short and Long Term Surface Water Storage	H	1	1	5.63	☑
G. Sediment/Nutrient/Toxicant Removal	H	1	1	5.63	☑
H. Sediment/Shoreline Stabilization	M	.7	1	3.941	☐
I. Production Export/Food Chain Support	H	.9	1	5.067	☑
J. Groundwater Discharge/Recharge	H	1	1	5.63	☑
K. Uniqueness	L	.3	1	1.689	☐
L. Recreation/Education Potential (bonus points)	M	.1	NA	0.563	☐
Totals:		6.9	11	38.847	
Percent of Possible Score			**62.73** %		

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

I	II	III	IV

Appendix C

Project Area Photographs

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

Photo Point 1:
Bearing: 0-100 Degrees

Location: "Welcome to Bozeman" sign
Taken in 2010

Photo Point 1: –
Bearing: 0-100 Degrees

Location: "Welcome to Bozeman" sign
Taken in 2011

Photo Point 2:
Bearing: 350

Location: Upstream of Story Ditch
Taken in 2010

Photo Point 2:
Bearing: 350

Location: Upstream of Story Ditch
Taken in 2011

Photo Point 3:
Bearing: 170

Location: Upstream of Story Ditch
Taken in 2010

Photo Point 3:
Bearing: 170

Location: Upstream of Story Ditch
Taken in 2011

Photo Point 4:
Bearing: 200-340 Degrees

Location: Looking west from east boundary.
Taken in 2010

Photo Point 4:
Bearing: 200-340 Degrees

Location: Looking west from east boundary.
Taken in 2011

Photo Point 5:
Bearing: 290-40 Degrees

Location: SE corner looking north.
Taken in 2010

Photo Point 5:
Bearing: 290-40 Degrees

Location: SE corner looking north.
Taken in 2011

Photo Point 6:
Bearing: 350 Degrees

Location: S of New Channel
Taken in 2011

Transect 1 – *Start*
Bearing: 10 Degrees

Location: Veg Com 6
Taken in 2010

Transect 1 – *Start*
Bearing: 10 Degrees

Location: Veg Com 6
Taken in 2011

Transect 1 – *End*
Bearing: 220 Degrees

Location: Veg Com 8
Taken in 2010

Transect 1 – *End*
Bearing: 220 Degrees

Location: Veg Com 8
Taken in 2011

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

Location: XS-1 looking downstream
Taken in 2010

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

Location: XS-1 looking downstream
Taken in 2011

Cross Section 1 – *Photo 2*
Bearing: 150 Degrees

Location: XS-1 looking upstream
Taken in 2010

Cross Section 1 – *Photo 2*
Bearing: 150 Degrees

Location: XS-1 looking upstream
Taken in 2011

Cross Section 2 – *Photo 1*
Bearing: 310 Degrees

Location: XS-2 looking upstream
Taken in 2010

Cross Section 2 – *Photo 1*
Bearing: 310 Degrees

Location: XS-2 looking upstream
Taken in 2011

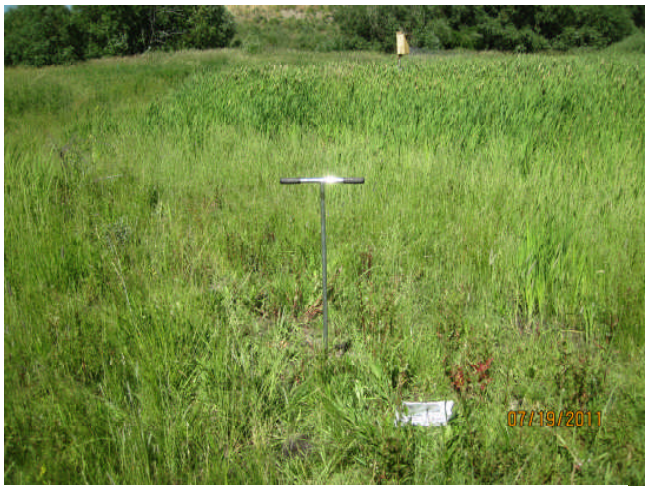
Cross Section 2 – *Photo 2*
Bearing: 150 Degrees

Location: XS-2 looking downstream
Taken in 2010

Cross Section 2 – *Photo 2*
Bearing: 150 Degrees

Location: XS-2 looking downstream
Taken in 2011

BZ 1 – *Photo 1*
Bearing: 0 degrees
Location: Veg Com 8
Taken in 2011



BZ 2 – *Photo 1*
Bearing: 290 degrees
Location: Veg Com 4
Taken in 2011

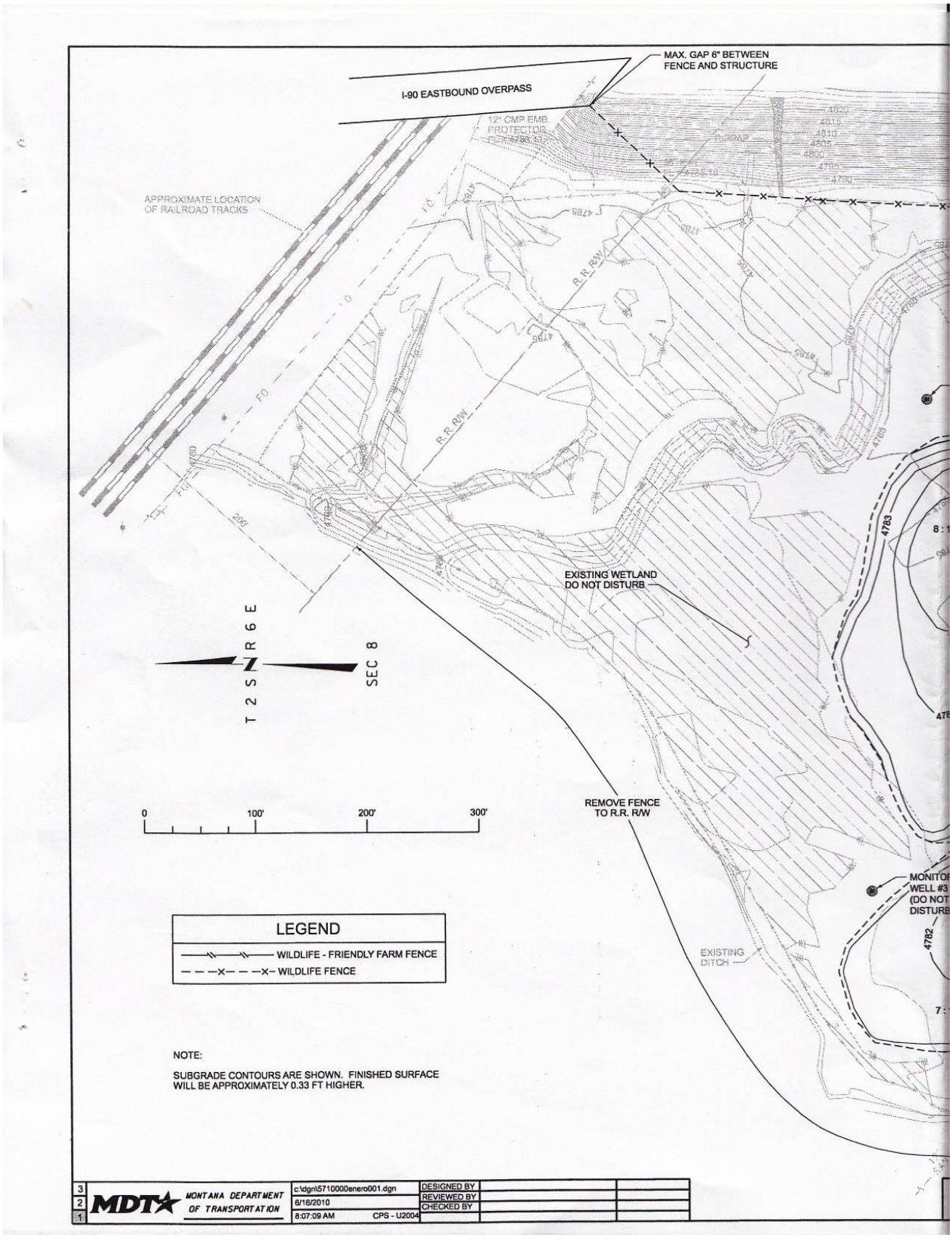
BZ 3 – *Photo 1*
Bearing: 290 degrees
Location: Veg Com 3
Taken in 2011

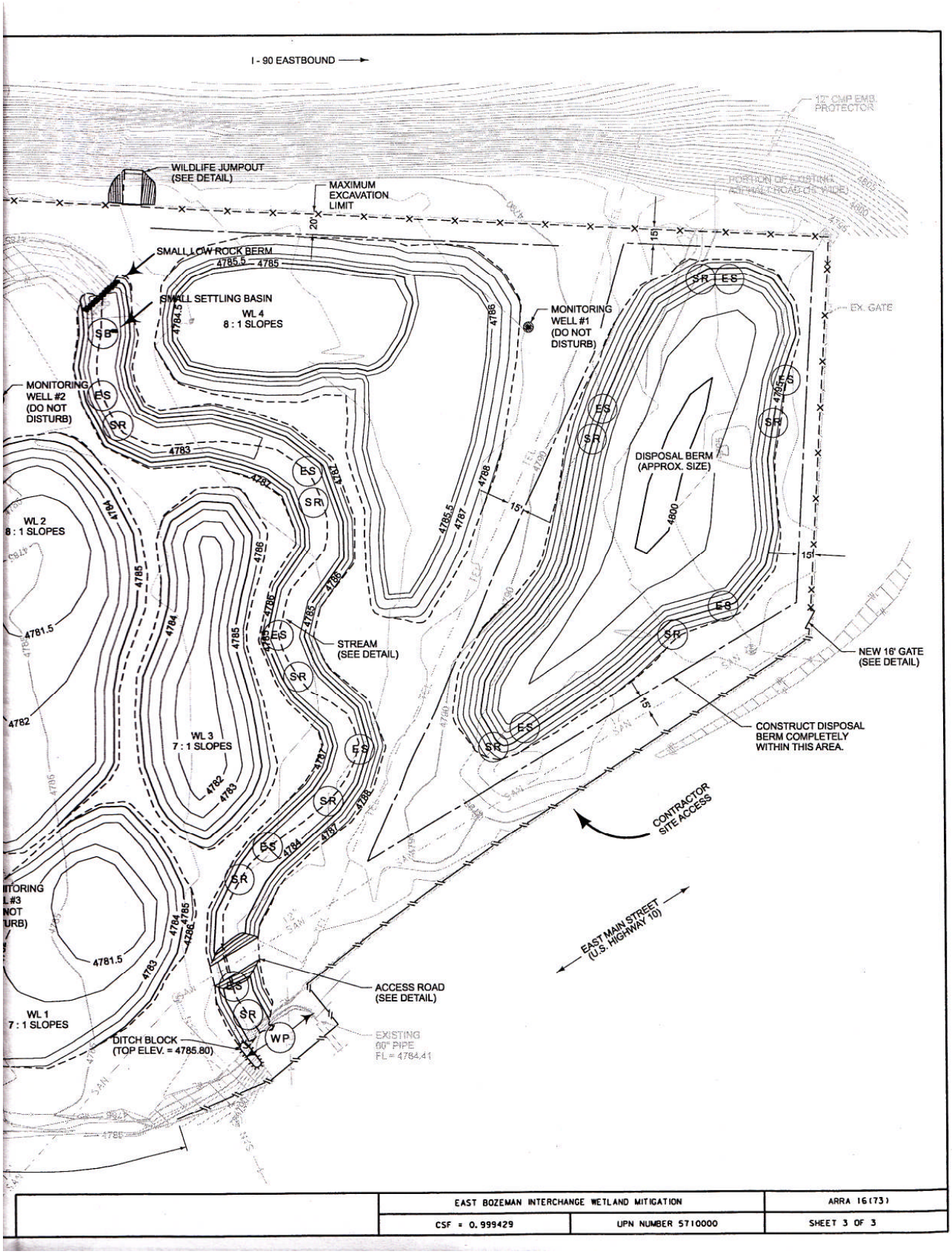
BZ 4 – *Photo 1*
Bearing: 315 degrees
Location: Veg Com 5
Taken in 2011

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)
DISPOSAL BERM (APPROX. SIZE)
EX. GATE
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