MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2012

I-90 East Bozeman
Gallatin County, Montana

Prepared for:

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December 2012

MONTANA DEPARTMENT OF TRANSPORTATION

WETLAND MITIGATION MONITORING REPORT:

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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 2012 Wetland Mitigation Monitoring Report presents the results of the third 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 mitigation site lies within the boundaries of Watershed 6, the Upper Missouri River Basin.

The wetland and 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 (US Army Corps of Engineers [USACE] Permit Number NWO-2007-3408-MTH). Five years of monitoring are required unless the success criteria are met and recognized by the 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 at the mitigation site, 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 (Berglund and McEldowney 2008). Appendix C contains photographs of the project area and Appendix D includes the project plan sheet.

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 as a result of a partial channel reconstruction in 1999 that facilitated the flow of surface water across the site. The existing Story Ditch conveys water along the west and north boundaries of the MDT property. The Story Ditch was dug historically for agricultural purposes and was incised with little to no fisheries habitat. An unnamed perennial creek discharges from the culvert outlet that crosses under East Main Street to the site at the southwest boundary. The stream exits the property at the northwest boundary, where it converges with the Story Ditch. The unnamed creek conveys spring flows from the foothills south of the site, runoff from ephemeral drainages southwest of the site, and stormwater runoff from residential and commercial developments located west and south of the site. The Story Ditch flows under the Montana Rail Line railroad and I-90 into Rocky Creek, ultimately draining to the East Fork of the Gallatin River.

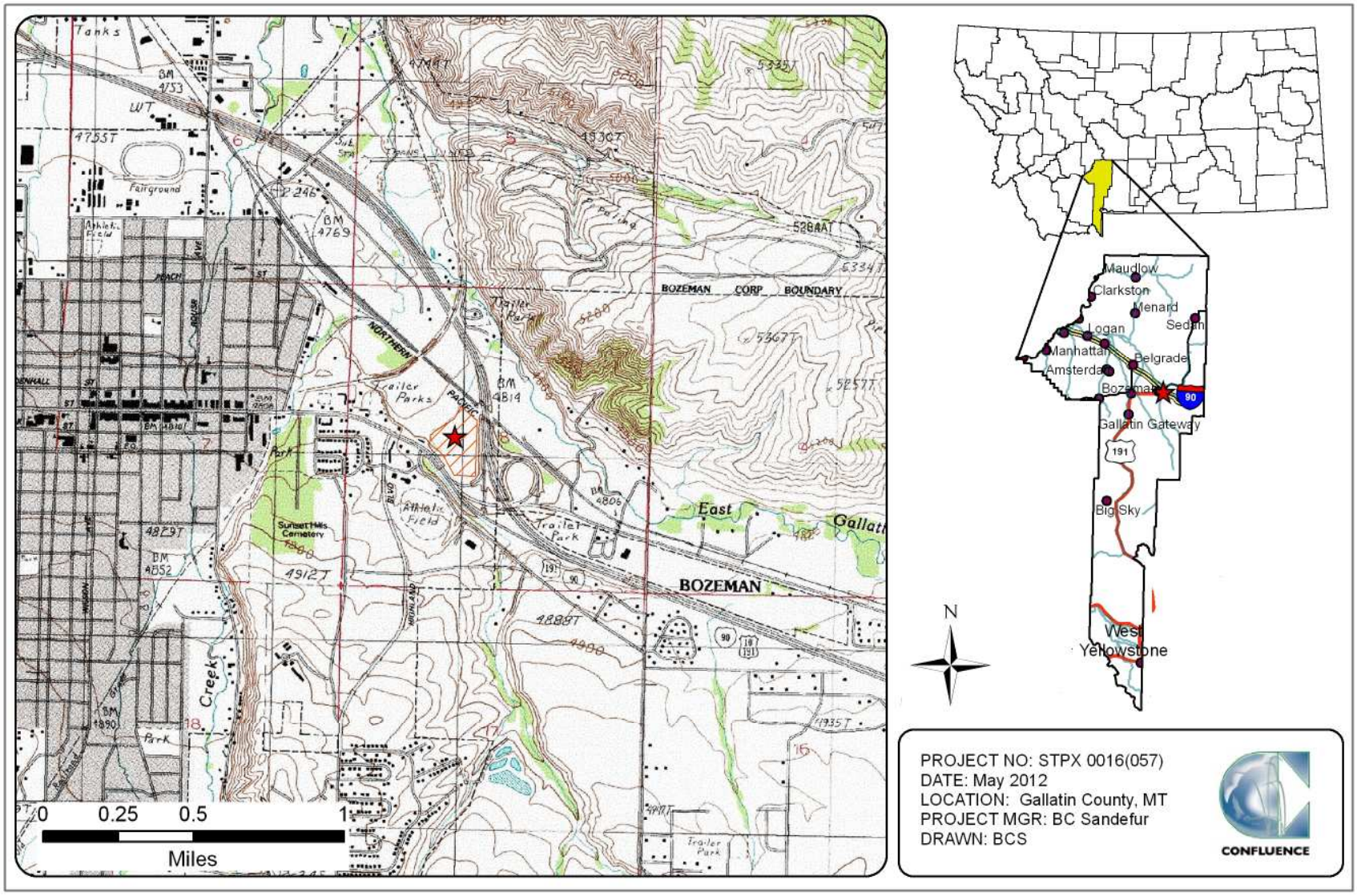

Figure 1. Project location I-90 East Bozeman Wetland Mitigation Site.

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 9.78 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 goal of the project is to increase the amount of wetlands within the site and restore the area to some semblance of the historic condition, which was 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 [Natural Resource Conservation Service] 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), Northwest Territory 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 **9.61** acres of emergent and scrub/shrub wetlands within the project site. (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 third year of monitoring was completed on August 9, 2012. Information for the Mitigation Monitoring Form and the Wetland Determination Data Forms were entered electronically on a palmtop computer during the field investigation (Appendix B). Monitoring activity locations were mapped 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 12.5 percent or more 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) located less than four miles from the mitigation site 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.

Hydrologic indicators as outlined on the USACE wetland determination data form were documented at three data points (BZN-1 to BZN-3) 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 locations of three onsite groundwater monitoring wells are shown on Figure 2 (Appendix A). Water levels were measured with a Solinst water level meter. The water surface elevation was recorded 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 Determination 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). Community types were named based on the predominant vegetation species that characterized each mapped polygon (Figure 3, Appendix A). The percent cover of plant species within a community type was estimated and recorded using the following categories: 0 (less than 1 percent), 1 (1 to 5 percent), 2 (6 to 10 percent), 3 (11 to 20 percent), 4 (21 to 50 percent), and 5 (greater than 50 percent) (Appendix B).

Temporal changes in vegetation were evaluated through annual assessments of a 10 feet wide and 544 feet long static belt transect established in August 2010 (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 used for the community polygon data (Figure 3, Appendix A). A cumulative plant species list was developed in 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.

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 presented 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 NRCS. Soil cores were excavated using a hand auger and evaluated according to procedures outlined in the USACE 1987 manual and 2010 Regional Supplement. A description of the soil profile, including hydric indicators when present, was recorded on the Wetland Determination Data Form for each profile (Appendix B).

2.4. Wetland Delineation

Waters of the US including jurisdictional wetlands and special aquatic sites were delineated throughout the project area in accordance with criteria established in the 1987 USACE wetland manual and the 2010 Regional Supplement. In order to delineate a representative area as wetland, the technical criteria for hydrophytic vegetation, hydric soil, and wetland hydrology, as described in the 1987 Manual and the 2010 Regional Supplement, must be satisfied. The name and indicator status of plant species was derived from the Draft 2012 National Wetland Plant List (NWPL) (Lichvar and Kartesz. 2009). Previous years' reports used the 1988 National List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1988). The 2012 NWPL scientific plant names were used in this report. Many common names used in the 2012 NWPL appear incomplete or erroneous. When used in this report, 2012 NWPL common names that appear to be incomplete or erroneous are provided with parenthetical clarification. For example, the common given name for the plant *Agrostis exarata* in the 2012 NWPL is "spiked bent". As this is likely an error, this species' common name would be reported here as "spiked bent (grass)". The Routine Level-2 On-site Determination Method (Environmental Laboratory 1987) was used to delineate jurisdictional areas within the project boundaries. The information was recorded on the Wetland Determination 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 hydrologic indicators based on the guidance in the 2010 Regional Supplement. The wetland boundary was defined on 2012 aerial photographs of the site. Wetland acreages were estimated using geographic information system (GIS) methods.

2.5. Wildlife

Observations 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 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, referred to as Assessment Areas (AA) (Appendix B).

2.7. Photo Documentation

Monitoring at photo points provided supplemental information documenting wetland conditions, trends, current land uses on the adjacent property, upland conditions, and vegetation transects. Photographs were taken at established photo points 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 2012 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 presented in Montana State Plane Single Zone NAD 83 meters. Site features and survey points that were located with GPS included fence boundaries, photograph points, transect endpoints, and wetland data points.

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 annual precipitation rate of 18.6 inches from April 1892 to December 2011 (WRCC 2012). The annual precipitation total for 2010 was 23.86 inches, or 5.35 inches above the 118-year average. The 2011 annual precipitation total was 17.08 inches, or 1.52 inches below the long-term average. The long-term monthly precipitation average from January to August is 13.23 inches. Total precipitation for the same January to August period was 17.18 inches (2010), 12.78 (2011), and 11.28 inches (2012).

Groundwater levels were measured in monitoring wells MW-1, MW-2, and MW-3 (Figure 2, Appendix A). Well MW-1 is located in an 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 is located on the north edge of the westernmost cell. Groundwater levels were 3.75 feet below the ground surface (bgs) in MW-1, 1.50 feet bgs in MW-2, and 1.92 feet bgs in MW-3. Groundwater elevations in the monitored wells were 0.4 feet lower in well MW-1 and 0.1 foot lower in MW-2 in 2012 as compared to 2011. The elevation in MW-3 was 0.33 feet higher in 2012 compared with 2011 field observations. The 2011 monitoring event was conducted on July 18, while the 2012 monitoring event occurred on August 9. The difference between water surface elevations between 2011 and 2012 may suggest varying degrees of surface water/groundwater inputs through the growing season.

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

Water Surface Depth (feet)			
	Data Collection Date		
Well ID	07/2010	07/2011	08/2012
MW-1	2.06	3.35	3.75
MW-2	1.77	1.40	1.50
MW-3	1.44	2.25	1.92

Surface water depths in the pre-existing stream ranged from 0.5 to 1.5 feet during the 2012 field survey. The water depth in the constructed stream ranged from 0.4 to 0.7 feet. Inundation levels were lower in the constructed cells in August 2012 compared to field observations during July 2011 which documented inundation levels between 0.1 and 2.0 feet. The water depth in the lowest contour of the cells ranged from 0.1 foot to 0.5 feet in 2012. Approximately 15 percent of the mitigation area was inundated. Areas delineated as wetlands that were not inundated exhibited signs of saturation to the ground surface or within 12 inches of the ground surface. Additional hydrological indicators observed onsite were surface soil cracks, salt crust, algal mat, sparsely vegetated concave surface, FAC-neutral test, drift deposits, water marks, and drainage patterns.

Three data points, BZN-1 through BZN -3, were assessed to refine the upland and wetland boundaries in 2012 (Wetland Determination 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-10 of Appendix C. All three data points were located within areas that met the wetland hydrology criteria. Algal mats and surface soil cracks were positive indicators of wetland hydrology at Bzn-1, located within Wetland Community Type 8. Positive hydrology indicators present at Bzn-2, located on the edge of the constructed stream, were drift deposits and surface soil cracks. Surface soil cracks and a sparsely vegetated concave surface were observed at Bzn-3, located on the perimeter of a constructed cell.

3.2. Channel Cross-Sections

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 are surveyed annually. The cross-section survey data collected from 2010 to 2012 are presented on Charts 1 and 2. Photographs of the cross-sections are shown on pages C-6 through C-9 of Appendix C. Cross-section 1 showed approximately two inches of accumulation of streambed material on the right side of the channel bottom. The channel remained stable and did not move laterally from 2010 to 2012. Cross-section 2 exhibited a slight narrowing of the channel width with aggradation (accumulation of material) on the left and right edges of the channel bottom. The thalweg of the channel shifted from the left bank to near the center of the channel cross-section in 2012.

The cover of plant species with high stability ratings such as sedge, rush, bulrush, and spikerush (Wetland community type 12) increased on the constructed channel streambanks in 2012. The percent cover on the banks increased from approximately 70 percent in 2011 to 90 percent in 2012. Surface water levels showed a decrease of approximately 0.2 foot at Cross-section 1 and 0.3 foot at Cross-Section 2 from 2011 to 2012. The average width of the constructed creek channel downgradient of the culvert outlet is greater than the 2 to 3 feet stipulated in the design. The width of the creek at cross-section 2 is approximately 25 feet.

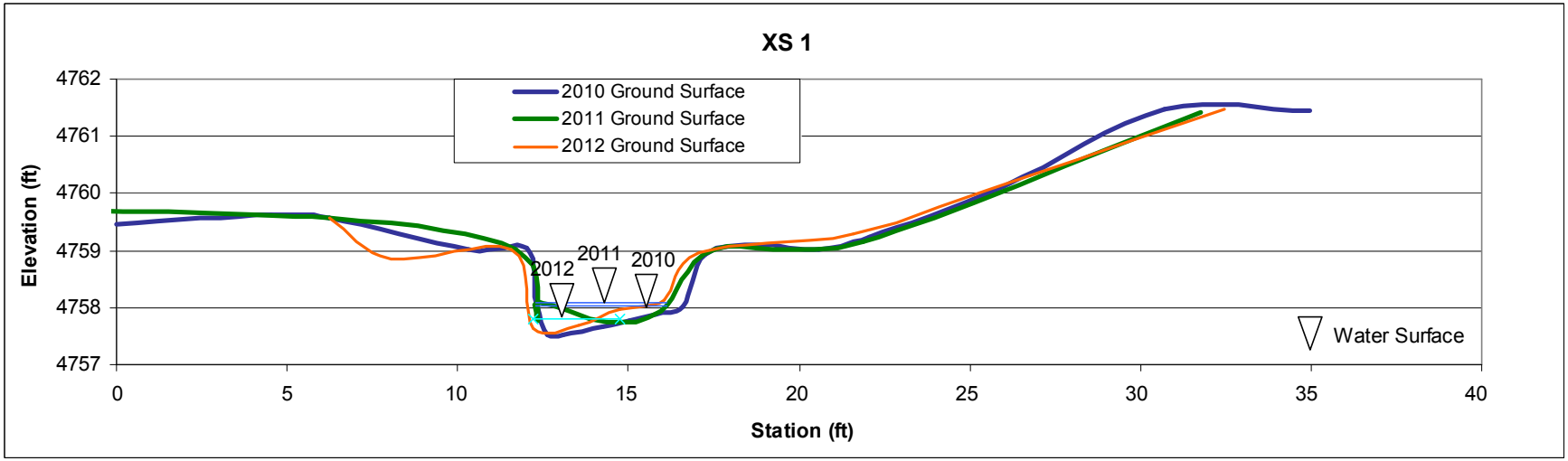

Chart 1. Survey data collected at cross-section 1 from 2010 to 2012.

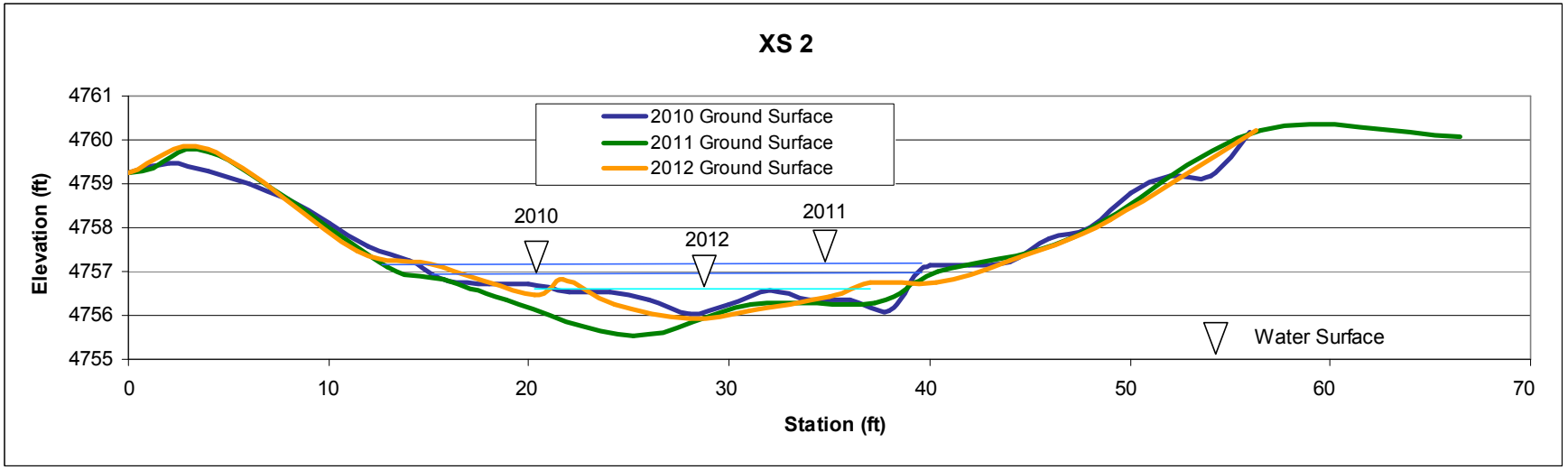

Chart 2. Survey data collected at cross-section 2 from 2010 to 2012.

3.3. Vegetation

A comprehensive list of 100 vegetation species identified at the East Bozeman I-90 mitigation site is presented on Table 2 and on the Mitigation Monitoring Forms (Appendix A). Eight vegetation community types, seven wetland and one upland, were identified on August 9, 2012 (Figure 3, Appendix A). The open water below the ordinary high water mark (OHWM) of the constructed and original channel was defined as a Water of the US and mapped as polygon 11 (Figure 3, Appendix A). Common duckweed (*Lemna minor*), brown algae, and unidentified submerged aquatic plants were present in the slower-moving, widened sections of the channel. Community types are identified and their dominant species are listed in descending order of abundance for each vegetation community type below.

Upland community Type 2 – *Bromus inermis* (smooth brome) was located on 5.13 acres 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. Smooth brome dominated the cover with lesser amounts of western-wheatgrass *(Pascopyrum smithii*, called *Agropyron smithii* on 1988 list), Kentucky bluegrass (*Poa pratensis*), and eighteen other species.

Wetland community Type 4 – *Typha latifolia* (broad-leaf cattail) was observed within the lowest contour and slopes of the constructed wetland cells. Upland community Type 3 characterized the slopes of the cells in 2011. The amount of bare ground decreased and the percent cover and diversity of hydrophytic species increased in 2012. This community increased from 3.39 acres in 2011 to 3.89 acres in 2012, an increase of 0.5 acres. Broad-leaf cattail dominated the vegetation cover. The secondary species included common spikerush (*Eleocharis palustris*), American sloughgrass (*Beckmannia syzigachne*), American mannagrass (*Glyceria grandis*), lesser poverty rush (*Juncus tenuis*), lamp rush (*Juncus effusus*), and common duckweed. Less inundation was observed within the wetland cells in 2012, possibly attributed to the lower precipitation recorded for the area and completing the field survey later in the growing season. The lowest contour of the cells contained 1 to 6 inches of water during the 2012 investigation.

Wetland Type 6 – *Carex spp./Scirpus microcarpus* (red-tinge bulrush) characterized 2.82 acres of wetland located in the north half of the site that developed between 2000 and 2009. Red-tinge bulrush, Northwest Territory sedge (*Carex utriculata*), Nebraska sedge (*Carex nebrascensis*), reed canary grass (*Phalaris arundinacea*), water smartweed (*Persicaria amphibia*, called *Polygonum amphibium* on 1988 list), and broad-leaf cattail dominated the vegetation species. The area of the community at the start of Transect 1 was inundated with 2 to 4 inches of water. The remainder of Community 6 was not inundated in August 2012.

Table 2. Vegetation species observed from 2010 to 2012 at the I-90 East Bozeman Wetland Mitigation Site.

Scientific Names	Common Names	WMVC Indicator Status[1]
Agrostis gigantea	Black Bent	FAC
Agrostis stolonifera	Spreading Bent	FAC
Alisma gramineum	Narrow-Leaf Water-Plantain	OBL
Alopecurus pratensis	Field Meadow-Foxtail	FAC
Amelanchier alnifolia	Saskatoon Service-Berry	FACU
Beckmannia syzigachne	American Slough Grass	OBL
Bromus inermis	Smooth Brome	FAC
Carduus nutans	Nodding Plumeless Thistle	UPL
Carex aquatilis	Leafy Tussock Sedge	OBL
Carex hystericina	**Porcupine Sedge**	**OBL**
Carex nebrascensis	Nebraska Sedge	OBL
Carex rostrata	Swollen Beaked Sedge	OBL
Carex stipata	Stalk-Grain Sedge	OBL
Carex utriculata	Northwest Territory Sedge	OBL
Chamerion angustifolium	Narrow-Leaf Fireweed	FACU
Chenopodium leptophyllum	Narrow-Leaf Goosefoot	FACU
Cicuta douglasii	Western Water-Hemlock	OBL
Cirsium arvense	Canadian Thistle	FAC
Cirsium vulgare	Bull Thistle	FACU
Cleome serrulata	**Rocky Mountain Beeplant**	**FACU**
Conium maculatum	Poison-Hemlock	FAC
Cornus alba	Red Osier	FACW
Dactylis glomerata	Orchard Grass	FACU
Deschampsia cespitosa	Tufted Hairgrass	UPL
Elaeagnus commutata	American Silver-Berry	FAC
Eleocharis palustris	Common Spike-Rush	OBL
Elymus lanceolatus	**Streamside Wild Rye**	**FACU**
Elymus repens	Creeping Wild Rye	FAC
Elymus trachycaulus	Slender Wild Rye	FAC
Epilobium ciliatum	Fringed Willowherb	FACW
Equisetum arvense	Field Horsetail	FAC
Erigeron formosissimus	Beautiful Fleabane	UPL
Festuca arundinacea	**Tall fescue**	**FAC**
Festuca pratensis	Meadow Fescue	FACU
Geum macrophyllum	Large-Leaf Avens	FAC
Glyceria grandis	American Manna Grass	OBL
Helianthus annuus	Common Sunflower	FACU
Heracleum maximum	American Cow-Parsnip	FAC
Hordeum brachyantherum	Meadow Barley	FACW
Hordeum jubatum	**Fox-Tail Barley**	**FAC**
Juncus arcticus	Arctic Rush	FACW
Juncus articulatus	Joint-Leaf Rush	OBL

[1]Lichvar and Kartesz 2009
Species first observed in 2012 are bolded.

Table 2. (Continued). Vegetation species observed from 2010 to 2012 at the I-90 East Bozeman Wetland Mitigation Site.

Scientific Names	Common Names	WMVC Indicator Status[1]
Juncus bufonius	Toad Rush	FACW
Juncus effusus	**Lamp Rush**	**FACW**
Juncus ensifolius	Dagger-Leaf Rush	FACW
Juncus longistylis	**Long-Style Rush**	**FACW**
Juncus tenuis	Lesser Poverty Rush	FAC
Juncus torreyi	**Torrey's Rush**	**FACW**
Juncus tweedyi	**Tweedy's Rush**	**NL**
Lactuca serriola	Prickly Lettuce	FACU
Lemna minor	Common Duckweed	OBL
Medicago lupulina	Black Medick	FACU
Melilotus officinalis	Yellow Sweet-Clover	FACU
Mentha arvensis	American Wild Mint	FACW
Mimulus guttatus	Seep Monkey-Flower	OBL
Pascopyrum smithii	Western-Wheat Grass	FACU
Persicaria amphibia	Water Smartweed	OBL
Persicaria maculosa	Lady's-Thumb	FACW
Phalaris arundinacea	Reed Canary Grass	FACW
Phleum pratense	Common Timothy	FAC
Poa palustris	Fowl Blue Grass	FAC
Poa pratensis	Kentucky Blue Grass	FAC
Polypogon monspeliensis	**Annual Rabbit's-Foot Grass**	**FACW**
Populus tremuloides	Quaking Aspen	FACU
Ribes aureum	Golden Currant	FAC
Rosa woodsii	Woods' Rose	FACU
Rudbeckia occidentalis	Western Coneflower	FAC
Rumex crispus	Curly Dock	FAC
Rumex occidentalis	Western Dock	FACW
Salix bebbiana	Gray Willow	FACW
Salix boothii	Booth's Willow	FACW
Salix exigua	Narrow-Leaf Willow	FACW
Salix geyeriana	**Geyer's Willow**	**FACW**
Salix lasiandra	Pacific Willow	FACW
Schoenoplectus acutus	Hard-Stem Club-Rush	OBL
Scirpus cyperinus	Cottongrass Bulrush	OBL
Scirpus microcarpus	Red-Tinge Bulrush	OBL
Shepherdia canadensis	Canada Buffalo-Berry	UPL
Sinapis arvensis	Charlock Mustard	UPL
Solanum dulcamara	**Climbing Nightshade**	**FAC**
Solidago canadensis	**Canadian Goldenrod**	**FACU**
Sonchus arvensis	Field Sow-Thistle	FACU
Sparganium eurycarpum	Broad-Fruit Burr-Reed	OBL
Stachys palustris	Marsh Hedgenettle	FACW

[1]Lichvar and Kartesz 2009
Species first observed in 2012 are bolded.

Table 2. (Continued). Vegetation species observed from 2010 to 2012 at the I-90 East Bozeman Wetland Mitigation Site.

Scientific Names	Common Names	WMVC Indicator Status[1]
Stellaria umbellata	Umbrella Starwort	FACW
Symphoricarpos albus	Common Snowberry	FACU
Symphoricarpos occidentalis	Western Snowberry	FAC
Tanacetum vulgare	Common Tansy	FACU
Taraxacum officinale	Common Dandelion	FACU
Thlaspi arvense	Field Penny-Cress	UPL
Trifolium fragiferum	Strawberry-Head Clover	FACU
Trifolium hybridum	Alsike Clover	FAC
Trifolium pratense	Red Clover	FACU
Typha latifolia	Broad-Leaf Cat-Tail	OBL
Urtica dioica	Stinging Nettle	FAC
Verbascum blattaria	Moth Mullein	UPL
Verbascum thapsus	**Great Mullein**	**FACU**
Veronica americana	American-Brooklime	OBL
Veronica peregrina	Neckweed	OBL
Veronica persica	**Birdeye Speedwell**	**UPL**

[1]Lichvar and Kartesz 2009
Species first observed in 2012 are bolded.

Wetland community 7 – *Typha latifolia/Carex* spp. was found on 0.74 acres 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, Northwest Territory sedge, water sedge, reed canary grass, sandbar willow (*Salix exigua*), Bebb willow (*Salix bebbiana*), Booth willow (*Salix boothii*), and Nebraska sedge. The prevalence, diversity, and size of willow species within this riparian corridor increased notably in 2012.

Wetland Type 8 – *Carex* spp./*Persicaria amphibia* was identified across 0.79 acres within the pre-existing wetland established as a result of construction activities completed in 1999. Water sedge, Northwest Territory sedge, Nebraska sedge, and water smartweed were the dominant vegetation species. Seventeen other species were identified in this community.

Wetland community 9 – *Salix exigua/Carex* spp. was identified on 0.13 acres of the pre-existing wetland located along the northwest boundary where the constructed channel discharges into the Story Ditch. A small stand of sandbar willow located on the southwest edge of the southwest cell was included in this community in 2012. The wetland was dominated by a woody overstory consisting of sandbar willow and quaking aspen (*Populus tremuloides*) with an understory of water sedge, Northwest Territory sedge, black bent grass, broad-leaf cattail, common spikerush, and reed canary grass.

Wetland community 10 – *Salix lasiandra* was identified in the existing wetland located at the southwest edge of the mitigation site in 2011. The Pacific willow trees were cut down in early 2012. New branches are sprouting from the trunks. A junk pile had been deposited near the base of the remaining tree trunks. A majority of the woody overstory in this community has been removed. The understory is dominated by field meadow-foxtail (*Alopecurus pratensis*), smooth brome, reed canary grass, and broad-leaf cattail.

Wetland community Type 12 – *Typha latifolia/Glyceria grandis* was identified along the banks of the reconstructed channel. This 2.82-acre community type transitioned from Type 5 – *Typha latifolia*/*Poa palustris*, identified in 2011, and reflected a shift in dominance from fowl bluegrass (*Poa palustris*) to American mannagrass. The species diversity and vegetation cover continued to increase in 2012. The dominant species were broad-leaf cattail, American mannagrass, and lamp rush. American sloughgrass, arctic rush, minor duckweed, fowl bluegrass, common spikerush, and lesser poverty rush provided diversity to this wetland community. The open water below the OHWM of the channel was labeled as Polygon 11.

Data were collected in 2012 along one vegetation transect at the I-90 East Bozeman site (Figure 2, Appendix A). The data are summarized in tabular and graphical formats on Table 3 and Charts 3 and 4 (Mitigation Monitoring Form, Appendix B). Photographs taken at the transect end points are located on page C-5 of Appendix C.

The vegetation 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. Hydrophytic vegetation species comprised 97.8 percent of the transect intervals, which is the same as in 2011. Apart from for a slight expansion of Wetland Community Type 4 – *Typha*, there was minimal change in the plant communities identified on the transect from 2011 to 2012. The percent cover and diversity of hydrophytic species on the side slopes of the constructed cells (Wetland Community Type 4) also increased in 2012.

Table 3. Data summary for Transect 1 from 2010 to 2012 at the I-90 East Bozeman Wetland Mitigation Site.

Monitoring Year	2010	2011	2012
Transect Length (feet)	**544**	**544**	**544**
Vegetation Community Transitions along Transect	5	4	4
Vegetation Communities along Transect	5	4	4
Hydrophytic Vegetation Communities along Transect	3	3	3
Total Vegetative Species	27	26	31
Total Hydrophytic Species	18	17	26
Total Upland Species	9	9	5
Estimated % Total Vegetative Cover	60	75	90
% Transect Length Comprising Hydrophytic Vegetation Communities	93	97.8	97.8
% Transect Length Comprising Upland Vegetation Communities	7	2.2	2.2
% Transect Length Comprising Unvegetated Open Water	0	0	0
% Transect Length Comprising Bare Substrate	0	0	0

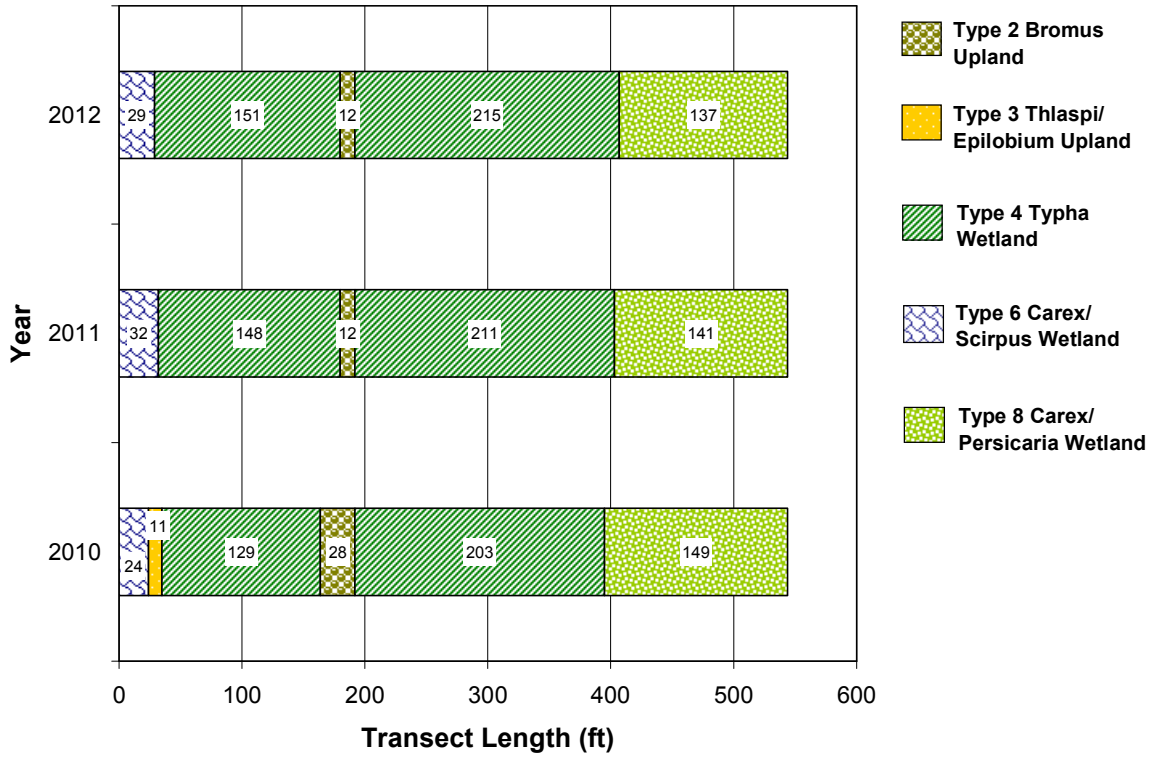

Chart 3. Transect map showing community types on Transect 1 from 2010 to 2012 from start (0 feet) to finish (544 feet) at the I-90 East Bozeman Wetland Mitigation Site.

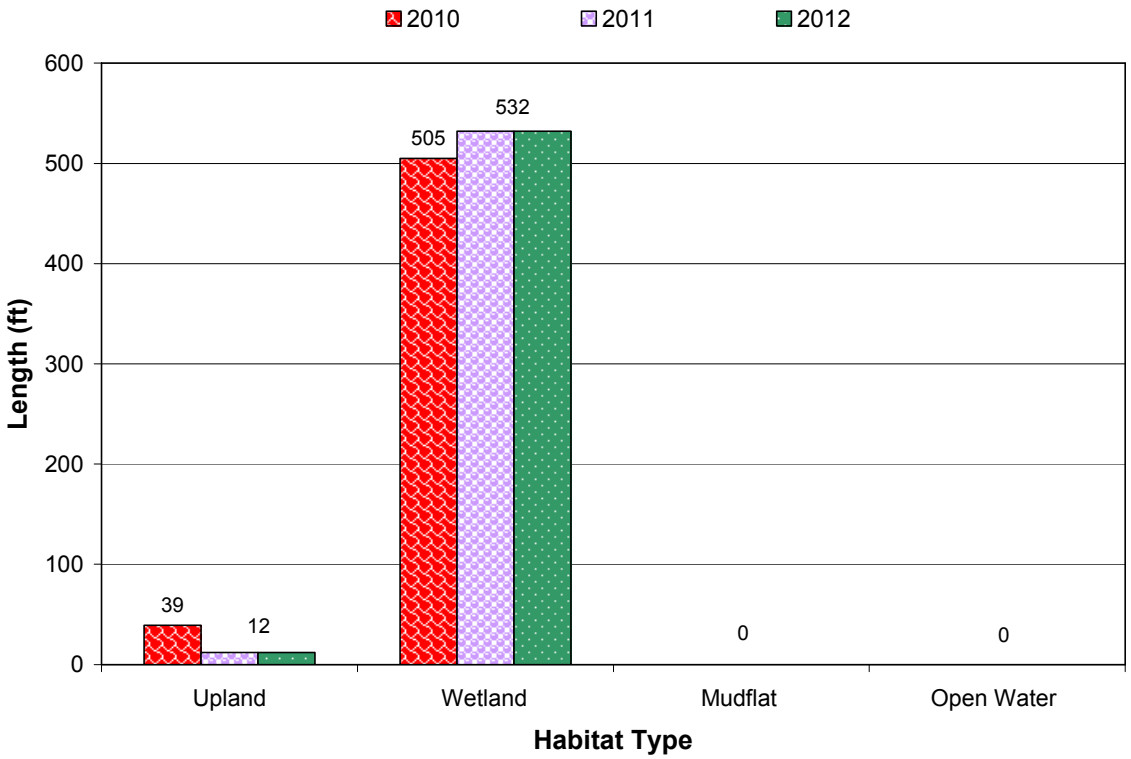

Chart 4. Length of habitat types within Transect 1 from 2010 to 2012 at the I-90 East Bozeman Wetland Mitigation Site.

The location of infestations of Canadian thistle, common tansy (*Tanacetum vulgare*), and spotted knapweed (*Centaurea maculosa*), all Priority 2B weeds, were mapped on Figure 3 (Appendix A). The prevalence of Canadian thistle decreased site wide from 2011 to 2012 as a result of herbicide spraying completed in August 2011. Isolated Canadian thistle plants were still present across Community Type 8 although the percent cover was less. The infestation size encompassed up to 1.0 acre with cover classes ranging from trace to moderate. The common tansy infestations were located primarily adjacent to the historic channel near the convergence with the Story Ditch. Another infestation of common tansy was located near the entry at the west boundary. The size was less than 0.1 acre with cover ranging from trace to moderate (less than 1 to 25 percent). One small spotted knapweed infestation was noted at the west boundary. The location was included on Figure 3 based on the aggressive nature of knapweed.

Several hundred containerized woody plants were installed on the perimeter of the constructed wetland cells in 2009. Approximately 50 to 75 willow cuttings were also installed on the stream banks at the upgradient end of the channel near the East Main culvert outlet and at the outlet near the Story Ditch. Two Western service berry (*Amelanchier alnifolia*), eighteen American silverberry (*Eleagnus communtata*), three quaking aspen, and two balsam poplar (*Populus balsamifera*) were observed in 2012. Multiple common snowberry (*Symphoricarpus alba*) volunteers were observed throughout upland Community

2 and wetland Community 6. The number, size, and diversity of willows on the channel, particularly along the original channel, increased notably in 2012. Volunteer willow shoots were also observed in the perimeter of the constructed cells.

3.4. 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 on floodplains. The Enbar loam is considered a non-hydric soil, taxonomically classified as a frigid Cumulic Haplustolls. The Nythar loam is a hydric soil, taxonomically classified as a frigid Cumulic Endoaquolls. The characterized soil pits generally confirmed the mapped unit.

Data points BZN-1, BZN -2, and BZN -3 were located in areas defined as wetlands (Figure 2, Appendix A). The soil profile at BZN -1, located in Wetland Community 8, revealed a silty clay loam (10 YR 5/1) without redoximorphic features. The depleted matrix provided a positive indication of hydric soil. The soil at BZN -2, located on a terrace adjacent to the constructed channel, was a black (10 YR 2/1) silty clay loam with a matrix containing 10 percent dark yellowish brown (10 YR 4/4) redox concentrations meeting the criteria for a redox dark surface. Test pit BZN -3 revealed a very dark gray, silty clay loam (10 YR 3/1) soil with redox concentrations (10 YR 4/4) in the matrix. The redox dark surface met the hydric soil criteria.

3.5. Wetland Delineation

Three data points were used to characterize the vegetation, soil, and hydrology of site wetlands (Bzn-1 through Bzn-3, Figure 2, Appendix A; Wetland Determination Data Forms, Appendix B). All three data points were located in areas that classified as wetlands. BZN-1 and BZN-3 were located along the vegetation transect. BZN-2 was located along the floodplain of the constructed channel The August 2012 delineation identified 9.67 acres of waters of the US including wetlands (Table 4), representing an increase of 0.41 acres since 2011. The increase in 2012 was primarily the result of a shift in plant dominance from Upland Community 3 – *Thlaspi arvense*/*Epilobium ciliatum* to Wetland Community 4 – *Typha latifolia* on the slopes of the excavated cells. The areal extent of Wetland Community 6 located between the east cell and constructed channel near the northeast boundary also increased slightly.

The total acreage of wetlands within the mitigation site included 3.51 acres of wetland developed since 1999; 5.15 acres of wetlands that have developed within the constructed cells; and 1.01 acres of riverine wetland that encompassed 0.34 acres of open water/WUS located within the OHWM of the existing and constructed channel.

Table 4. Total wetland acres delineated at the I 90 East Bozeman Wetland Mitigation Site in 2000 and 2010 to 2012.

Habitat	2000 (ac)	2010 (ac)	2011 (ac)	2012 (ac)
Prexisting Wetland Area	3.51	3.51	3.51	3.51
Created Wetland Depressions and Additional Wetland Development	---	4.98	4.74	5.15
Open Water Riverine	---	0.34	0.89	1.01*
TOTAL WETLAND HABITAT	**3.51**	**8.83**	**9.14**	**9.67**

*The difference in the open water riverine acreage from 2011 to 2012 is the result of adding the pre-existing channel acreage to the total riverine habitat.

3.6. Wildlife

A comprehensive list of wildlife species observed from 2010 to 2012 is presented in Table 5. Nine bird species were identified in 2012. A meadow vole (*Microtus pennsylvanicus*), deer tracks (*Odocoileus sp.*), coyote (*Canis latrans*) scat, and a muskrat (*Ondatra zibethicus*) den were observed in 2012. Several unidentified tadpoles were noted in the constructed channel.

Table 5. Wildlife species observed at the I-90 East Bozeman Wetland Mitigation Site from 2010 to 2012.

COMMON NAME	SCIENTIFIC NAME
AMPHIBIANS	
Frog spp	
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*

Species observed in 2012 are bolded.

Table 5 (cont). Wildlife species observed at the I-90 East Bozeman Wetland Mitigation Site from 2010 to 2012.

COMMON NAME	SCIENTIFIC NAME
BIRD	
Red-tailed Hawk	***Buteo jamaicensis***
Red-winged Blackbird	***Agelaius phoeniceus***
Sandhill Crane	*Grus canadensis*
Song Sparrow	***Melospiza melodia***
Sora	*Porzana carolina*
Spotted Sandpiper	*Actitis macularius*
Starling	*Sturnus vulgaris*
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*
FISH	
Yellowstone Cutthroat Trout	*Oncorhynchus clarkii bouvieri*
MAMMAL	
Coyote	***Canis latrans***
Deer Sp.	
Meadow Vole	***Microtus pennsylvanicus***
Mountain Cottontail	*Sylvilagus nuttallii*
Muskrat	***Ondatra zibethicus***
Raccoon	*Procyon lotor*
Red Fox	*Vulpes vulpes*
White-tailed Deer	*Odocoileus virginianus*

Species observed in 2012 are bolded.

3.7. Functional Assessment

Functions and values of two assessment areas (AA) within the I-90 East Bozeman mitigation wetlands were evaluated from 2010 to 2012 using the 2008 Montana Wetland Assessment Form (Table 6). The constructed wetland depressions, channel, and additional riverine wetlands were evaluated as one AA and encompassed 6.16 acres. This AA received a Category II rating with 70.9 percent of the total points possible in 2012, an improvement over the Category III rating and 62.7 percentage points assigned in 2011. The improvement was the result of higher ratings in the general fish/aquatic habitat function based on the August, 2011 observation by MDT of Yellowstone cutthroat trout (*Onchorhynchus clarki bouvieri*) in the channel, an the increase in the percent cover of vegetation on the streambanks, and an increase of recreation/education potential bonus points. The entire site was rated as documented secondary habitat for Yellowstone cutthroat trout and suspected secondary habitat for the great blue heron (*Ardea herodias*) yielding a moderate rating for Montana Natural Heritage Program (MTNHP) species habitat.

Table 6. Functions and Values of the I-90 East Bozeman Wetland Mitigation Site from 2010 to 2012.

Function and Value Parameters from the 2008 MDT Montana Wetland Assessment Method[1]	2010 Pre-Existing Wetland	2011 Pre-Existing Wetland	2012 Pre-Existing Wetland	2010 Created Wetland Depressions & Channel	2011 Created Wetland Depressions & Channel	2012 Created Wetland Depressions & Channel
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Mod (0.5)	Mod (0.5)	Mod (0.6)	Mod (0.5)	Mod (0.5)	Mod (0.6)
General Wildlife Habitat	Mod (0.7)	Mod (0.7)	Mod (0.7)	Low (0.3)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	Mod (0.4)	Mod (0.4)	Mod (0.6)	Low (0.2)	Low (0.2)	Low (0.6)
Flood Attenuation	Mod (0.6)	Mod (0.7)	Mod (0.7)	Mod (0.5)	Mod (0.5)	Mod (0.5)
Short and Long Term Surface Water Storage	High (0.8)	High (0.8)	High (0.8)	High (0.8)	High (1.0)	High (1.0)
Sediment/Nutrient/Toxicant Removal	High (0.9)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	High (1.0)	High (1.0)	High (1.0)	Mod (0.7)	Mod (0.7)	High (1.0)
Production Export/ Food Chain Support	High (0.8)	High (0.8)	High (0.8)	Mod (0.6)	High (0.9)	High (0.9)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.2)	Low (0.3)	Low (0.3)
Recreation/Education Potential (bonus points)	Mod (0.1)	Mod (0.1)	High (0.2)	Mod (0.1)	Mod (0.1)	High (0.2)
Actual Points / Possible Points	**7.1 / 11**	**7.3 / 11**	**7.7 / 11**	**5.9 / 11**	**6.9 / 11**	**7.8 / 11**
% of Possible Score Achieved	**64.6%**	**66.4%**	**70.0%**	**53.6%**	**62.7%**	**70.9%**
Overall Category	**II**	**II**	**II**	**III**	**III**	**II**
Acreage of Assessed Aquatic Habitats within Easement (ac)	**3.51**	**3.51**	**3.51**	**5.32**	**5.63**	**6.16**
Functional Units (acreage x actual points) (f^1-)	**24.92**	**25.62**	**27.03**	**31.39**	**38.85**	**48.05**

[1]Berglund and McEldowney 2008 MDT MWAM.

High ratings were achieved for short and long term surface water storage, sediment/nutrient/toxicant removal, production export/food chain support, groundwater discharge/recharge, and recreation/education potential.

The second AA encompassed 3.51 acres of pre-existing wetlands acknowledged by the USACE as onsite wetlands constructed prior to 2009. The pre-existing wetlands were rated as a Category II with 70.0 percent of the total points possible, or an increase of 3.6 percent since 2011. The increase was the result of the Yellowstone cutthroat trout observation, which increased the MTNHP species habitat and general fish/aquatic habitat ratings, and an increase of recreation/education potential bonus points. 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, ground/discharge/recharge, and recreation/education potential.

3.8. Photo Documentation

Photographs taken from 2010 to 2012 at photo points one through six (PP1 through PP6, Figure 2, Appendix A) are shown on pages C-1 to C-4 of Appendix C. Transect end points are shown on page C-5. The stream cross sections are included on pages C-6 through C-9 and the data points are shown on C-10 (Appendix C).

3.9. Maintenance Needs

The location of infestations of common tansy and Canadian thistle were mapped on Figure 3 (Appendix A). There was a single infestation of spotted knapweed at the fence line on the southwest boundary. It was noted in this report owing to the aggressive nature of this weed. As mentioned in Section 3.2, the percent cover of Canadian thistle decreased site-wide in 2012 as a result of herbicide spraying completed in August, 2011. Isolated Canadian thistle plants were observed throughout Community 8, near the site entry at the southwest boundary, and adjacent to the stream near the Story Ditch confluence. Several isolated infestations of common tansy were observed at the entrance to the site and near the Story Ditch confluence.

A rock vane was installed across the existing channel to restrict potential head cutting resulting from the excavation of the Story Ditch channel by the adjacent property owner. No head cutting was observed on MDT property in 2012. The grade-control structure was in good condition and stable. The concrete blocks and fencing associated with the wildlife jump out on I-90 along the east fence boundary of the mitigation site were repaired after the July 2011 field visit and this jump out was in good condition in 2012.

Four wood duck boxes and four bluebird boxes were observed on the site. The nesting structures were in good condition. One bluebird box showed signs of use.

3.10. Current Credit Summary

Table 7 presents the summary of wetland credits from 2010 to 2012 for the I-90 East Bozeman mitigation site. The projected credits were addressed in a USACE May 2008 letter to MDT that acknowledged available mitigation credits in the amount of 5.51 credit acres. The available credit acreage included 3.51 acres for pre-existing wetland that developed on the site between 2000 and 2009, 0.17 acres for maintenance of a 50-foot upland buffer, and 1.83 acres representing 30 percent of the expected 6.1 acres of created wetland. The USACE stated that the amount of credit available at the site will be adjusted as appropriate based on the monitoring results.

Based on the results of the 2012 monitoring, 9.73 credit acres have developed on site to date. The 2012 monitoring identified 1.01 acres of riverine wetland associated with the existing and newly constructed stream channel; creation of 5.15 acres of wetland within and adjacent to the constructed depressions; preservation of 3.51 acres of emergent wetland; and the maintenance of 0.17 acres of upland buffer. Full credit at a 1:1 ratio was assigned for the preservation 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 were created in the 2009 mitigation construction effort based on an 80 percent hydrophytic vegetation cover and a less than 10 percent weed cover. The 0.17 acres of upland credit was based on the presence of at least 0.85 acres of a 50-foot upland buffer at a 5:1 credit ratio. The upland buffer actually encompasses 5.14 acres. The credit acres will be recalculated annually as wetlands develop fully 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 riverine wetland is at least 80 percent. The percent hydrophytic vegetation cover on the streambanks of the constructed channel increased from approximately 70 percent in 2011 to 90 percent in 2012. The upland buffer exhibits greater than 50 percent areal cover of desirable vegetation and less than 10 percent weed cover. The woody overstory, particularly on the stream channel, continues to develop site wide.

The success criteria states that bank stability success will be evaluated by using the previously constructed stream channel downstream of the new channel construction as a reference reach. Bank stability success will be achieved when 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. The banks of the constructed channel appear to be stable without any measurable lateral migration based on the cross-section data collected from 2010 to 2012. However, the average width of the constructed creek channel (riverine wetland) is greater than the 2 to 3 feet stipulated in the design. The channel width at cross-section 2 is approximately 20 feet. Continued deposition of sediment

within the channel may eventually result in a channel width reflective of the target dimensions.

Table 7. Summary of Wetland Credits at the I 90 East Bozeman Wetland Mitigation Site from 2010 to 2012.

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	2012 Delineated Wetland Acres	2012 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	0.90	0.90
Creation of four wetland depressions	Creation	1:1	5.15		4.98	4.98	4.74	4.74	5.15	5.15
Maintain 3.51 acres of wetland developed since 2000.	Creation	1:1	3.51	3.51	3.51	3.51	3.51	3.51	3.51	3.51
Existing open water/WUS									0.11	NA
Maintain upland buffer	Upland buffer	5:1	0.17	0.17	--	0.17	--	0.17	--	0.17
Total Available Credit			9.78	5.51	8.83	9.00	9.14	9.31	9.67	9.73

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

**Wetland fringe associated with the created riverine wetland was included in created wetland depressions. This area was included in riverine creation in 2011 and 2012.

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Appendix A

Project Area Maps – Figures 2 & 3

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

Figure 2: 2012 Monitoring Activity Locations

N

0 62.5 125 250

Feet

BB
PP4
BB
BB
BB
PP5
MW-1
MW-2
XS-2
WDB
T-1 Finish
BZN-1
PP2
PP3
PP6
BZN-2
WDB
MW-3
WDB
BZN-3
BB
XS-1
T-1 Start
PP1
BB

Legend

- Vegetation Transect
- Monitoring Limits
- Data Points
- Photo Points
- Monitoring Wells
- Cross Section
- Blue Bird Box
- Woodduck Box

Base Photography Date: June 26, 2012

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

LOCATION: Gallatin Co., MT

PROJ NO: STPX-0016(057)

FILE: Bozeman/Monitor2012.mxd

Project Name: East Bozeman I-90 Mitigation Site

Drawing Title: 2012 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
BV	BCS	JJ

SCALE: Noted

Drawn: August 20, 2012

PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 2

REV -

Figure 3: 2012 Mapped Site Features

ACREAGES

Project Area	14.81 acres
WUS inc. Wetlands	9.67 acres
Existing Wetlands	3.51 acres
WUS (11)	0.34 acres
Created Wetlands	5.82 acres
Upland	5.14 acres

N

0 62.5 125 250

Feet

Legend

Monitoring Limits

Wetland Limits

Vegetation Communities

Base Photography Date: June 26, 2012

Noxious Weeds
- Tanacetum vulgare
- Cirsium arvense
- Centaurea maculosa

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
(4) Typha latifolia
(6) Carex spp./Scirpus microcarpus
(7) Typha latifolia/Carex spp.
(8) Carex spp/Persicaria amphibia
(9) Salix exigua/Carex spp.
(10) Salix lasiandra
(12) Typha latifolia/Glyceria grandis

LOCATION: Gallatin Co., MT

PROJ NO: STPX-0016(057)

FILE: Bozeman/Veg2012.mxd

Project Name: East Bozeman Interchange Wetland Mitigation Site

Drawing Title: 2012 Mapped Site Features

DRAWN	CHECKED	APPROVED
BV	BCS	JU

SCALE: Noted

Drawn: August 20, 2012

PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 3

REV -

Appendix B

2012 MDT Wetland Mitigation Site Monitoring Form
2012 USACE Wetland Determination Data Form
2012 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 8/9/2012 8:54:37 AM

Person(s) conducting the assessment: B Vaughn

Weather: smokey, calm, 75 deg F-90 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: 3 #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: 0.3 **(ft)** Range of Depths: 0.1 to 1.5 **(ft)**

Percent of assessment area under inundation: 15 %

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, salt crust, algal mat, sparsely vegetated concave surface, FAC-neutral, drift deposits, water marks, drainage patterns

Groundwater Monitoring Wells

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

Well ID	Water Surface Depth (ft)
MW-1	3.75
MW-2	1.5
MW-3	1.92

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:

Site drier during 2012 site visit as a result of less precip and site visit being conducted later in season. Less inundation in lowest contour of constructed cells.

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 / **Acres:** 5.13

Species	Cover class	Species	Cover class
Agrostis gigantea	0	Alopecurus pratensis	0
Brassica kaber	0	Bromus inermis	5
Carduus nutans	0	Cicuta douglasii	0
Cleome serrulata	0	Elymus lanceolatus	2
Elymus repens	2	Elymus trachycaulus	2
Festuca arundinacea	1	Hordeum jubatum	0
Pascopyrum smithii	3	Persicaria amphibia	0
Phleum pratense	1	Poa pratensis	3
Polypogon monspeliensis	0	Rumex crispus	0
Shepherdia canadensis	0	Symphoricarpos albus	0
Verbascum thapsus	0		

Comments:

Community # 4 **Community Type:** Typha latifolia / **Acres:** 3.89

Species	Cover class	Species	Cover class
Agrostis gigantea	1	Alopecurus pratensis	1
Beckmannia syzigachne	3	Carex aquatilis	1
Carex utriculata	0	Cirsium arvense	0
Cirsium vulgare	0	Deschampsia cespitosa	2
Elaeagnus commutata	0	Eleocharis palustris	4
Glyceria grandis	3	Juncus arcticus	1
Juncus effusus	2	Juncus longistylis	0
Juncus tenuis	3	Juncus torreyi	0
Juncus tweedyi	0	Lemna minor	2
Persicaria amphibia	1	Poa palustris	1
Salix lasiandra	0	Typha latifolia	5

Comments:

Community # 6 **Community Type:** Carex spp. / Scirpus microcarpus **Acres:** 2.82

Species	Cover class	Species	Cover class
Agrostis gigantea	0	Carduus nutans	0
Carex nebrascensis	3	Carex stipata	0
Carex utriculata	4	Cicuta douglasii	0
Deschampsia cespitosa	1	Elymus repens	1
Epilobium ciliatum	0	Glyceria grandis	0
Helianthus annuus	0	Lemna minor	1
Persicaria amphibia	2	Phalaris arundinacea	3
Rosa woodsii	0	Scirpus microcarpus	4
Solidago canadensis	0	Symphoricarpos albus	0
Typha latifolia	2	Veronica peregrina	1

Comments:

Community # 7 **Community Type:** Typha latifolia / Carex spp. **Acres:** 0.74

Species	Cover class	Species	Cover class
Agrostis gigantea	1	Carex aquatilis	4
Carex hystericina	0	Carex nebrascensis	2
Carex utriculata	4	Deschampsia cespitosa	0
Juncus arcticus	2	Juncus articulatus	1
Juncus tenuis	2	Lemna minor	1
Mentha arvensis	0	Persicaria amphibia	0
Phalaris arundinacea	3	Salix bebbiana	3
Salix boothii	2	Salix exigua	3
Salix geyeriana	1	Solanum dulcamara	0
Typha latifolia	5	Veronica persica	1

Comments:

Community # 8 Community Type: Carex spp. / Persicaria amphibia **Acres:** 0.79

Species	Cover class	Species	Cover class
Agrostis gigantea	2	Alopecurus pratensis	0
Carex aquatilis	4	Carex nebrascensis	3
Carex utriculata	4	Cirsium arvense	1
Deschampsia cespitosa	0	Geum macrophyllum	2
Juncus arcticus	2	Juncus articulatus	0
Juncus effusus	2	Juncus longistylis	0
Lactuca serriola	0	Persicaria amphibia	4
Phalaris arundinacea	1	Rosa woodsii	0
Scirpus microcarpus	2	Solidago canadensis	0
Sonchus arvensis	0	Tanacetum vulgare	0
Typha latifolia	0		

Comments:

Community # 9 Community Type: Salix exigua / Carex spp. **Acres:** 0.13

Species	Cover class	Species	Cover class
Agrostis gigantea	3	Carex aquatilis	4
Carex utriculata	2	Eleocharis palustris	3
Lemna minor	2	Phalaris arundinacea	3
Populus tremuloides	1	Salix bebbiana	2
Salix exigua	5	Typha latifolia	3

Comments:

Community # 10 Community Type: Salix lasiandra / **Acres:** 0.28

Species	Cover class	Species	Cover class
Alopecurus pratensis	4	Bare Ground	1
Bromus inermis	3	Cicuta douglasii	0
Phalaris arundinacea	2	Salix lasiandra	2
Solidago canadensis	0	Tanacetum vulgare	0
Thlaspi arvense	0	Typha latifolia	2

Comments:

Pacific willow cut down in 2012. New shoots sprouting from trunk. Area cleared around trunk. Junk pile and rebar w/ flag (denoting boundary??) within what was previously delineated as Community 10. Borrow ditch at base of steep road slope contains hydrophytic plants.

Community # 12 **Community Type:** Typha latifolia / Glyceria grandis **Acres:** 0.67

Species	Cover class	Species	Cover class
Beckmannia syzigachne	2	Carex hystericina	0
Cirsium arvense	0	Eleocharis palustris	2
Epilobium ciliatum	0	Glyceria grandis	4
Juncus arcticus	2	Juncus articulatus	1
Juncus effusus	3	Juncus tenuis	2
Lemna minor	2	Persicaria amphibia	1
Poa palustris	2	Tanacetum vulgare	0
Typha latifolia	5		

Comments:

Total Vegetation Community Acreage **14.45**

(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: 8/9/2012 8:54:37 AM

Transect Number: 1 **Compass Direction from Start:** 90

Interval Data:

Ending Station 29 **Community Type:** Carex spp. / Scirpus microcarpus

Species	Cover class	Species	Cover class
Carex nebrascensis	3	Carex utriculata	4
Deschampsia cespitosa	1	Epilobium ciliatum	0
Glyceria grandis	0	Lemna minor	2
Persicaria amphibia	3	Phalaris arundinacea	4
Scirpus microcarpus	4	Typha latifolia	2
Veronica peregrina	3		

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

Species	Cover class	Species	Cover class
Agrostis gigantea	0	Alopecurus pratensis	1
Beckmannia syzigachne	3	Deschampsia cespitosa	2
Eleocharis palustris	4	Glyceria grandis	3
Juncus arcticus	0	Juncus tenuis	2
Poa palustris	0	Typha latifolia	5

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

Species	Cover class	Species	Cover class
Agrostis gigantea	1	Alopecurus pratensis	1
Bromus inermis	4	Carduus nutans	0
Elymus repens	1	Festuca arundinacea	1
Phleum pratense	3	Poa pratensis	3

Ending Station 407 **Community Type:** Typha latifolia /

Species	Cover class	Species	Cover class
Alopecurus pratensis	1	Beckmannia syzigachne	2
Carex aquatilis	1	Carex utriculata	2
Cirsium vulgare	0	Deschampsia cespitosa	2
Eleocharis palustris	4	Glyceria grandis	2
Juncus arcticus	0	Juncus effusus	0
Juncus tenuis	1	Lemna minor	3
Persicaria amphibia	2	Typha latifolia	5

Ending Station 547 **Community Type:** Carex spp. / Persicaria amphibia

Species	Cover class	Species	Cover class
Agrostis gigantea	2	Alopecurus pratensis	0
Carex aquatilis	1	Carex nebrascensis	3
Carex utriculata	4	Cirsium arvense	2
Geum macrophyllum	1	Juncus arcticus	0
Juncus effusus	2	Persicaria amphibia	4
Phalaris arundinacea	1	Rosa woodsii	0
Sonchus arvensis	0		

Transect Notes:

Improved growth on graded slopes of constructed depressions.

PLANTED WOODY VEGETATION SURVIVAL

I 90 East Bozeman

Planting Type	#Planted	#Alive	Notes
Amelanchier alnifolia		2	2 dead
Cornus alba			2 dead:
Crataegus douglasii	50		
Eleagnus communtata	200	18	18 alive w/ dead top, good growth at base; 10 dead
Populus balsamifera		2	2 alive in good condition; 2 dead
Populus tremuloides		3	alive in fair condition, dry;
Shepherida canadensis	100		
Symphoricarpus albus			Multiple volunteer snowberry plants in Comms. 6 and 2.
willow spp.			Multiple S.bebb, S.lasiandra, S.boothii shoots noted.

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 the upstream end at the culvert outlet under East Main Street. Supplemental plantings of red-osier dogwood (50) and peach-leafed willows (50) were installed in November 2009 along the stream channel and the southern edges of the two cells adjacent to the north stream bank.

I 90 East Bozeman

WILDLIFE

Birds

Were man-made nesting structures installed? Yes

If yes, type of structure: 3 wood duck boxes, 6 bluebird boxes

How many? 8

Are the nesting structures being used? Yes

Do the nesting structures need repairs? No

Nesting Structure Comments:
The nesting structures are in good condition. One of the BBs was being used.

Species	#Observed	Behavior	Habitat
Black-billed Magpie	4	FO	AB, MA, OW, SS, UP
Black-capped Chickadee	3	FO	AB, MA, OW, SS, UP
Cinnamon Teal	8	BP, F, FO, L	AB, MA, OW, SS, UP
Eastern Kingbird	1	F, FO	AB, MA, OW, SS, WM
Mallard	4	F, L	AB, MA, OW, SS, UP
Red-tailed Hawk	1	FO	AB, MA, OW, SS, UP
Red-winged Blackbird	30	F, FO, L	AB, MA, OW, SS, UP
Song Sparrow	3	F, L	AB, MA, OW, SS, UP
Tree Swallow	8	FO, L	AB, MA, OW, SS, UP

Bird Comments

Cinnamon teal adults and four ducklings observed on existing channel near confluence w/ Story Ditch. Most birds observed on 8/10 in am when temps were 65 deg. F.

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
Coyote		No	Yes	No	
Deer Sp.		Yes	No	No	tracks in mud near channel
Meadow Vole	1	No	No	No	
Muskrat		No	No	Yes	muskrat den

Wildlife Comments:

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
3151-57				PP1-pano
3158			10	T-1 srt
3159-60			260	T-1 end
3161			300	Bzn-1
3162			285	Bzn-2
3163			310	PP-6 PP-6
3164			170	xs-1 upstrm
3165			340	xs-1 downstrm
3166			340	garbage pile
3167			15	xs-2 downstrm
3168			150	xs-2 upstrm
3169-3176			0	PP-4 pano
3177			350	PP-2-downstream
3178			170	PP-3 upstream
3179-3185			0	PP-5, MW-1 pano
3186-87			310	Bzn-3
3188-89			345	southwest bndy-rebar and flags

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

Note field visit was conducted on August 9 and August 10, 2012.

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.

Jump out structure for deer in good condition. Fence and cement blocks in good condition. No repairs needed. All nesting structures in good condition.

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

Project/Site: I-90 Bzn | City/County: Gallatin | Sampling Date: 8/10/2012

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

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

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

Subregion (LRR): LRR E | Lat: -111.013822 | Long: 45.678689 | Datum: WGS84

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

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:
comm 8 - large sedge 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: 5ft)			
1. Carex aquatilis	30	☑	OBL
2. Carex utriculata	25	☑	OBL
3. Carex nebrascensis	10	☐	OBL
4. Phalaris arundinacea	10	☐	FACW
5. Persicaria amphibia	10	☐	OBL
6. Cirsium arvense	10	☐	FAC
7. Juncus effusus	5	☐	FACW
8. Juncus articulatus	5	☐	OBL
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 0

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80
FACW species	15	x 2 =	30
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	105 (A)		140 (B)

Prevalence Index = B/A = 1.36842

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: Bzn-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
0-8	10YR 2/2	100					Silty Clay Loam	
8-14	10YR 5/1	90					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:

Community 8 is seasonally inundated based on the presence of soil cracks and algal mats.

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

Project/Site: I-90 Bzn | City/County: Gallatin | Sampling Date: 8/9/2012

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

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

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

Subregion (LRR): LRR E | Lat: -111.014569 | Long: 45.677559 | Datum: WGS84

Soil Map Unit Name: Enbar-Nythar Laom | NWI classification: Upland

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:
comm 12-stream terrace at base of upland slope .

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: 5ft)			
1. Glyceria grandis	35	☑	OBL
2. Juncus arcticus	5	☐	FACW
3. Juncus effusus	10	☐	FACW
4. Typha latifolia	20	☑	OBL
5. Poa pratensis	5	☐	FAC
6. Bromus inermis	25	☑	FAC
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	55	x 1 =	55
FACW species	15	x 2 =	30
FAC species	30	x 3 =	90
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		175 (B)

Prevalence Index = B/A = 1.75

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: bzn-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
0-8	10YR 3/2	100					Silty Clay Loam	moist,high clay
8-13	10YR 2/1	90	10YR 4/4	10	C	M	Silty Clay Loam	black soil

[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:

3 ft. laterally from surface water, water depth in creek 5 to 8 inches.

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

Project/Site: I-90 Bzn | City/County: Gallatin | Sampling Date: 8/10/2012

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

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

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

Subregion (LRR): LRR E | Lat: -111.01519 | Long: 45.678012 | Datum: WGS84

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

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:
Comm. 4, wetland, was Comm. 3, upl, in 2011.

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: 5ft)			
1. Deschampsia cespitosa	15	☑	FACW
2. Juncus tenuis	25	☑	FAC
3. Juncus effusus	20	☑	FACW
4. Persicaria amphibia	10	☐	OBL
5. Juncus torreyi	5	☐	FACW
6. Poa palustris	10	☐	FAC
7. Typha latifolia	5	☐	OBL
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: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	25	x 2 =	50
FAC species	35	x 3 =	105
FACU species	0	x 4 =	0
UPL species	15	x 5 =	75
Column Totals:	90 (A)		245 (B)

Prevalence Index = B/A = 2.9375

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: Bzn-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
0-11	10YR 2/2	100	10YR 5/1	30	D	M	Silty Clay Loam	
11-16	10YR 3/1	90	10YR 4/4	10	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:

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name I-90 East Bozeman **2. MDT project#** STPX-0016(057) **Control#** 5710

3. Evaluation Date 8/9/2012 **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 and common tansy.

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

AA includes 3.51acres (credited area allowed for preservation) 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: AA encompasses shrub-scrub and emergent vegetation 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 USFWS 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 Yellowstone Cutthroat Trout (S2), (susp - 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 MDT observed y.c.trout in 2011. MTNHP listed heron for this township and range. Heron is commonly seen in this area.

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 in 10%, uneven veg classes and moderate use of animals including nine bird species, deer tracks, coyote scat, and muskrat den during 2012 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** .6M

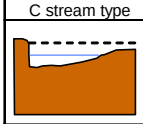
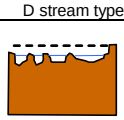
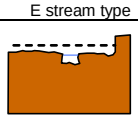
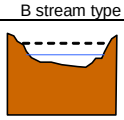
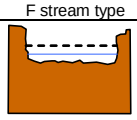
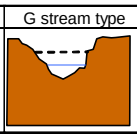
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ( ) **Y** (●) **N** *If yes, add 0.1 to the adjusted score in **i** or **iia** above:*
Modifed Rating

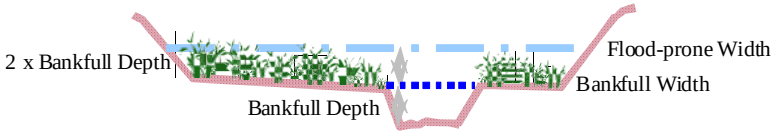
iii. Final Score and Rating: .6 M **Comments:** Yellowstone cutthroat trout is a Tier 1 sp. Culvert inlet and outlet present at upgradient and downgradient end of constructed channel. Well-developed veg on streambanks

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 upstream and downstream. Adjacent meadow subject to overflow from channel. Approx. 30% of channel banks scrub/shrub wetland.

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 0.60 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. Creek flowing in 2012. Less inundation in adjacent emergent wetland.

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: Existing channel streambanks vegetated with Arctic rush, beaked sedge, creeping spikerush, Nebraska sedge, water sedge, American 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: Portion of AA saturated to surface during 2012 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:

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	.6	1	2.106	☐
C. General Wildlife Habitat	M	.7	1	2.457	☐
D. General Fish Habitat	M	.6	1	2.106	☐
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)	H	.2	NA	0.702	☐
Totals:		7.7	11	27.027	
Percent of Possible Score			**70** %		

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#** 5710

3. Evaluation Date 8/9/2012 **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 6.16

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 6.16

☐ **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. The percent vegetation cover on the constructed cell perimeters increased in 2012. Site access currently restricted and protected by easement. AA surrounded by commercial real estate, highway, and railroad..

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

Canada thistle, common tansy. Small infestation of spotted knapweed on fence bndry.

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

An 885 foot stream channel and four wetland depressions were constructed in2009. The AA is surrounded by I-90, East Main, a railroad corridor, and commercial buildings. Cover of Canada thistle across the site decreased in 2012 although isolated plants were found throughout Community 8.

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 none listed on USFWS

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 Yellowstone cutthroat trout (S2), susp - 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 Y.C. Trout observed by MDT in 2011. Heron 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 2012 site visit by nine bird species, deer (tracks), coyote scat, and muskrat den . Temperatures were greater than 90 deg. F during first day of 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** .6M

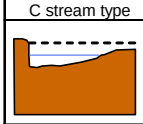
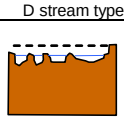
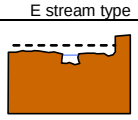
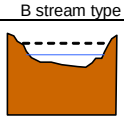
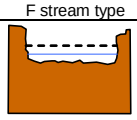
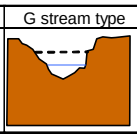
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ( ) **Y** (●) **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

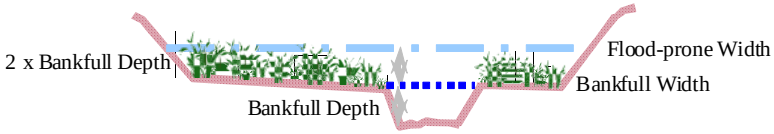
iii. Final Score and Rating: .6 M **Comments:** Culvert at upgradient and downgradient ends of constructed channel. The density of vegetation cover improved in 2012. Y.c.trout isa Tier 1 fish.

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% 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 6.16ac flooded to 1.5 ft depth. Flooded in 2011 and 2010. Less inundation in 2012.

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: Cells closed depressions. Restricted outlet in channel. Greater than 70% cover and evidence of ponding in 2012.

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

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

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

Comments: Vegetation cover increased in 2012. 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. Surface outlet via overland flow to channel. P/P regime in 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 in region.

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:

MSU uses for education and scientific study.

General Site Notes

Constructed wetland cells and stream. Vegetation cover increased notably from 2011 to 2012. Water levels high in 2011 partially the result of high spring precipitation and surface water groundwater levels. Lower inundation levels in 2012 as a result of lower precip and the site visit being conducted later in the season.

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	.6	1	3.696	☐
C. General Wildlife Habitat	M	.7	1	4.312	☐
D. General Fish Habitat	M	.6	1	3.696	☐
E. Flood Attenuation	M	.5	1	3.08	☐
F. Short and Long Term Surface Water Storage	H	1	1	6.16	☑
G. Sediment/Nutrient/Toxicant Removal	H	1	1	6.16	☑
H. Sediment/Shoreline Stabilization	H	1	1	6.16	☐
I. Production Export/Food Chain Support	H	.9	1	5.544	☑
J. Groundwater Discharge/Recharge	H	1	1	6.16	☑
K. Uniqueness	L	.3	1	1.848	☐
L. Recreation/Education Potential (bonus points)	H	.2	NA	1.232	☐
Totals:		7.8	11	48.048	
Percent of Possible Score			**70.91** %		

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 1: –
Bearing: 0-100 Degrees

Location: "Welcome to Bozeman" sign
Taken in 2012

Photo Point 2: **Location:** Upstream of Story Ditch
Bearing: 350 **Taken in 2010**

Photo Point 3: **Location:** Upstream of Story Ditch
Bearing: 170 **Taken in 2010**

Photo Point 2: **Location:** Upstream of Story Ditch
Bearing: 350 **Taken in 2011**

Photo Point 3: **Location:** Upstream of Story Ditch
Bearing: 170 **Taken in 2011**

Photo Point 2: **Location:** Upstream of Story Ditch
Bearing: 350 **Taken in 2012**

Photo Point 3: **Location:** Upstream of Story Ditch
Bearing: 170 **Taken in 2012**

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 4:
Bearing: 200-340 Degrees

Location: Looking west from east boundary.
Taken in 2012

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 5:
Bearing: 290-40 Degrees

Location: SE corner looking north.
Taken in 2012

Photo Point 6:
Bearing: 350 Degrees

Location: S of New Channel
Taken in 2011

Photo Point 6:
Bearing: 350 Degrees

Location: S of New Channel
Taken in 2012

Transect 1 – *Start*
Bearing: 10 Degrees
Location: Veg Com 6
Taken in 2010

Transect 1 – *End*
Bearing: 220 Degrees
Location: Veg Com 8
Taken in 2010

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 2011

Transect 1 – *Start*
Bearing: 10 Degrees
Location: Veg Com 6
Taken in 2012

Transect 1 – *End*
Bearing: 220 Degrees
Location: Veg Com 8
Taken in 2012

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 1*
Bearing: 350 Degrees

Location: XS-1 looking downstream
Taken in 2012

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

Cross Section 1 – *Photo 2* **Location:** XS-1 looking upstream
Bearing: 150 Degrees **Taken in 2011**

Cross Section 1 – *Photo 2* **Location:** XS-1 looking upstream
Bearing: 150 Degrees **Taken in 2012**

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 1*
Bearing: 310 Degrees

Location: XS-2 looking upstream
Taken in 2012

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

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

Location: XS-2 looking downstream
Taken in 2012

BZ 1 – *Photo 1*
Bearing: 300 degrees
Location:
Taken in 2012

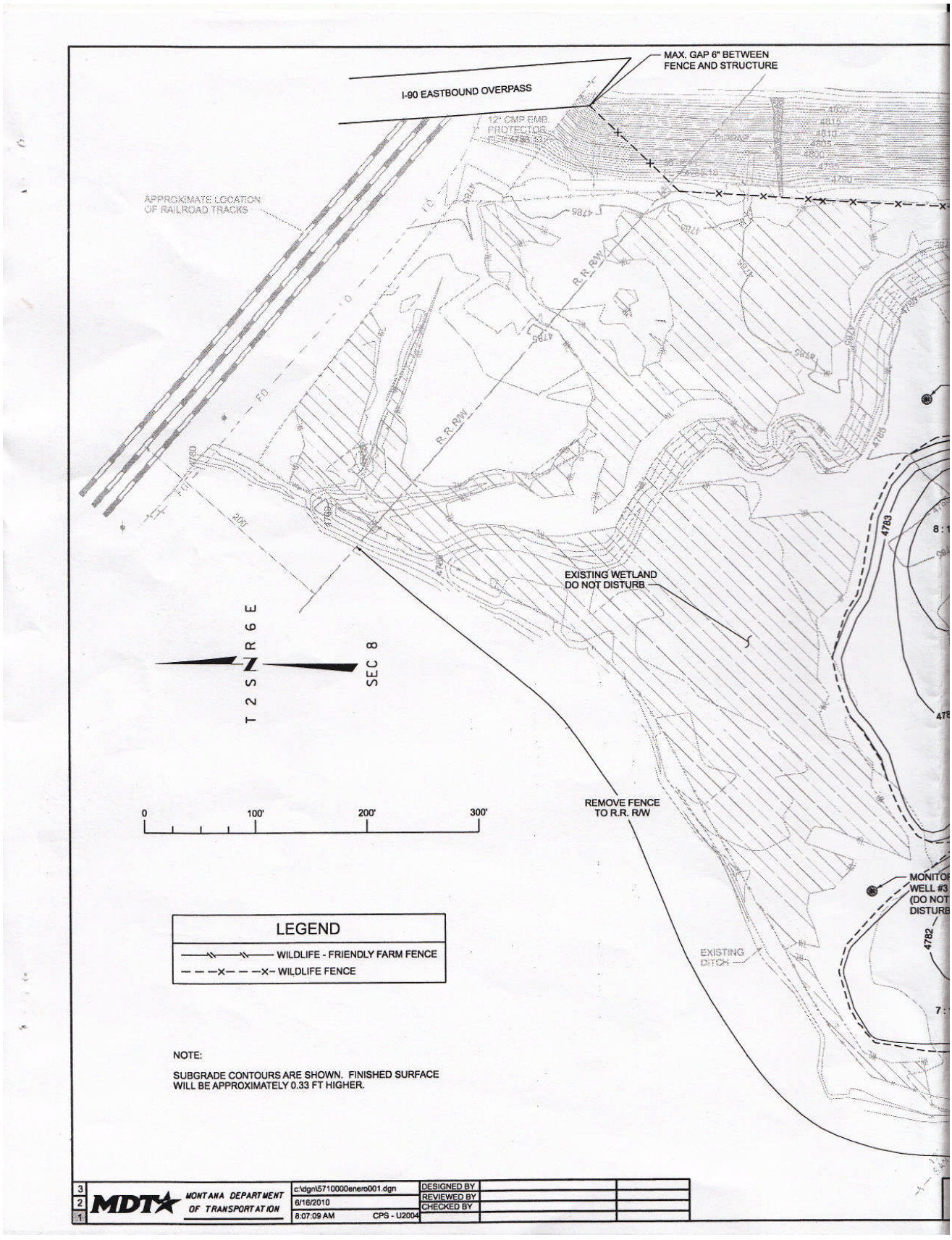
BZ 2 – *Photo 1*
Bearing: 285 degrees
Location:
Taken in 2012

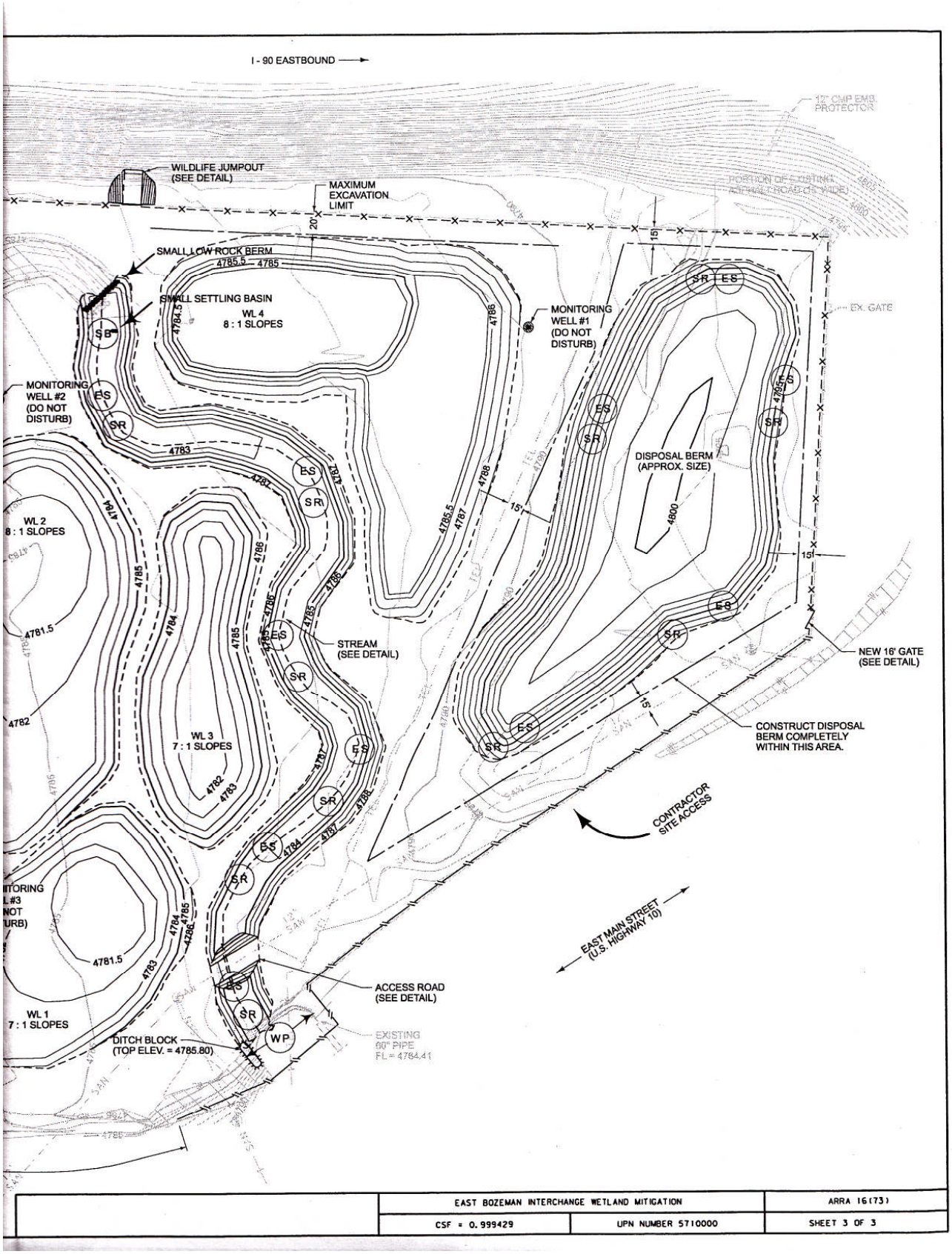
BZ 3 – *Photo 1*
Bearing: 310 degrees
Location:
Taken in 2012

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