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# MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT

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## SCHRIEBER LAKE MITIGATION SITE LINCOLN COUNTY, MONTANA

PROJECT COMPLETED: 2014

MONITORING REPORT #7: DECEMBER 2017



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# MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2017

## SCHRIEBER LAKE MITIGATION SITE LINCOLN COUNTY, MONTANA SITE-WIDE CONSTRUCTION: 2014

MDT Project Number NH 27(029)  
Control Number 1027007

Corps #: NWO-2013-00874-MTM  
SPA MDT-R1-40-2013

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December 2017

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## 1.0 INTRODUCTION

The Schrieber Lake Wetland Mitigation 2017 Monitoring Report presents the results of the third year of post-construction monitoring at the Schrieber Lake mitigation area. The site was acquired by the Montana Department of Transportation (MDT) in 2010 to provide compensatory mitigation for both stream and wetland impacts associated with the proposed Swamp Creek – East projects along the US Highway 2 corridor and to serve as a mitigation bank for future transportation projects within Watershed #1 – Kootenai River basin. Construction of the Schrieber Lake mitigation project was completed in 2014, and final revegetation of the site occurred in 2015.

Figures A-2 and A-3 in Appendix A of this report show the monitoring activity locations and mapped site features, respectively. Appendix B contains the MDT Wetland Mitigation Site Monitoring form, the US Army Corps of Engineers (USACE) Wetland Determination Data forms for the Western Mountains, Valleys, and Coast (WMVC) Region [USACE, 2010], and the 2008 MDT Montana Wetland Assessment Method (MWAM) forms. Appendix C contains photographs of the project area, Appendix D includes the surveyed stream cross sections, and Appendix E includes project plan sheets.

The MDT Schrieber Lake mitigation project is located adjacent to the US Highway 2 corridor in Sections 12 and 13 of Township 27 North, Range 30 West, Lincoln County, Montana, as shown in Figure 1-1. The 79.6-acre site lies within the boundaries of Watershed #1 – Kootenai River Basin. This site is situated directly downstream and adjacent to the 141-acre, MDT-owned Schrieber Meadows aquatic mitigation project. The property is bisected by Schrieber and Coyote Creeks, which drain into Schrieber Lake, which eventually drains into the Fisher River. Schrieber Lake is situated within a narrow valley corridor that is bordered on the western and northern sides by the Kootenai National Forest. The US Highway 2 corridor bounds the area to the east. Privately owned timber company land (formerly Plum Creek Timber and now Weyerhaeuser) occurs immediately adjacent to the site on the southwestern side.

Before the construction of the Schrieber Lake Mitigation Project, the area consisted of hay grounds and historic wetlands that had been filled, graded, leveled, and drained. The stream channel had been channelized to promote and maximize hay production and grazing opportunities for livestock, as well as to flood irrigate the adjacent hay pastures. Historically, the project site was likely a large floodplain and beaver pond complex of mixed riparian scrub/shrub and emergent wetlands associated with both Coyote and Schrieber Creeks.

The goals of the mitigation project include preserving, restoring, and creating wetland and riparian habitats. Specifically, MDT plans to restore the hydrology to approximately 19 acres of drained wetlands by excavating and creating depressional wetland cells; protect the existing 10.2 acres of fen-carr shrubland wetland vegetation community; restore previously developed agricultural areas into native wetland and upland plant communities through seeding and plantings; relocate and reconstruct approximately 3,000 linear feet of Schrieber Creek from the adjacent Schrieber Meadows site to its historic channel and outfall into Schrieber Lake; and to relocate and restore approximately 1,400 linear feet of channelized Coyote Creek to its historic channel and outfall into Schrieber Lake. Although technically located on the Schrieber Meadow site, monitoring of the reconstructed Schrieber Creek channel is being completed as part of the Schrieber Lake monitoring. The total area being monitored is 104.7 acres.



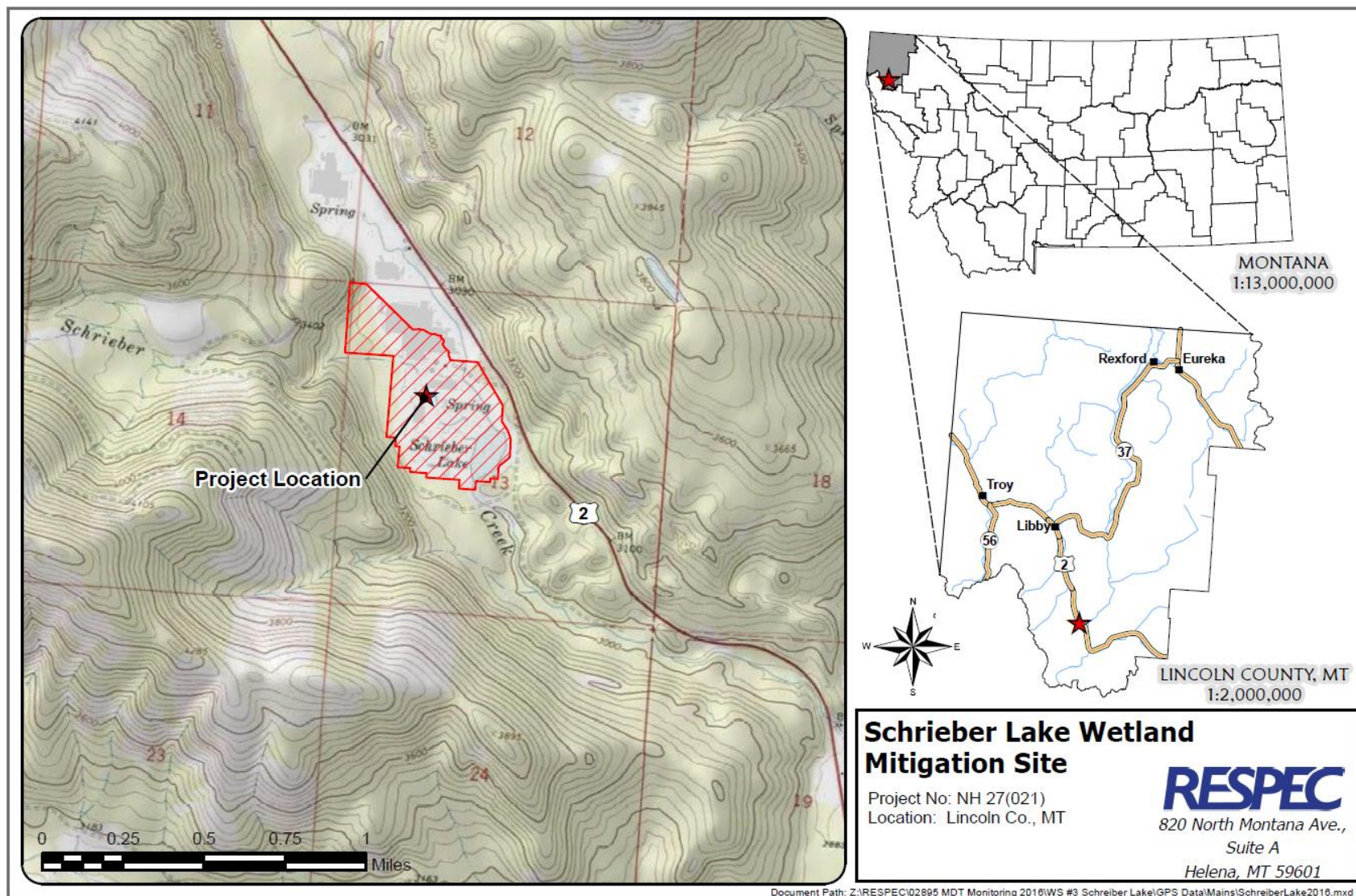


Figure 1-1. Project Location of the Schrieber Lake Site.

MDT anticipates developing 13.4 wetland credit acres from the Schrieber Lake project (Appendix E). The plan includes creation, restoration (rehabilitation and enhancement), and upland buffer credits. The entire Schrieber Lake mitigation project encompassed creating additional depression wetland cells and buffer areas within upland and degraded wetlands, enhancing scrub/shrub palustrine wetlands, and reconstructing the Coyote and Schrieber Creek channels. The crediting objectives of the full Schrieber Lake project include the following:

## 1.1 WETLAND MITIGATION OBJECTIVES

The mitigation objectives for wetlands on this site are described in detail below. How the proposed wetland credits were determined is further explained in Table 1-1.

- **Creation:** 3.06 wetland credit acres will be created by excavating shallow, seasonal, depressional wetland cells within the upland portions along the edges of the site. These areas will be seeded with a native wetland plant seed mix, and volunteer seeds within the soil bank are expected to also colonize within these sites.
- **Restoration (Reestablishment):** Approximately 1.69 wetland credit acres will be provided by excavating shallow depressions in the portions of the lower hay meadow. These shallow depressions were constructed to diversify the vegetation community by removing nonnative pasture grass sod within the site. These depressions will be flat and 1–2 feet deep to promote revegetation and establishment of sedge species.
- **Enhancement:** 1.51 wetland credit acres will be derived from the 4.53 acres of area that will be enhanced within the site. Enhancement will be a primary tool for much of the mitigation efforts within the lower hay meadow and will provide for the natural succession of the fen-carr wetland community to expand beyond its current limitations caused by haying operations. The succession of woody species is expected to continue along all edges of the fen-carr shrubland out into the former hay meadow after haying has ceased. Further enhancements within these areas will include seeding and woody plantings.
- **Preservation:** Approximately 6.4 wetland preservation credit acres will be provided. Approximately 25.6 acres of the property will be preserved, primarily because of the unique fen-carr areas that are present within the site.
- **Upland Buffers:** Approximately 0.76 upland buffer credit is being requested for the created wetland cells located at the northern end and within the interior of the property. These upland buffers are separated from the proposed riparian buffers for the new stream channels. The upland buffer areas will be reseeded and planted with shrubs/trees to diversify the vegetation communities adjacent to these created wetlands.
- **Open Water:** The open-water area of Schrieber Lake will be protected and maintained as open water and is not considered part of the preservation credit calculation.

**Table 1-1. Determination of Wetland Credits**

<b>Wetland Mitigation</b>	<b>Acreage</b>	<b>Ratio<sup>(a)</sup></b>	<b>Credit Acres</b>
Proposed Creation – Cells	3.06	1 to 1	3.06
Proposed Restoration (Re-establishment) Cells	2.53	1.5 to 1	1.69
Enhancement Areas (Carr Shrubland expansion)	4.53	3 to 1	1.51
Preservation (Existing Fen-Carr-Carex Areas)	25.6	4 to 1	6.40
Upland Buffer (50 feet) <sup>(b)</sup>	3.81	5 to 1	0.76
Open Water – Schrieber Lake	8.60	None	0
Temporary Project Impacts <sup>(c)</sup>	6.34	None	0
Permanent Project Impacts	0.02	None	–0.02
<b>Total Mitigation Credit Acreage</b>	<b>48.06</b>		<b>13.40 acres</b>

(a) Ratios used are from Column A of the Montana Regulatory Program Wetland Compensatory Mitigation Ratios, April 2005.

(b) Assuming a standard 50-foot upland buffer around the perimeter of the wetland cells constructed adjacent to the uplands.

(c) Temporary impacts associated with the restoration, enhancement, and new stream channel construction activities within the site.

## 1.2 STREAM-MITIGATION OBJECTIVES

For the purposes of obtaining stream-mitigation credits for the proposed Schrieber Lake mitigation project, the proposed stream restoration areas that concern Schrieber and Coyote Creeks have been divided into seven distinct reaches: two reaches in Coyote Creek, four reaches in Schrieber Creek, and the combined Coyote Creek/Schrieber Creek channel as the final reach. The following objectives are intended for this site:

- Restore approximately 1,398 linear feet of Coyote Creek stream channel and 2,987 linear feet of the Schrieber Creek channel.
- Develop approximately 36,741.85 stream-mitigation credits by restoring Coyote and Schrieber Creeks for use within Watershed #1 – Kootenai River Basin.

## 1.3 APPROVED PERFORMANCE STANDARDS

The following list presents the proposed performance standards for the mitigation activities [MDT, 2009].

1. **Wetland Characteristics** for all of the 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 Wetland Manual) [Environmental Laboratory, 1987] and the 2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (WMVC) (2010 Regional Supplement) [USACE, 2010].

- a. **Wetland Hydrology Success** will be achieved where wetland hydrology is present as per the technical guidelines in the 1987 Wetland Manual. Soil saturation will be present for at least 12.5 percent of the growing season.
  - 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. Because 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 where combined absolute cover of facultative or wetter species is 70 percent or greater and state-listed noxious weeds do not exceed 5 percent absolute cover.
2. **Open Water** is intended to be provided by the project during the spring and early summer within excavated depressions. As the growing season progresses and the groundwater levels recede, vegetation is expected to become established within the majority of the depressions. Open water with submerged and/or floating vegetation will, therefore, be considered successful and creditable.
3. **Channel Restoration Success** will be evaluated in terms of revegetation success.
  - a. **Revegetation** along the new Coyote and Schrieber Creek channel corridors will be considered successful when banks are vegetated with a majority of deep-rooting riparian plant species that have root stability indexes of 6 or greater and wetland herbaceous and woody plant species.
  - b. **New Stream Channels** will be allowed to naturally migrate within the established floodplain/riparian areas and will be given enough room to move and stabilize themselves within the site.
4. **Bank Restoration Success** will be achieved based on the rate of erosion encountered during the monitoring period and will be based on the assessed proper functioning condition assessment using methods outlined by Prichard [1998]. The rate of erosion will be determined by installing bank pins and measured annually for a period of 5 years and/or until the bank vegetation stabilizes.
5. **Riparian Buffer Success** will be achieved when woody and riparian vegetation becomes established and noxious weeds do not exceed 5 percent cover within the riparian buffer areas. Any areas within the creditable buffer area that were disturbed by the project construction must have at least 50 percent aerial cover of nonnoxious weed species by the end of the monitoring period.
  - a. **Vegetation Success** will be achieved where the combined aerial cover of riparian and stream bank vegetation communities is 70 percent or greater and state-listed noxious weeds do not exceed 5 percent cover, subject to the woody standards listed below.
  - b. **Woody Plants**, including planted trees and shrubs, will be considered successful where they exhibit 50 percent survival after 5 years. Natural colonization of woody plant species from nearby sources is expected to occur once haying and construction activities cease on the site.



6. **Upland Buffer Success** will be achieved when the noxious weeds do not exceed 5 percent of cover within the buffer areas on site. Any area within the creditable buffer zone that was disturbed by project construction must have at least 50 percent aerial cover of nonweed species by the end of the monitoring period.
7. **Weed Control** will be based on annual site monitoring to determine weed species and the degree of infestation within the site. Based on the monitoring results, control measures will be implemented by MDT to minimize and/or eliminate the intrusion of state-listed noxious weed species within the site. MDT managed the property to control known weed problems (knapweed and houndstongue) before wetland construction activities began within the site.

The restoration efforts within the Schrieber Lake site greatly complement the Schrieber Meadows restoration efforts to reestablish a larger aquatic ecosystem across the landscape. Once complete, the two sites will increase migratory bird and endangered species habitat protection, improve water storage within the watershed, reestablish wetlands and other aquatic habitat that will increase wildlife and fisheries habitat in the Schrieber and Coyote Creek drainages, and restore historic wetland and stream functions to the altered landscape within the site.

The construction of the Schrieber Lake mitigation project was authorized under the authority of Section 404 of the Clean Water Act via permit NWO-2013-00874-MTM and in accordance with Montana's Stream Protection Act (SPA) #MDT-R1-40-2013.

## 2.0 METHODS

The third annual monitoring event was conducted on July 26, 2017, for wetland and streams. Information that was collected to complete the Wetland Mitigation Site Monitoring form and Wetland Determination Data forms was recorded during the field investigation (Appendix B). Monitoring activity locations were mapped using a global positioning system (GPS) (Figure A-2, Appendix A). Data-collection activities included wetland delineation; wetland/open-water/aquatic habitat boundary mapping; vegetation community mapping; vegetation transect monitoring; soils, hydrology, and bird- and wildlife-use documentation; photographs; stream cross sections at 11 established stations; functional assessments; and a nonengineering examination of the established infrastructure in 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 28.5 degrees Fahrenheit [Environmental Laboratory, 1987]. The growing season that was recorded for the meteorological station at Libby 32 SSE (245020), which is located approximately 8 miles northwest of the project, extends from June 7 to September 4 for a total of 82 days [NRCS, 2010]. Areas that are

defined as wetlands would require 10 days of inundation or saturation within 12 inches of the ground surface to meet the hydrology criteria and performance standards. Annual precipitation from January through August each year at the Libby 32 SSE (245020) meteorological station will be compared to the long-term average for this area to determine if the site is receiving above-average, below-average, or average precipitation and whether the site is experiencing drought or wet cycles.

The presence of hydrological indicators as outlined on the Wetland Determination Data forms was assessed at two data points that were established within the project area. The hydrologic indicators were evaluated according to features observed in situ during the site visit. The data were recorded on the Wetland Determination Data forms (Appendix B). Hydrologic assessments allow mitigation goals that address inundation and saturation requirements to be evaluated.

Soil pits that were excavated during the wetland delineation were used to evaluate groundwater levels within 18 inches of the ground surface. The data were recorded on the Wetland Determination Data forms (Appendix B). Areas of surface inundation were delineated on an aerial photograph during the growing season. The extent of soil saturation was determined through core sampling.

## 2.2 VEGETATION

The boundaries of general dominant-species-based vegetation communities were determined in the field during the active growing season and subsequently delineated on the 2017 aerial photographs. The percent cover of dominant species within a community type was estimated and recorded using the following values: 0 (< 1 percent), 1 (1–5 percent), 2 (6–10 percent), 3 (11–20 percent), 4 (21–50 percent), and 5 (> 50 percent) (Appendix B). Community types were named based on the predominant vegetation species that characterized each mapped polygon (Figure A-3, Appendix A).

Temporal changes in vegetation were evaluated by annually monitoring three vegetation belt transects that are approximately 10 feet wide and 384, 280, and 584 feet long, respectively. The transect endpoints were recorded with a GPS unit. Spatial changes in the 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 cover ranges listed above (Appendix B). Photographs were taken at the endpoints of each transect during the monitoring event (Appendix C).

The *Montana Noxious Weed List* (February 2017), which was prepared by the Montana Department of Agriculture [2017], was used to categorize weeds identified within the site. The location of noxious weeds was noted in the field and mapped on the aerial photograph with noxious weed species color-coded (Figure A-3, Appendix A). Cover classes are represented by a T, L, M, or H, which represent less than 1 percent, 1–5 percent, 6–25 percent, and 26–100 percent, respectively. The total cover by noxious weeds overall across the site was estimated based on the noxious weed cover classes and project acreage.

## 2.3 SOIL

Soil information was obtained from the *Web Soil Survey for Lincoln County Area* and in situ soil descriptions accessed from the NRCS official soil description website [US Department of Agriculture,

2016]. Soil cores were excavated using a sharpshooter shovel and evaluated according to procedures outlined in the 1987 Wetland Manual and 2010 WMVC 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 special aquatic sites and jurisdictional wetlands, were delineated throughout the project area according to criteria established in the 1987 Wetland Manual and the 2010 WMVC Regional Supplement. The technical criteria for hydrophytic vegetation, hydric soil, and wetland hydrology that were described in the 2010 WMVC Regional Supplement must be satisfied to delineate a representative area as jurisdictional. The name and indicator status of plant species was derived from the 2016 national wetland plant list (NWPL) [Lichvar et al., 2016]. A routine level-2 on-site determination method [Environmental Laboratory, 1987] was used to delineate jurisdictional areas within the project boundaries. The information was recorded onto the Wetland Determination Data forms (Appendix B).

The wetland boundary was determined in the field based on changes in plant communities and/or hydrology and changes in soil characteristics. Topographic relief boundaries within the project area were also examined and cross-referenced with soil and vegetation communities as supportive information for this delineation. Vegetation composition, soil characteristics, and hydrology were assessed at likely wetland and adjacent upland locations. If all three parameters met the criteria, the area was designated as wetland and mapped by vegetation community type. If any one of the parameters did not exhibit positive wetland indicators, the area was determined to be upland unless the site was classified as an atypical situation, potential problem area, or special aquatic site (i.e., mudflat). The wetland boundary was surveyed in the field using GPS technology and identified on the 2017 aerial photographs. Wetland areas were calculated using GIS methods.

## 2.5 WILDLIFE

Observations and other positive indicators of use by mammal, reptile, amphibian, and bird species were recorded on the Wetland Mitigation Site Monitoring forms during each of the site visits. Indirect-use indicators, including tracks, scat, burrows, eggshells, skins, and bones, were also recorded. These signs were recorded while traversing the site for other required activities. Direct sampling methods, such as snap traps, live traps, and pitfall traps, were not used. A comprehensive wildlife species list of animals observed from 2015 through 2017 was compiled for this report.

## 2.6 FUNCTIONAL ASSESSMENT

The 2008 MDT MWAM has been used to evaluate functions and values on the site since post-construction monitoring began. This method provides an objective means of assigning an overall rating to wetlands and provides regulators with 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. An MWAM form was completed for each wetland or group of wetlands (assessment areas [AAs]) (Appendix B).

## 2.7 PHOTOGRAPHIC DOCUMENTATION

Monitoring at photo points provided supplemental information that documented wetland, upland, and transect conditions; site trends; and current land uses that surround the site. Photographs were taken at established photo points throughout the site during the site visit (Appendix C). Photo-point locations were recorded with a resource-grade GPS unit (Figure A-2, Appendix A).

## 2.8 STREAM-MONITORING METHODS

### 2.8.1 Channel Cross Sections

The Schrieber Lake mitigation plan called for establishing a minimum of one stream cross section per 500 feet of assessed stream reach or one per different stream reach segment to monitor channel form and function, natural channel migration, vertical stability (down-cutting), sediment buildup, thalweg location changes, and stream bank/riparian vegetation development. Eleven permanent monitoring cross sections were established perpendicular to the constructed streams during the 2015 spring site visit (Figure A-2, Appendix A). Rebar was driven into the ground at both ends of each cross section, marked with pink paint and flagging, and covered with a wildlife-friendly cap. Additionally, T-posts were installed at either end of the cross sections to more easily locate the cross sections during the summer months when vegetation cover is high. Cross sections were surveyed initially in 2015, as well as in subsequent monitoring years using a survey-grade GPS with a base station established on site to improve accuracy. Photographs were taken at each cross section and are shown in Appendix C.

### 2.8.2 Bank Pins

Bank pins (¼-inch steel, painted fluorescent orange to enhance visibility) were installed in 2015 at select monitoring cross sections to document the rate of erosion after construction. Pins were installed perpendicular to the flow below the bankfull elevation. The stick-out of each pin was recorded at the time of installation. Future measures of pin stick-out will permit assessment of lateral erosion during each subsequent monitoring event.

### 2.8.3 Vegetation Monitoring at Perpendicular Belt Transects

Riparian vegetation monitoring included establishing belt transects perpendicular to the newly constructed channel to document riparian buffer vegetative development, channel migration, and channel and riparian community diversity. Riparian belt transects were 10 feet wide and varied in length based on the width of the riparian buffer specified in the mitigation plan for each reach. Riparian buffer width along each stream reach is listed in Table 2-1. The vegetation inventory within each perpendicular belt transects included documenting total percent vegetation cover and percent cover by noxious weeds.



**Table 2-1. Riparian Buffer Widths for Each Reconstructed Channel Reach as Specified in the Schrieber Lake Mitigation Plan**

Channel Segment	Reach	Width of Right Riparian Buffer (feet)	Width of Left Riparian Buffer (feet)
Coyote Creek	1A	25	25
	1B	25	50
Schrieber Creek	1	100	100
	2A	100	100
	2B	75	75
	3	25	25
	7	25	25

#### 2.8.4 Vegetation Monitoring at Parallel Belt Transects

Vegetation belt transects were also established parallel to the stream channel to document riparian vegetation development and community diversity within the streamside and riparian buffers. The parallel belt transects were 5 feet wide and extended 12.5 feet upstream and downstream of each monitoring cross section for a total length of 25 feet. A planted vegetation survival assessment was performed within each parallel belt transect to document survival rates of woody vegetation installed along the reconstructed stream banks. The vegetation inventories within each parallel belt transect included compiling a comprehensive species list and assigning a cover class for each species.

The results of the vegetation inventory within the parallel belt transects were used to determine which vegetation communities are present along the reconstructed stream banks. Dominant species that were present along the banks were combined to assign vegetation community types, which were cross-referenced with bank stability indices [Winward, 2000]. If a stability rating was not available for the assigned community, an alternate stability rating was selected based on the individual species observed within the belt transect.

#### 2.9 GLOBAL POSITIONING SYSTEM DATA

Site features and survey points were collected by using a resource-grade ( $\pm 1$  meter) Trimble R1 GNSS GPS receiver and companion Android tablet during the 2017 monitoring season. The collected data were then transferred to a personal computer, imported into GIS, and projected in Montana State Plane Single Zone NAD 83 meters. Site features and survey points that were located with GPS included wetland boundaries, photo points, transect endpoints, stream cross sections, noxious weed infestations, and wetland data points. All channel cross-section positions were collected with survey-grade, Real-Time Kinematic GPS methods that used a base station on an MDT-established project control point within the project area.

## 2.10 MAINTENANCE NEEDS

Channels, engineered structures, fencing, bird boxes, and other man-made features were examined during the site visit for obvious signs of breaching, damage, and other problems. This examination was cursory and did not constitute an engineering-level structural inspection.

# 3.0 RESULTS

## 3.1 HYDROLOGY

Climate data from the Libby 32 SSE, Montana (245020), weather station recorded an average total annual precipitation rate of 24.44 inches from 1949 to 2016 [Western Regional Climate Center, 2017]. Annual precipitation in 2015 (21.26 inches) and 2016 (21.73 inches) was approximately 3 inches below the long-term average. Precipitation from January through August in 2015 (11.14 inches), 2016 (10.56 inches), and 2017 (8.47 inches) were 4–7 inches below the long-term average for that time of year (14.94 inches). In general, the region that surrounds the project area received below-average precipitation over the past 3 years of monitoring. Based on field observations of hydrology within the site over the first 3 years of monitoring, water levels within the excavated basins appeared to be largely influenced by groundwater and stream discharge with moderate influence from direct precipitation.

During the July 2017 investigation, the average depth of surface water across the site was estimated at 2 feet with a range of depths from 1 to 3 feet. Approximately 80 percent of the AAs were inundated. The surface-water depth at the emergent vegetation and open-water boundary was estimated at 1.1 feet. Direct precipitation also contributes to wetland hydrology, but the high seasonal groundwater table provides the majority of water that drives wetland hydrology within this site. Other site-wide indicators of wetland hydrology included saturation and inundation that is visible on aerial photographs and a seasonal high groundwater table.

Two data points were sampled in 2017 to determine the wetland/upland boundaries. DP-1W was located within wetland community Type 3 – *Phalaris arundinacea*/*Carex* sp. (Figure A-2, Appendix A). This wetland data point exhibited saturation to 10 inches below the ground surface, hydrogen sulfide odor, and geomorphic position (valley bottom at toe of slope). DP-1U was located upslope from DP-1W within upland community Type 1 – *Elymus repens*/*Bromus inermis*. No hydrologic indicators were found at DP-1U.

## 3.2 VEGETATION

A comprehensive list of 96 plant species that were identified on the site between 2015 and 2017 is presented in Table 3-1. No new plant species were identified in 2017. Nine wetland and three upland community types were identified and mapped at the mitigation site in 2017 (Figure A-3, Appendix A). Individual plant species that were observed within each community are listed on the Wetland Mitigation Site Monitoring form (Appendix B). The vegetation community types identified on the site in 2017 are discussed below.

**Table 3-1. Vegetation Species Identified From 2015 Through 2017 at the Schrieber Lake Site (Page 1 of 3)**

Scientific Names	Common Names	WMVC Indicator Status <sup>(a)</sup>
<i>Abies grandis</i>	Grand Fir	FACU
<i>Achillea millefolium</i>	Common Yarrow	FACU
<i>Agrostis scabra</i>	Rough Bent	FAC
<i>Agrostis stolonifera</i>	Spreading Bent	FAC
Algae, green	Algae, green	NL
<i>Alnus incana</i>	Speckled Alder	FACW
<i>Alopecurus pratensis</i>	Field Meadow Foxtail	FAC
<i>Amelanchier alnifolia</i>	Saskatoon Service-Berry	FACU
<i>Antennaria</i> sp.	Pussytoes	NL
<i>Apocynum androsaemifolium</i>	Spreading Dogbane	FACU
<i>Aquatic macrophytes</i>	Aquatic macrophytes	NL
<i>Arctostaphylos uva-ursi</i>	Red Bearberry	FACU
<i>Bromus marginatus</i>	Mountain Brome	NL
<i>Betula pumila</i>	Bog Birch	OBL
<i>Bromus inermis</i>	Smooth Brome	UPL
<i>Calamagrostis rubescens</i>	Pinegrass	NL
<i>Campanula rotundifolia</i>	Bluebell-of-Scotland	FACU
<i>Cardaria draba</i>	Whitetop	NI
<i>Carex aquatilis</i>	Leafy Tussock Sedge	OBL
<i>Carex bebbii</i>	Bebb's Sedge	OBL
<i>Carex geyeri</i>	Geyer's Sedge	NL
<i>Carex inops</i>	Long-Stolon Sedge	NL
<i>Carex lasiocarpa</i>	Woolly-Fruit Sedge	OBL
<i>Carex nebrascensis</i>	Nebraska Sedge	OBL
<i>Carex simulata</i>	Analogue Sedge	OBL
<i>Carex</i> sp.	Sedge	NL
<i>Carex utriculata</i>	Northwest Territory Sedge	OBL
<i>Carex vesicaria</i>	Lesser Bladder Sedge	OBL
<i>Centaurea stoebe</i>	Spotted Knapweed	NL
<i>Cirsium arvense</i>	Canada Thistle	FAC
<i>Cirsium vulgare</i>	Bull Thistle	FACU
<i>Comarum palustre</i>	Purple Marshlocks	OBL
<i>Cornus canadensis</i>	Canadian Bunchberry	FAC
<i>Crataegus douglasii</i>	Black Hawthorn	FAC
<i>Cynoglossum officinale</i>	Houndstongue	FACU
<i>Dactylis glomerata</i>	Orchard Grass	FACU
<i>Deschampsia caespitosa</i>	Tufted Hair Grass	FACW
<i>Elymus glaucus</i>	Blue Wild Rye	FACU
<i>Elymus repens</i>	Creeping Wild Rye	FAC
<i>Elymus trachycaulus</i>	Slender Wild Rye	FAC
<i>Epilobium ciliatum</i>	Fringed Willow Herb	FACW
<i>Equisetum arvense</i>	Field Horsetail	FAC

**Table 3-1. Vegetation Species Identified From 2015 Through 2017 at the Schrieber Lake Site (Page 2 of 3)**

Scientific Names	Common Names	WMVC Indicator Status <sup>(a)</sup>
<i>Fragaria virginiana</i>	Virginia Strawberry	FACU
<i>Galium triflorum</i>	Fragrant Bedstraw	FACU
<i>Geum macrophyllum</i>	Large-Leaf Avens	FAC
<b><i>Glyceria grandis</i></b>	<b>American Mannagrass</b>	<b>OBL</b>
<i>Glyceria striata</i>	Fowl Mannagrass	OBL
<i>Gnaphalium palustre</i>	Western Marsh Cudweed	FACW
<i>Hypericum perforatum</i>	Common St. John's-Wort	FACU
<i>Juncus nodosus</i>	Knotted Rush	OBL
<i>Juncus tenuis</i>	Lesser Poverty Rush	FAC
<i>Larix occidentalis</i>	Western Larch	FACU
<i>Lemna minor</i>	Common Duckweed	OBL
<i>Leucanthemum vulgare</i>	Ox-Eye Daisy	FACU
<i>Linaria dalmatica</i>	Dalmatian Toadflax	NL
<i>Linaria vulgaris</i>	Butter-and-Eggs	NL
<i>Mahonia aquifolium</i>	Holly-Leaf Oregon-Grape	FACU
<i>Maianthemum stellatum</i>	Starry False Solomon's-Seal	FAC
Moss	Sphagnum/Aulacomnium Moss	NL
<i>Nasella viridula</i>	Green Needlegrass	NL
<i>Pascopyrum smithii</i>	Western Wheatgrass	FACU
<i>Penstemon</i> sp.	Beardtongue	NL
<i>Persicaria amphibia</i>	Water Smartweed	OBL
<i>Phalaris arundinacea</i>	Reed Canary Grass	FACW
<i>Phleum pratense</i>	Common Timothy	FAC
<i>Pinus contorta</i>	Lodgepole Pine	FAC
<i>Pinus monticola</i>	Western White Pine	FACU
<i>Pinus ponderosa</i>	Ponderosa Pine	FACU
<i>Plantago</i> sp.	Plantain	NL
<i>Poa compressa</i>	Flat-Stem Bluegrass	FACU
<i>Poa palustris</i>	Fowl Bluegrass	FAC
<i>Poa pratensis</i>	Kentucky Bluegrass	FAC
<i>Poa</i> sp.	Bluegrass	NL
<i>Potentilla anserina</i>	Silverweed	OBL
<i>Potentilla norvegica</i>	Norwegian Cinquefoil	FAC
<i>Pseudoroegneria spicata</i>	Bluebunch Wheatgrass	NL
<i>Pseudotsuga menziesii</i>	Douglas Fir	FACU
<i>Rhamnus alnifolia</i>	Alder-Leaf Buckthorn	FACW
<i>Rosa woodsii</i>	Woods' Rose	FACU
<i>Rumex acetosella</i>	Common Sheep Sorrel	FACU
<i>Salix bebbiana</i>	Gray Willow	FACW
<i>Salix boothii</i>	Booth's Willow	FACW
<i>Salix candida</i>	Sage Willow	OBL
<i>Salix geyeriana</i>	Geyer's Willow	FACW



**Table 3-1. Vegetation Species Identified From 2015 Through 2017 at the Schrieber Lake Site (Page 3 of 3)**

Scientific Names	Common Names	WMVC Indicator Status <sup>(a)</sup>
<i>Salix</i> sp.	Willow	NL
<i>Scutellaria galericulata</i>	Hooded Skullcap	OBL
<i>Shepherdia canadensis</i>	Russet Buffalo-Berry	UPL
<i>Symphoricarpos albus</i>	Common Snowberry	FACU
<i>Symphotrichum spathulatum</i>	Mountain American-Aster	FAC
<i>Taraxacum officinale</i>	Common Dandelion	FACU
<i>Thlaspi arvense</i>	Field Pennycress	UPL
<i>Trifolium aureum</i>	Yellow Clover	NL
<i>Typha latifolia</i>	Broad-Leaf Cattail	OBL
<i>Urtica dioica</i>	Stinging Nettle	FAC
<i>Vaccinium</i> sp.	Blueberry	NL
<i>Verbascum thapsus</i>	Great Mullein	FACU

(a) 2016 NWPL [Lichvar et al., 2016].

New species that were identified in 2017 are **bolded**.

Upland community Type 1 – *Elymus repens*/*Bromus inermis* covered 30 acres of the project area, primarily in the uplands towards the northern end of the site. Creeping wild rye (*Elymus repens*), smooth brome (*Bromus inermis*), western wheatgrass (*Pascopyrum smithii*), common timothy (*Phleum pratense*), and flat-stem bluegrass (*Poa compressa*) dominated the community. Common yarrow (*Achillea millefolium*), redtop (*Agrostis stolonifera*), field meadow foxtail (*Alopecurus pratensis*), spotted knapweed (*Centaurea stoebe*), reed canary grass (*Phalaris arundinacea*), Kentucky bluegrass (*Poa pratensis*), bluebunch wheatgrass (*Pseudoroegneria spicata*), and Douglas fir (*Pseudotsuga menziesii*) were present at 1–5 percent cover.

Wetland community Type 2 – *Betula pumila*/*Rhamnus alnifolia* covered 10.7 acres of the project area and is associated with the fen-carr area located in the southwestern corner of the site. Bog birch (*Betula pumila*), alder-leaf buckthorn (*Rhamnus alnifolia*), and *Carex* species dominated the community. More than 50 percent of the community cover contained moss species. Six additional species were identified in this community at less than 5 percent cover.

Wetland community Type 3 – *Phalaris arundinacea*/*Carex* sp. covered 9.2 acres of the project area, occurs mainly in the middle of the site, and surrounds the excavated wetland depressions. Reed canary grass, analogue sedge (*Carex simulata*), and rough bentgrass (*Agrostis scabra*) dominated the community. Nine additional species were identified in this community at less than 5 percent to trace of the community cover. Approximately 5 percent of the community contained open water.

Wetland community Type 4 – *Carex simulata*/*Persicaria amphibia* covered 2.8 acres of the project area and generally borders the fen-carr area to the north and west. Analogue sedge, water smartweed (*Persicaria amphibia*), and leafy tussock sedge (*Carex aquatilis*) dominated the vegetation community. Rough bent, Northwest Territory sedge (*Carex utriculata*), and moss were each present within the community at less than 10 percent cover. Six additional species were identified in this community at less than 5 percent cover each.

Upland community Type 5 – *Pseudotsuga menziesii*/*Larix occidentalis* covered 21.9 acres along the edges of the project area. Douglas fir, western larch (*Larix occidentalis*), and lodgepole pine (*Pinus contorta*) dominated the vegetation community cover. The shrub layer contained common snowberry (*Symphoricarpos albus*), Woods' rose (*Rosa woodsii*), bearberry (*Arctostaphylos uva-ursi*), and blueberry (*Vaccinium* sp.). The understory contained Geyer's sedge (*Carex geyeri*), smooth brome, blue wild rye (*Elymus glaucus*), and starry false Solomon's-seal (*Maianthemum stellatum*). Two Priority 2B noxious weed species were identified within the community: spotted knapweed at 6–10 percent cover and Canada thistle (*Cirsium arvense*) at less than 1 percent cover.

Wetland community Type 6 – *Salix bebbiana*/*Phalaris arundinacea* covered 0.8 acre of the project area along the Coyote Creek channel toward the center of the site. Gray willow (*Salix bebbiana*) and reed canary grass dominated the vegetation community. Three additional species were identified in this community and were each present at less than 5 percent cover.

Wetland community Type 7 – *Alnus incana*/*Phalaris arundinacea* covered 0.4 acre of the project area along the historic Coyote Creek channel. Speckled alder (*Alnus incana*) and reed canary grass dominated the vegetation community. Water smartweed was present at less than 5 percent cover, and Canada thistle was present in trace amounts.

Wetland community Type 8 – *Carex utriculata* covered 10.7 acres of the project area toward the center of the site. This community was dominated by Northwest Territory sedge, which was interspersed with minor amounts of willow and other sedge species.

Upland community Type 9 – *Crataegus douglasii*/*Symphoricarpos albus* covered 0.5 acre of the project area on the northeastern side of the site. This community was dominated by black hawthorn (*Crataegus douglasii*) and common snowberry shrubs. Reed canary grass accounted for less than 10 percent of the vegetation community cover. This community had a substantial Canada thistle infestation that accounted for 6–10 percent of the vegetative cover. Eight other species were present at cover values of a trace or less, including houndstongue, which is a state-listed noxious weed.

Wetland community Type 10 – *Typha latifolia* covered 2.8 acres around the fringe of Schrieber Lake. This community contained broad-leaf cattail (*Typha latifolia*) and purple marshlocks (*Comarum palustre*) within areas of shallow open water.

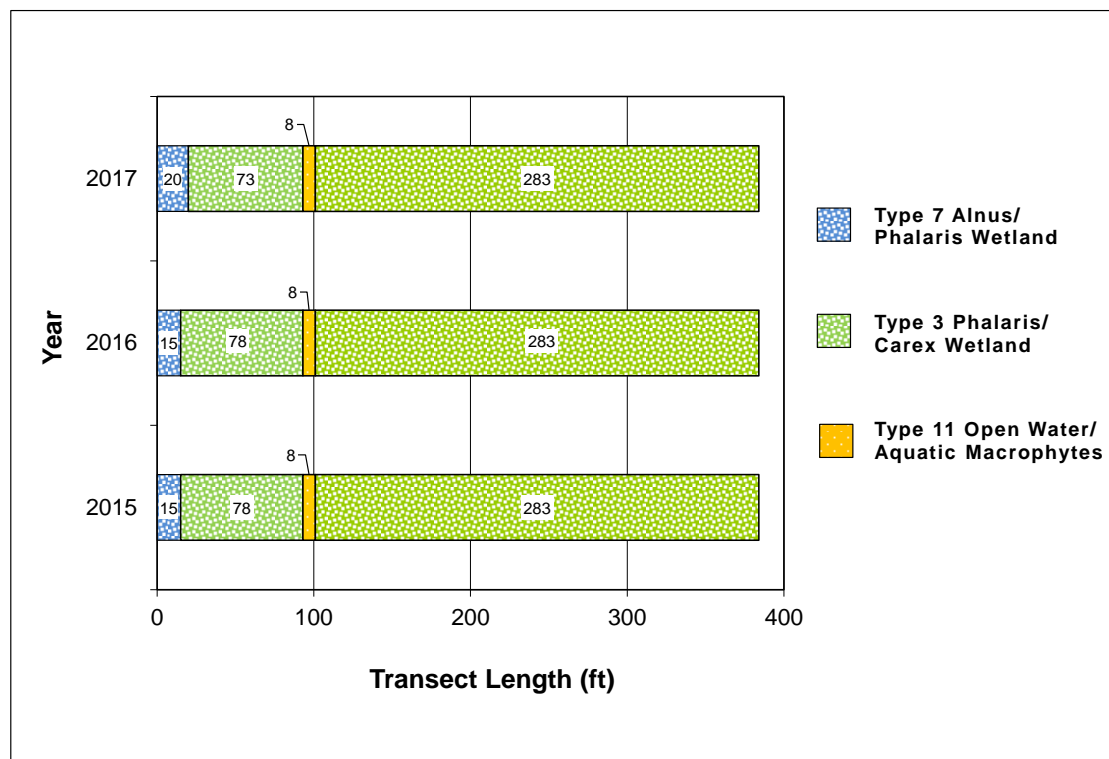
Wetland community Type 11 – Open Water/Aquatic Macrophytes covered 12.6 acres of the project area and included Schrieber Lake and the newly constructed wetland cells. This community contained more than 50 percent open water. Vegetation in the community included water smartweed and aquatic macrophytes.

Wetland community Type 12 – *Carex lasiocarpa* covered 1.3 acres of the project area on the southern edge of Schrieber Lake, immediately adjacent to the cattail community there (community Type 10). Woolly-fruit sedge (*Carex lasiocarpa*) accounted for more than 50 percent of the vegetative cover in this community. Reed canary grass and leafy tussock sedge were each present at less than 10 percent cover. Five species were identified in the community.

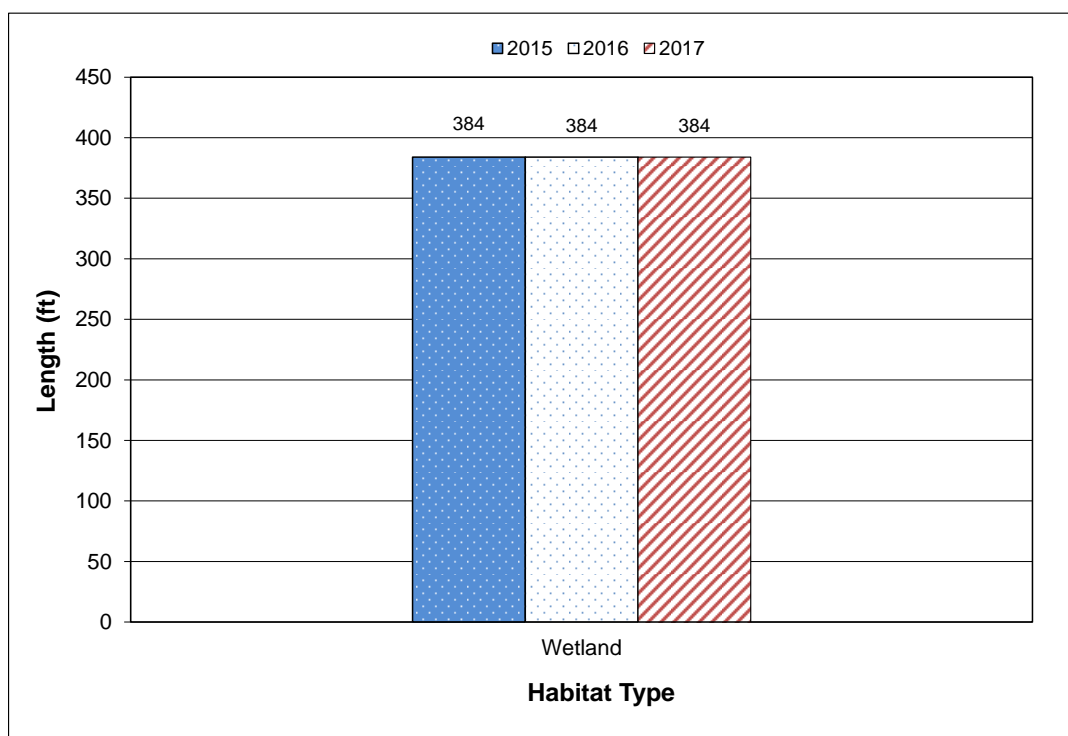
Trends in plant species composition were measured on three transects (T-1, T-2, and T-3) in 2017. Photographs of the transect end points are shown in Appendix C. T-1 consists of a 384-foot transect that was established during initial monitoring at the site in 2015. Table 3-2 and Charts 3-1 and 3-2 summarize the data for T-1 (Wetland Mitigation Site Monitoring form, Appendix B). Community Types 3, 7, and 11 were identified along this transect. All three vegetative communities are considered wetland communities. Site conditions in 2017 remained mostly similar to those observed in 2016.

**Table 3-2. Data Summary for T-1 From 2015 Through 2017 at the Schrieber Lake Site**

Monitoring Year	2015	2016	2017
Transect Length (feet)	384	384	384
Vegetation Community Transitions Along Transect	3	3	3
Vegetation Communities Along Transect	3	3	3
Hydrophytic Vegetation Communities Along Transect	3	3	3
Total Vegetative Species	10	9	10
Total Hydrophytic Species	5	8	9
Total Upland Species	5	1	1
Estimated % Total Vegetative Cover	90	100	100
Estimated % Unvegetated	10	0	0
% Transect Length Comprising Hydrophytic Vegetation Communities	100	100	100
% Transect Length Comprising Upland Vegetation Communities	0	0	0
% Transect Length Comprising Open Water	0	0	0
% Transect Length Comprising Mudflat	0	0	0



**Chart 3-1. Transect Map Showing Community Types on T-1 From 2015 Through 2017 From Start (0 Foot) to Finish (384 Feet).**

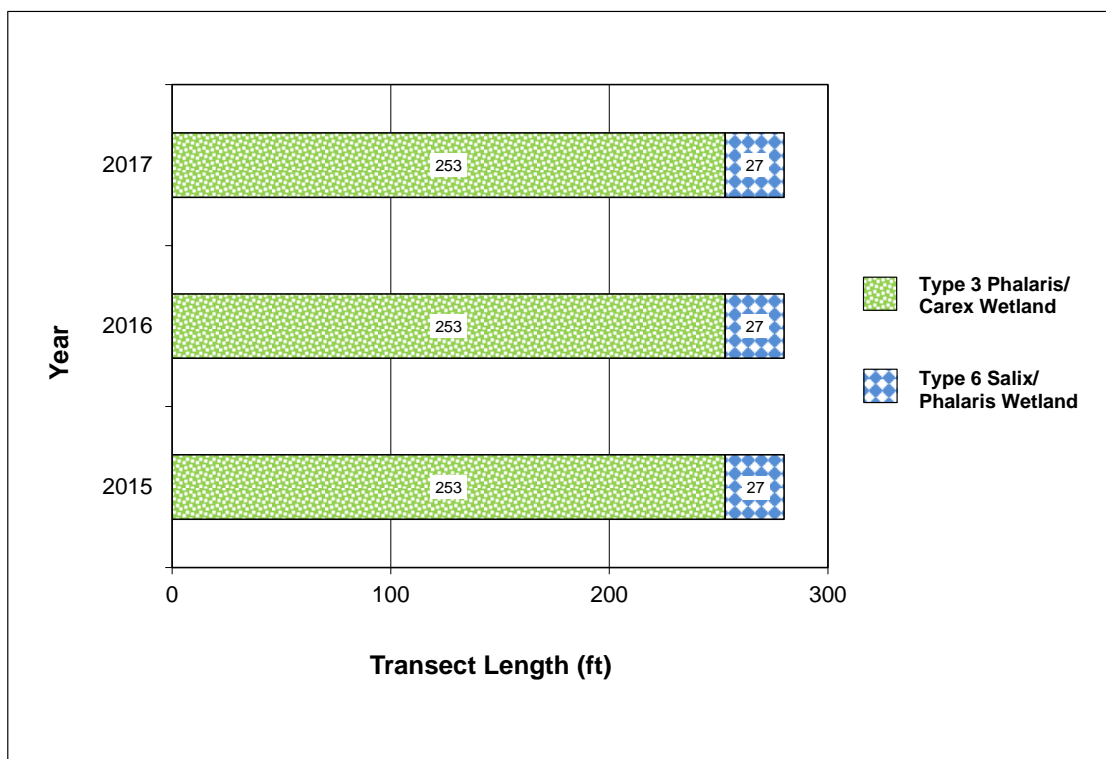


**Chart 3-2.** Length of Habitat Types Within T-1 From 2015 Through 2017.

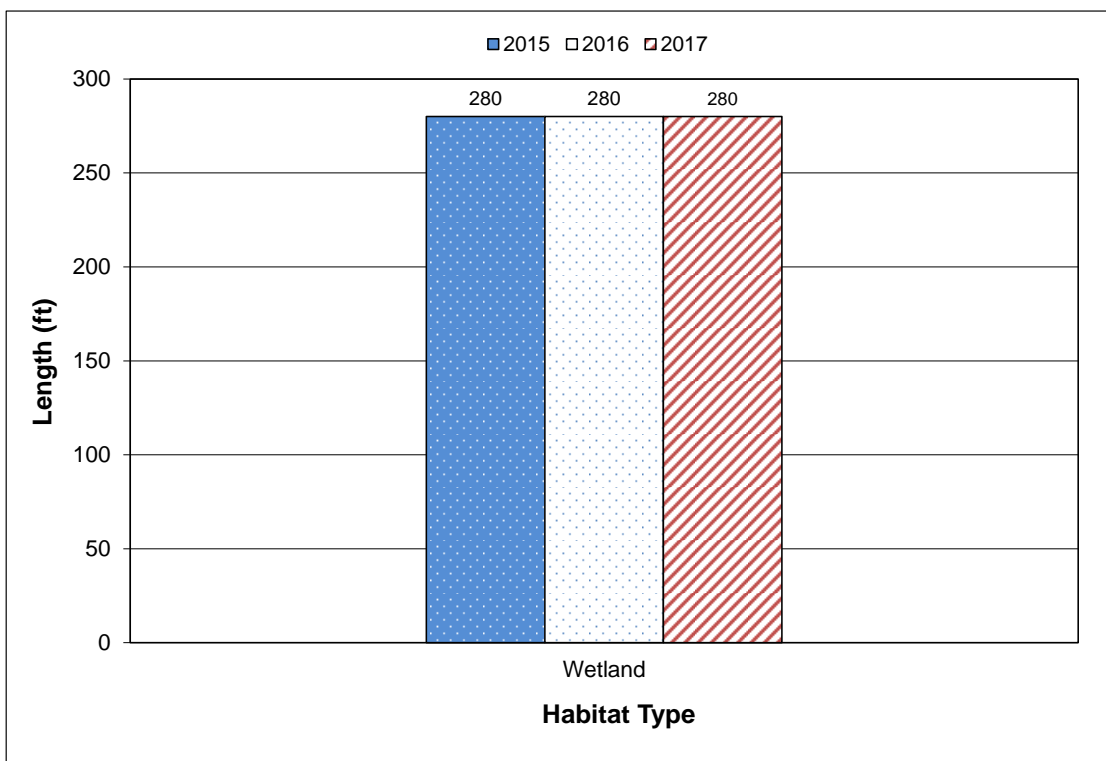
T-2 crossed wetland community Type 3 – *Phalaris arundinacea*/*Carex* sp. and wetland community Type 6 – *Salix bebbiana*/*Phalaris arundinacea* in the middle of the restored wetland area (Figure A-2, Appendix A). Hydrophytic vegetation communities dominated 100 percent of the transect (Figure A-3, Appendix A). Details of the transect data are summarized and graphed on Table 3-3 and Charts 3-3 and 3-4. Site conditions in 2017 remained similar to those observed in 2016. Photographs of the endpoints of T-2 are shown in Appendix C.

**Table 3-3. Data Summary for T-2 From 2015 Through 2017 at the Schrieber Lake Site**

Monitoring Year	2015	2016	2017
Transect Length (feet)	280	280	280
Vegetation Community Transitions Along Transect	1	1	1
Vegetation Communities Along Transect	2	2	2
Hydrophytic Vegetation Communities Along Transect	2	2	2
Total Vegetative Species	7	5	6
Total Hydrophytic Species	5	5	6
Total Upland Species	2	0	0
Estimated % Total Vegetative Cover	99	100	100
Estimated % Unvegetated	1	0	0
% Transect Length Comprising Hydrophytic Vegetation Communities	100	100	100
% Transect Length Comprising Upland Vegetation Communities	0	0	0
% Transect Length Comprising Unvegetated Open Water	0	0	0
% Transect Length Comprising Mudflat	0	0	0



**Chart 3-3.** Transect Map Showing Community Types on T-2 From 2015 Through 2017 From Start (0 Foot) to Finish (280 Feet).

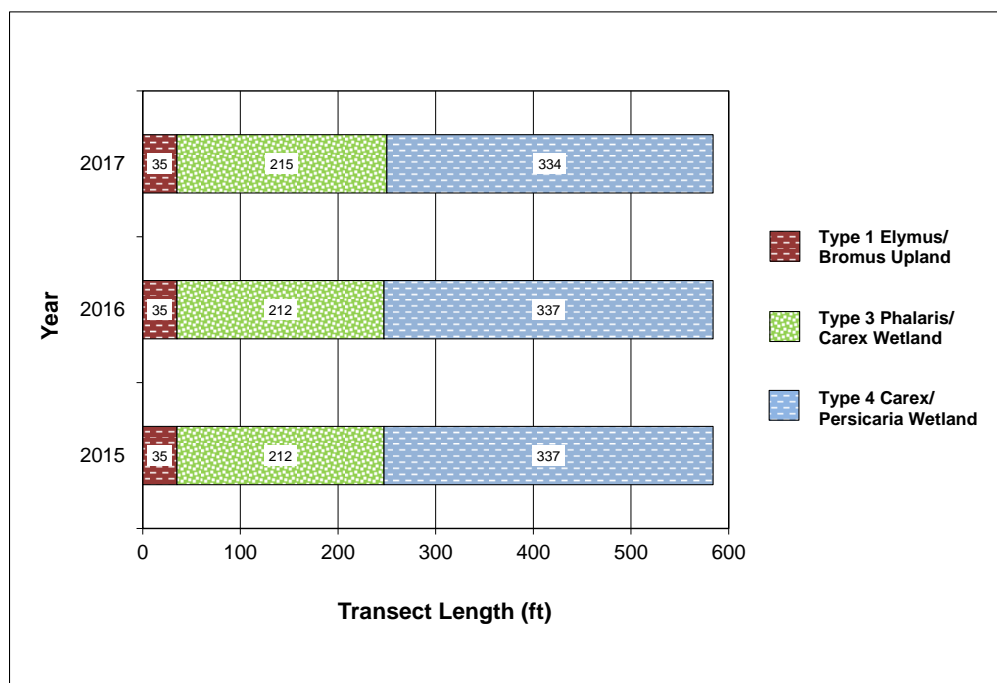


**Chart 3-4.** Length of Habitat Types Within T-2 From 2015 Through 2017.

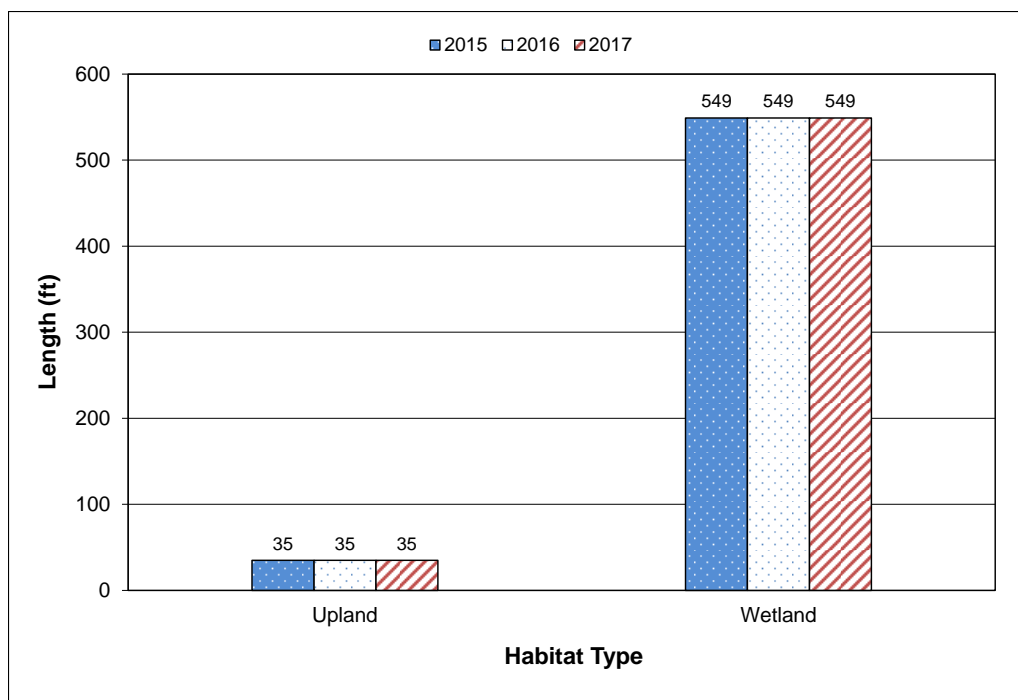
T-3 extended 584 feet at 175 degrees on the western side of the restored area (Figure A-2, Appendix A). Transect details are shown on Table 3-4 and Charts 3-5 and 3-6 (Wetland Mitigation Site Monitoring forms, Appendix B). Site conditions in 2017 remained similar to those observed in 2016. The transect crossed three communities: wetland community Types 3 – *Phalaris arundinacea*/*Carex* sp. and 4 – *Carex simulate*/*Persicaria amphibia* and upland community Type 1 – *Elymus repens*/*Broums inermis*. Sixteen plant species were identified along the transect. Photographs of the T-3 endpoints are shown in Appendix C.

**Table 3-4. Data Summary for T-3 From 2015 Through 2017 at the Schrieber Lake Site**

Monitoring Year	2015	2016	2017
Transect Length (feet)	584	584	584
Vegetation Community Transitions Along Transect	2	2	2
Vegetation Communities Along Transect	3	3	3
Hydrophytic Vegetation Communities Along Transect	2	2	2
Total Vegetative Species	16	11	10
Total Hydrophytic Species	14	10	8
Total Upland Species	2	1	2
Estimated % Total Vegetative Cover	100	100	100
Estimate % Unvegetated	0	0	0
% Transect Length Comprising Hydrophytic Vegetation Communities	94	94	94
% Transect Length Comprising Upland Vegetation Communities	6	6	6
% Transect Length Comprising Unvegetated Open Water	0	0	0
% Transect Length Comprising Mudflat	0	0	0



**Chart 3-5. Transect Map Showing Community Types on T-3 From 2015 Through 2017 From Start (0 Foot) to Finish (584 Feet).**



**Chart 3-6.** Length of Habitat Types Within T-3 From 2015 Through 2017.

Priority 2B noxious weeds that were identified within the Schrieber Lake mitigation site included spotted knapweed, Canada thistle, Gypsy-flower (*Cynoglossum officinale*), St. John's-wort (*Hypericum perforatum*), ox-eye daisy (*Leucanthemum vulgare*), dalmatian toadflax (*Linaria dalmatica*), whitetop (*Lepidium draba*), and butter-and-eggs (*Linaria vulgaris*). Infestation areas were mapped in 2017. The most common weed species found on the site were yellow toadflax, spotted knapweed, and Canada thistle (Figure A-3, Appendix A).

MDT planted 1,500 woody plants in the riparian buffer along Schrieber Creek, Coyote Creek, and around some wetland excavations. Based on observations at the parallel and perpendicular belt transects, woody plantings survival was estimated to be below the required 50 percent survival. Woody planting survival is hampered by competition with herbaceous vegetation, extremely saturated soil conditions, herbivory by ungulates and rodents, and (in some areas) by weed spraying activities.

### 3.3 SOIL

The primary map unit on the site (approximately 70 percent) was identified as a poorly drained Aquic Udifluent. The soil is found in intermontane basins and is classified as hydric. The NRCS soil unit Andic Dystric Eutrochrepts was mapped along the edges of the site and included silty glaciolacustrine deposits that are common on lacustrine terraces and glacial outwash terraces.

Two soil pits were evaluated to determine the extent of hydric soil development. DP-1W satisfied hydric soil indicators with the presence of a hydrogen sulfide odor. DP-1U revealed a black (10 YR 2/1) loam-textured soil without redox features from 0 to 18 inches. No positive indicators of hydric soil were observed at the upland data point.



### 3.4 WETLAND DELINEATION

The total jurisdictional wetland and aquatic habitat acreage that was delineated at the Schrieber Lake mitigation site in 2017 was 52.1 acres, as shown in Table 3-5. The wetland acreage has remained constant since monitoring began in 2015. This acreage includes Schrieber Lake (8.26 acres), the Schrieber and Coyote Creek stream channels (approximately 1 acre), wetlands that occur within the creditable riparian buffer of those stream channels (3.9 acres), and lake fringe wetlands that occur on that portion of the project site that is owned by the US Forest Service (USFS) (1.25 acres). None of those wetlands are eligible for wetland credit under the Schrieber Lake mitigation plan [MDT, 2009]. The remaining acreage available for wetland crediting is 37.65 acres. The extensive development of wetlands at this site is the product of excavating the wetland cells, plugging the former stream channels, and re-meandering and raising the bed elevation of the restored creek channels. As a result, widespread inundation was present throughout the site during the July 2017 site visit. Wetland development in the low-lying meadow in the west-central part of the site seems to have plateaued but will continue to be monitored for wetland expansion in this area.

**Table 3-5. Project Upland and Delineated Wetland Acres From 2015 Through 2017**

Habitat Type	2015 Acres	2016 Acres	2017 Acres
Uplands	52.60	52.60	52.60
Wetlands & Aquatic Habitat			
Schrieber Lake	8.26	8.26	8.26
Stream channels	1.00	1.00	1.00
Riparian buffer	3.90	3.90	3.90
USFS wetlands	1.25	1.25	1.25
Remaining wetlands	37.65	37.65	37.65
Wetlands subtotal <sup>(a)</sup>	52.10	52.10	52.10
<b>Project Area</b>	<b>104.70</b>	<b>104.70</b>	<b>104.70</b>

(a) The subtotal was rounded to the nearest hundredth.

### 3.5 WILDLIFE

A list of animal species that were observed directly or indirectly between 2015 and 2017 is presented in Table 3-6. Observations made by MDT staff on the same day that monitoring occurred are included in the species list for 2017. A total of 42 different bird species were identified at the site in 2017. Other wildlife that were directly observed included white-tailed deer (*Odocoileus virginianus*), muskrat (*Ondatra zibethicus*), western jumping mouse (*Zapus princeps*), ground squirrels (*Marmotini* sp.), and chipmunk (*Tamias* sp.). Breeding western toads (*Anaxyrus boreas*) (a Montana S2 species) have been documented by USFS personnel on the project site in the past. The Montana Department of Fish, Wildlife, and Parks and the US Fish and Wildlife Service have also documented grizzly bear (*Ursus arctos*) on the Schrieber Lake site.

**Table 3-6. Wildlife Observed at the Schrieber Lake Site  
From 2015 Through 2017 (Page 1 of 2)**

Common Name	Scientific Name
<i>Amphibian</i>	
<b>Columbia Spotted Frog</b>	<b><i>Rana luteiventris</i></b>
<b>Western Toad</b>	<b><i>Anaxyrus boreas</i></b>
<i>Fish</i>	
<b>Brook Trout</b>	<b><i>Salvelinus fontinalis</i></b>
<b>Pumpkinseed</b>	<b><i>Lepomis gibbosus</i></b>
<b>Shiner sp.</b>	
Trout sp.	
<i>Reptile</i>	
<b>Common Gartersnake</b>	<b><i>Thamnophis sirtalis</i></b>
<b>Painted Turtle</b>	<b><i>Chrysemys picta</i></b>
<i>Mammal</i>	
<b>Bushy-Tailed Woodrat</b>	<b><i>Neotoma cinerea</i></b>
<b>Chipmunk sp.</b>	<b><i>Tamias sp.</i></b>
Deer sp.	<i>Odocoileus sp.</i>
<b>Elk</b>	<b><i>Cervus elaphus</i></b>
Grizzly Bear	<i>Ursus arctos</i>
<b>Ground Squirrel</b>	<b><i>Marmotini sp.</i></b>
<b>Meadow Vole</b>	<b><i>Microtus pennsylvanicus</i></b>
<b>Moose</b>	<b><i>Alces americanus</i></b>
<b>Muskrat</b>	<b><i>Ondatra zibethicus</i></b>
<b>Raccoon</b>	<b><i>Procyon lotor</i></b>
Vole sp.	
<b>Western Jumping Mouse</b>	<b><i>Zapus princeps</i></b>
<b>White-Tailed Deer</b>	<b><i>Odocoileus virginianus</i></b>
<b>Yellow-Bellied Marmot</b>	<b><i>Marmota flaviventris</i></b>
<i>Bird</i>	
<b>American Coot</b>	<b><i>Fulica americana</i></b>
<b>American Dipper</b>	<b><i>Cinclus mexicanus</i></b>
<b>American Robin</b>	<b><i>Turdus migratorius</i></b>
<b>American Wigeon</b>	<b><i>Anas americana</i></b>
<b>Bank Swallow</b>	<b><i>Riparia riparia</i></b>
<b>Barn Swallow</b>	<b><i>Hirundo rustica</i></b>
<b>Belted Kingfisher</b>	<b><i>Ceryle alcyon</i></b>
<b>Black-Billed Magpie</b>	<b><i>Pica hudsonia</i></b>
Black-Capped Chickadee	<i>Poecile atricapillus</i>
Blue-Winged Teal	<i>Anas discors</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
<b>Bufflehead</b>	<b><i>Bucephala albeola</i></b>
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>
<b>Calliope Hummingbird</b>	<b><i>Stellula calliope</i></b>
<b>Canada Goose</b>	<b><i>Branta canadensis</i></b>

**Table 3-6. Wildlife Observed at the Schrieber Lake Site  
From 2015 Through 2017 (Page 2 of 2)**

Common Name	Scientific Name
<b>Cedar Waxwing</b>	<b><i>Bombycilla cedrorum</i></b>
Chimney Swift	<i>Chaetura pelagica</i>
<b>Chipping Sparrow</b>	<b><i>Spizella passerina</i></b>
<b>Cinnamon Teal</b>	<b><i>Anas cyanoptera</i></b>
<b>Common Snipe</b>	<b><i>Gallinago gallinago</i></b>
<b>Common Yellowthroat</b>	<b><i>Geothlypis trichas</i></b>
<b>Dark-Eyed Junco</b>	<b><i>Junco hyemalis</i></b>
Duck	
<b>Dusky Flycatcher</b>	<b><i>Empidonax oberholseri</i></b>
Flycatcher	
<b>Great Blue Heron</b>	<b><i>Ardea herodias</i></b>
<b>Green-Winged Teal</b>	<b><i>Anas crecca</i></b>
<b>Grosbeak sp.</b>	
<b>House Wren</b>	<b><i>Troglodytes aedon</i></b>
Killdeer	<i>Charadrius vociferus</i>
<b>Macgillivray's Warbler</b>	<b><i>Oporornis tolmiei</i></b>
<b>Mallard</b>	<b><i>Anas platyrhynchos</i></b>
<b>Marsh Wren</b>	<b><i>Cistothorus palustris</i></b>
<b>Northern Flicker</b>	<b><i>Colaptes auratus</i></b>
Northern Shoveler	<i>Anas clypeata</i>
<b>Osprey</b>	<b><i>Pandion haliaetus</i></b>
<b>Pied-Billed Grebe</b>	<b><i>Podilymbus podiceps</i></b>
<b>Red-Tailed Hawk</b>	<b><i>Buteo jamaicensis</i></b>
<b>Red-Winged Blackbird</b>	<b><i>Agelaius phoeniceus</i></b>
<b>Rough-Winged Swallow</b>	<b><i>Stelgidopteryx serripennis</i></b>
Ruddy Duck	<i>Oxyura jamaicensis</i>
<b>Song Sparrow</b>	<b><i>Melospiza melodia</i></b>
<b>Sora</b>	<b><i>Prozana carolina</i></b>
Sparrow sp.	
<b>Spotted Sandpiper</b>	<b><i>Actitis macularia</i></b>
Swallow sp.	
<b>Tree Swallow</b>	<b><i>Tachycineta bicolor</i></b>
<b>Vaux Swift</b>	<b><i>Chaetura vauxi</i></b>
Vesper Sparrow	<i>Poocetes gramineus</i>
Virginia Rail	<i>Rallus limicola</i>
<b>Western Bluebird</b>	<b><i>Sialia mexicana</i></b>
<b>Willow Flycatcher</b>	<b><i>Empidonax traillii</i></b>
Wilson's Snipe	<i>Gallinago delicata</i>
<b>Wilson's Warbler</b>	<b><i>Wilsonia pusilla</i></b>
<b>Yellow Warbler</b>	<b><i>Dendroica petechia</i></b>
<b>Yellow-Headed Blackbird</b>	<b><i>Xanthocephalus xanthocephalus</i></b>
<b>Yellow-Rumped Warbler</b>	<b><i>Dendroica coronata</i></b>

Species that were identified in 2017 are **bolded**.

### 3.6 FUNCTIONAL ASSESSMENT

The 2008 MDT MWAM was used to evaluate the site in 2017; Table 3-7 displays the results of this evaluation. The 2015 functional assessment incorporated the created, restored, and preserved wetlands into one AA. The 2017 functional assessment followed this format. The MWAM AA included all of the delineated wetlands, including the creditable wetlands (37.65 acres); the wetlands within the riparian buffers of Schrieber and Coyote Creeks (3.9 acres); the open water within Schrieber Lake (8.26 acres); portions of Schrieber and Coyote creeks that flow through the wetland areas (0.65 acres); and the wetlands on USFS lands (1.25 acres). The wetlands in the AA received a Category I rating with 87 percent of the total possible points in 2017. The 51.7-acre AA was rated as a Category I wetland and scored excellent for general wildlife habitat and production export/food chain support and high for listed/proposed threatened and endangered (T&E) species habitat, short- and long-term surface-water storage, sediment/nutrient/toxicant removal, sediment/shoreline stabilization, groundwater/discharge/recharge, and uniqueness. The fish habitat score decreased slightly in 2016 and 2017 from 2015 because brook trout are listed as a Tier IV species rather than Tier III, which was used in the 2015 rating.

**Table 3-7. Functions and Values of the Schrieber Lake Site From 2015 to 2017**

<b>Function and Value Parameters From the 2008 MDT MWAM<sup>(a)</sup></b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
Listed/Proposed T&E Species Habitat	High (0.8)	High (0.8)	High (0.8)
Montana Natural Heritage Program (MTNHP) Species Habitat	Mod (0.6)	Mod (0.6)	Mod (0.6)
General Wildlife Habitat	High (1.0)	High (1.0)	High (1.0)
General Fish/Aquatic Habitat	Mod (0.7)	Mod (0.5)	Mod (0.5)
Flood Attenuation	Mod (0.6)	Mod (0.6)	Mod (0.6)
Short- and Long-Term Surface-Water Storage	High (1.0)	High (1.0)	High (1.0)
Sediment/Nutrient/Toxicant Removal	High (1.0)	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	High (1.0)	High (1.0)	High (1.0)
Production Export/ Food Chain Support	High (1.0)	High (1.0)	High (1.0)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)
Uniqueness	High (0.9)	High (0.9)	High (0.9)
Recreation/Education Potential	Mod (0.1)	High (0.2)	High (0.2)
<b>Actual Points/Possible Points</b>	<b>9.7/11</b>	<b>9.6/11</b>	<b>9.6/11</b>
<b>% of Possible Score Achieved</b>	<b>88.2</b>	<b>87</b>	<b>87</b>
<b>Overall Category</b>	<b>I</b>	<b>I</b>	<b>I</b>
<b>Acreage of Assessed Aquatic Habitats within Easement (acres)</b>	<b>51.7</b>	<b>51.7</b>	<b>51.7</b>
<b>Functional Units (acreage × actual points)</b>	<b>501.49</b>	<b>496.32</b>	<b>496.32</b>

(a) Berglund and McElDowney [2008].

### 3.7 PHOTOGRAPHIC DOCUMENTATION

Ten photo points were initially established in the project area in 2015. All ten photo-point locations were documented during the 2017 site visit. Additionally, photographs were taken at each surveyed

stream cross section, sampled data point, and start and end of the vegetation transects (T-1, T-2, and T-3) in 2017. The locations of these photographs are illustrated on Figure A-2 in Appendix A. The 2017 photographs are provided in Appendix C.

## 3.8 STREAM-MONITORING RESULTS

### 3.8.1 Channel Cross Sections

From the channel cross-section survey and identification of the bankfull water surface elevation, parameters that are relevant to the geomorphic evolution of the channel can be calculated and compared. Geometric parameters of interest include bankfull width, maximum depth, cross-sectional area, and mean depth. From these metrics, the width to depth ratio is calculated. The width to depth (W:D) ratio is the ratio of the bankfull channel width divided by the mean bankfull depth. The W:D ratio is used in stream classification systems and is often used to compare conditions between reaches with the same stream type. Comparing the W:D ratios that were measured at the same location over time provides a potential quantitative indicator of channel over-widening and aggradation or channel incision and degradation. These two phenomena are observed responses of the channel morphology to changes in the hydrologic regime of the larger scale system related to sediment discharge, sediment particle size, stream flow, and stream slope. Increases or decreases of those four factors generally trigger a morphological response. For example, when a channel is straightened, it loses length over the same elevation change and consequently becomes steepened. A typical morphological response is for the stream to degrade (i.e., down-cut and become incised, headcut migration) to a new equilibrium. The incised channel then loses connectivity to its floodplain, where more flood flow is contained in the channel, which may accelerate channel degradation. Changes in any of the four factors generally creates an unstable condition, which triggers a morphological response until a new dynamic equilibrium is reached.

Significant increases or decreases in bankfull width, maximum depth, cross-sectional area, mean depth, and W:D ratio as measured over time may suggest that the channel is unstable and undergoing a morphological response toward dynamic equilibrium. For these repeated annual measurements and comparisons, the bankfull water surface elevation that was initially determined in 2015 was held constant for each cross section. Bankfull width, maximum depth, cross-sectional area, mean depth, and W:D ratio results from each cross section are shown in Table 3-8. Each surveyed cross section was plotted and included in Appendix D. The sinuosity of each constructed channel reach was calculated during the initial survey in 2015 by digitizing the new channel centerline from aerial photographs and dividing the centerline length by the valley length of each reach.

The following sections describe each reconstructed stream reach within the mitigation site after initial measurements in 2015.

Table 3-8. Surveyed Cross-Section Parameters at the Schrieber Lake Site From 2015 Through 2017

Monitoring Cross Section	Bankfull Width (ft)				Maximum Depth (ft)				XS Area (ft <sup>2</sup> )				Mean Depth (ft)				W:D Ratio			
	2015	2016	2017	%Δ <sup>(a)</sup>	2015	2016	2017	%Δ <sup>(a)</sup>	2015	2016	2017	%Δ <sup>(a)</sup>	2015	2016	2017	%Δ <sup>(a)</sup>	2015	2016	2017	%Δ <sup>(a)</sup>
SC1-1	11.0	11.7	11.4	-2%	2.0	2.2	2.1	-5%	14.3	17.0	16.3	-4%	1.3	1.5	1.4	-2%	8.4	8.0	8.0	0%
SC1-2	11.2	11.9	12.6	6%	1.6	1.7	1.7	-2%	12.1	12.8	14.1	10%	1.1	1.1	1.1	4%	10.4	11.1	11.3	2%
SC2A-1	11.6	12.2	14.1	15%	1.6	1.5	1.6	1%	12.4	11.4	12.5	10%	1.1	0.9	0.9	-5%	11.0	13.0	15.8	21%
SC2A-2	13.2	12.6	13.1	4%	2.4	2.3	2.3	0%	18.5	17.8	19.5	10%	1.4	1.4	1.5	6%	9.4	8.9	8.8	-2%
SC2B-1	12.5	12.6	13.4	6%	2.4	2.6	2.4	-7%	20.8	18.8	20.1	7%	1.7	1.5	1.5	1%	7.5	8.5	8.9	5%
SC3-1	14.5	14.6	14.5	-1%	2.6	2.6	2.5	-3%	29.9	31.2	28.0	-10%	2.1	2.1	1.9	-10%	7.0	6.9	7.6	10%
SC3-2	16.6	15.3	14.8	-3%	2.9	2.8	3.0	6%	27.8	27.6	24.3	-12%	1.7	1.8	1.6	-9%	9.8	8.5	9.0	7%
SC7-1	7.4	7.0	7.7	10%	2.0	1.8	2.5	37%	8.5	8.2	10.8	32%	1.1	1.2	1.4	20%	6.5	6.0	5.5	-8%
CC1A-1	10.2	9.6	10.0	4%	2.4	2.1	2.2	6%	13.6	11.4	13.6	19%	1.3	1.2	1.4	15%	7.7	8.1	7.4	-9%
CC1A-2	7.5	7.1	6.5	-9%	1.8	1.8	1.9	4%	11.3	11.9	11.7	-2%	1.5	1.7	1.8	7%	5.0	4.3	3.7	-15%
CC1B-1	11.4	12.0	11.7	-3%	2.6	3.0	2.5	-14%	19.5	22.0	16.9	-23%	1.7	1.8	1.5	-21%	6.7	6.6	8.0	22%

(a) Percent change between 2016 and 2017.  
ft = feet.

#### 3.8.1.1 *Schrieber Creek, Reach 1*

Reach 1 of Schrieber Creek was constructed through a dry former hayfield and is considered an ephemeral stream reach. The mitigation plan states that this channel segment will be constructed to a Rosgen B/C-type channel configuration, which typically exhibit moderate W:D ratios of more than 12 and moderate to high sinuosities of more than 1.2. Survey results at two cross sections within Reach 1 indicated W:D ratios of 8.4 and 10.4, which are more typical of Rosgen E-type channels. Bankfull widths at these two cross sections were 11.0 and 11.2 feet, which fell within the range specified for channel width within the design for Reach 1. The channel sinuosity is 1.1, which indicates a relatively straight channel alignment as compared to typical B- and C-type channels.

#### 3.8.1.2 *Schrieber Creek, Reach 2A*

Reach 2A of Schrieber Creek continues through the dry, former hayfield and is considered an ephemeral stream reach. The mitigation plan indicates that Reach 2A of Schrieber Creek will be constructed with a Rosgen C-type channel configuration, which typically exhibit W:D ratios of more than 12 and sinuosity of more than 1.5. Two cross sections were surveyed through Reach 2A and indicated W:D ratios of 11.0 and 9.4. These W:D ratios are considered low for a C-type channel and are more indicative of an E-type channel. The bankfull channel width surveyed at these cross sections was 11.6 and 13.2 feet, which is within the range specified in the design for Reach 2A. The sinuosity of the channel through Reach 2A is 1.1, which is also considered low for a C-type stream.

#### 3.8.1.3 *Schrieber Creek, Reach 2B*

Reach 2B is a short, 130-foot channel segment that remains within the ephemeral reach of Schrieber Creek. The mitigation plan proposes a Rosgen A/B channel type through Reach 2B as the creek transitions from the upper to the lower hay fields. The W:D ratio calculated for the two cross sections surveyed in Reach 2B of 7.5 indicates a Rosgen A-type channel, which have W:D ratios below 12 and are usually dominated by rocky step-pool features. The sinuosity of the reach is 1.0, which also indicates an A-type channel. The bankfull width surveyed in this reach was 12.5 feet, which is within the range specified in the project design for Reach 2B.

#### 3.8.1.4 *Schrieber Creek, Reach 3*

Reach 3 of Schrieber Creek runs across the lower hay meadow and appears to have perennial flows. The mitigation plan states that this channel segment will be constructed with a Rosgen E-type configuration, which typically exhibits very low W:D ratios (less than 12) and high sinuosities (more than 1.5). Two cross sections were surveyed in Reach 3 and exhibited W:D ratios that indicate an E-type channel configuration (7.1 and 9.8). Bankfull widths that were surveyed at these cross sections (14.5 and 16.5 feet) were higher than the widths specified in the design for Reach 3 (10.1–11.8 feet). Channel sinuosity through this constructed reach is 1.4, which is considered low for an E-type channel.

#### 3.8.1.5 *Schrieber Creek, Reach 7*

The mitigation plan included reactivating a relic segment of Schrieber Creek that had been deactivated after historic efforts to channelize and relocate the creek to improve agricultural production. Because this reach is a reactivated natural relic channel, it has a higher sinuosity than the other constructed reaches associated with this project. This reactivated channel segment is considered Reach 7 of Schrieber Creek. One cross section was surveyed in Reach 7 and exhibited dimensions typical of a



Rosgen E-type channel that flows through a wet meadow. The surveyed cross section in Reach 7 displayed a lower W:D ratio (6.5) and bankfull width (7.4 feet) that was approximately half of that surveyed in Reach 3. The cross-sectional area of the channel surveyed in Reach 7 was less than one-third the area of cross sections surveyed in Reach 3, which indicates a much-reduced channel capacity compared to the reconstructed channel reach upstream. Channel sinuosity through Reach 7 is 1.7, which is considerably higher than the constructed channel reaches because of the alignment that cuts across the valley bottom.

#### *3.8.1.6 Coyote Creek, Reach 1A*

Reach 1 of Coyote Creek was designed as a perennial, Rosgen E-type channel through the lower hay meadow. Two cross sections were surveyed within Reach 1 of Coyote Creek and displayed very low W:D ratios that indicate an E-type channel. CC1A-1 displayed a bankfull width (10.2 feet) that was higher than the range of design widths specified for Reach 1 (6.6–8.2 feet). Channel sinuosity through Reach 1A is 1.8, which falls within the range that is often observed in E-type channels.

#### *3.8.1.7 Coyote Creek, Reach 1B*

Reach 1B of Coyote Creek is the reactivated original stream channel that runs through the lower hay meadow. One cross section was surveyed through this reach and displayed a W:D ratio typical for a Rosgen E-type channel. The bankfull width of this channel cross section was 11.4 feet. The alignment of the channel through Reach 1B is relatively straight with a sinuosity of 1.1.

#### *3.8.1.8 Assessment From Current Monitoring Year Survey*

In general, large-scale horizontal and vertical changes were not observed. Subtle changes (less than 20 percent) that are shown in Table 3-8 between monitoring years may be attributed to many factors other than geomorphic changes, including the following:

- Differences in survey-point quantity and spacing
- Slight deviations in point collection alignment between cross-section monuments
- Settling of bioengineered banks.

The most apparent change in the monitored cross sections from the current year occurred at SC7-1. At this location, a slight deepening and widening produced changes in bankfull channel width, cross-sectional area, and W:D ratio. This cross section is located in a reactivated historic reach, similar to CC1B-1, both at breaks in the dense riparian canopy. Substantial muck comprises the channel bottom at both of these sections. The depositional conditions at these sections complicate surveying the channel bottom and banks, which potentially influences comparisons between monitoring years.

As mentioned, surveys for some reaches suggest that the channel was constructed as a different channel type than initially planned. However, these reaches appear to be stable and, in some cases, may be gradually trending toward dynamic equilibrium. For example, section SC2A-1 has shown a trend of increasing W:D ratio over the 3 monitoring years. This reach could be trending toward a C-type channel, as planned. Continued monitoring of all the cross sections will further document lateral or vertical adjustments over time.

### 3.8.2 Bank Pins

Bank pins were installed in 2015 perpendicular to select monitoring cross sections to document lateral movement of the channel over time. Lateral erosion rates will be documented in subsequent years' monitoring reports by measuring the length of bank pins exposed each year. Table 3-9 provides installed exposed length of rebar in 2015 and the field measured length for monitoring years 2016 and 2017.

**Table 3-9. Exposed Rebar Length at Select Cross Sections From 2015 Through 2017**

Monitoring Cross Section	Exposed Rebar Length (inch)					
	2015		2016		2017	
	Left	Right	Left	Right	Left	Right
SC1-1		1.0		0.625		No Pin Projecting
SC2A-2	1.0		0.5		0.25	
SC2B-1	0.88	0.88	0.5	No Pin Projecting	0.25	No Pin Projecting
SC3-2	1.0 (Upper Pin) 2.5 (Lower pin)		0.375 (Upper Pin) Lower Pin not located		0.56 (Upper Pin) 2.06 (Lower Pin)	
SC7-1	1.375 (Upper Pin) 1.375 (Lower Pin)		No Pins Located		No Pins Located	
CC1A-1		1.625 (Upper Pin) 1.563 (Lower Pin)		1.25 (Upper Pin) Lower Pin not located		1.25 (Upper Pin) 1.25 (Lower Pin)

In general, exposed rebar lengths decreased since installation or were not projecting from the bank, which is likely the result of sagging or slumping of the bioengineered soil lift that composes the constructed bank.

### 3.8.3 Vegetation Monitoring at Perpendicular Belt Transects

Results of the vegetation inventory within the perpendicular belt transects are summarized in Table 3-10. In 2017, the total percent cover within the riparian buffer along Schrieber Creek was 93 percent and 7 percent cover for noxious weeds. The total cover increased by 1 percent from 2016 to 2017. The total noxious weed cover decreased by 4 percent. In 2017, the total percent cover within the riparian buffer along Coyote Creek was 100 percent and 1 percent for noxious weeds. No change in percent cover was noted between 2016 and 2017.

**Table 3-10. Results of Vegetation Inventory Within Perpendicular Belt Transects From 2015 Through 2017**

New Channel Segment	Cross Section	Belt Transect Length (ft)	2015		2016		2017	
			Total Percent Cover	Percent Noxious Weed Cover	Total Percent Cover	Percent Noxious Weed Cover	Total Percent Cover	Percent Noxious Weed Cover
Schrieber Creek	SC1-1	200	90	8	94	9	94	5
	SC1-2	200	88	10	87	22	87	15
	SC2A-1	200	65	15	92	13	90	15
	SC2A-2	200	75	5	86	8	85	8
	SC2B-1	150	75	5	94	16	94	10
	SC3-1	50	100	0	100	0	100	0
	SC3-2	50	100	0	100	0	100	0
	SC7	50	100	0	100	0	100	0
	<b>Subtotal for Schrieber Creek</b>		<b>82</b>	<b>8</b>	<b>92</b>	<b>11</b>	<b>93</b>	<b>7</b>
Coyote Creek	CC1A-1	100	100	3	100	2.5	100	2.5
	CC1A-2	100	100	0	100	0	100	0
	CC1B-1	75	100	3	100	0	100	1
	<b>Subtotal for Coyote Creek</b>		<b>100</b>	<b>2</b>	<b>100</b>	<b>1</b>	<b>100</b>	<b>1</b>

Riparian buffer success criteria require a minimum of 50 percent cover of beneficial plant species by the end of the monitoring period with 5 percent or less cover of noxious weeds. Vegetation composition within the riparian buffer along Schrieber and Coyote Creeks is currently meeting the target for total percent cover. At Schrieber Creek, the 2017 total percent cover for noxious weeds does not meet the target of 5 percent or less as specified in the performance standards. Noxious weeds were more prevalent along Reaches 1, 2A, and 2B of Schrieber Creek. Weeds may be more prominent along these reaches because installed soil wraps are often more susceptible to weed proliferation until native vegetation establishes.

### 3.8.4 Vegetation Monitoring at Parallel Belt Transects

#### 3.8.4.1 *Percent Vegetation Cover*

Results of the percent vegetation cover within the parallel belt transects at each cross section are provided in Table 3-11. The parallel belt transects differ from the perpendicular belt transects in that they provide data on how well the stream banks are vegetating as opposed to the riparian buffer.

The parallel belt transects were evaluated for vegetation cover, woody species survival, and noxious weed cover during the 2017 monitoring. The 2017 data for Schrieber Creek remained similar to 2016 with 85 percent total vegetative cover along both banks. The total percent cover along Coyote Creek remained similar to observations in 2016 with extensive vegetation cover at 100 percent.

Vegetation establishment along the banks of Schrieber Creek is above 50 percent in all of the reaches and satisfies performance standards. Vegetation along the banks of Reaches 3 and 7 of Schrieber Creek are well vegetated because these reaches were constructed through a densely vegetated wet meadow, which precluded the need to build coir soil lifts along the banks.

Table 3-12 provides an area-weighted percent cover for perpendicular (riparian) and parallel (stream bank) belt transects combined. The combined percent cover of all of the belt transects is currently 91 percent along Schrieber Creek and 100 percent along Coyote Creek. The riparian buffer vegetation success criteria requires at least 70 percent of the combined aerial cover of riparian and stream bank vegetation; therefore, both of the reconstructed channel segments currently meet this standard when results for all of the cross sections are combined. A 13 percent increase for the total weighted percent cover was observed from 2015 to 2016 and remained constant in 2017. Vegetation continues to establish along the banks of the upper, ephemeral reaches of Schrieber Creek. The total weighted percent cover along Coyote Creek remained similar to 2016 observations with an existing vegetation cover of 100 percent.

Table 3-11. Results of Vegetation Inventory Within Parallel Belt Transects From 2015 Through 2017

New Channel Segment	Cross Section	2015			2016			2017		
		Percent Cover Left Bank	Percent Cover Right Bank	Total Percent Cover	Percent Cover Left Bank	Percent Cover Right Bank	Total Percent Cover	Percent Cover Left Bank	Percent Cover Right Bank	Total Percent Cover
Schrieber Creek	SC1-1	15	15	15	63	68	66	60	60	60
	SC1-2	20	35	28	59	79	69	59	79	69
	SC2A-1	65	30	48	89	90	90	85	90	88
	SC2A-2	20	50	35	86	67	77	86	67	77
	SC2B-1	30	15	23	90	86	88	90	86	88
	SC3-1	100	100	100	100	100	100	100	100	100
	SC3-2	100	100	100	100	100	100	100	100	100
	SC7	100	100	100	100	100	100	100	100	100
	<b>Subtotal for Schrieber Creek</b>	<b>56</b>	<b>56</b>	<b>56</b>	<b>86</b>	<b>86</b>	<b>86</b>	<b>86</b>	<b>85</b>	<b>85</b>
Coyote Creek	CC1A-1	100	100	100	100	100	100	100	100	100
	CC1A-2	100	100	100	100	100	100	100	100	100
	CC1B-1	100	100	100	100	100	100	100	100	100
	<b>Subtotal for Coyote Creek</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Table 3-12. Combined Cover for Riparian and Stream Bank Vegetation Transects in 2017

Channel Segment	Cross Section	Perpendicular Transect Length (ft)	Perpendicular Transect Total % Cover	Parallel Transect Length (ft) (Right Bank + Left Bank)	Parallel Transect Total % Cover	Total Weighted % Cover
Schrieber Creek	SC1-1	200	94	50	60	91
	SC1-2	200	87	50	69	85
	SC2A-1	200	92	50	88	92
	SC2A-2	200	86	50	77	85
	SC2B-1	150	94	50	88	93
	SC3-1	50	100	50	100	100
	SC3-2	50	100	50	100	100
	SC7	50	100	50	100	100
	<b>Subtotal for Schrieber Creek</b>		<b>92</b>		<b>86</b>	<b>91</b>
Coyote Creek	CC1A-1	100	100	50	100	100
	CC1A-2	100	100	50	100	100
	CC1B-1	75	100	50	100	100
	<b>Subtotal for Coyote Creek</b>		<b>100</b>		<b>100</b>	<b>100</b>



### 3.8.4.2 Stream Bank Vegetation

Success criteria for channel restoration requires a majority of species along the banks to have a bank stability index of 6 or higher using ratings provided by Winward [2000]. Stability ratings are provided for vegetation communities rather than for individual species; therefore, to use the Winward [2000] ratings, vegetation communities at each monitoring cross section were assigned. Vegetation communities were assigned by identifying the two dominant vegetation species within the parallel belt transect. At 2B-1 and 2B-2, the area was rated as Barren Ground (1) because the dominant species were not specified as a community in the stability index.

Table 3-13 includes the vegetation communities that were identified at each cross section and the bank stability rating provided for that community [Winward, 2000]. The upper, ephemeral reaches of Schrieber Creek (Reaches 1, 2A, and 2B) are recently constructed and, thus, continue to fully revegetate. The majority of reaches are dominated by reed canary grass, Canada thistle, or smooth brome. Two reaches are rated as bare ground but are dominated by a grass species (creeping wild rye). Stability ratings were satisfied for all of the reaches except 2A-2 and 2B-1. All of the reconstructed channel segments that occurred through the vegetated meadow area of the project site are dominated by reed canary grass and analogue sedge communities, which have a bank stability rating of 9. These reaches include Schrieber Creek Reaches 3 and 7 and Coyote Creek Reaches 1A and 1B.

**Table 3-13. Vegetation Communities Identified at Each Monitoring Cross Section**

Channel Segment	Monitoring Cross Section	Dominant Stream Bank Community	Community Type Stability Rating
Schrieber Creek	SC1-1	<i>Phalaris arundinacea</i>	9
	SC1-2	<i>Cirsium arvense</i>	6
	SC2A-1	<i>Bromus inermis</i>	3
	SC2A-2	<i>Elymus/Phalaris</i>	9
	SC2B-1	<i>Elymus/Phalaris</i>	9
	SC3-1	<i>Phalaris arundinacea</i>	9
	SC3-2	<i>Phalaris arundinacea</i>	9
	SC7	<i>Phalaris arundinacea</i>	9
Coyote Creek	CC1A-1	<i>Phalaris arundinacea/Carex simulata</i>	9
	CC1A-2	<i>Phalaris arundinacea/Carex simulata</i>	9
	CC1B-1	<i>Phalaris arundinacea</i>	9

### 3.8.4.3 Woody Vegetation Survival

Planted woody vegetation was assessed within each parallel belt transect at each cross section to determine survival rates. Planted woody vegetation was only observed at one stream bank cross section along Schrieber Creek (SC1-1) and one along Coyote Creek (CC1A-1). Woody plantings survival is below the required 50 percent survival rating as specified in the performance standards.

### 3.9 MAINTENANCE NEEDS

Two nest boxes were installed at the site, in good repair, and occupied. Noxious weed management will be an ongoing issue at this site. MDT completed noxious weed spraying at the Schrieber Lake site on August 2, 2017.

### 3.10 CURRENT CREDIT SUMMARY

#### 3.10.1 Wetland Mitigation Credit

MDT anticipates developing 13.4 wetland credit acres from the Schrieber Lake project. Proposed mitigation credits from the 2014 Schrieber Lake Mitigation Plan included creating 3.06 wetland acres, reestablishing 2.53 wetland acres, enhancing 4.53 acres of the fen-carr shrubland expansion, preserving 25.6 acres of existing fen-carr *Carex* areas, and creating a 50-foot upland buffer (3.81 acres) around newly established wetlands in the center of the site.

Table 3-14 summarizes the estimated wetland credits based on the pending USACE-approved credit ratios and the wetland delineation completed in July 2017. The 2017 wetland delineation indicates that 37.65 acres of wetland habitat that consist of Schrieber Lake, riparian buffer, and other uncreditable areas exist within the mitigation site. The wetland acreages that were delineated in 2017 included 4.8 acres of created wetland, 2.42 acres of reestablished wetlands, 4.77 acres of enhanced wetlands, 25.66 acres of preserved wetlands, and 3.81 acres of upland buffer. The 2017 estimated credit acres for this site have exceeded the proposed credit acres. A total of 15.17 credit acres have developed at this site after mitigation construction. Please note that the 2015 and 2016 credit calculations in Table 3-14 included an upland buffer around all wetlands on the property rather than just the newly established wetlands toward the center of the site. Because MDT only proposes to obtain upland buffer credits on 3.81 acres of upland, these numbers have been adjusted. Figure A-4 (Appendix A) shows the location of wetlands based on credit type.

**Table 3-14. Summary of Wetland Credits at the Schrieber Lake Site 2015–2017**

Mitigation Type	Total Proposed Acreage	Ratio <sup>(a)</sup>	Proposed Credit Acres	2015 Delineated Acreage	2015 Credit Acres	2016 Delineated Acreage	2016 Credit Acres	2017 Delineated Acreage	2017 Credit Acres
Creation	3.06	1:1	3.06	4.80	4.80	4.80	4.80	4.80	4.80
Restoration (Reestablishment)	2.53	1.5:1	1.69	2.42	1.62	2.42	1.62	2.42	1.62
Enhancement areas – carr shrubland expansion	4.53	3:1	1.51	4.77	1.59	4.77	1.59	4.77	1.59
Preservation – existing fen-carr <i>Carex</i> areas	25.60	4:1	6.40	25.66	6.42	25.66	6.42	25.66	6.42
Upland buffer (50 ft) <sup>(b)</sup>	3.81	5:1	0.76	8.42	1.68	8.42	1.68	3.81	0.76
Permanent project impacts	0.02	None	–0.02	–0.02	–0.02	–0.02	–0.02	–0.02	–0.02
<b>Total Mitigation Acreage</b>	<b>39.55</b>		<b>13.40</b>	<b>46.05</b>	<b>16.09</b>	<b>46.05</b>	<b>16.09</b>	<b>41.44</b>	<b>15.17</b>

(a) The ratios used are from Column A of the Montana Regulatory Program Wetland Compensatory Mitigation Ratios, April 2005. Riparian buffer areas were used to calculate stream and riparian credits. Wetland acreages within riparian buffer were subtracted from wetland credit total; the riparian buffer does not include upland buffer acreage.

(b) A standard 50-foot upland buffer was assumed for the perimeter of the delineated wetland. No credits are being requested for the existing Schrieber Lake.

### 3.10.2 Performance Standards and Success Criteria

The current site conditions documented in 2017 were evaluated using the approved performance standards and success criteria in Table 3-15. The wetlands delineated in 2017 met the performance standards approved for this site, which included meeting the three parameter criteria for hydrology, vegetation, and soils. Hydrophytic vegetation success has been achieved based on the absolute cover of facultative or wetter species being at 70 percent or more. The open-water area of Schrieber Lake was given no credit based on the stated goal of the project to maintain already existing open water in Schrieber Lake. Weed cover site-wide and within the upland buffers is estimated at less than 5 percent, which meets the success criteria. Isolated weed infestations were mapped throughout the site and are controlled by MDT as mandated by the performance standards. The upland buffer success criteria have been achieved; these areas have at least 50 percent aerial cover of nonweed species.

Table 3-15. Summary of Performance Standards and Success Criteria at the Schrieber Lake Site in 2017 (Page 1 of 4)

Performance Standards	Success Criteria	Criteria Achieved Y/N		Discussion
		SC <sup>(a)</sup>	CC <sup>(b)</sup>	
Wetland Characteristics	The three parameter criteria are met for hydrology, vegetation, and soils as outlined in the 1987 Wetland Manual and 2010 Regional Supplement.	Y	Y	Areas that were identified as wetland habitat within the mitigation site meet the three parameter criteria.
Wetland Hydrology	Soil saturation is present for at least 12.5 percent of the growing season.	Y	Y	Areas that were identified as wetland habitat within the mitigation site exhibit soil saturation for a minimum 12.5 percent of growing season.
Hydric Soil	Hydric soil conditions are present or appear to be forming.	Y	Y	Hydric soil characteristics have developed throughout a majority of the constructed wetlands.
	Soil is sufficiently stable to prevent erosion.	Y	Y	Disturbed soil is stable and does not exhibit signs of erosion.
	Soil is able to support plant cover.	Y	Y	Plant cover is well established across disturbed soils.
Hydrophytic Vegetation	Combined absolute cover of facultative or wetter species is 70 percent or greater.	Y	Y	Areas that were identified as wetland habitat within the mitigation site support a prevalence of hydrophytic vegetation (OBL, FACW, and FAC).
	State-listed noxious weeds do not exceed 5 percent absolute cover.	Y	Y	State-listed noxious weeds are estimated well below 5 percent absolute cover within wetland areas.
	Woody plants exceed 50 percent survival after 5 years.	N	N	Woody plant survival is very low.
Open Water	The project is intended to provide open water during the spring and early summer within excavated depressions. Open water with emergent, submerged, and/or floating vegetation will, therefore, be considered successful and creditable.	Y	Y	Excavated depressions within the upper reach of the site experience seasonal drawdown, and rooted hydrophytic vegetation development has been observed. The lower depressions appear to support perennial inundation with an established aquatic macrophyte community.

**Table 3-15. Summary of Performance Standards and Success Criteria at the Schrieber Lake Site in 2017 (Page 2 of 4)**

Performance Standards	Success Criteria	Criteria Achieved Y/N		Discussion
		SC <sup>(a)</sup>	CC <sup>(b)</sup>	
Channel Restoration Success	Revegetation along the new Coyote and Schrieber Creek channel corridors will be considered successful when banks are vegetated with a majority of deep-rooting riparian and wetland herbaceous and woody plant species with a root stability indexes greater than 6.	N	Y	Three of the five reaches of Schrieber Creek are ephemeral in nature and have yet to develop vegetation along the banks. As a result, these reaches (SC1, SC2A, and SC2B) do not currently meet the performance criteria. The downstream reaches of Schrieber Creek (Reaches SC3 and SC7) and both reaches of Coyote Creek (CC1A and CC1B) are dominated by reed canary grass, which has a root stability index of 9.
	New stream channels will be allowed to naturally migrate within the established floodplain/riparian areas and to give it enough room to move and stabilize itself within the site.	Y	Y	No lateral migration has been documented along either Schrieber or Coyote Creek to date.
Bank Restoration Success	Rates of success will be determined by the following rates: i.) Rate of less than 0.5 ft of erosion annually = Functioning ii.) Rate of less than 1.0 ft/year = Functioning iii.) Rate of less than 1.5 ft/year = Functioning at Risk iv.) Rate of less than 2.5 ft/year = Functioning at Risk v.) Rate of greater than 2.5 ft/year = Functioning at Risk or Not Functioning vi.) Rate of less than 3 ft/year = Not Functioning.	Y	Y	Transect data derived from bank pin locations during the 2017 monitoring have documented no lateral channel migration since 2015.

Table 3-15. Summary of Performance Standards and Success Criteria at the Schrieber Lake Site in 2017 (Page 3 of 4)

Performance Standards	Success Criteria	Criteria Achieved Y/N		Discussion
		SC <sup>(a)</sup>	CC <sup>(b)</sup>	
Bank Restoration Success	Ratings for the stream bank will be based on the proper functioning condition rating that determines if the area supports a healthy, stable bank area adjacent to the stream: i.) Functioning – The stream bank supports a healthy and stable bank area adjacent to the river. ii.) Functioning at Risk – one or more functions of the stream bank are adjusting to changes in the design within the reach area, and more monitoring is needed. ii.) Not Functioning – Measurements of the functions indicate that the site is not achieving functional goals and is not supporting a healthy, stable bank reach.	N/A	N/A	This data will be collected during the third and fifth monitoring years.
Riparian Buffer Success	Creditable buffer areas must have at least 50 percent aerial cover of nonnoxious weed species by the end of the monitoring period.	Y	Y	All riparian vegetation transects exhibited 50 percent or greater areal cover of nonnoxious weed species along both Schrieber and Coyote Creek.
	Combined aerial cover of riparian and stream bank vegetation communities is 70 percent or greater.	N	Y	Combined areal cover of riparian and stream bank vegetation along Schrieber Creek is 56 percent; however, two cross sections indicated a total weighted percent cover below 70 percent. Combined areal cover of riparian and stream bank vegetation along Coyote Creek is 100 percent.
	Noxious weeds do not exceed 5 percent cover within the riparian buffer areas.	N	Y	Noxious weed cover along Schrieber Creek is estimated at 8 percent. Noxious weed cover along Coyote Creek is 2 percent.
	Planted trees and shrubs will be considered successful where they exhibit 50 percent survival after 5 years.	N	N	Planted trees and shrubs along Schrieber Creek exhibit less than 50 percent survival to date. Planted trees and shrubs along Coyote Creek exhibit a 43 percent survival rate to date.



**Table 3-15. Summary of Performance Standards and Success Criteria at the Schrieber Lake Site in 2017 (Page 4 of 4)**

Performance Standards	Success Criteria	Criteria Achieved Y/N		Discussion
		SC <sup>(a)</sup>	CC <sup>(b)</sup>	
Upland Buffer	Noxious weeds do not exceed 5 percent cover within upland buffer area.	Y	Y	Noxious weed cover is less than 5 percent within the upland buffer.
	Any area that was disturbed within creditable buffer zone must have at least 50 percent aerial cover of nonweed species by end of monitoring period.	Y	Y	Disturbed areas have established greater than 50 percent cover by nonweed species.
Weed Control	Weed control will be based on annual site monitoring to determine weed species and degree of infestation within the site. Control measures based on the monitoring results will be implemented by MDT to minimize and/or eliminate the intrusion of state-listed noxious weed species within the site.	Y	Y	State-listed noxious weed species across the site have been monitored and mapped during each post-construction monitoring event. MDT administers an ongoing weed-control program.

(a) SC = Schrieber Creek

(b) CC = Coyote Creek.

### 3.10.3 Stream-Mitigation Credit

The goal of the stream-mitigation component of the Schrieber Lake project includes restoring approximately 2,130 linear feet of Schrieber Creek, 1,397 feet of Coyote Creek, and 978 feet of Schrieber Creek below the Schrieber/Coyote Creek confluence, which should result in an overall increase of 3,108 linear feet of stream length. When combined with establishing and protecting a riparian buffer of varying width on both sides of the restored channels, the project is expected to generate a total of 36,741.87 stream and riparian credits, as shown in Table 3-16. Stream-mitigation credit calculations follow guidance in the USACE's *Montana Stream-Mitigation Procedure (MTSMP)* – February 2013 [USACE, 2013]. The stream-mitigation project has been separated into the following distinct reaches:

1. **Coyote Creek, Reach 1A**, which involves reconstructing a new channel through the lower hay meadow between the MDT-owned Schrieber Meadows property line to its confluence with an existing, relic segment of Coyote Creek (974.5 feet)
2. **Coyote Creek, Reach 1B**, which consists of a relic segment of Coyote Creek that has been reactivated as a result of this project (423.0 feet)
3. **Schrieber Creek, Reach 1**, which consists of a newly constructed channel configuration that extends from the existing channel downstream to Reach 2A (531.6 feet)
4. **Schrieber Creek, Reach 2A**, which consists of a newly constructed channel configuration that extends from the downstream end of Reach 1 to the upstream end of Reach 2B (544.5 feet)
5. **Schrieber Creek, Reach 3**, which consists of a newly constructed channel configuration that extends from Reach 2B to the confluence with Coyote Creek (932.9 feet)
6. **Schrieber Creek, Reach 7**, which consists of a relic channel that extends from the confluence of Schrieber and Coyote Creeks to Schrieber Lake (978 feet).

**Table 3-16. Anticipated Riparian and Stream Credits  
Generated From the Schrieber Lake Site**

Channel Segment	Reach	Side	Predicted Credits
Coyote Creek	1A	A	4,141.63
		B	4,141.63
	1B	A	1,586.25
		B	1,692.00
Schrieber	1	A	2,392.20
		B	2,392.20
	2A	A	2,722.50
		B	2,722.50
	2B	A	576.65
		B	576.65
	3	A	3,964.83
		B	3,964.83
	7	A	2,934.00
		B	2,934.00
Total			36,741.87

The 2015 monitoring report for the Schrieber Lake site provided a first-year, baseline assessment of the site's condition after the project's completion. Data collected during the 2017 monitoring revealed continued development of vegetation cover along the reaches. Reaches 1, 2A, and 2B of Schrieber Creek have yet to meet performance criteria established for (1) establishing bank-stabilizing vegetation communities and (2) percent cover of noxious weeds within the riparian corridor. Reaches 3 and 7 of Schrieber Creek and Reaches 1A and 1B of Coyote Creek currently meet all of the success criteria and are expected to generate the predicted credits outlined in the monitoring plan. Future site monitoring will determine whether vegetation establishment within Reaches 1, 2A, and 2B of Schrieber Creek results in achieving the success criteria and generating all of the anticipated credits.

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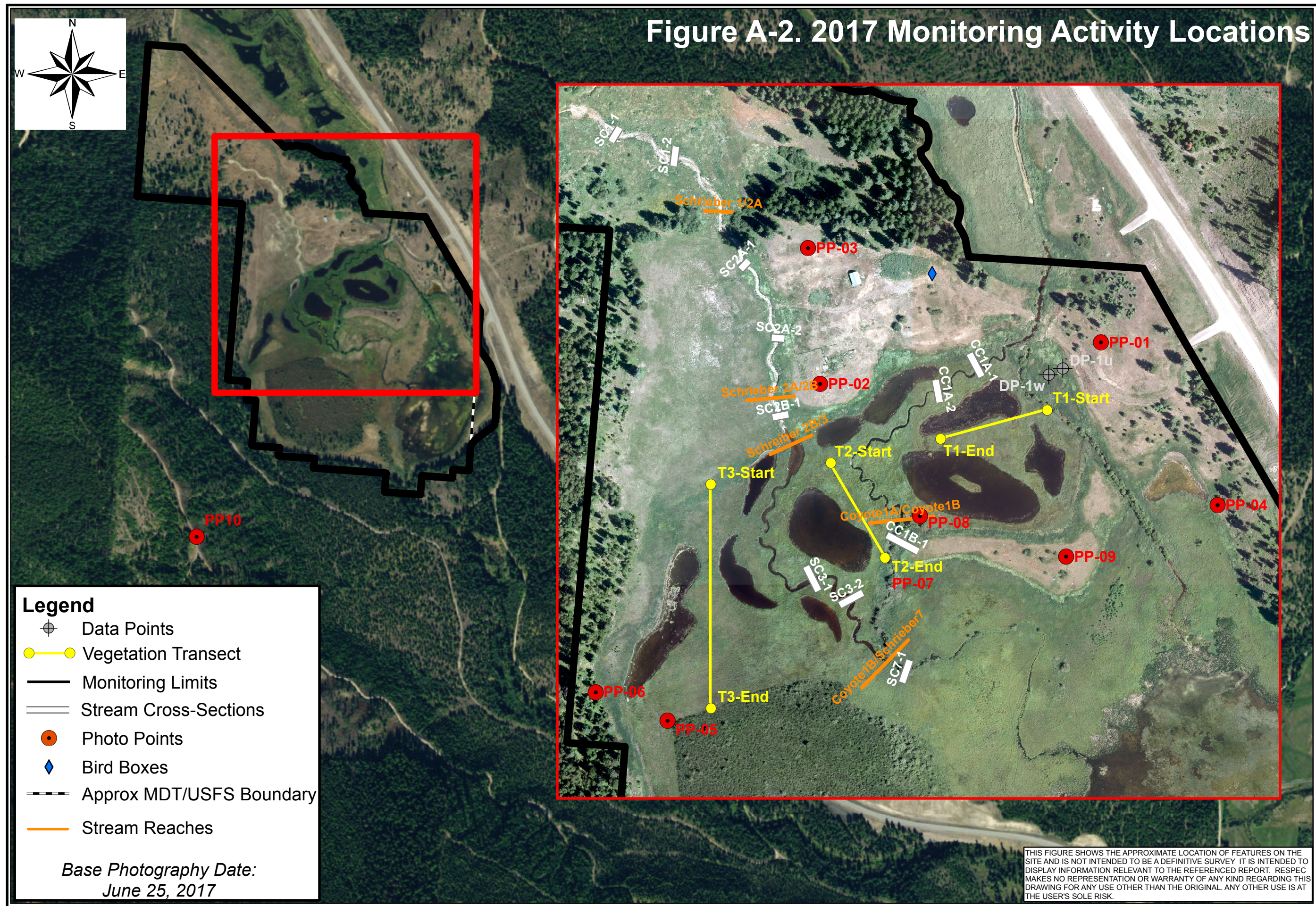
## APPENDIX A

# PROJECT AREA MAPS

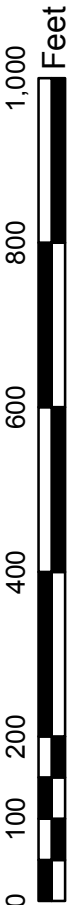
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MDT Wetland Mitigation Monitoring  
Schrieber Lake  
Lincoln County, Montana





**RESPEC**  
820 North Montana Ave.,  
Suite A  
Helena, MT 59601



Project: NH 27(021)

Location: Lincoln Co., Montana

Date: December 2017

Project Manager: M. Traxler

Drawn By: J. Rosenbaum

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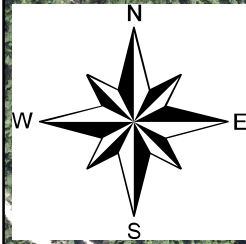


Figure A-3. 2017 Mapped Site Features

- Vegetation Community Types**
- ① Elymus/Bromus
  - ② Betula/Rhamnus
  - ③ Phalaris/Carex
  - ④ Carex/Persicaria
  - ⑤ Pseudostuga/Larix
  - ⑥ Salix/Phalaris
  - ⑦ Alnus/Phalaris
  - ⑧ Carex utriculata
  - ⑨ Craetagus/Symphoricarpus
  - ⑩ Typha/Open Water
  - ⑪ Open Water/Aquatic Macrophytes
  - ⑫ Carex lasiocarpa
  - ⑨⑨ Stream Channel

- Noxious Weeds**
- Cirsium arvense
  - Centaurea stoebe
  - Cynoglossum officinale
  - Linaria vulgaris
  - Hieracium aurantiacum,
  - Pilosella aurantiaca
  - Leucanthemum vulgare
  - Hypericum perforatum
  - Lepidium draba
  - Linaria dalmatica
- Cover Class**
- T = Trace (<1% cover)
  - L = Low (1-5% cover)
  - M = Moderate (6-25% cover)
  - H = High (26-100% cover)

**Legend**

- Monitoring Limits
- Wetland Limits
- Vegetation Communities
- Stream Channel

Base Photography Date:  
June 25, 2017

Acreages	
Project Area	104.70
Uplands	52.60
Total Wetlands and WUS	52.10
Schreiber Lake	8.26
Stream Channels	1.00
Riparian Buffers	3.90
USFS Wetlands	1.25
Creditable Wetlands	37.65

THIS FIGURE SHOWS THE APPROXIMATE LOCATION OF FEATURES ON THE SITE AND IS NOT INTENDED TO BE A DEFINITIVE SURVEY. IT IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. RESPEC 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.

820 North Montana Ave.,  
Suite A  
Helena, MT 59601

**Schrieber Lake Mitigation Site**

**2017 Mapped Site Features**

Project:	NH 27(021)
Location:	Lincoln Co., Montana
Date:	December 2017
Project Manager:	M. Traxler
Drawn By:	J. Rosenbaum

File: Z:\RESPEC\02895 MDT Monitoring 2016 - 2018\WS #3 Schrieber Lake\GPS Data\Mains\Veg2017.mxd



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## APPENDIX B

# MONITORING FORMS

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MDT Wetland Mitigation Monitoring  
Schrieber Lake  
Lincoln County, Montana



## RESPEC/MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: Schrieber Lake

Project Number: NH 27(021)

Assessment Date: July 26, 2017

Person(s) conducting the assessment: M. Traxler

Location: Highway 2, Swamp Creek East

MDT District: Missoula

Milepost: 53.8 on US 2

Legal Description: T 27N R 30W

Section 13 T 27N R 30W

Weather Conditions: sunny, 80 degrees

Time of Day: 8 am

Initial Evaluation Date: May 18, 2015

Monitoring Year: 3 # Visits in Year: 1

Size of evaluation area: 105 acres

Land use surrounding wetland: US Highway 2, US Forest

Service, forested watershed, Plum Creek lands to the south of the site.

### HYDROLOGY

Surface Water Source: Schrieber Creek, Coyote Creek, precipitation, groundwater

Inundation: Present

Average Depth: 2 feet Range of Depths: 1-3

Percent of assessment area under inundation: 80%

Depth at emergent vegetation-open water boundary: 1.0 feet

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

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

Groundwater Monitoring Wells: Absent

Record depth of water below ground surface (in feet):

Well Number	Depth	Well Number	Depth	Well Number	Depth

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.

### COMMENTS / PROBLEMS:

Water depth refers to shallow wetland cells, not including Schrieber Lake. 80% innundation does not include the extensive uplands in the northern "panhandle" of the project area.

## VEGETATION COMMUNITIES

Community Number: **1** Community Title (main spp): ***Elymus repens* / *Bromus inermis***

Dominant Species	% Cover	Dominant Species	% Cover
<i>Elymus repens</i>	4 = 21-50%	<i>Agrostis stolonifera</i>	1 = 1-5%
<i>Bromus inermis</i>	3 = 11-20%	<i>Alopecurus pratensis</i>	1 = 1-5%
<i>Pascopyrum smithii</i>	3 = 11-20%	<i>Phalaris arundinacea</i>	1 = 1-5%
<i>Phleum pratense</i>	3 = 11-20%	<i>Poa pratensis</i>	1 = 1-5%
<i>Poa compressa</i>	3 = 11-20%	<i>Pseudotsuga menziesii</i>	1 = 1-5%
<i>Achillea millefolium</i>	1 = 1-5%	<i>Pseudoroegneria spicata</i>	1 = 1-5%

Comments / Problems: \_\_\_\_\_

Community Number: **2** Community Title (main spp): ***Betula pumila* / *Rhamnus alnifolia***

Dominant Species	% Cover	Dominant Species	% Cover
<i>Betula pumila</i>	5 = > 50%	<i>Salix boothii</i>	1 = 1-5%
Moss	5 = > 50%	<i>Salix candida</i>	1 = 1-5%
<i>Rhamnus alnifolia</i>	2 = 6-10%	<i>Phalaris arundinacea</i>	+ = < 1%
<i>Carex</i> sp.	2 = 6-10%	<i>Symphyotrichum spathulatum</i>	+ = < 1%
<i>Comarum palustre</i>	1 = 1-5%		
<i>Persicaria amphibia</i>	1 = 1-5%		

Comments / Problems: \_\_\_\_\_

Community Number: **3** Community Title (main spp): ***Phalaris arundinacea* / *Carex* sp.**

Dominant Species	% Cover	Dominant Species	% Cover
<i>Carex stimulata</i>	5 = > 50%	<i>Persicaria amphibia</i>	1 = 1-5%
<i>Phalaris arundinacea</i>	5 = > 50%	<i>Symphyotrichum spathulatum</i>	1 = 1-5%
<i>Agrostis scabra</i>	2 = 6-10%	<i>Comarum palustre</i>	+ = < 1%
<i>Alopecurus pratensis</i>	1 = 1-5%	<i>Deschampsia caespitosa</i>	+ = < 1%
<i>Carex aquatilis</i>	1 = 1-5%	<i>Geum macrophyllum</i>	+ = < 1%
<i>Lemna minor</i>	1 = 1-5%	<i>Juncus tenuis</i>	+ = < 1%

Comments / Problems: \_\_\_\_\_

Community Number: **4** Community Title (main spp): ***Carex simulata* / *Persicaria amphibia***

Dominant Species	% Cover	Dominant Species	% Cover
<i>Carex stimulata</i>	5 = > 50%	<i>Comarum palustre</i>	1 = 1-5%
<i>Carex aquatilis</i>	3 = 11-20%	<i>Geum macrophyllum</i>	1 = 1-5%
<i>Persicaria amphibia</i>	3 = 11-20%	<i>Potentilla norvegica</i>	1 = 1-5%
<i>Carex utriculata</i>	2 = 6-10%	<i>Phalaris arundinacea</i>	1 = 1-5%
Moss	2 = 6-10%	<i>Symphyotrichum spathulatum</i>	1 = 1-5%
<i>Carex nebrascensis</i>	1 = 1-5%		

Comments / Problems: \_\_\_\_\_

## VEGETATION COMMUNITIES (continued)

Community Number: **5** Community Title (main spp): **Pseudotsuga menziesii / Larix occidentalis**

Dominant Species	% Cover	Dominant Species	% Cover
Larix occidentalis	4 = 21-50%	Bromus inermis	2 = 6-10%
Pseudotsuga menziesii	4 = 21-50%	Centaurea stoebe	2 = 6-10%
Pinus contorta	4 = 21-50%	Elymus glaucus	2 = 6-10%
Carex geyeri	3 = 11-20%	Symphoricarpos albus	2 = 6-10%
Abies grandis	2 = 6-10%	Bereberis repens	1 = 1-5%
Arcostaphylos uva-ursi	2 = 6-10%	Calamagrostis rubescens	1 = 1-5%

Comments / Problems: \_\_\_\_\_

Community Number: **6** Community Title (main spp): **Salix bebbiana / Phalaris arundinacea**

Dominant Species	% Cover	Dominant Species	% Cover
Salix bebbiana	5 = > 50%		
Phalaris arundinacea	5 = > 50%		
Alnus incana	1 = 1-5%		
Crataegus douglasii	1 = 1-5%		
Persicaria amphibia	1 = 1-5%		

Comments / Problems: \_\_\_\_\_

Community Number: **7** Community Title (main spp): **Alnus incana / Phalaris arundinacea**

Dominant Species	% Cover	Dominant Species	% Cover
Alnus incana	5 = > 50%		
Phalaris arundinacea	5 = > 50%		
Persicaria amphibia	1 = 1-5%		
Cirsium arvense	+ = < 1%		

Comments / Problems: \_\_\_\_\_

Community Number: **8** Community Title (main spp): **Carex utriculata**

Dominant Species	% Cover	Dominant Species	% Cover
Carex utriculata	4 = 21-50%		
Carex aquatilis	1 = 1-5%		
Persicaria amphibia	1 = 1-5%		
Phalaris arundinacea	1 = 1-5%		
Salix bebbiana	1 = 1-5%		
Salix candida	1 = 1-5%		

Comments / Problems: \_\_\_\_\_

## VEGETATION COMMUNITIES (continued)

Community Number: **9** Community Title (main spp): **Crataegus douglasii / Symphoricarpos albus**

Dominant Species	% Cover	Dominant Species	% Cover
Crataegus douglasii	5 = > 50%	Achillea millefolium	+ = < 1%
Symphoricarpos albus	4 = 21-50%	Cynoglossum officinale	+ = < 1%
Cirsium arvense	2 = 6-10%	Dactylis glomerata	+ = < 1%
Phalaris arundinacea	2 = 6-10%	Galium triflorum	+ = < 1%
Alopecurus pratensis	1 = 1-5%	Taraxacum officinale	+ = < 1%
Elymus trachycaulus	1 = 1-5%	Urtica dioica	+ = < 1%

Comments / Problems: \_\_\_\_\_

Community Number: **10** Community Title (main spp): **Typha latifolia / Open Water**

Dominant Species	% Cover	Dominant Species	% Cover
Typha latifolia	5 = > 50%		
Comarum palustre	4 = 21-50%		
Open Water	4 = 21-50%		

Comments / Problems: \_\_\_\_\_

Community Number: **11** Community Title (main spp): **Open Water / Aquatic macrophytes**

Dominant Species	% Cover	Dominant Species	% Cover
Open Water	5 = > 50%		
Aquatic macrophytes	4 = 21-50%		
Persicaria amphibia	3 = 11-20%		

Comments / Problems: \_\_\_\_\_

Community Number: **12** Community Title (main spp): **Carex lasiocarpa**

Dominant Species	% Cover	Dominant Species	% Cover
Carex lasiocarpa	5 = > 50%		
Carex aquatilis	2 = 6-10%		
Phalaris arundinacea	2 = 6-10%		
Carex utriculata	1 = 1-5%		
Typha latifolia	1 = 1-5%		

Comments / Problems: \_\_\_\_\_

### Additional Activities Checklist:

☒ Record and map vegetative communities on aerial photograph.

## PLANTED WOODY VEGETATION SURVIVAL

[illegible]

**Comments / Problems: MDT planted 1,500 woody plants in the riparian buffer along Schrieber Creek, Coyote Creek, and around some wetland excavations. Based on observations at the parallel and perpendicular belt transects woody plantings survival was estimated to be below the required 50% survival. For many of the plantings, competition with herbaceous vegetation such as reed canary grass is problematic, as are conditions that are either too wet or too dry for woody survival. Larry Urban with MDT (Contacted July 2017) has indicated that some of the woody plantings have likely been adversely affected by weed spraying activities at the site.**

## MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Schrieber Lake** Date: **July 26, 2017** Examiner: **M. Traxler**

Transect Number: **1** Approximate Transect Length: **284 feet** Compass Direction from Start: **251°** Note: \_\_\_\_\_

Transect Interval Length: <b>20 feet (Station 0-20)</b>	
Vegetation Community Type: <i>Alnus incana</i> / <i>Phalaris arundinacea</i>	
Plant Species	Cover
<i>Phalaris arundinacea</i>	5 = > 50%
Total Vegetative Cover:	100%

Transect Interval Length: <b>73 feet (Station 20-93)</b>	
Vegetation Community Type: <i>Phalaris arundinacea</i> / <i>Carex</i> sp.	
Plant Species	Cover
<i>Phalaris arundinacea</i>	5 = > 50%
<i>Carex simulata</i>	5 = > 50%
<i>Deschampsia cespitosa</i>	1 = 1-5%
<i>Carex utriculata</i>	1 = 1-5%
<i>Persicaria amphibia</i>	1 = 1-5%
<i>Eleocharis palustris</i>	1 = 1-5%
<i>Glyceria grandis</i>	+ = < 1%
Total Vegetative Cover:	100%

Transect Interval Length: <b>8 feet (Station 93-101)</b>	
Vegetation Community Type: Open Water / Aquatic macrophytes	
Plant Species	Cover
Open Water	5 = > 50%
<i>Persicaria amphibia</i>	3 = 11-20%
Aquatic macrophytes	+ = < 1%
Total Vegetative Cover:	50%

Transect Interval Length: <b>183 feet (Station 101-284)</b>	
Vegetation Community Type: <i>Phalaris arundinacea</i> / <i>Carex</i> sp.	
Plant Species	Cover
<i>Phalaris arundinacea</i>	5 = > 50%
<i>Carex simulata</i>	4 = 21-50%
<i>Persicaria amphibia</i>	3 = 11-20%
<i>Eleocharis palustris</i>	2 = 6-10%
<i>Carex utriculata</i>	1 = 1-5%
Algae - Green	+ = < 1%
<i>Lemna minor</i>	+ = < 1%
Total Vegetative Cover:	100%

## B-8

Transect Number: 2    Approximate Transect Length: 280 feet    Compass Direction from Start: 152°    Note: \_\_\_\_\_

Transect Interval Length: <b>27 feet (Station 253-280)</b>	
Vegetation Community Type: <i>Salix bebbiana</i> / <i>Phalaris arundinacea</i>	
Plant Species	Cover
<i>Phalaris arundinacea</i>	5 = > 50%
<i>Persicaria amphibia</i>	1 = 1-5%
<i>Salix bebbiana</i>	+ = < 1%
Total Vegetative Cover:	100%

Transect Interval Length:	
Vegetation Community Type:	
<b>Plant Species</b>	<b>Cover</b>
Total Vegetative Cover:	%

## MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Schrieber Lake** Date: **July 26, 2017** Examiner: **M. Traxler**

Transect Number: **3** Approximate Transect Length: **584 feet** Compass Direction from Start: **175°** Note: \_\_\_\_\_

Transect Interval Length: <b>35 feet (Station 0-35)</b>	
Vegetation Community Type: Elymus repens / Bromus inermis	
Plant Species	Cover
Bromus inermis	5 = > 50%
Phalaris arundinacea	5 = > 50%
Phleum pratense	1 = 1-5%
Total Vegetative Cover:	100%

Transect Interval Length: <b>215 feet (Station 35-250)</b>	
Vegetation Community Type: Phalaris arundinacea / Carex sp.	
Plant Species	Cover
Phalaris arundinacea	4 = 21-50%
Carex simulata	3 = 11-20%
Agrostis scabra	2 = 6-10%
Carex aquatilis	1 = 1-5%
Comarum palustre	+ = < 1%
Geum macrophyllum	+ = < 1%
Persicaria amphibia	+ = < 1%
Total Vegetative Cover:	100%

Transect Interval Length: <b>334 feet (Station 250-584)</b>	
Vegetation Community Type: Carex simulata / Persicaria amphibia	
Plant Species	Cover
Carex simulata	3 = 11-20%
Agrostis scabra	3 = 11-20%
Persicaria amphibia	2 = 6-10%
Moss	2 = 6-10%
Phalaris arundinacea	2 = 6-10%
Carex nebrascensis	1 = 1-5%
Comarum palustre	1 = 1-5%
Phleum pratense	1 = 1-5%
Total Vegetative Cover:	100%

Transect Interval Length:	
Vegetation Community Type:	
Plant Species	Cover
Total Vegetative Cover:	%



## MDT WETLAND MONITORING – VEGETATION TRANSECT

### Cover Estimate

+ = < 1%      3 = 11-10%  
1 = 1-5%      4 = 21-50%  
2 = 6-10%      5 = > 50%

### Indicator Class

+ = Obligate  
- = Facultative/Wet  
0 = Facultative

### Source

P = Planted  
V = Volunteer

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): \_\_\_\_%

Establish transects perpendicular to the shoreline (or saturated perimeter). The transect should begin in the upland area. Permanently mark this location with a standard metal fencepost. Extend the imaginary transect line towards the center of the wetland, ending at the 3 foot depth (in open water), or at the point where water depths or saturation are maximized. Mark this location with another metal fencepost.

Estimate cover within a 10 foot wide "belt" along the transect length. At a minimum, establish a transect at the windward and leeward sides of the wetland. Remember that the purpose of this sampling is to monitor, not inventory, representative portions of the wetland site.

Comments: \_\_\_\_\_

## 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.

Location	Photograph Frame #	Photograph Description & Lat/Long	Compass Reading (°)
PP-1		Photo Point 1, Photo 1: 48.107033 / -115.409592	242
PP-1		Photo Point 1, Photo 2: 48.107033 / -115.409592	197
PP-1		Photo Point 1, Photo 3: 48.107033 / -115.409592	164
PP-2		Photo Point 2, Photo 1: 48.106591 / -115.412511	323
PP-2		Photo Point 2, Photo 2: 48.106591 / -115.412511	205
PP-2		Photo Point 2, Photo 3: 48.106591 / -115.412511	162
PP-2		Photo Point 2, Photo 4: 48.106591 / -115.412511	104
PP-2		Photo Point 2, Photo 5: 48.106591 / -115.412511	69
PP-3		Photo Point 3: 48.10754 / -115.412747	183
PP-4		Photo Point 4: 48.105948 / -115.408236	287
PP-5		Photo Point 5, Photo 1: 48.104136 / -115.413847	173
PP-5		Photo Point 5, Photo 2: 48.104136 / -115.413847	35
PP-5		Photo Point 5, Photo 3: 48.104136 / -115.413847	359
PP-6		Photo Point 6, Photo 1: 48.104297 / -115.414628	150
PP-6		Photo Point 6, Photo 2: 48.104297 / -115.414628	103
PP-6		Photo Point 6, Photo 3: 48.104297 / -115.414628	52
PP-7		Photo Point 7, Photo 1: 48.105398 / -115.411691	228
PP-7		Photo Point 7, Photo 2: 48.105398 / -115.411691	299
PP-7		Photo Point 7, Photo 3: 48.105398 / -115.411691	355
PP-8		Photo Point 8, Photo 1: 48.105714 / -115.411356	320
PP-8		Photo Point 8, Photo 2: 48.105714 / -115.411356	49
PP-8		Photo Point 8, Photo 3: 48.105714 / -115.411356	79
PP-9		Photo Point 9, Photo 1: 48.105502 / -115.409787	323
PP-9		Photo Point 9, Photo 2: 48.105502 / -115.409787	120
PP-10		Photo Point 10, Photo 1: 48.100529 / -115.415406	17
PP-10		Photo Point 10, Photo 2: 48.100529 / -115.415406	39
PP-10		Photo Point 10, Photo 3: 48.100529 / -115.415406	57
T-1 start		Transect 1 start: 48.106526 / -115.410102	251
T-1 end		Transect 1 end: 48.106268 / -115.411205	71
T-2 start		Transect 2 start: 48.106037 / -115.412335	152
T-2 end		Transect 2 end: 48.105398 / -115.411692	332
T-3 start		Transect 3 start: 48.105866 / -115.413539	175

T-3 end		Transect 3 end: 48.104242 / -115.413401	355
DP-1W		Wetland soil pit: 48.106783 / -115.4101126	
DP-1U		Upland soil pit: 48.106833 / -115.409964	
SC1-1		SC1-1 upstream: 48.10823599 / -115.4148624	300
SC1-1		SC1-1 left bank: 48.108236 / -115.414862	30
SC1-2		SC1-2 upstream: 48.108116 / -115.414221	280
SC1-2		SC1-2 left bank: 48.108116 / -115.414221	10
SC2A-1		SC2A-1 downstream: 48.107386 / -115.413401	315
SC2A-1		SC2A-1 left bank: 48.107386 / -115.413401	45
SC2A-2		SC2A-2 downstream: 48.106889 / -115.412990	185
SC2A-2		SC2A-2 right bank: 48.106889 / -115.412990	275
SC2B-1		SC2B-1 downstream: 48.106342 / -115.412902	175
SC2B-1		SC2B-1 right bank: 48.106342 / -115.412902	265
SC3-1		SC3-1 upstream: 48.105212 / -115.412439	240
SC3-1		SC3-1 left bank: 48.105212 / -115.412439	330
SC3-2		SC3-2 downstream: 48.105090 / -115.412014	160
SC3-2		SC3-2 left bank: 48.105090 / -115.412014	70
SC7-1		SC7-1 downstream: 48.104608 / -115.411380	110
SC7-1		SC7-1 left bank: 48.104608 / -115.411380	20
CC1A-1		CC1A-1 upstream: 48.106803 / -115.410891	50
CC1A-1		CC1A-1 left bank: 48.106803 / -115.410891	140
CC1A-2		CC1A-2 upstream: 48.106600 / -115.411270	85
CC1A-2		CC1A-2 left bank: 48.106600 / -115.411270	175
CC1B-1		CC1B-1 downstream: 48.105509 / -115.411518	200
CC1B-1		CC1B-1 left bank: 48.105509 / -115.411518	110

**Comments / Problems:** \_\_\_\_\_

## GPS SURVEYING

Using a resource grade GPS survey the items on the checklist below. Collect at least 3 location points set at a 5 second recording rate. Record file numbers for site in designated GPS field notebook.

### GPS Checklist:

- ☒ Upland/wetland boundary.
- ☒ 4-6 landmarks that are recognizable on the aerial photograph.
- ☒ Start and End points of vegetation transect(s).
- ☒ Photograph reference points.
- ☐ Groundwater monitoring well locations.
- ☒ Bird nest boxes.

Comments / Problems: \_\_\_\_\_

## WETLAND DELINEATION

(attach COE delineation forms)

At each site conduct these checklist items:

- ☒ Delineate wetlands according to the 1987 Army COE manual and regional supplement.
- ☒ Delineate wetland – upland boundary onto aerial photograph.

Comments / Problems: \_\_\_\_\_

## FUNCTIONAL ASSESSMENT

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

Comments / Problems: \_\_\_\_\_

## 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? NA

If yes, are the structures working properly and in good working order? NA

If no, describe the problems below.

Comments / Problems: \_\_\_\_\_

## WILDLIFE

### Birds

Were man-made nesting structures installed? **Yes**

If yes, type of structure: **Box** How many? **2**

Are the nesting structures being used? **No**

Do the nesting structures need repairs? **No**

### Mammals and Herptiles

Mammal and Herptile Species	Number Observed	Indirect Indication of Use			
		Tracks	Scat	Burrows	Other
Chipmunk sp.	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ground squirrel sp.	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Columbia spotted frog		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Pumpkinseed		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Brook trout		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Shiner sp.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Painted turtle		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Common garter snake		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
White-tailed deer	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Raccoon		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Muskrat		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Meadow vole		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Bushy-tailed woodrat		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Western jumping mouse		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Yellow-bellied marmot		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Elk		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Moose		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Western toad		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

### Additional Activities Checklist:

**NA** Macroinvertebrate Sampling (if required)

**Comments / Problems: List includes species observed by MDT staff during a site visit conducted at the same time as 2017 monitoring.**

## BIRD SURVEY – FIELD DATA SHEET

Site: **Schrieber Lake** Date: **7/26/17**

Survey Time: \_\_\_\_\_ to \_\_\_\_\_

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Canada goose	28	F L	OW	Willow flycatcher		FO	MA
Mallard	12	F L	OW	Common snipe		F	MA
Dark-eyed junco	7	FO	MA	House wren		FO	MA
Green-winged teal		F L	OW	American robin		FO L	MA
Cinnamon teal		F L	OW	Song sparrow		FO	MA
Bufflehead		F L	OW	Chipping sparrow		FO	MA
Great blue heron		L	MA	Pied-billed grebe		F L	OW
Sora		F	MA	Macgillivray's warbler		FO	MA
Spotted sandpiper		F	MA	Northern flicker		FO	MA
American dipper		F	MA	Grosbeak sp.		FO	MA
Tree swallow		FO	MA	Wilson's warbler		FO	MA
Vaux's swift		FO	MA	Rough-winged swallow		FO	MA
Red-tailed hawk		FO	MA	Black-billed magpie		FO	MA
Bank swallow		FO	MA	Western bluebird		FO L	MA
Barn swallow		FO	MA	Osprey		FO	MA
Common yellowthroat		FO	MA	American wigeon		F L	OW
Yellow warbler		FO	MA	Belted kingfisher		FO L	MA
Red-winged blackbird		FO L	MA	Cedar waxwing		FO	MA
Yellow-headed blackbird		FO L	MA	American coot		F L	OW
Calliope hummingbird		FO	MA				
Yellow-rumped warbler		FO	MA				
Dusky flycatcher		FO	MA				
Marsh wren		FO L	MA				

### BEHAVIOR CODES

**BP** = One of a breeding pair

**BD** = Breeding display

**F** = Foraging

**FO** = Flyover

**L** = Loafing

**N** = Nesting

### HABITAT CODES

**AB** = Aquatic bed

**FO** = Forested

**I** = Island

**MA** = Marsh

**MF** = Mud Flat

**OW** = Open Water

**SS** = Scrub/Shrub

**UP** = Upland buffer

**WM** = Wet meadow

**US** = Unconsolidated shore

Weather: **80 degrees, sunny**

Notes: **List includes species observed by MDT staff during a site visit conducted at the same time as 2017 monitoring.**

# WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Schrieber Lake City/County: Lincoln Sampling Date: 26-Jul-17  
 Applicant/Owner: MDT State: MT Sampling Point: DP-1U  
 Investigator(s): RESPEC - M. Traxler Section, Township, Range: S 13 T 27N R 30W  
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): convex Slope: 2.0 % / 1.1 °  
 Subregion (LRR): LRR E Lat.: 48.106833 Long.: -115.409964 Datum: NAD 83  
 Soil Map Unit Name: aquic adfluents, poorly drained 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 <input type="radio"/> No <input checked="" type="radio"/>	Is the Sampled Area within a Wetland? Yes <input type="radio"/> No <input checked="" type="radio"/>
Hydric Soil Present? Yes <input type="radio"/> No <input checked="" type="radio"/>	
Wetland Hydrology Present? Yes <input type="radio"/> No <input checked="" type="radio"/>	
Remarks: Upland sample point.	

## VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: 30 Foot Radius )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status	Dominance Test worksheet: Number of Dominant Species That are OBL, FACW, or FAC: <u>0</u> (A)  Total Number of Dominant Species Across All Strata: <u>1</u> (B)  Percent of dominant Species That Are OBL, FACW, or FAC: <u>0.0%</u> (A/B)
1. _____	0	<input type="checkbox"/> 0.0%	_____	
2. _____	0	<input type="checkbox"/> 0.0%	_____	
3. _____	0	<input type="checkbox"/> 0.0%	_____	
4. _____	0	<input type="checkbox"/> 0.0%	_____	
		<b>= Total Cover</b>		
<b>Sapling/Shrub Stratum (Plot size: 15 Foot Radius )</b>				
1. _____	0	<input type="checkbox"/> 0.0%	_____	
2. _____	0	<input type="checkbox"/> 0.0%	_____	
3. _____	0	<input type="checkbox"/> 0.0%	_____	
4. _____	0	<input type="checkbox"/> 0.0%	_____	
5. _____	0	<input type="checkbox"/> 0.0%	_____	
		<b>= Total Cover</b>		
<b>Herb Stratum (Plot size: 5 Foot Radius )</b>				
1. <u>Elymus repens</u>	70	<input checked="" type="checkbox"/> 77.8%	FACU	
2. <u>Bromus inermis</u>	10	<input type="checkbox"/> 11.1%	UPL	
3. <u>Alopecurus pratensis</u>	5	<input type="checkbox"/> 5.6%	FACW	
4. <u>Phleum pratense</u>	5	<input type="checkbox"/> 5.6%	FACU	
5. _____	0	<input type="checkbox"/> 0.0%	_____	
6. _____	0	<input type="checkbox"/> 0.0%	_____	
7. _____	0	<input type="checkbox"/> 0.0%	_____	
8. _____	0	<input type="checkbox"/> 0.0%	_____	
9. _____	0	<input type="checkbox"/> 0.0%	_____	
10. _____	0	<input type="checkbox"/> 0.0%	_____	
11. _____	0	<input type="checkbox"/> 0.0%	_____	
		<b>= Total Cover</b>		
<b>Woody Vine Stratum (Plot size: 30 Foot Radius )</b>				
1. _____	0	<input type="checkbox"/> 0.0%	_____	
2. _____	0	<input type="checkbox"/> 0.0%	_____	
		<b>= Total Cover</b>		
% Bare Ground in Herb Stratum: <u>1</u>				
<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: <b>OBL species</b> <u>0</u> x <b>1</b> = <u>0</u> <b>FACW species</b> <u>5</u> x <b>2</b> = <u>10</u> <b>FAC species</b> <u>0</u> x <b>3</b> = <u>0</u> <b>FACU species</b> <u>75</u> x <b>4</b> = <u>300</u> <b>UPL species</b> <u>10</u> x <b>5</b> = <u>50</u> <b>Column Totals:</b> <u>90</u> (A) <u>360</u> (B) Prevalence Index = B/A = <u>4.000</u>				
<b>Hydrophytic Vegetation Indicators:</b> <input type="checkbox"/> 1 - Rapid Test for Hydrologic Vegetation <input type="checkbox"/> 2 - Dominance Test is > 50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup> <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.				
<b>Hydrophytic Vegetation Present?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>				
Remarks: Dominance of upland vegetation.				

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## Soil

**Sampling Point:** DP-1U

[illegible]

## Hydrology

Wetland Hydrology Indicators			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (minimum of two required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Drift deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-neutral Test (D5)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)	
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost Heave Hummocks (D7)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)			
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)			
<b>Field Observations:</b> Surface Water Present?    Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): <input type="text"/> Water Table Present?    Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): <input type="text"/> Saturation Present?    Yes <input type="radio"/> No <input checked="" type="radio"/> Depth (inches): <input type="text"/> (includes capillary fringe)			
		<b>Wetland Hydrology Present?</b> Yes <input type="radio"/> No <input checked="" type="radio"/>	
Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:			
Remarks:			
No hydrology indicators present.			



# WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Schrieber Lake City/County: Lincoln Sampling Date: 26-Jul-17  
 Applicant/Owner: MDT State: MT Sampling Point: DP-1W  
 Investigator(s): RESPEC - M. Traxler Section, Township, Range: S 13 T 27N R 30W  
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): flat Slope: 2.0 % / 1.1 °  
 Subregion (LRR): LRR E Lat.: 48.106783 Long.: -115.4101126 Datum: NAD 83  
 Soil Map Unit Name: aquic adfluents, poorly drained 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 <input checked="" type="radio"/> No <input type="radio"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="radio"/> No <input type="radio"/>
Hydric Soil Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	
Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	
Remarks: Wetland sample point. Wetland area dominated by emergent vegetation type.	

## VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: 30 Foot Radius )	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That are OBL, FACW, or FAC: <u>1</u> (A)  Total Number of Dominant Species Across All Strata: <u>1</u> (B)  Percent of dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)
1. _____	0	<input type="checkbox"/> 0.0%		
2. _____	0	<input type="checkbox"/> 0.0%		
3. _____	0	<input type="checkbox"/> 0.0%		
4. _____	0	<input type="checkbox"/> 0.0%		
<b>= Total Cover</b>				<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>100</u> x 2 = <u>200</u> FAC species <u>0</u> x 3 = <u>0</u> FACU species <u>0</u> x 4 = <u>0</u> UPL species <u>1</u> x 5 = <u>5</u> <b>Column Totals:</b> <u>101</u> (A) <u>205</u> (B) Prevalence Index = B/A = <u>2.030</u>
<b>Sapling/Shrub Stratum (Plot size: 15 Foot Radius )</b>				
1. _____	0	<input type="checkbox"/> 0.0%		
2. _____	0	<input type="checkbox"/> 0.0%		
3. _____	0	<input type="checkbox"/> 0.0%		
4. _____	0	<input type="checkbox"/> 0.0%		
5. _____	0	<input type="checkbox"/> 0.0%		
<b>= Total Cover</b>				
<b>Herb Stratum (Plot size: 5 Foot Radius )</b>				<b>Hydrophytic Vegetation Indicators:</b> <input checked="" type="checkbox"/> 1 - Rapid Test for Hydrologic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is > 50% <input checked="" type="checkbox"/> 3 - Prevalence Index is ≤ 3.0 <sup>1</sup> <input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> 5 - Wetland Non-Vascular Plants <sup>1</sup> <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. Phalaris arundinacea	80	<input checked="" type="checkbox"/> 79.2%	FACW	
2. Alopecurus pratensis	20	<input type="checkbox"/> 19.8%	FACW	
3. Bromus inermis	1	<input type="checkbox"/> 1.0%	UPL	
4. _____	0	<input type="checkbox"/> 0.0%		
5. _____	0	<input type="checkbox"/> 0.0%		
6. _____	0	<input type="checkbox"/> 0.0%		
7. _____	0	<input type="checkbox"/> 0.0%		
8. _____	0	<input type="checkbox"/> 0.0%		
9. _____	0	<input type="checkbox"/> 0.0%		
10. _____	0	<input type="checkbox"/> 0.0%		
11. _____	0	<input type="checkbox"/> 0.0%		
<b>= Total Cover</b>				
<b>Woody Vine Stratum (Plot size: 30 Foot Radius )</b>				
1. _____	0	<input type="checkbox"/> 0.0%		
2. _____	0	<input type="checkbox"/> 0.0%		
<b>= Total Cover</b>				
<b>% Bare Ground in Herb Stratum:</b> <u>1</u>				
<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>				
Remarks: Hydrophytic vegetation present.				

\*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

## Soil

Sampling Point: **DP-1W**

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

Depth (inches)	Matrix		Redox Features						Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>				
0-9	10YR	2/1	100						Loam	
9-18	10YR	2/1	95	10YR	5/8	5	D	M	Loam	

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

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

- |  |  |
|--|--|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)                            |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)                        |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1) (except in MLRA 1) |
| <input checked="" type="checkbox"/> Hydrogen Sulfide (A4)  | <input type="checkbox"/> Loamy Gleyed Matrix (F2)                    |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3)                        |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Dark Surface (F6)                     |
| <input type="checkbox"/> Sandy Muck Mineral (S1)           | <input type="checkbox"/> Depleted Dark Surface (F7)                  |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Redox depressions (F8)                      |

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

<sup>3</sup>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:

Hydric soil indicators present with smell of hydrogen sulfide.

## Hydrology

**Wetland Hydrology Indicators:**

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

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

Secondary Indicators (minimum of two 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, monitor well, aerial photos, previous inspections), if available:

Remarks:

Hydrology indicators present with saturated soils.

# MDT MONTANA WETLAND ASSESSMENT FORM (revised March 2008)

1. **Project Name:** Schrieber Lake 2. **MDT Project #:** NH 27(29) 3. **Control #:** 1027007  
 3. **Evaluation Date:** July 26, 2017 4. **Evaluator(s):** Mark Traxler 5. **Wetland/Site #(s):** Schrieber Lake  
 6. **Wetland Location(s):** Township 27 N, Range 30 W, Section 13; Township     N, Range     E, Section      
**Approximate Stationing or Roadposts:** Approximately Milepost 53.8

**Watershed:** 1 - Kootenai **County:** Lincoln

7. **Evaluating Agency:** RESPEC for MDT

**Purpose of Evaluation:**

- ☐ Wetland potentially affected by MDT project  
☐ Mitigation wetlands; pre-construction  
☒ Mitigation wetlands; post-construction  
☐ Other

8. **Wetland Size (acre):**            (visually estimated)  
51.7 (measured, e.g. GPS)

9. **Assessment Area (AA) Size (acre):**            (visually estimated)  
 (see manual for determining AA) 51.7 (measured, e.g. GPS)

**10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA** (See manual for definitions.)

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% OF AA
Depressional	Aquatic Bed		Permanent / Perennial	20
Depressional	Emergent Wetland		Permanent / Perennial	10
Riverine	Unconsolidated Bottom		Permanent / Perennial	5
Slope	Emergent Wetland		Permanent / Perennial	30
Slope	Emergent Wetland		Seasonal / Intermittent	10
Slope	Scrub-Shrub Wetland		Seasonal / Intermittent	25

**Comments:**           

11. **ESTIMATED RELATIVE ABUNDANCE** (of similarly classified sites within the same Major Montana Watershed Basin; see manual.)  
common

**12. GENERAL CONDITION OF AA**

i. **Disturbance:** Use matrix below to select the appropriate response; see manual for Montana listed noxious weed and aquatic nuisance vegetation species 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	---
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%.	---	---	---
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%.	---	---	---

**Comments** (types of disturbance, intensity, season, etc.): Highway 2 and USFS roads are adjacent to the AA.

ii. **Prominent noxious, aquatic nuisance, and other exotic vegetation species:** Spotted knapweed and Canada thistle infestations in the uplands surrounding the AA.

iii. **Provide brief descriptive summary of AA and surrounding land use/habitat:** Site is in a relatively flat valley bottom that has historically been used for agriculture and hay production. The valley sides are heavily forested with secondary growth coniferous forest. The entire AA is very wet and is dominated primarily by emergent vegetation. PSS wetlands occur immediately along the pre-existing creek channels and in the southwest corner of the site where a "carr" fen occurs. The fen supports bog birch and other SOC including hoary willow.

**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 one is forested) classes	high	NA	NA	NA
2 (or 1 if forested) classes	---	NA	NA	NA
1 class, but not a monoculture	---	←NO	YES→	---
1 class, monoculture (1 species comprises ≥90% of total cover)	---	NA	NA	NA

**Comments:** aquatic bed, emergent, scrub-shrub

Wetland/Site #(s): Schrieber Lake**14A. HABITAT FOR FEDERALLY LISTED OR PROPOSED THREATENED OR ENDANGERED PLANTS OR ANIMALS**i. **AA is Documented (D) or Suspected (S) to contain:** Check box based on definitions in manual.

Primary or critical habitat (**list species**) ☐ D ☐ S \_\_\_\_\_  
 Secondary habitat (**list species**) ☒ D ☐ S Grizzly bear  
 Incidental habitat (**list species**) ☐ D ☐ S \_\_\_\_\_  
 No usable habitat ☐ S

ii. **Rating:** Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
Functional Point/Rating	---	---	.8M	---	---	---	---

**Sources for documented use** (e.g. observations, records): USFS personnel observed a boar grizzly upstream of the AA in the Schrieber Creek drainage in 2010. Wolverines could potentially be in the area.

**14B. HABITAT FOR PLANTS OR ANIMALS RATED S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM**

Do not include species listed in 14A above.

i. **AA is Documented (D) or Suspected (S) to contain:** Check box based on definitions in manual.

Primary or critical habitat (**list species**) ☒ D ☐ S Salix candida (S3/S4), Western toad (S2);  
 Secondary habitat (**list species**) ☒ D ☐ S Townsend's big-eared bat (S3), hoary bat (S3)  
 Incidental habitat (**list species**) ☐ D ☒ S Westslope cutthroat trout (S2), fisher (S3)  
 No usable habitat ☐ S

ii. **Rating:** Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
<b>S1 Species</b>	---	---	---	---	---	---	---
<b>Functional Point/Rating</b>	---	---	---	---	---	---	---
<b>S2 and S3 Species</b>	.9H	---	---	---	---	---	---
<b>Functional Point/Rating</b>	.9H	---	---	---	---	---	---

**Sources for documented use** (e.g. observations, records): MDT BRR, USFS, MNHP, and MFWP databases and discussions with regional wildlife and fisheries biologists. Western toads were observed by MDT and Kootenai National Forest personnel in April 2011.

**14C. GENERAL WILDLIFE HABITAT RATING**i. **Evidence of Overall Wildlife Use in the AA:** Check substantial, moderate, or low based on supporting evidence.

- ☒ **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
  - ☒ interview with local biologist 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
  - ☐ interview with local biologist with knowledge of 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
  - ☐ interview with local biologist 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 manual for further definitions of these terms].

Structural Diversity (see #13)	<input checked="" type="checkbox"/> High								<input type="checkbox"/> Moderate								<input type="checkbox"/> Low			
Class Cover Distribution (all vegetated classes)	<input type="checkbox"/> Even				<input checked="" type="checkbox"/> Uneven				<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> 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
<input checked="" type="checkbox"/> <b>Low Disturbance</b> at AA (see #12i)	---	---	---	---	E	---	---	---	---	---	---	---	E	---	---	---	---	---	---	---
<input type="checkbox"/> <b>Moderate Disturbance</b> at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
<input type="checkbox"/> <b>High Disturbance</b> at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

iii. **Rating:** Use the conclusions from i and ii above and the matrix below to select the functional point and rating.

Evidence of Wildlife Use (i)	Wildlife Habitat Features Rating (ii)			
<input checked="" type="checkbox"/> <b>Substantial</b>	<input checked="" type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
<input type="checkbox"/> <b>Moderate</b>	1E	---	---	---
<input type="checkbox"/> <b>Minimal</b>	---	---	---	---

**Comments:** Good habitat diversity with substantial wildlife evidence.

Wetland/Site #(s): Schrieber Lake**14D. GENERAL FISH HABITAT** ☐ NA (proceed to 14E)

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 the NA box and proceed to 14E.

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].

**Type of Fishery:** ☒ Cold Water (CW) ☐ Warm Water (WW) Use the CW or WW guidelines in the manual to complete the matrix.

**i. Habitat Quality and Known / Suspected Fish Species in AA:** Use matrix to select the functional point and rating.

Duration of Surface Water in AA	<input checked="" type="checkbox"/> Permanent / Perennial						<input type="checkbox"/> Seasonal / Intermittent						<input type="checkbox"/> Temporary / Ephemeral					
Aquatic Hiding / Resting / Escape Cover	<input checked="" type="checkbox"/> Optimal		<input type="checkbox"/> Adequate		<input type="checkbox"/> Poor		<input type="checkbox"/> Optimal		<input type="checkbox"/> Adequate		<input type="checkbox"/> Poor		<input type="checkbox"/> Optimal		<input type="checkbox"/> Adequate		<input type="checkbox"/> 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	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier II or Native Game fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier III or Introduced Game fish	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Non-Game Tier IV or No fish species	---	.5M	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

**Sources used for identifying fish spp. potentially found in AA:** Brook Trout documented in Schrieber Creek immediately up and downstream of Schrieber Lake by FWP in 2011 (MFISH query). Westslope Cutthroat documented immediately upstream from confluence with Fisher River but outside project area.

**ii. Modified Rating:** NOTE: Modified score cannot exceed 1.0 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? ☐ YES, reduce score in i by 0.1 = \_\_\_ or ☒ NO

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area; specify in comments) for native fish or introduced game fish? ☐ YES, add to score in i or **ii** 0.1 = \_\_\_ or ☒ NO

**iii. Final Score and Rating:** .5M **Comments:** Salmonids observed in creek during monitoring. Assumed to be brook trout, but is unverified.

**14E. FLOOD ATTENUATION** ☐ NA (proceed to 14F)

Applies only to wetlands that are subject to flooding via in-channel or overbank flow.

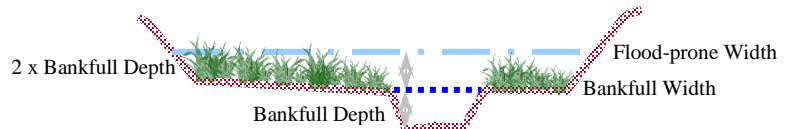
If wetlands in AA are not flooded from in-channel or overbank flow, check the NA box and proceed to 14F.

**Entrenchment Ratio (ER) Estimation** (see manual for additional guidance). Entrenchment ratio = (flood-prone width) / (bankfull width).

Flood-prone width = estimated horizontal projection of where 2 X maximum bankfull depth elevation intersects the floodplain on each side of the stream.

$$\frac{25}{10} = 2.5$$

flood prone width / bankfull width = entrenchment ratio



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

**i. Rating:** Working from top to bottom, use the matrix below to select the functional point and rating.

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	<input checked="" type="checkbox"/> Slightly Entrenched C, D, E stream types			<input type="checkbox"/> Moderately Entrenched B stream type			<input type="checkbox"/> Entrenched A, F, G stream types		
Percent of Flooded Wetland Classified as Forested and/or Scrub/Shrub	<input type="checkbox"/> 75%	<input type="checkbox"/> 25-75%	<input checked="" type="checkbox"/> <25%	<input type="checkbox"/> 75%	<input type="checkbox"/> 25-75%	<input type="checkbox"/> <25%	<input type="checkbox"/> 75%	<input type="checkbox"/> 25-75%	<input type="checkbox"/> <25%
AA contains no outlet or restricted outlet	---	---	.6M	---	---	---	---	---	---
AA contains unrestricted outlet	---	---	---	---	---	---	---	---	---

**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?** ☐ YES ☒ NO **Comments:** The stream channels in the AA have free access to their floodplains. The floodplains are dominated by herbaceous vegetation.

Wetland/Site #(s): Schrieber Lake**14F. SHORT AND LONG TERM SURFACE WATER STORAGE** ☐ NA (proceed to 14G)

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, then check the NA box and proceed to 14G.

- i. **Rating:** Working from top to bottom, use the matrix below to select the functional point and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see manual 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	<input checked="" type="checkbox"/> >5 acre feet			<input type="checkbox"/> 1.1 to 5 acre feet			<input type="checkbox"/> ≤1 acre foot		
Duration of Surface Water at Wetlands within the AA	<input checked="" type="checkbox"/> P/P	<input type="checkbox"/> S/I	<input type="checkbox"/> T/E	<input type="checkbox"/> P/P	<input type="checkbox"/> S/I	<input type="checkbox"/> T/E	<input type="checkbox"/> P/P	<input type="checkbox"/> S/I	<input type="checkbox"/> T/E
Wetlands in AA flood or pond ≥ 5 out of 10 years	1H	---	---	---	---	---	---	---	---
Wetlands in AA flood or pond < 5 out of 10 years	---	---	---	---	---	---	---	---	---

**Comments:** Extensive areas of inundation were observed.

**14G. SEDIMENT / NUTRIENT / TOXICANT / RETENTION AND REMOVAL** ☐ NA (proceed to 14H)

Applies to wetland 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, check the NA box and proceed to 14H.

- i. **Rating:** Working from top to bottom, use the matrix below to select the functional point and rating.

Sediment, Nutrient, and Toxicant Input Levels within AA	AA receives or surrounding land use has potential to deliver 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 is 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 has 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	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
Evidence of Flooding / Ponding in AA	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
AA contains <b>no</b> or restricted outlet	1H	---	---	---	---	---	---	---
AA contains <b>unrestricted</b> outlet	---	---	---	---	---	---	---	---

**Comments:** AA has potential to receive minor sedimentation from nearby US 2 and adjacent hillsides that have been logged.

**14H. SEDIMENT / SHORELINE STABILIZATION** ☐ NA (proceed to 14I)

Applies only if AA occurs on or within the banks of 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, check the NA box and proceed to 14I.

% Cover of Wetland Streambank or Shoreline by Species with Stability Ratings of ≥6 (see Appendix F).	Duration of Surface Water Adjacent to Rooted Vegetation		
	<input checked="" type="checkbox"/> Permanent / Perennial	<input type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
<input checked="" type="checkbox"/> ≥ 65%	1H	---	---
<input type="checkbox"/> 35-64%	---	---	---
<input type="checkbox"/> < 35%	---	---	---

**Comments:** Shorelines and banks are well vegetated.

**14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT**

- i. **Level of Biological Activity:** Synthesis of wildlife and fish habitat rates (select).

General Fish Habitat Rating (14Diii)	General Wildlife Habitat Rating (14Ciii)		
	<input checked="" type="checkbox"/> E/H	<input type="checkbox"/> M	<input type="checkbox"/> L
<input type="checkbox"/> E/H	---	---	---
<input checked="" type="checkbox"/> M	H	---	---
<input type="checkbox"/> L	---	---	---
<input type="checkbox"/> NA	---	---	---

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

A	<input checked="" type="checkbox"/> Vegetated Component >5 acres						<input type="checkbox"/> Vegetated Component 1-5 acres						<input type="checkbox"/> Vegetated Component <1 acre					
B	<input checked="" type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1H	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S/I	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
T/E/A	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Wetland/Site #(s): Schrieber Lake**14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT** (continued)iii. **Modified Rating:** Note: Modified score cannot exceed 1.0 or be less than 0.1.

**Vegetated Upland Buffer:** Area with  $\geq 30\%$  plant cover,  $\leq 15\%$  noxious weed or ANVS cover, AND that is not subjected to periodic mechanical mowing or clearing (unless for weed control).

Is there an average  $\geq 50$ -foot wide vegetated upland buffer around  $\geq 75\%$  of the AA's perimeter? ☒ **YES**, add 0.1 to score in ii = 1.00 ☐ **NO**

iv. **Final Score and Rating:** 1H **Comments:** High level of biological activity, veg component > 5 ac, perennial, has surface and subsurface outlets**14J. GROUNDWATER DISCHARGE / RECHARGE**

Check the appropriate indicators in i and 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 select the functional point and rating.

Criteria	Duration of Saturation at AA Wetlands <b>FROM GROUNDWATER DISCHARGE</b> or <b>WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM</b>			
	<input checked="" type="checkbox"/> P/P	<input type="checkbox"/> S/I	<input type="checkbox"/> T	<input type="checkbox"/> None
<input checked="" type="checkbox"/> Groundwater Discharge or Recharge	1H	---	---	---
<input type="checkbox"/> Insufficient Data/Information	---			

**Comments:** AA with perennial inundation/saturation to the surface.**14K. UNIQUENESS**i. **Rating:** Working from top to bottom, use the matrix below to select the functional point 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		
	<input type="checkbox"/> Rare	<input checked="" type="checkbox"/> Common	<input type="checkbox"/> Abundant	<input type="checkbox"/> Rare	<input type="checkbox"/> Common	<input type="checkbox"/> Abundant	<input type="checkbox"/> Rare	<input type="checkbox"/> Common	<input type="checkbox"/> Abundant
<input checked="" type="checkbox"/> <b>Low Disturbance</b> at AA (#12i)	---	.9H	---	---	---	---	---	---	---
<input type="checkbox"/> <b>Moderate Disturbance</b> at AA (#12i)	---	---	---	---	---	---	---	---	---
<input type="checkbox"/> <b>High Disturbance</b> at AA (#12i)	---	---	---	---	---	---	---	---	---

**Comments:** This wetland complex contains a fen, is relatively undisturbed, and so is fairly unique in the watershed.**14L. RECREATION / EDUCATION POTENTIAL**☐ NA (proceed to Overall Summary and Rating page)

Affords 'bonus' points if AA provides a recreational or educational opportunity.

i. **Is the AA a known or potential recreational or educational site?** ☒ **YES**, go to ii. ☐ **NO**, check the NA box.

ii. **Check categories that apply to the AA:** ☒ Educational/Scientific Study ☐ Consumptive Recreational ☐ Non-consumptive recreational  
☐ Other:

iii. **Rating:** Use the matrix below to select the functional point and rating.

Known or Potential Recreational or Educational Area		Known	Potential
Public ownership or public easement with general public access (no permission required)		.2H	---
Private ownership with general public access (no permission required)		---	---
Private or public ownership without general public access, or requiring permission for public access		---	---

**Comments:** This site is open to public access and has a high potential for education, especially for birders since there is a great hill at the entrance to the site that provides a good vantage point for low impact bird viewing.

15. **GENERAL SITE NOTES:** \_\_\_\_\_

Wetland/Site #(s): Schieber Lake

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	mod 0.80	1.00	41.36	*
B. MT Natural Heritage Program Species Habitat	mod 0.60	1.00	31.02	
C. General Wildlife Habitat	exc 1.00	1.00	51.7	*
D. General Fish Habitat	mod 0.50	1.00	25.85	
E. Flood Attenuation	mod 0.60	1.00	31.02	
F. Short and Long Term Surface Water Storage	high 1.00	1.00	51.7	*
G. Sediment / Nutrient / Toxicant Removal	high 1.00	1.00	51.7	
H. Sediment / Shoreline Stabilization	high 1.00	1.00	51.7	
I. Production Export / Food Chain Support	high 1.00	1.00	51.7	*
J. Groundwater Discharge / Recharge	high 1.00	1.00	51.7	
K. Uniqueness	high 0.90	1.00	46.53	
L. Recreation / Education Potential (bonus point)	high 0.20		10.34	
<b>Total Points</b>	<b>9.6</b>	<b>11</b>	<b>496.32</b>	<b>Total Functional Units</b>
<b>Percent of Possible Score 87%</b> (round to nearest whole number)				

**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; if not 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 (AA) RATING:** Check the appropriate category based on the criteria outlined above.
☒ I    ☐ II    ☐ III    ☐ IV



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## APPENDIX C

### PROJECT AREA PHOTOGRAPHS

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MDT Wetland Mitigation Monitoring  
Schrieber Lake  
Lincoln County, Montana

## Schrieber Lake: Photo Point Photographs



Photo Point: 1 – Photo 1  
Bearing: 242 degrees

Location: Northwest Boundary  
Year: 2015



Photo Point: 1 – Photo 1  
Bearing: 242 degrees

Location: Northwest Boundary  
Year: 2016



Photo Point: 1 – Photo 1  
Bearing: 242 degrees

Location: Northwest Boundary  
Year: 2017



Photo Point: 1 – Photo 2  
Bearing: 197 degrees

Location: Northwest Boundary  
Year: 2015



Photo Point: 1 – Photo 2  
Bearing: 197 degrees

Location: Northwest Boundary  
Year: 2016

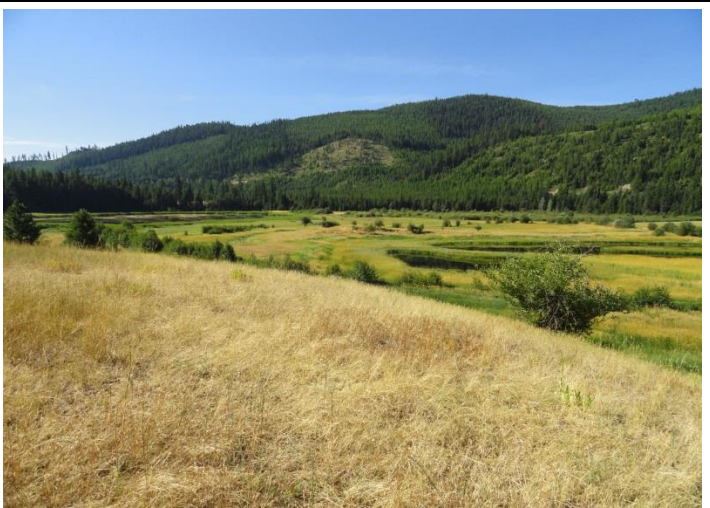


Photo Point: 1 – Photo 2  
Bearing: 197 degrees

Location: Northwest Boundary  
Year: 2017



## Schrieber Lake: Photo Point Photographs



Photo Point: 1 – Photo 3  
Bearing: 164 degrees  
Location: Northwest Boundary  
Year: 2015



Photo Point: 1 – Photo 3  
Bearing: 164 degrees  
Location: Northwest Boundary  
Year: 2016



Photo Point: 1 – Photo 3  
Bearing: 164 degrees  
Location: Northwest Boundary  
Year: 2017



Photo Point: 2 – Photo 1  
Bearing: 323 degrees  
Location: Near Corral  
Year: 2015



Photo Point: 2 – Photo 1  
Bearing: 323 degrees  
Location: Near Corral  
Year: 2016



Photo Point: 2 – Photo 1  
Bearing: 323 degrees  
Location: Near Corral  
Year: 2017



## Schrieber Lake: Photo Point Photographs



Photo Point: 2 – Photo 2  
Bearing: 205 degrees

Location: Near Corral  
Year: 2015



Photo Point: 2 – Photo 2  
Bearing: 205 degrees

Location: Near Corral  
Year: 2016



Photo Point: 2 – Photo 2  
Bearing: 205 degrees

Location: Near Corral  
Year: 2017



Photo Point: 2 – Photo 3  
Bearing: 162 degrees

Location: Near Corral  
Year: 2015



Photo Point: 2 – Photo 3  
Bearing: 162 degrees

Location: Near Corral  
Year: 2016



Photo Point: 2 – Photo 3  
Bearing: 162 degrees

Location: Near Corral  
Year: 2017



## Schrieber Lake: Photo Point Photographs



Photo Point: 2 – Photo 4  
Bearing: 104 degrees

Location: Near Corral  
Year: 2015



Photo Point: 2 – Photo 4  
Bearing: 104 degrees

Location: Near Corral  
Year: 2016



Photo Point: 2 – Photo 4  
Bearing: 104 degrees

Location: Near Corral  
Year: 2017



Photo Point: 2 – Photo 5  
Bearing: 69 degrees

Location: Near Corral  
Year: 2015



Photo Point: 2 – Photo 5  
Bearing: 69 degrees

Location: Near Corral  
Year: 2016



Photo Point: 2 – Photo 5  
Bearing: 69 degrees

Location: Near Corral  
Year: 2017



## Schrieber Lake: Photo Point Photographs



Photo Point: 3  
Bearing: 183 degrees

Location: West of Corrals  
Year: 2015



Photo Point: 3  
Bearing: 183 degrees

Location: West of Corrals  
Year: 2016



Photo Point: 3  
Bearing: 183 degrees

Location: West of Corrals  
Year: 2017

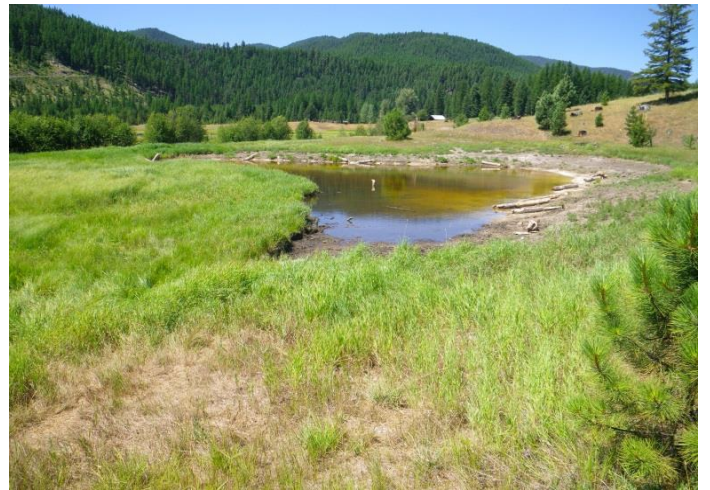


Photo Point: 4  
Bearing: 287 degrees

Location: East corner of Cell 10  
Year: 2015



Photo Point: 4  
Bearing: 287 degrees

Location: East corner of Cell 10  
Year: 2016



Photo Point: 4  
Bearing: 287 degrees

Location: East corner of Cell 10  
Year: 2017



## Schrieber Lake: Photo Point Photographs



Photo Point: 5 – Photo 1  
Bearing: 143 degrees

Location: Corner of carr  
Year: 2015



Photo Point: 5 – Photo 1  
Bearing: 143 degrees

Location: Corner of carr  
Year: 2016



Photo Point: 5 – Photo 1  
Bearing: 143 degrees

Location: Corner of carr  
Year: 2017



Photo Point: 5 – Photo 2  
Bearing: 35 degrees

Location: Corner of carr  
Year: 2015



Photo Point: 5 – Photo 2  
Bearing: 35 degrees

Location: Corner of carr  
Year: 2016



Photo Point: 5 – Photo 2  
Bearing: 35 degrees

Location: Corner of carr  
Year: 2017



## Schrieber Lake: Photo Point Photographs



Photo Point: 5 – Photo 3  
Bearing: 359 degrees

Location: Corner of carr  
Year: 2015



Photo Point: 5 – Photo 3  
Bearing: 359 degrees

Location: Corner of carr  
Year: 2016



Photo Point: 5 – Photo 3  
Bearing: 359 degrees

Location: Corner of carr  
Year: 2017



Photo Point: 6 – Photo 1  
Bearing: 150 degrees

Location: South end of Cell 1  
Year: 2015



Photo Point: 6 – Photo 1  
Bearing: 150 degrees

Location: South end of Cell 1  
Year: 2016



Photo Point: 6 – Photo 1  
Bearing: 150 degrees

Location: South end of Cell 1  
Year: 2017



## Schrieber Lake: Photo Point Photographs



Photo Point: 6 – Photo 2  
Bearing: 103 degrees

Location: South end of Cell 1  
Year: 2015



Photo Point: 6 – Photo 2  
Bearing: 103 degrees

Location: South end of Cell 1  
Year: 2016



Photo Point: 6 – Photo 2  
Bearing: 103 degrees

Location: South end of Cell 1  
Year: 2017



Photo Point: 6 – Photo 3  
Bearing: 52 degrees

Location: South end of Cell 1  
Year: 2015



Photo Point: 6 – Photo 3  
Bearing: 52 degrees

Location: South end of Cell 1  
Year: 2016



Photo Point: 6 – Photo 3  
Bearing: 52 degrees

Location: South end of Cell 1  
Year: 2017



## Schrieber Lake: Photo Point Photographs



Photo Point: 7 – Photo 1    Location: South end of Transect 2  
Bearing: 228 degrees        Year: 2015



Photo Point: 7 – Photo 1    Location: South end of Transect 2  
Bearing: 228 degrees        Year: 2016



Photo Point: 7 – Photo 1    Location: South end of Transect 2  
Bearing: 228 degrees        Year: 2017



Photo Point: 7 – Photo 2    Location: South end of Transect 2  
Bearing: 299 degrees        Year: 2015



Photo Point: 7 – Photo 2    Location: South end of Transect 2  
Bearing: 299 degrees        Year: 2016



Photo Point: 7 – Photo 2    Location: South end of Transect 2  
Bearing: 299 degrees        Year: 2017



## Schrieber Lake: Photo Point Photographs



Photo Point: 7 – Photo 3    Location: South end of Transect 2  
Bearing: 355 degrees    Year: 2015



Photo Point: 7 – Photo 3    Location: South end of Transect 2  
Bearing: 355 degrees    Year: 2016



Photo Point: 7 – Photo 3    Location: South end of Transect 2  
Bearing: 355 degrees    Year: 2017



Photo Point: 8 – Photo 1    Location: Interior of site  
Bearing: 320 degrees    Year: 2015



Photo Point: 8 – Photo 1    Location: Interior of site  
Bearing: 320 degrees    Year: 2016



Photo Point: 8 – Photo 1    Location: Interior of site  
Bearing: 320 degrees    Year: 2017



## Schrieber Lake: Photo Point Photographs



Photo Point: 8 – Photo 2  
Bearing: 49 degrees

Location: Interior of site  
Year: 2015



Photo Point: 8 – Photo 2  
Bearing: 49 degrees

Location: Interior of site  
Year: 2016



Photo Point: 8 – Photo 2  
Bearing: 49 degrees

Location: Interior of site  
Year: 2017



Photo Point: 8 – Photo 3  
Bearing: 79 degrees

Location: Interior of site  
Year: 2015



Photo Point: 8 – Photo 3  
Bearing: 79 degrees

Location: Interior of site  
Year: 2016



Photo Point: 8 – Photo 3  
Bearing: 79 degrees

Location: Interior of site  
Year: 2017



## Schrieber Lake: Photo Point Photographs



Photo Point: 9 – Photo 1      Location: Upland island center of site  
Bearing: 323 degrees      Year: 2015



Photo Point: 9 – Photo 1      Location: Upland island center of site  
Bearing: 323 degrees      Year: 2016



Photo Point: 9 – Photo 1      Location: Upland island center of site  
Bearing: 323 degrees      Year: 2017



Photo Point: 9 – Photo 2      Location: Upland island center of site  
Bearing: 120 degrees      Year: 2015



Photo Point: 9 – Photo 2      Location: Upland island center of site  
Bearing: 120 degrees      Year: 2016



Photo Point: 9 – Photo 2      Location: Upland island center of site  
Bearing: 120 degrees      Year: 2017



## Schrieber Lake: Photo Point Photographs



Photo Point: 10 – Photo 1  
Bearing: 17 degrees

Location: Overlook  
Year: 2015



Photo Point: 10 – Photo 1  
Bearing: 17 degrees

Location: Overlook  
Year: 2016



Photo Point: 10 – Photo 1  
Bearing: 17 degrees

Location: Overlook  
Year: 2017



Photo Point: 10 – Photo 2  
Bearing: 39 degrees

Location: Overlook  
Year: 2015



Photo Point: 10 – Photo 2  
Bearing: 39 degrees

Location: Overlook  
Year: 2016



Photo Point: 10 – Photo 2  
Bearing: 39 degrees

Location: Overlook  
Year: 2017



## Schrieber Lake: Photo Point Photographs



Photo Point: 10 – Photo 3  
Bearing: 57 degrees

Location: Overlook  
Year: 2015



Photo Point: 10 – Photo 3  
Bearing: 57 degrees

Location: Overlook  
Year: 2016



Photo Point: 10 – Photo 3  
Bearing: 57 degrees

Location: Overlook  
Year: 2017



## Schrieber Lake: Vegetation Transect Photographs



Transect 1: Start  
Bearing: 251 degrees  
Location: T-1  
Year: 2015



Transect 1: Start  
Bearing: 251 degrees  
Location: T-1  
Year: 2016



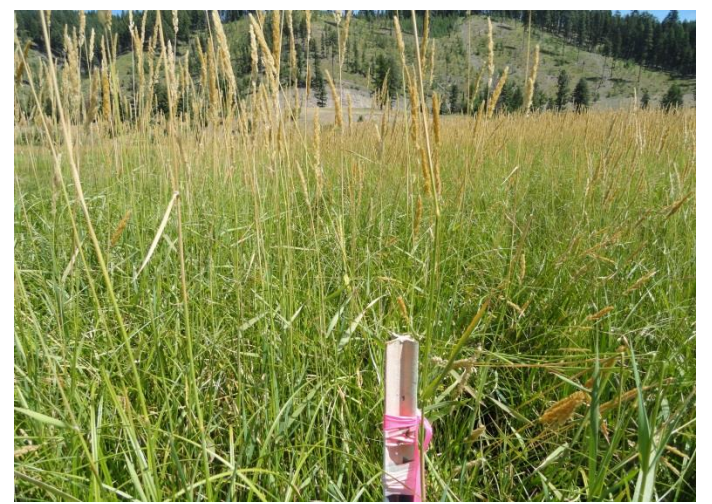
Transect 1: Start  
Bearing: 251 degrees  
Location: T-1  
Year: 2017



Transect 1: End  
Bearing: 71 degrees  
Location: T-1  
Year: 2015









Transect 1: End  
Bearing: 71 degrees  
Location: T-1  
Year: 2016



Transect 1: End  
Bearing: 71 degrees  
Location: T-1  
Year: 2017





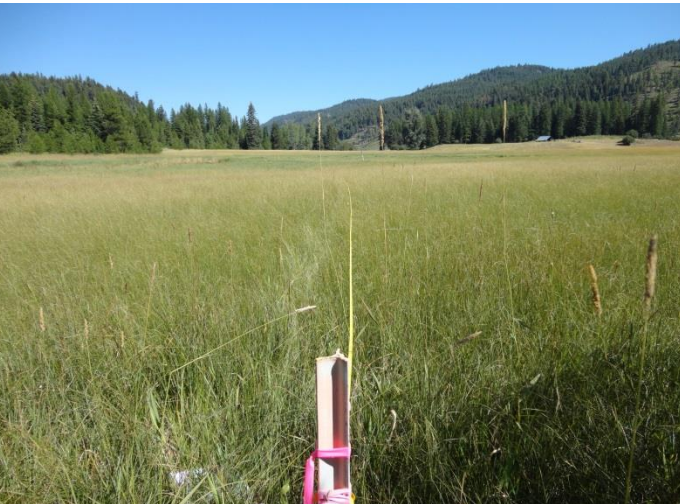



## Schrieber Lake: Vegetation Transect Photographs

	
Transect 2: Start Bearing: 152 degrees	Transect 2: Start Bearing: 152 degrees
	
Transect 2: Start Bearing: 152 degrees	Transect 2: End Bearing: 332 degrees
	
Transect 2: End Bearing: 332 degrees	Transect 2: End Bearing: 332 degrees



## Schrieber Lake: Vegetation Transect Photographs

			
Transect 3: Start Bearing: 175 degrees	Location: T-3 Year: 2015	Transect 3: Start Bearing: 175 degrees	Location: T-3 Year: 2016
			
Transect 3: Start Bearing: 175 degrees	Location: T-3 Year: 2017	Transect 3: End Bearing: 355 degrees	Location: T-3 Year: 2015
			
Transect 3: End Bearing: 355 degrees	Location: T-3 Year: 2016	Transect 3: End Bearing: 355 degrees	Location: T-3 Year: 2017



### Schrieber Lake: Data Point Photographs



Data Point: DP-1W  
Year: 2017

Location: Veg Com 3



Data Point: DP-1U  
Year: 2017

Location: Veg Com 1



## Schrieber Lake: Cross-Section Photographs



Cross-Section: SC1-1      Location: Schrieber Creek  
Bearing: 300° – upstream      Year: 2016



Cross-Section: SC1-1      Location: Schrieber Creek  
Bearing: 300° – upstream      Year: 2017



Cross-Section: SC1-1      Location: Schrieber Creek  
Bearing: 30° – Left Bank      Year: 2016



Cross-Section: SC1-1      Location: Schrieber Creek  
Bearing: 30° – Left Bank      Year: 2017



Cross-Section: SC1-2      Location: Schrieber Creek  
Bearing: 280° – upstream      Year: 2016



Cross-Section: SC1-2      Location: Schrieber Creek  
Bearing: 280° – upstream      Year: 2017



## Schrieber Lake: Cross-Section Photographs



Cross-Section: SC1-2  
Bearing: 10° – Left Bank

Location: Schrieber Creek  
Year: 2016



Cross-Section: SC1-2  
Bearing: 10° – Left Bank

Location: Schrieber Creek  
Year: 2017



Cross-Section: SC2A-1  
Bearing: 315° – downstream

Location: Schrieber Creek  
Year: 2016



Cross-Section: SC2A-1  
Bearing: 315° – downstream

Location: Schrieber Creek  
Year: 2017



Cross-Section: SC2A-1  
Bearing: 45° – Left Bank

Location: Schrieber Creek  
Year: 2016









Cross-Section: SC2A-1  
Bearing: 45° – Left Bank

Location: Schrieber Creek  
Year: 2017



## Schrieber Lake: Cross-Section Photographs

	
<p>Cross-Section: SC2A-2 Bearing: 185° – downstream</p>	<p>Cross-Section: SC2A-2 Bearing: 185° – downstream</p>
<p>Location: Schrieber Creek Year: 2016</p>	<p>Location: Schrieber Creek Year: 2017</p>
	
<p>Cross-Section: SC2A-2 Bearing: 275° – Right Bank</p>	<p>Cross-Section: SC2A-2 Bearing: 275° – Right Bank</p>
<p>Location: Schrieber Creek Year: 2016</p>	<p>Location: Schrieber Creek Year: 2017</p>
	
<p>Cross-Section: SC2B-1 Bearing: 175° – downstream</p>	<p>Cross-Section: SC2B-1 Bearing: 175° – downstream</p>
<p>Location: Schrieber Creek Year: 2016</p>	<p>Location: Schrieber Creek Year: 2017</p>



## Schrieber Lake: Cross-Section Photographs



Cross-Section: SC2B-1      Location: Schrieber Creek  
Bearing: 265° – Right Bank      Year: 2016



Cross-Section: SC2B-1      Location: Schrieber Creek  
Bearing: 265° – Right Bank      Year: 2017



Cross-Section: SC3-1      Location: Schrieber Creek  
Bearing: 240° – Upstream      Year: 2016



Cross-Section: SC3-1      Location: Schrieber Creek  
Bearing: 240° – Upstream      Year: 2017



Cross-Section: SC3-1      Location: Schrieber Creek  
Bearing: 330° – Left Bank      Year: 2016



Cross-Section: SC3-1      Location: Schrieber Creek  
Bearing: 330° – Left Bank      Year: 2017



## Schrieber Lake: Cross-Section Photographs



Cross-Section: SC3-2      Location: Schrieber Creek  
Bearing: 160° – downstream      Year: 2016



Cross-Section: SC3-2      Location: Schrieber Creek  
Bearing: 160° – downstream      Year: 2017



Cross-Section: SC3-2      Location: Schrieber Creek  
Bearing: 70° – Left Bank      Year: 2016



Cross-Section: SC3-2      Location: Schrieber Creek  
Bearing: 250° – Right Bank      Year: 2017









Cross-Section: SC7-1      Location: Schrieber Creek  
Bearing: 110° – downstream      Year: 2016



Cross-Section: SC7-1      Location: Schrieber Creek  
Bearing: 110° – downstream      Year: 2017









## Schrieber Lake: Cross-Section Photographs

	
<p>Cross-Section: SC7-1 Bearing: 20° – Left Bank</p>	<p>Cross-Section: SC7-1 Bearing: 20° – Left Bank</p>
	
<p>Cross-Section: CC1A-1 Bearing: 50° – Upstream</p>	<p>Cross-Section: CC1A-1 Bearing: 50° – Upstream</p>
	
<p>Cross-Section: CC1A-1 Bearing: 140° – Left Bank</p>	<p>Cross-Section: CC1A-1 Bearing: 320° – Right Bank</p>



## Schrieber Lake: Cross-Section Photographs

	
<p>Cross-Section: CC1A-2 Bearing: 85° – Upstream</p>	<p>Cross-Section: CC1A-2 Bearing: 85° – Upstream</p>
	
<p>Cross-Section: CC1A-2 Bearing: 175° – Left Bank</p>	<p>Cross-Section: CC1A-2 Bearing: 355° – Right Bank</p>
	
<p>Cross-Section: CC1B-1 Bearing: 200° – Downstream</p>	<p>Cross-Section: CC1B-1 Bearing: 200° – Downstream</p>



## Schrieber Lake: Cross-Section Photographs



Cross-Section: CC1B-1  
Bearing: 110° – Left Bank

Location: Coyote Creek  
Year: 2016



Cross-Section: CC1B-1  
Bearing: 290° – Right Bank

Location: Coyote Creek  
Year: 2017

---

## APPENDIX D

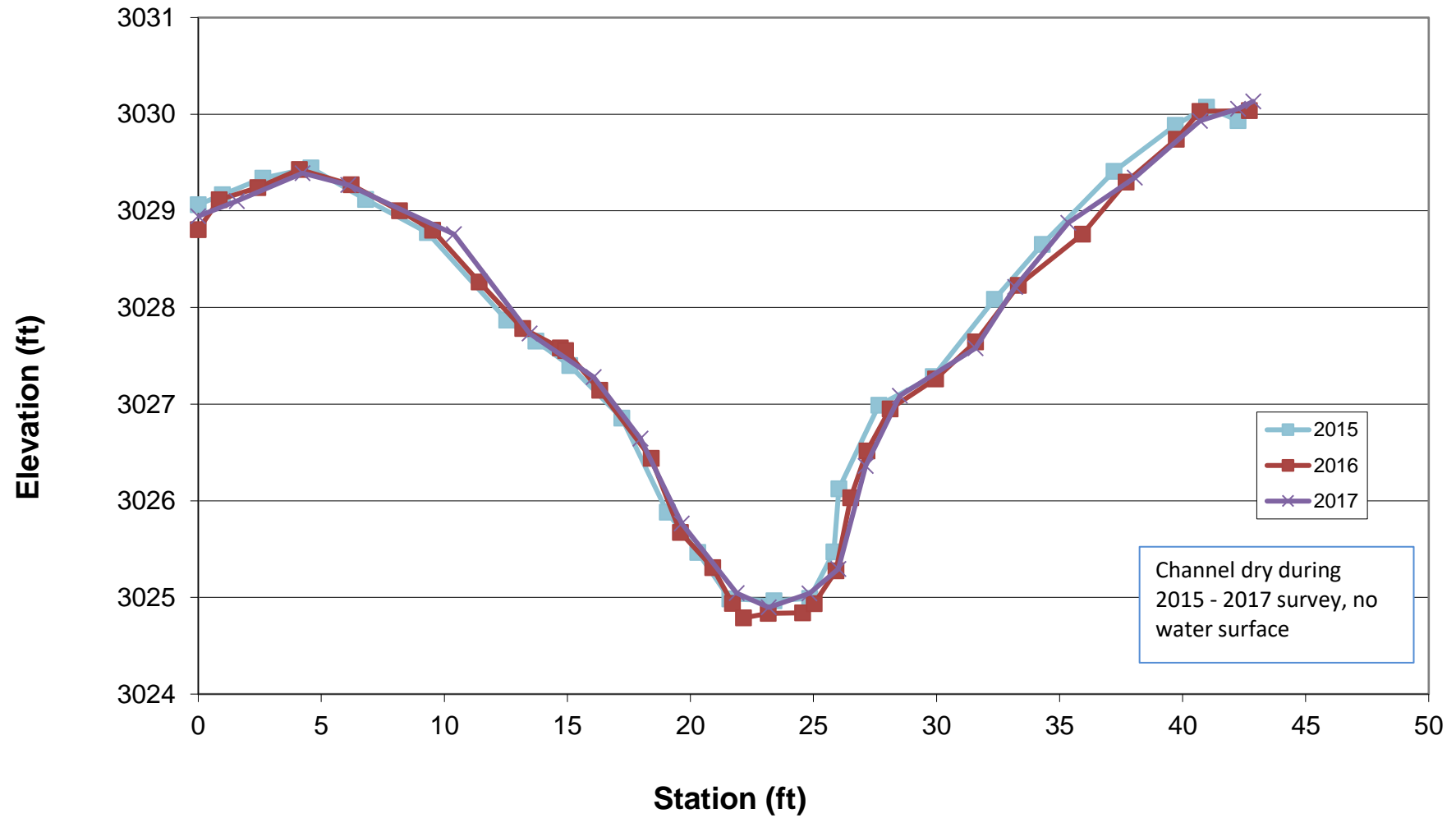
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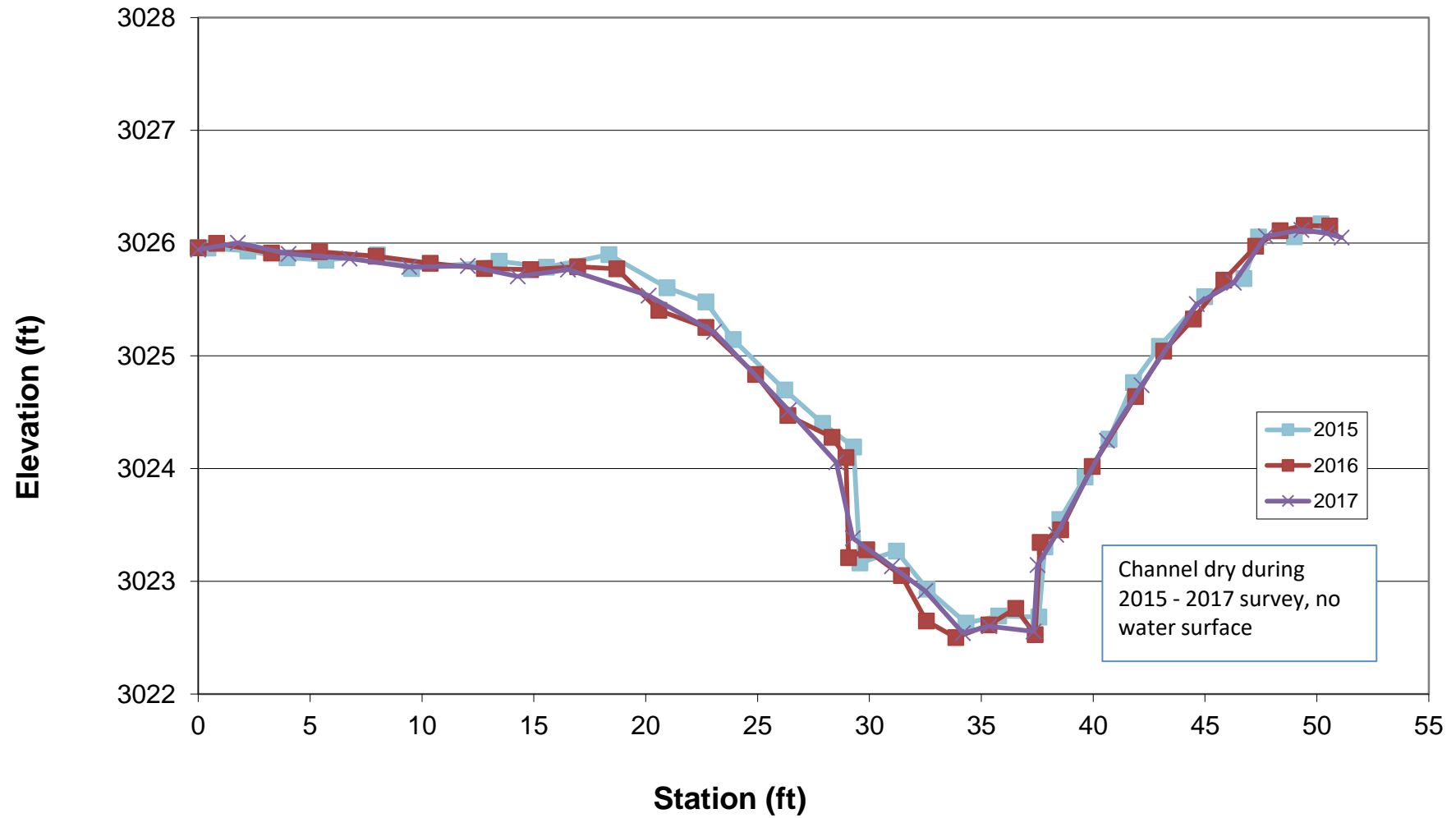
MDT Wetland Mitigation Monitoring  
Schrieber Lake  
Lincoln County, Montana



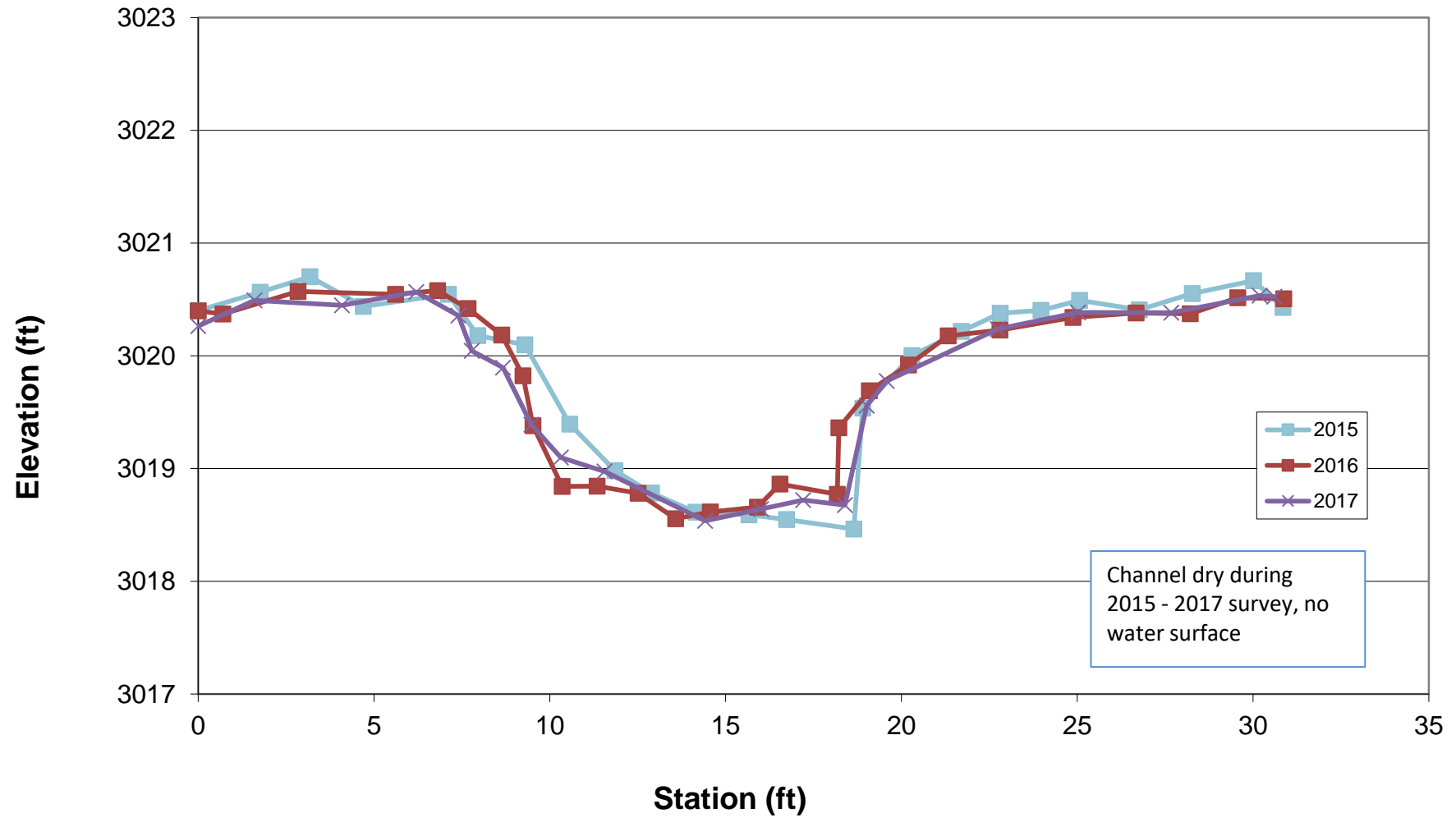
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## SC1-2

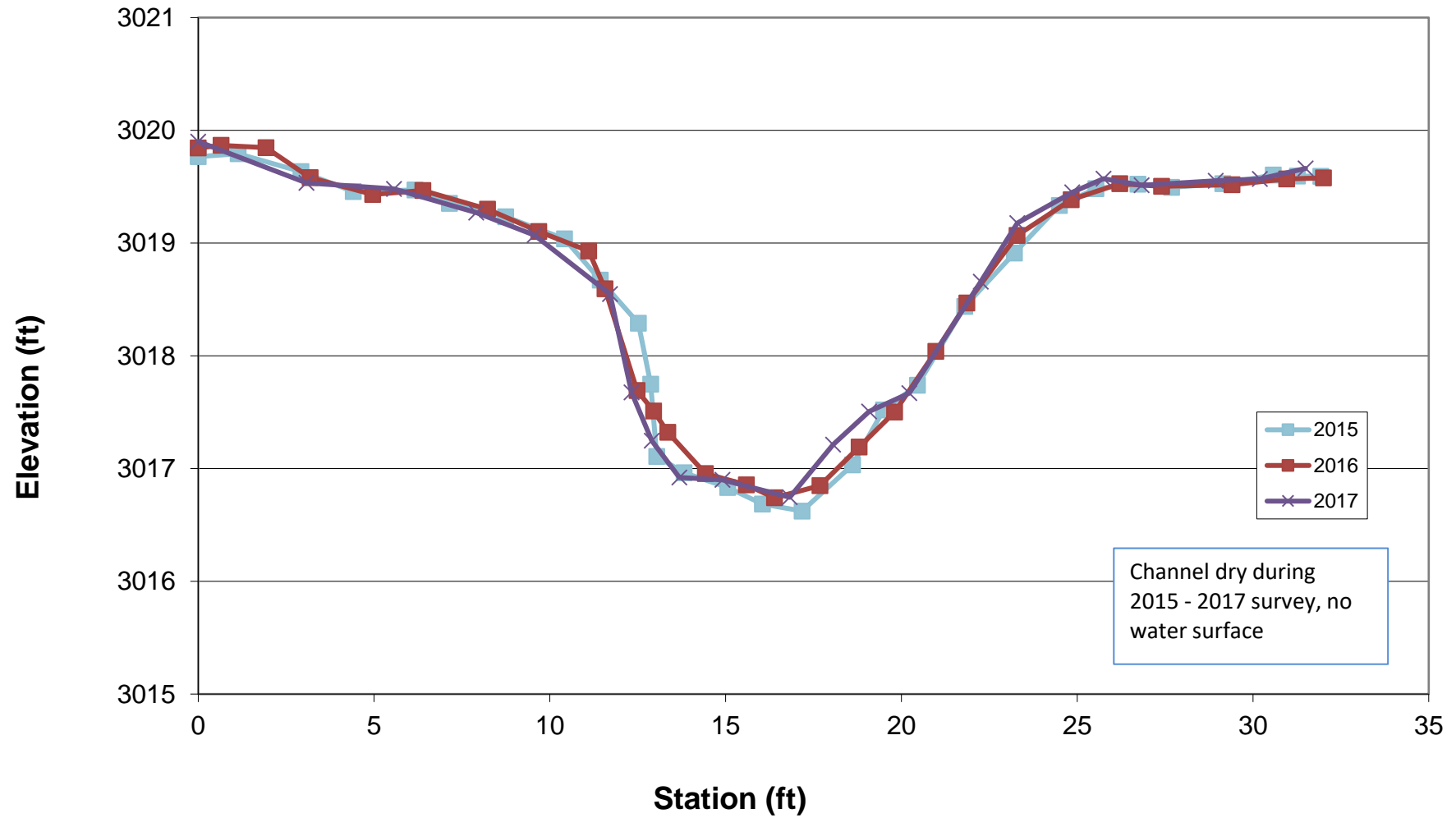


## SC2A-1

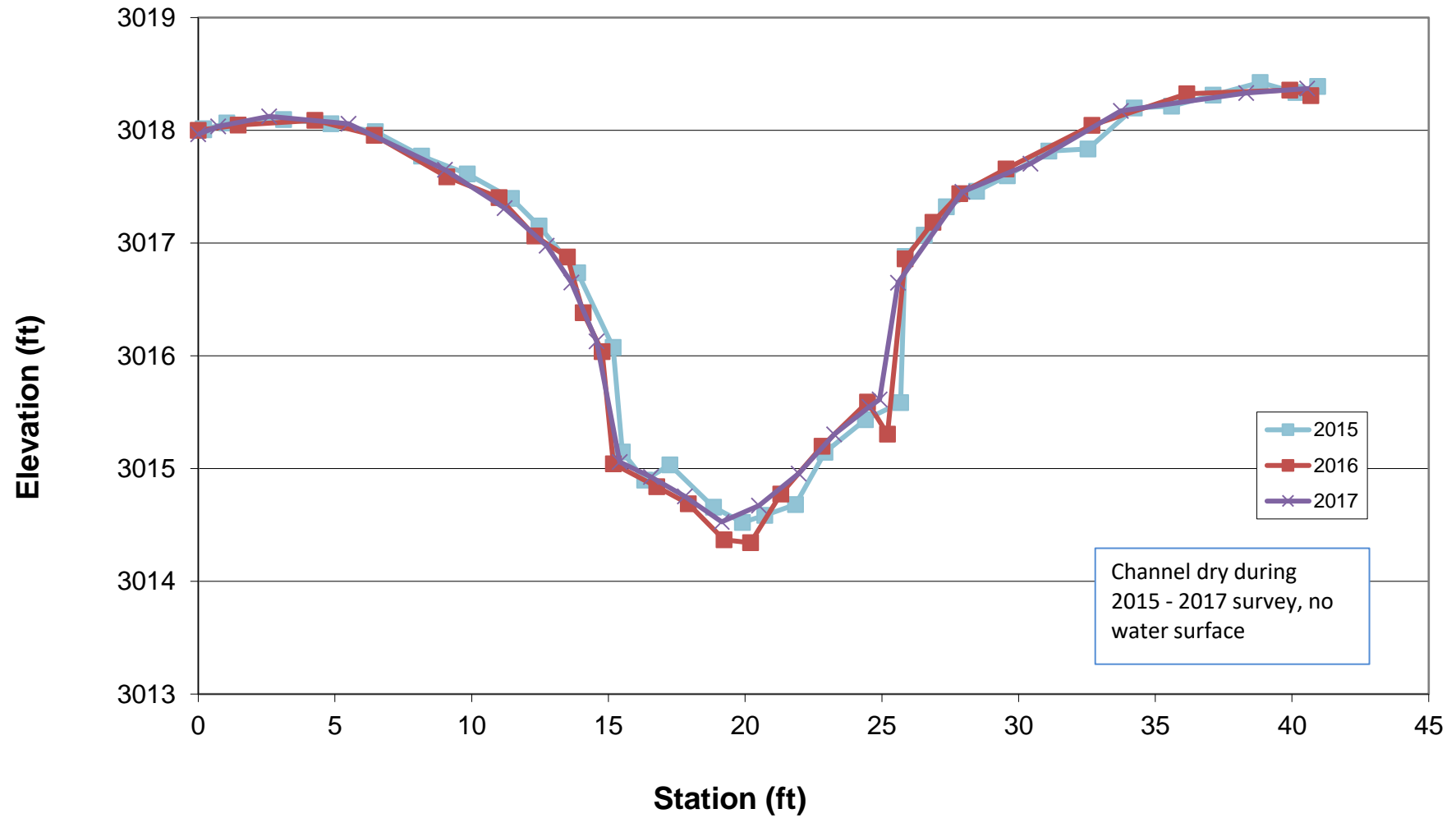




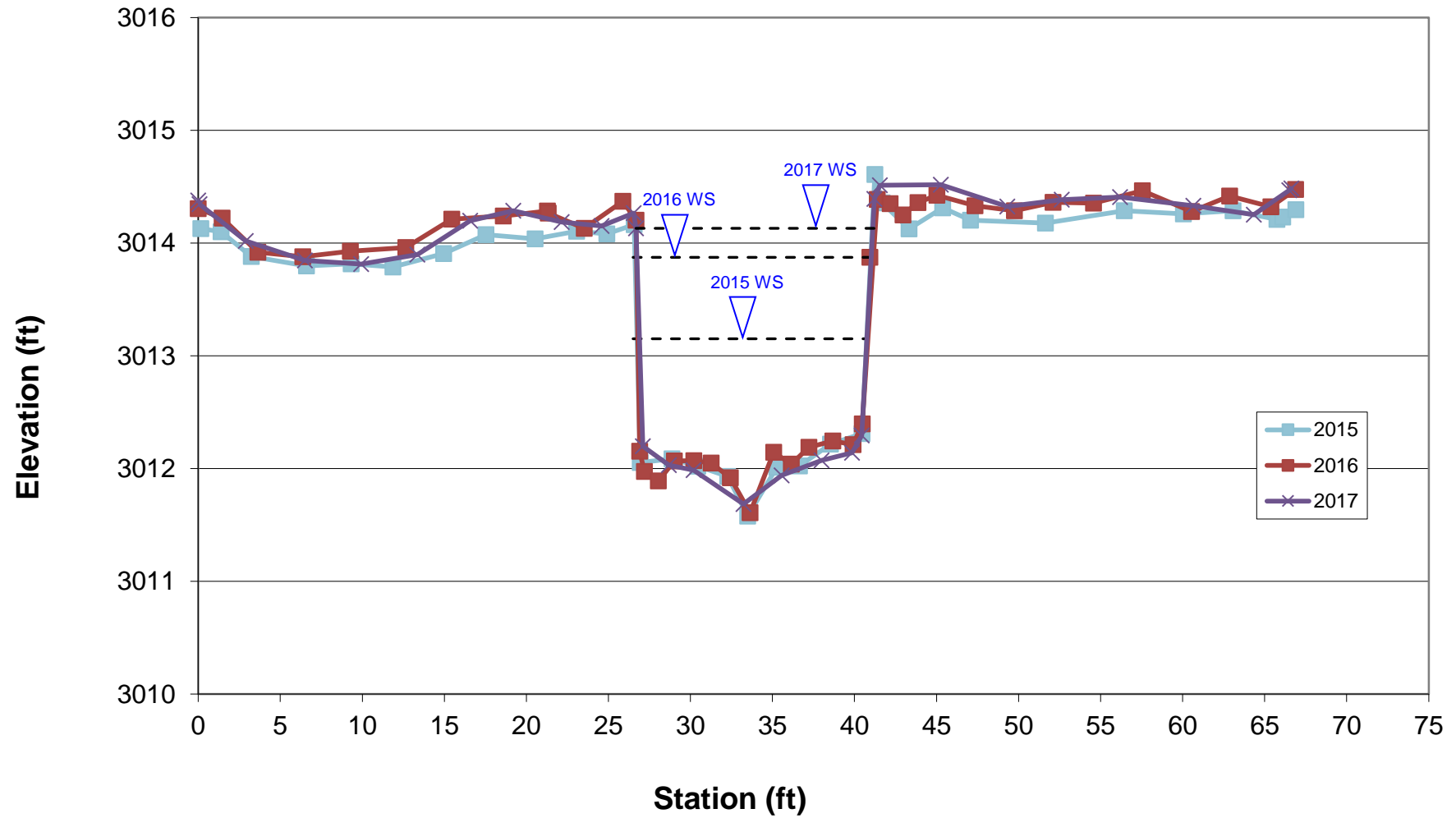
## SC2A-2



## SC2B-1

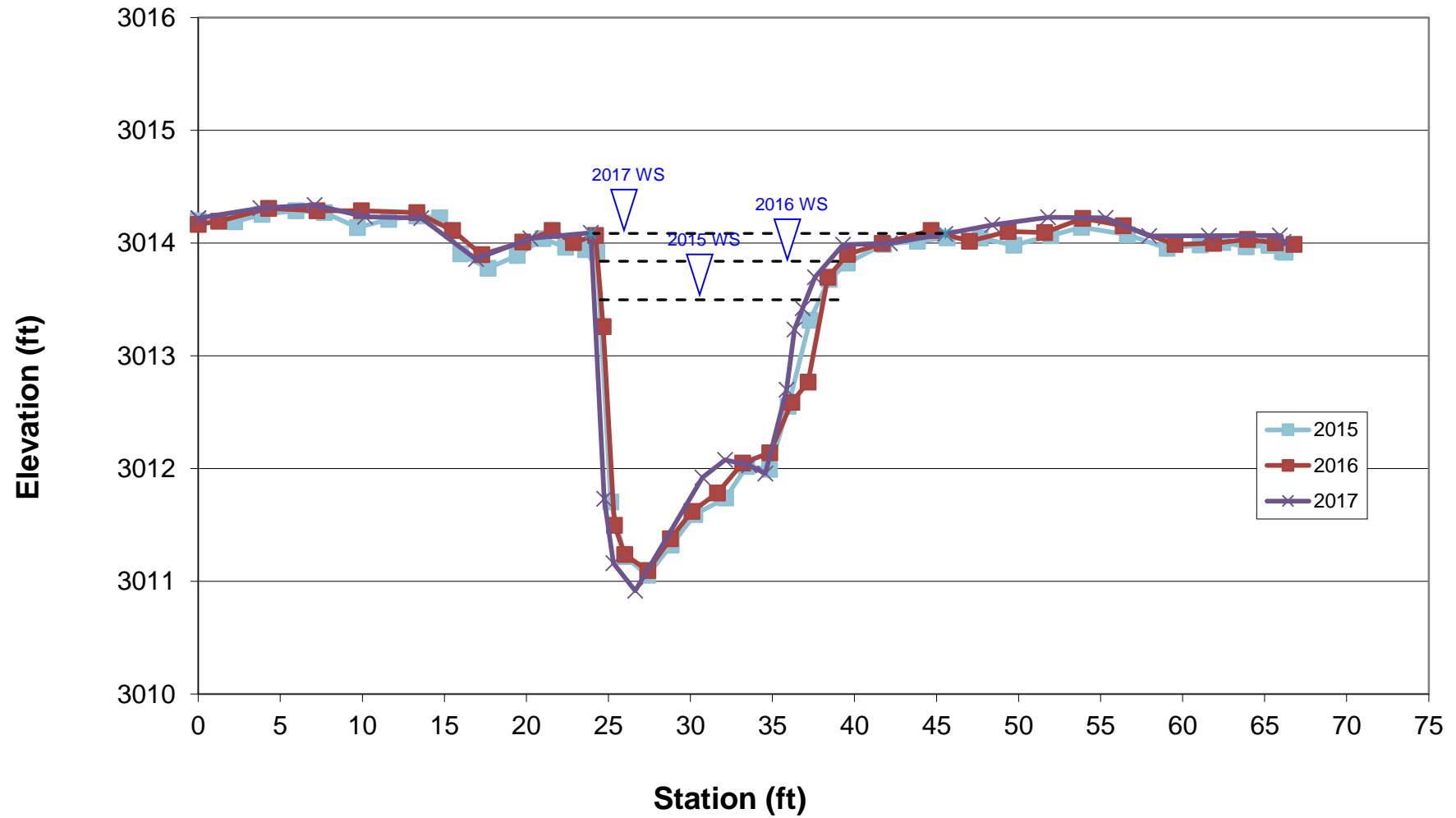


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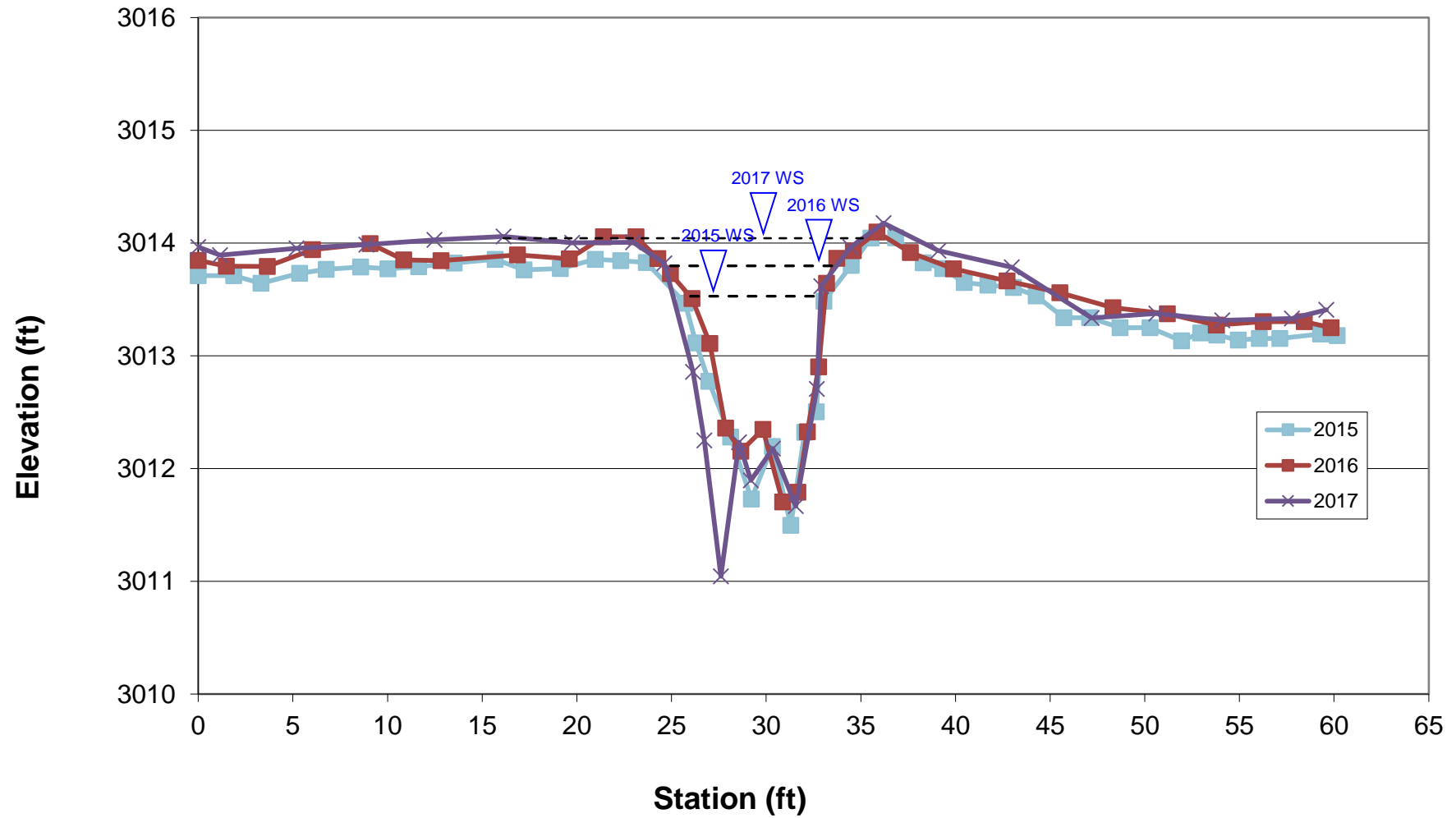




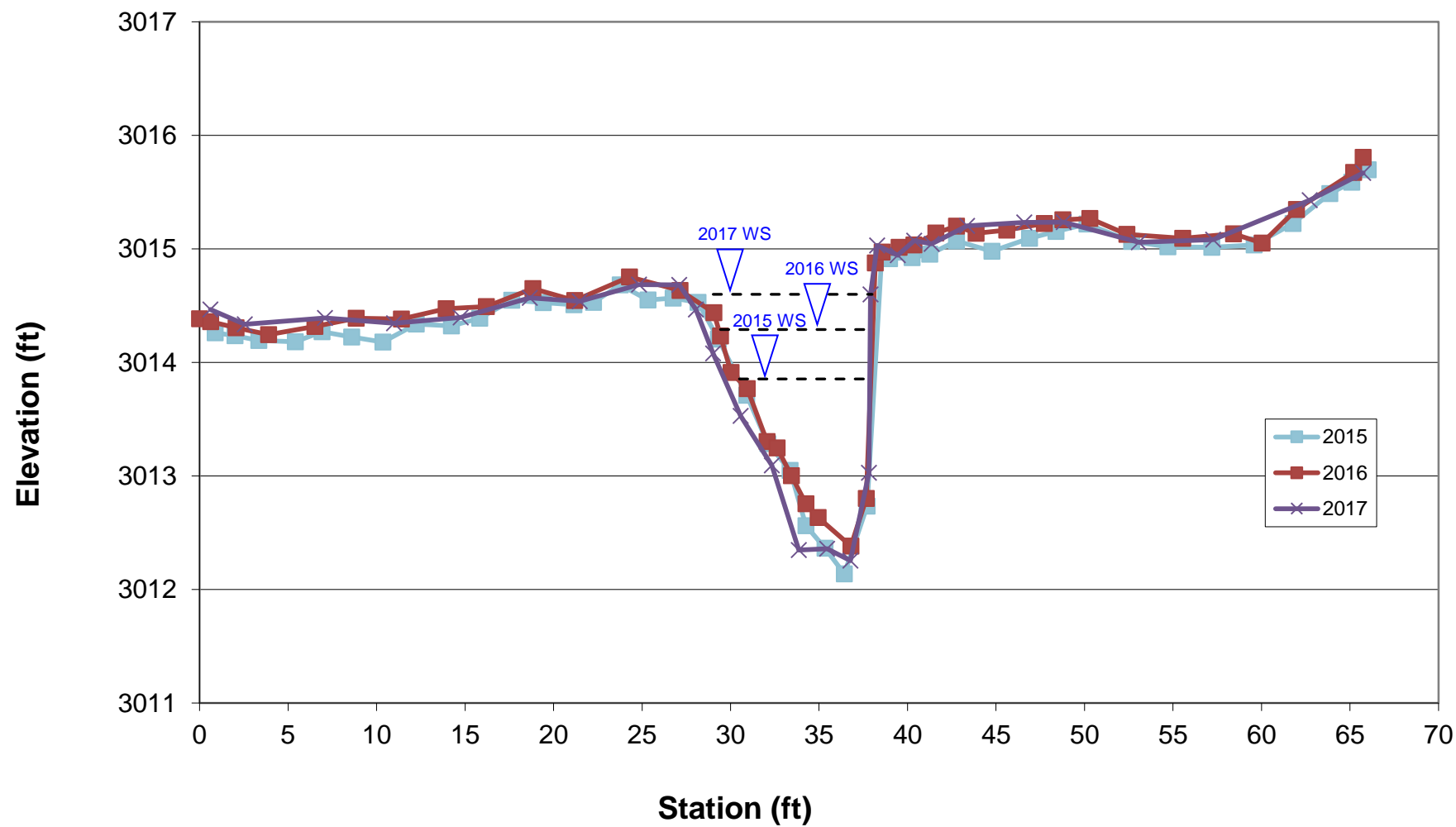
# SC3-2



# SC7-1

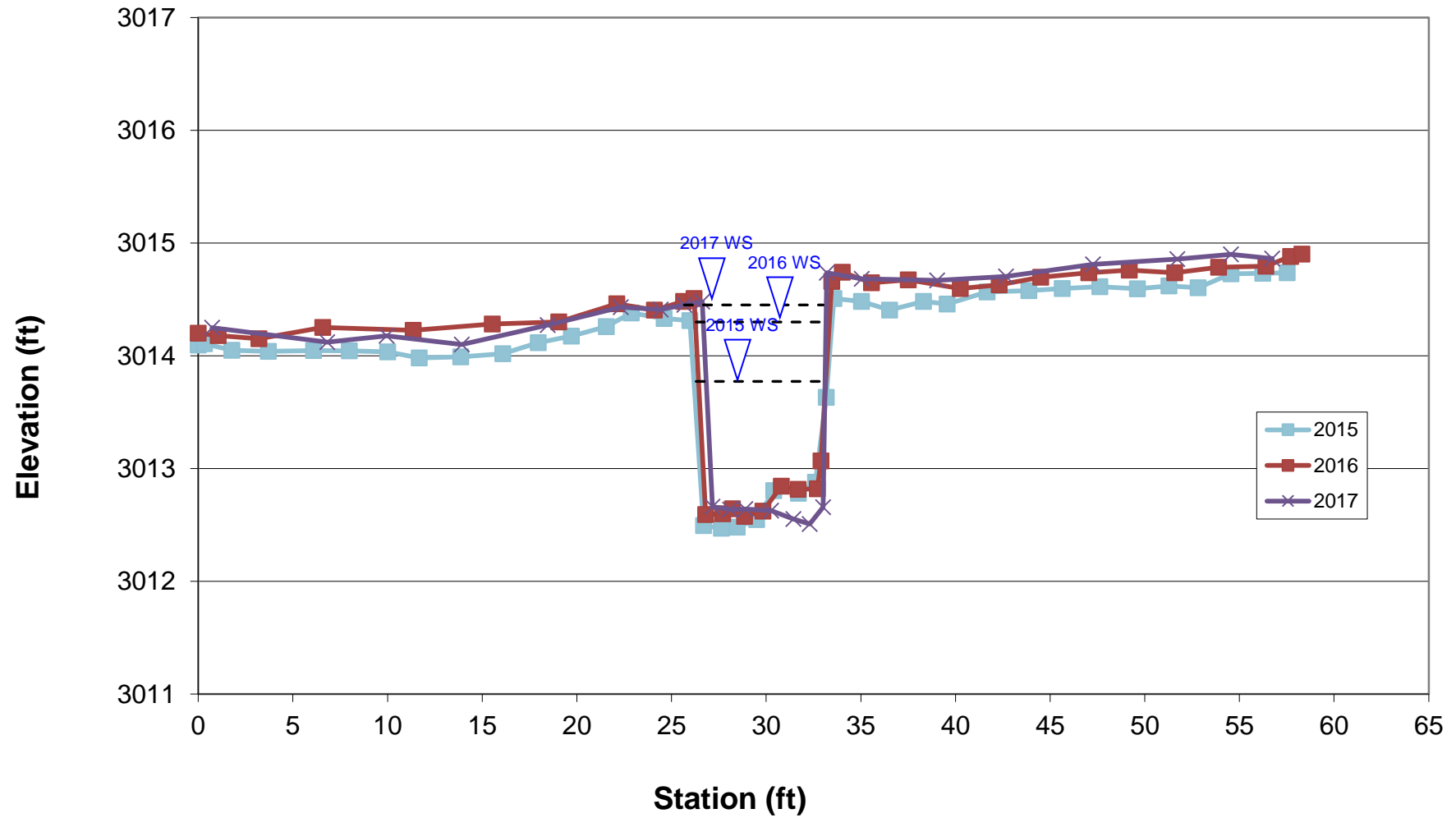


# CC1A-1

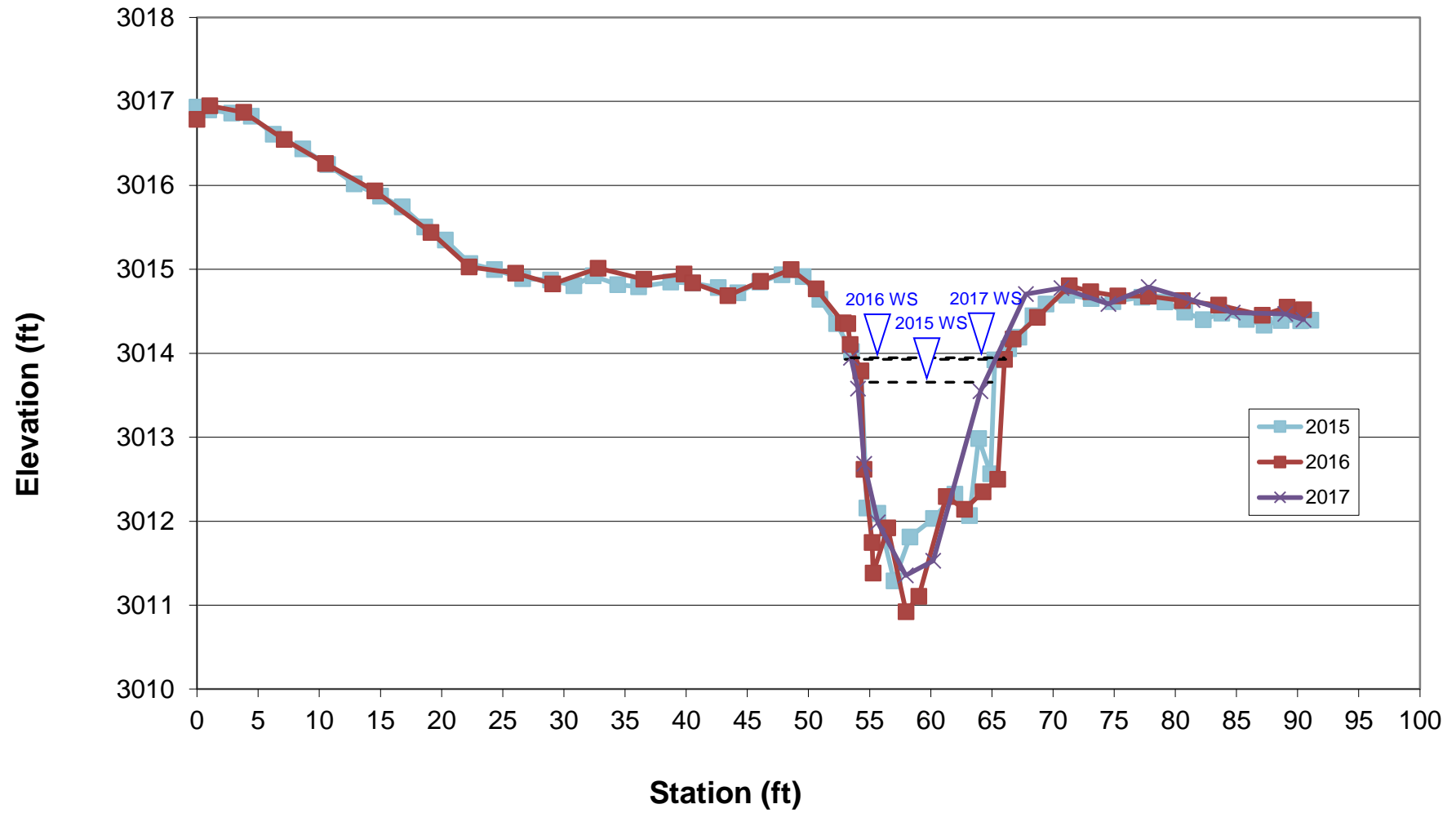




# CC1A-2



# CC1B-1



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## APPENDIX E

# PROJECT PLAN SHEETS

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MDT Wetland Mitigation Monitoring  
Schrieber Lake  
Lincoln County, Montana



# MONTANA DEPARTMENT OF TRANSPORTATION

CSF+0.99943246

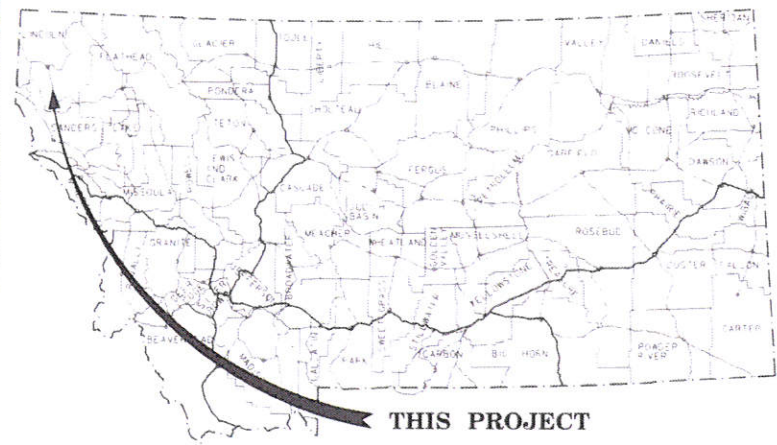
FEDERAL AID PROJECT NO. NH 27(39)

AQUATIC RESOURCES MITIGATION

SCHRIEBER LAKE MITIGATION

LINCOLN COUNTY

LENGTH N/A kilometers



THIS CONTRACT  
AQUATIC RESOURCES MITIGATION  
NH 27(39)

ASSOCIATED PROJECT AGREEMENT NUMBERS	
R W & LC.	NH 1-134145 F
P.E.	NH 1-1152145 F
	NH 27(29)

MONTANA DEPARTMENT OF TRANSPORTATION	
APPROVED : _____ 20____ MIKE TOOLEY DIRECTOR OF TRANSPORTATION BY : _____ ENVIRONMENTAL SERVICES BUREAU CHIEF	
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION	
APPROVED : _____ DIVISION ADMINISTRATOR	_____ DATE

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 27(39)	2

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# NOTES

## UTILITIES

CALL THE UTILITIES UNDERGROUND LOCATION CENTER (1-800-424-5555) OR OTHER NOTIFICATION SYSTEM FOR THE MARKING AND LOCATION OF ALL LINES AND SERVICES BEFORE EXCAVATING. ALL CLEARANCES OR DEPTHS PROVIDED FOR UTILITIES ARE FROM THE EXISTING GROUND LINE.

## WETLANDS

ALL WETLANDS WITHIN THE PROJECT AREA HAVE BEEN DELINEATED. WETLANDS DO EXIST BEYOND THE PROJECT LIMITS AND ANY ACTION AFFECTING SUCH WETLANDS IS THE RESPONSIBILITY OF THE CONTRACTOR.

## MONITOR WELLS

ALL MONITOR WELLS - DO NOT DISTURB  
SEE SITE PLAN FOR MONITOR WELL LOCATIONS.

## SOILS INFORMATION

SOILS INFORMATION IS INCLUDED WITH THE SPECIAL PROVISIONS FOR THIS PROJECT.

## SURVEY DATA

DTM FILES FORMATTED FOR TRIMBLE, LEICA, AND TOPCON SURVEY CONTROLLERS ARE AVAILABLE UPON REQUEST.  
CONTACT WADE SALYARDS, MDT WETLAND ENGINEER AT 406-444-0451.

# LINEAR & LEVEL DATA

## BEARING SOURCE

ALL COORDINATES ARE METRIC STATE PLANE COORDINATES  
HORIZONTAL COORDINATES ARE METERS (NAD83-2007)  
CSF = 0.99943246

## LEVEL DATUM SOURCE

ELEVATIONS ARE METERS (NADV88)  
ALL ELEVATIONS ARE GPS DERIVED



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21



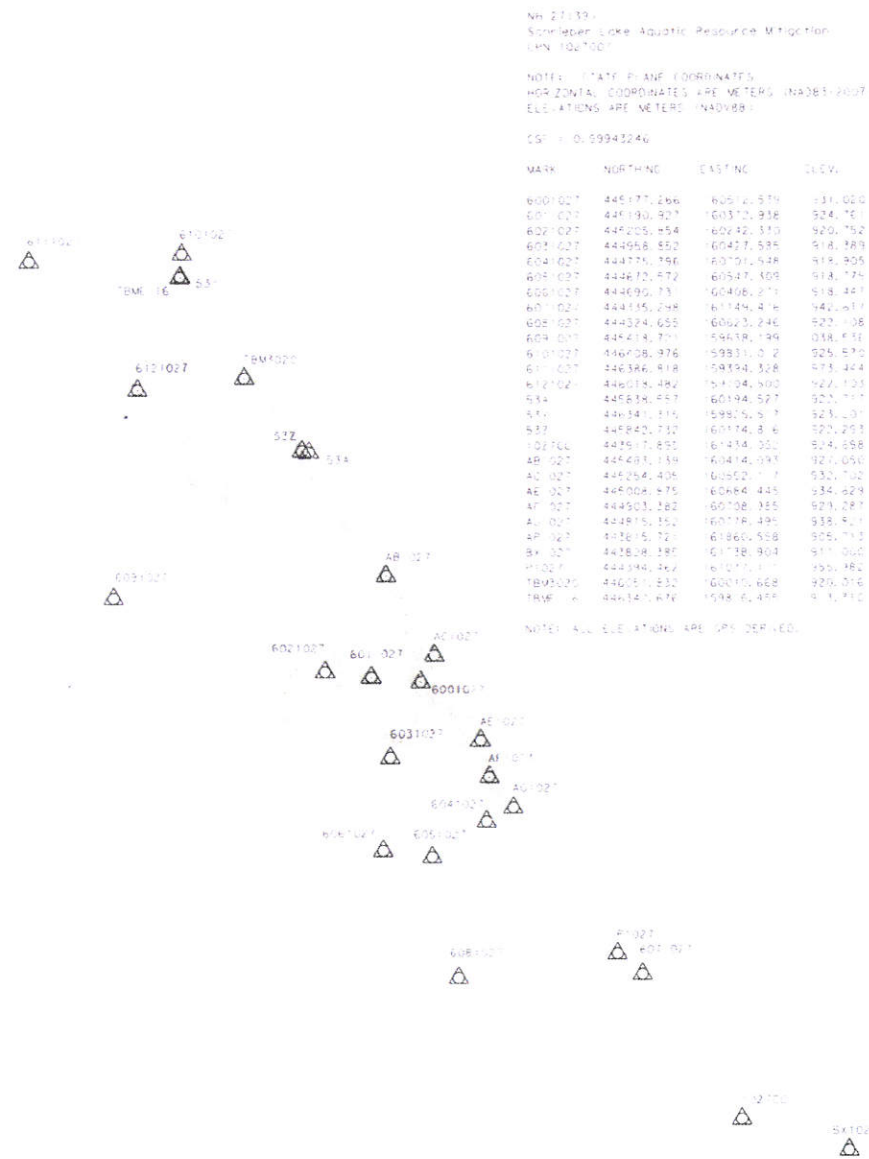
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 27(39)	3

# CONTROL DIAGRAM

MDTA MONTANA DEPARTMENT OF TRANSPORTATION

MONTANA CADD

BY	DATE	REVIEWED BY	DATE
4.8.20.14	11:03:21 AM	3	2
11:03:21 AM	11:03:21 AM	3	2



MARK DESCRIPTION

6001027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 6001027 2011  
ON US HIGHWAY 2 AT MILEPOST 54.00 TURN LEFT AND HEAD WEST 260 FEET THEN BALK NORTH 85 FEET  
AND THE MARK IS AT THE TOP OF A RIDGE FROM RPR 3470 MARK IS WEST 55 FEET  
SET WITNESS POST 4 FEET NORTH  
HAND HELD GPS N 48-06-25.4 W 115-24-34.7

601027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 601027 2011  
ON US HIGHWAY 2 AT MILEPOST 54.00 TURN LEFT AND HEAD WEST FOLLOW ROAD 1015 FEET TO AN  
ABANDONED HOUSE MARK IS 60 FEET SOUTH OF AN ABANDONED HOUSE MARK IS 30 FEET SOUTH-EAST OF  
AN OLD MUM-HOUSE SET WITNESS POST 5 FEET NORTH  
HAND HELD GPS N 48-06-25.4 W 115-24-41.4

602027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 602027 2011  
ON US HIGHWAY 2 AT MILEPOST 54.00 TURN LEFT AND HEAD WEST 450 FEET DOWN THE DIRT ROAD  
MARK IS WEST 58 FEET FROM A GATEPOST SET WITNESS POST 5 FEET NORTH  
HAND HELD GPS N 48-06-25.7 W 115-24-41.7

603027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 603027 2011  
AT MILEPOST 54.00 TURN LEFT AND HEAD WEST FOLLOW THE ROAD PAST THE ABANDONED HOUSE  
TURN AND HEAD SOUTH TO THE APPROX CENTER OF MEADOW MARK IS 50 FEET NORTH OF SCHREIBER CREEK  
SET WITNESS POST 5 FEET NORTH

604027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 604027 2011  
AT MILEPOST 54.11 TURN LEFT AND HEAD WEST 1350 FEET TAKE THE RIGHT FORK OF THE  
ROAD CONTINUE TO THE END OF THE ROAD A GAUGING STATION WILL BE DIRECTLY  
IN FRONT OF YOU CROSS THE CREEK AND HEAD NORTH 400 FEET FROM THE STATION MARK IS  
100 FEET EAST OF THE TREE LINE SET WITNESS POST 5 FEET NORTH  
HAND HELD GPS N 48-06-25.4 W 115-24-35.8

605027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 605027 2011  
ON US HIGHWAY 2 AT MILEPOST 54.11 TURN LEFT AND HEAD WEST AT 1350 FEET TAKE THE  
RIGHT FORK AND CONTINUE TO THE END OF THE ROAD A GAUGING STATION WILL BE DIRECTLY  
IN FRONT OF YOU CROSS THE CREEK AND HEAD NORTH 400 FEET FROM THE STATION MARK IS  
100 FEET EAST OF THE TREE LINE SET WITNESS POST 5 FEET NORTH  
HAND HELD GPS N 48-06-25.4 W 115-24-35.8

606027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 606027 2011  
MARK IS AT US HWY 2 MILEPOST 54.00 25 FEET RIGHT OF CENTERLINE  
SET WITNESS POST 5 FEET NORTH  
HAND HELD GPS N 48-06-25.4 W 115-24-35.1

607027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 607027 2011  
ON US HIGHWAY 2 AT MILEPOST 54.11 TURN LEFT AND HEAD WEST AT 1350 FEET TAKE THE  
RIGHT FORK AND CONTINUE TO THE END OF THE ROAD A GAUGING STATION WILL BE DIRECTLY  
IN FRONT OF YOU CROSS THE CREEK AND HEAD NORTH 400 FEET FROM THE STATION MARK IS  
100 FEET EAST OF THE TREE LINE SET WITNESS POST 5 FEET NORTH  
HAND HELD GPS N 48-06-25.4 W 115-24-35.8

608027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 608027 2011  
MARK IS AT US HWY 2 MILEPOST 54.00 25 FEET RIGHT OF CENTERLINE  
SET WITNESS POST 5 FEET NORTH  
HAND HELD GPS N 48-06-25.4 W 115-24-35.1

609027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 609027 2011  
ON US HIGHWAY 2 AT MILEPOST 54.11 TURN LEFT AND HEAD WEST AT 1350 FEET TAKE THE  
RIGHT FORK AND CONTINUE TO THE END OF THE ROAD A GAUGING STATION WILL BE DIRECTLY  
IN FRONT OF YOU CROSS THE CREEK AND HEAD NORTH 400 FEET FROM THE STATION MARK IS  
100 FEET EAST OF THE TREE LINE SET WITNESS POST 5 FEET NORTH  
HAND HELD GPS N 48-06-25.4 W 115-24-35.8

6101027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 6101027 2011  
ON US HIGHWAY 2 AT MILEPOST 54.11 TURN LEFT AND HEAD WEST AT 1350 FEET TAKE THE  
RIGHT FORK AND CONTINUE TO THE END OF THE ROAD A GAUGING STATION WILL BE DIRECTLY  
IN FRONT OF YOU CROSS THE CREEK AND HEAD NORTH 400 FEET FROM THE STATION MARK IS  
100 FEET EAST OF THE TREE LINE SET WITNESS POST 5 FEET NORTH  
HAND HELD GPS N 48-06-25.4 W 115-24-35.8

611027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 611027 2011  
ON US HIGHWAY 2 AT MILEPOST 54.11 TURN LEFT AND HEAD WEST AT 1350 FEET TAKE THE  
RIGHT FORK AND CONTINUE TO THE END OF THE ROAD A GAUGING STATION WILL BE DIRECTLY  
IN FRONT OF YOU CROSS THE CREEK AND HEAD NORTH 400 FEET FROM THE STATION MARK IS  
100 FEET EAST OF THE TREE LINE SET WITNESS POST 5 FEET NORTH  
HAND HELD GPS N 48-06-25.4 W 115-24-35.8

6121027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 6121027 2011  
ON US HIGHWAY 2 AT MILEPOST 54.11 TURN LEFT AND HEAD WEST AT 1350 FEET TAKE THE  
RIGHT FORK AND CONTINUE TO THE END OF THE ROAD A GAUGING STATION WILL BE DIRECTLY  
IN FRONT OF YOU CROSS THE CREEK AND HEAD NORTH 400 FEET FROM THE STATION MARK IS  
100 FEET EAST OF THE TREE LINE SET WITNESS POST 5 FEET NORTH  
HAND HELD GPS N 48-06-25.4 W 115-24-35.8

534  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 534 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

535  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 535 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

537  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 537 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

102100  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 102100 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

AB 027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED AB 027 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

AC 027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED AC 027 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

AD 027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED AD 027 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

AE 027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED AE 027 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

AF 027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED AF 027 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

AG 027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED AG 027 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

AH 027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED AH 027 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

AI 027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED AI 027 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

BM05025  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED BM05025 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

TRM 100  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED TRM 100 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

609027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 609027 2011  
ON US HIGHWAY 2 AT MILEPOST 54.11 TURN LEFT AND HEAD WEST FOLLOW ROAD 1015 FEET TO AN  
ABANDONED HOUSE MARK IS 60 FEET SOUTH OF AN ABANDONED HOUSE MARK IS 30 FEET SOUTH-EAST OF  
AN OLD MUM-HOUSE SET WITNESS POST 5 FEET NORTH  
HAND HELD GPS N 48-06-25.4 W 115-24-41.4

6101027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 6101027 2011  
ON US HIGHWAY 2 AT MILEPOST 54.11 TURN LEFT AND HEAD WEST FOLLOW ROAD 1015 FEET TO AN  
ABANDONED HOUSE MARK IS 60 FEET SOUTH OF AN ABANDONED HOUSE MARK IS 30 FEET SOUTH-EAST OF  
AN OLD MUM-HOUSE SET WITNESS POST 5 FEET NORTH  
HAND HELD GPS N 48-06-25.4 W 115-24-41.4

611027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 611027 2011  
ON US HIGHWAY 2 AT MILEPOST 54.11 TURN LEFT AND HEAD WEST FOLLOW ROAD 1015 FEET TO AN  
ABANDONED HOUSE MARK IS 60 FEET SOUTH OF AN ABANDONED HOUSE MARK IS 30 FEET SOUTH-EAST OF  
AN OLD MUM-HOUSE SET WITNESS POST 5 FEET NORTH  
HAND HELD GPS N 48-06-25.4 W 115-24-41.4

6121027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 6121027 2011  
ON US HIGHWAY 2 AT MILEPOST 54.11 TURN LEFT AND HEAD WEST FOLLOW ROAD 1015 FEET TO AN  
ABANDONED HOUSE MARK IS 60 FEET SOUTH OF AN ABANDONED HOUSE MARK IS 30 FEET SOUTH-EAST OF  
AN OLD MUM-HOUSE SET WITNESS POST 5 FEET NORTH  
HAND HELD GPS N 48-06-25.4 W 115-24-41.4

534  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 534 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

535  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 535 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

537  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 537 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

102100  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED 102100 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

AB 027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED AB 027 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

AC 027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED AC 027 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

AD 027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED AD 027 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

AE 027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED AE 027 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

AF 027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED AF 027 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

AG 027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED AG 027 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

AH 027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED AH 027 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

AI 027  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED AI 027 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

BM05025  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED BM05025 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST

TRM 100  
SET 5/8" X 30" REBAR WITH 2" MDT ALUM-HORIZ CONTROL CAP STAMPED TRM 100 2011  
MARK IS LOCATED ON WESTERLY FENCE OF MEADOW 100 FEET SOUTHERLY FROM TREE LINE  
AND 40 FEET EASTERLY OF A NORTH-SOUTH ROAD AT BOTTOM OF LOGGED HILLSIDE  
SET WITNESS POST 4 FEET EAST



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## SUMMARY

FENCING												
STATION		meters				REMOVE FENCE	each		meters		REMARKS	
		FARM FENCE					FARM FENCE PANEL		DEADMAN	FARM GATE		
							SINGLE	DOUBLE		TYPE G2		TYPE G3
FROM	TO					1902					SEE PROJECT SITE PLAN	
TOTAL						1902	~	~		~	~	

REMOVE STRUCTURE				
STATION		lump sum	cubic meters	REMARKS
			UNCL. EXC.	
FROM	TO			
		1	50	ACCESS ROAD BRIDGE REMOVAL
TOTAL		1	# 50	

# ESTIMATED QUANTITY - FOR INFORMATION ONLY - COST INCLUDED IN LUMP SUM FOR REMOVE STRUCTURE

CHANNEL CONSTRUCTION									
STATION		square meters		lin. meters	cubic meters		each	REMARKS	
		COIR EROSION CONTROL NETTING	COCONUT BLANKET	FASCINE	# STREAM- BED MATERIAL	# RIFFLE MATERIAL	UNCL. CHANNEL EXC.		* GRADE CONTROL STRUCTURE
FROM	TO								
0+24.76	1+81.24	1090	1090	218	40.2	65.5	885.2	7	SCHRIEBER CREEK (SEGMENT 1)
1+81.24	3+52.82	715	715	238	43.5	110.9	382.0		SCHRIEBER CREEK (SEGMENT 2A)
3+52.82	3+89.82	240	240	74	7.4	21.7	188.0	7	SCHRIEBER CREEK (SEGMENT 2B)
3+89.82	4+20.67					3.1	124.1		SCHRIEBER CREEK (TRANSITION POOL)
4+20.67	6+74.25						399.7		SCHRIEBER CREEK (SEGMENT 3)
6+74.25	10+10.00						451.5		COYOTE CREEK
TOTAL		2 045	2 045	530	91.1	201.2	2 430.5	14	

\* INCLUDES ALL ITEMS NECESSARY TO CONSTRUCT GRADE CONTROL STRUCTURE INCLUDING LOGS, COIR FABRIC AND ANCHOR ROCKS

# SUBEXCAVATION FOR RIFFLE MATERIAL AND STREAMBED MATERIAL INCLUDED IN UNCL. CHANNEL EXC

* CONSTRUCTION SURVEY & LAYOUT			
STATION		LUMP SUM	REMARKS
FROM	TO		
		1	PROJECT SITE
TOTAL		1	

\* SEE SPECIAL PROVISIONS

REVEGETATION						
FOR	cubic meters	hectares		lump sum	square meters	REMARKS
	TOPSOIL SALVAGING & PLACING	WETLAND SEEDING - UPLAND	WETLAND SEEDING- WETLAND	TREE & SHRUB PLANTING #	WETLAND SOD	
WETLAND CELLS			1.87			
SCHRIEBER CREEK SEGMENTS 1 AND 2	107	0.11		0.7		INCL. 2 DIVERSION STRUCTURES
ACCESS ROAD AND OLD HOME SITE	653	0.24				
SCHRIEBER CREEK SEG. 3 AND COYOTE CREEK				0.3	2 326	
TOTAL	760	0.35	1.87	1	2 326	

# PLANTING LOCATIONS TO BE STAKED BY MDT BOTANIST (SEE SPECIAL PROVISIONS)

* GRADING				
STATION	cubic meters			REMARKS
	UNCL. EXC.	UNCL. BORROW	EMB. +	
CELL 1	1 830			
CELL 2	673			
CELL 3	316			
CELL 4	344			
CELL 5	1 847			
CELL 6	1 170			
CELL 7	2 635			
CELL 8	986			
CELL 9	568			
CELL 10	1 694			
DIV. STRUCTURE		117		
TOTAL	12 063	117		

\* ALL UNCL. EXC. NOT USED FOR TOPSOIL TO BE STOCKPILED ON SCHRIEBER MEADOWS SITE

* LOG & ROOT WAD				
STATION		LOG & ROOT WAD (each)	BANK HABITAT LOG (each)	REMARKS
FROM	TO			
		30	45	SCHRIEBER LAKE PROJECT SITE
		75	100	SCHRIEBER MEADOWS PROJECT SITE
TOTAL		105	145	

\* PLACEMENT OF LOG &amp; ROOT WADS AND BANK HABITAT LOGS DETERMINED BY SRS

CLEARING & GRUBBING		
STATION		hectares
FROM	TO	CLEARING AND GRUBBING
		0.23
TOTAL		0.23

CULVERT SUMMARY RECAP									
BASIC BID	meters				cubic meters				square meters
	NEW PIPE (TOTAL)	RELAY CULVERT	CLEAN CULVERT	REMOVE CULVERT	FOUND- ATION MATERIAL	BEDDING MATERIAL	CLASS "DD" CONCRETE	CULVERT RIPRAP CLASS	GEOTEXTILE PERM. EROS. CNTRL. SURV. CLASS
914 mm CMP				21					
TOTAL				# 21					

# FOR INFORMATION ONLY, INCLUDED IN THE COST OF REMOVE STRUCTURE

DIVERSION STRUCTURE					
STATION		cubic meters		square meters	
FROM	TO	DIVERSION STRUCT. FILL #	RIFFLE MATERIAL	PERM. EROSION CONTROL FABRIC	EROSION CONTROL BLANKET - BIO
		59	10.8		135
		58		75	
TOTAL		# 117	10.8	75	135

# FOR INFORMATION ONLY, INCLUDED IN COST OF GRADING

MDTA

MONTANA  
CADD

04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014
04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014
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04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014	04/08/2014



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DETAIL

- NOTES: (1) TYPICAL SECTION DRAWINGS ARE PROVIDED TO INDICATE THE GENERAL SHAPE AND ORIENTATION OF THE CROSS-SECTIONAL CHANNEL FEATURES. THEY DO NOT INDICATE THE PLACEMENT OF IN-STREAM STRUCTURES, SUCH AS GRADE CONTROL STRUCTURES, WOODY DEBRIS, LIVE FASCINES, AND SOIL WRAPS.
- (2) THE TABLES BELOW PROVIDE DIMENSIONS AND SLOPES FOR EACH CHANNEL REACH, SPECIFIC LOCATIONS OF CHANNEL FEATURES (RUN, RIFFLE, DROP, POOL) TO BE DETERMINED DURING CONSTRUCTION BASED ON SITE CONDITIONS AND AT THE DISCRETION OF THE STREAM RESTORATION SPECIALIST (SRS).
- (3) CHANNEL DIMENSIONS MAY VARY WITHIN THE RANGE SHOWN AT THE DISCRETION OF THE SRS.
- (4) SEE THE SPECIAL PROVISION FOR CHANNEL CONSTRUCTION SEQUENCING REQUIREMENTS.

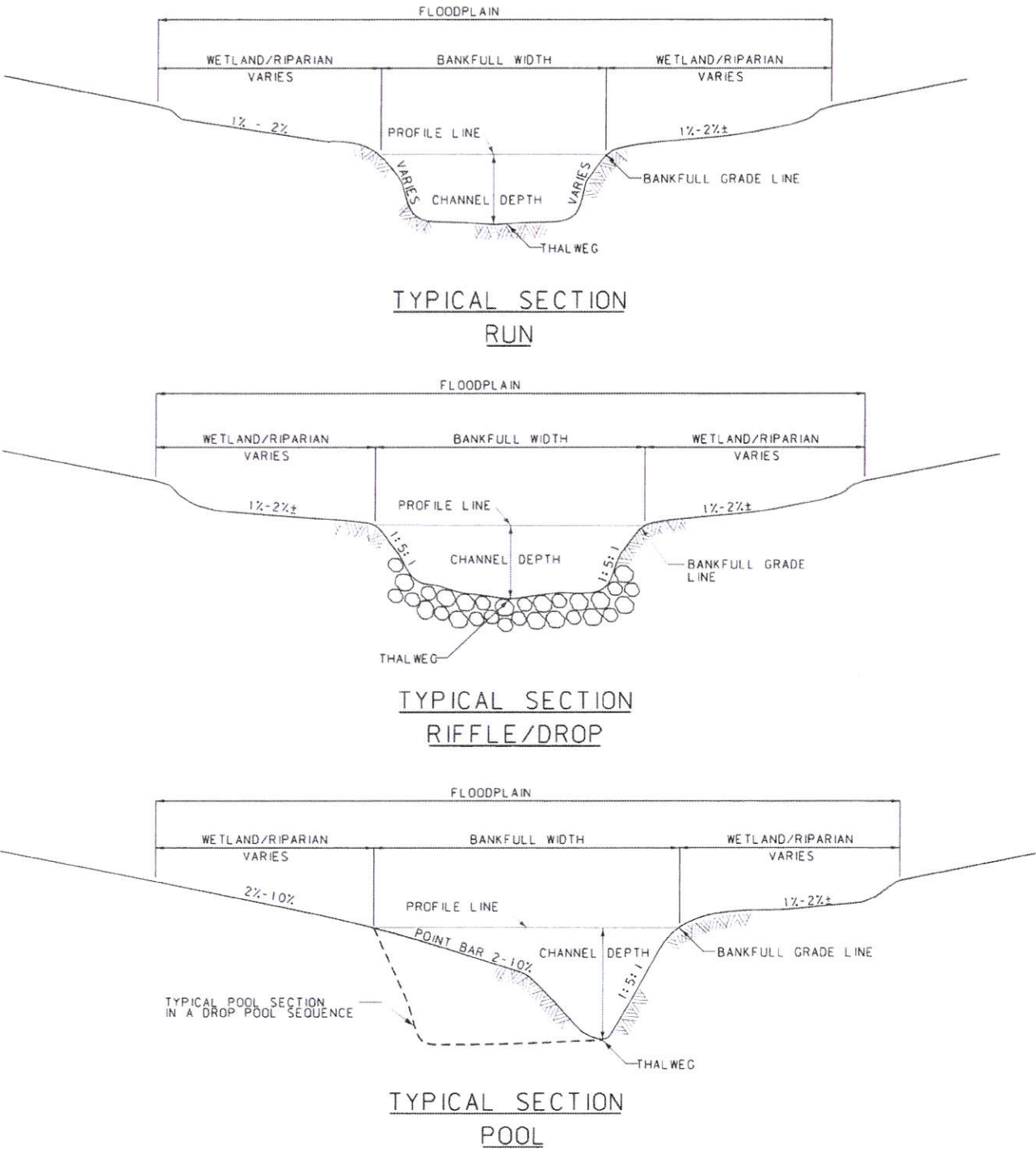
SCHRIEBER CREEK				
BANKLINE SLOPE = 0.9%				SEGMENT 1
FLOODPLAIN	POOL	RUN	RIFFLE	STA.0+24.76 TO 1+81.24
8.25 - 10.25	3.0 - 3.8	2.4 - 2.8	2.8 - 3.3	WIDTH
~	0.3 - 0.36	0.25 - 0.29	0.22 - 0.25	DEPTH
~	1.5:1	1.5:1	1.5:1	INSLOPE

SCHRIEBER CREEK				
BANKLINE SLOPE = 0.50%				SEGMENT 2A
FLOODPLAIN	POOL	RUN	RIFFLE	STA.1+81.24 TO 3+52.82
~	3.6 - 4.2	2.6 - 3.1	3.3 - 3.9	WIDTH
~	0.34 - 0.40	0.28 - 0.34	0.23 - 0.26	DEPTH
~	1.5:1	1.5:1	1.5:1	INSLOPE

SCHRIEBER CREEK				
BANKLINE SLOPE = 0.50%				SEGMENT 2B
FLOODPLAIN	POOL	RUN	RIFFLE	STA.3+52.82 TO 3+89.82
~	3.6 - 4.2	2.6 - 3.1	~	WIDTH
~	0.34 - 0.40	0.28 - 0.34	~	DEPTH
~	1.5:1	1.5:1	~	INSLOPE

SCHRIEBER CREEK				
BANKLINE SLOPE = 0.19%				SEGMENT 3
FLOODPLAIN	POOL	RUN	RIFFLE	STA.3+89.82 TO 6+74.25
~	3.6	3.1	~	WIDTH
~	0.70	0.35	~	DEPTH
~	VERTICAL	VERTICAL	~	INSLOPE

COYOTE CREEK				
BANKLINE SLOPE = 0.10%				STA.0+10.00 TO 3+07.10
FLOODPLAIN	POOL	RUN	RIFFLE	WIDTH
~	2.5	2.0	~	DEPTH
~	0.72	0.38	~	INSLOPE
~	VERTICAL	VERTICAL	~	



TYPICAL CHANNEL  
SECTION DIMENSIONS  
(NOT TO SCALE)

MONTANA  
CADD

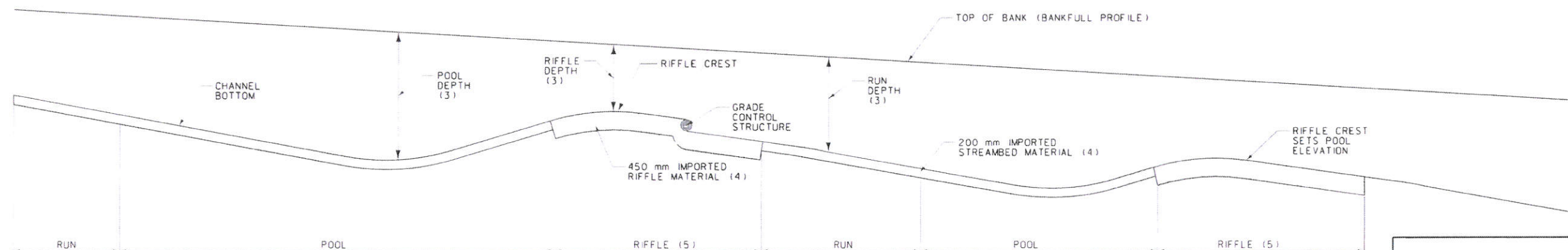
**MDTA** MONTANA DEPARTMENT  
OF TRANSPORTATION

A plan view diagram of a meandering stream channel. The channel is shown with a winding path, indicated by a dashed line. Key features and dimensions are labeled:

- Channel Features:**
  - RIFFLE:** Shaded areas along the channel banks.
  - RIFFLE CREST:** The highest point of the riffle.
  - POOL:** Shaded areas at the outer curves of the meanders.
  - POINT BAR:** Shaded areas at the inner curves of the meanders.
  - GRADE CONTROL STRUCTURE (2):** Two structures are shown, one in the upper riffle and one in the lower riffle.
  - FLOOD PLAIN:** The area outside the channel banks, indicated by a dashed line.
  - FLOW:** Indicated by arrows pointing downstream.
- Dimensions:**
  - POOL WIDTH (3):** The width of the pool area.
  - RIFFLE WIDTH (3):** The width of the riffle area.
  - RUN WIDTH (3):** The width of the channel run.
- Bank Protection:**
  - FASCINE/SOIL LAYER BANK PROTECTION SEE DETAIL:** Two labels point to the outer bank of the upper and lower meanders.

## NOTES

- (1) THIS DETAIL SHOWS TYPICAL BANK PROTECTION INSTALLATION. SEE PLANS, SPECIALS, AND SUMMARIES FOR MORE INFORMATION.
- (2) GRADE CONTROL STRUCTURES IN SEGMENT 1 WILL BE LOCATED PER PLANS OR AS DIRECTED BY THE SRS.
- (3) SEE TYPICAL CHANNEL SECTION DIMENSIONS DETAIL FOR CHANNEL DEPTHS & WIDTHS.
- (4) SEE SPECIAL PROVISIONS FOR MATERIAL AND CONSTRUCTION REQUIREMENTS FOR IMPORTED STREAMBED AND RIFFLE MATERIALS.
- (5) RIFFLE LENGTH VARIES BUT IS APPROXIMATELY 2 TIMES THE BANKFULL WIDTH. THE EXACT LENGTH TO BE DETERMINED BY THE SRS.

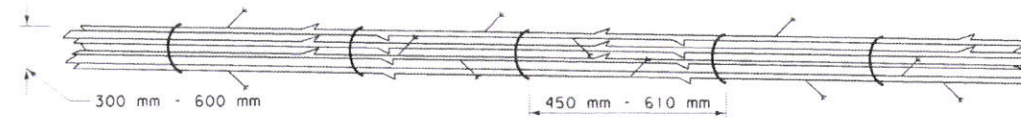


BANK PROTECTION PLAN  
(NOT TO SCALE)

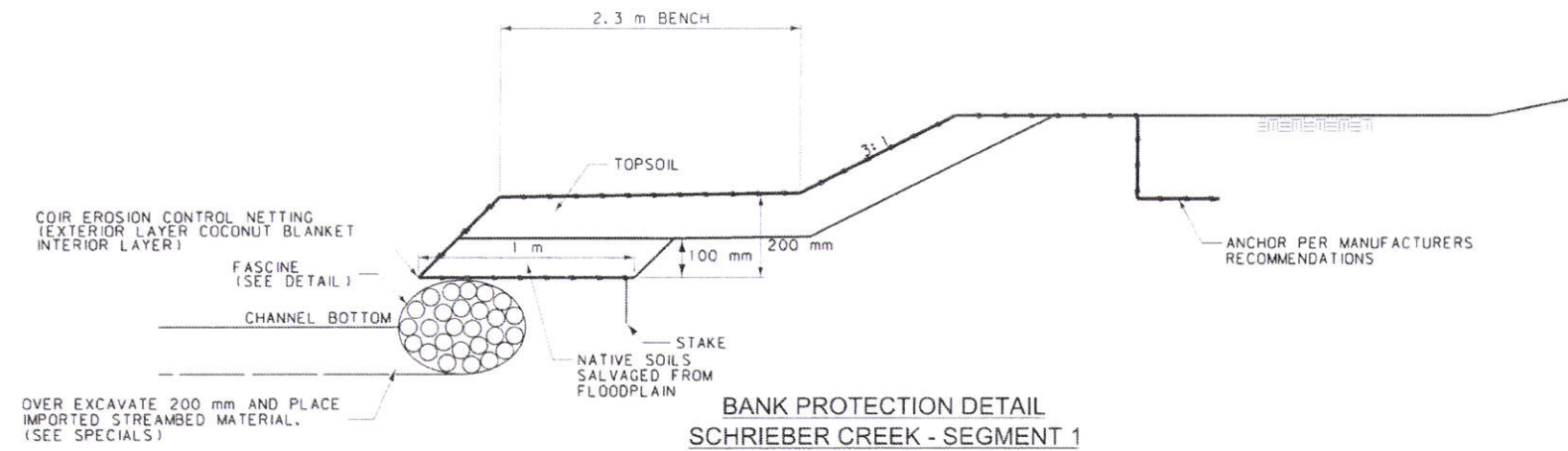


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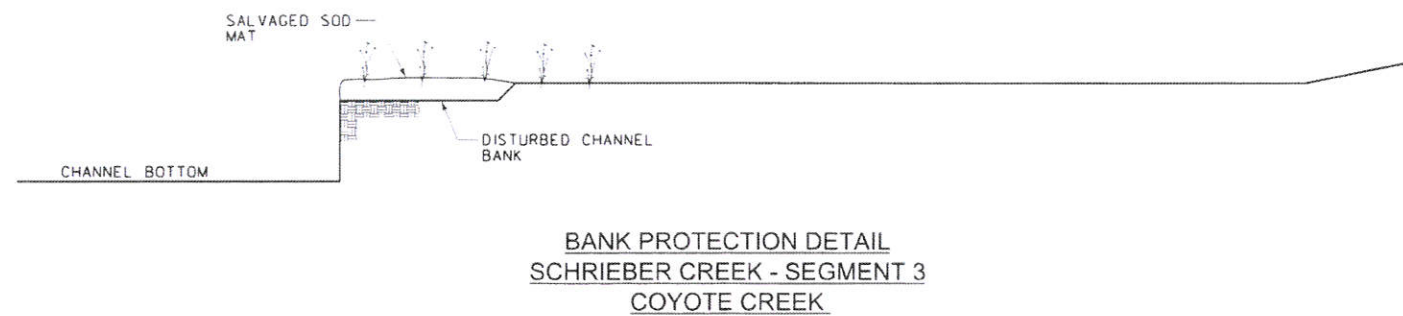
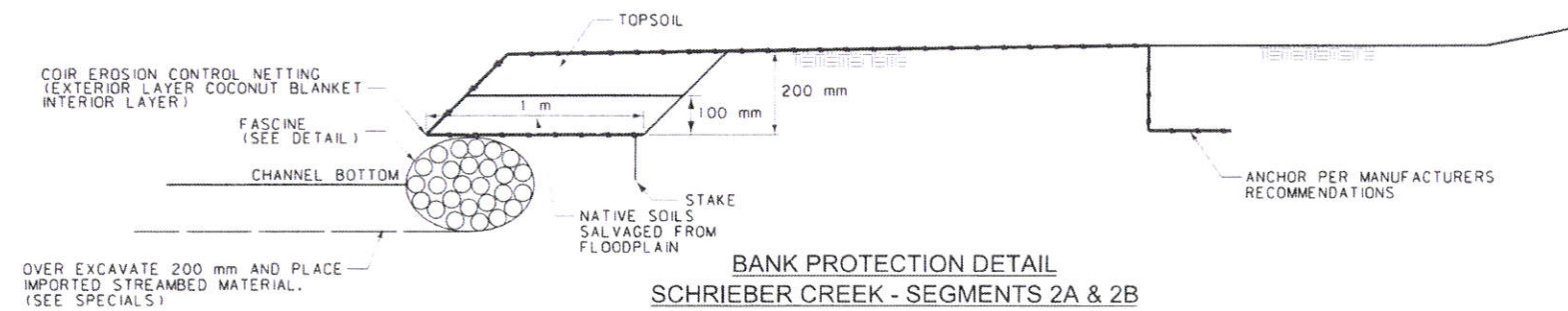
## DETAIL



FASCINE



NOTE: OBTAIN LIVE CONIFER BRANCHES  
13 mm TO 50 mm  
DIAMETER, 1.5 m TO 3.0 m LONG.  
SIDE BRANCHES CAN BE LEFT INTACT.  
STAGGER CUTTINGS IN A UNIFORM BUNDLE,  
1.5 m TO 6.1 m LONG DEPENDING ON SITE  
CONDITIONS AND HANDLING CAPABILITIES.  
VARY ORIENTATION OF CUTTINGS.  
TIE BUNDLE WITH 100% BIODEGRADABLE  
BINDING MATERIAL



CHANNEL STRUCTURE  
AND STREAM BANK  
PROTECTION DETAILS  
(NOT TO SCALE)

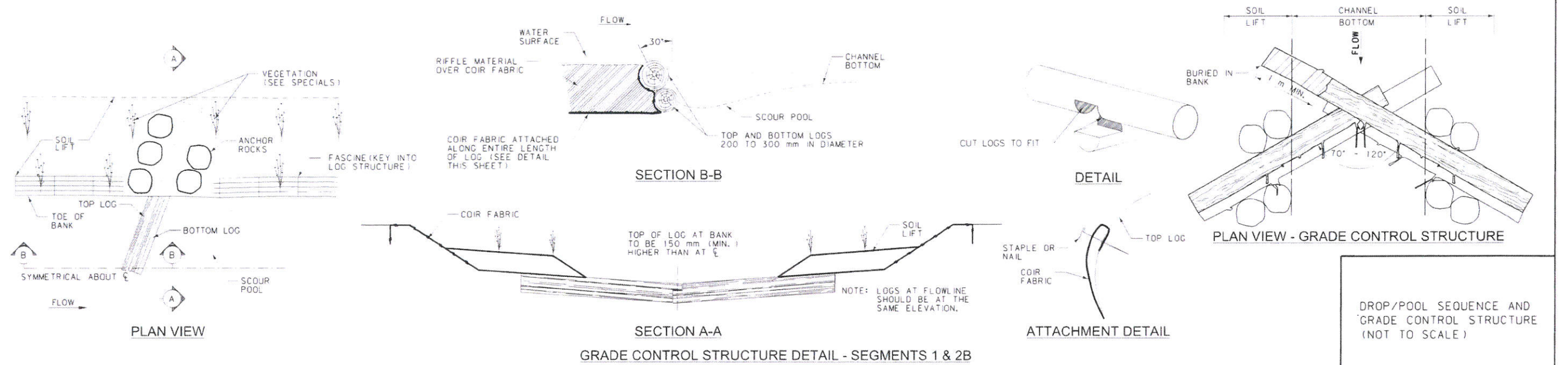
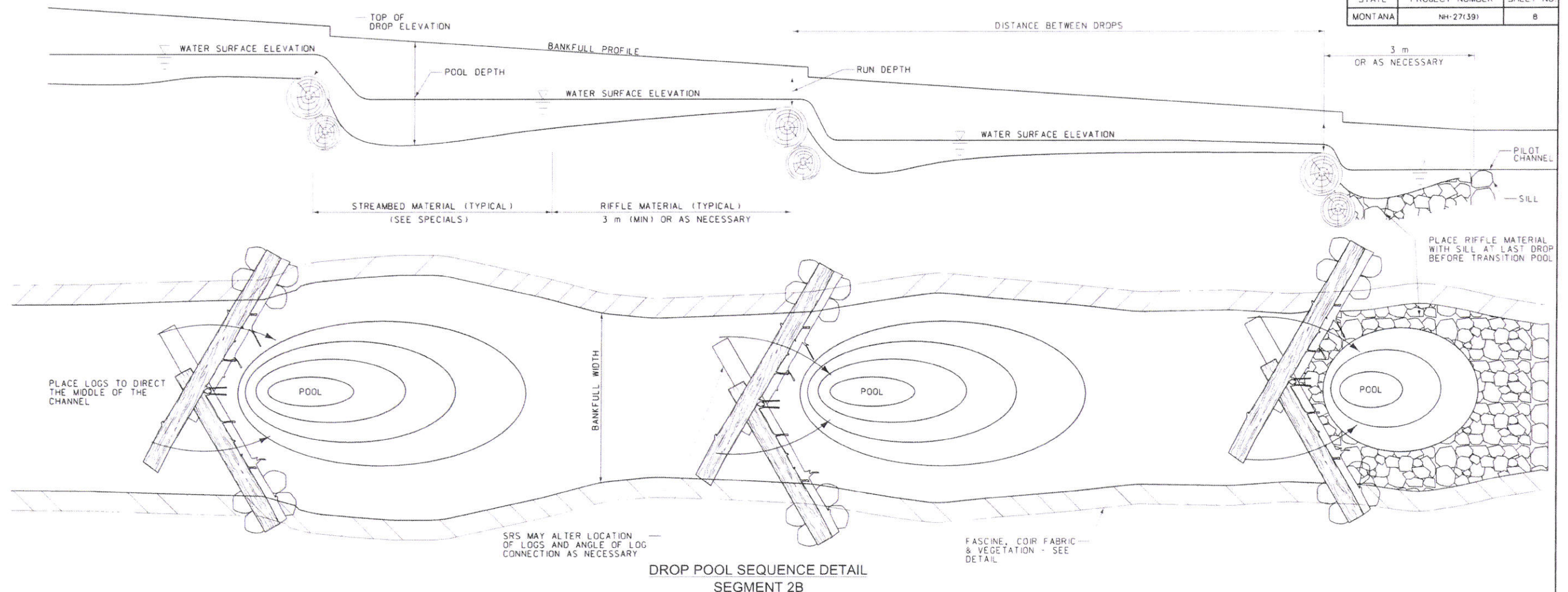
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STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH-27(39)	8

MDTA MONTANA DEPARTMENT OF TRANSPORTATION

MONTANA CADD

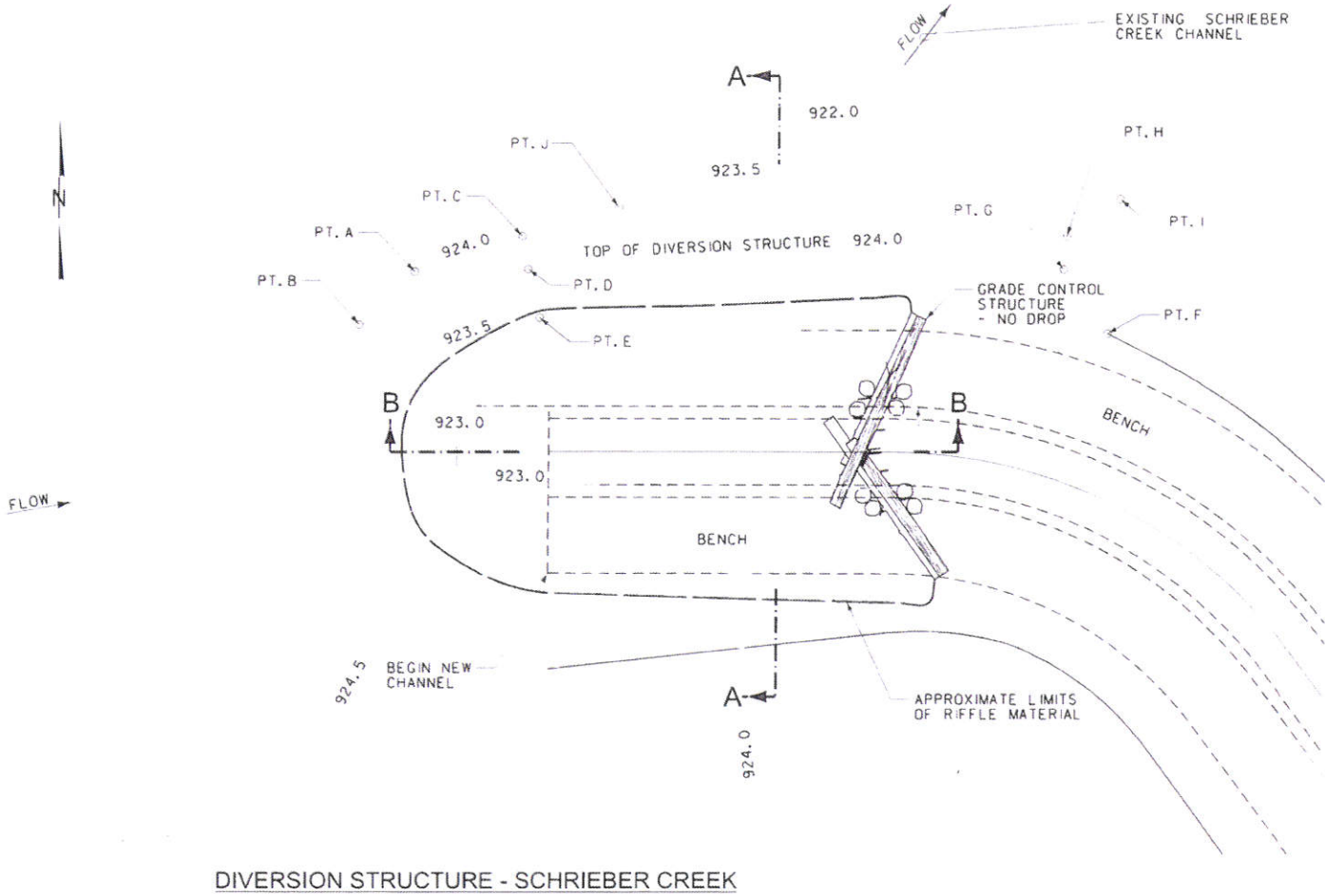


DROP/POOL SEQUENCE AND GRADE CONTROL STRUCTURE (NOT TO SCALE)

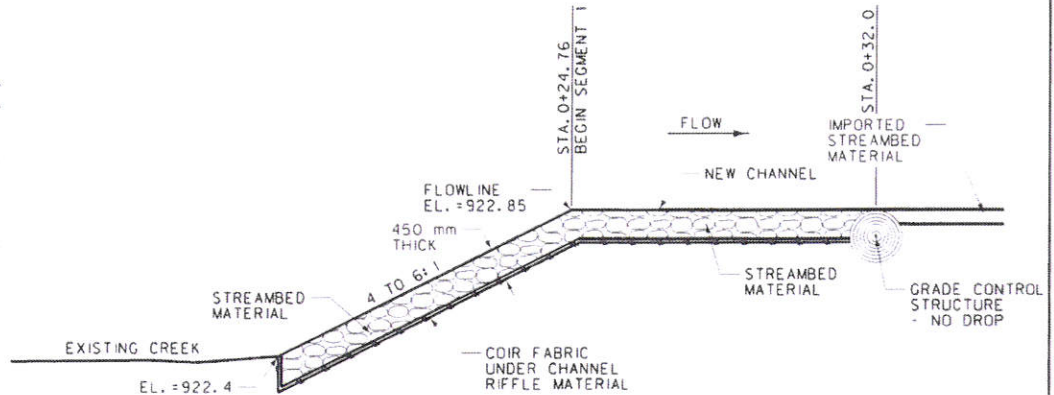


STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH-27(39)	9

DIVERSION STRUCTURE DETAILS

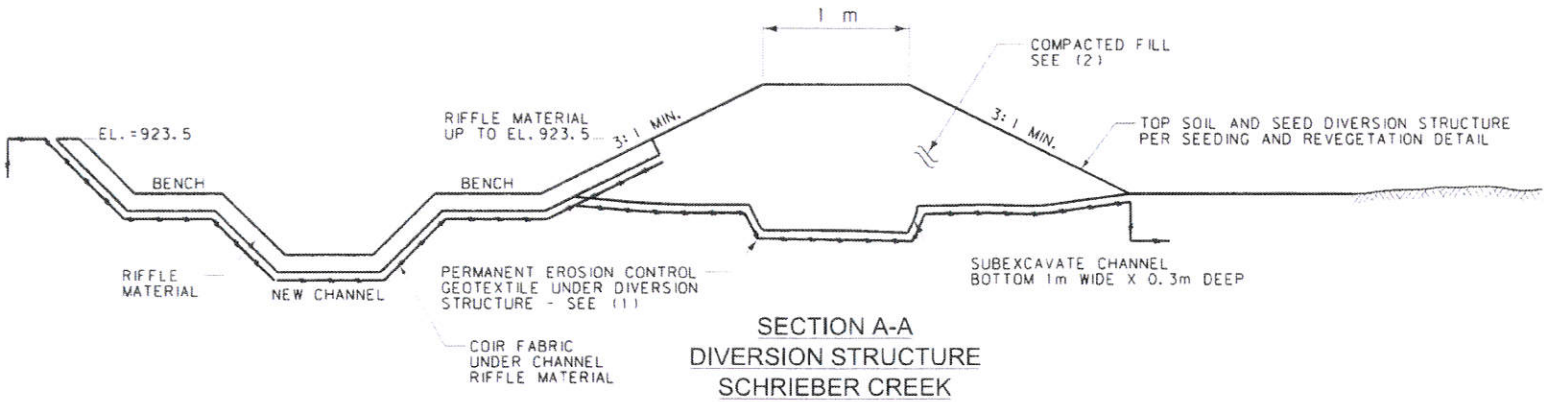


DIVERSION STRUCTURE COORDINATE POINTS			
POINT	NORTHING (m)	EASTING (m)	ELEVATION (m)
A	445365.871	160092.057	924.0
B	445364.273	160090.408	924.0
C	445366.938	160095.284	924.0
D	445365.945	160095.466	924.0
E	445364.825	160095.272	923.5
F	445363.992	160112.855	923.5
G	445365.923	160111.528	924.0
H	445366.924	160111.620	924.0
I	445368.057	160113.229	923.5
J	445367.812	160098.171	923.8



SECTION B-B  
SCHRIEBER CREEK  
EXISTING CHANNEL TO  
NEW CHANNEL TRANSITION

- (1) BURY AND ANCHOR PERMANENT EROSION CONTROL GEOTEXTILE SO THAT NO PORTION OF THE FABRIC IS EXPOSED.  
(2) PLACE AND COMPACT SUITABLE MATERIALS PER SECTION 203, EARTH EMBANKMENT.



SECTION A-A  
DIVERSION STRUCTURE  
SCHRIEBER CREEK

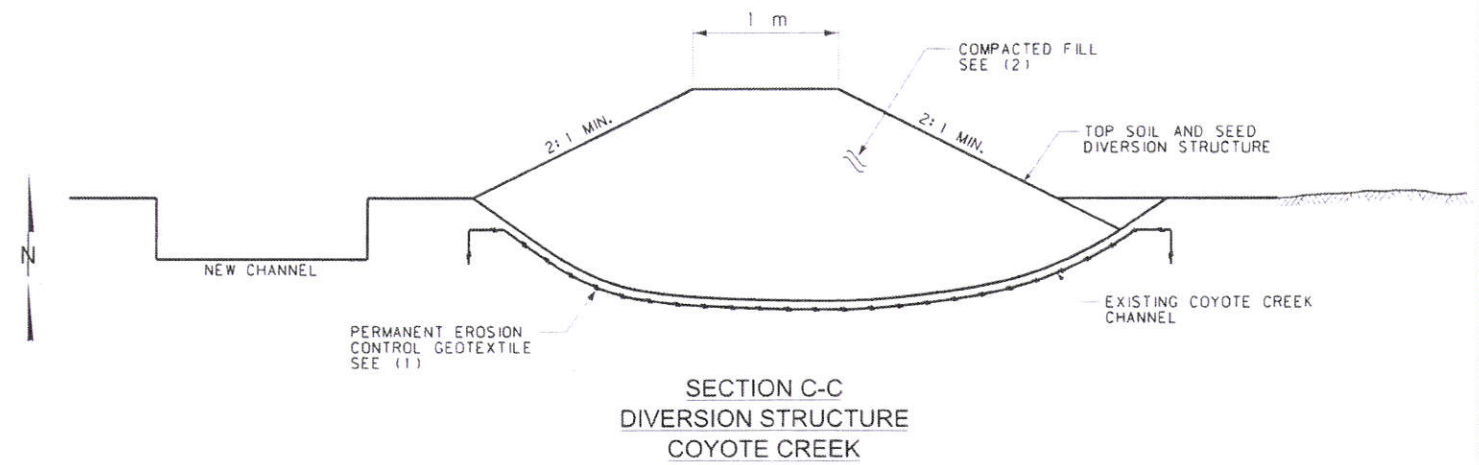
SCHRIEBER CREEK  
DIVERSION STRUCTURE DETAIL  
(NOT TO SCALE)

MDTA MONTANA DEPARTMENT OF TRANSPORTATION  
CADD

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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DIVERSION STRUCTURE COORDINATE POINTS			
POINT	NORTHING (m)	EASTING (m)	ELEVATION (m)
A	445178.084	160452.005	919.75
B	445176.102	160451.433	919.75
C	445189.847	160463.708	919.75
D	445188.147	160463.512	919.75



- (1) BURY AND ANCHOR PERMANENT EROSION CONTROL FABRIC SO THAT NO PORTION OF THE FABRIC IS EXPOSED.
- (2) PLACE AND COMPACT SUITABLE MATERIALS PER SECTION 203, EARTH EMBANKMENT.

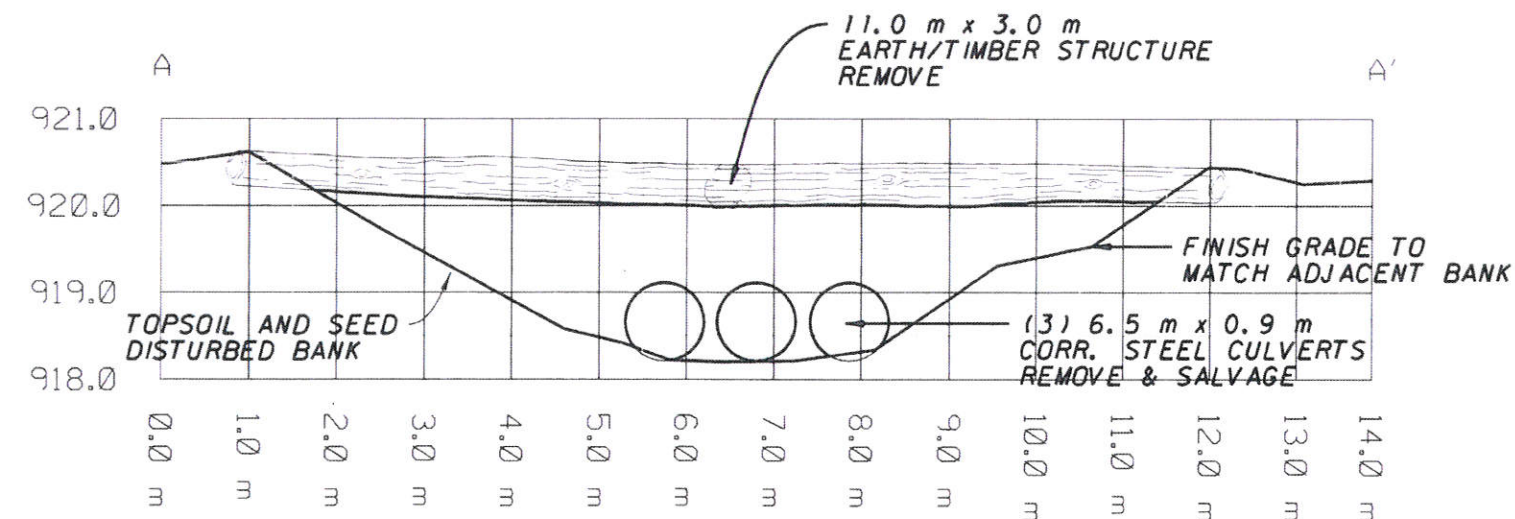
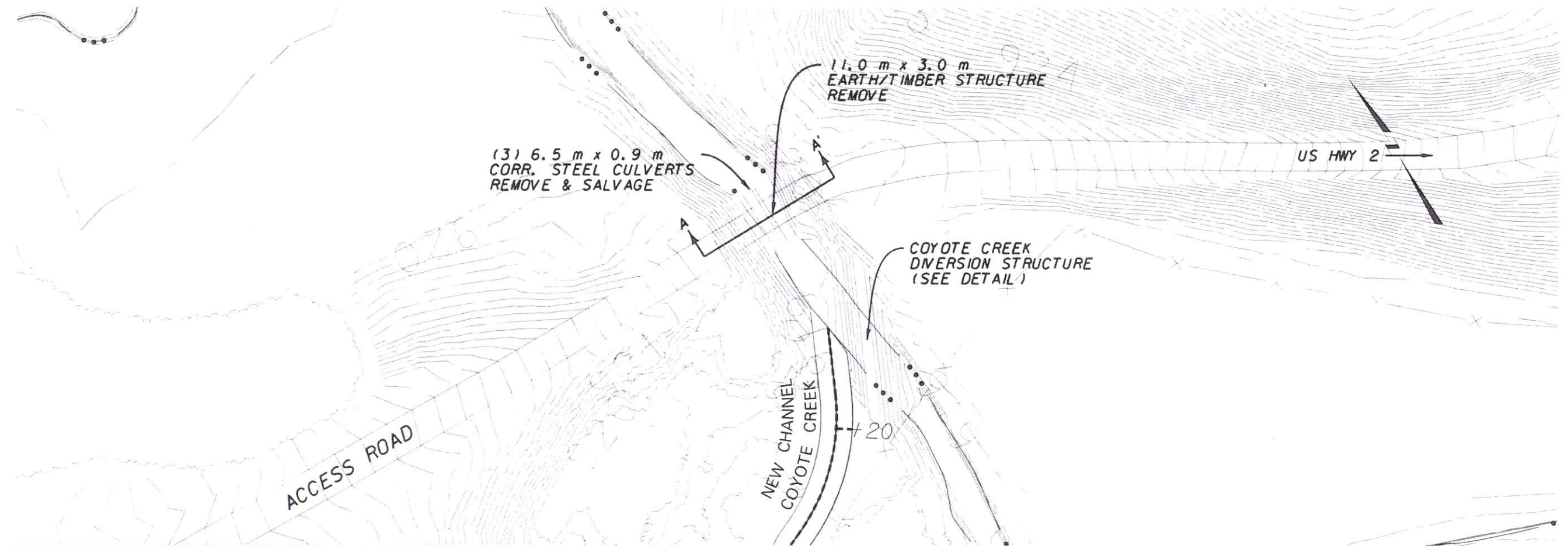
COYOTE CREEK  
DIVERSION STRUCTURE DETAIL  
(NOT TO SCALE)

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 27(39)	11

CSF = 0.99943246

MDTA MONTANA DEPARTMENT  
OF TRANSPORTATION

MONTANA  
CADD



BRIDGE REMOVAL DETAIL  
(NO SCALE)

DESIGNED BY	04/08/2014
CHECKED BY	04/08/2014
APPROVED BY	04/08/2014
DATE	04/08/2014
BY	04/08/2014
FOR	04/08/2014
PROJECT	04/08/2014
SHEET	04/08/2014
TOTAL	04/08/2014

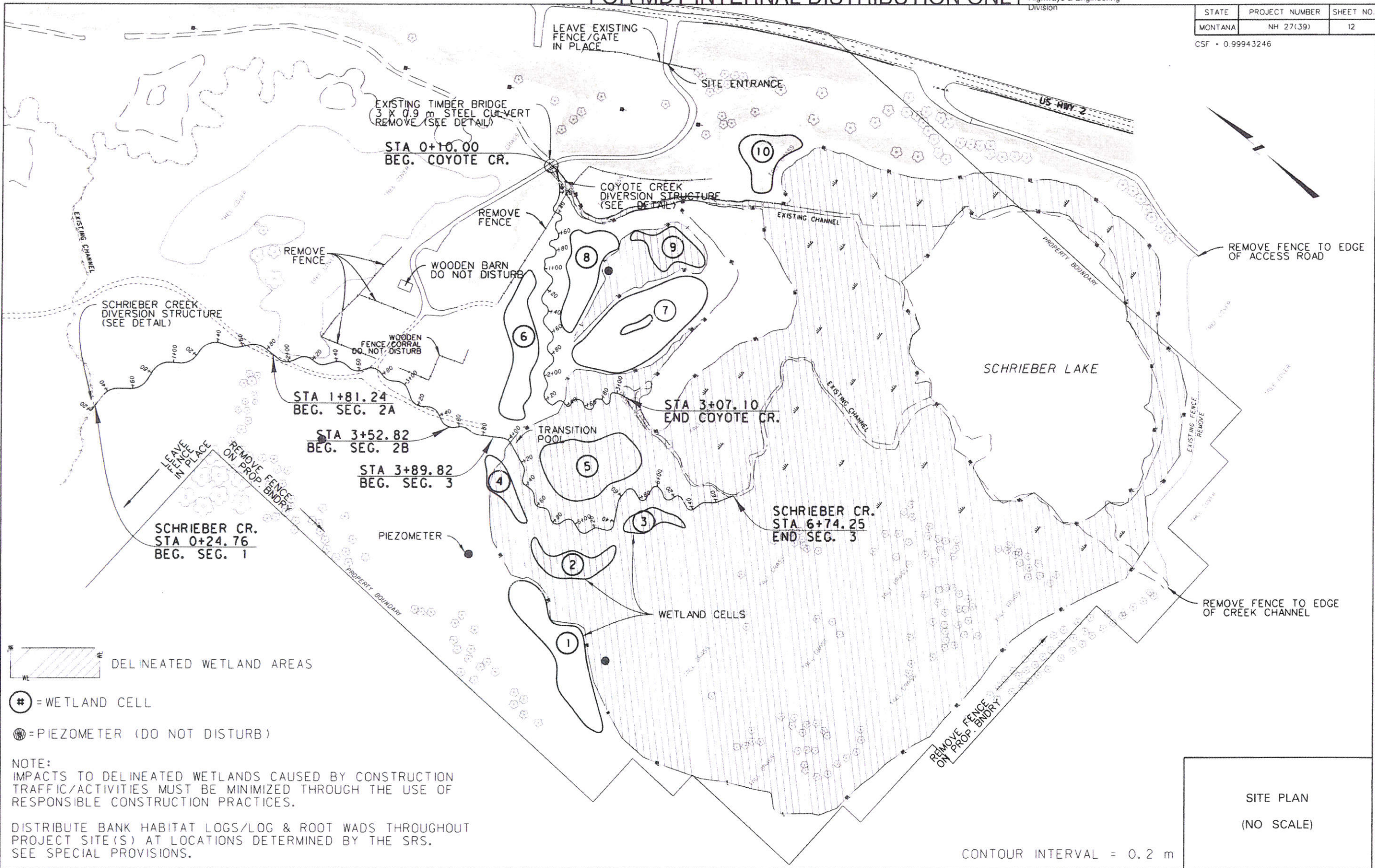


STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 27(39)	12

CSF - 0.99943246

MDTA MONTANA DEPARTMENT OF TRANSPORTATION  
MONTANA CADD

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## FOR MDT INTERNAL DISTRIBUTION ONLY

04/08/2014  
Highways & Engineering  
Division

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 27(39)	13

NOTE:  
ALL STATIONS/ COORDINATES ARE METRIC  
STATE PLANE ON CHANNEL CENTERLINE.

CSF • 0.99943246

STREAM ALIGNMENT COORDINATE TABLE

STATION	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
0+10.00	PI*	445,186,944	160,456,487	BEGIN COYOTE CREEK
0+16.56	PT	445,182,331	160,451,331	
0+24.11	PI	445,177,016	160,446,471	
0+30.99	PT	445,176,568	160,438,937	
0+32.31	PI	445,176,448	160,437,621	
0+33.79	PT	445,176,401	160,436,139	
0+35.07	PI	445,175,170	160,435,310	
0+35.18	PT	445,175,073	160,435,245	
0+36.60	PI	445,173,897	160,434,454	
0+37.63	PT	445,172,532	160,431,860	
0+40.66	PI	445,169,829	160,435,672	
0+42.30	PT	445,168,258	160,436,142	
0+43.66	PI	445,167,079	160,435,077	
0+44.52	PT	445,166,368	160,434,522	
0+46.41	PI	445,164,925	160,433,289	
0+47.55	PT	445,166,080	160,431,185	
0+48.24	PI	445,167,109	160,430,443	
0+50.33	PT	445,167,937	160,429,371	
0+51.60	PI	445,167,244	160,426,208	
0+53.45	PT	445,166,374	160,426,633	
0+55.60	PI	445,165,270	160,424,183	
0+57.31	PT	445,163,125	160,424,203	
0+59.80	PI	445,162,240	160,424,238	
0+59.75	PT	445,161,989	160,421,652	
0+59.71	PI	445,161,088	160,421,459	
0+60.93	PT	445,160,107	160,422,772	
0+61.17	PI	445,159,442	160,420,909	
0+61.67	PT	445,159,576	160,418,405	
0+62.73	PI	445,161,373	160,416,154	
0+71.17	PT	445,160,868	160,411,310	
0+72.56	PI	445,161,158	160,412,740	
0+73.09	PT	445,160,774	160,412,381	
0+74.06	PI	445,160,067	160,411,717	
0+74.81	PT	445,159,171	160,412,090	
0+75.45	PI	445,158,575	160,410,338	
0+80.67	PT	445,153,766	160,414,341	
0+81.18	PI	445,152,483	160,409,287	
0+83.31	PT	445,150,452	160,409,162	
0+84.82	PI	445,152,082	160,407,703	
0+85.70	PT	445,153,032	160,406,538	
0+90.55	PI	445,153,857	160,403,052	
0+91.07	PT	445,153,427	160,401,125	
0+94.10	PI	445,158,500	160,399,547	
0+96.08	PT	445,154,276	160,398,344	
0+96.72	PI	445,153,723	160,398,148	
0+97.33	PT	445,153,543	160,397,549	
0+98.66	PI	445,152,989	160,396,739	
0+99.75	PT	445,152,253	160,394,375	
1+00.33	PI	445,152,572	160,394,361	
1+00.63	PT	445,151,478	160,393,903	
1+01.56	PI	445,147,069	160,387,672	
1+12.92	PT	445,145,323	160,390,065	
1+13.12	PI	445,142,907	160,389,469	
1+25.46	PT	445,140,482	160,378,443	
1+29.35	PI	445,140,294	160,373,549	
1+32.20	PT	445,139,336	160,373,636	
1+34.63	PI	445,133,763	160,375,686	
1+41.22	PT	445,127,381	160,373,783	
1+43.90	PI	445,128,806	160,367,551	
1+44.04	PT	445,128,808	160,367,411	
1+49.13	PI	445,129,973	160,362,450	
1+51.35	PT	445,128,431	160,361,403	
1+50.40	PI	445,126,160	160,359,671	
1+55.77	PT	445,111,505	160,358,568	
1+58.61	PI	445,112,492	160,353,403	
1+59.06	PT	445,113,136	160,352,971	
1+59.00	PI	445,114,745	160,347,736	
1+57.79	PT	445,109,877	160,346,627	
1+50.47	PI	445,106,143	160,346,348	
1+50.78	PT	445,105,860	160,345,801	
1+54.63	PI	445,101,723	160,340,562	
1+54.46	PT	445,102,277	160,334,452	
1+58.13	PI	445,103,427	160,327,168	
2+00.78	PT	445,100,322	160,323,431	
2+05.46	PI	445,125,822	160,327,431	
2+07.89	PT	445,123,706	160,326,355	
2+09.91	PI	445,123,207	160,324,601	
2+13.48	PT	445,120,762	160,320,577	
2+17.67	PI	445,129,584	160,316,413	
2+20.80	PT	445,127,425	160,315,830	
2+22.58	PI	445,125,861	160,315,582	
2+22.65	PT	445,124,602	160,315,433	
2+24.72	PI	445,123,535	160,315,512	
2+25.98	PT	445,122,278	160,315,605	
2+27.07	PI	445,121,183	160,315,686	
2+27.85	PT	445,120,931	160,316,747	
2+31.22	PI	445,120,140	160,320,004	
2+35.42	PT	445,119,149	160,324,093	
2+37.70	PI	445,117,174	160,322,835	
2+40.07	PT	445,115,226	160,326,220	
2+43.02	PI	445,110,019	160,321,382	
2+43.97	PT	445,107,281	160,324,315	
2+49.13	PI	445,107,650	160,328,161	

STREAM ALIGNMENT COORDINATE TABLE

STATION	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
2+50.10	PI	445,070,825	160,330,424	
2+51.62	PT	445,069,393	160,331,361	
2+52.50	PI	445,068,319	160,331,784	
2+55.12	PT	445,066,015	160,331,074	
2+57.33	PI	445,063,676	160,327,891	
2+60.53	PT	445,060,821	160,330,406	
2+61.15	PI	445,060,265	160,330,125	
2+61.73	PT	445,059,648	160,330,239	
2+63.49	PI	445,057,920	160,330,444	
2+67.69	PT	445,053,752	160,331,210	
2+69.19	PI	445,055,646	160,324,767	
2+73.56	PT	445,057,614	160,333,671	
2+75.26	PI	445,058,380	160,340,190	
2+76.38	PT	445,057,003	160,341,190	
2+78.17	PI	445,055,553	160,342,243	
2+80.29	PT	445,053,838	160,343,489	
2+82.07	PI	445,051,244	160,342,769	
2+83.54	PT	445,050,458	160,342,268	
2+85.20	PI	445,048,998	160,341,705	
2+86.71	PT	445,048,056	160,341,133	
2+88.61	PI	445,047,302	160,343,392	
2+89.22	PT	445,047,088	160,342,771	
2+89.47	PI	445,046,003	160,346,091	
2+93.64	PT	445,050,388	160,349,620	
2+96.52	PI	445,052,010	160,351,908	
2+97.35	PT	445,049,438	160,353,191	
3+00.58	PI	445,047,072	160,354,353	
3+02.10	PT	445,049,117	160,353,026	
3+03.29	PI	445,044,215	160,355,257	
3+05.10	PT	445,040,745	160,355,809	END COYOTE CREEK

STREAM ALIGNMENT COORDINATE TABLE

STATION	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
0+24.76	PI*	445,360,438	60,096,174	BEGIN SCHRIEBER CR-SEG 1
0+25.03	PT	445,360,418	60,106,386	
0+42.58	PI	445,360,404	60,113,232	
0+43.01	PT	445,364,317	60,118,418	
0+53.17	PI	445,345,977	60,123,861	
0+56.87	PT	445,333,977	60,129,037	
0+73.94	PI	445,340,999	60,137,682	
0+81.16	PT	445,341,847	60,144,850	
0+90.34	PI	445,342,975	60,153,970	
0+97.64	PT	445,335,583	60,159,277	
1+04.87	PI	445,327,189	60,163,095	
1+13.52	PT	445,322,277	60,163,208	
1+20.56	PI	445,323,664	60,166,834	
1+24.21	PT	445,322,904	60,169,232	
1+25.91	PI	445,323,662	60,172,860	
1+41.08	PT	445,312,551	60,185,186	
1+44.71	PI	445,307,201	60,197,188	
1+54.08	PT	445,303,138	60,194,934	
1+58.22	PI	445,300,252	60,201,909	
1+59.86	PT	445,295,516	60,207,644	
1+59.86	PI	445,290,531	60,213,197	
1+97.09	PT	445,283,156	60,213,192	
1+97.24	PI*	445,281,579	60,213,191	END SCHRIEBER CR-SEG 1

STREAM ALIGNMENT COORDINATE TABLE

STATION	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
1+51.24	PI*	445,281,579	60,213,191	BEGIN SCHRIEBER CR-SEG 2A
1+52.06	PT	445,270,761	60,214,205	
1+54.23	PI	445,264,592	60,218,214	
2+03.11	PT	445,261,747	60,218,252	
2+08.71	PI	445,259,158	60,223,251	
2+10.18	PT	445,256,183	60,228,988	
2+10.50	PI	445,249,711	60,233,614	
2+21.94	PT	445,247,989	60,228,513	
2+27.34	PI	445,242,579	60,233,621	
2+31.84	PT	445,239,367	60,238,636	
2+34.33	PI	445,235,498	60,243,748	
2+43.68	PT	445,232,309	60,242,038	
2+49.15	PI	445,226,972	60,241,776	
2+51.91	PT	445,227,215	60,241,531	
2+58.31	PI	445,216,826	60,241,277	
2+63.29	PT	445,213,863	60,246,916	
2+65.14	PI	445,213,007	60,248,582	
2+73.23	PT	445,209,258	60,255,753	
2+78.74	PI	445,201,463	60,263,582	
2+81.33	PT	445,198,973	60,252,889	
2+85.87	PI	445,194,597	60,251,671	
2+89.86	PT	445,190,800	60,254,185	
2+93.55	PI	445,187,715	60,256,131	
2+93.97	PT	445,193,347	60,259,717	
3+04.96	PI	445,176,908	60,258,302	
3+11.01	PT	445,171,730	60,253,089	

STREAM ALIGNMENT COORDINATE TABLE

STATION	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
3+19.33	PI	445,165,911	160,212,690	
3+23.64	PT	445,159,482	160,252,928	
3+27.82	PI	445,156,575	160,255,350	
3+33.78	PT	445,151,730	160,255,795	
3+38.55	PI	445,146,390	160,256,184	
3+44.02	PT	445,141,407	160,253,749	
3+52.47	PI	445,134,713	160,252,509	
3+52.82	PT	445,132,952	160,253,526	END SEG. 2A/BEG. SEG. 2B
3+56.81	PI	445,129,727	160,255,886	
3+59.30	PT	445,128,000	160,257,703	
3+63.38	PI	445,125,220	160,260,680	
3+67.05	PT	445,121,144	160,260,848	
3+71.38	PI	445,116,923	160,261,027	
3+73.88	PT	445,114,325	160,261,130	
3+76.38	PT	445,112,170	160,262,336	
3+89.82	PT	445,100,384	160,264,320	END SCHRIEBER CR-SEG 2B

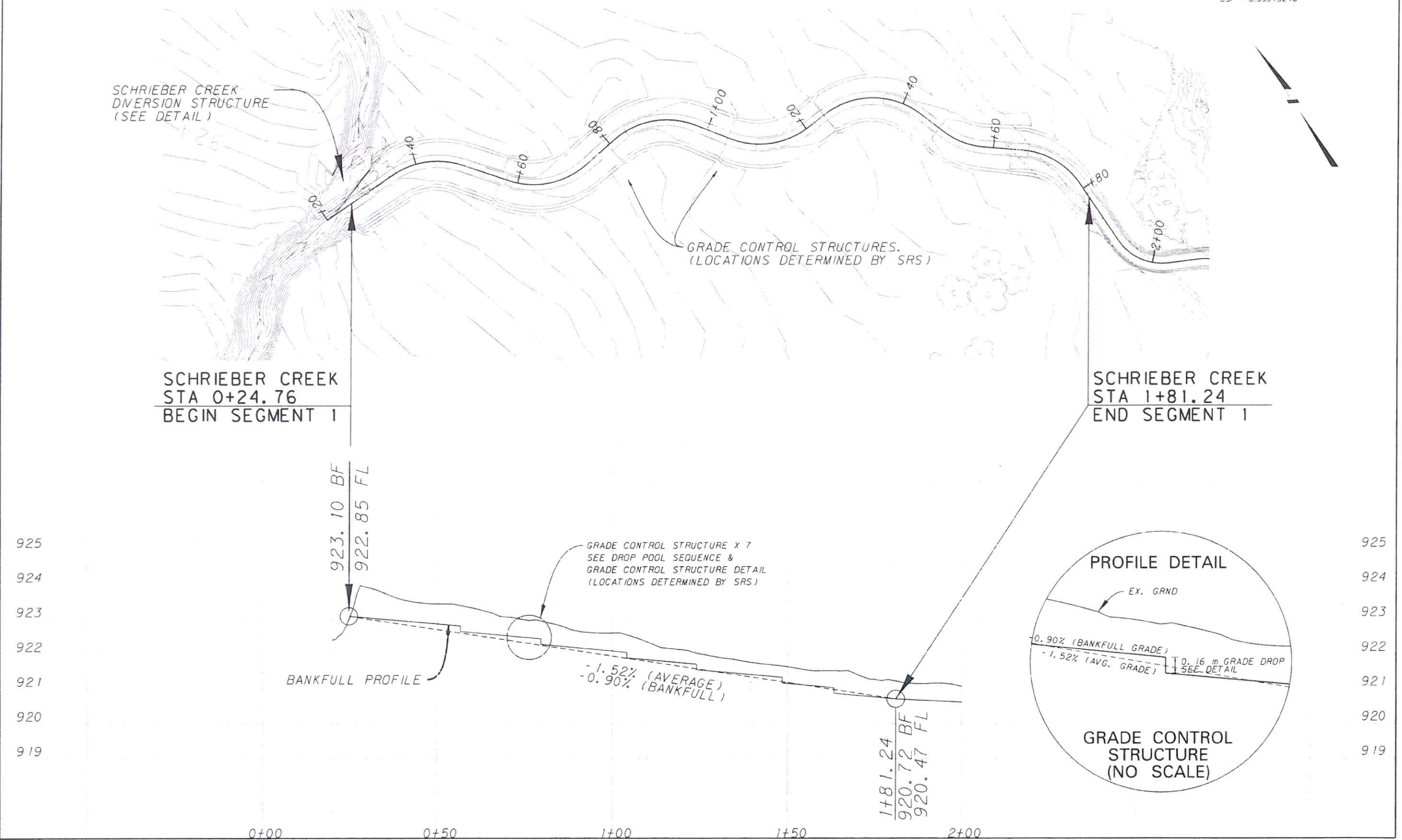
STREAM ALIGNMENT COORDINATE TABLE

STATION	DESCRIPTION	N OR Y COORDINATE	E OR X COORDINATE	REMARKS
3+85.82	PI*	445,100,495	160,263,261	BEGIN SCHRIEBER CR-SEG 3
3+90.99	PT	445,098,171	160,272,389	
3+99.64	PI	445,091,880	160,273,545	
4+03.90	PT	445,088,445	160,272,717	
4+22.43	PI	445,070,592	160,265,111	
4+25.75	PT	445,067,334	160,263,992	
4+28.65	PT	445,065,331	160,261,099	
4+34.39	PI	445,063,564	160,256,205	
4+36.62	PT	445,062,459	160,253,923	
4+38.60	PT	445,058,924	160,253,948	
4+44.07	PT	445,054,460	160,254,002	
4+47.61	PT	445,050,920	160,254,038	
4+50.73	PT	445,048,514	160,251,440	
4+55.09	PT	445,045,552	160,248,247	
4+59.03	PT	445,042,823	160,245,356	
4+61.57	PT	445,039,426	160,242,288	
4+65.03	PT	445,036,591	160,248,987	
4+68.41	PT	445,033,641	160,250,645	
4+70.98	PT	445,031,306	160,248,173	
4+76.05	PT	445,027,045	160,245,276	
4+83.05	PT	445,021,570	160,241,829	
4+85.57	PT	445,019,239	160,247,928	
4+88.63	PT	445,015,922	160,251,562	
4+94.78	PT	445,010,205	160,256,641	
4+97.04	PT	445,011,264	160,254,284	
5+04.36	PT	445,004,764	160,257,827	
5+09.84	PT	445,000,100	160,250,000	
5+12.70	PT	444,998,252	160,254,175	
5+17.82	PT	444,996,491	160,253,580	
5+19.57	PT	444,995,750	160,261,601	
5+21.88	PT	444,993,715	160,262,453	
5+27.95	PT	444,988,196	160,264,853	
5+33.29	PT	444,983,296	160,266,962	
5+36.13	PT	444,985,717	160,271,715	
5+38.13	PT	444,985,717	160,271,715	
5+54.89	PT	444,994,230	160,288,408	
5+56.73	PT	444,995,069	160,290,074	
5+58.51	PT	444,994,886	160,291,921	
5+65.77	PT	444,991,655	160,299,183	
6+11.17	PT	444,994,414	160,304,576	
6+13.24	PT	444,989,326	160,302,773	
6+20.38	PT	444,985,592	160,300,326	
6+25.21	PT	444,979,042	160,298,774	
6+26.47	PT	444,978,611	160,303,568	
6+29.67	PT	444,978,694	160,312,707	
6+30.87	PT	444,990,301	160,312,869	
6+36.52	PT	444,975,331	160,316,489	
6+39.50	PT	444,972,381	160,315,904	
6+36.20	PT	444,977,722	160,315,513	
6+37.87	PT	444,970,344	160,314,546	
6+39.63	PT	444,968,891	160,313,542	
6+15.03	PT	444,964,463	160,310,472	
6+17.10	PT	444,962,806	160,315,611	
6+20.61	PT	444,961,733	160,318,959	
6+24.38	PT	444,960,552	160,322,552	
6+26.37	PT	444,957,086	160,321,135	
6+15.01	PT	444,949,077	160,317,890	
6+38.99	PT	444,945,387	160,316,296	
6+40.96	PT	444,944,377	160,320,216	
6+47.57	PT	444,942,699	160,326,641	
6+49.31	PT	444,942,258	160,328,323	
6+50.92	PT	444,940,869	160,329,368	
6+58.29	PT	444,934,975	160,333,202	
6+59.30	PT	444,934,167	160,334,410	
6+60.99	PT	444,933,658	160,335,284	
6+74.25	PT	444,926,641	160,347,355	END SCHRIEBER CR-SEG 3



CSF • 0.99943246

NOTE: DISTRIBUTE BANK HABITAT LOGS/LOG & ROOT WADS  
THROUGHOUT PROJECT SITE(S) AT LOCATIONS DETERMINED  
BY THE SRS. SEE SPECIAL PROVISIONS.





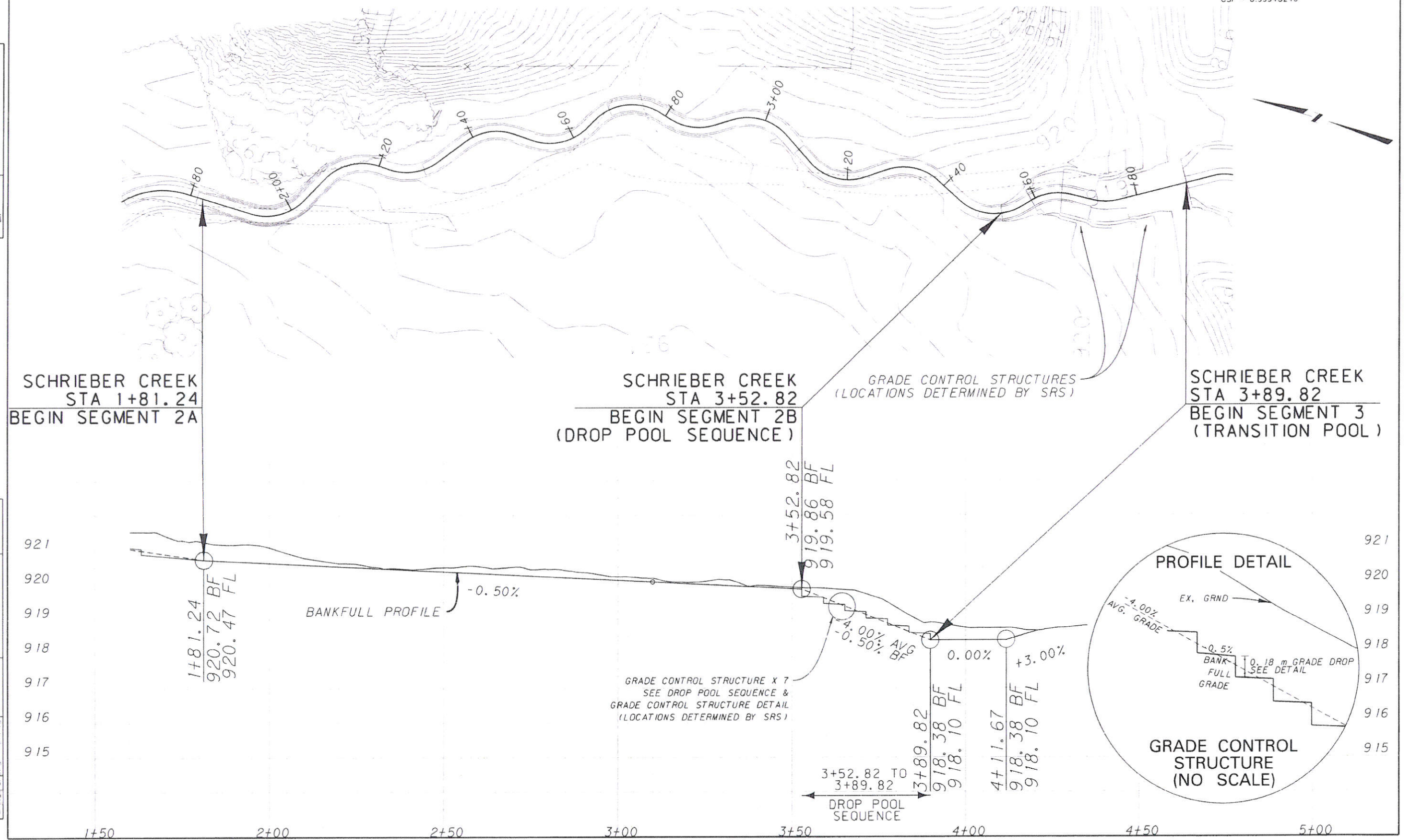
STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 27(39)	15

CSF = 0.99943246

NOTE: DISTRIBUTE BANK HABITAT LOGS/LOG & ROOT WADS  
THROUGHOUT PROJECT SITE(S) AT LOCATIONS DETERMINED  
BY THE SRS. SEE SPECIAL PROVISIONS.



DESIGNED BY	10/27/07	10/27/07	10/27/07
CHECKED BY	11/14/11	11/14/11	11/14/11
APPROVED BY	11/14/11	11/14/11	11/14/11
DATE	11/14/11	11/14/11	11/14/11
BY	11/14/11	11/14/11	11/14/11





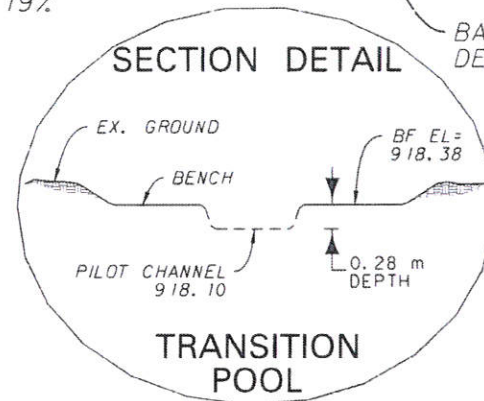
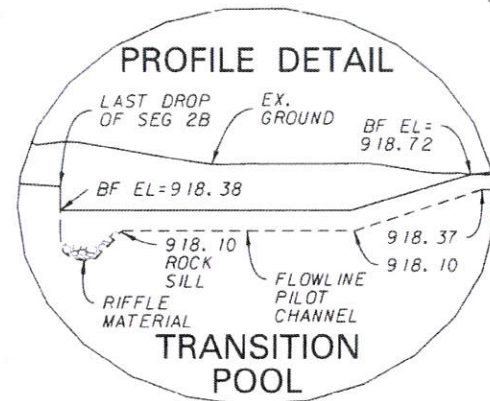
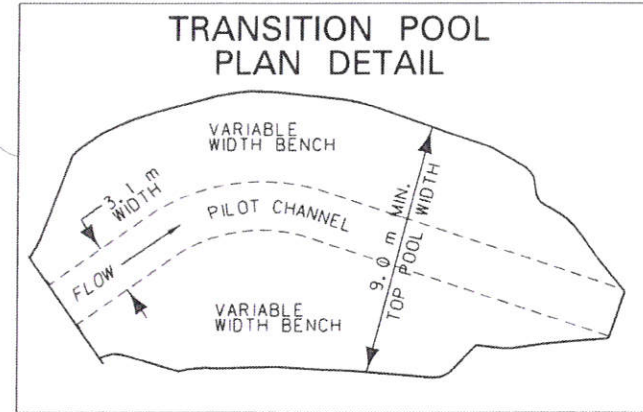
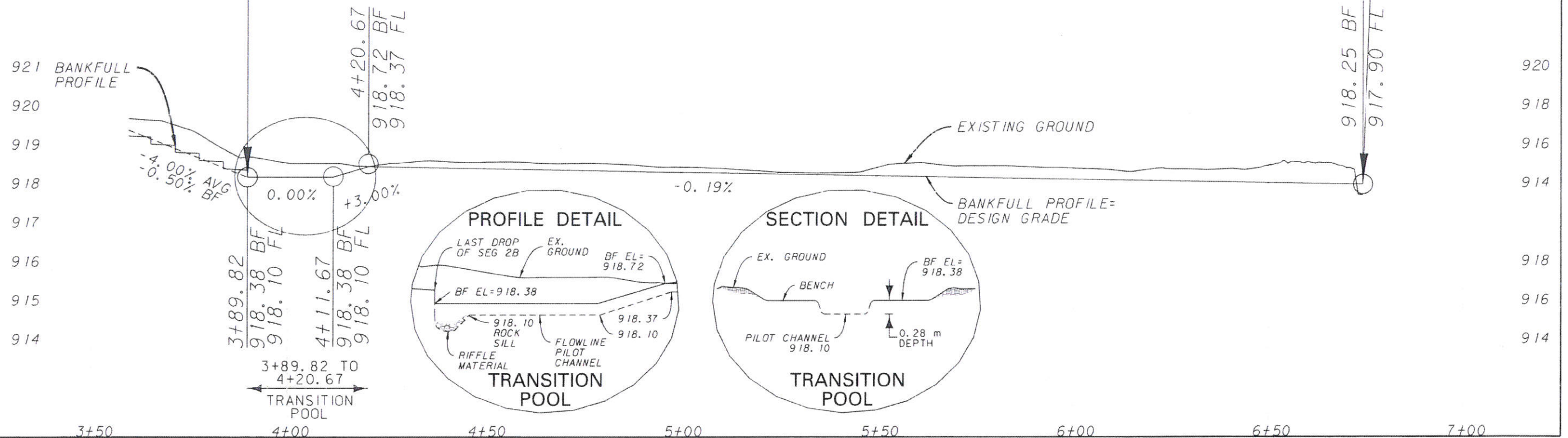
NOTE: DISTRIBUTE BANK HABITAT LOGS/LOG & ROOT WADS  
THROUGHOUT PROJECT SITE(S) AT LOCATIONS DETERMINED  
BY THE SRS. SEE SPECIAL PROVISIONS.



SCHRIEBER CREEK  
STA 3+89.82  
END SEGMENT 2B  
BEGIN SEGMENT 3

SCHRIEBER CREEK  
STA 6+74.25  
END SEGMENT 3

CSF = 0.99943246

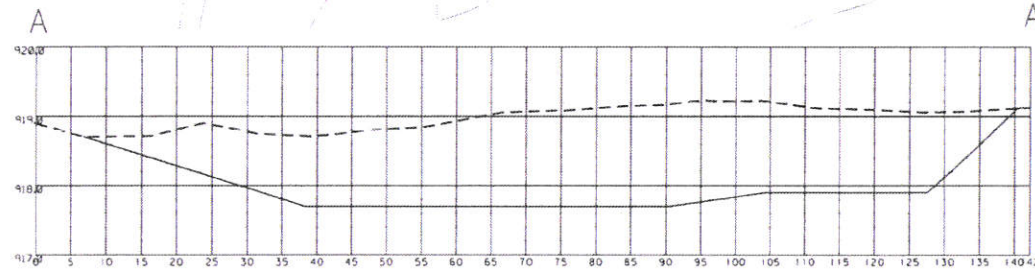
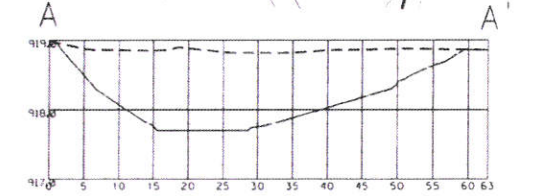
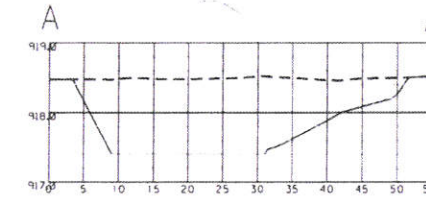
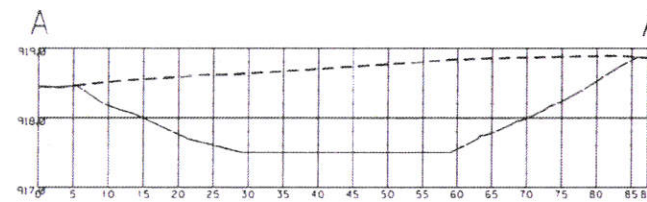
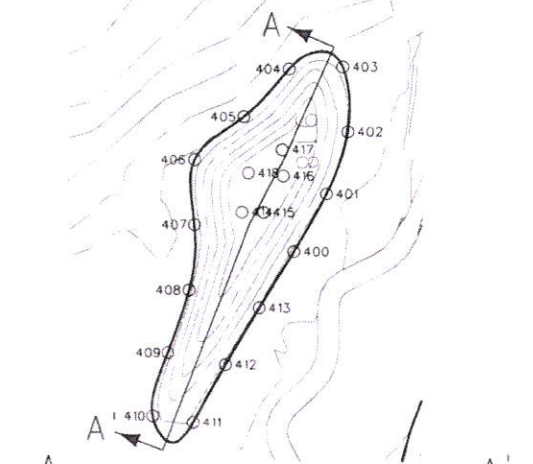
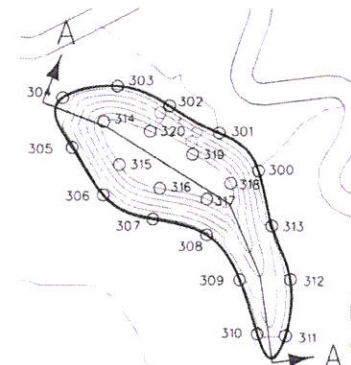
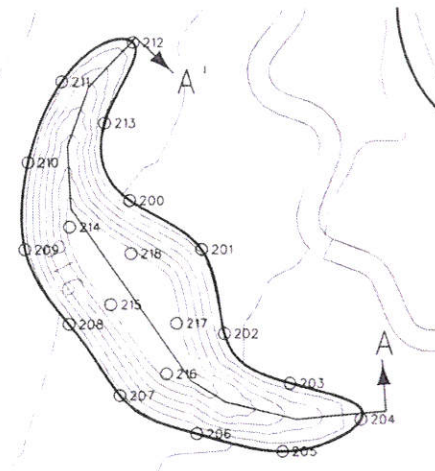


STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 27(39)	17

NOTE: DISTRIBUTE BANK HABITAT LOGS/LOG & ROOT WADS  
THROUGHOUT PROJECT SITE(S) AT LOCATIONS DETERMINED  
BY THE SRS. SEE SPECIAL PROVISIONS.

MONTANA  
CADD



CSF = 0.99943246

CELL 3 COORDINATES				
POINT NAME/NUMBER	N OR Y COORDINATE	E OR X COORDINATE	ELEVATION	
1	4444444	6666666	0000000	0000000
2	4444444	6666666	0000000	0000000
3	4444444	6666666	0000000	0000000
4	4444444	6666666	0000000	0000000
5	4444444	6666666	0000000	0000000
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64	4444444	6666666	0000000	0000000
65	4444444	6666666	0000000	0000000
66	4444444	6666666	0000000	0000000
67	4444444	6666666	0000000	00

CELL 4 COORDINATES			
POINT NAME/NUMBER	N OR Y COORDINATE	E OR X COORDINATE	ELEVATION
400	44	15	68
401	44	14	68
402	44	13	68
403	44	12	68
404	44	11	68
405	44	10	68
406	44	9	68
407	44	8	68
408	44	7	68
409	44	6	68
410	44	5	68
411	44	4	68
412	44	3	68
413	44	2	68
414	44	1	68
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497	44	0	68
498	44	0	68
499	44	0	68
500	44	0	68

[illegible]

ALL COORDINATES ARE METRIC STATE PLANE COORDINATES  
HORIZONTAL COORDINATES AND DISTANCES ARE METERS (NAD83-2007)  
ELEVATIONS ARE METERS (NADV88)

(NO SCALE)



CSF = 0.99943246

