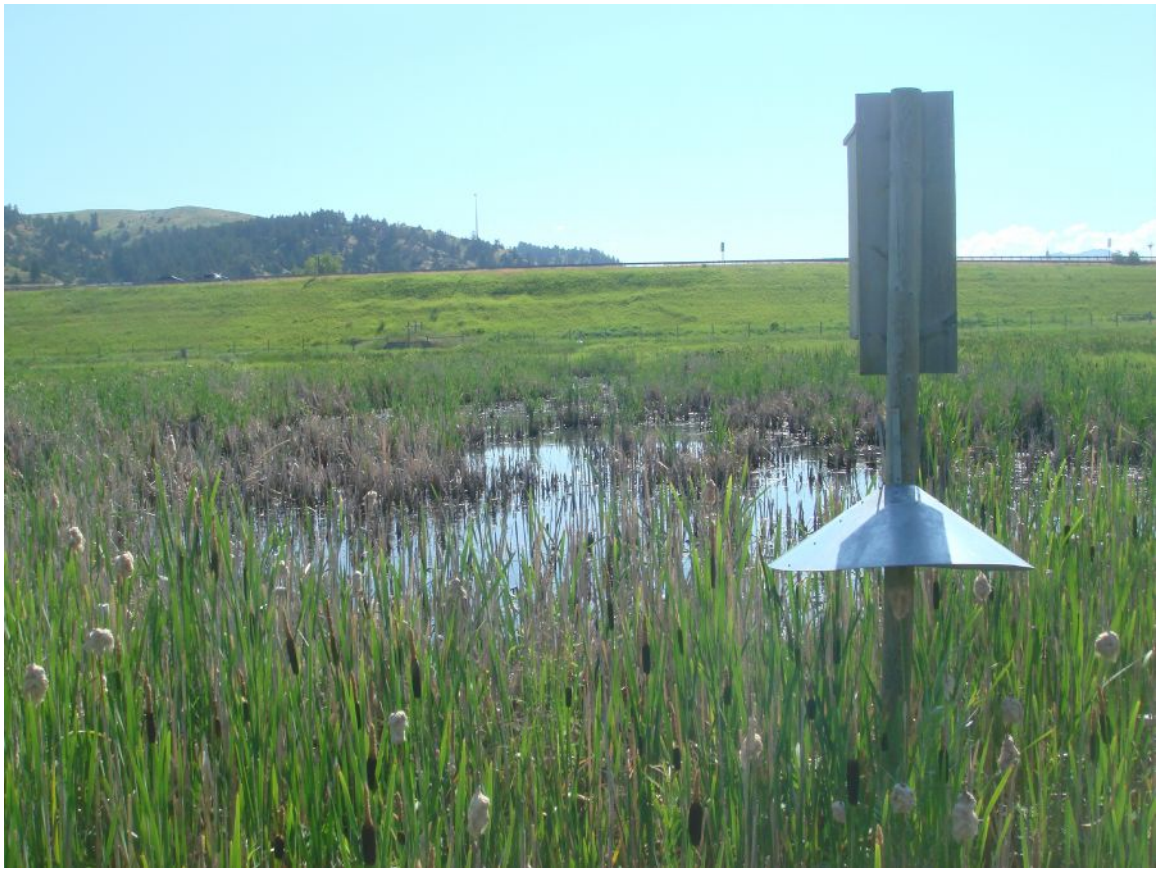
MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2014

I-90 East Bozeman
Gallatin County, Montana



Prepared for:

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December 2014

MONTANA DEPARTMENT OF TRANSPORTATION

WETLAND MITIGATION MONITORING REPORT:

YEAR 2014

I-90 East Bozeman
Gallatin County, Montana
Constructed: 2010

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.006

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1. INTRODUCTION

The Interstate 90 (I-90) East Bozeman 2014 Wetland Mitigation Monitoring Report presents the results of the fifth and final 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 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 suspended 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). The USACE permit specified that five years of mitigation monitoring of the site was required unless the success criteria were 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 Form, 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. The ditch channel is incised with little to no fisheries habitat. A culvert outlet that crosses under East Main Street discharges to the reconstructed perennial creek located at the southwest boundary of the mitigation site. 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 Link railroad and I-90 into Rocky Creek, ultimately draining to the East Fork of the Gallatin River.

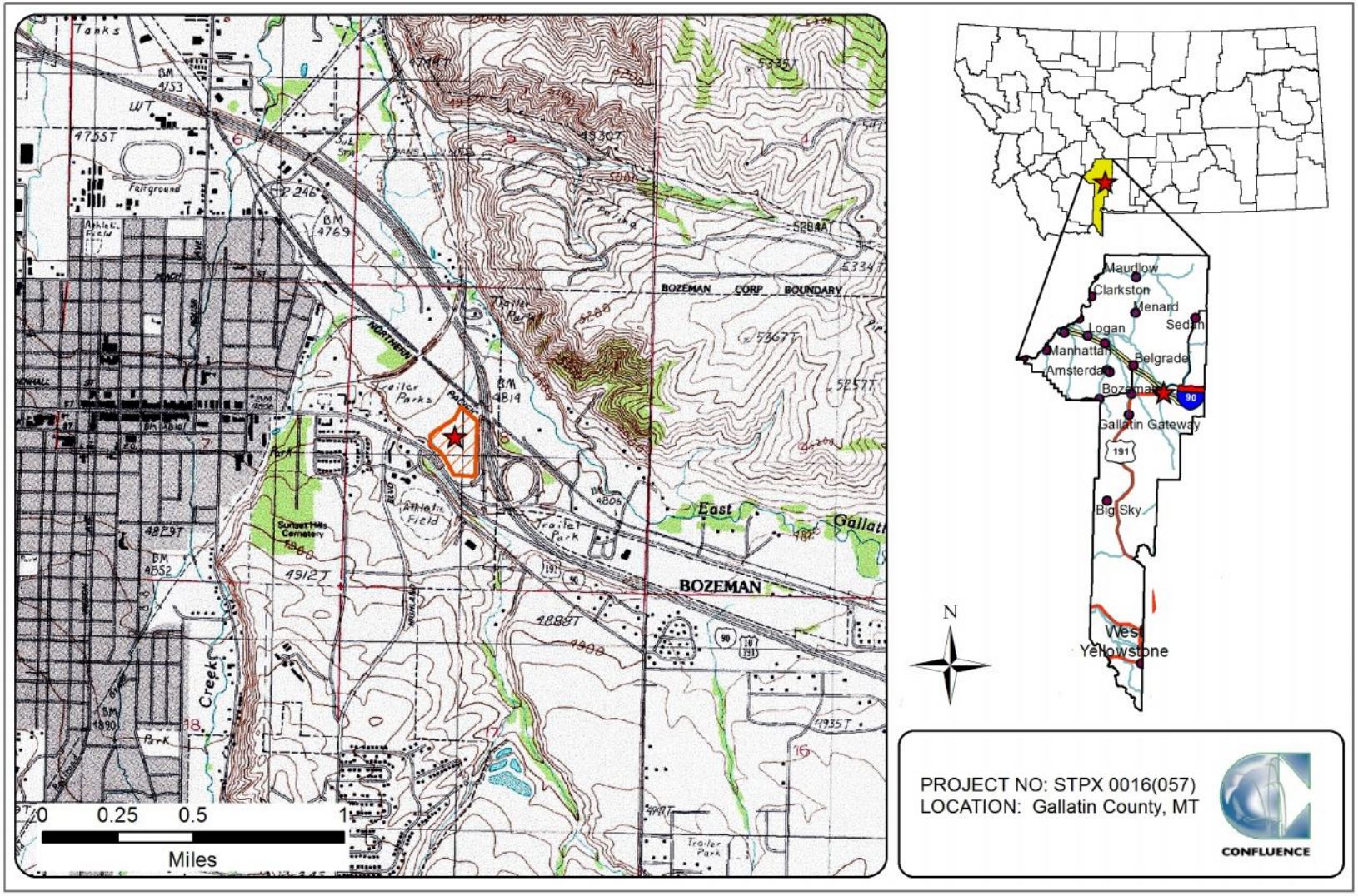


Figure 1. Project location I-90 East Bozeman Wetland Mitigation Site.

CONFLUENCE

The USACE Clean Water Act (CWA) Section 404 permit authorized the following work in May 14, 2008 (USACE 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 requested 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 wetland species trees and shrubs.
- Weeds will be controlled in both the wetland and upland areas.

The USACE acknowledged in a letter dated May 14, 2008 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 were released prior to construction.

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 to 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* (1987 USACE Manual) and *2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (*2010 Regional Supplement) 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 Natural Resource Conservation Service [NRCS] definitions for hydric soil) or appear to be forming, the soil is sufficiently stable to prevent erosion, and the soil is able to support plant cover. Soil sampling will be conducted during the course of the monitoring period to determine if wetland areas are exhibiting characteristics of hydric soils per the 1987 USACE Manual and 2010 Regional Supplement. Since typical hydric soil indicators may require long periods to form, a lack of distinctive hydric soil features will not be considered a failure if hydrologic and vegetation success is achieved.

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

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

ii. **Herbaceous Plants** – At the conclusion of the monitoring period, ocular coverage of desirable hydrophytic vegetation (wetland plants listed as OBL, FACW and FAC) will be at least 80 percent. A wetland seed mix was prepared for this site that included tufted hairgrass (*Deschampsia cespitosa* – FACW), 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 that is located immediately downstream from 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 acre of wetlands existing on the site prior to the implementation of construction in 1999 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** acre 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 less than 5 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 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 located downstream as a reference reach for the new channel as it is located directly adjacent, is relatively undisturbed, and is 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 staff 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 fifth year of monitoring was completed on July 16, 2014. Information for the Mitigation Monitoring Form and the Wetland Determination Data Forms was entered in an electronic tablet during the field investigation (Appendix B). Monitoring activity locations were mapped using a global positioning system (GPS) (Figure 2, Appendix A). Data collection included locating wetland boundaries, mapping vegetation communities, monitoring vegetation transects, assessing planted woody species survival, developing bank stability data, surveying steam cross-sections, assessing soil and hydrology characteristics, 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). Wetland systems with continuous inundation or saturation for greater than 12.5 percent of the growing season meet the hydrology criteria. 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 southwest 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-1w, BZN-2w, and BZN-2u, sampled within the project area. On-site 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 the 2014 field visit. Water depths in the constructed depression wetlands were measured and recorded.

The locations of three on-site groundwater monitoring wells are shown on Figure 2 (Appendix A). Water levels were measured with a handheld electronic 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-foot-wide and 544-foot-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 has been developed for each annual monitoring report. Photographs were taken at the endpoints of the transect during the monitoring event (Appendix C). The survival of woody species installed on site was recorded during monitoring.

The Montana State Noxious Weed List (September 2010), prepared by the Montana Department of Agriculture, was used to categorize weeds identified within the site. 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 on the map. 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, 6 to 25 percent, and 26 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 Manual and the 2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (USACE 2010). 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 USACE Manual and the 2010 Regional Supplement, must be satisfied. The name and indicator status of plant species was derived from the 2014 National Wetland Plant List (NWPL) (Lichvar *et al*. 2014). The 2014 NWPL scientific and common plant names were used in this report. 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 mapped using GPS methods and this boundary shown on the 2014 aerial photograph of the site (Figure 3, Appendix A). 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 on site during annual monitoring events and MDT site reviews.

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, site trends, current land uses on the adjacent property, upland conditions, and vegetation transect cover development. 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 2014 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, photographic points, transect endpoints, wetland boundaries, 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 18.57 inches from April 1892 to December 2013 (WRCC 2014). The annual precipitation total was 23.86 inches in 2010 (5.29 inches above the 122-year average), 17.08 inches in 2011 (1.49 inches below the average), 15.02 inches in 2012 (3.55 inches below average), and 18.12 inches in 2013 (near 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), 11.28 inches (2012), 9.58 inches (2013), and 16.83 inches (2014). These data suggest the 2011 through 2013 growing seasons experienced increasingly drier than normal conditions with above-average precipitation received during the 2010 and 2014 growing seasons. The annual pattern of precipitation for Bozeman typically shows increasing precipitation from March to a peak in June, a decline through mid-summer, another increase in late August to a second, smaller peak in September, followed by a general decline to the yearly low in February (WRCC 2013).

Groundwater levels have been measured in three monitoring wells (MW-1, MW-2, and MW-3) each year. Well MW-1 is located in an upland area in the southeast corner of the site; well MW-2 is located between the northern-most constructed wetland cell and the established channel along the wetland/upland interface; and well MW-3 is located on the west edge of the northern-most cell (Figure 2, Appendix A). Mitigation monitoring from 2011 to 2014 was completed on July 18, August 9, August 20, and July 16, respectively. Groundwater levels measured in 2014 were 6.75 feet below the ground surface (bgs) in MW-1, 4.75 feet bgs in MW-2, and 6.30 feet bgs in MW-3 and were generally the lowest of all five years of monitoring. The 2013 groundwater elevations had previously been the lowest in the preceding four years of monitoring. A drainage ditch located along the northern boundary of this mitigation site was cleaned and deepened in 2011 and it appears this ditch has had a negative effect on the wetland hydrology within mitigation site. An analysis of USGS well data collected on this site between 2004 and 2013 indicated a statistically significant decrease of 6 inches in the water table across the site following excavation of the drainage ditch in 2011.

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**	**08/2013**	**07/2014**
MW-1	2.06	3.35	3.75	6.00	6.75
MW-2	1.77	1.40	1.50	5.25	4.75
MW-3	1.44	2.25	1.92	2.53	6.30

Surface water depths in the pre-existing stream ranged from 0.5 to 1.5 feet during the 2014 field survey. The water depths observed within the stream in 2014 were generally the same as in 2013 even though precipitation levels from January to August were above average in 2014. Inundation levels in the constructed cells from 2013 to 2014 were also similar. The water depth in the lowest contour of the cells averaged 0.1 feet in 2014. Approximately 15 percent of the mitigation area was inundated. Inundation levels were lower in the wetland cells from 2012 to 2014 as compared to 2010 and 2011, despite the above average precipitation recorded in 2014 and the completion of monitoring earlier in the growing season. Areas delineated as wetlands that were not inundated commonly exhibited signs of saturation to the ground surface or within 12 inches of the ground surface. Additional hydrological indicators observed onsite were high water table, drainage patterns, water marks, drift deposits, algal mats, surface soil cracks, inundation and saturation visible on aerial imagery, sparsely vegetated concave surface, oxidized rhizospheres along living roots, presence of reduced iron, geomorphic position, and FAC-neutral test.

Three data points, BZN-1w, BZN-2w, and BZN-2u, were assessed to refine the upland and wetland boundaries in 2014 (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-13 of Appendix C. Data points BZN-1w and BZN-2w were located within areas that met the wetland hydrology criteria. Positive indicators of wetland hydrology at BZN-1w, located in Community 6 southwest of the center cell were saturation at 8 inches below the ground surface (bgs), the presence of reduced iron, drainage patterns, dry-season water table, and the FAC-neutral test. Positive hydrological indicators present at BZN-2w were a high water table at 4 inches bgs, saturation, oxidized rhizospheres along living roots, the presence of reduced iron, drainage patterns, geomorphic position, and the FAC-neutral test. The data point was located within wetland community Type 12 at the edge of the constructed channel. No positive indicators of wetland hydrology were observed at the upland data point, BZN-2u located upslope from BZN-2w.

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 have been surveyed annually. The cross-section survey data collected from 2010 to 2014 at Cross-sections 1 and 2 are illustrated on Charts 1 and 2, respectively. Photographs of the cross-sections are shown on pages C-9 through C-12 of Appendix C.

Cross-section 1 has remained stable and has not displayed any notable lateral adjustment from 2010 to 2014 (Chart 1). The banks of this cross-section are entirely vegetated with reed canary grass (*Phalaris arundinacea*) and exhibit highly stable conditions. Approximately two inches of accumulation of fine-sediment streambed material was noted on the right side of the channel bottom in 2013. Aside from a clump of sod that had washed into the cross-section in

2014, as noted by the peak within bankfull, very little change was noted in channel geometry as XS-1 between 2013 and 2014.

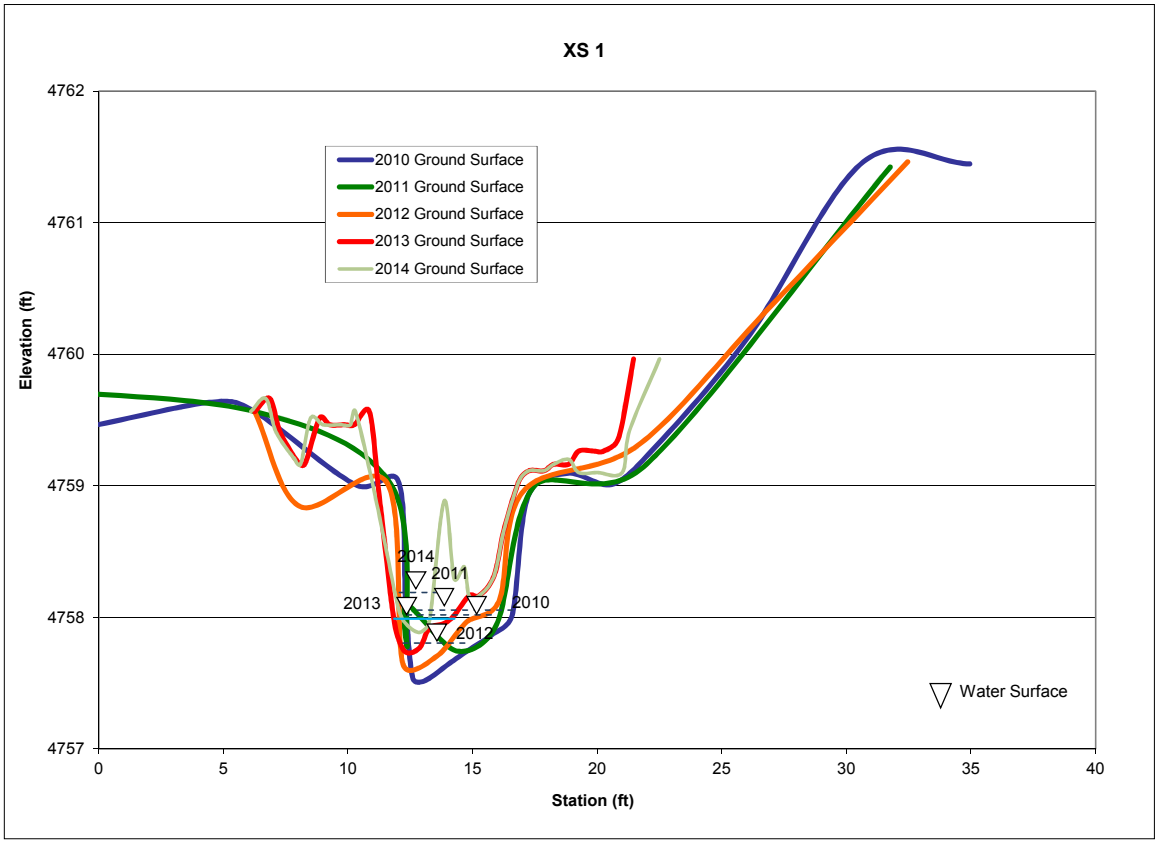


Chart 1. Survey data collected at cross-section 1 from 2010 to 2014.

The channel width at cross-section 2 is approximately 25 feet, much greater than the 2 to 3 feet stipulated in the design (Chart 2). Natural fluvial geomorphological adjustments at this cross-section have included a slight narrowing of the channel width with aggradation (accumulation of material) on the left and right edges of the channel bottom. Vegetation establishment along both banks have also effectively narrowed the surface water flow channel and thalweg. The average width of the constructed creek channel down-gradient of the culvert outlet averages 10 to 15 feet. Continued aggradation of the channel appears to be improving the width/depth ratio and general aquatic habitat quality of this stream. A natural constriction at the connection between the new and old channel appears to impede flow and backs up water at cross-section 2, resulting in the inundation of the adjacent low floodplain.

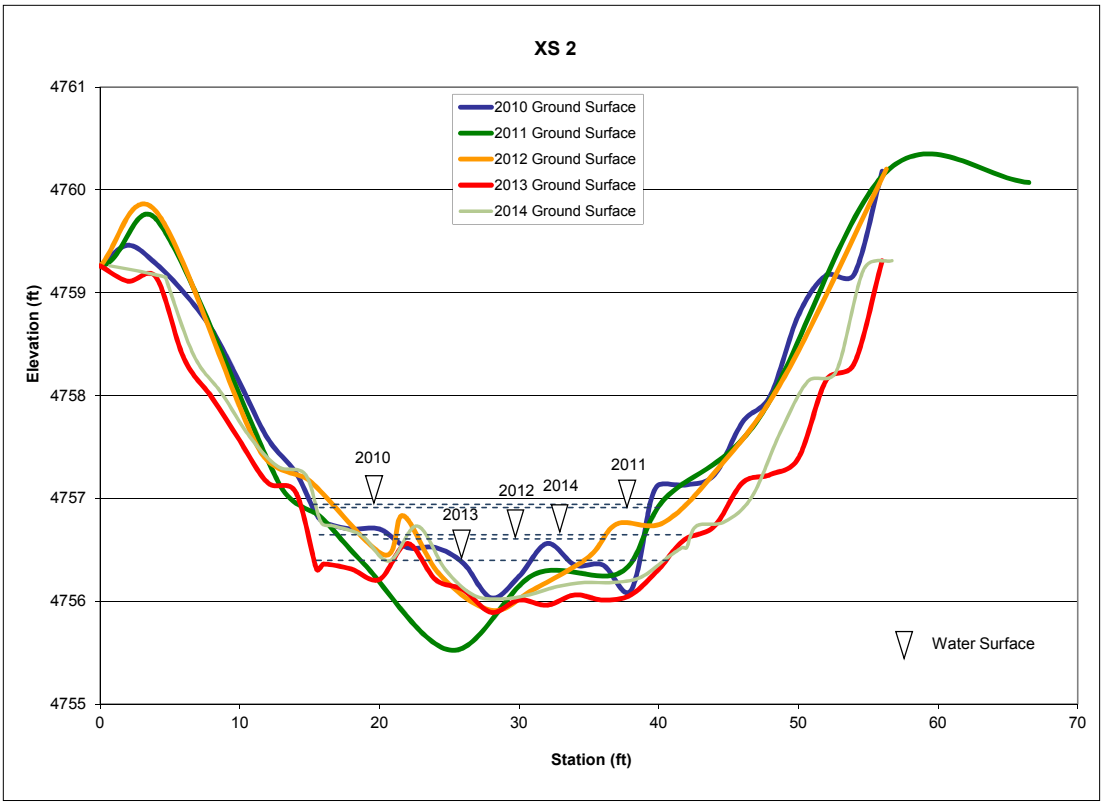


Chart 2. Survey data collected at cross-section 2 from 2010 to 2014.

The cover of plant species with high stability ratings such as sedge, broad-leaf cat-tail, reed canary grass, rush, club rush, and spikerush (Wetland Community Type 12) continued to increase along the full reach of the constructed channel streambanks in 2014. The percent cover on the banks increased from approximately 70 percent in 2011, 90 percent in 2012 and 2013, to nearly 100 percent cover in 2014. The banks of the stream channel are well vegetated and display high stability. The reach of stream between the cross-vane and confluence of Story Mill Ditch along the north property boundary has incised approximately 8 inches as a result of the lowered ditch channel. The rock cross vane installed across the stream to control head cutting has remained intact and is functioning as intended.

3.3. Vegetation

A comprehensive list of the 107 vegetation species identified at the I-90 East Bozeman mitigation site is presented on Table 2 and on the Mitigation Monitoring Forms (Appendix B). Eight vegetation community types, seven wetland and one upland, were identified on July 16, 2014 (Figure 3, Appendix A). The community names are based on the dominant species in each community type. A comprehensive list of species identified in each community is included on the Mitigation Monitoring Form in Appendix B. Discussions of the dominant species in each community are provided below.

Table 2. Vegetation species observed from 2010 to 2014 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
Algae, green	Algae, green	NL
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
Berteroa incana	Hoary False-alyssum	NL
Brassica kaber	Brassica kaber	NL
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
Centaurea stoebe	Spotted Knapweed	NL
Chamerion angustifolium	Fireweed	NL
Chenopodium leptophyllum	Narrow-Leaf Goosefoot	FACU
Cicuta douglasii	Western Water-Hemlock	OBL
Cirsium arvense	Canadian Thistle	FAC
Cirsium vulgare	Bull Thistle	FACU
Conium maculatum	Poison-Hemlock	FAC
Cornus alba	Red Osier	FACW
Cynoglossum officinale	**Gypsy-Flower**	**FACU**
Dactylis glomerata	Orchard Grass	FACU
Deschampsia caespitosa	Tufted Hair Grass	FACW
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	NL
Festuca pratensis	Meadow Fescue	NL
Geum macrophyllum	Large-Leaf Avens	FAC

[1] 2014 NWPL (Lichvar *et al.* , 2014.)

Species first observed in 2014 are **bolded**.

Table 2. (Continued). Vegetation species observed from 2010 to 2014 at the I-90 East Bozeman Wetland Mitigation Site.

Scientific Names	Common Names	WMVC Indicator Status[1]
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 articulatus	Joint-Leaf Rush	OBL
Juncus balticus	Baltic Rush	FACW
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
Linaria vulgaris	Butter-and-eggs	NL
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
Peritoma serrulata	Rocky Mountain Beeplant	FACU
Persicaria amphibia	Water Smartweed	OBL
Persicaria maculosa	Spotted 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

[1] 2014 NWPL (Lichvar *et al.* , 2014.)

Species first observed in 2014 are **bolded**.

Table 2. (Continued). Vegetation species observed from 2010 to 2014 at the I-90 East Bozeman Wetland Mitigation Site.

Scientific Names	Common Names	WMVC Indicator Status[1]
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	Russet Buffalo-Berry	UPL
Sinapis arvensis	Corn Mustard	NL
Solanum dulcamara	Climbing Nightshade	FAC
Solidago canadensis	Canadian Goldenrod	FACU
Sonchus arvensis	Field Sow-Thistle	FACU
Sparganium emersum	**European Burr-Reed**	**OBL**
Sparganium eurycarpum	Broad-Fruit Burr-Reed	OBL
Stachys palustris	Marsh Hedge-nettle	NL
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 Pennycress	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	White Moth Mullein	UPL
Verbascum thapsus	Great Mullein	FACU
Veronica americana	American-Brooklime	OBL
Veronica peregrina	Neckweed	OBL
Veronica persica	Bird-eye Speedwell	NL

[1] 2014 NWPL (Lichvar *et al.*, 2014.)

Species first observed in 2014 are **bolded**.

Upland community Type 2 – *Bromus inermis* (smooth brome) was located on 5.77 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*), Kentucky bluegrass (*Poa pratensis*), streamside wild rye (*Elymus lanceolatus*), creeping wild rye (*E. repens*), slender wild rye (*E. trachycaulus*), and 23 other species.

Wetland community Type 4 – *Typha latifolia* (broad-leaf cat-tail) was observed on 3.57 acres within the lowest contour and slopes of the constructed wetland cells. The cover on the slopes of the cells has transitioned from upland to wetland vegetation since 2011. The amount of bare ground has decreased and the percent cover and diversity of hydrophytic species has increased notably from 2011 to 2014. Bare ground was not identified as a cover class in 2014. The community size decreased slightly from 3.89 acres in 2012 to 3.57 acres in 2013 and 2014. This was primarily the result of refining the surveyed wetland boundaries. Broad-leaf cat-tail dominated the vegetation cover. Secondary species included common spikerush (*Eleocharis palustris*), American sloughgrass (*Beckmannia syzigachne*), American mannagrass (*Glyceria grandis*), lesser poverty rush (*Juncus tenuis*), lamp rush (*Juncus effusus*), tufted hairgrass (*Deschampsia cespitosa*), field meadow fox-tail (*Alopecurus pratensis*) and common duckweed.

Wetland Type 6 – *Carex spp.*/*Scirpus microcarpus* (red-tinge bulrush) characterized 2.77 acres of wetland located in the north half of the site that developed primarily between 2000 and 2009. The extent of the community remained the same from 2013 to 2014. 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), broad-leaf cat-tail, and tufted hairgrass dominated the vegetation species. A majority of wetland community Type 6 was not inundated in July 2014.

Wetland community 7 – *Typha latifolia/Carex* spp. was identified on 0.74 acre 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 cat-tail, Northwest Territory sedge, water sedge (*Carex aquatilis*), gray willow (*Salix bebbiana*), Nebraska sedge, reed canary grass, Baltic rush (*Juncus balticus*), Booth's willow (*Salix boothii*), Nebraska sedge, lesser poverty rush, and tufted hairgrass. Geyer's willow (*Salix geyeriana*), porcupine sedge (*Carex hystericina*), joint-leaf rush (*Juncus articulatus*) were also observed at less than five percent cover. The prevalence, diversity, and size of willow species within this riparian corridor have continued to increase since 2010.

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

Wetland community 9 – *Salix exigua/Carex* spp. was identified on 0.13 acre of the pre-existing wetland located along the northwest boundary where the constructed channel discharges into the Story Ditch. A small stand of narrow-

leaf willow (*Salix exigua*) 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 narrow-leaf willow, quaking aspen (*Populus tremuloides*), and gray willow with an understory of water sedge, Northwest Territory sedge, black bent grass (*Agrostis gigantea*), broad-leaf cat-tail, common spikerush, and reed canary grass.

Wetland community 10 – *Salix lasiandra* (Pacific willow) was identified on 0.29 acres in the existing wetland located at the southwest edge of the mitigation site. A majority of the Pacific willow trees that formed this community were cut down in early 2012. New branches are sprouting from the trunks. The understory is dominated by field meadow-foxtail, smooth brome, and reed canary grass.

The 0.34 acres of 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*) and green algae were present in the slower-moving, widened sections of the channel. Broad-leaf cat-tail and hard-stem club-rush (*Schoenoplectus acutus*) have established along the margins of the open water area and continued to develop into the shallow, slow-moving water through the constructed reach.

Wetland community Type 12 – *Typha latifolia/Glyceria grandis* inhabits the banks of the reconstructed channel. This 0.40-acre community type transitioned from Type 5 – *Typha latifolia*/*Poa palustris* to Type 12 between 2011 and 2012, reflecting the shift in dominance from fowl bluegrass (*Poa palustris*) to American mannagrass. The species diversity and vegetation cover continued to increase from 2012 to 2014. Broad-leaf cat-tail, American mannagrass, American sloughgrass, lamp rush, Baltic rush, lesser poverty rush, common duckweed, fowl bluegrass, and common spikerush contributed to the overall diversity of this wetland community.

Data were collected in 2014 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 pages C-7 and C-8 of Appendix C.

The vegetation transect traversed the site from southwest to northeast across WL-1 and WL-2 (wetland 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 communities dominated 98.2 percent of the transect intervals in 2014. Thirty-five vegetative species were observed along the transect in 2014 reflecting a continued upward trend in diversity since the first year of monitoring.

Table 3. Data summary for Transect 1 from 2010 to 2014 at the I-90 East Bozeman Wetland Mitigation Site.

Monitoring Year	2010	2011	2012	2013	2014
Transect Length (feet)	544	544	544	547	547
Vegetation Community Transitions along Transect	5	4	4	4	4
Vegetation Communities along Transect	5	4	4	4	4
Hydrophytic Vegetation Communities along Transect	3	3	3	3	3
Total Vegetative Species	27	26	31	32	35
Total Hydrophytic Species	18	17	26	27	27
Total Upland Species	9	9	5	5	8
Estimated % Total Vegetative Cover	60	75	90	100	100
Estimated % Unvegetated	40	25	10	0	0
% Transect Length Comprising Hydrophytic Vegetation Communities	93.0	97.8	97.8	98.2	98.2
% Transect Length Comprising Upland Vegetation Communities	7.0	2.2	2.2	1.8	1.8
% Transect Length Comprising Unvegetated Open Water	0.0	0.0	0.0	0.0	0.0
% Transect Length Comprising Mudflat	0.0	0.0	0.0	0.0	0.0

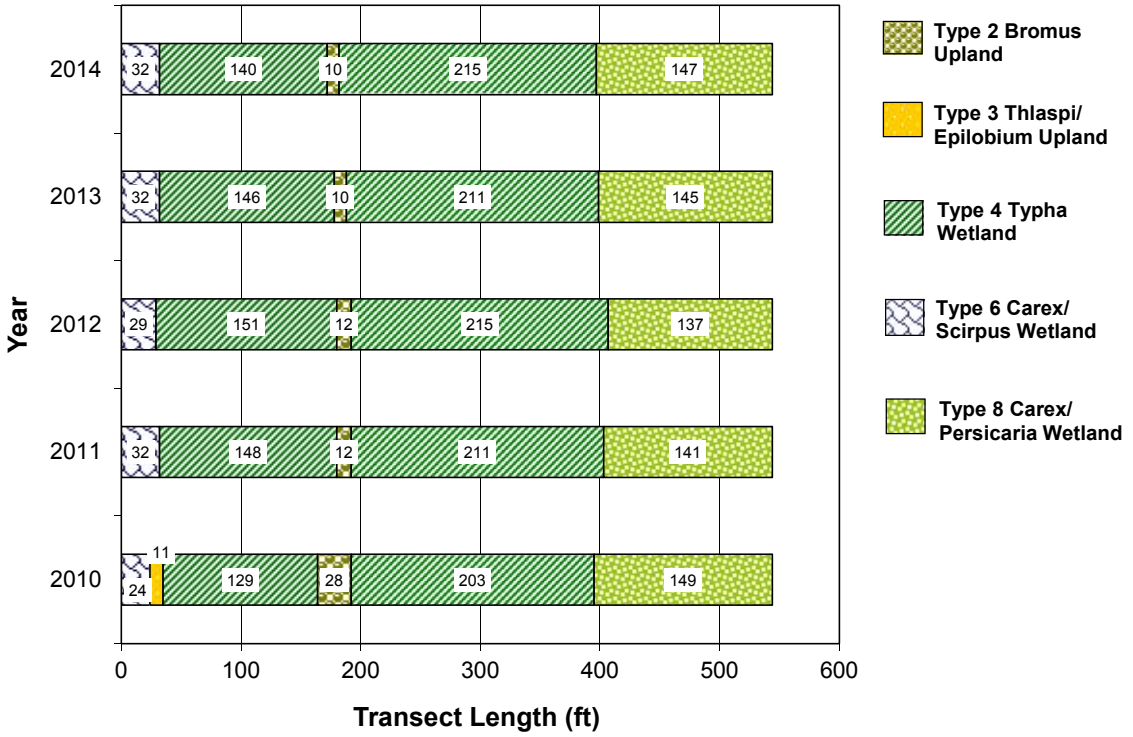


Chart 3. Transect map showing community types on Transect 1 from 2010 to 2014 from start (0 feet) to finish (544 feet) at the I-90 East Bozeman Wetland Mitigation Site.

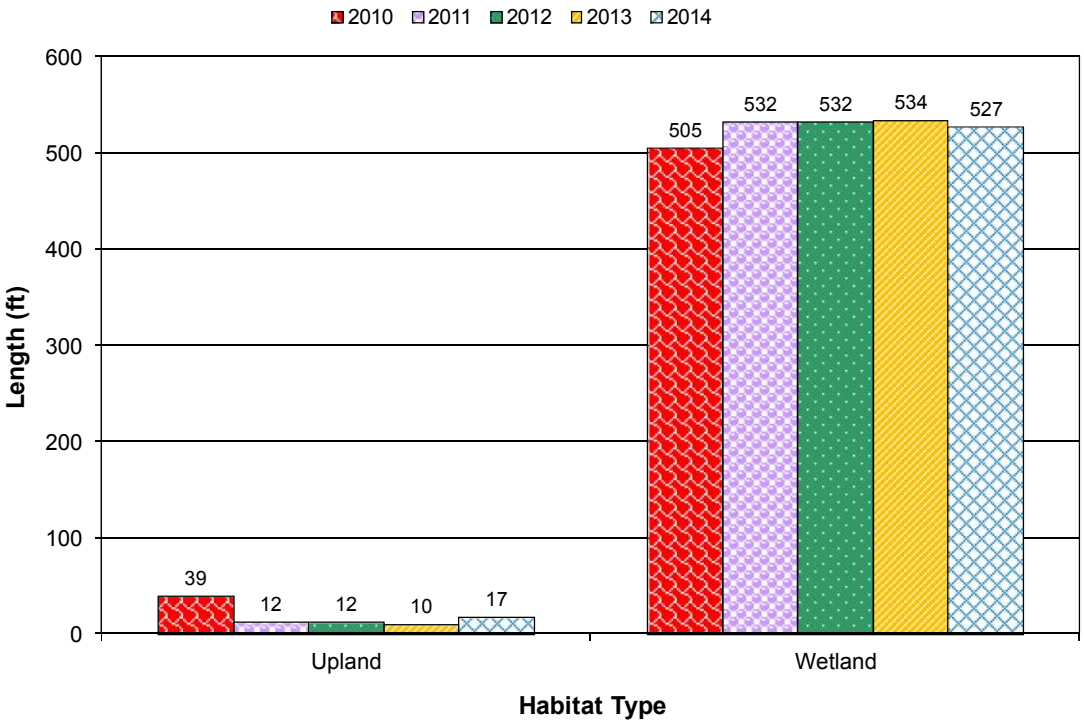


Chart 4. Length of habitat types within Transect 1 from 2010 to 2014 at the I-90 East Bozeman Wetland Mitigation Site.

The location of 44 infestations of Priority 2B weeds mapped during the 2014 site visit are shown on Figure 3 (Appendix A) and included hoary false-alyssum (*Berteroa incana*), gypsy flower (*Cynoglossum officinale*), Canadian thistle (*Cirsium arvense*), common tansy (*Tanacetum vulgare*), spotted knapweed (*Centaurea stoebe*), and butter and eggs (Yellow toadflax-*Linaria vulgaris*). Hoary false-alyssum and gypsy flower were mapped on the site for the first time in 2014. They were observed in trace amounts on less than 0.1 acre located primarily near the property boundaries. The prevalence of Canadian thistle decreased site-wide from 2011 to 2013 and 2014 as a result of herbicide spraying by MDT's contractor on the site every year since 2010. The transect photos on page C-8 show a decrease in the prevalence of Canadian thistle within Community Type 8 in 2013 and 2014. Isolated Canadian thistle plants were still present in Community Types 6, 7, 8, 10, and 12 in 2014. The size of the infestations ranged from less than 0.1 acre to 1.0 acre with cover classes ranging from trace to moderate. Common tansy appears to have spread from the confluence of the Story Ditch and historic channel to the constructed channel and south portion of the site. Two infestations of common tansy were noted near the site entry at the southwest boundary. The size was less than 0.1 acre with cover ranging from low to moderate (less than 1 percent to a high of 25 percent). One isolated spotted knapweed infestation was noted at the west boundary (outside of the site). However, the location was included on Figure 3 based on the aggressive nature of knapweed. A small infestation of butter and eggs was identified near the East Main culvert outlet on the west boundary for the first time in 2013. The weed was also observed at the east boundary in 2014.

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 up-gradient end of the channel near the East Main culvert outlet and at the outlet near the Story Ditch. Twenty-eight live plants were observed during the 2014 field survey, indicating approximately six percent survival. Two western service-berry (*Amelanchier alnifolia*), sixteen American silverberry (*Elaeagnus commutata*), two quaking aspen, two balsam poplar (*Populus balsamifera*), and six russet buffalo-berry (*Shepherdia canadensis*) were observed in good condition in 2013 and 2014. Multiple common snowberry (*Symphoricarpos albus*) volunteers were observed throughout upland Community 2 and wetland Community 6. The number, size, and diversity of gray, Pacific, Booth, and Geyer willows on the channel, particularly along the original channel, continued to increase in 2013 and 2014. Volunteer narrow-leaf, gray, Pacific, and Booth 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 frigid Cumulic Haplustolls. The Nythar loam is a hydric soil, taxonomically classified as frigid Cumulic Endoaquolls. The onsite soil test pits generally confirmed the mapped unit.

Data points BZN-1w and BZN-2w were located in areas defined as wetlands in 2014 (Figure 2, Appendix A). The soil profile at BZN-1w, located within Wetland Community 6 west of the two western-most cells, revealed a dark gray (10 YR 4/1) sandy loam with 10 percent yellowish brown (10 YR 5/6) redoximorphic concentrations in the matrix. The redox dark surface provided a positive indication of hydric soil. The soil at BZN-2w, located in Community 12 at the edge of the constructed channel, was a black (10 YR 2/1) sandy loam with a matrix containing 5 percent dark yellowish brown (10 YR 4/6) redoximorphic concentrations. The soil profile from 0 to 6 inches was muck with a hydrogen sulfide odor. The redox dark surface, hydrogen sulfide, and presence of muck were positive indicators for hydric soil. Test pit BZN-2u was located upslope of BZN-2w. The soil profile revealed a very dark grayish brown (10 YR 3/2), sandy loam soil without redoximorphic features. There were no positive indicators of hydric soil at this location.

3.5. Wetland Delineation

Three data points (BZN-1w, BZN-2w, and BZN-2u) were used to characterize the vegetation, soil, and hydrology of site wetlands (Figure 2, Appendix A; Wetland Determination Data Forms, Appendix B). Data points BZN-1w and BZN-2w were located in areas that met the wetland criteria. The July 2014 delineation identified 9.03 acres of waters of the US including wetlands (Table 4), the same

total acreage of aquatic habitat delineated in 2013. The breakdown between pre-existing, created, and open water habitat remained the same from 2013 to 2014. The total acreage of wetlands within the mitigation site included 3.51 acres of existing wetland established since 1999; 5.18 acres of wetlands developed within the constructed cells and riverine fringe of the constructed channel, and 0.34 acre of open water/Waters of the US (WUS) located within the OHWM of the existing and constructed channel. A decrease in wetland habitat was documented at this site between 2012 and 2013 and was primarily the result of the exclusion of the fringe around an excavated basin in the center of the site that did not support elevated water levels capable of supporting hydrophytic vegetation and wetland hydrology.

Table 4. Total wetland acres delineated at the I-90 East Bozeman Wetland Mitigation Site in 2000 and 2010 to 2014.

Habitat	2000 (ac)	2010 (ac)	2011 (ac)	2012 (ac)	2013 (ac)	2014 (ac)
Pre-existing Wetland Area	3.51	3.51	3.51	3.51	3.51	3.51
Created Wetland Area	---	5.32	5.63	5.82	5.18	5.18
Open Water Area	---			0.34	0.34	0.34
TOTAL WETLAND HABITAT	**3.51**	**8.83**	**9.14**	**9.67**	**9.03**	**9.03**

3.6. Wildlife

A comprehensive list of wildlife species observed from 2010 to 2014 is presented in Table 5. The eight bird species identified in 2014 are listed in bold type. Four of the six blue bird boxes showed signs of use by swallows in 2014. The tracks and scat of a deer (*Odocoileus sp.*) were noted in 2014. A muskrat (*Ondatra zibethicus*) was also observed.

Table 5. Wildlife species observed at the I-90 East Bozeman Wetland Mitigation Site from 2010 to 2014.

COMMON NAME	SCIENTIFIC NAME
AMPHIBIANS	
Frog spp	
BIRD	
American Coot	*Fulica americana*
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*

Species observed in 2014 are **bolded**.

Table 5 (continued). Wildlife species observed at the I-90 East Bozeman Wetland Mitigation Site from 2010 to 2014.

COMMON NAME	SCIENTIFIC NAME
BIRD	
Black-capped Chickadee	*Poecile atricapillus*
Blue-winged Teal	*Anas discors*
Canada Goose	***Branta canadensis***
Cinnamon Teal	*Anas cyanoptera*
Cliff Swallow	*Petrochelidon pyrrhonota*
Common Yellowthroat	***Geothlypis trichas***
Eastern Kingbird	***Tyrannus tyrannus***
Gray Catbird	*Dumetella carolinensis*
Gray Partridge	*Perdix perdix*
Green-winged Teal	*Anas crecca*
Hooded Merganser	*Lophodytes cucullatus*
Killdeer	*Charadrius vociferus*
Mallard	***Anas platyrhynchos***
Marsh Wren	*Cistothorus palustris*
Mourning Dove	*Zenaida macroura*
Northern Shoveler	*Anas clypeata*
Red-tailed Hawk	*Buteo jamaicensis*
Red-winged Blackbird	***Agelaius phoeniceus***
Ring-necked Pheasant	*Phasianus colchicus*
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	
Black Bear	*Ursus americanus*
Coyote	*Canis latrans*
Deer Sp.	*Odocoileus visp.*
Meadow Vole	*Microtus pennsylvanicus*
Mountain Cottontail	*Sylvilagus nuttallii*
Muskrat	***Ondatra zibethicus***
Raccoon	*Procyon lotor*
Red Fox	*Vulpes vulpes*
Striped Skunk	*Mephitis mephitis*
White-tailed Deer	***Odocoileus virginianus***

Species observed in 2014 are **bolded**.

3.7. Functional Assessment

Functions and values of two AAs within the I-90 East Bozeman mitigation wetlands were evaluated from 2010 to 2014 using the 2008 Montana Wetland Assessment Form (Table 6). The constructed wetland depressions and developed riverine wetlands were evaluated as one 5.18-acre AA. This AA received a Category II rating with 71.8 percent of the total points possible in 2013 and 2014, an improvement over the Category III rating and 62.7 percentage points assigned in 2011. The change in overall category was primarily the result of a higher rating in the general fish/aquatic habitat category based on the August 2011 observation of Yellowstone cutthroat trout (*Onchorhynchus clarki bouvieri*) by Montana Fish, Wildlife, and Parks fisheries biologists, the increase in the percent vegetation cover on the streambanks, and the increase in 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. High ratings were achieved for short and long term surface water storage, sediment/nutrient/toxicant removal, sediment/shoreline protection, production export/food chain support, groundwater discharge/recharge, and recreation/education potential. The functional units decreased from 48.05 in 2012 to 40.92 in 2013 and 2014, as a result of a 0.64-acre decrease in wetland area from 2012 to 2013. Another factor that contributed to the reduction in the number of functional units in 2013 and 2014 was the exclusion of the open water area (0.34 acre) from the AA wetland acreage to allow for the stream mitigation credit calculation.

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 Category II in 2013 and 2014 with 70.9 percent of the total points possible, an increase of 4.5 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 in 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, groundwater/discharge/recharge, and recreation/education potential. The functional units attained by this AA in 2013 and 2014 totaled 27.38.

3.8. Photo Documentation

Photographs taken from 2010 to 2014 at photo points one through six (PP1 through PP6, Figure 2, Appendix A) are shown on pages C-1 to C-6 of Appendix C. Transect end points are shown on pages C-7 and C-8. The stream cross sections are included on pages C-9 through C-12 and the data points are shown on page C-13 (Appendix C).

Table 6. Functions and Values of the I-90 East Bozeman Wetland Mitigation Site from 2010 to 2014.

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	2013 Pre-Existing Wetland	2014 Pre-Existing Wetland
Listed/Proposed T&E Species Habitat	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 (0.6)	Mod (0.6)
General Wildlife Habitat	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	Mod (0.4)	Mod (0.4)	Mod (0.6)	Mod (0.7)	Mod (0.7)
Flood Attenuation	Mod (0.6)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)
Short and Long Term Surface Water Storage	High (0.8)	High (0.8)	High (0.8)	High (0.8)	High (0.8)
Sediment/Nutrient/Toxicant Removal	High (0.9)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Production Export/ Food Chain Support	High (0.8)	High (0.8)	High (0.8)	High (0.8)	High (0.8)
Groundwater Discharge/Recharge	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 (0.3)	Low (0.3)
Recreation/Education Potential (bonus points)	Mod (0.1)	Mod (0.1)	High (0.2)	High (0.2)	High (0.2)
Actual Points / Possible Points	**7.1 / 11**	**7.3 / 11**	**7.7 / 11**	**7.8 / 11**	**7.8 / 11**
% of Possible Score Achieved	**64.6%**	**66.4%**	**70.0%**	**70.9%**	**70.9%**
Overall Category	**II**	**II**	**II**	**II**	**II**
Acreage of Assessed Aquatic Habitats within Easement (ac)	**3.51**	**3.51**	**3.51**	**3.51**	**3.51**
Functional Units (acreage x actual points)	**24.92**	**25.62**	**27.03**	**27.38**	**27.38**

[1]Berglund and McEldowney 2008 MDT MWAM.

Function and Value Parameters from the 2008 MDT Montana Wetland Assessment Method[1]	2010 Created Wetland Depressions & Channel	2011 Created Wetland Depressions & Channel	2012 Created Wetland Depressions & Channel	2013 Created Wetland Depressions & Channel	2014 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)
MTNHP Species Habitat	Mod (0.5)	Mod (0.5)	Mod (0.6)	Mod (0.6)	Mod (0.6)
General Wildlife Habitat	Low (0.3)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	Low (0.2)	Low (0.2)	Low (0.6)	Mod (0.7)	Mod (0.7)
Flood Attenuation	Mod (0.5)	Mod (0.5)	Mod (0.5)	Mod (0.5)	Mod (0.5)
Short and Long Term Surface Water Storage	High (0.8)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Sediment/Nutrient/Toxicant Removal	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	Mod (0.7)	Mod (0.7)	High (1.0)	High (1.0)	High (1.0)
Production Export/ Food Chain Support	Mod (0.6)	High (0.9)	High (0.9)	High (0.9)	High (0.9)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)
Recreation/Education Potential (bonus points)	Mod (0.1)	Mod (0.1)	High (0.2)	High (0.2)	High (0.2)
Actual Points / Possible Points	**5.9 / 11**	**6.9 / 11**	**7.8 / 11**	**7.9 / 11**	**7.9 / 11**
% of Possible Score Achieved	**53.6%**	**62.7%**	**70.9%**	**71.8%**	**71.8%**
Overall Category	**III**	**III**	**II**	**II**	**II**
Acreage of Assessed Aquatic Habitats within Easement (ac)	**5.32**	**5.63**	**6.16***	**5.18**	**5.18**
Functional Units (acreage x actual points)	**31.39**	**38.85**	**48.05**	**40.92**	**40.92**

[1]Berglund and McEldowney 2008 MDT MWAM.

*Acreage reported for 2012 included 0.34 acres open water area, stream mitigation credits sought for this area. Wetland acreage adjusted to exclude open water area associated with stream mitigation credits.

3.9. Maintenance Needs

The location of infestations of hoary false-alyssum, gypsy flower, Canadian thistle, common tansy, spotted knapweed, and butter and eggs were mapped on Figure 3 (Appendix A). As mentioned in Section 3.2, the percent cover of Canadian thistle did not appear to have increased from 2013 to 2014 as a result

of annual herbicide spraying. Common tansy appears to have spread to the constructed channel and south portion of the mitigation site in 2014. Hoary false-alyssum and gypsy flower were observed for the first time onsite in 2014. The weeds were primarily located near the site boundaries.

Four wood duck boxes and six bluebird boxes were observed on the site. The nesting structures were in good condition and four out of the six bluebird boxes showed signs of use by swallows in 2014. The concrete blocks and fencing installed for the wildlife jump-out on I-90 located along the east fenced boundary were repaired after the July 2011 field visit. The jump-out was in good condition in 2014.

A rock vane had been installed across the existing channel to restrict potential head cutting resulting from the excavation of the Story Ditch channel by the adjacent property owner. Head cutting was observed on MDT property in 2013. The head cut extended to the rock vane in 2014. The extent of degradation was limited by the rock vane, which was functioning as intended. The grade-control structure has remained in good condition and stable in 2013 and 2014.

3.10. Current Credit Summary

Table 7 presents the summary of wetland credits from 2010 to 2014 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 that represented 30 percent of the expected 6.1 acres of created wetland. The USACE stated that the amount of credit available at the site would be adjusted as appropriate based on the monitoring results.

Based on the results of the 2014 monitoring, 9.24 credit acres have developed within the mitigation site to date. The 2014 delineation identified the creation of 5.18 acres of wetland within and adjacent to the constructed depressions, the preservation of 3.51 acres of existing emergent wetland; and the maintenance of 2.76 acres of upland buffer. Full credit at a 1:1 impact to creation ratio was assigned to the constructed depression wetlands based on the presence of 80 percent cover of hydrophytic species and less than 10 percent cover of weeds. Full credit at a 1:1 credit ratio was assigned for the preservation of the existing wetlands based on the attainment of the same success criteria. The 0.55 acres of upland credit was awarded based on the presence of 2.76 acres within a 50-foot upland buffer calculated at a 5:1 credit ratio. As this is the final year of monitoring, it is recommended that MDT pursue acknowledgement of 9.24-acre credits developed at this mitigation site.

Table 7. Summary of Wetland Credits at the I-90 East Bozeman Wetland Mitigation Site from 2010 to 2014.

Proposed Mitigation Features	Compensatory Mitigation Type	USACE Mitigation Ratios	MDT Final Credit Estimate (Acres)	USACE Acknowledged Credit	2010 Delineated Wetland Acres	2010 Credit Acres	2011 Delineated Wetland Acres	2011 Credit Acres
Creation of riverine wetland, 2 to 3 feet wide, one half to one foot deep	Creation	1:1	0.95	1.83*	5.32	5.32	5.63	5.63
Creation of four wetland depressions	Creation	1:1	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
Open water/WUS	None							
Maintain upland buffer	Upland buffer	5:1	0.17	0.17	--	0.17	--	0.17
Total Available Credit			9.78	5.51	8.83	9.00	9.14	9.31

Proposed Mitigation Features	Compensatory Mitigation Type	USACE Mitigation Ratios	2012 Delineated Wetland Acres	2012 Credit Acres	2013 Delineated Wetland Acres	2013 Credit Acres	2014 Delineated Wetland Acres	2014 Credit Acres
Creation of riverine wetland, 2 to 3 feet wide, one half to one foot deep	Creation	1:1	5.82***	5.82	5.18	5.18	5.18	5.18
Creation of four wetland depressions	Creation	1:1						
Maintain 3.51 acres of wetland developed since 2000.	Creation	1:1	3.51	3.51	3.51	3.51	3.51	3.51
Open water/WUS	None		0.34**	--	0.34**	--	0.34**	--
Maintain upland buffer	Upland buffer	5:1	--	0.17	--	0.17	2.76	0.55
Total Available Credit			9.67	9.50	9.03	8.86	9.03	9.24

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

**Stream Credit being sought for channel, acreage excluded from credit calculations.

***Acreage reported for 2010 and 2011included open water area, stream mitigation credits sought for this area. Wetland acreage adjusted to exclude open water area associated with stream mitigation credits in 2012.

Table 8 provides a summary of the site's performance against established success criteria presented in Section 1.0 of this document. This table also provides some discussion for each standard. The success criteria for wetland characteristics, including wetland hydrology, hydric soils, and hydrophytic vegetation, have been met. The additional criteria for woody plants and herbaceous plants have also been achieved with the cover of desirable hydrophytic plants in the footprint of the created wetland cells and riverine wetland at least 80 percent and the woody overstory, particularly on the stream channel, continuing to develop site wide. The goals and performance standards for wetland acreage have not been fully achieved, falling approximately 0.9 acres shy of the overall wetland acreage, emergent wetlands comprising approximately 90 to 95 percent of the site, and scrub/shrub habitat type between 5 to 10 percent of the site. The 3.51 acres of wetland habitat initially developed have been maintained, open water is less than five percent of the total wetland area, and approximately 2.76 acres of upland were identified within a 50-foot wetland buffer on the project site in 2014. The upland buffer exhibits greater than 50 percent areal cover of desirable vegetation and less than 10 percent weed cover. The deep-rooted hydrophytic vegetation cover on the streambanks of the constructed channel increased from approximately 70 percent in 2011 to 95 percent in 2013 and 2014. Wildlife-friendly fencing has been installed around the perimeter of the mitigation site and is in good condition.

The success criteria state that bank stability success will be evaluated by using the previously constructed stream channel downstream from the new channel construction used as a reference reach. Bank stability success was to 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 2014. However, the average width of the constructed creek channel (riverine wetland) around the vicinity of cross-section 2 is greater than the 2 to 3 feet stipulated in the design. A natural constriction at the connection between the new and old channel appears to impede flow and backs up water at cross-section 2, resulting in the inundation of the adjacent low floodplain. Deposition of sediment within the channel/floodplain in the area of this backwater seems to be a natural fluvial geomorphic process that may eventually result in a channel width reflective of the target dimensions through this stretch of the stream. The majority of the constructed and undisturbed stream through the remaining reaches of the site is narrower and generally within reference specifications.

Table 8. Summary of success criteria against site performance in 2014.

Performance Standards	Success Criteria	Criteria Achieved Y/N	Discussion
Wetland Characteristics	Meet the three parameter criteria for hydrology, vegetation, and soils as outlined in the 1987 Wetland Delineation Manual and 2010 Mountains, Valleys, Coast Region.	Y	Areas identified as wetland habitat within the mitigation site meet the three parameter criteria.
Wetland Hydrology	Soil saturation present for at least 12.5 percent of the growing season.	Y	Areas identified as wetland habitat within the mitigation site exhibit soil saturation for a minimum 12.5 percent of growing season.
	Groundwater wells will be left undisturbed within the site for the purpose of monitoring groundwater elevations during the growing season.	Y	Three groundwater wells remain on site and water levels recorded in wells during the growing season reported in annual monitoring reports.
	Groundwater is filling the depressional wetlands excavated into the upland areas of the site.	Y	Groundwater has seasonally/perennially filled the depressional wetlands excavated in the upland areas of the site.
	Constructed stream channel is stable.	Y	The constructed stream channel is stable with no bank erosion identified throughout the mitigation area.
Hydric Soil	Hydric soil conditions present or appear to be forming.	Y	Hydric soil characteristics, including redoximorphic concentrations, have developed throughout a majority of the constructed wetlands.
	Soil is sufficiently stable to prevent erosion.	Y	Disturbed soil is stable and does not exhibit signs of erosion.
	Soil is able to support plant cover.	Y	Plant cover is well-developed across disturbed soils.
Hydrophytic Vegetation	Achieved when wetlands delineated as hydrophytic utilizing technical guidelines.	Y	Areas identified as wetland habitat within the mitigation site support a prevalence of hydrophytic vegetation (OBL, FACW, and FAC).
Woody Plants	Trees and shrubs will be installed and survival will be assessed.	Y	Trees and shrubs have been planted throughout the mitigation site and are assessed during each yearly monitoring visit.
	Success of woody plants determined by stem counts each year to determine survival rates or the various planted woody species and also the evaluation of naturally recruited woody plant species within the site.	Y	Each monitoring report provides the approximate number of surviving woody plants identified, including notes regarding naturally recruited woody plant species within the site
Herbaceous Plants	At least 80 percent ocular vegetation coverage by desirable hydrophytic vegetation at conclusion of monitoring period.	Y	Desirable hydrophytic vegetation consist of greater than 80 percent of total vegetation cover within delineated wetlands.
Wetland Acreage Development	Provide 9.61 acres of emergent and scrub-shrub wetlands within the project site.	N	A total of 8.69 acres of wetland habitat were identified within the site in 2014, including 8.27 acres of emergent wetland and 0.42 acres of scrub-shrub wetlands.
	Emergent wetlands will comprise approximately 90 to 95 percent of the site.	N	Approximately 56 percent of the site is comprised of emergent wetlands.
	Scrub/shrub wetland and riparian areas will comprise 5 to10 percent of the site primarily along the proposed stream corridor and between created wetlands.	N	Scrub/shrub wetland and riparian habitat comprised approximately 3 percent of the site as mapped in 2014.
	Maintain 3.51 acres of wetlands that have developed as a result of the incomplete project within the MDT site.	Y	The 3.51-acres of wetlands initially developed as a result of the incomplete project within the MDT site have been maintained.
	Create approximately 6.10 acres of new wetlands in current upland areas through the excavation of a new stream channel and depressional wetlands.	N	Approximately 5.18 acres of wetland habitat was developed through excavation of a new stream channel and depressional wetlands.
	Develop 0.21 acre of upland buffer credit through a buffer area approximately 50 feet in width from the edge of the proposed wetland areas.	Y	Approximately 2.76 acres of upland were identified within a 50-foot wetland buffer on the project site in 2014.
	Open water will comprise less than 5 percent of the total wetland area within the site after final monitoring.	Y	Excavated cells are predominantly vegetated with hydrophytic plants, no unvegetated open water mapped in 2014.

Table 8 (Continued).

Performance Standards	Success Criteria	Criteria Achieved Y/N	Discussion
Stream Channel Restoration	Considered stable when banks are vegetated with a majority of deep-rooting riparian and wetland plant species	Y	Streambanks along the constructed channel are vegetated with a diversity of deep-rooting and wetland plant species.
	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.	Y	Banks within the constructed channel are stable and compare to reference reach conditions with no signs of erosion or channel movement.
Upland Buffer	Noxious weeds do not exceed 10 percent cover within upland buffer area.	Y	Noxious weed cover has been estimated at less than 10 percent within the upland buffer.
	Any area disturbed within creditable buffer zone must have at least 50 percent aerial cover of non-weed species by end of monitoring period.	Y	Disturbed areas have established greater than 50 percent cover by non-weed species.
Weed Control	Complete annual monitoring and minimize and/or eliminate the intrusion of state-listed noxious weed species.	Y	State-listed noxious weed species across the site is less than 5 percent absolute cover.
Fencing	Install to protect integrity of the wetland from disturbance.	Y	Wildlife-friendly fencing has been installed around the easement boundaries and is in good condition.
Monitoring	Monitor the site for a minimum period of three to five years or longer as determined by the US Army Corps.	Y	Comprehensive site monitoring has been on-going for 5 years.

4. REFERENCES

Berglund, J. and R. McEldowney. 2008. *MDT Montana Wetland Assessment Method.* Prepared for Montana Department of Transportation, Helena, Montana. Post, Buckley, Schuh, & Jernigan, Helena, Montana. 42pp.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. U.S. Army Corps of Engineers. Washington, DC.

Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. *The National Wetland Plant List. 2014 Update of Wetland Ratings*. Phytoneuron 2014-41:1-42.

Montana Department of Transportation. 2006. *Threatened and Endangered Species and Biological Resources Report*. July 21, 2006. Project Number - STPX 001 (057).

National Climatic Data Center (NCDC). *Climatological Data Montana*. Volume 114 Numbers 01-06. ISSN 145-0395.

U.S. Army Corps of Engineers. 2008. Correspondence. May 14, 2008. 404 Permit Authorization for Corps File Number NWO-2007-3408-MTH.

US Army Corps of Engineers. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-3.Vicksburg, MS: US Army Engineer Research and Development Center.

Websites:

Natural Resource Conservation Service. 2010. US Department of Agriculture, WETS Station data. Accessed at: http://www.wcc.nrcs.usda.gov/climate/wetlands.html .

United States Department of Agriculture-Natural Resource Conservation Service. Web Soil Survey for Gallatin County, Montana. 2010. Accessed in August 2010 at: http://websoilsurvey.nrcs.usda.gov/app/.

Western Regional Climate Center. United States Historical Climatology Network. Reno, Nevada. 2012. Accessed October 2014.

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Appendix A

Project Area Maps – Figures 2 and 3

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

Figure 2: 2014 Monitoring Activity Locations

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

Legend

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

Base Photography Date: July 24, 2014

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/Monitor2014.mxd

Project Name
I-90 East Bozeman Mitigation Site

Drawing Title
2014 Monitoring Activity Locations

DRAWN BCS | CHECKED EN | APPROVED LU

SCALE: Noted

Drawn: October 10, 2014

PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 2

REV -

Figure 3: 2014 Mapped Site Features

ACREAGES

Project Area	14.80 acres
WUS inc. Wetlands	9.03 acres
Existing Wetlands	3.51 acres
WUS (11)	0.34 acres
Created Wetlands	5.18 acres
Upland	5.77 acres

N

0 62.5 125 250

Feet

Legend

Monitoring Limits

Wetland Limits

Vegetation Communities

Base Photography Date: July 24, 2014

Noxious Weeds
- Berteroa incana
- Cynoglossum officinale
- Linaria vulgaris
- Tanacetum vulgare
- Cirsium arvense
- Centaurea stoebe

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 (6-25% cover)
- H = High (26-100% 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

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/Veg2014.mxd

Project Name: I-90 East Bozeman Mitigation Site

Drawing Title: 2014 Mapped Site Features

DRAWN	CHECKED	APPROVED
BCS	BV	LU

SCALE: Noted

Drawn: October 10, 2014

PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 3

REV -

Appendix B

2014 MDT Wetland Mitigation Site Monitoring Form
2014 USACE Wetland Determination Data Forms
2014 MDT Montana Wetland Assessment Forms

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

MDT WETLAND MITIGATION SITE MONITORING FORM

Project Site: I-90 East Bozeman Assessment Date/Time 7/16/2014

Person(s) conducting the assessment: Erik Nyquist

Weather: sunny, clear 75 degrees 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: 5 #Visits in Year: 1

Size of Evaluation Area: 14.8 (acres)

Land use surrounding wetland:

Interstate corridor, commercial, undeveloped

HYDROLOGY

Surface Water Source: Groundwater, unnamed trib., Story Ditch

Inundation: ☑ Average Depth: 0.5 **(ft)** Range of Depths: 0.1-1.5 **(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**:**

Drainage patterns, water marks, FAC-neutral test, drift deposits, surface soil cracks, algal mat, sparsely vegetated concave surface, high water table, oxidized rhizospheres along living roots, saturation on aerial imagery, geomorphic position, and presence of reduced iron.

Groundwater Monitoring Wells

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

Well ID	Water Surface Depth (ft)
1	6.75
2	4.75
3	6.3

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:

Water levels seemed lower than 2013, field investigation completed over a month earlier in 2014 season than 2013.

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%)

Community # 2 **Community Type:** Bromus inermis / **Acres** 5.77

Species	Cover class	Species	Cover class
Agrostis gigantea	0	Alopecurus pratensis	1
Berteroa incana	0	Brassica kaber	0
Bromus inermis	5	Carduus nutans	1
Centaurea stoebe	0	Cicuta douglasii	0
Cirsium arvense	1	Deschampsia caespitosa	0
Elymus lanceolatus	2	Elymus repens	2
Elymus trachycaulus	2	Festuca arundinacea	1
Hordeum jubatum	1	Linaria vulgaris	0
Pascopyrum smithii	3	Peritoma serrulata	0
Persicaria amphibia	0	Phleum pratense	0
Poa pratensis	3	Polypogon monspeliensis	0
Rumex crispus	0	Shepherdia canadensis	1
Symphoricarpos albus	1	Tanacetum vulgare	2
Thlaspi arvense	0	Typha latifolia	0
Verbascum thapsus	0		

Comments:

Community # 4 **Community Type:** Typha latifolia / **Acres** 3.57

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

Comments:

Community # 6 **Community Type:** Carex spp. / Scirpus microcarpus **Acres** 2.77

Species	Cover class	Species	Cover class
Agrostis gigantea	0	Algae, green	0
Carex nebrascensis	3	Carex stipata	0
Carex utriculata	4	Cicuta douglasii	0
Cirsium arvense	0	Deschampsia caespitosa	3
Elymus repens	1	Epilobium ciliatum	2
Glyceria grandis	0	Helianthus annuus	1
Lemna minor	1	Persicaria amphibia	3
Phalaris arundinacea	3	Rosa woodsii	0
Scirpus microcarpus	4	Solidago canadensis	1
Stachys palustris	1	Symphoricarpos albus	0
Tanacetum vulgare	1	Typha latifolia	4
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 caespitosa	2
Juncus articulatus	1	Juncus balticus	3
Juncus tenuis	2	Lemna minor	1
Mentha arvensis	0	Persicaria amphibia	2
Phalaris arundinacea	3	Salix bebbiana	4
Salix boothii	2	Salix geyeriana	1
Solanum dulcamara	0	Typha latifolia	5
Veronica peregrina	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	2
Cirsium vulgare	0	Deschampsia caespitosa	0
Geum macrophyllum	2	Juncus articulatus	0
Juncus balticus	2	Juncus effusus	2
Juncus longistylis	0	Lactuca serriola	0
Mentha arvensis	1	Persicaria amphibia	4
Phalaris arundinacea	2	Rosa woodsii	0
Scirpus microcarpus	2	Solidago canadensis	0
Sonchus arvensis	1	Tanacetum vulgare	0
Thlaspi arvense	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	3	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** 0.29

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

Comments:

Community # 11 **Community Type:** Open Water / **Acres** 0.34

Species	Cover class	Species	Cover class
Algae, green	1	Lemna minor	2
Open Water	5	Schoenoplectus acutus	1
Typha latifolia	1		

Comments:

Community # 12 **Community Type:** Typha latifolia / Glyceria grandis **Acres** 0.4

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

Comments:

Total Vegetation Community Acreage **14.8**

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

VEGETATION TRANSECTS

Site: I-90 East Bozeman Date: 7/16/2014

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

Interval Data:

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

Species	Cover class	Species	Cover class
Algae, green	1	Carex nebrascensis	3
Carex utriculata	4	Cirsium arvense	1
Deschampsia caespitosa	1	Epilobium ciliatum	1
Glyceria grandis	0	Lemna minor	2
Persicaria amphibia	3	Phalaris arundinacea	4
Scirpus microcarpus	3	Tanacetum vulgare	1
Typha latifolia	2	Veronica peregrina	3

Ending Station 172 **Community Type:** Typha latifolia /

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

Ending Station 189 **Community Type:** Bromus inermis /

Species	Cover class	Species	Cover class
Agrostis gigantea	1	Alopecurus pratensis	1
Bromus inermis	4	Cirsium arvense	1
Deschampsia caespitosa	0	Elymus repens	1
Festuca arundinacea	1	Phleum pratense	3
Poa pratensis	3	Shepherdia canadensis	0
Tanacetum vulgare	0	Typha latifolia	0

Ending Station 397 **Community Type:** Typha latifolia /

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

Ending Station 544 **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
Cirsium vulgare	0	Geum macrophyllum	2
Juncus balticus	2	Juncus effusus	2
Mentha arvensis	1	Persicaria amphibia	4
Phalaris arundinacea	1	Rosa woodsii	1
Sonchus arvensis	2	Tanacetum vulgare	1
Thlaspi arvense	0		

Transect Notes:

PLANTED WOODY VEGETATION SURVIVAL

I-90 East Bozeman

Planting Type	#Planted	#Alive	Notes
Amelanchier alnifolia		2	
Cornus alba	50	0	
Crataegus douglasii	50	0	
Elaeagnus commutata	200	16	Observed 16 alive with good growth
Populus balsamifera		2	Observed 2 volunteers alive with good growth
Populus tremuloides		2	Observed 2 volunteers alive in good condition
Salix spp.	50		Approx. 50-75 cuttings planted, observed several S. Bebbiana, S. Lasiandra, S. Boothii shoots
Shepherdia canadensis	100	6	Observed 6 alive in good condition
Symphoricarpos albus			Observed several volunteer plants in Veg. Comms. 2 and 6

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 willow (50) were installed in November 2009 along the stream channel and the southern edges of the two cells adjacent to the north stream bank.

WILDLIFE

Birds

Were man-made nesting structures installed? Yes

If yes, type of structure: 4 wood duck boxes, 6 blue bird boxes

How many? 10

Are the nesting structures being used? Yes

Do the nesting structures need repairs? No

Nesting Structure Comments:

The nest structures are in good condition. 4 of the 6 blue bird boxes exhibited use by tree swallows in 2014.

Species	#Observed	Behavior	Habitat
Canada Goose	8	F, L, N	MA, OW, WM
Common Yellowthroat	1	L	SS
Coot	2	L	AB, OW
Eastern Kingbird	1	F	UP
Mallard	4	F, L, N	AB, OW, WM
Red-winged Blackbird	10	BD, F, L, N	AB, MA, OW, SS, WM
Tree Swallow	20	BD, F, FO, N	AB, OW, SS, UP, WM
Yellow-headed Blackbird	12	F, L, N	MA, SS, WM, US

Bird Comments

BEHAVIOR CODES

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

HABITAT CODES

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

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

Mammals and Herptiles

Species	# Observed	Tracks	Scat	Burrows	Comments
Muskrat	1	No	No	Yes	
White-tailed Deer	1	Yes	Yes	No	

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
10-13	45.678112	-111.012642	200	PP4, pano
1-5	45.677654	-111.015664	90	PP1, pano
17-20	45.677163	-111.013052	290	PP5, pano
21	45.6775	-111.014425	350	PP6
22	45.677976	-111.015333	10	T-1, start
23	45.678831	-111.01363	220	T-1, end
26	45.677794	-111.015405	350	XS-1, downstream
27	45.677831	-111.015357	150	XS-1, upstream
33	45.678063	-111.013429	165	XS-2, upstream
34	45.678063	-111.013429	345	XS-2, downstream
35	45.678625	-111.014887	45	BZN-1w
36	45.677682	-111.01417	45	BZN-2w
37	45.677642	-111.014118	0	BZN-2u
8	45.67958	-111.0139	350	PP2, looking downstream
9	45.679497	-111.013849	170	PP3, looking upstream

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

Functional Assessments

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

Functional Assessment Comments:

Maintenance

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

If yes, do they need to be repaired? No

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

Were man-made structures built or installed to impound water or control water flow into or out of the wetland? Yes

If yes, are the structures in need of repair? No

If yes, describe the problems below.

Rock vane installed above Story ditch has limited the amount of head-cutting within stream. Banks seem to be stabilized due to increased vegetation (willow and reed canarygrass).

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

Project/Site: I-90 East Bozeman City/County: Bozeman, Gallatin Sampling Date: 7/16/2014

Applicant/Owner: MDT State: Montana Sampling Point: BZN-1w

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

Landform (hillslope, terrace, etc.): wet meadow Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 45.678626 Long: -111.014889 Datum: WGS84

Soil Map Unit Name: Enbar-Nythar loams 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:

VEGETATION - Use scientific names of plant

Tree Stratum Plot size (30 Foot Radius) — Absolute % Cover: — Domiant Species? — Indicator Status

Sapling/Shrub Stratum Plot size (15 Foot Radius)

Herbaceous Stratum Plot size (5 Foot Radius)

Cirsium arvense	5	☐	FAC
Deschampsia caespitosa	10	☐	FACW
Juncus balticus	30	☑	FACW
Persicaria amphibia	30	☑	OBL
Scirpus microcarpus	35	☑	OBL

Woody Vine Stratum Plot size (30 Foot Radius)

Percent Bare Ground 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: 100 % (A/B)

Prevalence Index worksheet

Total % Cover of:			Multiply by:
OBL species	65	X 1	65
FACW species	40	X 2	80
FAC species	5	X 3	15
FACU species	0	X 4	0
UPL species	0	X 5	0
Column Totals	110 (A)		160 (B)

Prevalence Index = B/A = 1.45455

Hydrophytic Vegetation Indicators

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

Indicators of hydric sil and wetland hydrology must be present, unless disturbed or problematic for #3, 4, 5.

Hydrophytic Vegetation Present? Yes ☑ NO ☐

Remarks:

SOIL

Sampling Point: BZN-1w

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1	95	10YR 5/6	5	C	M	Silty Clay Loam	
6-20	10YR 4/1	90	10YR 5/6	10	C	M	Sandy 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): 8

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks:

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

Project/Site: I-90 East Bozeman City/County: Bozeman, Gallatin Sampling Date: 7/16/2014

Applicant/Owner: MDT State: Montana Sampling Point: BZN-2u

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

Landform (hillslope, terrace, etc.): Bench Local relief (concave, convex, none): flat Slope (%): 1

Subregion (LRR): LRR E Lat: 45.677646 Long: -111.014118 Datum: WGS84

Soil Map Unit Name: Enbar-Nythar loams 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 ☐	
Hydric Soil Present?	Yes ☐	No ☑	**Is the Sampled Area within a Wetland?** Yes ☐ No ☑
Wetland Hydrology Present?	Yes ☐	No ☑	

Remarks:

VEGETATION - Use scientific names of plant

Tree Stratum Plot size (30 Foot Radius)

	Absolute % Cover:	Domiant Species?	Indicator Status

Sapling/Shrub Stratum Plot size (15 Foot Radius)

Herbaceous Stratum Plot size (5 Foot Radius)

Bromus inermis	70	☑	FAC
Cirsium arvense	10	☐	FAC
Dactylis glomerata	5	☐	FACU
Elymus trachycaulus	5	☐	FAC
Poa palustris	5	☐	FAC
Thlaspi arvense	5	☐	UPL

Woody Vine Stratum Plot size (30 Foot Radius)

Percent Bare Ground 0

Dominance Test worksheet

Number of Dominant Species that are OBL, FACW or FAC: 1 (A)

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

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

Prevalence Index worksheet

Total % Cover of:			Multiply by:
OBL species	0	X 1	0
FACW species	0	X 2	0
FAC species	90	X 3	270
FACU species	5	X 4	20
UPL species	5	X 5	25
Column Totals	100 (A)		315 (B)

Prevalence Index = B/A = 3.15

Hydrophytic Vegetation Indicators

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

Indicators of hydric sil and wetland hydrology must be present, unless disturbed or problematic for #3, 4, 5.

Hydrophytic Vegetation Present? Yes ☑ NO ☐

Remarks:

SOIL

Sampling Point: BZN-2u

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	100					Sandy Loam	
4-20	10YR 3/2	100					Sandy 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:

No hydric soil indicators observed.

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:

No hydrology indicators identified.

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

Project/Site: I-90 East Bozeman City/County: Bozeman, Gallatin Sampling Date: 7/16/2014

Applicant/Owner: MDT State: Montana Sampling Point: BZN-2w

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

Landform (hillslope, terrace, etc.): Channel (active) Local relief (concave, convex, none): concave Slope (%): 1.5

Subregion (LRR): LRR E Lat: 45.67768 Long: -111.014179 Datum: WGS84

Soil Map Unit Name: Enbar-Nythar loams 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:

VEGETATION - Use scientific names of plant

Tree Stratum Plot size (30 Foot Radius)

	Absolute % Cover:	Domiant Species?	Indicator Status

Sapling/Shrub Stratum Plot size (15 Foot Radius)

Cornus alba	10	☑	FACW
Salix exigua	5	☑	FACW

Herbaceous Stratum Plot size (5 Foot Radius)

Alopecurus pratensis	5	☐	FAC
Carex nebrascensis	5	☐	OBL
Eleocharis palustris	20	☑	OBL
Glyceria grandis	25	☑	OBL
Juncus balticus	40	☑	FACW
Lemna minor	5	☐	OBL
Typha latifolia	20	☑	OBL

Woody Vine Stratum Plot size (30 Foot Radius)

Percent Bare Ground 0

Dominance Test worksheet

Number of Dominant Species that are OBL, FACW or FAC: 6 (A)

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

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

Prevalence Index worksheet

Total % Cover of:			Multiply by:
OBL species	75	X 1	75
FACW species	55	X 2	110
FAC species	5	X 3	15
FACU species	0	X 4	0
UPL species	0	X 5	0
Column Totals	135	(A)	200 (B)

Prevalence Index = B/A = 1.48148

Hydrophytic Vegetation Indicators

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

Indicators of hydric sil and wetland hydrology must be present, unless disturbed or problematic for #3, 4, 5.

Hydrophytic Vegetation Present? Yes ☑ NO ☐

Remarks:

SOIL

Sampling Point: BZN-2w

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1						Muck	
6-20	10YR 2/1	95	10YR 4/6	5	C	M	Sandy 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): 4

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 0

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 7/16/2014 **4. Evaluators** E. Nyquist **5. Wetland/Site# (s)** I-90 East Bozeman, creation

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

Approx Stationing or Mileposts

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

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 5.18

How assessed: Measured e.g. by GPS

Purpose of Evaluation

- ☐ **Wetlands potentially affected by MDT project**
- ☐ **Mitigation Wetlands: pre-construction**
- ☑ **Mitigation Wetlands: post construction**
- ☐ **Other**

9. Assesssment area (AA) size (acres) 5.18

How assessed: Measured e.g. by GPS

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Depressional	Emergent Wetland	Excavated	Permanent/Perennial	80
Riverine	Unconsolidated Bottom	Excavated	Permanent/Perennial	20

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 disturbance	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)

The site is currently managed in a natural state. Site access is currently restricted and protected by a conservation easement. The AA is surrounded by transporation infrastructure, commercial and residential developments, interstate/interstate interchange, and a railroad.

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

Canada thistle, common tansy, yellow toadflax, hoary alyssum, spotted knapweed, gypsy flower

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

The AA includes an approximately 885-foot-long stream channel and four wetland depressions that were constructed in 2009. The AA is surrounded by I-90, East Main Street, a railroad corridor, and commercial/residential developments.

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: No species listed as occurring in corresponding Township and Range in 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), 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: YCT observed by MFWP in 2011. GBH listed on MNHP database for township and range with suitable habitat on site.

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		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				L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	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			.7M
Moderate	.9H	.7M	.5M	
Minimal	.6M		.2L	

Comments Moderate wildlife observed during the 2014 site visit including several bird species, deer tracks, and muskrat.

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		.5M							.7M	.6M	.5M		.3L	.3L
FWP Tier II or Native Game fish species		.8H	.7M	.6M		.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M		.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M			.4M	.4M	.3L	.5M	.4M	.3L		.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M		.5M	.4M		.3L						.2L	.2L	.2L			.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** .7M

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:*

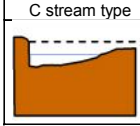
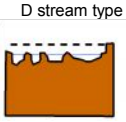
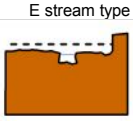
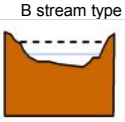
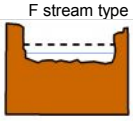
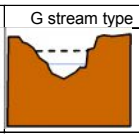
Modifed Rating .7M

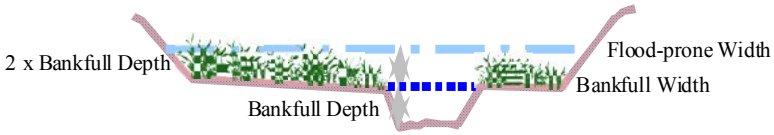
iii. Final Score and Rating: .7 M **Comments:** Culverts located at up-gradient and down-gradient ends of constructed channel. YCT is a Tier 1 fish species.

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
						



Floodprone 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: Culverts located at upstream and downstream ends of constructed channel. No outlet on depressional wetland cells but 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: The wetland cells are closed depressions. The channel has a restricted outlet. Greater than 70% cover and evidence of ponding in 2014.

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: The wetland cells are closed depressions. The channel has a restricted outlet. Greater than 70% cover and evidence of ponding in 2013.

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

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

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

Comments: Stability based on species including meadow foxtail, Amercian mannagrass, and creeping spikerush on the banks of the 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	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

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

a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** ○ **N** ○ *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:* **Modified Rating** .9H

Comments: Moderate wildlife activity observed. Surface outlet via overland flow to channel. P/P water 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: The site was saturated to the surface during 2014 site visit. Vegetation growing in July.

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 education for wetland mitigation/construction

General Site Notes

The AA is constructed wetland cells and stream.

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): I-90 East Bozeman, creation

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	0	1	0	☐
B. MT Natural Heritage Program Species Habitat	M	.6	1	3.108	☐
C. General Wildlife Habitat	M	.7	1	3.626	☐
D. General Fish Habitat	M	.7	1	3.626	☐
E. Flood Attenuation	M	.5	1	2.59	☑
F. Short and Long Term Surface Water Storage	H	1	1	5.18	☑
G. Sediment/Nutrient/Toxicant Removal	H	1	1	5.18	☑
H. Sediment/Shoreline Stabilization	H	1	1	5.18	☐
I. Production Export/Food Chain Support	H	.9	1	4.662	☐
J. Groundwater Discharge/Recharge	H	1	1	5.18	☑
K. Uniqueness	L	.3	1	1.554	☐
L. Recreation/Education Potential (bonus points)	H	.2	NA	1.036	☐
Totals:		7.9	11	40.922	
Percent of Possible Score			**71.82** %		

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

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

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

☐

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

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

I	II	III	IV

MDT Montana Wetland Assessment Form (revised March 2008)

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

3. Evaluation Date 7/16/2014 **4. Evaluators** E. Nyquist **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

How assessed: Measured e.g. by GPS

Purpose of Evaluation

- ☐ **Wetlands potentially affected by MDT project**
- ☐ **Mitigation Wetlands: pre-construction**
- ☑ **Mitigation Wetlands: post construction**
- ☐ **Other**

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

How assessed: Measured e.g. by GPS

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Riverine	Emergent Wetland		Seasonal/Intermittent	65
Riverine	Scrub-Shrub Wetland		Seasonal/Intermittent	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 disturbance	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)

The AA includes pre-existing wetlands associated with the Story Ditch, an unnamed tributary to the Story Ditch, and wet meadow wetlands created prior to additional wetland mitigation construction activities completed in 2009.

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

Canada thistle, common tansy, yellow toadflax, spotted knapweed, houndstongue, and hoary alyssum.

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

The AA includes 3.51 acres (credited area allowed for preservation) of wetland identified prior to the 2009 wetland mitigation construction and down-gradient end of the ditch channel. No recent disturbance has occurred to the AA. The AA is managed in conservation easement. Surrounding landuse includes commercial developments, residential developments, transportation (interstate and interstate interchange, East Main Street), and a 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 includes scrub-shrub 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: No species occurrences listed by corresponding Township and Range in 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), 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: MFWP observed YCT in 2011. GBH listed on MNHP database for township and range with suitable habitat on site.

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		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			L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	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			.7M
Moderate	.9H	.7M	.5M	
Minimal	.6M		.2L	

Comments Moderate disturbance in AA, P/P water regime in10% of AA, uneven vegetation classes and moderate wildlife use of AA observed in 2014 during on-site investigation.

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		.5M							.7M	.6M	.5M		.3L	.3L
FWP Tier II or Native Game fish species		.8H	.7M	.6M		.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M		.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M			.4M	.4M	.3L	.5M	.4M	.3L		.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M		.5M	.4M		.3L						.2L	.2L	.2L			.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** .7M

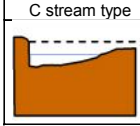
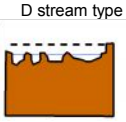
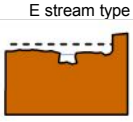
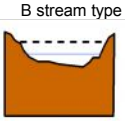
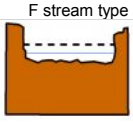
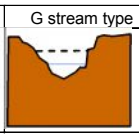
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ○ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating .7M

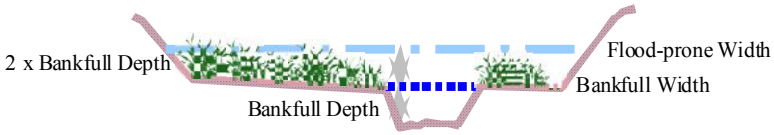
iii. Final Score and Rating: .7 M **Comments:** YCT is a tier 1 fish species. Culverts are present on the inlet and outlet on up-gradient and down-gradient end of constructed channel. Well-developed vegetation on stream banks.

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
						



Floodprone 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 of and downstream from AA. Adjacent meadow is subject to overflow channel. Approximately 35% of stream banks are 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 that approximately 3.51 acres of wetland are inundated to a depth of 0.6 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 wetland flooded in 2011. Creek flowing in 2014 with 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 stream banks are vegetated with species with high stability ratings (Sandbar willow, Bebb willow, Baltic rush, beaked sedge, creeping spikerush, Nebraska sedge, water sedge, and American mannagrass).

14I. Production Export/Food Chain Support:

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

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

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

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

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

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

Comments: Moderate ratings for fish and wildlife support. Surface outlet provided by channel. P/P water 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: A portion of the AA was saturated at the surface during the 2014 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, wetland construction/mitigation education

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	.7	1	2.457	☐
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:		7.8	11	27.378	
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 above)

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 2012



Photo Point 1:
Bearing: 0-100 Degrees

Location: "Welcome to Bozeman" sign
Taken in 2013



Photo Point 1:
Bearing: 0-100 Degrees

Location: "Welcome to Bozeman" sign
Taken in 2014



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



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



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



Photo Point 2
Bearing: 350
Location: Upstream of Story Ditch facing downstream
Taken in 2013



Photo Point 2
Bearing: 350
Location: Upstream of Story Ditch facing downstream
Taken in 2014



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



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



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



Photo Point 3
Bearing: 170
Location: Upstream of Story Ditch facing upstream
Taken in 2013



Photo Point 3
Bearing: 170
Location: Upstream of Story Ditch facing upstream
Taken in 2014



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 2012



Photo Point 4:
Bearing: 200-340 Degrees

Location: Looking west from east boundary.
Taken in 2013



Photo Point 4:
Bearing: 200-340 Degrees

Location: Looking west from east boundary.
Taken in 2014



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 2012



Photo Point 5:
Bearing: 290-40 Degrees

Location: SE corner looking north.
Taken in 2013



Photo Point 5:
Bearing: 290-40 Degrees

Location: SE corner looking north.
Taken in 2014

No Photo Available

Photo Point 6
Bearing: 350 Degrees
Location: S of New Channel
Taken in 2010



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



Photo Point 6
Bearing: 350 Degrees
Location: S of New Channel
Taken in 2013



Photo Point 6
Bearing: 350 Degrees
Location: S of New Channel
Taken in 2014



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



Transect 1 – *Start*
Bearing: 10 Degrees
Location: Veg Com 6
Taken in 2011



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



Transect 1 – *Start*
Bearing: 10 Degrees
Location: Veg Com 6
Taken in 2013



Transect 1 – *Start*
Bearing: 10 Degrees
Location: Veg Com 6
Taken in 2014



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



Transect 1 – *End*
Bearing: 220 Degrees
Location: Veg Com 8
Taken in 2011



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



Transect 1 – *End*
Bearing: 220 Degrees
Location: Veg Com 8
Taken in 2013



Transect 1 – *End*
Bearing: 220 Degrees
Location: Veg Com 8
Taken in 2014



Cross Section 1
Bearing: 350 Degrees

Location: XS-1 looking downstream
Taken in 2010



Cross Section 1
Bearing: 350 Degrees

Location: XS-1 looking downstream
Taken in 2012



Cross Section 1
Bearing: 350 Degrees

Location: XS-1 looking downstream
Taken in 2013



Cross Section 1
Bearing: 350 Degrees

Location: XS-1 looking downstream
Taken in 2014



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 1 – *Photo 2* **Location:** XS-1 looking upstream
Bearing: 150 Degrees **Taken in 2013**



Cross Section 1 – *Photo 2* **Location:** XS-1 looking upstream
Bearing: 150 Degrees **Taken in 2014**



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 2012



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

Location: XS-2 looking upstream
Taken in 2013



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

Location: XS-2 looking upstream
Taken in 2014



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 2012



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

Location: XS-2 looking downstream
Taken in 2013



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

Location: XS-2 looking downstream
Taken in 2014



Data Point: BZN-1w
Bearing: 310 degrees
Location: Veg Com 6
Taken in 2014



Data Point: BZN-2w
Bearing: 240 degrees
Location: Veg Com 12
Taken in 2014

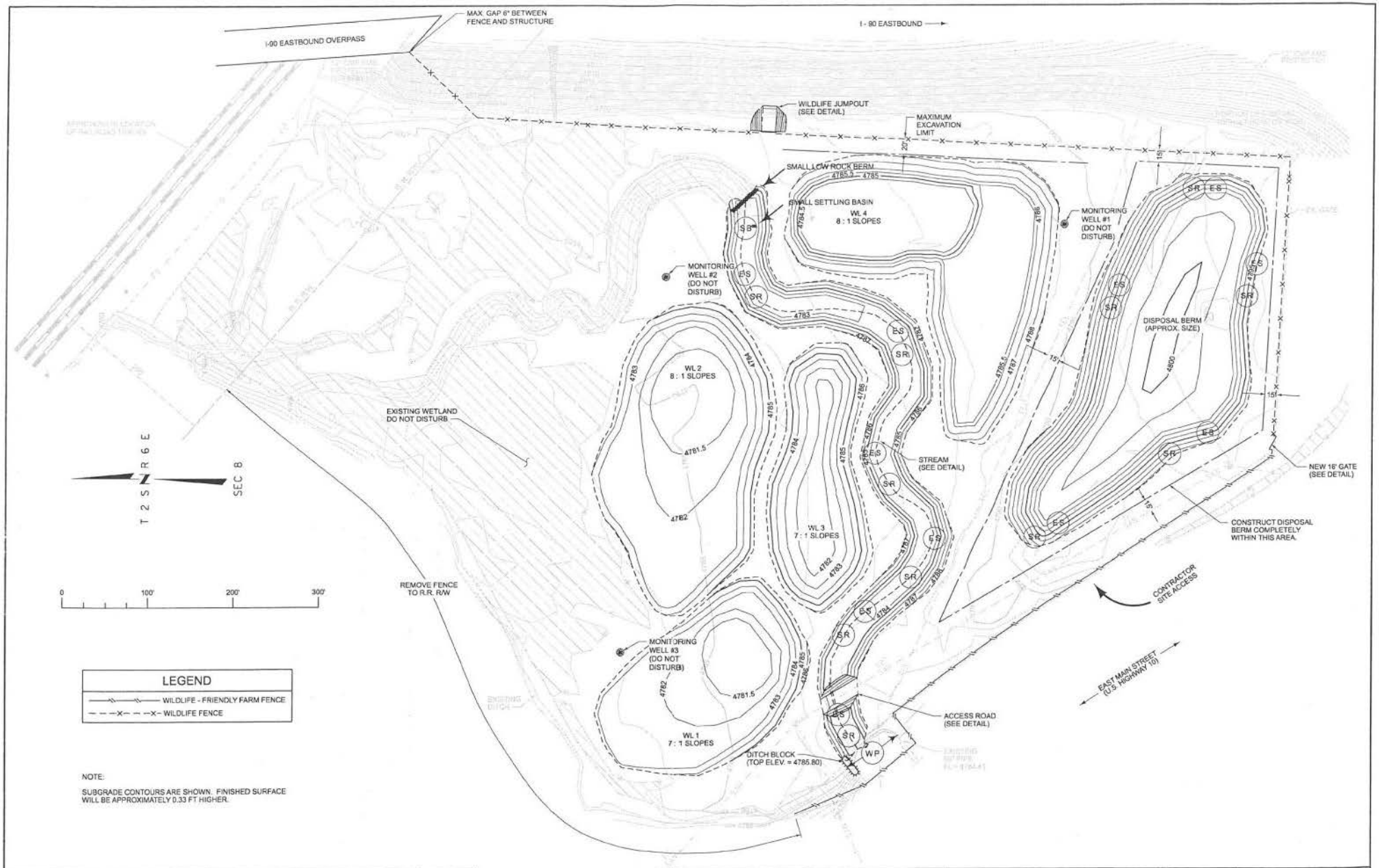


Data Point: BZN-2u
Bearing: 290 degrees
Location: Veg Com 2
Taken in 2014

Appendix D

Project Plan Sheet

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



NOTE:

SUBGRADE CONTOURS ARE SHOWN. FINISHED SURFACE WILL BE APPROXIMATELY 0.33 FT HIGHER.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\571000ener001.dgn	DESIGNED BY		EAST BOZEMAN INTERCHANGE WETLAND MITIGATION	ARRA 16(73)
2		6/16/2010	REVIEWED BY		CSF = 0.999429 UPN NUMBER 5710000	SHEET 3 OF 3
1		8:07:09 AM CPS - U2004	CHECKED BY			