MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2013

I-90 East Bozeman
Gallatin County, Montana



Prepared for:

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December 2013

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I-90 East Bozeman
Gallatin County, Montana

MDT Project Number STPX-0016(057)
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SPA # MDT-R3-62-2007
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1. INTRODUCTION

The Interstate 90 (I-90) East Bozeman 2013 Wetland Mitigation Monitoring Report presents the results of the fourth year of monitoring at the East Bozeman mitigation site. The wetland and stream mitigation site was constructed on a 14.81 acre parcel owned by the Montana Department of Transportation (MDT), located in the northwest corner of the interchange between I-90 and East Main Street in Bozeman, Montana (Figure 1). The project is located in the southeast quarter, northwest quarter of Section 8 in Township 2 South, Range 6 East, in Gallatin County. The mitigation site lies within the boundaries of Watershed 6, the Upper Missouri River Basin.

The wetland and stream restoration project was partially constructed in 1999 by Rajah and Associates under an MDT Lease Agreement. Construction was 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). Five years of mitigation monitoring will be required unless the success criteria are met and recognized by the USACE prior to the fifth year of monitoring (USACE 2008).

Figures 2 and 3 (Appendix A) show the Monitoring Activity Locations and Mapped Site Features at the mitigation site, respectively. Appendix B contains the MDT Wetland Mitigation Site Monitoring Forms, the USACE Wetland Determination Data Forms for the Western Mountains, Valleys, and Coast Region (USACE 2010), and the 2008 MDT Montana Wetland Assessment Forms (Berglund and McEldowney 2008). Appendix C contains photographs of the project area and Appendix D includes the project plan sheet.

A wetland delineation completed in 2005 identified 3.47 acres of wetlands, an increase from the 0.2 acres identified in 1997. These additional wetlands developed as a result of a partial channel reconstruction in 1999 that facilitated the flow of surface water across the site. The existing Story Ditch conveys water along the west and north boundaries of the MDT property. The Story Ditch was dug historically for agricultural purposes. The 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 Line railroad and I-90 into Rocky Creek, ultimately draining to the East Fork of the Gallatin River.

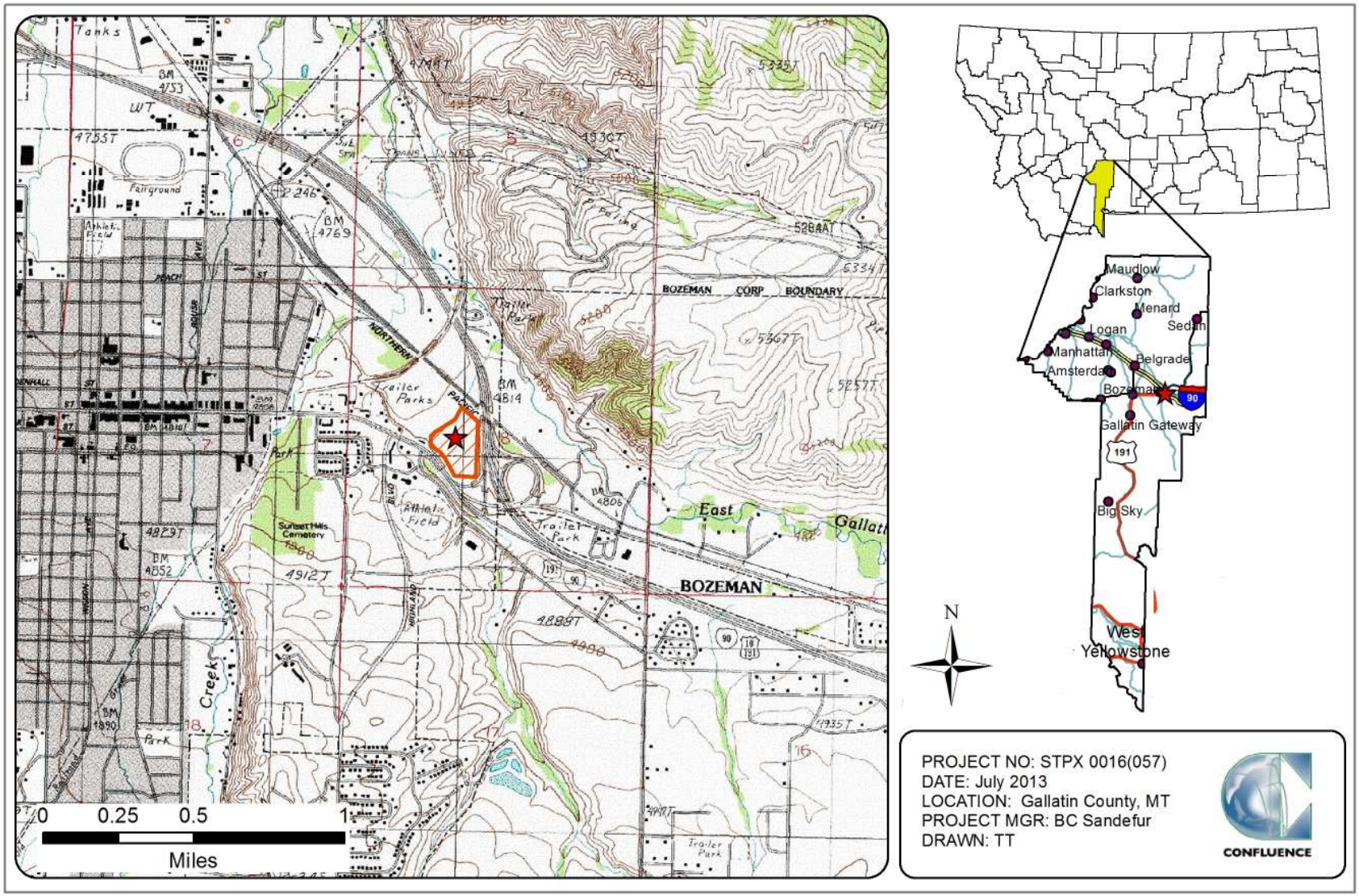


Figure 1. Project location I-90 East Bozeman Wetland Mitigation Site.

CONFLUENCE

The USACE 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 of wetland species trees and shrubs.
- Weeds will be controlled in both the wetland and upland areas.

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

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

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

The goal of the project is to increase the amount of wetlands within the site and 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 it 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 fourth year of monitoring was completed on August 20, 2013. Information for the Mitigation Monitoring Form and the Wetland Determination Data Forms were entered electronically on a palmtop computer during the field investigation (Appendix B). Monitoring activity locations were mapped using a global positioning system (GPS) (Figure 2, Appendix A). Information collected entailed locating wetland boundaries, mapping vegetation communities, monitoring vegetation transects, assessing planted woody species survival, developing bank stability data, surveying steam cross-sections, collecting soil and hydrology data, documenting bird and wildlife use, taking photographs, and examining (non-engineering) the infrastructure established within the mitigation project area.

2.1. Hydrology

Technical criteria for wetland hydrology guidelines have been established as "permanent or periodic inundation, or soil saturation within 12 inches of the ground surface for a significant period (usually 14 days or 12.5 percent or more during the growing season)" (USACE 2010). Systems with continuous inundation or saturation for greater than 12.5 percent of the growing season are considered wetlands. The growing season is defined for purposes of this report as the number of days where there is a 50 percent probability that the minimum daily temperature is greater than or equal to 28 degrees Fahrenheit (Environmental Laboratory 1987). The growing season recorded for the meteorological station at Bozeman MSU (241044) located less than four miles from the mitigation site extends from May 5 through October 1 for a total of 149 days (NRCS 2010). Areas defined as wetlands would require 19 days of inundation or saturation within 12 inches of the ground surface to meet the hydrology criteria and performance standards.

Hydrologic indicators as outlined on the USACE wetland determination data form were documented at three data points, BZN-1u, BZN-2w, and BZN-3w, established 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 August 20, 2013 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 was developed in each yearly monitoring report. Photographs were taken at the endpoints of the transect during the monitoring event (Appendix C). The survival of woody species installed 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. 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 Draft 2012 National Wetland Plant List (NWPL) (Lichvar and Kartesz. 2009). Previous years' reports used the 1988 National List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1988). The 2012 NWPL scientific 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 2013 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 2013 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 2012 (WRCC 2012). The annual precipitation total was 23.86 inches in 2010 (5.29 inches above the 118-year average), 17.08 inches in 2011 (1.49 inches below the long-term average), and 15.02 inches in 2012 (3.55 inches below 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), and 9.58 inches (2013). These data suggest the 2011 through 2013 growing seasons experienced increasingly drier than normal conditions.

Groundwater levels were measured in monitoring wells MW-1, MW-2, and MW-3 (Figure 2, Appendix A) in 2013. 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. Well MW-3 is located on the north edge of the western-most cell. Groundwater levels were 6.0 feet below the ground surface (bgs) in MW-1, 5.25 feet bgs in MW-2, and 2.53 feet bgs in MW-3. The 2013 groundwater elevations were the lowest in all three wells in the four years of monitoring. The groundwater elevations in MW-1 and MW-2 dropped 2.25 feet and 3.75 feet, respectively from 2012 to 2013. The groundwater level in MW-3 decreased 0.61 feet from 2012 to 2013, reflecting more stable hydrology within the wetland preservation area of the site. The monitoring events from 2011 to 2013 were completed on July 18, August 9, and August 20, respectively. The annual pattern of precipitation for Bozeman typically results in 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). Decreased annual precipitation totals each year since 2010 are reflected in the decreased water table elevation within the mitigation site.

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
MW-1	2.06	3.35	3.75	6.00
MW-2	1.77	1.40	1.50	5.25
MW-3	1.44	2.25	1.92	2.53

Surface water depths in the pre-existing stream ranged from 0.5 to 1.5 feet during the 2013 field survey and were generally lower than the previous three years. Inundation levels were also lower in the constructed cells in August 2013 compared to field observations recorded during previous surveys. The water

depth in the lowest contour of the cells averaged 0.1 feet in 2013. Approximately 15 percent of the mitigation area was inundated. 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, 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, drainage patterns, geomorphic position, and FAC-neutral test.

Three data points, BZN 1-u, BZN 2-w, and BZN 3-w, were assessed to refine the upland and wetland boundaries in 2013 (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 2-w and BZN 3-w were located within areas that met the wetland hydrology criteria. Positive indicators of wetland hydrology at BZN 2-w were surface water high water table, saturation, oxidized rhizospheres along living roots, drainage patterns, saturation visible on aerial imagery, geomorphic position and FAC-neutral test. The data point was located within wetland community Type 12 at the edge of the constructed channel. Positive hydrological indicators present at BZN 3-w, located in wetland community Type 6, were surface soil cracks, presence of reduced iron, drainage patterns, and FAC-neutral test. No positive indicators of wetland hydrology were observed at the upland data point, BZN 1-u.

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 2013 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 2013 (Chart 1). The banks of this cross-section are entirely vegetated with reed canarygrass (*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.

The channel at cross-section 2 has displayed over-wide conditions since construction (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 of the channel have effectively narrowed the surface water flow and thalweg. The average width of the constructed creek channel down-gradient of the culvert outlet is generally greater than the 2 to 3 feet stipulated in the design. The width of the creek at

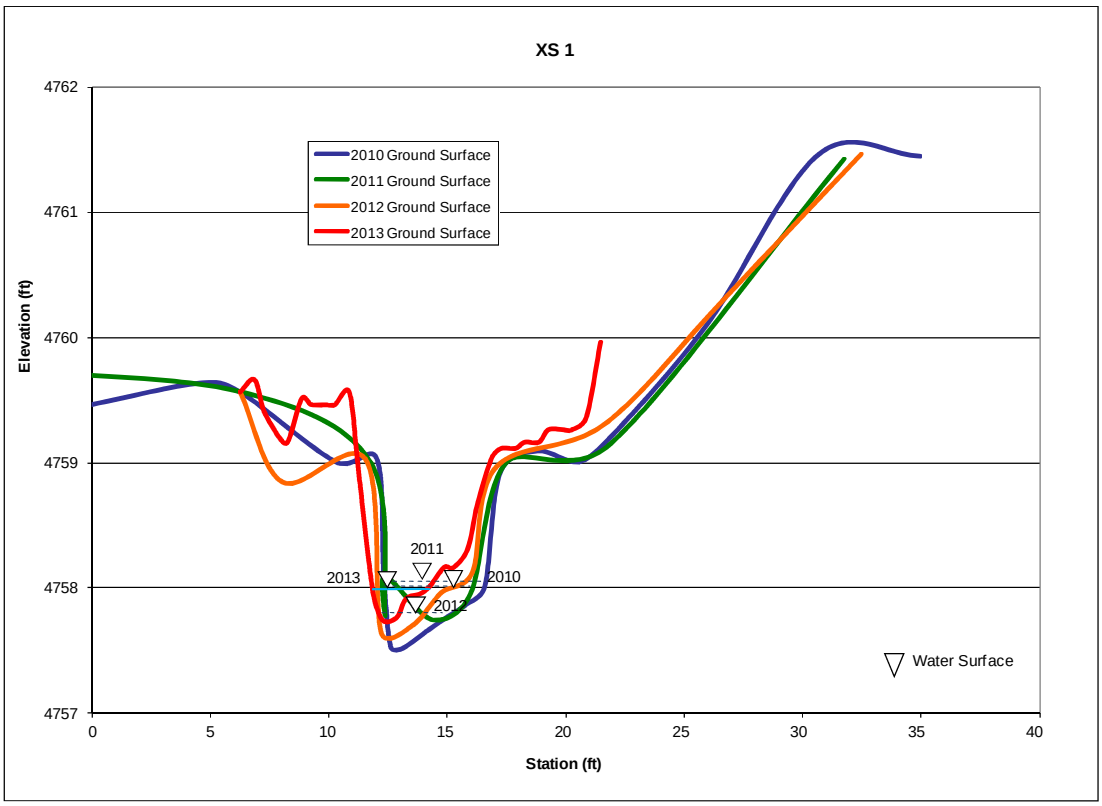


Chart 1. Survey data collected at cross-section 1 from 2010 to 2013.

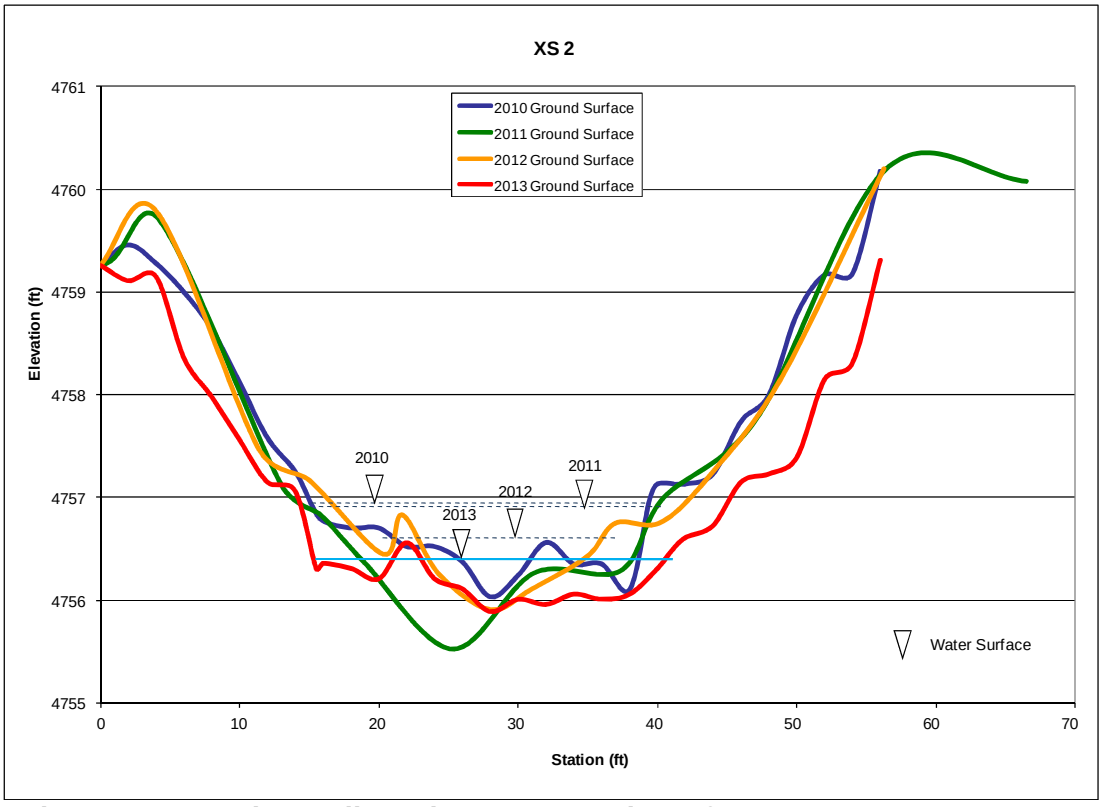


Chart 2. Survey data collected at cross-section 2 from 2010 to 2013.

cross-section 2 is approximately 25 feet. Continued aggradation of the channel appears to be improving the width/depth ratio and general aquatic habitat quality of this stream.

The cover of plant species with high stability ratings such as sedge, broad-leaf cat-tail, reed canarygrass, rush, club rush, and spikerush (Wetland Community Type 12) continued to increase along the full reach of the constructed channel streambanks in 2013. The percent cover on the banks increased from approximately 70 percent in 2011 to 90 percent in 2012 and 2013. 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 northern 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 headcutting has remained intact and is functioning as intended.

3.3. Vegetation

A comprehensive list of the 103 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 August 20, 2013 (Figure 3, Appendix A). The open water below the ordinary high water mark (OHWM) of the constructed and original channel was defined as a Water of the US and mapped as polygon 11 (Figure 3, Appendix A). Common duckweed (*Lemna minor*) and green algae were present in the slower-moving, widened sections of the channel. The community names are based on the dominant species in each community type. A comprehensive list of species identified in each community is provided in the Mitigation Monitoring form in Appendix B. Discussions of each community are provided below.

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 17 other species.

Wetland community Type 4 – *Typha latifolia* (broad-leaf cat-tail) was observed within the lowest contour and slopes of the constructed wetland cells. Upland community Type 3 characterized the slopes of the cells in 2011. The amount of bare ground decreased and the percent cover and diversity of hydrophytic species has increased notably from 2011 to 2013. The community size decreased slightly from 3.89 acres in 2012 to 3.57 acres in 2013, primarily a result of the refinement of the surveyed wetland boundaries. Broad-leaf cat-tail dominated the vegetation cover. Secondary species included common spikerush

Table 2. Vegetation species observed from 2010 to 2013 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
Brassica kaber	**Wild Mustard**	**UPL**
Bromus inermis	Smooth Brome	FAC
Carduus nutans	Nodding Plumeless Thistle	UPL
Carex aquatilis	Leafy Tussock Sedge	OBL
Carex hystericina	Porcupine Sedge	OBL
Carex nebrascensis	Nebraska Sedge	OBL
Carex rostrata	Swollen Beaked Sedge	OBL
Carex stipata	Stalk-Grain Sedge	OBL
Carex utriculata	Northwest Territory Sedge	OBL
Chamerion angustifolium	Narrow-Leaf Fireweed	FACU
Chenopodium leptophyllum	Narrow-Leaf Goosefoot	FACU
Cicuta douglasii	Western Water-Hemlock	OBL
Cirsium arvense	Canadian Thistle	FAC
Cirsium vulgare	Bull Thistle	FACU
Cleome serrulata	Rocky Mountain Beeplant	FACU
Conium maculatum	Poison-Hemlock	FAC
Cornus alba	Red Osier	FACW
Dactylis glomerata	Orchard Grass	FACU
Deschampsia cespitosa	Tufted Hairgrass	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	FAC
Festuca pratensis	Meadow Fescue	FACU

1Lichvar and Kartesz, 2009.

Species first observed in 2013 are bolded.

Table 2. (Continued). Vegetation species observed from 2010 to 2013 at the I-90 East Bozeman Wetland Mitigation Site.

Scientific Names	Common Names	WMVC Indicator Status[1]
Geum macrophyllum	Large-Leaf Avens	FAC
Glyceria grandis	American Manna Grass	OBL
Helianthus annuus	Common Sunflower	FACU
Heracleum maximum	American Cow-Parsnip	FAC
Hordeum brachyantherum	Meadow Barley	FACW
Hordeum jubatum	Fox-Tail Barley	FAC
Juncus arcticus	Arctic Rush	FACW
Juncus articulatus	Joint-Leaf Rush	OBL
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**	**UPL**
Medicago lupulina	Black Medick	FACU
Melilotus officinalis	Yellow Sweet-Clover	FACU
Mentha arvensis	American Wild Mint	FACW
Mimulus guttatus	Seep Monkey-Flower	OBL
Pascopyrum smithii	Western-Wheat Grass	FACU
Persicaria amphibia	Water Smartweed	OBL
Persicaria maculosa	Lady's-Thumb	FACW
Phalaris arundinacea	Reed Canary Grass	FACW
Phleum pratense	Common Timothy	FAC
Poa palustris	Fowl Blue Grass	FAC
Poa pratensis	Kentucky Blue Grass	FAC
Polypogon monspeliensis	Annual Rabbit's-Foot Grass	FACW
Populus tremuloides	Quaking Aspen	FACU
Ribes aureum	Golden Currant	FAC
Rosa woodsii	Woods' Rose	FACU
Rudbeckia occidentalis	Western Coneflower	FAC
Rumex crispus	Curly Dock	FAC
Rumex occidentalis	Western Dock	FACW

1Lichvar and Kartesz, 2009.

Species first observed in 2013 are bolded.

Table 2. (Continued). Vegetation species observed from 2010 to 2013 at the I-90 East Bozeman Wetland Mitigation Site.

Scientific Names	Common Names	WMVC Indicator Status[1]
Salix bebbiana	Gray Willow	FACW
Salix boothii	Booth's Willow	FACW
Salix exigua	Narrow-Leaf Willow	FACW
Salix geyeriana	Geyer's Willow	FACW
Salix lasiandra	Pacific Willow	FACW
Schoenoplectus acutus	Hard-Stem Club-Rush	OBL
Scirpus cyperinus	Cottongrass Bulrush	OBL
Scirpus microcarpus	Red-Tinge Bulrush	OBL
Shepherdia canadensis	Canada Buffalo-Berry	UPL
Sinapis arvensis	Charlock Mustard	UPL
Solanum dulcamara	Climbing Nightshade	FAC
Solidago canadensis	Canadian Goldenrod	FACU
Sonchus arvensis	Field Sow-Thistle	FACU
Sparganium eurycarpum	Broad-Fruit Burr-Reed	OBL
Stachys palustris	Marsh Hedgenettle	FACW
Stellaria umbellata	Umbrella Starwort	FACW
Symphoricarpos albus	Common Snowberry	FACU
Symphoricarpos occidentalis	Western Snowberry	FAC
Tanacetum vulgare	Common Tansy	FACU
Taraxacum officinale	Common Dandelion	FACU
Thlaspi arvense	Field Penny-Cress	UPL
Trifolium fragiferum	Strawberry-Head Clover	FACU
Trifolium hybridum	Alsike Clover	FAC
Trifolium pratense	Red Clover	FACU
Typha latifolia	Broad-Leaf Cat-Tail	OBL
Urtica dioica	Stinging Nettle	FAC
Verbascum blattaria	Moth Mullein	UPL
Verbascum thapsus	Great Mullein	FACU
Veronica americana	American-Brooklime	OBL
Veronica peregrina	Neckweed	OBL
Veronica persica	Birdeye Speedwell	UPL

1Lichvar and Kartesz, 2009.

Species first observed in 2013 are bolded.

(*Eleocharis palustris*), American sloughgrass (*Beckmannia syzigachne*), American mannagrass (*Glyceria grandis*), lesser poverty rush (*Juncus tenuis*), lamp rush (*Juncus effusus*), tufted hairgrass (*Deschampsia cespitosa*), and common duckweed. Inundation levels were lower in the wetland cells in 2012 and 2013 as compared to 2010 and 2011, likely the result of lower annual precipitation totals and completing the survey later in the growing season.

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 between 2000 and 2009. The community decreased 0.05 acre in 2013. Red-tinge bulrush, Northwest Territory sedge (*Carex utriculata*), Nebraska sedge (*Carex nebrascensis*), reed canary grass (*Phalaris arundinacea*), and water smartweed (*Persicaria amphibia*, called *Polygonum amphibium* on 1988 list) dominated the vegetation species. A majority of wetland community Type 6 was not inundated in August 2013.

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*), porcupine sedge (*Carex hystericina*), reed canary grass, narrow-leaf willow (*Salix exigua*), gray willow (*Salix bebbiana*), Booth's willow (*Salix boothii*), Nebraska sedge, arctic rush (*Juncus arcticus*), and lesser poverty rush. Geyer's willow (*Salix geyeriana*) and 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 has 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. Twelve 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 located on the southwest edge of the southwest cell was included in this community in 2012 and 2013. 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 in the existing wetland located at the southwest edge of the mitigation site and was approximately 0.29 acres. A majority of the woody overstory in this community has been removed including several Pacific willow trees that were cut down in early 2012. New branches are sprouting from the trunks. The understory is dominated by field meadow-foxtail (*Alopecurus pratensis*), smooth brome, reed canary grass, and broad-leaf cat-tail.

Wetland community Type 12 – *Typha latifolia/Glyceria grandis* was identified along the banks of the reconstructed channel. This 0.40-acre community type

transitioned from Type 5 – *Typha latifolia*/*Poa palustris*, identified in 2011, 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 2013. Broad-leaf cat-tail, American mannagrass, lamp rush, American sloughgrass, arctic rush, common duckweed, fowl bluegrass, common spikerush, and lesser poverty rush contributed to the overall diversity of this wetland community.

The open water below the OHWM of the entire channel was labeled as Polygon 11 on Figure 3 and consisted of 0.34 acres. Green algae, broad-leaf cat-tail, common duckweed, and hard-stem club-rush (*Schoenoplectus acutus*) were observed in the open water area. An increase of emergent vegetation along the margins of the stream was noted during the 2013 survey.

Data were collected in 2013 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 (wetlands cells identified on the Project Plan Sheet in Appendix D) and a portion of the pre-existing wetland. The transect intersected wetland communities 4, 6, and 8 and upland community 2. Hydrophytic vegetation communities dominated 98.2 percent of the transect intervals, a slight increase from the 97.8 percent measured in 2011 and 2012. Thirty-two vegetative species were observed along this transect in 2013 and reflect a general trend of continuing increase in diversity since initial monitoring.

Table 3. Data summary for Transect 1 from 2010 to 2013 at the I-90 East Bozeman Wetland Mitigation Site.

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

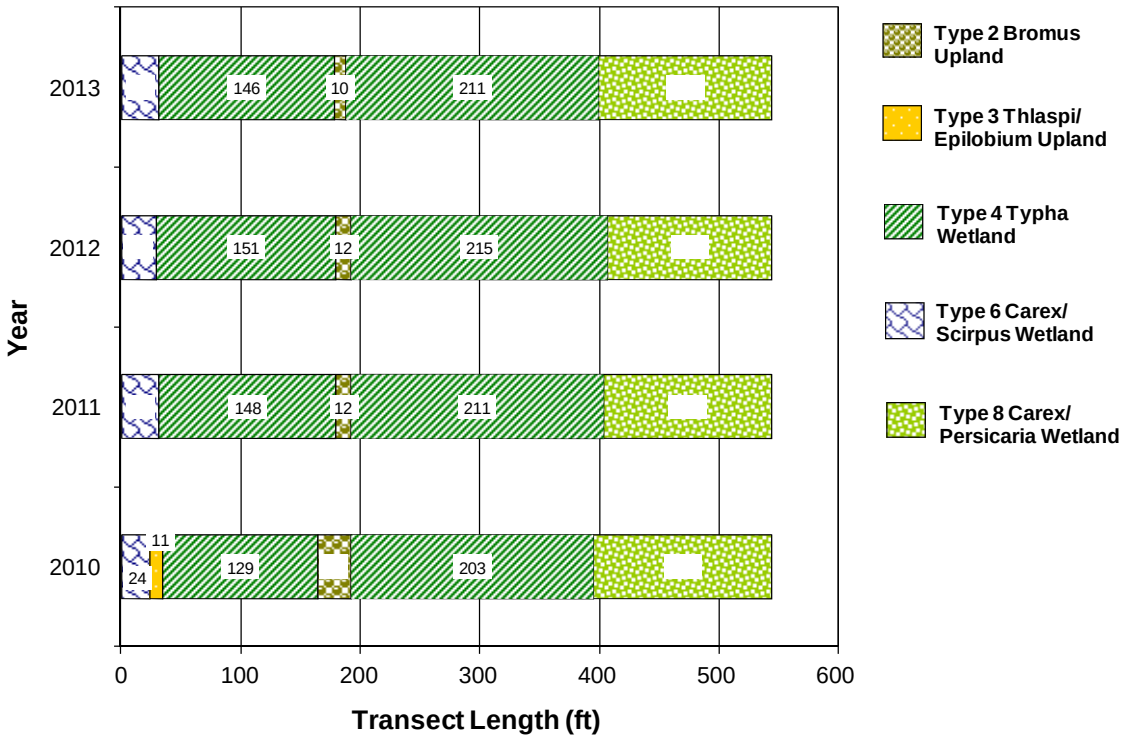


Chart 3. Transect map showing community types on Transect 1 from 2010 to 2013 from start (0 feet) to finish (544 feet) at the I-90 East Bozeman Wetland Mitigation Site.

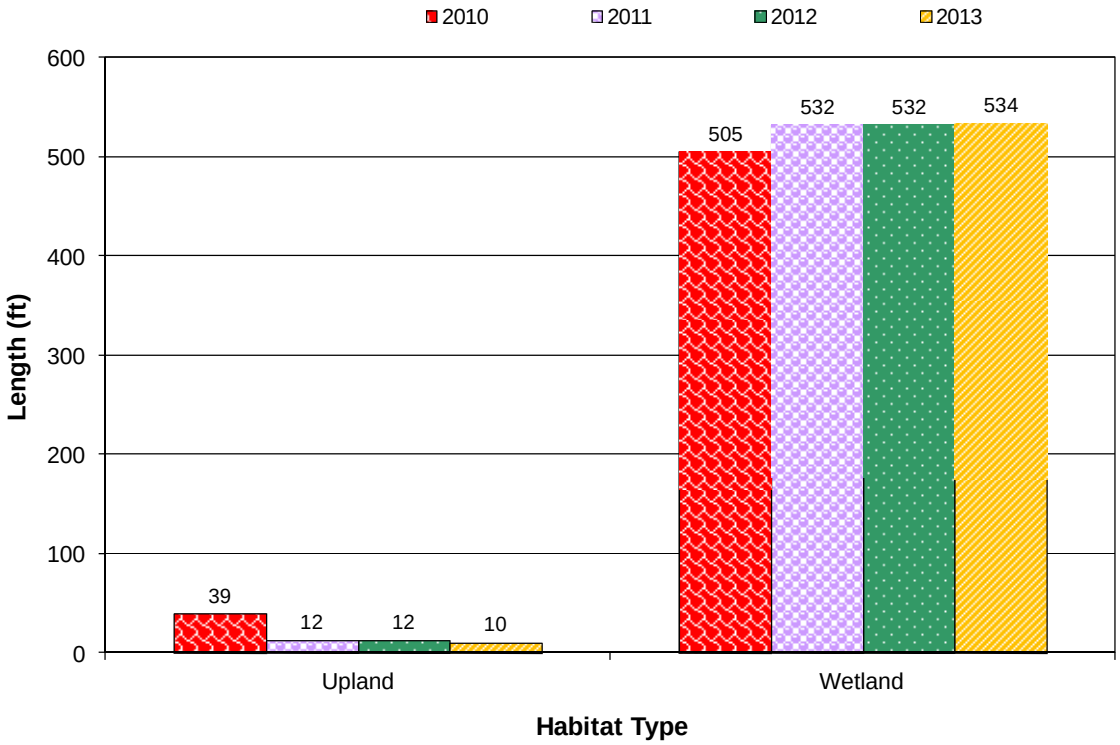


Chart 4. Length of habitat types within Transect 1 from 2010 to 2013 at the I-90 East Bozeman Wetland Mitigation Site.

The location of infestations of Priority 2B weeds, Canadian thistle (*Cirsium arvense*), common tansy (*Tanacetum vulgare*), spotted knapweed (*Centaurea maculosa*), and butter and eggs (Yellow toadflax-*Linaria vulgaris*), were mapped and are shown on Figure 3 (Appendix A). The prevalence of Canadian thistle decreased site-wide from 2011 to 2013 as a result of herbicide spraying by MDT and it's contractor conducted within this site every year since 2010 including July and August of 2013. Isolated Canadian thistle plants were still present across Community Types 6, 7, and 8. The size of the infestations ranged from less than 0.1 acre to 1.0 acre with cover classes ranging from trace to moderate. The common tansy infestations were primarily located next to the historic channel near the convergence with the Story Ditch. Two infestations of common tansy were located near the site entry at the west 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. The location was included on Figure 3 based on the aggressive nature of knapweed. A small infestation of butter and eggs was identified on site for the first time in 2013. The plants were located near the East Main culvert outlet on the west boundary.

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. Two Western service-berry (*Amelanchier alnifolia*), sixteen American silverberry (*Eleagnus commutata*), two quaking aspen, and two balsam poplar (*Populus balsamifera*) were observed in 2013. Multiple common snowberry (*Symphoricarpos albus*) volunteers were observed throughout upland Community 2 and wetland Community 6. The number, size, and diversity of willows on the channel, particularly along the original channel, continued to increase in 2013. Volunteer narrow-leaf, gray, Pacific, and Booth's willow shoots were also observed in the perimeter of the constructed cells.

3.4. Soil

The project site is mapped in the *Gallatin County Soil Survey* (USDA 2010) as the Enbar-Nythar loam found on 0 to 4 percent slopes. The Enbar and Nythar series are comprised of somewhat poorly drained loam soils found on floodplains. The Enbar loam is considered a non-hydric soil, taxonomically classified as a frigid Cumulic Haplustolls. The Nythar loam is a hydric soil, taxonomically classified as a frigid Cumulic Endoaquolls. The on-site soil test pits generally confirmed the mapped unit.

Data points BZN 2-w and BZN 3-w were located in areas defined as wetlands (Figure 2, Appendix A). The soil profile at BZN 2-w, located at the west edge of the constructed channel in Wetland Community 12, revealed a (10 YR 5/1) gray sandy clay loam with dark yellowish brown (10 YR 4/6) redoximorphic concentrations in the matrix. The depleted matrix provided a positive indication of hydric soil. The soil at BZN 3-w, located between a constructed cell and the

restored channel, was a black (10 YR 2/1) sandy clay loam with a matrix containing 10 percent yellowish brown (10 YR 5/6) redoximorphic concentrations. This met the criteria for a redoximorphic dark surface. Test pit BZN 1-u was located in upland community 2. The soil profile revealed a dark grayish brown, sandy clay loam (10 YR 4/2) soil without redoximorphic features. There were no positive indicators of hydric soil at this location.

3.5. Wetland Delineation

Three data points (BZN 1-u, BZN 2-w, and BZN 3-w) 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 2-w and BZN 3-w were located in areas that met the wetland criteria. The August 2013 delineation identified 9.03 acres of waters of the US including wetlands (Table 4), representing a decrease of 0.64 acre since 2012. There were minor decreases in wetland acreage in wetland community types 4, 6, and 12. The decrease may be the result of the timing of the monitoring event, the reduction in the annual precipitation total for 2013, and/or refinement of the surveyed wetland boundary.

The total acreage of wetlands within the mitigation site included 3.51 acres of existing wetland developed since 1999; 5.18 acres of wetlands that have 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.

Table 4. Total wetland acres delineated at the I-90 East Bozeman Wetland Mitigation Site in 2000 and 2010 to 2013.

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

3.6. Wildlife

A comprehensive list of wildlife species observed from 2010 to 2013 is presented in Table 5. The nine bird species identified in 2013 are listed in bold type. Two white-tailed does (*Odocoileus virginianus.*) were observed in the scrub-shrub along the channel outlet. A muskrat (*Ondatra zibethicus*) den and black bear (*Ursus americanus*) scat were also noted. Coyote (*Canas latrans*), red fox (*Vulpus vulpus*), and skunk (*Mephitis mephitis*) tracks were observed in 2013.

Table 5. Wildlife species observed at the I-90 East Bozeman Wetland Mitigation Site from 2010 to 2013.

COMMON NAME	SCIENTIFIC NAME
AMPHIBIANS	
Frog spp	
BIRD	
American Crow	*Corvus brachyrhynchos*
American Goldfinch	*Spinus tristus*
American Robin	*Turdus migratorius*
American Wigeon	*Anas americana*
Bank Swallow	*Riparia riparia*
Barn Swallow	*Hirundo rustica*
Black-billed Magpie	*Pica hudsonia*
Black-capped Chickadee	***Poecile atricapillus***
Blue-winged Teal	*Anas discors*
Canada Goose	***Branta canadensis***
Cinnamon Teal	*Anas cyanoptera*
Cliff Swallow	*Petrochelidon pyrrhonota*
Eastern Kingbird	***Tyrannus tyrannus***
Gray 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*

Species observed in 2013 are bolded.

Table 5 (continued). Wildlife species observed at the I-90 East Bozeman Wetland Mitigation Site from 2010 to 2013.

COMMON NAME	SCIENTIFIC NAME
BIRD	
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.	
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 2013 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 2013 using the 2008 Montana Wetland Assessment Form (Table 6). The constructed wetland depressions, channel, 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, an improvement over the Category III rating and 62.7 percentage points assigned in 2011. The improvement was the result of a higher rating in the general fish/aquatic habitat function based on the August 2011 observation by Montana Fish, Wildlife, and Parks fisheries biologists of Yellowstone cutthroat trout (*Onchorhynchus clarki bouvieri*), 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, due to a 0.64 acre decrease in wetland area from 2012 to 2013. Another factor that contributed to the reduction in the number of

Table 6. Functions and Values of the I-90 East Bozeman Wetland Mitigation Site from 2010 to 2013.

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	2010 Created Wetland Depressions & Channel	2011 Created Wetland Depressions & Channel	2012 Created Wetland Depressions & Channel	2013 Created Wetland Depressions & Channel
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Mod (0.5)	Mod (0.5)	Mod (0.6)	Mod (0.6)	Mod (0.5)	Mod (0.5)	Mod (0.6)	Mod (0.6)
General Wildlife Habitat	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Low (0.3)	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)	Low (0.2)	Low (0.2)	Low (0.6)	Mod (0.7)
Flood Attenuation	Mod (0.6)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.5)	Mod (0.5)	Mod (0.5)	Mod (0.5)
Short and Long Term Surface Water Storage	High (0.8)	High (0.8)	High (0.8)	High (0.8)	High (0.8)	High (1.0)	High (1.0)	High (1.0)
Sediment/Nutrient/Toxicant Removal	High (0.9)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	High (1.0)	High (1.0)	High (1.0)	High (1.0)	Mod (0.7)	Mod (0.7)	High (1.0)	High (1.0)
Production Export/ Food Chain Support	High (0.8)	High (0.8)	High (0.8)	High (0.8)	Mod (0.6)	High (0.9)	High (0.9)	High (0.9)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.2)	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)	Mod (0.1)	Mod (0.1)	High (0.2)	High (0.2)
Actual Points / Possible Points	**7.1 / 11**	**7.3 / 11**	**7.7 / 11**	**7.8 / 11**	**5.9 / 11**	**6.9 / 11**	**7.8 / 11**	**7.9 / 11**
% of Possible Score Achieved	**64.6%**	**66.4%**	**70.0%**	**70.9%**	**53.6%**	**62.7%**	**70.9%**	**71.8%**
Overall Category	**II**	**II**	**II**	**II**	**III**	**III**	**II**	**II**
Acreage of Assessed Aquatic Habitats within Easement (ac)	**3.51**	**3.51**	**3.51**	**3.51**	**5.32**	**5.63**	**6.16***	**5.18**
Functional Units (acreage x actual points) (f^{1}-)	**24.92**	**25.62**	**27.03**	**27.38**	**31.39**	**38.85**	**48.05**	**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.

functional units in 2013 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 a Category II in 2012 and 2013 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 totaled 27.38.

3.8. Photo Documentation

Photographs taken from 2010 to 2013 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).

3.9. Maintenance Needs

The location of infestations of 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 decreased site-wide in 2012 as a result of herbicide spraying. The number and size of the Priority 2B weed infestations remained essentially the same from 2012 to 2013.

A rock vane was installed across the existing channel to restrict potential head cutting resulting from the excavation of the Story Ditch channel by the adjacent property owner. Head cutting was observed on MDT property in 2013 and has been effectively controlled by the rock vane. The grade-control structure was in good condition and stable in 2013. The concrete blocks and fencing associated with the wildlife jump out on I-90 along the east fence boundary of the mitigation site were repaired after the July 2011 field visit. The jump out was in good condition in 2013. Four wood duck boxes and six bluebird boxes were observed on the site. The nesting structures were in good condition and some of the bluebird boxes showed signs of use.

3.10. Current Credit Summary

Table 7 presents the summary of wetland credits from 2010 to 2013 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

Table 7. Summary of Wetland Credits at the I-90 East Bozeman Wetland Mitigation Site from 2010 to 2013.

Proposed Mitigation Features	Compensatory Mitigation Type	USACE Mitigation Ratios	MDT Final Credit Estimate (Acres)	USACE Acknowledged Credit	2010 Delineated Wetland Acres	2010 Credit Acres	2011 Delineated Wetland Acres	2011 Credit Acres	2012 Delineated Wetland Acres	2012 Credit Acres	2013 Delineated Wetland Acres	2013 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	5.82***	5.82	5.18	5.18
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	3.51	3.51	3.51	3.51
Open water/WUS	None								0.34**	--	0.34**	--
Maintain upland buffer	Upland buffer	5:1	0.17	0.17	--	0.17	--	0.17	--	0.17	--	0.17
Total Available Credit			9.78	5.51	8.83	9.00	9.14	9.31	9.67	9.50	9.03	8.86

*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 2012 included 0.23 acres open water area, stream mitigation credits sought for this area. Wetland acreage adjusted to exclude open water area associated with stream mitigation credits.

representing 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 2013 monitoring, 8.86 credit acres have developed within the mitigation site to date. The acres of created wetland decreased by 0.64 acre from 2012 to 2013. The 2013 delineation identified the creation of 5.18 acres of wetland within and adjacent to the constructed depressions, preservation of 3.51 acres of existing emergent wetland; and the maintenance of 0.17 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 80 percent hydrophytic vegetation cover and less than 10 percent weed cover. The 0.17 acres of upland credit was based on the presence of at least 0.85 acres of a 50-foot upland buffer calculated at a 5:1 credit ratio. The upland area actually encompasses 5.77 acres. The credit acres will be recalculated annually as wetlands develop fully within the site.

Fulfilling the success criteria presented in Section 1.0 of this document, the areas currently defined as wetland met the criteria for hydrophytic vegetation, hydric soil, and hydrology. The cover of desirable hydrophytic plants in the footprint of the created wetland cells and riverine wetland is at least 80 percent. 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. The upland buffer exhibits greater than 50 percent aerial cover of desirable vegetation and less than 10 percent weed cover. The woody overstory, particularly on the stream channel, continues to develop site wide.

Emergent wetlands comprise approximately 60 percent of the site. Scrub/shrub wetlands encompass 12.5 percent of the site. The 3.51 acres of existing wetlands have been maintained. Approximately 5.18 acres of new wetlands have been created in historic upland areas. The total uplands currently encompass 5.77 acres, although the upland buffer credit was calculated only for 0.85 acres directly adjacent to the wetlands. The open water in the channel represents 3.7 percent of the total wetland area and is below the 5 percent threshold identified in the success criteria for open water.

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 will be achieved when less than 25 percent of the banks are unstable or the percent stability of the restored channel is within 5 percent of the downstream reference reach. The banks of the constructed channel appear to be stable without any measurable lateral migration based on the cross-section data collected from 2010 to 2013. However, the average width of the constructed creek channel (riverine wetland)

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. Wildlife-friendly fencing has been installed around the perimeter of the mitigation site and is in good condition.

4. REFERENCES

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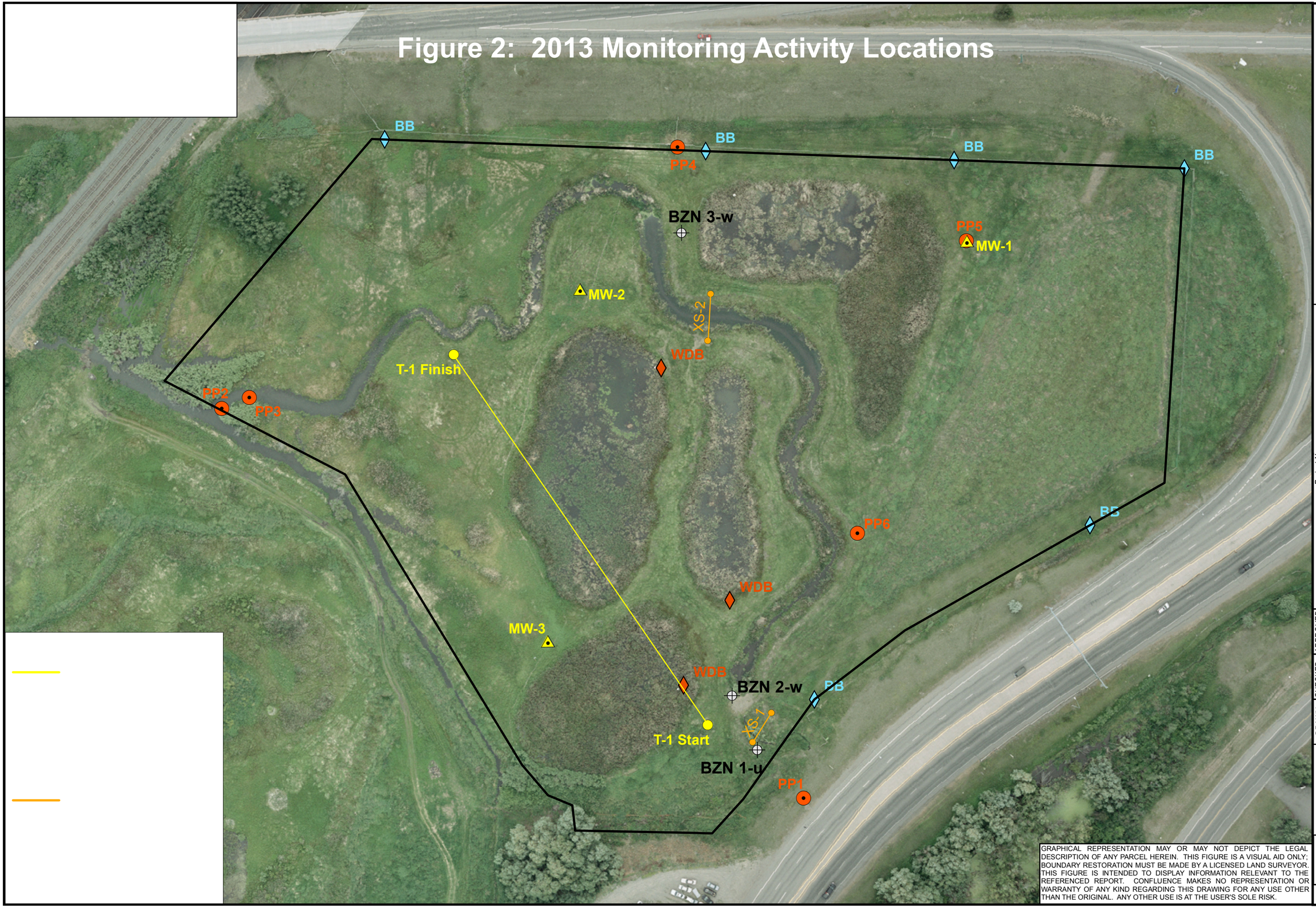
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Appendix A

Project Area Maps – Figures 2 and 3

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

Figure 2: 2013 Monitoring Activity Locations



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/Monitor2013.mxd

Project Name
I-90 East Bozeman Mitigation Site

Drawing Title
2013 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
BCS	EN	LU

SCALE: Noted

Drawn: September 17, 2013

PROJ MGR: B Sandefur

CONFLUENCE
consulting incorporated

Figure
2

REV -

Figure 3: 2013 Mapped Site Features

Project Area	14.80 acres
WLIS inc. Wetlands	9.03 acres

N

0 62.5 125 250

Feet

Legend

Monitoring Limits

Wetland Limits

Vegetation Communities

Base Photography Date: July 14, 2013

Noxious Weeds
- Linaria vulgaris
- Tanacetum vulgare
- Cirsium arvense
- Centaurea maculosa

Infestation Size
- X = <0.1 acre
- ▲ = 0.1 to 1 acre
- ■ = 1 to 5 acre

Cover Class
- T = Trace (<1% cover)
- L = Low (1-5% cover)
- M = Moderate (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/Veg2013.mxd

Project Name: I-90 East Bozeman Mitigation Site

Drawing Title: 2013 Mapped Site Features

DRAWN	CHECKED	APPROVED
BCS	EN	LU

SCALE: Noted

Drawn: September 17, 2013

PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 3

REV -

Appendix B

2013 MDT Wetland Mitigation Site Monitoring Form
2013 USACE Wetland Determination Data Forms
2013 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 8/20/2013 8:19:05 AM

Person(s) conducting the assessment: Erik Nyquist

Weather: Sunny, clear, approx. 70 degrees 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: 4 #Visits in Year: 1

Size of Evaluation Area: 14.8 (acres)

Land use surrounding wetland:

interstate corridor, commericial, undeveloped

HYDROLOGY

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

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

Percent of assessment area under inundation: 15 %

Depth at emergent vegetation-open water boundary: 0.5 **(ft)**

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

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

Drainage patterns, water marks, FAC-neutral, 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)
MW-1	6
MW-2	5.25
MW-3	2.53

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:

Groundwater levels are lower than observed in 2012. Site visit was completed later in the season than in 2012. Water depth in MW-1 was greater than 6 feet.

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

Comments:

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

Species	Cover class	Species	Cover class
Agrostis gigantea	0	Alopecurus pratensis	1
Beckmannia syzigachne	3	Carex aquatilis	1
Carex utriculata	0	Cirsium arvense	0
Cirsium vulgare	0	Deschampsia cespitosa	2
Elaeagnus commutata	0	Eleocharis palustris	4
Glyceria grandis	3	Juncus arcticus	1
Juncus effusus	2	Juncus tenuis	3
Juncus torreyi	0	Lemna minor	2
Persicaria amphibia	2	Poa palustris	1
Salix lasiandra	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	Carex nebrascensis	3
Carex stipata	0	Carex utriculata	4
Cicuta douglasii	0	Cirsium arvense	0
Deschampsia cespitosa	2	Elymus repens	1
Epilobium ciliatum	1	Glyceria grandis	0
Helianthus annuus	0	Lemna minor	1
Persicaria amphibia	3	Phalaris arundinacea	3
Rosa woodsii	0	Scirpus microcarpus	4
Solidago canadensis	0	Symphoricarpos albus	0
Tanacetum vulgare	0	Typha latifolia	2
Veronica peregrina	1		

Comments:

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

Species	Cover class	Species	Cover class
Agrostis gigantea	1	Carex aquatilis	4
Carex hystericina	0	Carex nebrascensis	2
Carex utriculata	4	Deschampsia cespitosa	0
Juncus arcticus	2	Juncus articulatus	1
Juncus tenuis	2	Lemna minor	1
Mentha arvensis	0	Persicaria amphibia	1
Phalaris arundinacea	3	Salix bebbiana	3
Salix boothii	2	Salix exigua	3
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	1
Cirsium vulgare	0	Deschampsia cespitosa	0
Geum macrophyllum	2	Juncus arcticus	2
Juncus articulatus	0	Juncus effusus	2
Juncus longistylis	0	Lactuca serriola	0
Mentha arvensis	0	Persicaria amphibia	4
Phalaris arundinacea	1	Rosa woodsii	0
Scirpus microcarpus	2	Solidago canadensis	0
Sonchus arvensis	0	Tanacetum vulgare	0
Typha latifolia	0		

Comments:

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

Species	Cover class	Species	Cover class
Agrostis gigantea	3	Carex aquatilis	4
Carex utriculata	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
Linaria vulgaris	0	Phalaris arundinacea	2
Salix lasiandra	2	Solidago canadensis	0
Tanacetum vulgare	0	Thlaspi arvense	0
Typha latifolia	1		

Comments:

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

Species	Cover class	Species	Cover class
Algae, green	2	Lemna minor	1
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 arcticus	2	Juncus articulatus	1
Juncus effusus	3	Juncus tenuis	2
Lemna minor	2	Persicaria amphibia	1
Poa palustris	2	Tanacetum vulgare	0
Typha latifolia	5		

Comments:

Total Vegetation Community Acreage **14.8**

(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: 8/20/2013 8:19:05 AM

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
Carex nebrascensis	3	Carex utriculata	4
Cirsium arvense	0	Deschampsia cespitosa	1
Epilobium ciliatum	1	Glyceria grandis	0
Lemna minor	2	Persicaria amphibia	3
Phalaris arundinacea	4	Scirpus microcarpus	4
Tanacetum vulgare	0	Typha latifolia	3
Veronica peregrina	3		

Ending Station 178 **Community Type:** Typha latifolia /

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

Ending Station 188 **Community Type:** Bromus inermis /

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

Ending Station 399 **Community Type:** Typha latifolia /

Species	Cover class	Species	Cover class
Alopecurus pratensis	1	Beckmannia syzigachne	2
Carex aquatilis	1	Carex utriculata	2
Deschampsia cespitosa	3	Eleocharis palustris	4
Glyceria grandis	2	Juncus arcticus	1
Juncus effusus	0	Juncus tenuis	1
Lemna minor	2	Persicaria amphibia	2
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 arcticus	1	Juncus effusus	2
Mentha arvensis	1	Persicaria amphibia	4
Phalaris arundinacea	1	Rosa woodsii	1
Sonchus arvensis	0	Tanacetum vulgare	0

Transect Notes:

PLANTED WOODY VEGETATION SURVIVAL

I-90 East Bozeman

Planting Type	#Planted	#Alive	Notes
Amelanchier alnifolia		2	
Cornus alba			
Crataegus douglasii	50		
Elaeagnus commutata	200	16	Observed 16 alive with good growth
Populus balsamifera		2	Observed 2 alive in good condition
Populus tremuloides		2	Observed 2 alive in fair condition
Shepherdia canadensis	100		
Symphoricarpos albus			Observed multiple volunteer snowberry plants in Veg Comms. 2 and 6.
Willow spp.			Observed multiple S. bebbiana, S. lasiandra, S. boothii shoots

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? 9

Are the nesting structures being used? Yes

Do the nesting structures need repairs? No

Nesting Structure Comments:

The nesting structures are in good condition. Three of the blue bird boxes exhibited use in 2013.

Species	#Observed	Behavior	Habitat
Black-capped Chickadee	2	F	SS
Canada Goose	6	FO	MA
Eastern Kingbird	2	F	UP, WM
Gray Catbird	1	L	SS, UP
Mallard	4	F	MA, OW
Mourning Dove	4	FO	SS, UP, WM
Red-winged Blackbird	3	F	MA
Ring-necked Pheasant	1	FO, L	UP
Sandhill Crane	3	F, FO	AB, MA, UP, WM

Bird Comments

BEHAVIOR CODES

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

HABITAT CODES

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

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

Mammals and Herptiles

Species	# Observed	Tracks	Scat	Burrows	Comments
Black Bear		No	Yes	No	
Coyote		Yes	Yes	No	
Muskrat	1	Yes	No	Yes	muskrat den in open water
Red Fox		Yes	Yes	No	
Striped Skunk		Yes	No	No	
White-tailed Deer	2	Yes	Yes	No	Observed two does in scrub-shrub

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
10-16	45.678112	-111.012642		Photo Point 4: 200-340 degrees
1-7	45.677654	-111.015664		Photo Point 1: 0-100 degrees
17-22	45.677163	-111.013052		Photo Point 5: 290-40 degrees
23	45.6775	-111.014425	350	Photo Point 6: South of New Channel
24	45.677976	-111.015333	10	Transect 1: Start
25	45.678831	-111.01363	220	Transect 1: End
26	45.677794	-111.015405	350	Cross Section 1: looking downstream
27	45.677831	-111.015357	150	Cross Section 1: looking upstream
28	45.678063	-111.013429	310	Cross Section 2: looking upstream
29	45.677912	-111.013432	150	Cross Section 2: looking downstream
31	45.67781389	-111.0154444444	310	BZN 1u - upland data point
32	45.6778	-111.014892	240	BZN 2w - wetland data point
33	45.67809444	-111.0130417	290	BZN 3w - wetland data point
8	45.67958	-111.0139	350	Photo Point 2: Upstream of Story Ditch
9	45.679497	-111.013849	170	Photo Point 3: Upstream of Story Ditch

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

Site visit was completed on 8/20/2013

Functional Assessments

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

Functional Assessment Comments:

Maintenance

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

If yes, do they need to be repaired? No

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

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

into or out of the wetland? No

If yes, are the structures in need of repair?

If yes, describe the problems below.

Deer jump out structure is in good condition. All nesting structures are in good condition. The grade control structure installed above the confluence of the stream with the Story Ditch was intact and functional as designed.

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

Project/Site: East Bozeman I-90 City/County: Bozeman, Gallatin Sampling Date: 8/20/2013

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

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

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

Subregion (LRR): LRR E Lat: 45.67781389 Long: -111.015444444444 Datum: WGS84

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

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

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

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

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

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

Remarks:
Upland area

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5)			
1. Bromus inermis	90	☑	FAC
2. Pascopyrum smithii	10	☐	FACU
3.	0	☐	
4.	0	☐	
5.	0	☐	
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum

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: 100.00% (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	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	100 (A)		310 (B)

Prevalence Index = B/A = 3.1

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: BZN 1-u

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
0-24	10YR 4/2	100					Sandy Clay Loam	

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

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

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

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☑

Remarks:

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:

No hydrology indicators observed.

Remarks:

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

Project/Site: East Bozeman I-90 City/County: Bozeman, Gallatin Sampling Date: 8/20/2013

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

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

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

Subregion (LRR): LRR E Lat: 45.6778 Long: -111.014892 Datum: WGS84

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

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

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

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

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

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

Remarks:
Wetland fringe along stream channel/open water.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1. Salix exigua	15	☑	FACW
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	15 = Total Cover		
Herb Stratum (Plot size:)			
1. Typha latifolia	35	☑	OBL
2. Scirpus microcarpus	20	☑	OBL
3. Phalaris arundinacea	15	☐	FACW
4. Glyceria grandis	10	☐	OBL
5. Juncus arcticus	5	☐	FACW
6. Lemna minor	5	☐	OBL
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	90 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	70	x 1 =	70
FACW species	35	x 2 =	70
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	105 (A)		140 (B)

Prevalence Index = B/A = 1.33

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: BZN 2-w

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	100		100			Fine Silty Loam	
8-24	10YR 5/1	95	10YR 4/6		C	M	Sandy Clay Loam	

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

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

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

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☑ No ☐

Remarks:

Muck on ground surface.

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): 1

Water Table Present? Yes ☑ No ☐ Depth (inches): 0

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:

Inundation 1.0 inches; wetland fringe along stream channel.

Remarks:

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

Project/Site: East Bozeman I-90 City/County: Gallatin Co. Sampling Date: 8/20/2013

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

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

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

Subregion (LRR): LRR E Lat: 45.67809444 Long: -111.0130417 Datum: WGS84

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

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

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

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

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

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

Remarks:
Wetland data point in between depressional wetland cells.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5ft)			
1. Carex utriculata	25	☑	OBL
2. Deschampsia caespitosa	20	☑	FACW
3. Poa palustris	15	☐	FAC
4. Scirpus microcarpus	10	☐	OBL
5. Persicaria amphibia	5	☐	OBL
6. Alopecurus pratensis	5	☐	FAC
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	80 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	20	x 2 =	40
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		140 (B)

Prevalence Index = B/A = 1.75

Hydrophytic Vegetation Indicators:

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

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

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: BZN 3-w

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
0-24	10YR 2/1	90	10YR 5/6	10	C	M	Sandy Clay Loam	

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

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

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

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☑ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

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

Wetland Hydrology Present? Yes ☑ No ☐

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

Drainage pattern observed downslope into wetland cells; surface soil cracks evident indicating saturation early in growing season.

Remarks:

MDT Montana Wetland Assessment Form (revised March 2008)

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

3. Evaluation Date 8/20/2013 **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

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

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

☐ **Mitigation Wetlands: pre-construction**

How assessed: Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
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. The percent vegetation cover on the constructed wetland cells increased in 2013. Site access is currently restricted. 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.

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

The AA includes an approximately 885-foot-long stream channel (~0.34-ac) 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	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

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

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

Comments Moderate wildlife observed during the 2013 site visit including several bird species, deer tracks, bear and coyote scat, 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	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

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

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)
a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* **Y** ◯ **N** ◉ *If yes, reduce score in* ***i*** *above by 0.1:* **Modified Rating** .7M

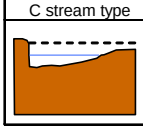
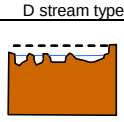
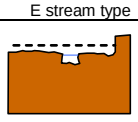
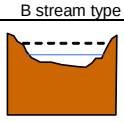
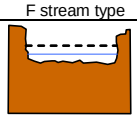
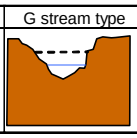
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating .7M

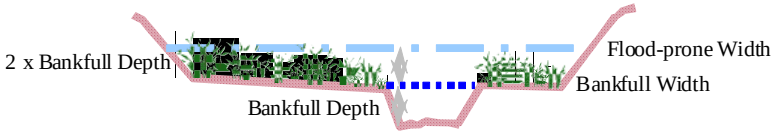
iii. Final Score and Rating: .7 M **Comments:** Culverts located at up-gradient and down-gradient ends of constructed channel. The density of vegetative cover increased from 2012 to 2013. YCT is a Tier 1 fish species.

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. 0% scrub/shrub cover.

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, click ☐ **NA** here and proceed to 14G.)

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

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

Comments: Constructed wetland cells and existing wetland are subject to flooding and ponding from in-channel flow, precipitation, upland surface flow, and groundwater. Assumes 5.38 acres flooded to 1.5 ft depth. Less inundation observed in 2013.

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: Vegetation cover increased in 2013. 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 2013 site visit. Vegetation growing in late August.

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. Vegetation cover increased from 2012 to 2013. Water levels were lower in 2013 than previous years possibly due to the site visit being completed in late August and low precipitation levels. Includes 0.34 ac open water.

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 8/20/2013 **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

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

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

☐ **Mitigation Wetlands: pre-construction**

How assessed: Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Riverine	Emergent Wetland		Seasonal/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, and yellow toadflax.

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. 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	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

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

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

Comments Moderate disturbance in AA, P/P water regime in10% of AA, uneven vegetation classes and moderate wildlife use of AA observed in 2013 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	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

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

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)
a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* **Y** ◯ **N** ◉ *If yes, reduce score in* ***i*** *above by 0.1:* **Modified Rating** .7M

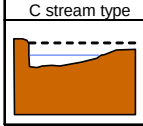
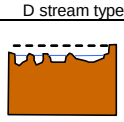
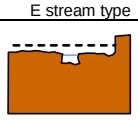
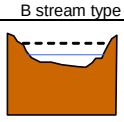
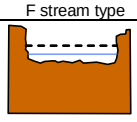
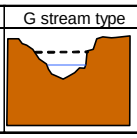
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating .7M

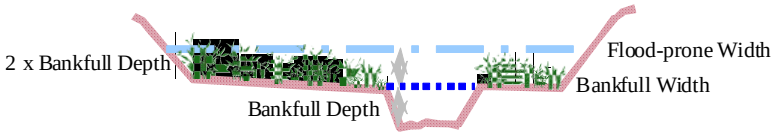
iii. Final Score and Rating: .7 M **Comments:** YCT is a tier 1 fish species. Culverts are present on the inlet and outlet on up-gradient and down-gradient end of constructed channel. Well-developed vegetation on stream banks.

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 2013 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, artic 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 2013 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: Panorama
Bearing: 0-100 Degrees

Location: "Welcome to Bozeman" sign
Taken in 2010



Photo Point 1: Panorama
Bearing: 0-100 Degrees

Location: "Welcome to Bozeman" sign
Taken in 2011



Photo Point 1: Panorama
Bearing: 0-100 Degrees

Location: "Welcome to Bozeman" sign
Taken in 2012



Photo Point 1: Panorama
Bearing: 0-100 Degrees

Location: "Welcome to Bozeman" sign
Taken in 2013



Photo Point 2
Bearing: 350

Location: Upstream of Story Ditch
Taken in 2010



Photo Point 2
Bearing: 350

Location: Upstream of Story Ditch
Taken in 2011



Photo Point 2
Bearing: 350

Location: Upstream of Story Ditch
Taken in 2012



Photo Point 2
Bearing: 350

Location: Upstream of Story Ditch
Taken in 2013



Photo Point 3
Bearing: 170

Location: Upstream of Story Ditch
Taken in 2010



Photo Point 3
Bearing: 170

Location: Upstream of Story Ditch
Taken in 2011



Photo Point 3
Bearing: 170

Location: Upstream of Story Ditch
Taken in 2012



Photo Point 3
Bearing: 170

Location: Upstream of Story Ditch
Taken in 2013



Photo Point 4: Panorama
Bearing: 200-340 Degrees

Location: Looking west from east boundary.
Taken in 2010



Photo Point 4: Panorama
Bearing: 200-340 Degrees

Location: Looking west from east boundary.
Taken in 2011



Photo Point 4: Panorama
Bearing: 200-340 Degrees

Location: Looking west from east boundary.
Taken in 2012



Photo Point 4: Panorama
Bearing: 200-340 Degrees

Location: Looking west from east boundary.
Taken in 2013



Photo Point 5: Panorama
Bearing: 290-40 Degrees

Location: SE corner looking north.
Taken in 2010



Photo Point 5: Panorama
Bearing: 290-40 Degrees

Location: SE corner looking north.
Taken in 2011



Photo Point 5: Panorama
Bearing: 290-40 Degrees

Location: SE corner looking north.
Taken in 2012



Photo Point 5: Panorama
Bearing: 290-40 Degrees

Location: SE corner looking north.
Taken in 2013

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



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 – *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



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

Location: XS-1 looking downstream
Taken in 2010



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

Location: XS-1 looking downstream
Taken in 2011



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

Location: XS-1 looking DS
Taken in 2012



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

Location: XS-1 looking DS
Taken in 2013



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 2 – *Photo 1*
Bearing: 310 Degrees

Location: XS-2 looking upstream
Taken in 2010



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

Location: XS-2 looking upstream
Taken in 2011



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

Location: XS-2 looking US
Taken in 2012



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

Location: XS-2 looking US
Taken in 2013



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

Location: XS-2 looking downstream
Taken in 2010



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

Location: XS-2 looking downstream
Taken in 2011



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

Location: XS-2 looking DS
Taken in 2012



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

Location: XS-2 looking DS
Taken in 2013



Data Point: BZN 1u
Bearing: 310 degrees
Location: Veg Com 12
Taken in 2013



Data Point: BZN 2w
Bearing: 240 degrees
Location: Veg Com 2
Taken in 2013

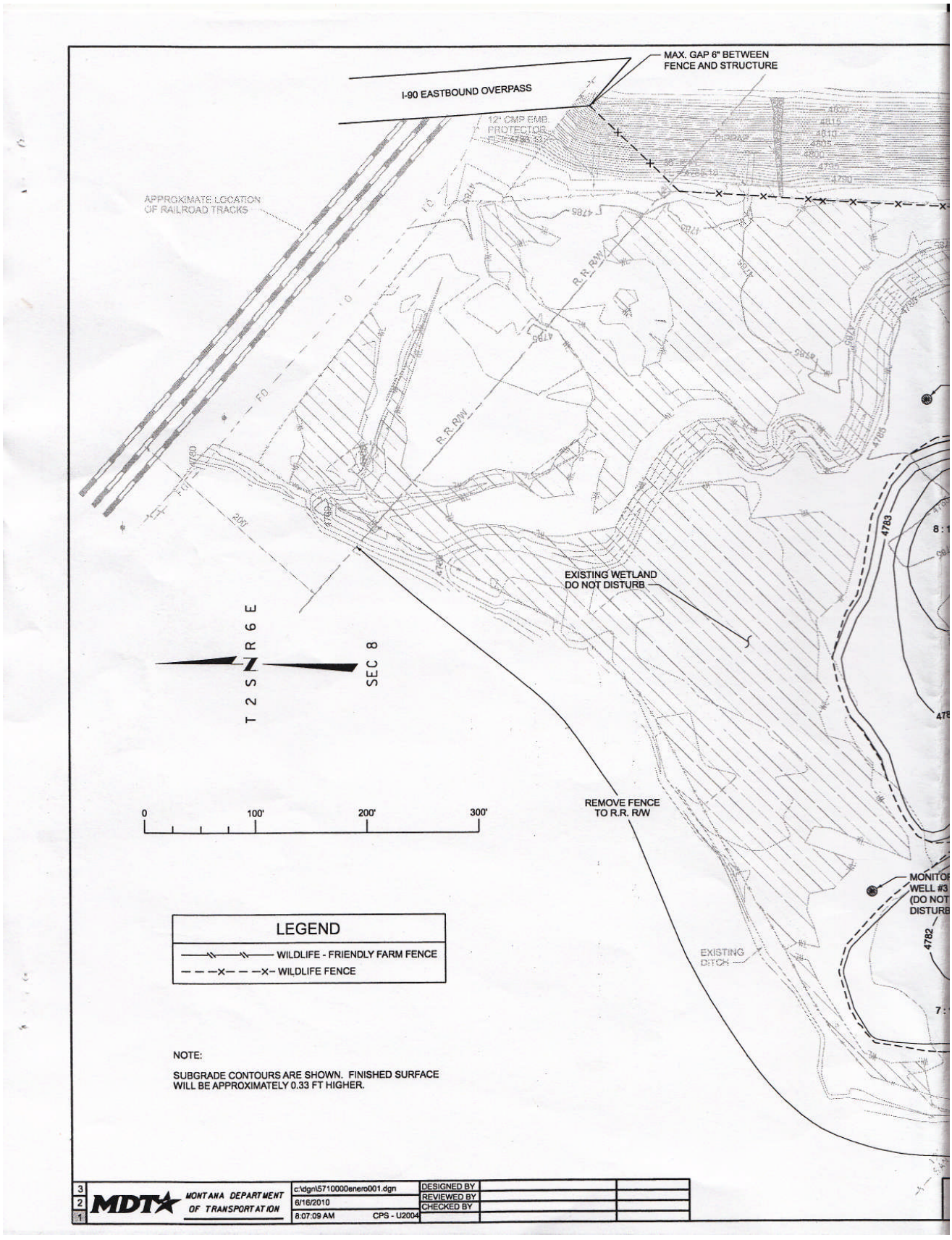


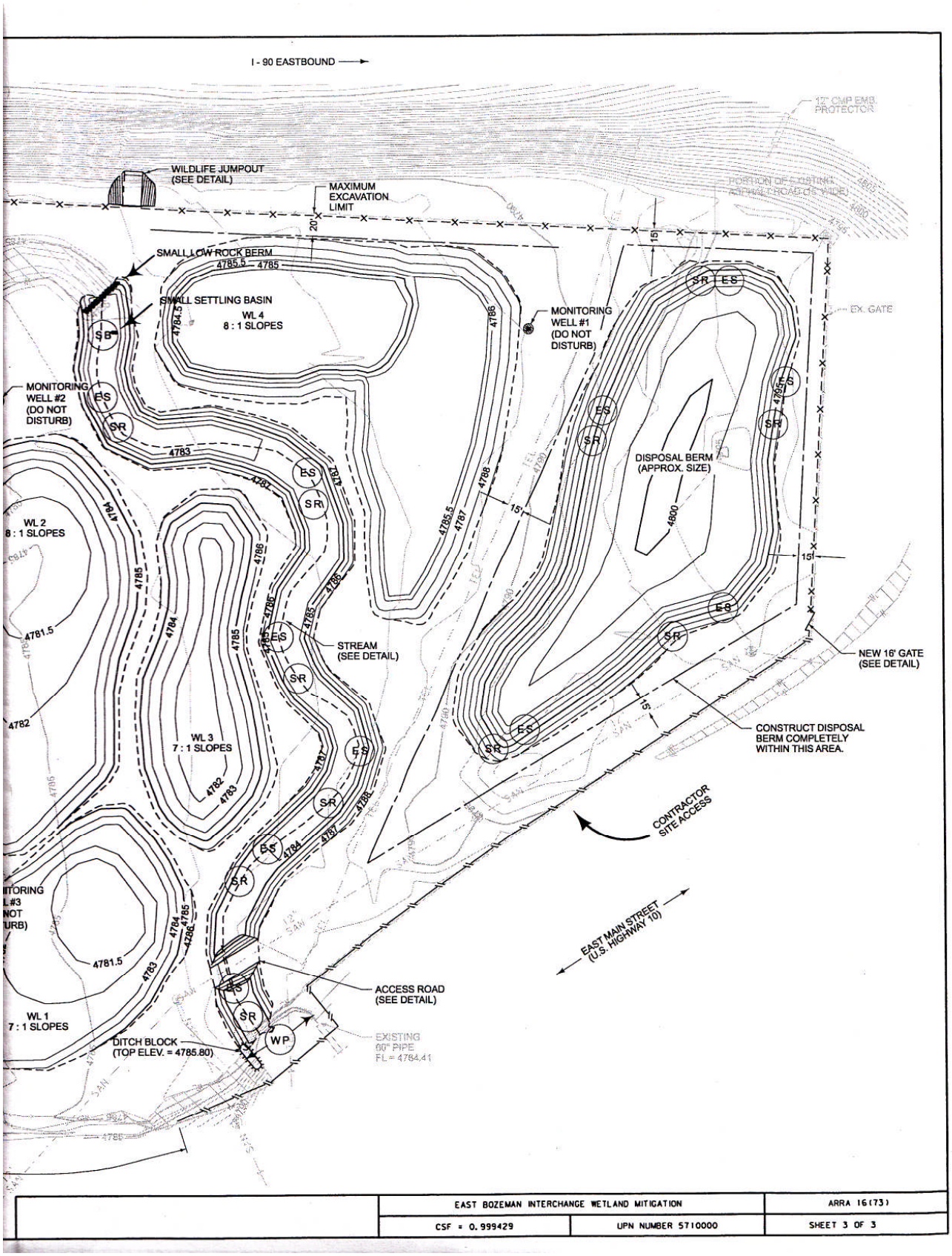
Data Point: BZN 3w
Bearing: 290 degrees
Location: Veg Com 6
Taken in 2013

Appendix D

Project Plan Sheet

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


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


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